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External Jugular Vein Peripheral Intravenous Catheters: An Emergency Nurse's Guide: JEN

ABSTRACT (ENGLISH)

Insertion of a peripheral intravenous catheter into the external jugular vein is regularly performed in emergency departments to treat patients with difficult intravenous access. Although emergency nurses are experienced in inserting peripheral intravenous catheters, there is an inconsistent practice and a lack of education and training regarding the insertion of catheters in the external jugular vein. This manuscript provides a practical guide for emergency nurses to care for patients who require an external jugular peripheral intravenous catheter. Key information found in this manuscript includes indications for external jugular intravenous access, the nurse's role in performing external jugular peripheral intravenous catheters, and clinical considerations when caring for patients with an external jugular peripheral intravenous catheter.

FULL TEXT

Introduction

Insertion of peripheral intravenous (PIV) catheters is one of the most frequently performed nursing skills in the emergency department. Establishing vascular access rapidly and successfully is critical to ensure timely diagnosis and treatment interventions for patients. Emergency nurses are typically highly skilled in PIV catheter insertion; however, patients with difficult IV access can experience delays in care and increased anxiety.[1] The use of the external jugular (EJ) vein can be considered when other veins cannot be accessed.[2] This manuscript will provide emergency nurses with a practical guide on performing EJ PIV insertion and caring for patients who need an EJ PIV based on current evidence-based practice recommendations and current clinical guidelines. In addition, this manuscript will provide information on policy development regarding EJs to promote the safety of patients and emergency nurses in the practice setting.

EJ PIV Catheterization

The EJ vein, located in the anterior and lateral neck, forms from the combination of the posterior auricular and retromandibular vein and runs obliquely across and superficial to the sternocleidomastoid.[3] EJ PIV catheters are peripheral catheters placed in the EJ vein. EJ PIVs are used for emergent access or when other veins cannot be accessed and are only a temporary treatment option.[4] Other less invasive options and technology should be considered before attempting an EJ PIV, such as vein lights or ultrasound guided IV insertion.

When inserting a PIV in the EJ, it is important to use the smallest-gauge catheter that can be used for the prescribed interventions to decrease vessel damage and to ensure adequate blood flow around the catheter, subsequently reducing the risk of phlebitis.[5] Equipment needed to perform the procedure includes gloves and other necessary personal protective equipment (eg, gown, goggles), antiseptic solution such as chlorhexidine or alcohol, an IV catheter (16-20 gauge), saline lock or luer lock adapter, saline solution (saline flush), and a transparent dressing (Table).[5]

Before attempting an EJ PIV, it is important to ensure that there is a provider prescription or order. After verification of a provider prescription or order and gathering necessary equipment, patients should be positioned in a lying position, preferably in the Trendelenburg position (if it can be tolerated by the patient) (Figure 1). It is important to thoroughly assess a patient's understanding of the procedure and their anxiety level. Repositioning a patient in the Trendelenburg position can create respiratory complications and anxiety if the patient has any type of

cardiorespiratory compromise. It is important to ensure that the patient can emotionally and physically tolerate the procedure and is able to remain still to prevent dangerous complications that could occur if the surrounding tissue is punctured with the IV catheter needle.

To complete the procedure, the patient's head should be slightly tilted to the opposite side, and light pressure can be applied above the clavicle to help visualize the EJ vein (Figures 2-4).[5] The skin should be thoroughly cleaned with antiseptic solution and allowed to dry. The vein should be stabilized using the nondominant hand to minimize vein movement during the procedure (Figure 5). The PIV should be inserted with the bevel up at a superficial angle (≤ 30°).[3,5] Upon entry into the vein, blood should appear in the chamber, and the catheter should be advanced an additional 2 to 3 mm into the vein. There may not be a considerable flash of blood into the catheter, or it may occur more slowly than in other peripheral veins because of the lower pressure in the EJ vein.[3] The IV catheter needle should then be removed while advancing the IV catheter into the vein. The preflushed saline lock or luer lock should then be attached to the catheter and secured with a transparent dressing (Figure 6).[5] If venous catheterization is unsuccessful, the catheter should be removed, and direct pressure should be applied to the area for 5 minutes.[5]

Emergency Nurses' Role in EJ Vein Access

Historically, there has been a great deal of uncertainty and debate regarding the PIV insertion into the EJ vein by emergency nurses. The position of the Infusion Nurses Society (INS) is that a qualified registered nurse may insert, maintain, and remove external jugular PIV catheters.[4] The INS supports the use of an EJ PIV in acute care settings and in emergency situations when other veins cannot be accessed. However, an alternative vascular access site should be identified as soon as possible.[2]

It is important to note that an emergency nurse should seek out clarification from the Board of Nursing in the state in which they practice before performing EJ PIV insertion. The position of the Board of Nursing varies, with many states following the INS recommendations and allowing qualified registered nurses to insert EJ PIVs.[6] However, some states only allow EJ PIV insertion in the event of a "life threatening situation."[7] Other states require that the facility in which the nurse is employed have clearly outlined policies and procedures regarding the insertion of an EJ PIV with a required educational component.[8] As an emergency nurse, it is important to stay up to date on one's respective State Board of Nursing's position on EJ PIV insertion by registered nurses.

Registered nurses should only perform EJ PIVs if they have been trained to perform the procedure. Emergency nurses should advocate for their respective employer to provide training and policies to support the insertion of EJ PIVs within their facility. Formal policies can establish guidelines and the standard of care expected of the nurse by the employer when performing EJ PIVs to reduce practice variability (Figure 7).

Clinical Considerations

EJ PIVs are commonly inserted in patients with problematic peripheral access. Conditions that can lead to difficult vascular access include obesity, chronic illness, hypovolemia, IV drug abuse, and vasculopathy.[9] The EJ is not the ideal choice for venous cannulation and should only be used as a temporary option.[3] Contraindications for EJ PIV insertion include patients with an inability to lie flat or remain still, trauma or burns to the neck area, infections at or near the intended insertion site, cervical injuries, and nonvisible or nonpalpable EJ vein.[10] EJ PIV insertion should not be attempted on patients who are noncompliant or unable to follow instructions because of the risk of IV catheter discontinuation or dislodgement by the patient.

Complications of EJ PIVs include hematomas, infection, infiltration, and air embolisms. An air embolism is a severe complication that can result in sudden cardiac arrest and death and has been reported with central venous cannulation.[11] Arterial cannulation may also accidentally occur with IV catheter insertion and can lead to tissue necrosis and ischemia.[12] If an artery is cannulated unintentionally, the catheter should immediately be removed, and pressure should be applied to avoid hemorrhage or other potential complications.[12] The EJ PIV sites should be closely monitored for signs of complications, which include erythema, warmth, cool sensation, or increased pain at the site. The emergency nurse should always use luer-lock connectors to reduce the chance of IV catheter disconnection from the IV line, which can lead to bleeding or increased risk of air embolism.[11] IV infusion pumps should always be used when infusing medication into an EJ PIV to promote patient safety. EJ PIVs are

contraindicated with high pressure injection systems typically used in radiology, owing to the increased risk of extravasation.[13] Vesicant solutions such as vasopressors should not be infused through EJ PIVs because of the risk of tissue damage and necrosis.[5] Nursing documentation should include the insertion site, the PIV catheter gauge, the number of insertion attempts, and how the patient tolerated the procedure.

Conclusion

The insertion of EJ PIVs is a valuable therapeutic technique for emergency nurses to perform on patients in the emergency department. Emergency nurses should be trained according to facility policy and procedure to perform EJ PIVs on patients within their scope of practice on the basis of the rules and regulations of their respective State Board of Nursing. EJ PIVs allow for rapid IV access and treatment to improve patient outcomes; therefore, competency with this skill benefits patients, nurses, and health care organizations.

Author Disclosures

Conflicts of interest: none to report.

Indications	•Patients with difficult vascular access•IV administration of fluid, medications, or blood products•Emergencies in which no peripheral site is available or easily accessible
Contraindications	•Patients with infections, burns, or injury near the neck or the external jugular vein site•Patients who are unable to lie flat or remain still•Patients who are noncompliant or unable to follow directions•Patients with external jugular vein thrombosis•Patients with bleeding disorders or abnormal clotting values•Patients requiring IV administration of vesicant solutions
Supplies	•Personal protective equipment (gloves, gown, and goggles)•Antiseptic solution (chlorohexidine is preferred)•IV catheter (16-20 gauge)•Saline lock or luer lock adapter•Saline solution (saline flush)•Transparent dressing and tape
Nursing considerations	•Ensure that there is a provider prescription or order•Position patient in a lying position, preferably the Trendelenburg position with head tilted slightly•Ensure that the patient can emotionally and physically tolerate the procedure•Reduce risk of infection by maintaining sterility of catheter and cleaning site•Ensure adequate training and competency when performing procedure, check the position of the State Board of Nursing in the state in which the nurse is practicing

IV insertion procedure	•Position the patient’s head to face the opposite direction of the site•Apply light pressure above the clavicle to help visualize the external jugular vein•Thoroughly clean the insertion site with antiseptic solution and allow it to dry•Stabilize the vein using the nondominant hand to minimize vein movement during the procedure•Insert the intravenous catheter with the bevel up at a superficial angle (<30°)•Upon entry into the vein, look for blood to appear in the chamber, and then advance the catheter an additional 2-3 mm into the vein•Advance the IV catheter while simultaneously removing the needle•Attach the preflushed saline lock or luer lock to the catheter and secure with a transparent dressing and tape•If venous catheterization is unsuccessful, the catheter should be removed, and direct pressure should be applied to the area for 5 minutes
Adverse events and interventions	•Air embolismoReduce the risk by using a luer-lock connector and minimizing disconnection of lines from the intravenous catheter and ensuring that saline locks or luer locks are preflushed during IV insertionoAssessment findings related to this condition include signs and symptoms of an air embolism including anxiety, tachycardia, difficulty breathing, and decreased oxygen saturationoTreatment includes life-saving interventions to reduce the risk of cardiac arrest and death associated with emboli•BleedingoReduce the risk by avoiding EJ insertion in patients with bleeding disorders or abnormal clotting valuesoAssessment findings related to this condition include bleeding at the catheter insertion siteoTreatment includes holding pressure to the insertion site for 5 minutes and frequent reassessment to ensure that bleeding has stopped•Extravasation and infiltrationoReduce the risk by ensuring the catheter is fully in the vein and assessing frequently for dislodgmentoAssessment findings related to this condition include warmth, pallor, swelling, pain or burning, and difficulty infusing fluids through the IV catheteroTreatment includes removing the catheter and assessing the site frequently for tissue damage•Arterial cannulationoReduce the risk by using appropriate landmarks to avoid unintended arterial cannulationoAssessment findings related to this condition include backflow of pulsatile bright-red blood, pain on injection, and blanching distal to injection siteoTreatment includes immediately removing the catheter and holding firm pressure to the IV insertion site
Patient teaching	•Educate the patient on the importance of remaining still during the procedure•Patient should immediately report any bleeding or pain at the site, as this can indicate complications
Medication and IV fluid considerations	•No vesicant solutions should be administered through the EJ PIV (including medications with a pH <5, pH >9, or osmolarity >600 mOsm/L, including sclerosing solutions, some chemotherapeutic agents, and vasopressors)•All medications and fluids should be administered using a pump to minimize the risk of complications•Radiology power injectors should not be used with an EJ PIV

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Professional Self-Concept, Job Stress, and Triage Competency Among Emergency Nurses: Secondary Data Analysis of a Cross-Sectional Survey: JEN

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ABSTRACT (ENGLISH)

Introduction

This study aimed to evaluate the indirect relationship of job stress with triage competency through professional self-concept among emergency nurses in Korea.

Methods

A secondary data analysis of survey data from 132 questionnaires was used. A convenience sample of emergency nurses working in regional or local emergency centers in 2 Korean cities was recruited for the survey. Study variables were analyzed using descriptive statistics, correlation, and a model tested using the Hayes PROCESS macro (Model 4) mediation model.

Results

Job stress alone was not associated directly with triage competency (β = 0.01, *P* = .74). An indirect pathway was observed between job stress and triage competency through professional self-concept (*F* = 5.85, *P* < .001, *R2* = 0.33). In the tested model, job stress was associated with professional self-concept (β = −0.05, *P* <.05) and professional self-concept was associated with triage competency (β = 0.79, *P* ≤ .001).

Conclusion

Professional self-concept may be an important determinant of triage competency among emergency nurses. To increase triage competency among emergency nurses, individual nurse and management efforts are recommended to foster professional self-concept and reduce emergency nurse job stress.

FULL TEXT

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The Great Resignation, Newly Licensed Nurse Transition Shock, and Emergency Nursing: JEN

ABSTRACT (ENGLISH)

ECRI boldly called out the impact of precipitating workplace factors stemming from electronic health records (EHRs), time pressures, heavy patient workload, patient complexity, rapid change, and limited resources on a workforce largely comprising high achievers.4 They emphasized the importance of listening to clinician concerns, leveraging change at the system level to address the underlying causes such as improper resource allocation, and ending the treatment of employees as “cogs in a wheel.” Workplace elements solidly coupled with emergency nurse burnout and turnover include difficult work schedules and shift work, inadequate support by leadership, and escalating workplace violence toward staff.7,8 Layer on frustrations caused by a lack of essential supplies and equipment, barriers to patient flow, inadequate staffing relative to demand, and ever-increasing regulatory burdens. COVID-19 added the threat of infectious disease contagion, potentially without adequate or appropriate personal protective equipment, and worsened the nurse-specific trauma of caring for scores of critically ill and dying patients in a time of insufficient and even rationed resources.9-11 The system dysfunction that created the conditions for nursing burnout and turnover before the pandemic was magnified by COVID-19–related surges and stressors.12,13 While temporary and travel nurse staffing agencies have long filled a need for short-term nursing labor demands, the value and demand for nursing skills multiplied during the pandemic.14,15 For institutions that had undervalued long-term nurse employees and nurse retention, the pay gaps between loyal nurse employees and temporary or travel nurses created further backlash from employees, contributed to additional turnover, and saw institutional attrition spiral. The prolonged pandemic disaster context exposed emergency nurses to additional risk factors for burnout, grief injury, fatigue injury, moral injury, and traumatic injury.11,13,21 In the resulting gaps in stable existing workforce supports, we also discuss how quintessentially timely and important regional and specialty-wide resources and infrastructure will be for new nurse transition support.21,22Transition Stages and Transition Shock Models The first year of professional nursing is profoundly transformative.19 Assuming supported and evolutionary developmental knowledge and skill pathways were offered during nursing education, one might expect that new nurses would be able to anticipate a relatively stable postgraduate period rather than the steep, dynamic, and tumultuous learning curve they actually find.

FULL TEXT

The Great Resignation

There is a phenomenon occurring across all employment settings in the United States that is aptly termed **The Great Resignation**. Anthony Klotz, an organizational psychologist and business professor, named this trend in 2019, the year before the COVID-19 pandemic, when annual worker turnover reached an all-time high.[1] Although the rate plateaued in 2020 with the advent of the pandemic, turnover again set new record levels both in 2021 and 2022, leading to extensive nationwide job vacancies.[1] Nursing turnover is no exception in The Great Resignation trend. The origins of the present nursing turnover problem predate COVID-19 and center on factors broadly attributed to nursing burnout.[2,3] Solutions that focus solely on building nursing resilience and exclude workplace-related causes

are particularly short-sighted. This approach targets the nurse without the necessary organizational due diligence to identify correctable issues in the practice environment that contribute to burnout. The end result risks creating a false mindset that the nurse and not the system must be fixed.

The Joint Commission published a prepandemic safety brief in July of 2019 on combating nursing burnout.[2] The Joint Commission warned that burnout could affect cost, patient satisfaction, and clinical outcomes. This report drew upon results and recommendations from a wide variety of sources, noting that emergency nurses are at higher risk for burnout.[2,3] In addition, in 2019, ECRI (formerly called the Emergency Care Research Institute and now by the initials ECRI) identified "burnout and its impact on patient safety" as number 3 in their list of top 10 patient safety concerns.[4] They emphasized the risks to patient safety in cases of health care professional burnout, as well as the association of depression and suicidal ideation in physicians, nurses, and allied health professionals experiencing burnout. ECRI boldly called out the impact of precipitating workplace factors stemming from electronic health records (EHRs), time pressures, heavy patient workload, patient complexity, rapid change, and limited resources on a workforce largely comprising high achievers.[4] They emphasized the importance of listening to clinician concerns, leveraging change at the system level to address the underlying causes such as improper resource allocation, and ending the treatment of employees as "cogs in a wheel."[4]

In 2020, Dall'Ora et al[5] examined 91 quantitative studies that looked at relationships between nursing burnout and work-related factors. Not surprisingly, their findings revealed that high workload, low control, inadequate staffing, and long shift length are notably associated with burnout. These researchers also identified a negative impact on nurses' general health and more sickness-related absences; nursing work performance worsened with resultant declines in patient care quality, safety, and experience, as well as increased medication errors, adverse events, patient falls, and greater intentions to leave.[5] Given these findings, it is ironic that health care institutions commonly employ a do-more-with-less business mantra as an overall financial strategy. This paradigm typically means that nursing leaders are expected to ratchet down staffing levels to the bare minimum, despite having no ready options to provide backup for sick time, leaves of absence, and resignations, particularly in specialties such as the emergency department. At the same time, expectations remain high for nurses working short staffed and with a resulting heavier workload to achieve the finest patient satisfaction, patient care quality, and publicly reported metrics.

The stressors inherent in being a frontline emergency nurse, even during nonpandemic conditions, are significant. As the 24-hour, 7-day-a-week entry point into hospitals and health systems for all-comers, emergency nurses regularly experience all of the factors identified by ECRI as contributing to burnout, including time pressures, heavy patient workload, patient complexity, rapid change, and limited resources.[4] A poorly designed or implemented EHR that drives dysfunctional workflow rather than workflow driving EHR design also contributes to burnout.[6]

Fast forward to 2022. A systematic review of academic studies that focused on emergency nurse burnout and resilience by Phillips et al[7] identified steep burnout rates in emergency nurses; burnout was strongly associated with higher turnover in emergency nurses than in other health care specialties. Workplace elements solidly coupled with emergency nurse burnout and turnover include difficult work schedules and shift work, inadequate support by leadership, and escalating workplace violence toward staff.[7,8] Layer on frustrations caused by a lack of essential supplies and equipment, barriers to patient flow, inadequate staffing relative to demand, and ever-increasing regulatory burdens. COVID-19 added the threat of infectious disease contagion, potentially without adequate or appropriate personal protective equipment, and worsened the nurse-specific trauma of caring for scores of critically ill and dying patients in a time of insufficient and even rationed resources.[9-11]

The system dysfunction that created the conditions for nursing burnout and turnover before the pandemic was magnified by COVID-19–related surges and stressors.[12,13] While temporary and travel nurse staffing agencies have long filled a need for short-term nursing labor demands, the value and demand for nursing skills multiplied during the pandemic.[14,15] For institutions that had undervalued long-term nurse employees and nurse retention, the pay gaps between loyal nurse employees and temporary or travel nurses created further backlash from employees, contributed to additional turnover, and saw institutional attrition spiral. Even before the pandemic, the largest portion of the new emergency nursing workforce was composed of newly licensed nurses.[16] It is logical to anticipate that

newly licensed nurses will become an ever-increasing proportion of the immediate postpandemic workforce. Existing workforce turnover and mobility place new nurses entering the workforce in unprecedented unit instability and experiencing significant gaps in support.

Newly Licensed Emergency Nurses

Retaining seasoned nurses is essential to high-quality patient care, and we will focus editorial content on the occupational health of the current emergency nursing workforce in future issues. As late spring and summer are hallmark seasons for nursing school graduation and subsequent newly licensed nurse hiring, we focus this May issue editorial on entry to practice for the newest members of our specialty. The unpredictable, complex, and intense nature of emergency nursing presents special challenges to nurses who enter the specialty directly after graduation.[17] The Transition Stages (Figure 1) and Transition Shock (Figure 2) models[18-20] provide a holistic framework that can be used to increase our collective understanding of new nurse transition to practice. The insight offered by these constructs promises to illuminate areas where interventions are needed to support the newest members of our emergency nursing workforce at this especially vulnerable time. In the past, transition support for newly licensed nurses and nurses new to the specialty largely fell to unit-based preceptors, mentors, and educators. The prolonged pandemic disaster context exposed emergency nurses to additional risk factors for burnout, grief injury, fatigue injury, moral injury, and traumatic injury.[11,13,21] In the resulting gaps in stable existing workforce supports, we also discuss how quintessentially timely and important regional and specialty-wide resources and infrastructure will be for new nurse transition support.[21,22]

Transition Stages and Transition Shock Models

The first year of professional nursing is profoundly transformative.[19] Assuming supported and evolutionary developmental knowledge and skill pathways were offered during nursing education, one might expect that new nurses would be able to anticipate a relatively stable postgraduate period rather than the steep, dynamic, and tumultuous learning curve they actually find.

The Transition Stages Model is organized by months of nursing practice postgraduation; the transition experience depicted therein occurs within 3 stages over the initial 12 months of practice. The model conceptualizes the stages as (1) doing, (2) being, and (3) knowing.[19] Rather than just focusing on the professional knowledge and skill that a nurse must acquire to function in the job, the model holistically integrates the impact and influence of cognitive, emotional, sociodevelopmental, physical, and personally relational factors that span the new nurse's work and personal life. Information about how the model was developed and the characteristics of each stage is published in detail elsewhere.[18-20] The model is briefly summarized here.

The first stage of transition has been coined the doing stage.[18,19] New graduate nurses enter the work environment with varying levels of familiarity with practice expectations and the workplace culture, often experiencing it as unstable and unpredictable. Facilitating realistic professional expectations should focus on assisting the graduates in acquiring a routine for the shift while providing preceptorship and mentorship. Meanwhile, backup and mutual support are required for situations requiring skill development and evolving clinical judgment. A narrow focus on task completion and time management should be expected and augmented with preceptor and team nursing support. While investing substantial emotional and cognitive energy into appearing competent to gain coworker acceptance and approval, the new nurse often arrives to their new practice environment with minimal tacit knowledge. The new nurse may face patient complexity, change of condition, and unfamiliar patient presentations with little or no experiential knowledge to guide them.[23] In an environment fraught with immense pressures to rapidly become an independent clinician, quality and safety might be compromised if the new nurse hides their need for dependence on their experienced colleagues. The new emergency nurse may struggle to balance their important learning and status-seeking needs with feeling burdensome to the clinical team.[24] This developmental hurdle can, during the initial practice months, translate into vulnerable levels of care competency if the graduate does not feel safe exposing their inadequacies.

Transition shock (Figure 2) is the initial experience of leaving the familiar student experience and entering the unpredictable and unfamiliar context of the professional practice realm. This period can last days or weeks and is

commonly accompanied by feelings of profound doubt, loss, confusion, and disorientation.[18] Figure 2 outlines key areas of imbalance that may lead to stress and transition shock in the nurses' personal and professional roles, responsibilities, relationships, and knowledge. Many of these issues are amenable to assessment and intervention, such as clarifying realistic and developmentally targeted performance expectations and clinical growth ladders, offering structured and unstructured peer support networks, and matching graduates with role models who exemplify success on key professional issues such as navigating a work-life balance, striving for and advancing practice standards, managing their time amid competing priorities, and working collaboratively with inter- and intradisciplinary colleagues. Transition shock is as personal as it is professional; graduates will oftentimes be struggling to find their independence as young adults, including managing their own finances and initiating new or more complex relationships (ie, marriage, cohabitation, or parental responsibility). Likewise, we suggest that unit and institutional leaders and professional organization support networks can offer formative needs assessments based on the various stressors depicted in the Transition Shock model. These assessments can be used to inform priority areas where holistic support can be offered to ease the shock and transition for the newest members of the profession (see examples in Table).

The second stage, coined by Duchscher[19] as the being stage, finds the new nurse experiencing frustration and discontent with their own professional performance gaps. This relative expression of inadequacy can progressively turn outward as criticisms of the unit practice standards or further to health care system deficiencies and failures. The nurse's thinking can shift from a sense that they as an individual only need to acquire more knowledge and skill to address practice realities on to accepting the realities of professional nursing as overall quite different from what they had envisioned when they chose nursing. This can lead to the nurse questioning whether the nursing discipline was the right career choice for them. This is one of the most at-risk stages of new nurse transition for both job turnover and for leaving the profession. This crisis of confidence can cumulate into a transition crisis as the new nurse moves from the being to the knowing phase approximately 6 to 8 months after orientation.[18,25] Monitoring the new nurse during this stage for signs of disillusionment or expressions of disappointment in the profession is paramount to guiding them to a new level of acceptance of practice realities in health care.

The final stage in the Transition to Practice model is identified as knowing. In this stage, the nurse begins to fully integrate work-life balance, recovers from the steep initial learning curve, and commonly finds a sense of personal normalcy and professional identity.[19] After 12 to 18 months of practice, the nurse may be fully ready to engage by leading unit improvement projects, precept others, and contribute beyond the individual clinical patient assignment. Although the models discussed here were developed on the basis of data from new graduate nurse transition, there may be broader applications to other emergency nurses as well.

Experienced nurses working in novel contexts can also experience transition shock, but it is largely muted and abbreviated from that of a newly graduated nurse. The work demands of the pandemic with staffing shortages and challenging workloads have resulted in a daily clinical shift that is nearly unrecognizable to many when compared with prepandemic workflows. This means that even the most experienced nurse may feel a profound loss of professional mastery and identity. The Stages of Transition and Transition Shock Model can also be tested for their applicability to any emergency nursing career transition. These career transitions may range from transferring to a new unit, position, or specialty to a profoundly altered work situation in one's long-term employing unit. The 6-month "WHAT AM I DOING?" transition crisis and the imposter syndrome that Duchscher[19] elegantly describes may have much broader applications to consider in career transitions and assuming new leadership responsibilities along the entire professional continuum.[25-27]

Supports and Interventions

Given the urgent and timely need to recruit and retain high-quality emergency nurses, best-practice pathways for new graduate nurses entering this specialty must be developed, refined, and shared. The availability of mentors, preceptors, and coworkers experienced in the specialty and the employing unit are likely to be limited, given pandemic turnover and stressors. It is not unusual to hear seasoned nurses share stories of situations in which they had to succeed by their own individual efforts or fail the patient and professional challenge entirely. There is a

common theme in the Rubicon of sink or swim as it related to career moments in our professional socialization as emergency nurses. Survivor bias can enter these stories where we are profoundly missing the voices of those who had a crisis moment without support and left emergency nursing after experiencing the resulting negative patient and professional outcomes. The Stages of Transition theory and Transition Shock model presented here frame the stressors and stress reactions of adapting and assimilating to professional nursing as normal, expected, and even embraced developmental phases.[18,19] These frameworks can help remove unnecessary blame and shame from the nurse experiencing these crises and shock reactions from our collective norms. The models can also aid preceptors, managers, educators, and coworkers to set realistic and transition-appropriate professional expectations, rather than applying the traditional and largely dysfunctional sink or swim mentality. The models can also be very useful in anticipating and addressing relatively predictable stress reactions to support the newly licensed nurse or any transitioning nurse practicing in the emergency department setting. These frameworks also serve the specialty with key reminders to stay connected and updated on our newest specialty members' key benchmarks throughout a healthy transition such that we can facilitate a satisfying and lengthy career in emergency nursing.

Shanafelt et al[28] summarized the pandemic-related needs that frontline clinicians have expressed they need from their organizations as Hear Me, Protect Me, Prepare Me, Support Me, and Care for Me. These themes are derived from clinicians across the career span and not just new nurses as we discussed here. How inspiring to envision that we can collectively and individually structure support for one another through our organizations in this way and to know that we can be each other’s light despite the surrounding darkness of the pandemic. It is simply no longer reasonable, or honestly feasible from a human resource capacity perspective, to expect a seasoned clinical unit preceptor to bear a disproportionate amount of the burden for successfully onboarding new nurses, especially when facing their own risk of stress injury and burnout.[13,16,29]

In addition to raising awareness and understanding about transition crises and its triggers in less-than-ideal work environments, we recommend that emergency clinicians at all levels of practice engage in dialogue and activities to build a shared understanding of the stages of transitions, clarify the impacts in your own workplace or professional social network, and craft interventions to support healthy transitions.[30,31] External resources to support the new emergency nurses’ knowledge acquisition include ENA University pathway for those new to the specialty, the ENA Nurse Residency Program, Board Certification for Emergency Nursing Learn,[32] Nursing the Future, and other academic and professional organizational learning supports in your region.[31,33] Certification and certification preparation are open to newly licensed nurses, which offer pinnacle professional identity support and validation.[34] The ENA offers Emerging Professionals activities for leadership and social support tailored for those new to the specialty. We also encourage local chapter and council activities to welcome and mentor role, responsibility, relationships, and knowledge holistic learning needs of our newest members of the clinical specialty. Along with these onboarding efforts, retention of the new emergency nurses as well as the experienced nurses is critical. To reverse the flight of talent, we believe that health care leaders must actively address the organizational sources of stress and burnout and transform their operations to create gratifying work environments.[35] Key to this work is defining new evidence-based budget strategies that provide the human and physical resources necessary for safe practice and high-quality care delivery as opposed to relying on current industry benchmarks that do not adequately represent the clinical reality for frontline emergency nurses.[35]

Given that there may be a dearth of available mentors, preceptors, and clinical educators owing to pandemic-era workforce turnover and vacancies, the time is ripe for creatively exploring algorithmic clinical guides for novices[23] and virtual (including virtual reality and online simulation)[36] and structured external supports for newly licensed nurse training and support. Preparing and retaining the next generation of emergency nurses in this moment in time is filled with challenges and barriers, but the innovation, perseverance, and culture of rising above the crisis and spirit of emergency nurses are poised to overcome to an even more promising future. We welcome rigorous program development, evaluation, and intervention testing manuscripts to address emergency nurse orientation and newly licensed transitions to the emergency department in the *Journal of Emergency Nursing*.

Author Disclosures

Dr. Castner is President and Principal of Castner Incorporated, a New York State woman owned business enterprise.

Transition shock stressor	Example support activity
Life roles: partner-spouse	Off unit mentor or role model who can discuss and help develop strategies to mitigate new home relationship strain created with first time working night and/or weekend shifts.
Skills and tasks	Nurse residency program, formal professional development onboarding, professional association courses, virtual or augmented reality skills practice, extra skills lab practice at home education institution.
Financial management	ENA Council meeting with financial planning speakers or vendors with content relevant to new nurse household budgeting, student loan repayment, and common early adulthood or early career financial goals.
Intergenerational dynamics	Off unit education lab or virtual reality simulation with facilitated role play activities to explore and develop better response, coping, or understanding of frustrating or puzzling intergenerational dynamics.
Life changes	Inclusive celebratory and acknowledgment events, rituals, and routines to recognize marriage, births, new homeownership, or other major life event.
Role stress/strain	Realistic expectations, structured and unambiguous orientation and onboarding pathway. Information for organization's EAP and external therapists trusted by nurse coworkers if requested by new nurse.

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Clinician Wire Puncture Injury to the Hand from Chest Compressions on a Patient with a Median

Sternotomy: A Case Report: JEN

ABSTRACT (ENGLISH)

Standard precautions, including protections from blood and body fluid exposure, are designed to protect health care providers from infections. Sharps safety practices rarely include the potential for the unconscious patient's own body to be a potential source of clinician percutaneous injury from sharp objects outside of the perioperative setting. This case report reviews a percutaneous injury to the hand of a physician who was performing chest compressions on a patient with an out-of-hospital cardiac arrest. The 76-year-old patient in cardiac arrest had undergone a medial sternotomy surgery 15 years before the arrest. The sternal wire rotated owing to the initial chest compressions, breaking the clinician's nitrile glove and producing an open wound on the thenar region of the clinician's right hand. Application of a 10 × 10 12-ply gauze pack on the chest of the patient in cardiac arrest allowed the resuscitation team to continue with the compressions with no further wounds from the wire. This case report is a novel contribution to the published literature and advances standard precautions considerations in patients with out-of-hospital cardiac arrest, with the sternotomy wire from previous surgery as a source of percutaneous clinician injury during chest compression.

FULL TEXT

Introduction

Advanced life support teams responding to out-of-hospital cardiac arrest may face rare and unusual situations in uncontrolled settings, with limited information on the patient they are treating. These teams must have advanced knowledge of all the usual and unusual pathologies that could be found as first responders in the community setting.[1] This case report describes the percutaneous injury experienced by a physician responding to an out-of-hospital cardiopulmonary arrest while administering chest compressions.

Nontransport Rapid Deployment Background

Rapid deployment vehicle teams in Madrid, Spain, are composed of a physician, nurse, and a driver who also has basic Emergency Medical Services training. These rapid deployment teams are equipped with vehicles such as vans with all the materials and equipment of a fully equipped intensive care ambulance. However, these rapid deployment teams do not have the capacity to transfer patients. Their objective is to reach the incident as quickly as possible and begin the health care procedures and stabilization of the patient as soon as possible while the ambulance or further support, if required, arrives.

Patient Information

An emergency call was received on 112 (similar to United States 911) in Madrid in 2019, informing dispatch of a 76-year-old male patient with cardiorespiratory failure in a park. His medical history included arterial hypertension, ischemic heart disease with bypass from acute myocardial infarction to anterior descent, and saphenous to right coronary 15 years ago, presenting with diabetes mellitus and renal failure.

Diagnostic Assessment

Bystanders who saw the patient fall unconscious and called 112 informed the team that they had not performed basic cardiopulmonary resuscitation (CPR). Upon the arrival of the rapid deployment vehicle Advanced Life Support team, 7 minutes after the call was received, advanced resuscitation maneuvers were begun. This case fell under the code 0 procedure, which indicates that in the case of an unconscious patient where the medical Emergency Medical Services' arrival time is under 10 minutes, resuscitation techniques should be administered to restore vital signs or maintain organ perfusion for potential organ donation.

The patient's airway was opened and supported with orotracheal intubation by the physician; intravenous access

and drug treatment protocol were begun by the nurse, and chest compressions were started by the medical technician. The patient's initial cardiac rhythm was asystole.

Once the airway was secured, the clinician team rotated turns to provide chest compressions. Chest compressions were first performed by the medical technician and then the physician.

During the first rotation of physician administered chest compressions, the physician noticed punctures in the palm of the hand that was in contact with the patient's sternal surface, and a lump was observed in the central area of the sternum (similar to Figures 1 and 2). She realized that the nitrile glove was broken in the area of the palm of the hand, and when she removed it, she noted a puncture wound in the thenar region of her right hand.

Therapeutic Intervention and Patient Outcome

Unaware of the origin of these wounds to the physician's hand, the clinical team thoroughly examined the patient's chest. During this assessment, a surgical scar was observed under the patient's chest hair. The clinician team then observed that the median sternotomy wire from the patient's chest had penetrated the skin. The wire tip could be seen with the naked eye. The point of the sternotomy wire that appeared was no longer than 0.5 cm from the surface of the patient's skin. This observation was consistent with the published literature, given that it is described that sternal wire can change position when under pressure.[1] In this case, the sternal wire changed position during the initial chest compressions during the medical technician's rotation.

The team tried to protect themselves from further injury by using a pack of 10 × 10 cm 12-ply sterile gauze to cover the protruding sternotomy wire and continued chest compressions. After 25 minutes of advanced life support, resuscitation maneuvers were suspended. The patient's death was certified.

Discussion

This case report presents a novel contribution to the published literature and advances standard precautions considerations in patients with out-of-hospital cardiac arrest, with the patient's sternotomy wire from previous surgery as a source of percutaneous clinician injury during chest compressions. Median sternotomy is a surgical technique performed during cardiac and pulmonary surgeries.[2] The sternum is closed with a wire suture at the completion of the surgery.

The wires used in a medial sternotomy have been described[3] as capable of a slight rotation under pressure, which can cause the wire to be palpable from the skin, externally. If chest compressions are conducted on a patient who has undergone a sternotomy, the wire can rotate sufficiently to point outward and puncture the patient's skin and subsequently the clinician's hands performing the chest compressions. Chest compressions are reportedly contraindicated in patients who have undergone recent sternotomy.[4] This precaution is meant to prevent excess stress at the surgical site and prevent the breakage or movement of the wires used for the suture. Although medial sternotomy is a well-described technique with many options for suture, procedures performed more than 10 years ago commonly used the sternal wire.[1] The possibility of this wire migrating or moving when handled or placed under pressure has also been described.[5] What has not been previously described is that this happens during chest compressions owing to a CPR technique.

There are 2 published cases pertinent to this present case. The first is an abdominal CPR technique[6] in a patient with a very recent median sternotomy to avoid dehiscence and potential rupture of the sternum. The second case is that of a 44-year-old male who presented with chest pain and a lump in the neck, which X-ray revealed to be the point where the sternal wire had broken.[7] We found no other similar cases reported in the published literature, wherein a past, healed sternotomy became a sharps injury risk for clinicians.

Thus, in patients who have undergone a previous medial sternotomy with sternal wire who require chest compressions, we document a risk of injury to the clinician. Prevention can include considerations that (1) chest compressions are contraindicated, (2) use of abdominal CPR techniques, or (3) padding and/or covering the site as we did by applying a full pack of 10 × 10 cm 12-ply sterile gauze to continue chest compressions.

Follow-Up and Clinician Outcomes

After resuscitation was discontinued and we confirmed that the nitrile gloves and the skin of the physician had been punctured, follow-up according to the protocol for the accidental puncture in interventions with patients was initiated.

Although the patient was considered at low risk, it should be noted that 30- to 40-year-old surgical procedures present a risk of viral contagion exposure such as hepatitis or human immunodeficiency virus, which are some of the main sharps injury-related blood and body fluid exposure infection risks to health workers.[8]

Following the standard postexposure prophylaxis procedures for percutaneous injury exposure,[9] the injured physician was taken for blood tests for human immunodeficiency virus, hepatitis B virus, and hepatitis C virus. The results were negative for bloodborne infectious-contagious diseases. Because this was a single case involving exposure to only one clinician, no further postexposure prophylaxis protocols or procedures were applied to the other members of the emergency response team whose skin remained intact.

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This case report adheres to Elsevier's Patient Consent Policy.

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Respiratory Care Innovation in Times of Crisis: JEN

Srinivasan, Shriya S

ABSTRACT (ENGLISH)

System-based modifications such as resistors, clamps, and valves have enabled varying levels of control in carefully matched patients.10,11 In addition, the ability to monitor, overcome ventilator self-tests, exposure, and alarms have been overcome by recent systems.11 Splitting high flow oxygen delivered by a mask or a nasal cannula is certainly less risky, although the rate of oxygen consumption would be increased without special valving leading to accelerated depletion of oxygen reservoirs. In 2021, insufficient oxygen reserves and widespread use for COVID-19 patients created drastic shortages, leading to increased mortality in India.12 Technologies to cost-effectively expand high-flow nasal oxygen systems without wastage would benefit health care infrastructures experiencing high caseloads.—Shriya S. Srinivasan, PhD, Department of Mechanical Engineering, Massachusetts Institute of Technology, Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, David H. Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Project Prana Foundation, Cambridge 02139, Boston 02115, MA, United States; E-mail: shriyas@mit.edu. Twitter:

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FULL TEXT

Dear Editor:

The COVID-19 pandemic has led to a global health care crisis and put unprecedented pressure on our health care system with more than 75 million confirmed cases, 3 million hospitalizations, and 900,000 COVID-19 associated deaths in the United States alone over the past 2 years.[1] The novel disease came with 2 immediate challenges: (1) building disease-specific diagnostics, therapeutics, and preventive measures, and (2) increasing care capacity to treat those with severe courses of the disease.

For both challenges, innovation has turned out to play a key role, most prominently demonstrated by the rapid development of the COVID-19 vaccines. In the current issue's letter to the editors, Duprez et al[2-4] have focused on increasing respiratory care capacity and developed a device that can reduce oxygen consumption during high-flow oxygen treatment, which is often administered in patients suffering from shortness of breath and hypoxemia.[2-4] Reducing oxygen consumption would increase the number of patients who can be served in scarcely resourced areas. During a pandemic such settings rapidly transition to triage-based care, as evidenced in India in spring 2021.[5]

Expedited Regulatory Framework for Pandemic Innovations

Medical innovation enters the United States market after being thoroughly tested for safety and efficacy and receiving regulatory approval by the Food and Drug Administration (FDA), which can be a multi-year process. However, emergency situations require a dynamic response to rapidly changing circumstances. To enable such a response, the FDA has implemented the "emergency use authorization". The emergency use authorization allows rapid approvals for otherwise unapproved medical products or unapproved usage of approved medical products to be used in an emergency to diagnose, treat, or prevent serious or life-threatening diseases or conditions. Under the ventilator and ventilator accessories section, a set of guidelines was provided to assist and evaluate the safety and efficacy of modified devices.[5,6] Other nations' regulatory bodies issued similar modified processes to enable the rollout of life-critical technologies during the pandemic.

Human clinical trials can be challenging to perform during health care crises. Instead, simulators such as the Michigan test lung system and computational analyses can provide robust validation methods.[7,8] Conformance with applicable International Electrotechnical Commission and International Organization for Standardization standards further increase reliability and safety of the device. The FDA also requires clear device labeling and safety alarm functionalities, which is particularly important in ventilators and ventilator modifiers.

An Innovative Approach to Reduce Oxygen Consumption In High-Flow Therapy

Duprez et al[4] suggest a simple-to-implement and innovative modification of commercial nasal cannulas to further increase the oxygen concentration in inhaled air by reducing the amount of dilution with room air. At its core, the modification consists of a reservoir for oxygenated air from the cannula. Instead of being lost to room air at times other than inspiration, the oxygenated air is pooled inside the reservoir. This is similar in some ways to a nonrebreather mask with a reservoir bag to pool oxygenated air prior to delivery.

The technology mentioned was first described in 1991 in a similar form. Early studies showed that such a simple adaptation could increase partial pressure of oxygen in patients without increasing partial pressure of carbon dioxide, showing that expired air is in fact pushed out of the reservoir trunks by incoming cannula airflow. This double-trunk mask was also shown to be as, if not more, efficient than the nonrebreather mask at maintaining and improving partial pressure of oxygen.[8,9]

The authors have previously shown how this design can improve oxygenation during high-flow nasal oxygen cannula therapy.[2] In this letter,[4] the authors highlight how this might be used to conserve oxygen supplies in resource-limited settings to supplement low flow nasal cannula oxygen therapy. This is of particular note given how

the COVID-19 pandemic has stretched health delivery globally. Assuming a hypoxemic patient takes 30 breaths per minute and is on low flow of oxygen of 900L/h, such a device could reduce source oxygen utilization by 21%.
A question that remains, given the long history of testing such a double-trunk mask, is why both trunks have been kept the same diameter and length. In theory, increasing trunk length would increase reservoir capacity, further reducing oxygen consumption. It seems that the airflow and fluid dynamics of this device would benefit from a more thorough understanding.

Considerations for Modifying Respiratory Devices

The modification of respiratory devices is accompanied by numerous technical and safety challenges, such as cross contamination, patient-specific needs for pressure and volume support, and alarm management. During the COVID-19 pandemic, respiratory devices were multiplexed to manage the overwhelming case load experienced by some hospitals. In such cases, independent control of volume and pressure to each patient is critical for lung-protective ventilation, the standard of care for acute respiratory distress syndrome. In most multiplexed devices, the compliance and resistance of the patients become part of the same circuit and therefore must be managed with modifications that can manipulate the interdependence. System-based modifications such as resistors, clamps, and valves have enabled varying levels of control in carefully matched patients.[10,11] In addition, the ability to monitor, overcome ventilator self-tests, exposure, and alarms have been overcome by recent systems.[11]
Splitting high flow oxygen delivered by a mask or a nasal cannula is certainly less risky, although the rate of oxygen consumption would be increased without special valving leading to accelerated depletion of oxygen reservoirs. In 2021, insufficient oxygen reserves and widespread use for COVID-19 patients created drastic shortages, leading to increased mortality in India.[12] Technologies to cost-effectively expand high-flow nasal oxygen systems without wastage would benefit health care infrastructures experiencing high caseloads.—*Shriya S. Srinivasan, PhD, Department of Mechanical Engineering, Massachusetts Institute of Technology, Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, David H. Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Project Prana Foundation, Cambridge 02139, Boston 02115, MA, United States; E-mail*: shriyas@mit.edu. ***Twitter:*** ShriyaSrinivas3*; Rajib Mondal, Harvard-MIT Division for Health-Sciences and Technology, Research Laboratory of Electronics, Massachusetts Institute of Technology, McGovern Institute for Brain Research, Massachusetts Institute of Technology, Project Prana Foundation, Cambridge, MA 02139, United States; E-mail:* rmondal@mit.edu. ***Twitter:*** rajibmndl*; Khalil B. Ramadi, PhD, Department of Mechanical Engineering and David H. Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology; Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School; Project Prana Foundation, Cambridge 02139, MA, United States. Division of Engineering, New York University Abu Dhabi, Abu Dhabi, United Arab Emirates; E-mail:* kramadi@mit.edu. ***ORCID identifier:*** https://www.doi.org/0000-0002-5864-2386.

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Emergency Nurse Certification: JEN

ABSTRACT (ENGLISH)

The nurse workforce consists of people with varying levels of education and experience in specialty areas.1 Nurses often seek to distinguish clinical and professional expertise through specialty certification.2,3 As the healthcare environment is becoming more complex, some healthcare leaders are advocating for specialty certification as a national standard to increase nurses' professional standing and prepare nurses to better meet the specific needs of the patient populations they serve.4 Board certification demonstrates excellence and recognition of the specialized knowledge, skills, and clinical judgement validated by the achievement of standards identified by nursing specialty to promote optimal health outcomes.5 The first large-scale, rigorous study examining the value of emergency nursing certification to nurses, their patients, and their employers, “The Value of Certification Study,” was conducted by the Human Resources Research Organization and commissioned by the Board of Certification for Emergency Nursing (BCEN).6 Study results were based on survey data from over 8,800 certified and non-certified emergency nurses and over 1,000 emergency supervisors. Previously, ENA has collaborated with stakeholders, including the American Academy of Emergency Nurse Practitioners (AAENP) and the National Association of Clinical Nurse Specialists, to further establish core competencies and expand opportunities for APRNs in the emergency setting.20,21 In 2019, the ENA Position Statement, Advance Practice Registered Nurses in the Emergency Setting, established the importance of APRNs in the ED setting and outlined gaps in national certifications.22 AAENP developed a strategic partnership with ENA to establish the emergency nurse practitioner (ENP) specialty scope and standards, thereby paving the way for professional certification mechanisms.17,23 Emergency nurse practitioners may attain an Emergency Nurse Practitioner Certification (ENP-C) through a program offered by the American Academy of Nurse Practitioners in collaboration with AAENP.24 For clinical nurse specialists (CNSs) who practice in the emergency setting, there is currently no emergency certification method for the CNS APRN role. [...]variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in this position statement. [...]this position statement should not be construed as dictating an exclusive course of management, treatment or care, nor does adherence to this position statement guarantee a particular outcome.

FULL TEXT

Description

Emergency nurses play a pivotal role in providing quality care and improving patient outcomes. The nurse workforce consists of people with varying levels of education and experience in specialty areas.[1] Nurses often seek to distinguish clinical and professional expertise through specialty certification.[2,3] As the healthcare environment is becoming more complex, some healthcare leaders are advocating for specialty certification as a national standard to increase nurses' professional standing and prepare nurses to better meet the specific needs of the patient populations they serve.[4] Board certification demonstrates excellence and recognition of the specialized knowledge, skills, and clinical judgement validated by the achievement of standards identified by nursing specialty to promote optimal health outcomes.[5]

The first large-scale, rigorous study examining the value of emergency nursing certification to nurses, their patients,

and their employers, “The Value of Certification Study,” was conducted by the Human Resources Research Organization and commissioned by the Board of Certification for Emergency Nursing (BCEN).[6] Study results were based on survey data from over 8,800 certified and non-certified emergency nurses and over 1,000 emergency supervisors. Outcomes of value from Certified Emergency Nurse (CEN) certification to emergency nurses included the following: higher annual pay, job advancement, employability, and nursing self-efficacy, even after controlling for level of education and years of experience. These results support prior studies that reported specialty certifications in nursing are associated with increased nurse satisfaction and empowerment.[7–9] In the “Value of Certification Study,” employers of nurses with CEN certification reported multiple aspects of greater technical performance, accuracy, and ethical behavior for those certified than those not certified.[6] Nurses with specialty certification are more likely to leverage their knowledge and power to make independent clinical judgments regarding the need for patient vital signs and the impact of variation on patient care.[10] Further, engaging nurses with CEN in process improvement efforts to reduce hemolysis in blood samples is beneficial as these nurses are likely better informed on evidence-based practices.[11] Researchers found possible linkage of specialty certification with improved patient outcomes.[7,8,12–16]

Certification has additional meaning for APRNs as licensure and certification are often linked, requiring certification as a mandate for entry into practice.[2,17,18] The APRN Consensus Workgroup supports the link between licensure and certification.[19] The Consensus Model for advanced practice registered nurses (APRN) regulation outlines the standard accreditation, education, certification, and licensure throughout the United States, with the goal of attaining full practice authority for APRNs.[19]

ENA Position

It is the position of the Emergency Nurses Association (ENA) that:

1. Specialty certification validates advanced knowledge, competence, and commitment to excellence in emergency nursing.
2. Attainment of emergency nursing certification contributes to the delivery of safe, effective, quality care.
3. Development of validation methods for advanced emergency certification to facilitate the meeting of licensure requirements by APRNs is essential.
4. Practice environments that encourage and facilitate emergency nursing certification and continuing education opportunities promote improved patient outcomes and greater professional satisfaction.
5. Certification and credentials integrated into professional advancement models are a means to recognize specialized knowledge, leadership, and clinical judgment.
6. Healthcare institutions support both the initial certification and renewal certification of their emergency nursing workforce.
7. Nurses who have successfully achieved specialty certification have earned the privilege to use and professionally display credentials following their name, including on their identification badges.
8. Research specific to and regarding the relationship of emergency nursing certification to safe, effective, quality practice, and to both nurse and patient satisfaction is essential.

Background

In the complex, time-pressured, and dynamic environment of emergency care, emergency nurses engage in continuing education to remain aware of current knowledge and best practices. Specialty certification is a method for validating the knowledge, skills, and competencies unique to specific populations supported by the National

Academy of Medicine (formerly the Institute of Medicine)[1] and is recognized as a strong benchmark of quality in Magnet-recognized organizations.[8] Registered nurses in the emergency setting may attain specialty certification by exam through the BCEN as a generalist (CEN), flight nurse (CFRN), critical care ground transport nurse (CTRN), pediatric emergency nurse (CPEN), and trauma nurse (TCRN).[5]

Certification for APRNs in the emergency setting is evolving. Previously, ENA has collaborated with stakeholders, including the American Academy of Emergency Nurse Practitioners (AAENP) and the National Association of Clinical Nurse Specialists, to further establish core competencies and expand opportunities for APRNs in the emergency setting.[20,21] In 2019, the ENA Position Statement, *Advance Practice Registered Nurses in the Emergency Setting*, established the importance of APRNs in the ED setting and outlined gaps in national certifications.[22] AAENP developed a strategic partnership with ENA to establish the emergency nurse practitioner (ENP) specialty scope and standards, thereby paving the way for professional certification mechanisms.[17,23] Emergency nurse practitioners may attain an Emergency Nurse Practitioner Certification (ENP-C) through a program offered by the American Academy of Nurse Practitioners in collaboration with AAENP.[24] For clinical nurse specialists (CNSs) who practice in the emergency setting, there is currently no emergency certification method for the CNS APRN role.

Barriers regarding the value of specialty nursing certification include the lack of a universal taxonomy for professional certifications in nursing and the complexity of research that enables merging of nurse, patient, and institution-specific data.[1,12] Large scale, generalizable research that examines the value of specialty nursing certification to patient outcomes is complex. It requires the merging of information from large datasets, such as the National Database of Nursing Quality Indicators, which captures nursing- and unit-specific data, with information from others, such as the Centers for Disease Control and Prevention's National Healthcare Safety Network or the Hospital Consumer Assessment of Healthcare Providers and Systems Survey, which capture patient outcome data.[12]

In today's value-based healthcare system, organization payment and, at times, provider compensation are linked to patient quality outcomes, including nurse-sensitive quality indicators. Professional certification benefits the individual emergency nurse, the patients they serve, and the healthcare institution. Existing data suggest that a relationship between certification and patient outcomes exists but is not fully understood and requires further investigation.[25] However, the intrinsic rewards of professional certification, such as the sense of competence and empowerment it offers nurses and the credibility it offers healthcare institutions, are well supported by the existing literature.[5]

Disclaimer

This position statement, including the information and recommendations set forth herein, reflects ENA's current position with respect to the subject matter discussed herein based on current knowledge at the time of publication. This position statement is only current as of its publication date and is subject to change without notice as new information and advances emerge. The positions, information and recommendations discussed herein are not codified into law or regulations. In addition, variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in this position statement. Therefore, this position statement should not be construed as dictating an exclusive course of management, treatment or care, nor does adherence to this position statement guarantee a particular outcome. ENA's position statements are never intended to replace a practitioner's best nursing judgment based on the clinical circumstances of a particular patient or patient population. Position statements are published by ENA for educational and informational purposes only, and ENA does not "approve" or "endorse" any specific sources of information referenced herein. ENA assumes no liability for any injury and/or damage to persons or property arising out of or related to the use of or reliance on any position

statement.

Resources

Board of Certification for Emergency Nursing. Take your emergency department to the next level with board certified emergency nurses: a special report for ED leaders and hospital administrators. 2018. Accessed February 26, 2021. https://bcen.org/want-to-take-your-ed-to-the-next-level/

Board of Certification for Emergency Nursing. Five compelling reasons to get (and keep) your emergency nursing specialty certification: a white paper for emergency nurses. 2018. Accessed February 26, 2021. https://www.bcencertifications.org/Tools-Resources/BCEN-Whitepaper/BCEN-Whitepaper-Nurses

Institute of Medicine. (2015). *Future directions of credentialing research in nursing: workshop summary*. The National Academies Press; 2015. https://doi.org/10.17226/18999

DETAILS

Subject:	Research; Emergency medical care; Continuing education; Workforce; Clinical standards; Clinical skills; Health status; Nurse practitioners; Leadership; Emergency services; Clinical nursing; Advanced practice nurses; Patient satisfaction; Clinical outcomes; Certification; Nurse specialists; Quality standards; Clinical nurse specialists; Human resources; Knowledge; Empowerment; Specialists; Emergency nurse practitioners; Education; Supervisors; Clinical decision making
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Emergency Evaluation of Nonfatal Strangulation Patients: A Commentary on Controversy and Care Priorities: JEN

ABSTRACT (ENGLISH)

Both leave few marks, both can result in loss of consciousness, both are used to assert dominance and authority over the life of the other, both create intense fear and potentially result in death and both can be used repeatedly, often with impunity.2Poststrangulation Diagnostic Imaging Computed tomographic angiography (CTA) is considered the preferred screening test to evaluate cervical vasculature for blunt cerebrovascular injuries (BCVIs).13-15 However, determining which poststrangulation patients should receive CTA to maximize utility and minimize risk is a topic of controversy. Increased incidence of thyroid cancer has been observed in patients exposed to high-dose radiation from atomic weapons or nuclear power plant accidents. [...]there is continued discussion in the literature about whether or not the increased incidence of thyroid cancer is associated with or caused by increased use of diagnostic computed tomography scans. Radiation specific studies have calculated the estimated cancer risk from CTA of the neck to be a maximum of 36 cancers per 1,000,000 studies or 0.0036% for a single CTA.23 The authors of the Eastern Association for the Surgery of Trauma PMGs concluded that this risk was outweighed by the benefits of diagnosing BCVI using a liberal or universal CTA screening protocol.15 We are unaware of any existing research on the psychological burden CTAs pose to patients presenting after strangulation.

FULL TEXT

Strangulation–external pressure applied to the neck that compromises blood flow, air flow, or both–is a common occurrence in the setting of interpersonal violence.[1,2] As emergency nurses and prescribers have become increasingly aware of the prevalence and negative health outcomes of strangulation, practice and research teams have begun to explore best practices for evaluation of these patients.

In this issue of the *Journal of Emergency Nursing*, Stellpflug et al[3] describe characteristics of strangulation patients evaluated in a sexual assault nurse examiner (SANE) program. Findings presented in this retrospective medical record analysis emphasize the varied presentations, assessments, and treatment approaches for this vulnerable population. Consistent with data reported in other literature, documented symptoms include loss of consciousness (LOC) or near-LOC.[4,5] Recognizing that carotid artery occlusion can result in asphyxial LOC within 5 to 10 seconds and death in minutes,[1,6] the critical need for coordinated emergency evaluation and response is clear. This manuscript adds to the growing literature on strangulation and highlights 2 important considerations for emergency care of these patients: appropriate diagnostic imaging evaluation and variability in clinical documentation.

The Mechanism of Strangulation

Blunt force trauma to the neck, such as strangulation, can cause cerebrovascular injury through 3 main mechanisms: arterial stretching, arterial twisting and direct compression of the artery.[7] Injury usually begins with intimal tearing and is frequently followed by a silent, or latent, period of hours, days, weeks, months or, rarely, years before evolving and creating neurologic damage (usually a thrombotic or embolic stroke).[7-10]

Focal, posteriorly directed force to the neck compresses the carotid arteries against the underlying transverse processes of the cervical vertebrae.[11] Simultaneous, bilateral compression of both carotid arteries can stop or significantly decrease blood flow to the brain, resulting in LOC or near-LOC. A lack of cerebral perfusion can also result in anoxic brain injury that may present in very subtle or more overt ways. These mechanistic risks exist for strangled patients as they do for other trauma victims sustaining blunt neck trauma as strangulation is, by definition, a type of blunt force neck trauma.

The physical injuries associated with strangulation are not the only consequences of concern. Strangulation as a mechanism to impart such rapid physical control makes it a tool of choice for perpetrators of violence looking to control others.[12] *Nonfatal strangulation might well be the equivalent of water boarding, widely considered as torture. Both leave few marks, both can result in loss of consciousness, both are used to assert dominance and authority over the life of the other, both create intense fear and potentially result in death and both can be used repeatedly, often with impunity.*[2]

Poststrangulation Diagnostic Imaging

Computed tomographic angiography (CTA) is considered the preferred screening test to evaluate cervical vasculature for blunt cerebrovascular injuries (BCVIs).[13-15] However, determining which poststrangulation patients should receive CTA to maximize utility and minimize risk is a topic of controversy. Arguments against liberal or universal use of CTA to detect poststrangulation vascular injury have included: rarity of clinically significant findings; unnecessary radiation exposure increasing long-term cancer risk; expense of testing and reimbursement challenges; and additional psychological burden to patients. These concerns, also echoed in this current paper, are important considerations for both patients and ED operations.

In the United States, evidence based BCVI practice management guidelines (PMGs) endorse screening all symptomatic patients, and asymptomatic patients with certain risk factors, including those that can be experienced during strangulation (eg, near hanging with cerebral anoxia, clothesline-type injury [laryngeal injury]).[15] Updated in 2020, Eastern Association for the Surgery of Trauma PMGs further support screening patients with an injury involving severe cervical hyperextension/rotation or hyperflexion, which may also be inflicted during a strangulation-related assault. Other large studies of various trauma have reported that liberal or universal CTA, as compared to BCVI clinical screening criteria (eg, Denver, Memphis), significantly increases detection of BCVI, further underscoring the diagnostic performance limitations of selective clinical screening criteria.[13,14] These studies found rates of BCVI ranging from 2.2% to 2.7% and noted that using clinical screening protocols instead of liberal CTA use

would have missed approximately 20% to 50% of BCVIs.

In addition, there are a small but growing collection of manuscripts specifically dedicated to examining cohorts of patients who were strangled.[16-20] These studies present relatively smaller samples of patients seeking care after strangulation and report rates of positive vascular findings on CTA ranging from 1.0% to 2.1%. Notably the MacDonald et al[19] study presented a rate of 15.4% but only completed CTAs on a very small percentage of their sample (6%), so we have excluded it from our overall range. These studies were all retrospective chart reviews, limiting the available information to that which was previously documented, and reflected wide clinical practice variation in using CTA/magnetic resonance imaging for BCVI detection (see [Table] for BCVI considerations for health care clinicians).

Measurement bias is of particular concern, because not all strangled patients were screened using CTA and those not screened may falsely be assumed to have no findings. Rates of documented CTA in most of the strangulation-specific studies ranged from 6% to 60%,[16,18-20] in contrast to 100% CTA use in the larger cohorts of general trauma patients (inclusive of strangulation). In these 2 studies, liberal or universal CTA protocols performed significantly better than the tested clinical screening or PMGs.[13,14] Thus, using clinical indicators or “suspicion” alone to determine who may or may not have a BCVI, and thereby who should or should not receive CTA screening, is not supported by the current evidence.

Stellpflug et al[3] also warn of many potential risks of CTA including cancer risk from radiation exposure and unnecessary psychological stress, among other concerns. The risk of cancer, particularly given the susceptibility of the thyroid gland to radiation, is raised when considering use of a diagnostic screening tool such as CTA for BCVI. Increased incidence of thyroid cancer has been observed in patients exposed to high-dose radiation from atomic weapons or nuclear power plant accidents. This is, of course, not the same as exposure to radiation from diagnostic imaging. As a result, there is continued discussion in the literature about whether or not the increased incidence of thyroid cancer is associated with or caused by increased use of diagnostic computed tomography scans. Radiation specific studies have calculated the estimated cancer risk from CTA of the neck to be a maximum of 36 cancers per 1,000,000 studies or 0.0036% for a single CTA.[23] The authors of the Eastern Association for the Surgery of Trauma PMGs concluded that this risk was outweighed by the benefits of diagnosing BCVI using a liberal or universal CTA screening protocol.[15]

We are unaware of any existing research on the psychological burden CTAs pose to patients presenting after strangulation. Conclusions about psychological burden should not be made without evidence to substantiate this claim and should not be drawn from research on other types of surveillance testing (such as breast mammography or low dose computed tomography screening for lung cancer in heavy smokers). To the contrary, there is evidence that intervention with a SANE can increase patient satisfaction, especially when the SANE is empathetic and the patient feels believed. Ordering a CTA may, in fact, convey a sense of validation for the patient.[24,25]

Although we concur that the potential risks raised may be real, we also want to highlight that they are almost entirely unstudied in this context and population. Further study regarding actual versus perceived risk is needed before commenting on the status of a CTA and its burden to patients and providers in the setting of poststrangulation assessment. These risks must also be balanced against the established risk of a silent, evolving BCVI (1.0%-2.7%) that is easily detectable in the asymptomatic latent interval, treatable with oral medication that offers a high likelihood of preventing neurologic compromise and, if missed, risks stroke or death.

Documentation Concerns

The authors’ recommendations also emphasize the need for improved documentation guidelines.[3] Inconsistent or missing documentation of evaluation and treatment elements is a known limitation of retrospective reviews. Notably, the authors of the current publication found missing data of up to 96% in the chart fields they reviewed.[3] This highlights that, although retrospective chart reviews play an important role in data collection about current practice, they cannot act as a substitute for prospective patient-centered research. In another example, a 2022 publication demonstrates that, even in a sample of known nonfatal strangulation patients presenting for ED and forensic care, strangulation was only included in final diagnosis or billing codes for 27.8%, further emphasizing how inconsistent

documentation can be.[26]

Numerous challenges face the nurses, physicians, and other health care providers who care for patients after strangulation–often in an intense, time-pressured and resource-pressured ED setting. Expert recommendations for strangulation clinical assessment and documentation exist,[27-29] which can inform the development of robust electronic solutions to more efficiently and effectively help ED teams capture this important information. Subsequently, more widespread adoption of strangulation assessment tools in electronic health records and consistent use of strangulation-related diagnostic classification codes are important steps toward collecting these data for individual, high-quality, longitudinal care and public health research.

Conclusion

Stellpflug et al[3] have added to the small but growing literature describing patients presenting for care after surviving strangulation. However, we strongly advise readers to consider methodological limitations when evaluating the BCVI evaluation recommendations put forward. This study used retrospective chart reviews with significant practice and documentation variability and very few patients undergoing CTA of the neck.

Many researchers, including 3 decades of trauma surgery investigators, have struggled to develop reliable decision rules to predict risk of cerebrovascular injury after blunt trauma using injury mechanisms, history and physical examination findings. To date, no decision rule on this issue has proved accurate enough to be relied upon in clinical practice to safely exclude patients at potential risk for cerebrovascular injury from CTA screening.[13,14] We strongly agree with the authors that further research to develop and rigorously test reliable decision rules for diagnostic imaging of patients surviving strangulation is needed.

However, we respectfully disagree that the findings presented, specifically a lack of documented major injuries in the 13 of 130 strangled patients (10%) screened with CTA of the neck, support selective use of CTA in this population. With an estimated BCVI prevalence of 1% to 2% and a full patient cohort of 130, we would expect that if all of these patients received CTA screening, at least 1 or 2 would have been found to have a vascular injury. One may not sound like a very high number, but if that one person is your loved one, doing everything possible to save their life suddenly becomes very important and, again, only 10% of the patients included in this study received a neck CTA. Although subsequent electronic health records visits from 89 of 130 patients (68.5%) within their health system were identified, none with stroke or cervical artery dissection in their medical problem list, this single data point does not provide adequate reassurance that there were no missed cerebrovascular injuries or delayed strangulation complications.

Given the recognized risk of cerebrovascular injury (and potential for resultant neurologic compromise or death) after strangulation, coupled with the limitations of predictive clinical screening criteria for BCVI at this time, we continue to support the use of liberal or universal CTA protocols to evaluate poststrangulation patients.

Author Disclosures

Conflicts of interest: none to report.

•BCVI mechanisms (ie, crushing, twisting, stretching) are the same as those involved in strangulation.
•Currently, even the most complete history and physical exam cannot reliably differentiate who does and does not have a BCVI.[13,14,21]
•CTA is a widely available, brief, and well tolerated procedure for detecting BCVI.
•Undiagnosed (or untreated) BCVI may lead to devastating neurologic sequelae or death.

•If diagnosed early, most BCVI lesions can be effectively treated, and neurologic compromise prevented, with anticoagulation therapy (most commonly oral antiplatelet drugs).[15]
•Patients with BCVI may present deceased, or with a spectrum of neurologic symptoms and findings, or may be completely asymptomatic.[22]
•Patients with BCVI may present with significant physical findings, such as bruising, or no findings at all.[13,14,17,21]
•The interval between vascular injury and neurologic deterioration (the latent or “silent” period) may be minutes, hours, days, or even months.[7,8]
•This latent period offers an important clinical opportunity to diagnose the vascular lesion and intervene therapeutically to prevent subsequent neurologic deterioration.
•The risk of BCVI after external neck trauma (including compressive trauma) is low (approximately 1.0%-2.7% across trauma patient and strangled cohorts), but not zero.[13,14,16-20,21]

DETAILS

Subject:	Carotid arteries; Emergency medical care; Thyroid cancer; Tomography; Accidents; Disputes; Neck; Documentation; Asymptomatic; Injuries; Sex crimes; Radiation; Nuclear power plants; Patient satisfaction; Psychological trauma; Trauma; Nuclear energy; Angiography; Consciousness; Surgery; Weapons; Veins &arteries; Nuclear accidents &safety; Strangulation; Dominance; Fainting; Medical screening
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Providing Hearing Assistance to Veterans in the Emergency Department: A Qualitative Study: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Introduction

Effective communication is essential to good health care, and hearing loss disrupts patient-provider communication. For the more than 2 million veterans with severe hearing loss, communication is particularly challenging in noisy health care environments such as emergency departments. The purpose of this qualitative study was to describe patient and provider perspectives of feasibility and potential benefit of providing a hearing assistance device, a personal amplifier, during visits to an emergency department in an urban setting affiliated with the Department of Veterans Affairs.

Methods

This qualitative descriptive study was conducted in parallel with a randomized controlled study. We completed a semistructured interview with 11 veterans and 10 health care providers to elicit their previous experiences with patient-provider communication in the ED setting and their perspectives on hearing screening and using the personal amplifier in the emergency department. Interview data were analyzed using content analysis and Atlas.ti V8.4 software (Scientific Software Development GmbH, Berlin, Germany).

Results

The veteran sample (n = 11) had a mean age of 80.3 years (SD = 10.2). The provider sample included 7 nurses and

3 physicians. In the ED setting, hearing loss disrupts patient-provider communication. Screening for hearing loss in the emergency department was feasible except in urgent/emergent cases. The use of the personal amplifier made communication more effective and less effortful for both veterans and providers.

Discussion

Providing the personal amplifier improved the ED experience for veterans and offers a promising intervention that could improve health care quality and safety for ED patient populations.

FULL TEXT

Contribution to Emergency Nursing Practice

••Hearing loss is highly prevalent among veterans; noise pollution in the emergency department interferes with patient-provider communication and challenges ED care for older veterans. Caring for older veterans in the emergency department is complicated by the influence of aging on symptomatology of disease, multiple chronic conditions, and unmet physical and social needs. In general, those with hearing loss report worse communication with their health care providers and overall poorer health care quality; they also have increased ED recidivism and hospitalization rates.

••The main finding of this paper is that in the VA ED setting, hearing loss influences veteran-provider communication and current approaches are inadequate to address this gap in care. Screening for hearing loss in the emergency department was feasible except in urgent/emergent cases, and providing a hearing assistive device was perceived as very beneficial in that it improved the ED experience for veterans and clinicians.

••Recommendations for translating these findings into emergency clinical practice include implementation of point-of-care hearing assessment that is integrated with medical intake or history taking to identify undiagnosed or untreated hearing loss. Providing the use of a low-cost, easy-to-use point-of-care personal amplifier can facilitate effective veteran-provider communication in the emergency department that includes assessment, treatment, and postdischarge instructions.

Introduction

Effective communication is a cornerstone of health care, and patients with hearing loss often struggle to hear and understand their health care providers. For the more than 30 million Americans[1,2] with bilateral hearing loss, communication is particularly challenging in noisy clinical environments such as emergency departments.[3-5] Age-related hearing loss is highly prevalent; 25% of adults between 60 and 69 years of age and 80% of those older than 80 years of age have bilateral disabling hearing loss.[6,7] ED visit rates also increase significantly with age and multiple comorbid conditions often complicate ED presentations of older adults.[8] For many older adults seeking care in the emergency department, hearing loss interferes with speech understanding and increases the likelihood of poor communication with providers. The array of noises in an emergency department includes ambient noises emanating from competing conversations between patients and health care providers, beeping sounds from various pieces of electronic equipment, and other noises related to patient admission and processing. Such noise pollution in the emergency department affects patients by compromising patient safety, increasing fatigue and elevating stress owing to the difficulty of and effort required in understanding what others are saying.[9]

Problem Formulation

Hearing loss is of particular importance in the care of our nation's veterans, who may have a history of significant noise exposure in combat.[10] Notably, Vietnam-era veterans have now crossed the critical >60-year age threshold, when the normal decline of hearing with age may be accelerated by noise exposure history and other risk factors.

Among older veterans, hearing loss is the second most common disability compensation[11] and the most prevalent occupational health disability.[12] More than 2 million veterans have a severe hearing loss; compared with nonveterans of the same age, veterans experience higher rates of hearing loss.[13] The increased risk of hearing loss among veterans is multifactorial. Combat-related service places veterans at risk of excessive noise exposure and earlier onset and greater severity of age-related hearing loss.[12] Tobacco is another veteran-associated exposure.[14] When considering the synergistic effect of age, smoking, and excessive noise exposure, veterans are at much greater risk of hearing loss than the nonveteran population.[15,16]

Notably, 56% of the nation's 19.1 million veterans are more than 60 years old.[17] It is estimated that each year more than 1 million veterans, seek ED care at a VA setting[18,19]; most are older than the age of 60 and nearly 20% are older than the age of 80 years.[18] Similar to nonveteran older adults seeking care in the emergency department, the ED presentation for older veterans is influenced by aging on disease symptomatology and the presence of multiple comorbid conditions.[20,21] Caring for older veterans in the emergency department may take more time and resources owing to unmet physical and social needs[22] including high rates of homelessness.[23] Hearing loss may compound these challenges of ED care for veterans. In general, patients with hearing loss report worse communication with their health care providers and overall poorer health care quality; they also have increased hospitalization rates.[24,25] Unfortunately, screening for impaired hearing is not part of usual ED care. Therefore, older patients with hearing loss have a greater likelihood for poor communication with providers and inadequate preparation for postdischarge care.[26] Collectively, these challenges to effective communication between veterans and providers may contribute to missed or incorrect diagnoses, inadequate discharge plans, and recurring ED visits.

Problem Statement

Despite high prevalence rates among older adults, hearing loss is often underrecognized and undertreated.[27] Screening rates for age-related hearing loss in older adults are as low as 12.9% in primary care settings.[28,29] Hearing aids are the primary treatment for sensorineural hearing loss; however, only approximately 20% of patients who could benefit from this intervention actually use their hearing aids.[30] For veterans, access to comprehensive hearing services and hearing aids are provided through the VA services.[31] However, utilization of hearing aids among veterans is lower than among nonveterans.[32] As a result, many older veterans may present for care in an emergency department without hearing assistance devices.

In the inpatient setting, the most common strategy to facilitate communication with a patient who has untreated hearing loss is with a personal amplifier (PA). This low-cost device consists of a microphone, amplifier, and hardwired headset or ear buds; the provider speaks into the microphone, and the amplified voice is heard by the patient through the headset. PAs reduce the difficulty in "difficult listening situations," by direct amplification of another's voice fed to a patient's ears, making the signal louder than background noise. Clinical reports indicate that PA use can enhance communication with patients who have hearing loss in a variety of clinical settings, including hospitals,[33] nursing homes,[34] and palliative care units.[35,36] In a randomized controlled trial (RCT) of 180 new device users (mean age 74.3 years), the PA was reported as equivalent in performance to hearing aids[37]; sound quality of the PA was judged as preferable to hearing aids.[37] Another study found that providing a PA to older hospitalized patients improved physician-patient communication; only 6% of those provided with a PA reported poor or unsatisfactory patient-provider communication compared with 22% of those who did not receive a device.[38] Given the prevalence of hearing loss in older veterans and increasing prevalence in older adults in general,[39] our multidisciplinary team has begun a series of studies of formal tests of the effectiveness of PAs in health care settings including VA emergency departments.

This qualitative descriptive study was conducted in parallel with an RCT of patients in an urban VA emergency

department.[40] The Hearing Impairment, Strategies and Outcomes in VA (HearVA) study, which is described in detail elsewhere,[40] focused on patients 60 years and older, the age at which age-related hearing loss begins to increase in prevalence.[41] In the HearVA RCT, 133 veterans with hearing difficulty who presented to the emergency department but were likely to be discharged to home were enrolled and randomized to receive the PA intervention with a brief training on its use or usual care and control. The intervention group had improvements in objectively measured communication and reductions in readmission to the emergency department compared with the control group.[40] During the HearVA RCT, we conducted semistructured interviews with veterans, nurses, and physicians about their experiences with hearing loss in the VA emergency department and the acceptability of hearing screening and the use of PAs that were provided to study patients. Because research in the emergency department is uncommon, this qualitative study addresses an important knowledge gap about ED point-of-care interventions to facilitate patient-provider communication in populations with hearing loss.

Verbal Exchange Health Literacy Model

Our research is guided by the verbal exchange health literacy (VEHL) model that elucidates the factors essential for the verbal exchange of health information.[42] VEHL is defined as "the ability to speak and listen that facilitates the exchanging, understanding, and interpreting of health information for health-decision making, disease management and navigation of the health care system."[42(p.6)] According to the VEHL model, a number of factors including patient, provider, relational, and system characteristics influence VEHL, which in turn influences health outcomes. For example, a patient's VEHL influences their understanding of information provided by the provider and their use of this information including adherence to treatment recommendations and discharge instructions. Communication through the aural (ie, hearing) and oral exchange of health information (ie, speaking) between patients and providers is essential to patient care. Hearing loss disrupts these exchanges (ie, the listening component of communication) but may be mitigated through the use of an amplification device. An adapted VEHL model focusing on the listening component ([Figure]) guided the qualitative study and included (1) patient characteristics (hearing loss, attitudes, perspectives, previous experience with hearing aids, communication strategies, and ED setting), (2) provider characteristics (communication strategies, previous experience), and (3) system characteristics (in-ED interactions, access to VA hearing care). The adapted model was used to inform the interview guide, generate a priori codes, and help guide directed content analysis.

Purpose

The purpose of this qualitative descriptive study was to describe patient and provider perspectives of feasibility and potential benefit of providing a hearing assistance device, a PA, during visits to an emergency department in an urban setting affiliated with the Department of Veterans Affairs.

Methods Qualitative Approach

This was a qualitative descriptive study that elicited perspectives of veterans (eg, previous experience, attitudes, preferences, ED experience) and providers (eg, in-ED experience, communication strategies) about hearing screening in the emergency department and the use of a PA as a strategy to facilitate patient-provider communication. The qualitative descriptive design[43] is appropriate to answer specific questions, such as our study purpose; the underlying philosophical orientation is naturalistic inquiry.[43] As such, qualitative descriptive studies may be guided by a theory to varying degrees; in this study, the VEHL model was used to guide data collection and analysis. In qualitative descriptive studies, a common data analytic approach is content analysis; interpretation is low inference given that the intent is to generate an accurate description of the experience.[44] Findings of a qualitative descriptive study have great potential for translation to address important health issues and identify strategies to improve care, for example, developing or refining interventions and addressing health disparities through program

development.[44]

Setting

This study was conducted in a large urban VA emergency department that provides care to more than 12,000 veterans annually. The setting had dedicated space for confidential recruitment and interviews.

Sample

A purposive sample of veterans from the HearVA RCT intervention arm (n = 11) participated in interviews about being screened for hearing loss and their experiences with the PA. Veterans presenting to the emergency department were eligible to participate if they were (1) aged ≥60 years, (2) English speaking, (3) likely to be discharged to home based on the Emergency Severity Index criteria,[45] and (4) scored ≥10 on the Hearing Handicap Inventory –Screen.[46] Individuals were excluded if they had cochlear implants or a cognitive or neurological condition that limited their ability to consent. Maximum variation sampling[47] of veterans was used to ensure that cases provided maximum heterogeneity on key attributes (eg, race, age, and sex) that could be important in understanding utility of the device. The sample characteristics were monitored by the principal investigator, and the veteran sample size was judged to be sufficient when data saturation[48] occurred after the 11th interview.

We conducted interviews with 10 VA providers to gain their perspectives on their previous experiences with patients with hearing loss and the use of the PA during the ED encounter. We purposively selected VA providers who were assigned on a regular basis to work in the emergency department (eg, not temporary or on rotation assignment) and provided direct patient care (eg, physicians, nurses, midlevel providers). The purposive sampling plan ensured that selected providers were knowledgeable about the VA emergency department and able to provide perspectives that inform study aim. The provider sample size was determined to be sufficient when data saturation[48] occurred after the 10th interview.

Ethical Considerations

The study was approved by the appropriate institutional review boards (Department of Veteran Affairs NYHHS IRB Committee Expedited Review PROJECT TITLE: [1575047-3] - [HearVA-ED] Hearing Impairment, Strategies and Outcomes in VA Emergency Departments). The informed consent process included a detailed description of all of the study components, an information sheet about the interviews and sufficient time to have questions answered by a research assistant. Veterans and providers gave an informed consent for audiotaping the qualitative interviews. Data were deidentified; audiotapes were destroyed after professional transcription.

Data Collection

Subjects were interviewed individually by a research assistant trained in qualitative interviewing. For the veterans, a semistructured interview guide consisted of a series of open-ended questions (“tell me about your hearing problem” “what did you think of the...”) and probes (“how did you use the …”) that focused the interview while allowing the participant to speak freely and provide information about their use of the device. Qualitative interviews with the providers followed the same format of open-ended questions (“tell me about taking care of patients with a hearing loss in the ED”), with follow-up probes (“what strategies do you use…”; “how have you /your patient used the...”) that focused on their interactions with veterans with hearing loss in the emergency department and barriers and facilitators to assessing hearing loss in the emergency department and the use of a PA with their patients.

Data Analysis

Interviews were audiotaped and transcribed verbatim. Qualitative data were analyzed using directed content analysis[49] and Atlas.ti V8.4 (Scientific Software Development GmbH). Following the analytic steps of Miles and Huberman,[50] transcripts were reviewed line by line and coded. Consistent with directed content analysis, codes were developed a priori based on study aims and the VEHL model; additional codes were added during the analysis.[49] All

analytic decisions, impressions, and the researcher reflections on data collection were recorded. The software's analytic tools including co-occurring codes and networks were used to identify patterns within the qualitative data. Veteran narratives were analyzed first followed by provider narratives. Then patterns were examined across veterans and providers looking for commonalities and differences. The patterns of data yielded key findings that summarized the perspectives and feasibility of the point-of-care PA use in the VA emergency department.

Methodological Rigor

Methodological rigor was assured through an audit trail, regular meetings with experts and member checking, the process by which findings are validated as representative of the experience of the participants.[51] The research assistant recorded reflections after each interview to capture potential influences during data collection.[52] Before coding and analysis, transcriptions were reviewed showing 100% accuracy. The audit trail consisted of methodical memoing of all analytic steps and decision making throughout the study.[51] For example, we tracked the addition of codes with definitions, codes that were merged, and decisions regarding categories and patterns. The audit trail enhanced study credibility.[51]

The research team consisted of experts in nursing, emergency medicine, hearing, and geriatrics; they met biweekly to review findings. During peer debriefing, the audit trail was reviewed, and validation of the conclusions by content experts was achieved. Finally, member checking involved discussing the preliminary findings with clinical and veteran stakeholders to ensure that the findings were representative of their experiences, thereby increasing study credibility and confirmability.[51]

Results Study Participants

The veteran sample (n = 11; mean age 80.3 [SD 10.2)] years) was 45% non-Hispanic White, 27% non-Hispanic Black, and 18% Hispanic White ([Table 1]). This sample reflects the range of variation on key characteristics in the HearVA RCT sample, with the exception that no females were interviewed (in the HearVA RCT, 98.3% of the 133 veterans were male). The providers (n = 10) included 7 nurses and 3 physicians.

Qualitative Findings

A key finding of our analysis is that in the VA ED setting, hearing loss influences patient-provider communication and current approaches are inadequate. Screening for hearing loss in the emergency department was feasible (eg, "it is welcomed!"), except in urgent/emergent cases. Providing the PA was perceived as very beneficial in that it improved the ED experience for veterans and clinicians (e.g., "everyone wins"). Both veterans and providers described frustration in past experiences and challenges to communication and favorable perspectives on the PA use.

One veteran, a Black male in his 80s with known hearing loss described his ED experience and perspective of the hearing assessment and PA use as feasible and beneficial, improving communication and alleviating frustration.I'll ask them could you talk a little louder. Could you write it down? That's what I usually do. Some are very nice, some get impatient, but most understand…it's frustrating…repeat it two and three times…have to raise their voice. I see their frustration…I don't blame them. This time I was here in the emergency department…I really had my mind on other things, but the fact that some of my hearing questions were addressed I felt good about that… and [PA]'s functional…without it I'd feel helpless again….

Similarly, an experienced emergency nurse described a common clinical experience caring for veterans in the emergency department and the feasibility of the point-of-care hearing assessment and PA use:Hearing is one of the vital senses. A lot of patients need to be evaluated…but wouldn't dedicate time…so what usually happens here…we get louder and louder…. Communication is the key! You don't want the patient to misinterpret what you're saying…you want them to hear what you ask and not guess. This [PA] is perfect; we can stay on top of the game. In most cases if the patient can actually hear what you're saying, they can probably understand what you're

asking…trying to convey.

In the paragraphs that follow, we summarize key findings and provide illustrative quotations from veterans and providers in Table 2.

Finding 1: Usual Care Does not Support Effective Communication for Veterans With Hearing Loss

Most veterans knew they had hearing loss, recounted previous hearing tests, and were aware that the VA system offered access to hearing aids. It is noteworthy that even those who had hearing aids reported that they often did not use them in the emergency department for 2 key reasons: (1) fear of losing them within the course of the ED visit and/or hospitalization and (2) diminished effectiveness in the ED setting (eg, owing to background noise). Others said that their hearing aids were not working, were difficult to use/adjust, or, if lost, had simply not been replaced, leaving them with untreated hearing loss. As a result, veterans had difficulty hearing and understanding and felt at a disadvantage navigating their ED encounter and follow-up care.

Providers described the need for and value of identifying veterans with hearing loss. Usual strategies to communicate with veterans with hearing loss in the emergency department included repeating content, talking loudly, using a writing board, and speaking into a stethoscope. These were judged inadequate.

Finding 2: Screening for Hearing Loss in the Emergency Department is Generally Acceptable

Veterans and providers were favorably disposed toward screening for hearing loss in the emergency department. They said that the hearing assessment and brief instruction on PA use did not inhibit/slow workflow or patient evaluation and treatment flow, but rather was an efficient use of “lots of waiting time.” The disclaimer by both groups was that if the emergency department was particularly busy or the patient was seriously ill, hearing assessment was a low priority.

Finding 3: Using the Pa Made Communication More Effective and Less Effortful

Both groups reported that PA use facilitated communication in the emergency department. Veterans noted ease of use, convenience, and quality, and some were eager to use it for other health care visits and beyond the health care setting. Only 2 veterans noted barriers to use; 1 veteran with housing insecurity voiced a safety concern about using the device outside of the health care setting, that is, being seen as having something of value that would make him a crime target. Another noted that although he liked the device, there would always be those who would oppose innovation (“knuckleheads” who “won’t agree with nothing.”) Providers reported that communication was easier because there was less need to raise their voices or repeat questions and instructions. They perceived that veterans seemed to understand better when they used the PA.

Discussion

Many older veterans with undiagnosed or uncorrected hearing loss who present for ED care are at risk of adverse consequences related to poor patient-provider communication in the ED environment.[9,24,25] This study addresses an important knowledge gap in nursing science and emergentology by describing the feasibility of a simple point-of-care intervention that can facilitate communication in ED patient populations with a high prevalence of hearing loss.

The key finding of this study, that hearing loss influences patient-provider communication and current approaches are inadequate, highlights a significant and persistent issue in the care of veterans with hearing loss in the emergency department. The emergency department presents one of the most challenging listening environments in clinical settings.[53,54] Noise levels exceed the level of normal conversational speech, challenging communicative effectiveness even for those with intact hearing.[4] According to Eckert et al,[55] stressful listening situations tend to affect the ability to cope with and communicate in different environments. Research suggests that it is not the severity of hearing loss but self-reported feelings of frustration, embarrassment, irritability, and discomfort when communicating with others that most affect speech understanding ability in the laboratory setting.[56] Furthermore,

individuals with hearing loss have higher odds of rating their satisfaction with communication with their providers as unsatisfactory, are less likely to rate the overall quality of their health care as satisfactory, and may choose to avoid medical visits because they are stressful and frustrating.[57,58]

Findings from this qualitative study complement those from our HearVA pilot study that evaluated the outcomes of objectively measured communication and readmissions to the emergency department. In the quantitative study, we found high receptivity to the intervention (66.2%; n = 133 screen positive patients agreed to participate) and improvements in hearing and understanding among those provided with the PA.[40] This qualitative study describes the subjective experience: both veterans and clinicians were eager to find a way out of the hearing loss status quo of miscommunication and reported that the PA was easy to use and effective. In addition, both groups found screening for hearing loss in the emergency department to work well, with the caveat that it should not be done in emergent settings.

Many of the experiences described here are all too familiar to health care providers who care for patients with hearing loss in the emergency department and have experienced miscommunication, frustration, and failure while providing care.[59-61] What is new is that we provide subjective reports of success and satisfaction with a scalable intervention, albeit within a small and circumscribed sample.

We focused on veterans with hearing loss who received care in the VA emergency department; however, it is worth emphasizing the scope of the population with hearing loss and the magnitude of impact in ED settings. Hearing loss is common among older people; starting at the age of 50 years, the prevalence doubles with every decade and by the age of 70 years, two-thirds of older adults have a clinically significant loss.[2] Adults aged 60 years and older with hearing loss make an estimated 12.09 million ED visits and have 7.39 million acute care hospitalizations every year.[62] Many veterans have dual access benefits and may access VA or non-VA emergency care.[63] Thus, improving communication in ED settings could improve history taking, communication about procedures, adherence, patient education, and understanding of discharge instructions for millions of veterans and nonveterans receiving ED care.

Limitations and Strengths

There are several limitations to this study. The sample was recruited from 1 VA medical center in the Northeast. Although the VA system has similar health care delivery systems and benefits across geographical areas, some care and access to services may vary, and results could differ in different settings. We recruited a racially/ethnically diverse sample; however, we did not have any female veterans in this sample. Efforts to engage female veterans in future research is needed. Veteran perspectives about hearing health care may have been altered by exposure to this intervention, which was provided at no cost and conveniently in the emergency department thus eliminating typical barriers to care. Veterans also potentially benefited by having additional interactions with research staff before these interviews. Perspectives might be different without such exposure. Interviews with our provider sample and the veterans took place during weekday and weekend day shift, so experiences and perspectives may vary at other times. Our decision to limit hours of data collection was in consultation with clinical stakeholders and intended to minimize disruption to patient care. It is also important to note that this study took place before the pandemic. There may now be additional communication challenges associated with face masking and the need to socially distance that were not explored in this study.

Implications for Emergency Clinical Care

The average ED background noise level of 61 to 69 dB challenges communication, even for those with normal hearing.[4] In the noisy ED environment, patients with untreated hearing loss require increased listening effort and demands on their cognitive resources.[9] Our study that included both veteran and provider interviews provides insight into the communication process and challenges that veterans with hearing loss face in the emergency department.

Notably, there was a discrepancy between health care providers' perceptions about hearing assessment in the veteran population and veteran actual experience of hearing assessment. Although health care providers reported that veterans did not know they had a hearing loss, all of the veterans in the study knew they had a hearing loss but many did not have adequate treatment. Our findings from both groups affirmed that existing tactics to address communication between providers and veterans with hearing loss are inadequate. Bridging these gaps is essential to improving care in the emergency department and outcomes after discharge. Emergency nurses are ideally suited to champion innovative strategies to address this patient safety and clinical practice issue for ED patients.

Our findings suggest that a point-of-care hearing assessment and use of a PA may be extremely useful in the VA emergency department. Point-of-care hearing assessment that is integrated with medical intake or history taking may identify undiagnosed or untreated hearing loss that can be addressed using a PA and be followed with referral to an appropriate VA audiology provider. Success with hearing assessment and the assistive device may reinforce the treatment need for veterans. We report that point-of-care use of a PA is an easy-to-use method to facilitate communication between provider and patient. Veterans reported ease, acceptability, and feasibility in the emergency department and across other clinical visits at the VA. Ineffective communication as described by our sample is frustrating and time consuming to both veterans and providers, but veterans may be reluctant to bring or use their hearing aids in the emergency department. Emergency nurses should be aware of potential barriers to hearing aid use in the emergency department that includes fear of losing the devices and diminished effectiveness in the ED environment. Improving communication may lead to better understanding of discharge instructions and potentially lower ED recidivism. Because hearing loss has been associated with health care utilization and social isolation,[64] such interventions have potential to improve quality of life in older veterans.

Hearing loss ranks as a top health compensation and occupation-related disability among veterans[11] and is one of the most prevalent chronic conditions among older adults in general.[2] Accommodations for those with hearing loss are needed to ensure health equity and access to health services.[65] Our results provide a point-of-care accommodation that may be implemented by emergency nurses for those with hearing disability. Given the health disparities associated with hearing loss, facilitating effective patient-provider communication is paramount.

Conclusion

A simple, acceptable device may alter the hearing loss status quo and how patients and providers are able to communicate. Providing the PA improved the ED experience for patients and providers in our study and offers a promising intervention that could improve health care quality and safety for a large patient population.

Author Disclosures

Conflicts of interest: none to report.

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n = 11	Mean	SD
Age, y	80.3	10.2

N = 21	From veterans (n = 11)	From providers (n = 10)
Usual care does not support effective communication for patients with hearing loss.	“Had it tested at the VA…the VA gave me hearing aids…. I don’t bring them… I don’t want to lose them.”Let’s put it this way, I have them [hearing aids]… I’m supposed to use them...with the shouting, banging all here...let’s put it this way…if they are looking at me…and I lean in closely, maybe I can hear some…but there’s a good possibility I wouldn’t hear... I wouldn’t understand.	Communication is the biggest issue…taking a proper history is key. If [veteran] can’t hear and understand what we're saying...that impacts what they tell us….Most don’t know they’re hard of hearing…have to speak loud…it’s almost like [veteran] reads lips to fully understand or write notes back and forth….“Put your stethoscope in the patient’s ears and you speak into the bell…”
Screening for hearing loss in the emergency department is generally acceptable.	“A good use of time….“ “We’re definitely a captive audience…. Lots of waiting.”	“While they wait...that’s a perfect opportunity to just evaluate…be proactive.” “… it helps all of us--the providers and the veterans!”
Using the PA made communication more effective and less effortful.	“It’s simple enough. Just turn it on and it just works… could just adjust it right quick…”This one [the PA] doesn’t pick up everything when I turn it on like the others do with [the PA], I could figure out what the specialist was tellin’ me; [doctor] didn’t have to scream it to me….It’s is easy, very clear sound…makes me comfortable… not strain to listen…. I take it to other doctors….	They don’t ask the same question over and over…. I think it’s because they are hearing me for the first time….It seems to boost their understanding…they are able to answer you, repeat back… they aren’t just guess at what you’re saying....

DETAILS

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Analysis of a Consecutive Retrospective Cohort of Strangulation Victims Evaluated by a Sexual Assault Nurse Examiner Consult Service: JEN

ABSTRACT (ENGLISH)

Objective

The purpose of this study was to review the evaluation of strangulation victims assessed by a sexual assault nurse examiner (SANE) service. The primary objective was to produce observational results on documented injury frequency and secondarily to explore advanced imaging use, outcomes, signs/symptoms, and documentation.

Methods

This was a retrospective analysis of a cohort of 130 consecutive strangled patients over a 42-month period evaluated by a SANE consult service in a metropolitan area. A single investigator extracted medical records for demographics, history, imaging, injuries, disposition, and both presence and documentation of a number of signs/symptoms. A second investigator independently extracted greater than 30% of the total charts with universal agreement. Data were analyzed with descriptive statistics.

Results

Patients were primarily female (129:1) and their age averaged 30.6 years. Time from event to presentation varied. There were no major brain or neck injuries detected (0%; 95 confidence interval, 0-2.31), and all patients were discharged in stable condition. Imaging was used in 23 patients (17.7%). Certain signs and symptoms were more common than others, and documentation frequency of signs and symptoms varied.

Conclusion

In this retrospective cohort of 130 consecutive nonfatally strangled awake patients seen as SANE consults in a single emergency department, there were no major injuries documented. The most common signs or symptoms were neck pain, neck markings, and loss of consciousness. Imaging was used in 17.7% of the patients. Presence or absence of neck pain, neck markings, and altered mental status were most consistently documented. Seizure, subcutaneous emphysema, and carotid bruit were least consistently documented.

FULL TEXT

Contribution to Emergency Nursing Practice

••What is already known on sexual assault nurse examiner assessment of nonfatal strangulation is that the advent of sexual assault nurse examiner care over the last few decades has improved the quality and consistency of the overall care of this vulnerable population. There is some limited research in varied populations on injury patterns and standard ED assessment in this context.

••The main findings of this paper are that no serious brain or vascular injuries were documented, imaging was ordered in a minority of patients, and there was no clear prognostic link with any presenting signs or symptoms and any injuries documented.

••Recommendations for translating the findings of this paper into emergency clinical practice are for emergency departments to recognize that although strangulation injuries can be devastating, major injuries are not commonly documented, advanced imaging should be used selectively, and work needs to be done to improve guidelines on use of both imaging and documentation.

Introduction

Sexual assault nurse examiner (SANE) programs formally began approximately 50 years ago, with multiple hospital systems committing to this process during the mid to late 1970s.[1–4] It was recognized that the standard care for victims of sexual violence could be improved drastically by using specially trained providers and an organized

approach.[5] Over the past several decades, the SANE practice model has been analyzed and refined to make service delivery more efficient for hospitals and patients.[6] SANE encounters are recognized as incredibly valuable to the consulting hospital system, and, more importantly, the quality and trauma-centered expertise are appreciated by the patients themselves.[7] Strangulation events are very common among patients undergoing a SANE evaluation and in patients who have been victims of assault. More than two-thirds of domestic violence victims have been strangled by their partners in their lifetime, and just less than half of domestic violence victims have been strangled in the last year.[8] Although reported strangulation frequency varies, it is common and occurs in as many as one-third of domestic violence patients.[9-11]

Strangulation is compression of the neck, affecting any part of the local anatomy. It is occasionally referred to as choking, but choking is technically obstruction of the lumen of the airway, usually from inside.[12] Injuries can occur with strangulation, although they are not common.[13,14] However, when injuries do occur, they can be devastating. Strangulation is involved in 5.9% of intimate partner–associated homicides,[15] and the rate of homicide by asphyxiation in the United States is in the range of 0.2 per 100,000 women ≥15 years old.[16] The most severe injuries that occur in this context are typically caused by prolonged neck compression leading to brain ischemia, injuries to neck vasculature such as dissections to the carotid or vertebral arteries, or damage to the airway. Reduced cerebral perfusion pressure, either primarily from the neck compression or secondarily from arterial injury, can lead to infarction akin to ischemic strokes that occur commonly outside the context of strangulation. This can be focal or global, depending on the mechanism and pathophysiology induced by the event. Loss of consciousness (LOC) can occur in less than 10 seconds during an effective strangle.[17] Although brief strangulation (events lasting through a few seconds after LOC) rarely results in serious injury,[14] serious injuries including death can occur in as little as 1 to 3 minutes of an effective strangle causing decreased perfusion pressure.[18] Recognition of symptoms and signs of strangulation is vital for emergency clinicians.[19] This is not always easy though. In a large series of domestic violence-related strangulations, Strack et al[20] found that only 50% of women showed any external physical injuries from the strangulation. Of those with injuries, 35% were minor, and just 15% were significant enough for photographic documentation. Even in strangulation homicides, there may be no external physical signs of strangulation.[21] For this reason, to maximize detection and appropriate management, an organized approach to assessment and documentation of strangulation victims is vital. There have been multiple guidelines for the assessment and management of victims of strangulation-related interpersonal violence.[22,23] National organizations have taken a position to help organize the health care community to address the needs involved in caring for this vulnerable population.[24] SANE practitioners can be the front line to evaluate these patients carefully and document in a thorough fashion, and in addition, help address the physical and psychological consequences of intimate partner violence.[25]

The purpose of this study was to conduct a review of strangulation injury assessment in patients being evaluated by a metropolitan area SANE consultation service. These were patients seen by SANE practitioners in the emergency department who reported strangulation as a part of their assault. This study does not include patients not reporting strangulation, nor does it include strangulation in other contexts presenting to the emergency department. The primary objective was to produce observational results to contribute to the existing knowledge of the frequency of discovery of major injury, such as ischemic brain damage, major vascular injury, or airway injury. Secondarily, the goal was to explore use of advanced imaging, outcomes, presenting signs and symptoms, and documentation of those signs and symptoms.

Methods Study Design

This investigation was a retrospective consecutive cohort performed via electronic medical record (EMR) review.

Setting

A review was conducted of every patient who received a SANE evaluation involving reported strangulation over a 42-month period (August 2017 to January 2021). The involved SANE service cares for patients across a large portion of a metropolitan area; however, each of the involved patients happened to be seen in a single large urban level 1 trauma center. This SANE service is involved in the evaluation of reported sexual assault victims after the initial patient evaluation has been completed by the ED care team. The consultation is initiated after the combination of the primary nurse and either physician or physician assistant have agreed that SANE services are needed. This investigation was determined as not considered human subjects research by the HealthPartners/Regions Hospital institutional review board.

Participants

The medical records were identified from a pre-existing approved protected database of SANE consults. Over the analyzed time period, part of standard mandated SANE practitioner case documentation was to record whether or not a strangulation was reported, thus making this a consecutive body of cases to analyze to the extent that this standard database case entry and the reported history were accurate. This documentation also included noting the presence or absence of the signs and symptoms analyzed in this study, although this specific signs and symptoms documentation was not mandated. Cases would have been excluded from this investigation if ED documentation failed to verify the reported strangulation event; however, all cases identified are represented in the presented analysis because this failure did not occur with any case.

Variables

Once cases were identified, the following information was extracted from the electronic health record: age at time of event, sex, race, brief event description, time between event and ED presentation, whether or not advanced imaging was done, type of imaging done, whether or not there was major injury detected (brain injury or vascular injury diagnosed), description of head or neck injury, condition on discharge and then presence or absence of visual symptoms, orofacial petechial hemorrhage, ligature marks or abrasions on neck, neck swelling, neck pain, seizure, unexplained altered mental status, limb numbness, limb weakness, dysphonia or aphonia, subcutaneous emphysema, carotid bruit, incoordination, and LOC. Documentation of the presence or absence of these findings was extracted, and it was also noted whether these findings were not mentioned by the SANE practitioner or the emergency clinician. The last piece of information extracted was whether the patients' current medical problem list included a present or past diagnosis of stroke or cervical artery dissection; if so, further investigation would have been done to try to source the timing of that injury. To help determine the likelihood that the medical problem list had been updated during a follow-up encounter, it was also noted whether or not the patient had contact within the medical system after the investigated strangulation encounter. All extracted data were kept in a secure database within a secure drive.

Data Sources/Measurements

The EMRs served as the primary data source. The date of the SANE encounter was known, and the visit from that date was accessed. Most of the data points were extracted from the documentation of the SANE practitioner and ED provider. Of note, in this particular ED setting, each of the patients was formally evaluated by either an emergency medicine physician or physician assistant along with the SANE practitioner. The documentation from these providers, the nurses, and emergency room technicians all appear in one unified documentation list. The investigators performing the data extraction also searched for radiologic studies associated with the encounter under investigation. In addition, the extractors looked at the main summary page within the record to access the patient's active and past problem list to verify whether or not the injuries mentioned earlier were present.

Bias

One of the main potential sources of error or bias was the chart extraction process. A single investigator extracted each of the charts involved. A second investigator independently extracted multiple random blocks of 10 consecutive charts until they had repeated greater than 30% of the total. If extraction observations varied at all, then formal interobserver agreement analysis was to be done.

Study Size

SANE evaluations were mandated to include the presence or absence of strangulation beginning in August 2017. All patients who were seen by the SANE service and had reported a strangulation between August 2017 and January 2021 were included in this study. The goal of this venture was to present all available data transparently in descriptive fashion as opposed to attempting to reach a particular number of subjects to drive significance.

Quantitative Variables

All variables described earlier were simply counted as a proportion of the entire available dataset of patients.

Statistical Methods

Data are presented in raw form with the addition of proportions of various self-explanatory denominators. The only statistical analysis on the proportions offered is a 95% confidence interval (CI) surrounding the proportion of patients with detected major injury (stroke, vascular injury, neck structural damage). Because none were detected, the zero-event principle was applied, simplifying the 95% CI from a complex proof to [3/n × 100], where n is the total denominator of the group in which the zero events were detected, in this case the full data set of patients. The 3 in the [3/n × 100] can vary depending on context and dataset; however, 3 is most standard in the context of this investigation.[26]

Results

Over the analyzed time period, 130 strangulation cases were identified. All 130 medical records were evaluated for data extraction by a single investigator. A second investigator independently extracted 40 records in 4 random blocks of 10 consecutive charts. There was universal agreement between the 2 investigators. Given this rate of agreement with more than 30% cross-observations completed, the primary rater's extraction was deemed acceptably reliable per convention. No cases were excluded for not having a reported strangulation event.

The average age of the patients was 30.6 years (median, 28.5; standard deviation, 11.1). They were predominantly female (129:1). Self-identified race was White (50.8%), African American (22.3%), mixed (16.2%), Hispanic (5.4%), Asian (3.1%), and Native American (2.3%).

The elapsed time between the assault and the presentation to the emergency department for SANE contact varied greatly: The average was just more than 30 hours. However, the mean is skewed because of some very large gaps in time. The median time was 13 hours, the standard deviation was 42 hours, and 27 of the patients presented within 5 hours of the event.

There were no brain injuries or vascular injuries detected within the analyzed group (n = 130; zero event 95% CI, 0-2.31). There was one patient with an abnormality noted on a computed tomography (CT) angiogram of the neck: a filling defect in an internal jugular vein, reported by the radiologist as potentially consistent with a thrombus. That patient had no other abnormalities on that CT angiogram of the neck nor on the CT head. A follow-up formal ultrasound of the neck during that hospital visit revealed normal flow in all examined neck vessels, including both internal jugular veins. During evaluation by the emergency physicians and the SANE practitioner, the patient had visible abrasions and bruising on the neck with tenderness in those areas but no documented swelling. There were no other abnormal findings documented in the history and examination. This patient was discharged in stable condition and had no follow-up visits or follow-up documentation in the EMR indicating ongoing issues related to the

potential CT findings. In fact, all 130 patients were deemed stable on discharge and none had follow-up visits or diagnoses of brain or neck pathology in their ongoing medical problem list on review of the medical record (which is not inclusive of visits that may have happened or injuries documented outside of the pool of hospitals automatically included in our medical record system). Of the 130 patients included, 89 had visits within the accessible system. Advanced imaging of the head and/or neck was completed in 23 of the 130 patients (17.69%). The imaging performed for those 23 patients is presented in [Table 1]. The presence or absence of signs and symptoms varied greatly, as did the frequency of documentation (see [Table 2]).

Discussion

The primary objective of this exploration was to determine the frequency of serious strangulation-related injury detected in 130 consecutive patients seen by an urban SANE consulting service. There were no ischemic strokes, cervical arterial dissections, cervical spine fractures, airway injuries, or other significant neck injuries noted in this study population. The detected major injury rate of 0% (95% CI, 0-2.31) is similar to previous work using a similar patient population. Matusz et al[13] found major injuries in 0.6% (95% CI, 0.1-2.0) of alert strangulation victims. This distinction is important; the SANE service included in the present study conducts consultations on all patients needing their specialty care. All 130 patients included in this study were awake and alert enough to provide history and participate in the examination. Neck pain and ligature marks/abrasions were the most common presenting symptom and sign, respectively, among these 130 patients. Neck pain as the most common presenting symptom is consistent with previous work.[13] The third most common finding was LOC. LOC was reported in 23 patients, and another 6 were not certain whether or not they lost consciousness. This frequency is comparable with previous literature[13] and is not surprising, given that the LOC can occur in under 10 seconds during a strangulation encounter.[17] LOC has been suggested as an indication for advanced imaging independent of the status of the patient at the time of evaluation.[23] However, in awake and alert patients, transient LOC alone does not necessitate imaging.[13,14] LOC from brief strangulation is akin to LOC from syncope because of a transient alteration in cerebral perfusion.[27,28] Brief LOC from strangulation does not generally lead to poor outcomes,[13,14] and advanced imaging is not likely to be helpful in the absence of other findings. Certainly prolonged strangulation (as little as 1-3 minutes of reduced cerebral perfusion pressure) can lead to anoxic brain injury and death,[18] but in patients with a brief LOC, no neurologic symptoms, and a normal neurologic examination, advanced imaging seems unlikely to add to the evaluation.

The discussion of advanced imaging in the context of strangulation victims needs to be focused on CT angiography (CTA) of the neck. X-ray and ultrasound are not helpful for the most part in diagnosing the injuries of concern; noncontrast CT of the neck does not provide the sensitivity necessary to detect vascular injuries; and magnetic resonance imaging, although very informative, is not universally available. Although cervical vascular injuries are rare, CTA is considered the most appropriate imaging modality for identification.[29] However, some studies[13,29] indicate that the frequency of such injuries is likely greater than previously thought.[30] There are proponents of broad use of imaging in strangulation victims because of the real but small chance of devastating injury and also because of the possibility of occult injuries, which can be missed because of underwhelming signs and symptoms.[23,31] Recommendations such as these, using common signs and symptoms in isolation to drive CTA imaging, are supported mainly by anecdotes. In some studies with collated data on strangulation presentations and subsequent workups, including this study, injuries cannot reliably be predicted by presence or absence of various findings on history and examination.[13,29] There are known risks of CTA imaging, primarily cancer risk from radiation exposure and possibility of allergic reaction to intravenous contrast.[32] In addition, there is the psychological aspect of exposing a recently assaulted patient to a more invasive workup, cost, and a longer stay in the emergency department. This

cannot be discounted in a scenario where the short- and long-term psychological effects are already problematic.[25] Given the above mentioned information, emergency physicians and SANE consultants need to take into account the context of the history and examination to act in accordance with their clinical suspicion to perform the appropriate evaluation. In the 130 patients studied here, 23 had advanced imaging done. The imaging profile shown in Table 1 does not represent workups done solely for strangulation-related injuries. Many of these cases, such as sexual assaults in general, included other forms of trauma as well, including blunt head and neck trauma necessitating head or cervical spine CT.

Documentation in the medical record is an interesting portion of this study's secondary outcomes. Presence or absence of neck pain, ligature marks or abrasions, and altered mental status were more consistently documented than any other findings. The findings most often not documented as being present or absent were seizure, subcutaneous emphysema, and carotid bruit. Of the 130 patients within the analyzed group, there were no significant injuries detected. As such, the lack of documentation of some of the potential strangulation-related signs and symptoms likely represented a lack of clinically significant examination findings that had the potential to change management during the ED course, at least as interpreted by the ED providers and SANE practitioners at the time. This inconsistent documentation represents an opportunity to bolster the approach to assessment and documentation in the future. Complete documentation would include noting the presence or absence of each of the signs and symptoms listed, along with a few others, as important findings in multiple strangulation studies and guidelines including the present work.[13,23,29] This sort of complete documentation could facilitate future research and help identify patients who require advanced imaging and those who can safely forego it.

Limitations

This was a retrospective study as opposed to a prospective data gathering venture. Evaluation of this consecutive series of patients was limited by the information gathered by the providers caring for the patients during each visit, and providers were not asked to retrospectively provide explanation for a lack of documentation of specific examination findings that could have been present in patients reporting strangulation. However, this was part of the goal of the study, in that the presence or absence of documentation itself was an outcome measure.

This group of patients was large enough to contribute to existing literature on the topic, but not large enough to generate significant prognostic patterns of certain findings. In addition, there were no serious physical injuries detected in this patient group, further limiting commentary on predictability of injury based on signs and symptoms. Moreover, signs and symptoms in some cases may have limited utility given the time between the reported strangulation event and the ED presentation.

The 130 patients in this study were awake and alert and could participate in providing history to the providers. Because of this, it should be noted that this study cannot directly inform readers on information on approach to patients who present for care with severe altered mental status or coma. This population is complicated both because of the difficulty of consenting for a full SANE examination during involvement and because of their lack of ability to translate the aforementioned symptoms that might clue providers to do further workup for strangulation-related injuries.

This was a single-center study, and therefore, the local or regional practice standard may have impacted or biased assessment, workup, and documentation.

Follow-up was limited within this patient group, and the follow-up available within the EMR was not robust enough to claim to have identified injuries that might have been missed during the initial visit.

Of note, if this study is used as a platform for prospective data gathering on this topic, the authors would suggest adding headache, memory problems, involuntary loss of bowel or bladder control, and dysphagia to the signs and

symptoms commented on in these current methods and results. These 4 items were not included here, but would be very reasonable to include in future work.

Implications for Emergency Clinical Care

This descriptive study may affect the SANE approach to assessment and management of ED strangulation victims. It reinforces that serious injury is rare and also that documentation for strangulation signs and symptoms can be improved. More research is needed to determine which strangulation patients would benefit from advanced imaging.

Conclusion

In this group of 130 consecutive SANE consults in alert strangulation victims, there were no major brain or vascular injuries detected (0%; 95% CI, 0-2.31). The most common presenting signs or symptoms were neck pain, ligature mark or abrasion, and LOC. Advanced imaging of the brain, neck vasculature, or cervical spine was used in 23 patients (17.69%). Presence or absence of neck pain, ligature marks or abrasions, and altered mental status were the most consistently documented by a combination of the emergency physician or SANE consultant. Presence or absence of seizure, subcutaneous emphysema, and carotid bruit were least consistently documented. Future research is needed to help guide the workup of strangulation victims who are awake and alert in the emergency department given that significant injuries are not commonly documented.

Author Disclosures

Conflicts of interest: none to report.

Type of imaging	Number of patients	% of total imaged
CT head alone	9	39.1
CTA neck alone*	6	26.1
CTA neck, CT head	4	17.4
CT head, CT C spine	1	4.3
CTA neck, CT C spine	1	4.3
CTA neck, CT head, CT C spine	2	8.7

Sign/symptom	Yes	%	No	%	Not documented	%
LOC	29*	22.3	36	27.7	65	50.0
Vision symptoms	2	1.5	66	50.8	62	47.7

Orofacial petechiae	7	5.4	92	70.8	31	23.8
Ligature mark/abrasion	39	30	88	67.7	3	2.3
Neck swelling	2	1.5	62	47.7	66	50.8
Neck pain	63	48.5	66	50.8	1	0.7
Seizure	2	1.5	2	1.5	126	96.9
Unexplained AMS	4	3.1	125	96.2	1	0.7
Limb numbness	2	1.5	57	43.8	71	54.6
Limb weakness	0	0	72	55.4	58	44.6
Dysphonia/aphonia	4	3.1	53	40.8	73	56.2
SC emphysema	0	0	9	6.9	121	93.1
Carotid bruit	0	0	9	6.9	121	93.1
Incoordination	1	0.7	48	36.9	81	62.3

DETAILS

Subject:	Neck pain; Medical records; Emergency medical care; Domestic violence; Documentation; Brain research; Injuries; Hospitals; Emergency services; Emphysema; Sex crimes; Victims; Patients; Symptoms; Victims of crime; Trauma; Consciousness; Sexual assault; Consensus; Strangulation; Murders &murder attempts; Convulsions &seizures; Medical imaging; Stroke
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Recharging Through Advocacy and Support of Legislation: JEN

ABSTRACT (ENGLISH)

The Dr Lorna Breen Act helps to support this effort by having the US Department of Health and Human Services (DHHS) support grants that train health care providers on suicide prevention, other behavioral health issues, and strategies to improve well-being. [...]DHHS would be asked to establish or expand programs to promote mental and behavioral health among health care providers involved with COVID-19 response efforts. The second part of the law states that the DHHS will study and develop policy recommendations on preventing burnout and improving mental

and behavioral health among health care providers, removing barriers to accessing care and treatment, and identifying strategies to promote resiliency.

FULL TEXT

We are nearly halfway through 2022 and continuing to support emergency nurses in so many ways. Springtime for the Emergency Nurses Association (ENA) means our annual day on the hill. This day, and general time of year, means that we are able to go to Washington, DC, to advocate for issues that are relevant to our work and to the patients for whom we care. I sincerely look forward to this opportunity to share ENA's priorities with as many legislators as possible.

If you think about Washington, DC, in spring, you likely can imagine cherry blossoms, the monuments, and the National Mall. Admittedly, on my first-ever visit to our nation's capital, I was surprised to hear that the mall did not have any stores! Turns out, the name for the National Mall is derived from a history of lawn games and grand avenue parks that preceded The Mall in London and consists of a host of incredible museums. There are so many opportunities to take in the history of the United States and to learn about those who have helped to guide and lead our country.

Each year, ENA takes our state and chapter leaders and government affairs chairs to Capitol Hill to support legislation that is relevant to our profession. We have 2 dedicated government-relations experts, Richard Mereu and Rob Kramer, who focus solely on emergency nurses and issues that need attention. These 2 experts led efforts related to the Dr Lorna Breen Health Care Provider Protection Act.[1] This bill was passed in the House of Representatives in 2021, passed by the Senate on February 17, 2022, and signed into law by the President on March 18, 2022.

This law is key to the health and well-being of our care team members. Throughout the year, we have highlighted how emergency nurses should recharge and focus on taking care of themselves to take care of others. The Dr Lorna Breen Act helps to support this effort by having the US Department of Health and Human Services (DHHS) support grants that train health care providers on suicide prevention, other behavioral health issues, and strategies to improve well-being. In addition, DHHS would be asked to establish or expand programs to promote mental and behavioral health among health care providers involved with COVID-19 response efforts. The law recognizes the impact on our care team members and asks for specific efforts to help in ensuring their health. COVID-19 has changed the way we look at health care and the work environments our staff experience.

The second part of the law states that the DHHS will study and develop policy recommendations on preventing burnout and improving mental and behavioral health among health care providers, removing barriers to accessing care and treatment, and identifying strategies to promote resiliency. The passing of this law was key to the acknowledgment of the challenges and marks positive progress in addressing the struggles care team members have seen. ENA was there every step of the way and will continue to be as we find ways to recover, redesign and recharge our nurses.

This action and advocacy is only one of the ways in which ENA supports our members in recharging and engaging in their profession. For many, supporting legislation that improves their work environment is rewarding, and I encourage all ENA members to continue to use their voice and advocate for improvement.

Author Disclosures

Conflicts of interest: none to report.

DETAILS

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Woman With Left Pulsatile Exophthalmos: JEN

ABSTRACT (ENGLISH)

In the disease, there are skin, peripheral and central nervous system, bone, and soft tissue involvements, and there is an increase in the susceptibility to cancer.1 NF-1 is seen once in 3000 births, showing autosomal dominant inheritance and affecting many systems simultaneously.2 The NF-1 gene is located on chromosome 17 and encodes a type of tumor suppressor protein called neurofibromin. [...]of incomplete or incorrect folding of this protein, benign and rarely malignant nerve tumors are seen from the early stages of life. Because the disease affects many systems at the same time, the diagnostic criteria have been shaped in this direction. The magnetic resonance angiography imaging temporal lobe was herniated anteriorly with the median cerebral artery, causing the orbital contents' forward shift (Figure 3). [...]we diagnosed the patient as having NF-1 with sphenoid wing dysplasia.Discussion In NF-1 disease, sphenoid wing dysplasia is seen in 5% to 10% of cases.

FULL TEXT

Background

Neurofibromatosis is rarely seen in emergency departments unless it becomes symptomatic. There are 3 types of neurofibromatosis. Neurofibromatosis type 1 (NF-1; von Recklinghausen disease) is the most common of the 3 types of neurofibromatosis disease. In the disease, there are skin, peripheral and central nervous system, bone, and soft tissue involvements, and there is an increase in the susceptibility to cancer.[1] NF-1 is seen once in 3000 births, showing autosomal dominant inheritance and affecting many systems simultaneously.[2] The NF-1 gene is located on chromosome 17 and encodes a type of tumor suppressor protein called neurofibromin. As a result of incomplete or incorrect folding of this protein, benign and rarely malignant nerve tumors are seen from the early stages of life. Because the disease affects many systems at the same time, the diagnostic criteria have been shaped in this direction. Diagnostic criteria include café au lait spots, neurofibromas, axillary and/or inguinal freckles, optic glioma, Lisch nodules (iris hamartomas), typical bone lesions, and NF-1 disease in first-degree relatives.[3] In uncertain cases, genetic testing may be requested to confirm the diagnosis.

In this case, a rare presentation of NF-1 is discussed.

Case

A 45-year-old-woman admitted to the emergency department with swelling, redness, and pulsation of the left eye for 10 days. She was not complaining of any visual problems or foreign body sensation in her eye, and there was no history of trauma. On physical examination, both pupils were reactive to light, and visual acuity was normal in both eyes. Pulsatile exophthalmos (anterior movement of the eyeball synchronously with the pulse) was observed in the left eye ([Video]). In the detailed physical examination, multiple neurofibromas and diffuse café au lait spots were observed on her skin ([Figure 1]; black arrows for café au lait spots, white arrows for neurofibromas). In the auscultation of the left eye, a systolic murmur was identified. She stated that her father also had the same skin lesions. Brain computed tomography and magnetic resonance angiography were obtained to exclude vascular or other pathologies ([Figures 2] and [3]). Sphenoid wing dysplasia was detected on the bone window of the brain computed tomography ([Figure 2]). The magnetic resonance angiography imaging temporal lobe was herniated anteriorly with the median cerebral artery, causing the orbital contents' forward shift ([Figure 3]). Thus, we diagnosed the patient as having NF-1 with sphenoid wing dysplasia.

Discussion

In NF-1 disease, sphenoid wing dysplasia is seen in 5% to 10% of cases. It is unilateral and mostly asymptomatic.[3] Sphenoid dysplasia is generally paired with ipsilateral temporal arachnoid cyst, which usually blocks the anterior

herniation of the temporal lobe,[4] but in our patient the temporal lobe was herniated anteriorly with the median cerebral artery causing the forward shift of the orbital contents. In this way, pulsatile proptosis and systolic murmur were observed in the left eye's auscultation.

Patient Consent Form

The patient has provided the authors with written consent to publish this work.

Author Disclosures

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Supplementary Data

Video

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2021.12.007.

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A Cross-Sectional Geographic Information Systems Study of a Pediatric Emergency Department Child Restraint System Distribution Program: JEN

ABSTRACT (ENGLISH)

Introduction

A pediatric ED program sought to promote injury prevention through distribution of child restraint systems. Program funds are paid for child passenger safety technician certification of all personnel. Pediatric emergency nurses distributed child restraint systems at hospital discharge and dedicated technicians at fitting stations. Researchers described program characteristics, developed a baseline understanding of program outreach using geographic information systems, and evaluated adherence to manufacturer guidelines with a sensitivity analysis.

Methods

This retrospective cross-sectional study used distribution forms linked to hospital records from 2013 to 2016. Testing for differences used nonparametric methods. Median values and interquartile ranges for weight and height of children were compared with manufacturer guidelines. Geographic information systems visualized recipients' street addresses and motor vehicle crashes on an underlying base map.

Results

There were 312 child restraint systems distributed: of which 179 (57.4%) at the hospital, 126 (40.4%) at fitting stations, and 7 (2.2%) missing a location. Among those on Medicaid, 64.4% received a child restraint system at the hospital compared with 35.6% at fitting stations ($\chi 2 = 5.40$, $P < .02$). Fitting stations had limited outreach to rural residents. Finally, results from the sensitivity analysis showed that devices were issued according to manufacturer guidelines.

Discussion

Despite the workplace pressures of clinical care, pediatric emergency nurses delivered educational information and demonstrated hands-on installation at similar rates to dedicated technicians. Distribution of child restraint systems through the hospital reached a uniquely underserved population. Further research should investigate methods to

improve fitting station outreach among Medicaid recipients.

FULL TEXT

Highlights

••The distribution of child restraint systems offers the opportunity to improve child passenger safety by disseminating knowledge, teaching best practices, and promoting health equity.

••Pediatric emergency nurses distributing child restraint systems through the hospital reached a uniquely underserved population compared with fitting stations.

••Emergency departments and child safety programs should work together when distributing child restraint systems because each serves a heterogenous population.

Introduction

The nonuse or improper installation of child restraint systems (CRS) is associated with high rates of pediatric morbidity and mortality from motor vehicle crashes (MVCs).[1-5] During 2019 in the United States, there were 1053 children aged 14 years and younger who were killed during MVCs.[6] Children were unrestrained in 33% of pediatric MVC deaths.[1]

Studies have demonstrated the pediatric emergency department (PED) is an effective environment to deliver child passenger safety (CPS) interventions among parents and caregivers.[7-11] In a clinical environment, parents and caregivers may be more receptive to behavioral change and knowledge acquisition. Fitting stations, also known as car seat clinics, offer additional opportunities to improve CPS by disseminating knowledge, teaching best practices, and promoting equity in CRS distribution.[7,8,11-14] However, a comparison of the effectiveness of these 2 modalities (PED vs fitting station) reaching children in underserved and rural areas has not yet been evaluated.

A PED-based program presented the opportunity for research into CRS distribution. The PED, the only such unit in New Mexico, was part of a safety-net hospital system that included the sole level 1 trauma center. Program goals were to provide equitable access to CRS, disseminate best practices, and promote injury prevention. Program funds are paid for CPS technician certification of all personnel who distributed CRS, including pediatric emergency nurses and dedicated CPS technicians. Pediatric emergency nurses distributed CRS at the hospital, and CPS technicians distributed CRS at fitting stations.

Hospital Distribution

Pediatric emergency nurses distributed CRS upon patient discharge under 2 circumstances: (1) parents/caregivers had no immediate access to height- and weight-appropriate CRS, or (2) the structural integrity of the device was compromised after a moderate- to high-mechanism MVC. A CRS would infrequently be distributed to a parent in the labor and delivery unit if no properly fitting device was available. In addition, there were several emergency medical technicians and other staff members certified as CPS technicians who distributed units in the hospital.

Fitting Station Distribution

Fitting stations took place on a monthly basis at community sites in Albuquerque, including local fire departments and the PED administration building. Advance notice was given by email, news, word of mouth, and referrals. Individualized appointments lasting approximately 30 minutes were encouraged between fitting station CPS technicians and parents/caregivers to correctly fit the child and demonstrate installation. Instruction manuals and additional educational information were distributed to aid with proper installation. Educational information was delivered by various media including video, brochure, or verbal instruction.

Objectives

The objectives of this study were three-fold: (1) describe the demographics of CRS recipients and program characteristics to examine the effectiveness in reaching underserved populations, (2) develop a baseline understanding of program outreach using geographic information systems (GIS) to advance future efforts, and (3) conduct a sensitivity analysis of the devices that were distributed to evaluate adherence to manufacturer guidelines.

Methods Cross-Sectional Study

A cross-sectional design was used for the descriptive component of the study. Data sources comprised 4 years of distribution forms completed during 2013 to 2016 and data analysis was completed in 2020. Among subjects who received clinical care, forms were linked to hospital medical records via deterministic methods for additional demographic data.

CRS recipients voluntarily answered questions on age, weight, and height of child; street address of residence; and public assistance. Personnel recorded the type of device, location of the distribution (hospital or fitting station), and whether hands-on installation was demonstrated. The study was approved by the University of New Mexico Health Sciences Center Human Protections Office Institutional Review Board, determined to be exempt, and documentation of consent was not required (ID: 17-075).

Continuous data included age in months, weight in kilograms, and height in centimeters. Categorical data included sex of child and whether parents/caregivers resided in metropolitan or rural (comprising small metropolitan, mixed urban/rural and rural) counties,[15] received any type of public assistance or Medicaid, or participated in special supplemental nutrition program for women, infants, and children (WIC). Researchers extracted the type of CRS from distribution forms.

As multiple researchers participated in the data collection process, 10% of chart reviews were reviewed for accuracy of data entry, with findings reviewed with the group over 3 quality improvement sessions. Testing for statistical significance was based on the Mann–Whitney U test for continuous data and the chi-square test for categorical data; the significance threshold was set at the *P* 16

GIS Analysis

A GIS analysis was used to accomplish the secondary objective to develop a baseline understanding of program outreach. New Mexico contains a culturally diverse population residing in a mix of metropolitan, rural, and tribal communities. To advance future injury prevention efforts, MVC data would be displayed on an underlying base map. Geocoding precision was specified to full street addresses, and coordinate data were displayed at the state level, to protect individual privacy. Street addresses would be extracted from CRS distribution forms and, if unavailable or incomplete, then obtained from medical records. To address missing addresses, geoimputation methods were used including the use of the closest post office centroids, public schools, or chapter houses on the Navajo Nation.[17] Out-of-state addresses would not be included in the analysis. Geospatial analysis was conducted using an ArcGIS online base map, imported data points, and New Mexico Department of Transportation MVC data from 2010 to 2014.[18]

Sensitivity Analysis

The tertiary objective was to compare child weight and height data with manufacturer guidelines in a sensitivity analysis. It was prioritized to evaluate the whole program's adherence to guidelines rather than by modality (PED vs fitting station). Although age is a consideration in the decision-making process, weight and height were selected as key covariates for the sensitivity analysis. If data from CRS distribution forms were unavailable or incomplete, then hospital medical records would be accessed. Tables were developed displaying median values and interquartile ranges (IQRs) for the weight and height of CRS recipients. This information was further divided into subgroups based on type of CRS distributed (rear-facing only, convertible, combination, or booster). Evenflo manufacturer

guidelines were researched for device-specific recommended child weight and height ranges.[19]

Results

A total of 312 distribution forms were fully completed; 2 duplicate records were removed before analysis. Distribution forms were linked to medical records for 176 of 179 (98.3%) among those who received a CRS at the hospital. Continuous data were considered to be nonparametric and presented using median and IQR. Age was found to be highly skewed (1.15), whereas weight (0.52) and height (0.66) were moderately skewed.[20]

Characteristics of Recipients and Program

Baseline CRS recipient data are presented in [Table 1]. The median child age (IQR) was 18.0 months (1.0-42.0). The median child weight was 11.3 kg (5.9-15.9) and height 63.5 cm (49.5-91.4). A total of 189 recipients (60.6%) reported receiving some type of public assistance. Among subjects who received a CRS at the hospital, American Indian/Alaska Native (AI/AN) recipients accounted for 41 (22.9%).

The characteristics of the program are presented in [Table 2]. A total of 179 (57.4%) received a CRS at the hospital, and 126 (40.4%) at fitting stations, whereas distribution data on 7 (2.2%) were missing. Educational information was provided to 238 recipients (76.3%), and hands-on demonstrations took place at 145 installations (46.5%). More than 3 quarters of recipients resided in a metropolitan home area population (n = 236, 75.6%). Convertibles were most frequently distributed, accounting for 159 (51.0%), and combination the second most at 65 (20.8%).

The relationship of characteristics between those who received CRS at the hospital and fitting stations is presented in [Table 3]. Among rural residents, 79.7% received a CRS at the hospital compared with 20.3% at fitting stations (χ^2 = 17.56, P 2 = 5.40, P 2 = 1.48, P = .22) or WIC (χ^2 = 0.07, P = .79) utilization between the 2 groups. Finally, no significant differences were noted between educational information provided (χ^2 = 2.33, P = .13) or hands-on demonstrations (χ^2 = 2.54, P = .11) performed at the hospital and fitting stations.

Geographic Distribution

GIS coordinate data were available for 291 (93.3%) CRS recipients. The geocodes of 80 street addresses (27.5%) were imputed. A graduated symbol map, with proportionally increasing circles classified into quantiles, showed a geographically broad distribution ([Figure]). Grouped around the center of the state were 236 CRS recipients (75.6%), where the largest metropolitan center is located, and the other 75 (24.1%) reached rural areas.

Adherence to Guidelines

The relationship between weight/height data and manufacturer guidelines is presented in [Table 4]. Values were not available for each subject despite medical record review; missingness was more pronounced for height (missing = 177) rather than weight (missing = 31). The median weight and IQR of all subjects (n = 271) were within manufacturer guidelines. Available height data (n = 125) indicated that CRS were also within manufacturer guidelines, with the exception of the lower bound of height among booster seat recipients.

Discussion

CRS program data are a rich source of information that is often underused. Our study used a triad of methodology to better use available CRS program data—a cross-sectional design, GIS analysis, and a sensitivity analysis. This study highlighted some of the challenges of conducting research using real-world data such as missingness of covariates. However, this research study presented an opportunity to use data that are often not available from administrative or claims databases.

Previous research has provided insight into those who may benefit most from CRS distribution programs.[12,21,22] Parents/caregivers who indicated they are recipients of some form of public assistance are 1 category. In our study, nearly 61% of subjects self-reported they received public assistance and 53% received Medicaid. Furthermore, our research showed hospital distribution was more effective in reaching Medicaid recipients than fitting stations (64.4%

vs 35.6%; $\chi^2 = 5.40$, *P*

Parents/caregivers who identify as a minority race or ethnic group or speak a primary language other than English have also been shown to benefit from CRS distribution programs.[12,22] Among hospital recipients in our study, we found that more than one-third of children (34.7%) were from a minority race or ethnic group. Furthermore, more than one-fifth of children (22.9%) were AI/AN. Although improvements in CPS have been made on tribal lands, 51% of children aged 12 years and younger were improperly restrained in a study of 6 tribes in the northwestern United States.[23] Efforts to increase the number of CRS distributed among the AI/AN community and educate parents/caregivers on proper use are needed.

Fitting station outreach had a limited impact on the rural population. Among rural residents, only one-fifth (20.3%) received a CRS at a fitting station. There was limited research that compared rural with metropolitan CPS. In a convenience sample of 527 vehicles, 1 study found 28.7% of urban and 41.3% of rural children were improperly restrained in the front seat.[24] Our study is one of the first to examine distribution data with GIS in New Mexico. Ideally, using GIS to map the availability of child safety programs by county would be the next level of analysis.[25]

Mistakes when following recommended guidelines for sizing and installation are common, increasing the risk of morbidity and mortality.[9,21,26-34] Many people find it difficult to install CRS properly, convertible or combination units being especially problematic. Considering that convertibles were most frequently distributed (51%) and the median age of children in our study was 18 (1.0-42.0) months, these findings are pertinent to injury prevention efforts. Convertibles may be used when children outgrow rear-facing specifications and can be later transitioned to forward-facing units. The likelihood of using a poorly fitted device increases with child age, the effect being more pronounced among children who qualify for booster seat use.[27,28,30-32,34] Based on results of the sensitivity analysis, it appeared that CRS recipients were well matched to an appropriate-fitting device; median heights and weights were within device-specific manufacturer guidelines.

Limitations

Data were generated before the development of an a priori hypothesis, and therefore, a retrospective study design was used. Any inferential relationships could have been influenced by bias or confounding. For example, the limited impact that fitting station outreach had on rural residents was strongly influenced by design; fitting stations were localized to the metropolitan area. It would violate assumptions of independence to proceed with advanced data analysis and make further inferences. A significant percentage of missingness was noted among certain covariates, specifically weight, height, and age. These were key variables used for selecting an appropriately fitting CRS. Although results from the sensitivity analysis showed that devices were issued according to manufacturer guidelines, missing data are nevertheless a threat to internal validity in research.

Socioeconomic status (SES) is a dynamic, evolving, and multifactorial definition. Although data from the distribution forms may have served as a proxy for SES, the concept is more complex than self-report of public assistance, Medicaid, WIC, or being from a rural population. As limited as these data are, the distribution forms provided important insight into the SES of those who are participating in a CPS program. The generalizability of demographic data was limited in our study. Data on child race were only available for subjects who received clinical care at the hospital. In addition, Hispanic ethnicity was classified as a race by the hospital, and researchers did not collect language data.

One criterion for CRS distribution was compromised structural integrity after high-mechanism MVC. Pediatric emergency nurses relied on reports of rollovers, extrications, improperly restrained children, and trauma alert protocols according to National Highway Traffic Safety Administration guidelines.[6] The ability of nurses to accurately identify these events was not determined as in other research.[35]

Finally, assumptions in geoimputation could lead to a geographical bias toward larger population centers, and adjustment for population density was not made. However, similar geoimputation methods have been used without serious drawbacks compared with census tracts,[17] and our study was concerned with visualizing crude distribution rates only.

Implications for Emergency Clinical Care

Several benefits were identified that have direct implications for emergency clinical care. Despite the pressures of providing emergency care, pediatric emergency nurses were able to provide educational information ($\chi^2 = 2.33$, $P = .13$) and demonstrate hands-on installation ($\chi^2 = 2.54$, $P = .11$) at similar rates to dedicated CPS technicians. Devices distributed by pediatric emergency nurses in the hospital reached a high proportion of children on Medicaid, demonstrating that the impact of emergency care may extend beyond the reach of fitting stations. Finally, a PED-based program followed manufacturer guidelines when fitting children with appropriately sized CRS.

Conclusions

After the analysis of cross-sectional data from 4 years of distribution forms, pediatric emergency nurses distributed nearly 60% of CRS. The hospital was more effective in reaching Medicaid recipients than fitting stations. Pediatric emergency nurses provided educational information and instruction manuals and demonstrated hands-on installation at similar rates to dedicated CPS technicians. Finally, a sensitivity analysis showed that properly fitted devices were issued according to manufacturer guidelines. Further research should investigate methods to improve fitting station outreach among Medicaid recipients.

Author Disclosures

Conflicts of interest: none to report.

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Variable	Median or n	IQR or %
Child age		
Age in mo (n = 283)	18.0	1.0-42.0
Child weight		
Kg (n = 271)	11.3	5.9-15.9
Child height		
Cm (n = 125)	63.5	49.5-91.4
Child sex		

Female	107	34.3
Male	135	43.3
Missing	70	22.4
Child race*		
White	82	45.8
AI/AN	41	22.9
Other†	21	11.8
Missing	35	19.6
Public assistance		
Yes	189	60.6
No	118	37.8
Missing	5	1.6
Medicaid		
Yes	165	52.9
No	141	45.2
Missing	6	1.9
WIC		
Yes	82	26.3
No	224	71.8
Missing	6	1.9

Variable	n	%

Type of CRS		
Rear-facing only	41	13.1
Convertible	159	51.0
Combination	65	20.8
Booster	37	11.9
Missing	10	3.2
Location of distribution		
Hospital	179	57.4
Fitting station	126	40.4
Missing	7	2.2
Educational information		
Yes	238	76.3
No	46	14.7
Missing	28	9.0
Hands-on demonstration		
Yes	145	46.5
No	138	44.2
Missing	29	9.3
Home area population		
Metropolitan	236	75.6
Rural	75	24.1
Missing	1	0.3

Variable	Hospital (n = 179)		Fitting station (n = 126)		Test statistic	P value
n	Median (IQR) or %	n	Median (IQR) or %	Age		
Age in mo	178	17 (0.0-43.0)	99	18.0 (6.0-41.0)	z = 0.68	.49
Weight						
Kg	165	11.3 (3.7-15.9)	100	12.1 (8.3-16.1)	z = 1.64	.10
Height						
Cm	71	55.9 (48.9-87.0)	54	75.3 (53.3-92.0)	z = 1.86	.06
Sex						
Female	75	72.1	29	27.9	$\chi^2 = 0.83$	.36
Male	102	77.3	30	22.7	Home area population	
Metropolitan	120	52.2	110	47.8	$\chi^2 = 17.56$	< .001*
Rural	59	79.7	15	20.3	Public assistance	
Yes	113	61.4	71	38.6	$\chi^2 = 1.48$	.22
No	63	54.3	53	45.7	Medicaid	
Yes	103	64.4	57	35.6	$\chi^2 = 5.40$	.02*
No	71	51.1	68	48.9	WIC	
Yes	45	57.0	34	43.0	$\chi^2 = 0.07$	.79

No	129	58.6	91	41.4	Educational information	
Yes	144	62.1	88	37.9	$\chi^2 = 2.33$	.13
No	23	50.0	23	50.0	Hands-on demonstration	
Yes	78	55.3	63	44.7	$\chi^2 = 2.54$	.11

Type of CRS	n	Median (IQR)	Manufacturer guidelines[19]
Rear-facing only	41		
Weight (kg)	32	2.4 (2.1-3.9)	1.8-15.9
Height (cm)	24	48.3 (45.7-50.8)	43.2-76.2
Convertible	159		
Weight (kg)	143	9.5 (5.0-12.0)	2.3-29.5
Height (cm)	66	61.0 (50.8-82.2)	48.3-137.2
Combination	65		
Weight (kg)	58	14.8 (13.6-18.0)	10.0-49.9
Height (cm)	21	91.4 (88.9-104.1)	71.1-144.8
Booster	37		
Weight (kg)	30	20.2 (18.1-25.9)	13.6-49.9
Height (cm)	10	113.0 (91.4-134.6)*	101.6-144.8

DETAILS

Subject:	Parents &parenting; Medical records; Population; Stations; Medicaid; Child restraints; Data analysis; Nurses; Emergency services; Outreach programmes; Information systems; Technicians; Pediatrics; Physical restraints; Best practice; Sensitivity analysis; Installation; Certification; Age; Fitting; Injury prevention; Workplaces; Geographic information systems; Children &youth; Rural areas; Caregivers; Injuries; Underserved populations; Clinical nursing; Children; Emergency medical care
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Hypokalemic Cardiac Arrest: Narrative Review of Case Reports and Current State of Science: JEN

ABSTRACT (ENGLISH)

Purpose

Hypokalemic cardiac arrest is an uncommon occurrence in the emergency department. Electrocardiogram findings related to hypokalemic cardiac arrest include prolonged QT, U waves, and preventricular contractions leading to Torsades de Pointes and then arrest. Literature evaluating the prevalence of hypokalemic cardiac arrest is scarce, and its management is lacking. This review provides a summary of current literature, recommendations from current guidelines, and proposed management strategies of hypokalemic cardiac arrest.

Summary

Intravenous potassium administration is the treatment for hypokalemic cardiac arrest. Although the treatment for hypokalemic cardiac arrest is known, there is limited evidence on the proper procedure for administering intravenous potassium appropriately and safely. Owing to the time-sensitive nature of treating hypokalemic cardiac arrest, rapid administration of intravenous potassium (10 mEq/100 mL of potassium chloride over 5 minutes) is warranted. Concerns regarding rapid potassium administration are not without merit; however, a risk-benefit analysis and potential mitigation strategies for unwanted side effects need to be considered if hypokalemic cardiac arrest is to remain a reversible cause. It is imperative to identify hypokalemia as the cause for arrest as soon as possible and administer potassium before systemic acidosis, ischemia, and irreversible cell death.

Conclusions

More evidence is necessary to support treatment recommendations for hypokalemic cardiac arrest; however, it is the authors' opinion that, if identified early during cardiac arrest, intravenous potassium should be administered to treat a reversible cause for cardiac arrest.

FULL TEXT

Contribution to Emergency Nursing Practice

••Current resuscitation guidelines do not provide strong treatment recommendations for the reversible treatment and management of hypokalemia during cardiac arrest with potassium administration.

••This review attempts to show the limited information available to treat hypokalemic cardiac arrest (HOCA), illustrate exacerbating causes, and discuss potential treatment options.

••There is limited evidence to guide the use of intravenous bolus potassium for HOCA.

••Potential treatment solutions for HOCA management are provided that may allow for better outcomes; however, the data for these recommendations are lacking and based on expert opinion.

Introduction

Hypokalemia-induced cardiac arrest is uncommon and can be argued as an underreported occurrence despite the many etiologies that can disrupt potassium homeostasis.[1-3] Noted as being a reversible cause in the American Heart Association (AHA) guidelines for advanced cardiac life support (ACLS), there is currently no guidance from the AHA on how to treat hypokalemia in the setting of cardiac arrest.[2] This lack of guidance was not always the case. In the year 2000, the AHA ACLS guidelines recommended an infusion of 10 mEq of potassium chloride (KCl) at 2 mEq per minute intravenously (IV) over 5 minutes followed by another 10 mEq infusion over 5 to 10 minutes.[1] Unfortunately, there are limited data supporting this recommendation, and the recommendation was later removed in the 2010 AHA ACLS guideline update to state “The effect of bolus administration of potassium for cardiac arrest suspected to be secondary to hypokalemia is unknown and ill advised.” The recommendations since 2010 remain in the updated AHA ACLS guidelines of 2020 with concerns of safety and lack of evidence.[3] In the absence of guidance, the treatment for hypokalemic cardiac arrest (HOCA) remains unclear. In this article, we review influencing factors of ACLS that may exacerbate HOCA, the current evidence for the treatment of HOCA with IV bolus potassium, and potential HOCA treatment strategies.

Methods

The authors followed the Grading of Recommendations Assessment, Development, and Evaluation working group’s methodology to evaluate the evidence.[4] The authors developed a list of questions regarding the use of rapid potassium administration for HOCA. A literature search from PubMed, Ovid, Clinical Key, CINAHL, Cochrane Library, UpToDate, Web of Science, and Google Scholar was performed for articles using the keywords “cardiac arrest,” “intravenous potassium bolus,” “hypokalemia,” “hypokalemic cardiac arrest,” and “severe hypokalemia.” Articles were limited to English language and human studies. No limits were placed on year of publication. Where limited or no data were present, authors acknowledged the lack of evidence and based recommendation on clinical opinion.

Results

Of the 41 articles reviewed, 36 articles were excluded (Figure). Five case reports were selected for inclusion. Table provides a summary of the 5 case reports.

Discussion Background

The effects of hypokalemia on conduction disturbances are well known to the medical community, involving induced ectopic rhythms in isolated rabbit hearts all the way to identified specific potassium currents during ventricular repolarization in humans.[5,6] Mechanisms of hypokalemia induction are also well known, with the major effectors being diuretic therapy, renin-angiotensin-aldosterone system activation, and cardiac disease (eg, congestive heart failure) resulting in sustained sympathetic activation.[6] Current guidelines characterize hypokalemia as a serum potassium concentration of 7 The threshold at which life-threatening arrythmias occur has been associated with a serum potassium level of less than 2.5 mEq/L, requiring urgent treatment.[7] Although the incidence of HOCA is considered uncommon and limited to case reports, the relative importance of having a treatment modality is essential if hypokalemia in the setting of cardiac arrest is to be considered a reversible cause.[8] To discuss the evidence surrounding HOCA, it would be pertinent to discuss factors of ACLS management that can exacerbate

hypokalemia before discussing and reviewing treatment recommendations.

ACLS Practices Associated with Exacerbating Hypokalemia EPINEPHrine

EPINEPHrine is the mainstay of medication therapy in ACLS; however, its influence on potassium homeostasis may contribute to the overall poor achievement of return of spontaneous circulation (ROSC) seen in cardiac arrest.[2,9] EPINEPHrine works as an alpha and beta agonist. The $beta_2$ receptor agonism may be hindering the positive effects of EPINEPHrine by facilitating an intracellular shift of potassium through the downstream activation of Na^+/K^+ ATPase, ultimately potentiating or worsening HOCA.[10] The relationship between EPINEPHrine and its influence on serum potassium levels was demonstrated in 2 studies. Darbar et al[11] examined the effect of different continuous EPINEPHrine infusion doses on serum potassium levels in healthy subjects. The authors observed a decrease in serum potassium of 0.7 to 1 mEq/L between EPINEPHrine infusion doses of 0.16 and 0.32 mcg/kg/min. Similar findings were identified in patients receiving a fixed dose EPINEPHrine infusion resulting in a decrease of serum K of ~0.8mEq/L with return to baseline after discontinuation.[10] The relevance of these studies showcases EPINEPHrine's effects on serum K^+. However, what remains unknown is the magnitude of K^+ decrease with escalating/repeat doses of EPINEPHrine and whether there is a degree of saturation that occurs where potassium shifting ceases.

The pharmacodynamics of EPINEPHrine observed in the aforementioned studies help to inform ACLS practices in relation to HOCA. Recommended doses of EPINEPHrine during ACLS include 1 mg every 3 to 5 minutes.[2] In a 70 kg patient, 1 mg every 3 minutes equates to a continuous infusion rate of 4.8 mcg/kg/min. In applying the results noted by Darbar et al,[11] EPINEPHrine rates of 0.06 to 0.32 mcg/kg/min demonstrated a 0.7 to 1 mEq/L decrease in potassium, making a case for concern on EPINEPHrine's influence on potentiating or worsening HOCA. It is important to address the fact that the studies previously mentioned were done in healthy subjects, which cannot be directly translated to patients who are critically ill or experiencing cardiac arrest.

Sodium Bicarbonate

Recommendations on sodium bicarbonate administration have been limited to special resuscitation situations when sodium channel blockade or hyperkalemia is suspected; however, despite these recommendations and the lack of benefit of its routine use outside of said indications, sodium bicarbonate continues to be used in patients with cardiac arrest.[2,12] The routine use of sodium bicarbonate outside of the recommended indications of ACLS management is important to address based on its potential to exacerbate HOCA.

The influence of sodium bicarbonate administration in HOCA entails its immediate effects on potassium shifts related to metabolic acidosis. During acidemia, a net shift of K+ from the intracellular to the extracellular space occurs.[13] If the acidosis is treated with sodium bicarbonate, there is a reverse shift of potassium back into the cells.[14] Multiple studies have looked at sodium bicarbonate administration in hyperkalemia with conflicting results; however, a potential decrease of serum potassium up to 0.5 mEq/L has been reported.[14–18] Based on these mechanisms, sodium bicarbonate could potentiate or even worsen HOCA.

Dextrose

Dextrose is often given for hypoglycemia and/or undifferentiated encephalopathy; however, with administration of dextrose, there is insulin release that may cause a shift of extracellular potassium intracellularly that can also worsen underlying hypokalemia.[19]

Treatment of Hypokalemia

The gold standard of hypokalemia treatment is to replace potassium. Understanding the infusion limits on potassium will help explain the reluctance to exceed these rate limits in the treatment of HOCA. Kruse et al[20] provide a basis for potassium infusion limits in healthy individuals. In their study, 20 mEq of KCl was infused IV over 60 minutes and

demonstrated saturation of potassium homeostasis mechanisms resulting in an abrupt increase in serum potassium of ~0.4 mEq/L from baseline.[20] After infusion completion, serum potassium rapidly redistributed, resulting in an expected 0.2 mEq/L increase of serum K+ from baseline from a 20 mEq/100 mL infusion.[20] Owing to the risk of hyperkalemia leading to dysrhythmias and sudden cardiac death, potassium infusions are not generally administered faster than 20 mEq/hour; however, safety for infusions up to 40 mEq/hour has been demonstrated.[9,20-22]

Osmolarity may become a concern when choosing between IV KCl solutions to administer. The osmolarity of concentrated KCl (2 mEq/mL) is 4000 mOsm/L whereas premixed KCl 10 mEq/100 mL is 200 mOsm/L. Given the high osmolarity in concentrated KCl, administration of KCl 10 mEq/100 mL would be the most ideal and matches with Institute for Safe Medication Practices (ISMP) recommendations to use KCl premixes in place of concentrated potassium vials.

These limitations bring conflict to the decision on how to treat patients with HOCA owing to the urgent need for rapid potassium replacement in a short time period.

ACLS Guideline Recommendations

ACLS guidelines in the year 2000 had recommended a rapid potassium infusion for the treatment of cardiac arrest or malignant ventricular arrythmias owing to life-threatening hypokalemia.[1] The infusion of KCl was dosed at 2 mEq per minute IV for a total of 10 mEq followed by another 10 mEq infusion if needed until patient is stable.[1] Unfortunately, there were no documented references on which to base this recommendation. Alfonzo et al[23] recommended a similar treatment route with life-threatening hypokalemia, administering 20 mEq of KCl over 10 minutes. In the case of cardiac arrest, Alfonzo et al[23] recommended 20 mEq of KCl IV over 2 to 3 minutes. These recommendations also lacked referenced data to support them.

In 2010, the AHA updated the ACLS guidelines to indicate the effect of IV bolus potassium for cardiac arrest was unknown and administration was ill advised. Updated recommendations in 2020 go further to suggest that IV bolus potassium is not recommended.[2,3] It is unclear what evidence AHA used to indicate administration of IV bolus potassium is ill advised because the references provided do not address this comment. Evidence used for the 2020 ACLS recommendations regarding HOCA is not comprehensive, listing 1 study consisting of 2 case reports. The first patient's serum potassium was "between 2.8 and 3.5 mEq/L," and the use of quiNIDine resulted in the ventricular arrythmia. The second patient had a complicated cardiac history making it difficult to assume that a mild to moderate potassium correction was the key driver for patient stability.[24]

The new European Resuscitation Council Guidelines of 2021 mimic the recommendations from the ACLS 2000 guidelines, without supporting evidence for this recommendation.

Review of Rapid Potassium Administration

Question: Among patients with HOCA, does rapid administration of IV KCl improve survival?

Ungraded Statement: There are insufficient data to conclude rapid administration of IV KCl improves survival.

Rationale: Five case reports describe the rapid administration of IV KCl for HOCA. In the 5 case reports, administration of KCl led to the achievement of ROSC. The case reports are further detailed below.

The first case report by Bannister et al[25] in 1977 was in a patient who was diagnosed as having hypokalemia with a serum potassium of 1.3 mEq/L. Immediately after diagnosis, the patient developed ventricular fibrillation. Patient was successfully treated with external cardiac massage and a 60 mEq/100 mL bolus of KCl IV over 5 minutes.

The second case report by Tassone et al[26] in 2004 was in a patient who had developed asystole secondary to unknown thyrotoxicosis. A potassium level was drawn bedside revealing a serum K level of 1.5 mEq/L. During ACLS, the patient was given 40 mEq of KCl over 30 minutes. ROSC was achieved. Despite the initial intervention,

additional doses of KCl had to be given until the discovery of an underlying thyroid issue.

The third report of rapid potassium administration for HOCA comes from Abdulaziz et al[27] in 2012 in a patient with diabetic ketoacidosis before cardiac arrest. An immediate potassium level was drawn showing 1.7 mEq/L. A 40 mEq KCl IV bolus was administered resulting in immediate reversal of asystole and achievement of ROSC. KCl administration rate was not documented.

The fourth report from Martindale et al[28] in 2020 involves a dialysis patient brought in by emergency medical services in cardiac arrest. A venous blood gas drawn before the administration of insulin, dextrose, sodium bicarbonate, and calcium chloride for presumed hyperkalemia was reported revealing a potassium level of 2.3 mEq/L. A KCl bolus of 40 mEq over several minutes (administration time not clarified) obtained ROSC with a following serum potassium level obtained after ROSC of 3.3 mEq/L. Patient experienced an additional 2 ventricular fibrillation arrests where ROSC was achieved after bolus administration of 20 mEq of KCl. Patient died 16 hours later from another ventricular fibrillation arrest.

The fifth report comes from Liu et al[29] and involves a 21-year-old patient in ventricular tachycardia. Potassium level was 1.5 mEq/L, and after 20 minutes of standard ACLS protocol, a 40 mEq/40 mL KCl bolus was administered via central line, rate not documented. Within 8 minutes of the KCl bolus, ROSC was achieved. A repeat potassium level of 2.1 mEq/L was seen after ROSC.

Some limitations of the previously listed case reports include data on infusion rates, possibility of other therapies being the primary cause of ROSC, and positive publication bias.

Question: Among patients with HOCA, does rapid administration of IV KCl cause harm?

Ungraded Statement: There is currently no evidence to conclude that rapid administration of IV KCl in patients with HOCA causes harm.

Rationale: No trials have been reported that indicate the rapid administration of IV KCl in patients with HOCA causes harm. It is important to recognize IV potassium as a high-alert medication as identified by ISMP. ISMP has published reports of serious errors with the use of concentrated KCl vials outside of a cardiac arrest setting.[30]

Question: Among patients with HOCA, what dose of KCl should be used for rapid administration of IV KCl and at what administration rate?

Ungraded Statement: There is an insufficient amount of high-quality data to determine a dose or rate of administration of IV KCl for patients with HOCA.

Rationale: Of the 5 case reports previously mentioned ([Table 1]), KCl dosing strategies were inconsistent and ranged from 20 mEq to 60 mEq over 0 to 30 minutes IV.[25-29] Extrapolating from studies in patients not experiencing HOCA, max infusion rates of KCl can be given up to 10 mEq over 15 minutes.[9,21,22] There are no studies comparing dosing strategies for IV potassium administration in HOCA; however, rapid replacement is warranted. One study by McCall et al[31] examines the rise of serum potassium levels through continuous blood sampling in cardiopulmonary bypass patients after IV push of KCl. In this study, patients were given an average of 3 mEq of KCl IV push, which demonstrated a rise in serum potassium levels of ~3.1 mEq/L at ~17.5 seconds. The serum potassium levels returned to baseline in ~68 seconds. A rise in serum potassium level of 3 mEq/L in a patient presenting with HOCA may be appropriate to obtain ROSC; however, this cannot be concluded from this study. Comparing these results with the recommendations from the 2000 AHA ACLS guidelines, the 2021 European Resuscitation Council Guidelines, and Alfonzo et al,[23] it may be appropriate to consider a rapid KCl infusion of 10 mEq/5 minutes to achieve serum potassium levels that would increase the chance of achieving ROSC. Unfortunately, the data from McCall et al[31] cannot be extrapolated to patients experiencing HOCA given that there are multiple factors effecting potassium homeostasis described in this review that are not present in the studied population by McCall et al.[31]

The authors conclude that mimicking the dosing strategies from the 2000 AHA ACLS guidelines, the 2021 European Resuscitation Council Guidelines, and Alfonzo et al[23] is preferred to no treatment at all for HOCA. The authors also emphasize caution that a KCl bolus is intended only in the cardiac arrest setting and not to be used once ROSC is achieved. To avoid potential serious drug errors in relation to using concentrated KCl vials, ISMP safe practice recommendations include using premix KCl solutions of which can be stocked and readily available throughout the hospital. The authors echo these safe practice recommendations and to use KCl premixes via rapid infusion in the setting of HOCA.

Role of Calcium

Calcium has a few postulated mechanisms of actions for the management of hyperkalemia. The mechanisms proposed include calcium's action through calcium-dependent cellular depolarization and propagation, restoration of resting membrane potential, shifting of Vmax resulting in the restoration of normal myocyte excitability, and, finally, reversing myocyte depression by increasing the magnitude of the calcium inward current.[32,33] All of these effects are proposed through having a higher calcium concentration in the bloodstream through the administration of calcium. The evidence for calcium's use in hyperkalemia is weak but its use for preventing arrythmias and cardiac arrest is widely accepted.[20,34] Because of these mechanisms, pretreatment with calcium can be theorized to prevent the negative cardiac effects associated with IV bolus potassium, thereby limiting the associated danger of its use in ACLS.[35]

Calcium is not without its risks. By its same mechanisms involved with treating hyperkalemia, there is a possibility to cause a ventricular tachyarrhythmia resulting from the enhanced automaticity, but the evidence supporting this information is weak. Although, traditionally, calcium has been contraindicated with the patient's concurrent use of digoxin, there is no strong supporting evidence, and it is the opinion of the authors that it should not preclude the administration of calcium.

Role of Magnesium

Magnesium is a known component of any hypokalemia treatment protocol. The role of magnesium is to inhibit the renal outer medullary potassium channels in the distal nephron preventing the loss of potassium.[36,37] If there is a magnesium deficiency, potassium will be lost more readily through the renal outer medullary potassium channels, impairing any effort at potassium replacement.[37] Its effects in HOCA are limited; however, it may be good practice to administer magnesium in HOCA to prevent potential potassium losses if ROSC is achieved. This is particularly important especially because the most common arrhythmias associated with hypokalemia are ventricular fibrillation and Torsades de Pointes.

Other Treatment Options

Alternatives to IV bolus potassium would include extracorporeal membrane oxygenation; however, given the limited availability of extracorporeal membrane oxygenation access to most hospitals, it will not be reviewed here.

Hypokalemia Management in Cardiac Arrest

Based on the evidence available, there are limited data to determine how to administer potassium for HOCA; however, it is the authors' opinion that it is reasonable to treat confirmed HOCA by administering KCl 10 mEq/100 mL premix over 5 minutes given that the potential benefits outweigh the risks. The European Resuscitation Council Guidelines of 2021 make recommendations similar to those of Alfonso et al,[23] with a rapid infusion of potassium of 2 mEq/min for 10 minutes followed by 10 mEq over 5 to 10 minutes. Regardless of the method, potassium replacement should take precedence over other pharmacologic interventions. Noting the evidence to support this recommendation is poor, based on case reports, rapid potassium administration makes the most rational sense in a time-sensitive situation such as HOCA until further studies define a more appropriate method.

This recommendation is only intended in the clinical situation of HOCA. It is recommended to use the KCl premixes if available to prevent medical errors identified through ISMP with the use of concentrated KCl vials. Documentation of KCl administration should be considered as stated in the 2000 AHA ACLS guidelines: “In the patient’s chart, document that rapid infusion is intentional in response to life-threatening hypokalemia.”

Conclusion

There is limited evidence and significant positive publication bias guiding the treatment of HOCA. Potassium replacement for a cardiac arrest induced by a potassium deficit is the solution; however, how that deficit is corrected is not well defined. It is imperative that well-designed prospective trials of HOCA treatment involving potassium replacement dose, rate, and potential detriments of therapy be conducted to further guide appropriate management. In the absence of these data, we recommend using the aforementioned strategy. It is reasonable to believe that HOCA is rare, because acidosis caused by arrest leads to hyperkalemia. However, in-hospital cardiac arrests where more information is often available, such as the patient’s most recent laboratory reports or medications administered, can lead to scenarios where hypokalemia can be identified as the reversible cause of cardiac arrest and subsequently treated. Thus, it is the opinion of these authors that, if identified, potassium should be administered for HOCA.

Author Disclosures

Conflicts of interest: none to report.

Reference	Age in y (sex)	K+ level (mEq/L)	Developing rhythm	Potassium intervention	Outcome
Bannister et al[25]	58 (female)	1.3	V-fib	60 mEq KCl IV over 5 min	ROSC
Tassone et al[26]	22 (male)	1.5	Asystole	40 mEq KCl IV over 30 min	ROSC
Abdulaziz et al[27]	23 (female)	1.7	V-tach	40 mEq bolus, unknown bolus rate	ROSC
Martindale et al[28]	52 (male)	2.3	V-fib	40 mEq bolus, unknown bolus rate	ROSC
Liu et al[29]	21 (male)	1.5	V-tach	40 mEq bolus, unknown bolus rate	ROSC

DETAILS

Subject:	Patients; Homeostasis; Hypokalemia; Arrests; Acidosis; Sodium; Side effects; Emergency services; Myocardial infarction; Potassium; Hyperkalemia; Mitigation; Reversible; Management; Emergency medical care; Heart attacks; Necrosis; Ischemia
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DETAILS

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Patient Extrication Process for Urban Emergency Departments: JEN

ABSTRACT (ENGLISH)

Objectives

This project aimed to create and implement a safe and efficient role-based process to rapidly extricate traumatically injured persons transported to the emergency department via police transport or private vehicle.

Methods

A simulation exercise was conducted with an interdisciplinary team of ED personnel, Philadelphia Police Department, and University of Pennsylvania police officers to identify the necessary steps to rapidly extricate traumatically injured individuals.

Results

The simulation exercise identified several new processes needed to complete rapid extrications of traumatically injured individuals from private and police vehicles. These included a safe drop-off location, ED personnel role identification, proper personal protective equipment donning, 2 rapid extrication techniques, and a hard stop for weapon check by security before entering the emergency department.

Conclusions

Through simulation, the ED interdisciplinary team was able to develop a role-based safe and efficient rapid extrication process. Educating new ED personnel, security, and Pennsylvania police continues to facilitate ongoing safe rapid extrication practices in the emergency department.

FULL TEXT

Introduction Rationale

Similar to many urban areas in the United States, Philadelphia has experienced a substantial increase in gun violence over the last year ([Figure 1]).[1] Gun violence is a public health crisis, particularly in the Philadelphia region.[2-4] Unlike other urban areas, officers from the Philadelphia Police Department (PPD) transport shooting victims from the incident scene to the nearest trauma center, a process known as scoop and run. Approximately one-quarter of shooting victims in Philadelphia are cared for at Penn Presbyterian Medical Center, a level 1 trauma center located in West Philadelphia ([Figure 1]).[5] The PPD policy directing officers to transport “persons suffering from serious penetrating wounds”[5] was initiated in 1996 in the hopes of decreasing time to emergency care and saving more lives. This policy has resulted in a considerable rise in the number of people transported directly to the emergency department via police or private vehicles (PVs) ([Figure 2]).[6] There is some evidence that shooting victims arriving via PV have a lower mortality rate than shooting victims transported by Emergency Medical Services (EMS).[7-9] In 1 meta-analysis, 74,187 patients with gunshot wounds (GSWs) were treated at 182 trauma centers.[7] The majority (76%) were transported by EMS whereas 12.6% were transported by PV. By individual trauma center, the proportion of patients transported by each category varied widely: EMS (median, 78%; interquartile range [IQR], 66%-85%), PV

(median, 11%; IQR, 7%-17%), or others (median, 7%; IQR, 2%-18%).[7] Unadjusted mortality was significantly different between PV and EMS (2.1% vs 9.7%; *P* 7 Multivariable analysis demonstrated that EMS-transported patients had a greater than twofold odds of dying than PV (odds ratio, 2.0; 95% confidence interval, 1.73-2.35).[7] In addition, another study evaluated mortality rates of PV transport that included police transport and found that PV transport was associated with a significantly lower likelihood of death than ground EMS transport for individuals with GSWs and stab wounds in urban US trauma systems.[8]

Once dispatched, it takes an average of 9 minutes for EMS to arrive on the scene.[10] With the scoop and run process, the PPD officers immediately place the injured person in the rear of the police vehicle and travel with lights and sirens to the nearest trauma center.[6] While en route, the officer communicates with the PPD dispatchers who then call the emergency department to inform them of the incoming penetrating trauma patient, more often than not a gunshot victim. Depending on the proximity of the incident to the hospital, there may be little, if any, prenotification to ED staff.

During rapid transport to the trauma center, the injured person is not secured and often ends up in the confined space of the vehicle's floor up against the partition dividing the front and back seat.[9] This creates a challenge when trying to rapidly extricate the person from the floor of the vehicle. Although there is some information about rapid extrication of persons from a vehicle at the scene of an accident,[11,12] to the best of our knowledge, there is no existing standard of practice for rapidly extricating traumatically injured persons from police vehicles or PVs upon arrival to the emergency department.

Seconds count in caring for the gravely injured; processes of care for victims of trauma are improved with strong leadership and teamwork.[13] Clinicians and police identified the need for a systematic, role-based approach to extricate persons from police vehicles. The goal in creating a role-based rapid extrication process was to eliminate confusion and improve safety and efficiency in getting the injured person to the treatment area. This article aimed to use the Template for Intervention Description and Replication framework[14] to describe the creation of a safe and efficient process to rapidly extricate traumatically injured persons transported to the emergency department via police transport or PV (see [Table]).

Who

An interdisciplinary team of ED personnel including nurses, ED technicians, hospital security, University of Pennsylvania police officers, and Philadelphia police officers participated in an exercise designed to simulate the existing process for rapidly extricating patients from a police car. ED leadership provided staff with space, time, and encouragement to perform the exercise. ED personnel with prehospital backgrounds were able to share their knowledge of various lifting and extricating techniques used in the field.

Where

The simulation exercise was conducted in the driveway and entrance of the emergency department at Penn Presbyterian Medical Center, an urban academic medical center with level 1 trauma designation.

What

The University of Pennsylvania Police Department provided multiple police vehicles including sedans of various sizes, sports utility vehicles, and vans, for which different scenarios and challenging patient presentations were simulated using participating clinicians. The use of multiple vehicles helped to generalize the approach and increase applicability to other emergency departments. This enabled the interdisciplinary team to collaboratively run through the current process and discuss, alter, and experiment with different rapid extrication techniques. We also reviewed the evidence on safely and efficiently extricating patients from vehicles. In a meta-analysis of 24 studies of spine immobilization in penetrating traumas,[15] none of the studies found benefit to spine immobilization in regard to mortality and neurologic injury.[15] In fact, there was an increased risk or mortality associated with spine immobilization with a risk ratio of 2.4 (confidence interval, 1.07-5.41).[15] Therefore, spine immobilization was not included as part of our extrication process.

After completion of this initial simulation exercise, the leadership team was able to (1) identify the appropriate drop-off location for police vehicles and PVs, (2) delineate the roles ED personnel perform during the rapid extrication

process, (3) determine the proper personal protective equipment (PPE) donning location and PPE equipment needed, (4) identify and refine 2 safe and efficient rapid extrication techniques, and (5) mandate a security hard stop for weapon checks in the vestibule before the individual's entering of the trauma bay.

Drop-Off Zone

During the simulation exercise, police and clinicians identified a need for visual cues to direct arriving officers where to stop in the ED driveway. Visual cues are now provided via a “drop-off lane” that includes a large sign “Police Emergency Drop-off Here” in tall, visible red letters. It sits on the sidewalk next to a solid yellow line with the words “Police Drop-off” painted on the driveway, positioned approximately 1 car length past the ambulance bay doors and on a relatively flat surface. This positioning allows space behind the vehicle to maneuver patient stretchers (Figure 3). PVs use the same drop-off location to get as close to the door as possible on a flat surface.

PPE

The ED ambulance entrance was redesigned to facilitate quick access to PPE and supplies. Three stretchers with backboards for lifting are kept in the ambulance entrance as well as the appropriate PPE for staff to don before proceeding to the vehicles for extrication. The standard rapid extrication PPE consists of impervious gowns, bouffant caps, gloves, eye protection, and face masks (Figure 4). As team members are donning their PPE, each verbally declares their role, based on the time of clinician arrival and experience.

Role Identification

Rapid extrication can be performed with as little as 2 clinicians but for optimal safety 3 clinicians per injured person is ideal. The main nurses station where the charge nurse is stationed and 2 additional nursing zones are directly across from the ambulance bay doors. The ED attending physicians and residents are stationed directly next to the ambulance bay doors facilitating a rapid response from nurses, ED technicians, and physicians. We have trained all staff in the following 3 roles.

Team member #1 is the primary team leader during extrications, responsible for deciding which technique to use based on the vehicle and presentation of the injured person. When the vehicle comes to a complete stop, team member #1 opens the nearest side door and makes contact with the injured person. This person is typically a nurse who does a rapid assessment of whether the patient is responsive and how capable the patient is to assist with the extrication. If the person is alert and able to ambulate, the team member will assist them to the waiting stretcher. If the patient is unresponsive or unable to ambulate, team member #1 identifies to the rest of the team the location of the injured person’s head. Simulation training identified that it is easier to remove the injured person head first to the awaiting stretcher. Therefore, it is essential to know which side of the car the injured person’s head is closest to to facilitate a safe and efficient extrication to the waiting stretcher. Once on the stretcher and moving toward the vestibule, the nurse looks for hemorrhaging wounds that require direct pressure and conducts basic airway, breathing, and circulation assessments. The nurse will also ask an alert patient if they have ever been shot before and how many gunshots they heard. This information provides the trauma team with an approximation of how many bullets to look for and/or determine whether there are bullets retained from previous shootings. During transport, the nurse informs the patient of what to expect once they arrive in the trauma bay.

Team members #2 and #3 are responsible for maneuvering the stretcher and placing the backboard at the correct location after team member #1 identifies which side of the vehicle the patient’s head is presenting. Team member #3 will remain at the head of the stretcher to ensure it does not move and to lock and unlock the stretcher during the rapid extrication. These 2 techniques were identified using the emergency medical technician rapid extrication guidelines[11] and previous emergency medical technician experience of several of our nurses and ED technicians.

Two Rapid Extrication Techniques The Bridge Technique

The most commonly used technique is the “bridge” technique, in which the person is lifted from the car seat to the stretcher by team members #1 and #2. This approach can be made easier by bridging the gap between the stretcher and car seat with a rigid EMS backboard that acts as a slide board to support the person while extricating (Figure 5). This technique works best for smaller persons who are easily lifted and moved. Another consideration for this technique is how wide the vehicle door opens to maneuver the stretcher close enough to the vehicle seat and at the

height of the vehicle in relation to the stretcher. The bridge technique works well for sport utility and van vehicle types.

The Ground Technique

The second technique used is the “ground” technique. This technique is used for larger persons that may be too difficult for team members #1 and #2 to lift up onto the stretcher. This technique is also useful when the vehicle door does not open wide enough to allow the stretcher near the car or when the vehicle seat is lower than the stretcher as seen in sedans and low-riding vehicles. When the ground technique is called for, the backboard will be placed on the ground perpendicular to the vehicle. Team member #3 will position the stretcher so the foot of the stretcher lines up linearly with the backboard. Team member #3 will then lock the stretcher and position themselves so that they can secure the backboard from moving while team members #1 and #2 slide the person from the vehicle onto the backboard, while supporting person’s head and neck. Once the person is fully on the backboard, all team members will lift the backboard up and onto the stretcher (see Figure 6). Team member #3 will then unlock the stretcher and move the person into the ED vestibule.

Weapons Screening

After the person is extricated from the vehicle and placed onto the stretcher, they are brought inside the ED vestibule area in the ambulance entrance area. Regardless of the person’s clinical condition, once in the vestibule, the stretcher is stopped and appropriate security staff members perform a pat-down of the person. This “Hard Stop” is performed on all injured persons and lasts on average 10 seconds with the sole purpose of removing and securing any obvious weapons before the injured person enters fully into the emergency department. Owing to the construction of stretchers, metal detecting wands are ineffective in distinguishing a concealed weapon from artifact. Therefore, it is essential that security conducts manual pat-down for detection and removal of weapons in the vestibule before the person entering the trauma bay. Through the collaboration and work with Penn Presbyterian Medical Center security and University of Pennsylvania Police Department, the “Hard Stop” and weapons screening has become the expected and routine procedure. Figure 7 is part of a poster hanging in the vestibule area of our ambulance entrance, as an additional visual aid for our security personnel.

Training

The initial simulation was an active learning exercise to identify safe and efficient methods to extricate traumatically injured patients from police vehicles or PVs. The knowledge and understanding that were gained from the simulation were then translated into a formal extrication procedure that clearly outlined roles and responsibilities for each discipline. Before the implementation of the process, ED technician and nursing champions were identified. This core team, along with nursing leadership, mentor and advise staff during rapid extrications. Real-time orientation to the process is supplemented with didactic educational sessions and slide presentations. Education on the process begins at orientation for all new ED and security staff.

Who

Education for ED clinicians and security staff was developed by the clinical nurse specialist (CNS) and an ED staff nurse with previous prehospital experience.

What

The rapid extrication process has been outlined in a step-by-step fashion in a PowerPoint document (Supplementary Appendix) that has been distributed to ED clinicians and security staff. Another educational tool used is the algorithm shown in Figure 8, which delineates the steps for using the ground and bridge techniques. This information has also been distributed through verbal discussions to ED clinicians at morning change of shift huddles.

How Often

The extrication process is included in the new employee orientation binder for nurses, physicians, and ED technicians. In addition, owing to turnover and increasing trauma volume, education of ED and security personnel on this process is ongoing to ensure that there is no gap in using this safe and efficient standardized rapid extrication approach. ED clinicians are provided the opportunity to practice extrication in a controlled environment during annual competency updates. Staff also provide feedback in real time with each extrication of a patient from a police vehicle

or PV to the charge nurse who then relays the feedback to the ED CNS. If necessary, the ED CNS provides individualized education to clinicians.

How Well

We timed the interval from arrival of the vehicle to patient arriving in the vestibule for the hard stop for 27 victims using the security videos. The average time it took to rapidly extricate the victim from the car to the ED vestibule before the simulation was 60.33 seconds. With implementation of the role-based extrication process, the average time to extrication decreased to 51.5 seconds. Although an 8- to 9-second decrease may seem small, every second counts when treating people with GSWs. Often, patients survive the gunshot but hemorrhage before reaching the hospital.[16] Efficiencies realized through the development of the role-based extrication process improved time to patient arrival in the trauma bay for definitive treatment.

Implications for Emergency Nursing

This article aimed to offer guidance on the development and implementation of a role-based extrication process in the instance that other municipality police departments decide to adopt a scoop and run policy for transporting gunshot victims. There are several factors to consider when creating a rapid extrication process for patients arriving to the emergency department by PV. First, police transport of shooting victims removes the buffer between the community and the emergency department typically provided by trained EMS. As such, standard processes for transfer from the vehicle to the emergency department and patient assessment require revision. The simulation described in this article was useful for creating processes designed to transition the patient from a PV to definitive care. For example, the simulation exposed the need to move the police drop-off site closer to the ED entrance to improve efficiency of staff access to patient. Spine stabilization was also eliminated from the extrication process after reviewing current guidance suggesting that there is no benefit, as well as the potential for irreversible neurologic deficits, with the use of this practice.[15]

Second, implementing an extrication protocol involves incorporating all necessary stakeholders from hospital security, all ED personnel, and community police. Collaboration with community police and security helps to clearly identify team member roles, appropriate drop-off sites, and communication pathways between teams. Mandatory adherence to the “Hard Stop” to allow security to conduct a search and a well-defined weapons-handling policy are important aspects to ensure the safety of ED clinicians, patients, and visitors. ED champions, identified by leadership, are essential for successful implementation of recommended processes. The champions function in a mentoring role and assist with education and monitoring adherence to defined process steps with particular focus on PPE.

Future directions include a continuous quality improvement project on patient and interdisciplinary team outcomes including the team’s satisfaction with this extrication process. This should include any untoward physical injuries to identify the need to reinforce safe transfer techniques to avoid injuries of the interdisciplinary team. In addition, we will continue to quantify the frequency of police and civilian drop-offs of patients with penetrating wounds to the emergency department compared with EMS transports and monitor the outcomes of these patients.[17] The nurses would also like to work with the police department to develop a device to help avoid the transported individuals ending up on the floor of the police vehicle to facilitate easier transfers and support individual’s dignity during the transfer.

Nurses can engage in gun violence prevention as part of a multisector approach. Per the Centers for Disease Control and Prevention, this entails providing data to inform action, conducting research, and applying effective solutions inside and outside the confines of the emergency department and promoting collaboration.[2]

In addition, emergency nurses can help facilitate the mental health healing process for victims of gun violence by referring all surviving victims of gun violence to the chaplain and for a psychiatric consult. Aftercare for their physical and psychological wounds is essential.[2]

Supplementary Data

Supplementary Appendix

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.01.012

Item number	Item description	Brief description from this report
1.Brief name	Provide a name or phrase that describes the intervention.	Extrication of persons from police and private vehicles
2.Why	Describe rationale, theory, or goal of the elements essential to the intervention.	To develop a process to safely and efficiently extricate traumatically injured persons arriving to the emergency department by police or private vehicle
3.What: materials	Describe materials used in the intervention. Provide where materials may be accessed.	Simulation exercise using clinicians, security personnel, police, police vehicles, PPE, stretchers, and backboards took place in the ED driveway.
4.What: procedures	Describe each of the procedures and processes used including enabling or support activities.	Simulations were run to identify proper PPE, clinician roles, drop-off location, extrication techniques, and weapons screening for traumatically injured persons arriving by police or private vehicle.
5.Who provided	For each category of intervention, describe their expertise, background, and any specific training given.	The ED CN III led the process with the assistance of the master's prepared CNS and the master's prepared nurse manager. They engaged with the city's police lieutenant who was the liaison between the city police and the emergency department. The university police and onsite security lead were also fully engaged.
6.How	Describe the modes of delivery of the intervention and whether it was provided individually or in a group.	The simulation to develop the safe and efficient processes to extricate traumatically injured patients from police or private vehicle was hands-on active learning approach. The learnings from the simulation were then communicated in groups and individually through PowerPoint presentations and real-time orientation to the process by nursing leadership.
7.Where	Describe the types of locations where intervention occurred including any necessary infrastructure or relevant features.	This process was developed for the ED driveway and entrance.

8.When and how much	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, schedule, duration, intensity, or dose.	The education on the process is delivered either yearly or every other year and upon orientation. The process is reinforced with each extrication by nursing leadership.
9.Tailoring	If the intervention was planned to be personalized, titrated, or adapted, then describe what, why, when, and how.	This process can be replicated in other emergency departments but will need to be modified to address their environment. However, the PPE-required role identification and hard stop for weapons checks should not be modified to provide a safe and efficient extrication process.
10.Modifications	If intervention was modified during the course of the study, describe the changes what, why, when, and how.	The modification required during the implementation of the extrication process was reinforcement of the hard stop for weapons checks to assure the safety of the clinicians in the trauma bay.
11.How well: planned	If intervention adherence or fidelity was assessed, describe how and by whom and if any strategies were used to maintain or improve fidelity.	The CNS and CN III initially assessed the adherence to all the steps of the process in real time when they were present in the emergency department and by using the security camera footage when available. The CNS and CN III provided individual training to clinicians, typically ED technicians, RNs, and security who were challenged to adhere to the process. This resulted in greater adherence.
12.How well: actual	If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.	The CNS and CN III initially assessed the adherence to all the steps of the process in real time when they were present in the emergency department and by using a checklist and the security camera footage when available.

DETAILS

Subject:	Emergency medical care; Personal protective equipment; Mortality; Vehicles; Trauma centers; Interdisciplinary aspects; Equipment; Leadership; Emergency services; Patrol cars; Teams; Confidence intervals; Police; Nurses; Patients; Simulation; Trauma; Security staff; Private transport; Urban areas; Employees; Gun violence
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Automated Dispensing Cabinet Overrides—An Evaluation of Necessity in a Pediatric Emergency Department: JEN

ABSTRACT (ENGLISH)

Objective

Automated dispensing cabinets, or ADCs, are often used at health care facilities to aid in the medication-use process. Although ADCs minimize certain medication errors, they introduce a new type of error involving overrides. Although helpful when used appropriately in emergencies, overrides bypass pharmacist verification and increase potential for patient harm through drug-drug interactions, medication allergies, inappropriate dosing, and more. The purpose of this study was to evaluate automated dispensing cabinets override pulls in a pediatric hospital's emergency department. The authors sought to discover whether overridden medications were being administered before verification (indicating it was needed emergently, thus justifying override) or after verification (indicating the override did not result in quicker administration and/or the medication was not emergent).

Methods

This was a retrospective, observational study. Data were collected from electronic health record reports from a 343-bed pediatric hospital's emergency department from October 13, 2019, to December 22, 2019.

Results

A total of 445 override pulls were identified during this time, and after data analysis, 99 override pulls remained in the data set. Overall, time from input of prescription into the electronic medical record to medication override was approximately 4 minutes. Pharmacist verification also took a median of four minutes after prescription input. However, administration took twice as long, at 8 minutes. On average, pharmacist verification occurred 4 minutes before medication administration.

Conclusion

This research from a pediatric emergency department suggests that most situations did not require an immediate administration, and perhaps an override was unnecessary and could have been avoided.

FULL TEXT

Introduction

In 1999, the Institute of Medicine published a report, *To Err Is Human: Building a Safer Health System*,[1] to draw attention to the significant problem of medication-related errors in the health care system and to increase focus on improvements and the prevention of these errors.[2] Although this report increased awareness, there is still more work to be done. Many medication-related errors are minimal without adversely affecting patients, whereas others result in serious life-threatening events, including patient morbidity and mortality. Therefore, these errors must be taken seriously, and strategies should be established to prevent patient harm.[2]

Since the 1980s, automated dispensing cabinets (ADCs) have been used in health care facilities for storage, dispensing, and tracking of drugs in patient care units.[3] ADCs have been recommended as a potential way to increase efficiency and reduce the number of medication errors.[3] Although research shows that there are fewer errors in drug administration, fewer missing doses, and lower rates of dispensing errors with ADCs, a number of issues related to their use have surfaced.[3,4] A recent Danger Zone article, published in the *Journal of Emergency Nursing*, discusses the importance of using ADCs safely and keeping in mind the risks associated with their use.[5] The author suggests that safety gains can be achieved only with careful use of ADCs, in addition to clear practice

expectations when using the machine in patient care units.[5] Without close attention to detail, medication errors can still occur with ADC use.

ADC functionality allows for medications to be vended from the cabinet after review and verification by the pharmacist, which is the safest scenario.[2] However, there is a function imbedded into the machines, called an override, that allows a member of the patient care team to remove medications before pharmacist review and verification, specifically in emergency situations, if delay would result in patient harm.[2] The Institute for Safe Medication Practices (ISMP) has established guidelines for the safe use of ADCs to improve safety during the medication-use process.[6] ISMP states that, in some instances, overrides are occurring unnecessarily or even when a drug has not been prescribed, leading to selection and removal of the wrong medication, strength, or dose.[6] This override bypasses the important safety net of a pharmacist's expertise and clinical judgment and should be avoided if possible. Unfortunately, this override function may be misused because of inefficiencies in the system, inadequate training, lengthy wait times for pharmacist review and verification, and a lack of guidance on what is considered an emergency.[7]

The ISMP defines override as "a process of bypassing the pharmacist's review of a medication order to obtain a medication from the ADC when assessment of the patient indicates that a delay in therapy would harm the patient."[8] The idea behind an override is to shorten the time to drug administration to the patient for reasons mentioned earlier. A list of overridable medications is agreed upon by health care professionals—usually the pharmacy and therapeutics committee—in each institution where ADCs are used. This list comprised medications that would likely need to be accessed in emergency situations in which waiting for pharmacist verification would pose a risk to the patient. The overridable medications inside an ADC may vary based on the location of the patient care unit because certain medications are needed quickly in some units of the hospital but not necessarily in others. A commonly overridable medication, particularly in pediatric settings and emergency settings, is albuterol hydrofluoroalkane (HFA). This is likely caused by the utility of this medication in asthma exacerbations and bronchospasm, which are relatively emergent situations. The ADC is programmed to allow nurses to access the overridable medications without them first being verified by a pharmacist. It is impossible for a nurse to complete an override pull for a medication that is not on the approved override list.

While working in a fast-paced environment and trying to efficiently treat all patients, health care professionals sometimes get accustomed to pulling medications for which an override is possible without following all requirements. According to ISMP, necessary steps required for an override pull include ensuring that the medication has been prescribed (whether verbally or via the electronic medical record [EMR]), assessing the patient, and discerning that harm would come from a delay in administration.[8] Additional risk reduction strategies in the setting of an override include requiring documentation of override rationale, assessing the patient's allergies and weight, avoiding the use of multiple-dose containers, and using a witness with another licensed health care provider at the ADC when removing the medication.[6] Sometimes, practitioners will obtain a medication from the ADC without a specific verbal, telephone, written, or electronic prescription.[8] Often, this is incorrectly referred to as an ADC override; however, all true overrides begin with a prescription and end with a decision to not wait for a pharmacist to review the prescription before obtaining the medication from the ADC.[8]

Using the override feature of the ADC without following the proper steps of the override process is to be avoided. In addition, these overrides create the potential for medication errors given that they bypass an important review from the pharmacist of a medication's dosing, drug interactions, or life-threatening allergies.[9] Regardless of the practice setting, whether inpatient, outpatient, or in a community pharmacy, it is standard practice for a licensed pharmacist to perform a final verification for all prescriptions before medication administration. The verification step is essential for ensuring accuracy and patient safety and preventing medication errors. The series of actions associated with ADC overrides should be viewed as risky rather than routine, owing to the elimination of the important pharmacist verification step.[8] There are numerous reports of medication errors and patients being put at risk owing to medication overrides, including multiple doses of piperacillin/tazobactam being given to a patient with a penicillin allergy.[3] In a situation in which an override is not performed, the order of steps in the process is as follows:

prescription entry into the EMR, pharmacist verification of the prescription, medication withdrawal from the ADC, and then medication administration to the patient.

Hospitals that are visited by surveyors from The Joint Commission must demonstrate adherence to hospital-specific policies for reviewing overrides for medications kept in ADCs.[10] In 2018, The Joint Commission added an assessment of the ADC override process to hospitals' performance element in the medication management standard.[10] A performance element is a standard that is used to measure, assess, and improve an organization's performance.[11] Although there is no national goal for measuring override rates, health care facilities should strive for a decline in override rates.[12] As mentioned earlier, pharmacists can take an active role in evaluating and improving medication-use processes to ensure patient safety. The American Society of Health-System Pharmacists has developed guidelines to support pharmacists with recommendations and best practices for preventing medication errors in the health care system.[2] These guidelines recommend that each health care institution develop a specific criterion that allows for medication overrides in emergency situations and specify which medications can be overridden.[2] In addition, because nurses perform most transactions in the ADC, their role in error prevention is a key one. Although pharmacists are responsible for medication review and verification, nurses are responsible for medication administration; a multidisciplinary collaboration between pharmacists and nurses will optimize patient care and the safety and productivity of ADC use.[13]

The purpose of this study was to identify whether the process of medication override decreases the time it takes for medications to be administered. An additional goal was to identify whether any medications were being overridden in situations in which they did not need to be administered immediately. The primary outcome was the time difference, in minutes, between prescription verification by a pharmacist and administration of overridden medications in the pediatric emergency department. We also sought to get a better understanding of the medications that are most commonly overridden in the pediatric emergency department at our institution.

Methods

This was a retrospective observational study of patients in the emergency department in the pediatric hospital of an academic medical center. It was approved by the Vanderbilt University Medical Center Institutional Review Board with protocol identifier 202295. Override data were collected from Epic, the EMR system used at a 343-bed pediatric hospital. Data include ADC overrides in the emergency department from October 13, 2019, to December 22, 2019. During the time period that was studied, this emergency department did not have a dedicated pharmacist 24 hours a day, 7 days a week, but rather an ED pharmacist for 4 10-hour shifts per week. However, at all times there is a pharmacist tasked with prospective review of all inpatient prescriptions. An override report was run in Epic for each week during this time period; administration and verification times were collected from each patient's EMR. Override pulls that were included were for medications that had been overridden, administered to the patient, and verified by a pharmacist (either before or after administration). Override pulls were excluded if they were returned to stock, were not administered to the patient, were not verified by a pharmacist (eg, autoverified prescriptions), or were for medications whose sole purpose was to dilute or reconstitute other medications (eg, sterile water for injection). In this institution, some medications are not verified by the pharmacist because of the autoverification policy in which certain medications are subject to retrospective medication review only. Nurse-initiated standing orders or protocols are autoverified in the EMR and as such were not analyzed because pharmacist verification is not a step in this process. These prescriptions were not reviewed because they cannot be overridden. Override pulls that met any of the exclusion criteria were not analyzed further. Override data were then analyzed using descriptive statistics.

Owing to the labor-intensive process required for running the reports and performing chart review for each override pull, coupled with the time constraints of our data collection period, data were only collected for the October-to-December 2019 season. ED visits at our institution were significantly lower than usual during the first few months of the coronavirus disease 2019 pandemic and continued to be low at the time of institutional review board submission. As such, the researchers decided to conduct this study on prepandemic data which were, at the time, more indicative of what is typical for our institution.

Results

A total of 445 ADC override pulls were analyzed from this time period, of which 99 met the inclusion criteria and were not excluded because of previously mentioned reasons. Medications that were overridden are shown in Figure 1; albuterol HFA was the most commonly overridden medication in our study (n = 44). Of 99 override pulls, 72 (73%) involved medications that were administered at or after the time of pharmacist verification, with 27 of them being administered more than 5 minutes after verification (Figure 2).

Of the 99 override pulls, only 51 were associated with an electronic inpatient prescription that had already been placed before the override pull. The remaining 48 override pulls were overridden, then entered into the EMR, and then verified. As mentioned previously, one of the necessary steps of a valid override is ensuring that a prescription has been placed verbally or in writing. It is hospital policy at our institution that medications that are prescribed verbally by a provider are input into the EMR immediately by a pharmacist or nurse with verbal readback to the provider. In situations involving verbal prescriptions that have been input into the medical record, the prescriber is notified and is able to sign off on the prescription. Ideally, all medications that are prescribed verbally would be entered into the EMR, and as such, verbal prescriptions and prescriptions entered into the EMR by the provider appear similar in the medical chart. Only in circumstances where this would be detrimental to the patient (eg, an emergent situation) should a verbal “repeat back” be used and entry delayed. Owing to the retrospective nature of the study, prescriptions that were given verbally but not input into the EMR were unable to be accounted for.

Figure 3 examines the override time, which is the time it took for the nurse to pull the medication from the ADC using the override function after the medication was prescribed in the EMR. This was only evaluated for the 51 prescriptions for which the override actually took place after the prescription was entered into the EMR. Override time was a median time of 4 minutes (interquartile range [IQR] 2-7.75). The minimum override time was 1 minute, and the maximum time was 24 minutes.

Figure 4 examines the verification and administration times. Verification time is the length of time, in minutes, it took for the pharmacist to verify the prescription after it was placed electronically. The median time to verification was 4 minutes (IQR 1.5-8 minutes). The minimum time to verification was 0 minutes, and the maximum time was 71 minutes. Regarding albuterol HFA only, the median time to verification was 5 minutes with a maximum time to verification of 29 minutes.

Administration time is the length of time, in minutes, it took for the nurse or other practitioner to administer the medication after the medication had been overridden. The median time to medication administration was 8 minutes (IQR 5-14.5 minutes). The minimum time to medication administration after override was 1 minute, and the maximum time was 140 minutes. Regarding albuterol HFA only, the median time to administer the medication after the override was 17.25 minutes.

Figure 5, delay time, is the amount of time the nurse would have had to wait to pull the medication from the ADC without performing an override pull. This value was only calculated for prescriptions that were input into the EMR before being overridden and were not already verified at the time of override pull. There were 23 pulls that met these criteria of being appropriately overridden and had an associated delay time calculated; 19 of those (83%) involved a delay time of ≤5 minutes. Five of these actually had a delay time of 0 minutes, meaning that the override pull occurred at the same time as the pharmacist verification step.

Discussion

In the pediatric emergency department at this academic medical center, there were override pulls initiated before the prescription was entered into the EMR. There were also scenarios in which the override process may not have been necessary to ensure prompt administration of medications, based on the times of prescription input, override, verification, and administration. Verification is an extremely important step of the medication-use process and is often done promptly enough to bring the necessity of override pulls into question. On average, pharmacist verification happened more quickly than nurse administration. The fact that the median time to administration was 8 minutes after override time and took place after pharmacist verification suggests that most situations did not necessitate immediate administration of the medication, and perhaps an override was unnecessary in those

situations. Medication overrides occurred a median of 4 minutes after prescription input, whereas pharmacist verification occurred a median of 4 minutes after prescription input. However, medication administration often occurred after medication verification despite the potential delay. In addition, the fact that one of the medications was administered 140 minutes after being pulled is concerning because it indicates that the situation was not emergent and therefore did not necessitate a true override. Furthermore, many of the medications that were pulled using the override feature were either returned to stock or simply not administered at all, which means that the medications were not actually needed by the patient. The results regarding delay time mean that even in situations where medications were overridden appropriately (only about one-fourth of the overridden medications), most of them would not have had to be overridden if the nurse could have waited 5 minutes for verification.

The most common order of steps that occurred was as follows: prescription input into EMR, medication pulled via override function, prescription verified by pharmacist, and finally medication administered to patient. The results from Figure 2 led to the conclusion that only approximately 27% of the overriden prescriptions were definitely administered more quickly through the override process than they would have been had they not been overridden. Approximately 45% of the override pulls may or may not have involved time saved because of being overridden (administered 0-5 minutes after verification), because if the nurse had waited until verification before pulling the medication, they might have had to administer the medication later than they actually did using the override process. Approximately 27% of the overridden medications were overridden unnecessarily because these prescriptions were actually verified quickly enough that they could have been pulled without override and still administered at or before their actual time of administration.

This study has several strengths. First, owing to the paucity of data regarding this topic, this research can aid in informing health care providers and decision makers about the prevalence of medication overrides and how appropriately (or inappropriately) they are being performed. In addition, the fact that this study was retrospective and observational in nature ensured that neither pharmacists nor nurses altered their behavior or workflow because of knowing that the study was taking place. Finally, all information was extracted directly from the medical record and did not rely on coding.

A limitation of this study is that the extensive exclusion criteria, although improving the specificity of our data set, significantly decreased the number of override pulls that could be further analyzed. Furthermore, time constraints on our data collection period prevented us from collecting data from a broader range of time. Not having a comparator group of medications that were dispensed from the ADC through the normal process (not overridden) also limits the interpretation of the results of this study. In addition, times in the EMR are listed in hours and minutes. The fact that seconds are not recorded and displayed makes the calculations of time differences slightly less specific. Another limitation of this study is the potential for small time inaccuracies in charting. For example, a nurse who administered a medication at 6:07 might not have charted it until 6:08 or may have estimated that she administered it at 6:05. In addition, the method of data collection made it impossible to account for verbal prescriptions before they had been recorded in the medical record. Finally, the single pediatric medical center and retrospective design of this study limit the interpretation and generalizability of the results.

Implications for Emergency Clinical Care

This research highlights the potential need for further education regarding the risks associated with the override process and the importance of performing overrides properly. Health care professionals would likely benefit from an update or reminder of the override protocol in their respective medical centers. The ISMP has articles that would be helpful in this endeavor.[8] In addition, education should be provided on methods to avoid overrides if possible, such as paging or calling the pharmacist to ask for an important medication to be verified promptly.

Nurses and other practitioners who use the override feature in an ADC should ensure that a verbal or written prescription is placed before the medication is overridden. Furthermore, it should be reiterated that just because a medication is on the list of those that can be overridden does not mean that practitioners should be in the habit of overriding that medication if it is unnecessary to do so.

Conclusions

In the pediatric emergency department of this academic medical center, the progression of steps involved in the override process often indicated that medications could have undergone the usual process of being verified before being pulled (ie, not being overridden) and still be administered at or before the administration time that was achieved using the override feature. The pattern of utilization of the override option in ADC calls into question whether the override was necessary in these instances. In effect, if a patient truly needed a medication emergently, why was the medication not administered as soon as possible after being pulled from the ADC?

A medication override is meant to achieve more efficient administration of certain medications in situations that require quick action to prevent patient harm, but every override comes at a cost—with each override, the important step of pharmacist verification is bypassed, an omission that could lead to patient harm. Pharmacist verification helps to ensure medication safety and appropriateness before administration, thus reducing the risk of medication errors and improving patient care. As such, this step's importance should not be overlooked or undervalued, and bypassing it should be avoided as much as possible. Health care institutions should continually assess policies associated with medication overrides and aim to decrease override frequency, specifically in the emergency department.

Further research is needed to determine the effects of unnecessary medication overrides, including potential or actual patient harm. Ideally, this study could be continued to obtain a more robust picture of the nature of overrides in this institution over a longer period of time. This would account for seasonal variations in medication use and ED visits. A potential future study could be conducted prospectively to reduce possible bias from reviewing data retrospectively, but would introduce a new type of bias as nurses and/or pharmacists may change their behaviors if they were to know they were being monitored for a study. In addition, a control group of medications that have undergone a normal medication-use process (ie, those that have not been overridden) would provide meaningful comparison to the study results. A list of excluded override pulls and the reason for exclusion should be extensively documented. An analysis of the presence of a pharmacist in the department should be performed to analyze their role on medication verification time. There is a need to eliminate for confounding variables between accurate medication administration time and time documented in the medical record, especially in critical, high-acuity situations. Finally, a list of approved overridable medications would strengthen this research; however, this information is institution specific and is confidential information that cannot be shared with individuals outside the institution.

We urge other institutions and other departments of our own institution to evaluate their utilization of the override process and ensure that this strategy is being implemented to improve patient care rather than unnecessarily put patients at risk.

Author Disclosures

Conflicts of interest: none to report.

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A Modified Aerosol Mask Could Significantly Save Oxygen Supplies during SARS COV 2 Pandemic: JEN

ABSTRACT (ENGLISH)

Of note, the World Health Organization recently published an interim guide on oxygen source and distribution during the COVID-19 pandemic, estimating that an average of 90 m3 of oxygen per hour would be necessary to cover the needs of a hospital managing 100 concurrent COVID-19 cases.2 Unfortunately, epidemic waves have put health care systems under stress, and oxygen supply scarcity has been encountered in some regions of the world, such as India, Africa and Latin America.3 Oxygen supply and oxygen-saving strategies are thus of utmost importance for those regions. In addition to hospital use, an online video tutorial (shared by a Quick Response-code on oxygen bottles) or documentation included with oxygen bottles could allow implementation of this simple device among the population for at-home care. In addition to saving oxygen, proper use of this device could have a significant economic impact on and reduce the risk of catastrophic health expenditure faced by families taking care of their relatives at home because of overwhelmed hospitals.—Duprez F, PT, RT, PhD, ICU Epicura Hospital Hornu Belgium and Laboratory of Motion and Respiratory Physiology Condorcet School, Tournai, Belgium; De Terwangne Ch, MD, PhDs, Deparment of Geriatric Medicine, Université Catholique de Louvain, Brussels, Belgium; Poncin W, RT, PhD, Service de Pneumologie, Cliniques; and secteur de Kinésithérapie et Ergothérapie, Cliniques Universitaires Saint-Luc, Brussels, Belgium; Bruyneel A, RN, CCRN, PhDs, Health Economics, Hospital Management and Nursing Research Department, School of Public Health, Université Libre de Bruxelles, Brussels, Belgium.

FULL TEXT

Dear Editor:

Coronavirus disease (COVID-19) is predominantly a respiratory illness that can evolve to hypoxemic respiratory failure. In those cases, oxygen therapy is used as first-line treatment and is still the most supportive treatment of the disease.[1] Therefore, oxygen supply is key for an effective health care response, and meeting the surging oxygen demand is vital during the COVID-19 emergency. Of note, the World Health Organization recently published an interim guide on oxygen source and distribution during the COVID-19 pandemic, estimating that an average of 90 m^3 of oxygen per hour would be necessary to cover the needs of a hospital managing 100 concurrent COVID-19 cases.[2]

Unfortunately, epidemic waves have put health care systems under stress, and oxygen supply scarcity has been encountered in some regions of the world, such as India, Africa and Latin America.[3] Oxygen supply and oxygen-saving strategies are thus of utmost importance for those regions.

To treat severe hypoxemia, the main systems currently used are the non-rebreathing mask or high flow nasal oxygen.[4] However, these systems consume large amounts of oxygen and have thus limited usefulness in places where hospital capacities are overwhelmed and oxygen storages have been depleted.

The Modified Aerosol Mask (MAM) is an original handmade oxygen delivery system that can be self-assembled with few and easily available disposables. Indeed, the MAM is made of 1 aerosol mask onto which 2 pieces of corrugated tubing (15 cm length) are connected (Figure 1). The whole system is placed above the classical nasal cannula (NC), which remains the source of oxygen distribution. During expiration, the continuous oxygen flow from the NC is collected in the 2 tubes instead of being immediately dispersed into the room. During the next inspiration, the patient will receive, when inspiratory flow exceeds NC flow, this oxygen-enriched gas mixture from the tubes instead of atmospheric room air. Of course, once the tidal volume exceeds the mask and tubing volume (210 mL), atmospheric air will penetrate the tubes and will be inspired by the patient. In doing so, the increased dead space from the corrugated tubes of the MAM theoretically acts as a collector of wasted oxygen during the expiratory phase or in the case of mouth breathing (Figure 2). This set up may have the advantage of increasing the fraction of inspired oxygen for a given oxygen flow delivered by NC, without clinically significant arterial CO_2 increase.[5] Hence, for this fraction

of inspired oxygen, the addition of the MAM allows lower oxygen flows and thereby saves oxygen supplies. The MAM can spare up to 50% of oxygen flow while preserving a target arterial oxygen pressure.[6] This mask is an experimental prototype, used under an emergency exemption and with approval from the two main ethics committees of our country. The device has not yet been approved for use in the United States. The MAM can be used with either oxygen cylinders or oxygen concentrators. This device could thus be valuable in those countries in need of enormous amounts of oxygen and undergoing actual oxygen scarcity. In addition to hospital use, an online video tutorial (shared by a Quick Response-code on oxygen bottles) or documentation included with oxygen bottles could allow implementation of this simple device among the population for at-home care. In addition to saving oxygen, proper use of this device could have a significant economic impact on and reduce the risk of catastrophic health expenditure faced by families taking care of their relatives at home because of overwhelmed hospitals.—

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External jugular vein peripheral intravenous catheters: An emergency Nurse's guide: JEN. (2022). Journal of Emergency Nursing, 48(3), 303-309. doi:https://doi.org/10.1016/j.jen.2022.01.009

Insertion of a peripheral intravenous catheter into the external jugular vein is regularly performed in emergency departments to treat patients with difficult intravenous access. Although emergency nurses are experienced in inserting peripheral intravenous catheters, there is an inconsistent practice and a lack of education and training regarding the insertion of catheters in the external jugular vein. This manuscript provides a practical guide for emergency nurses to care for patients who require an external jugular peripheral intravenous catheter. Key information found in this manuscript includes indications for external jugular intravenous access, the nurse's role in performing external jugular peripheral intravenous catheters, and clinical considerations when caring for patients with an external jugular peripheral intravenous catheter.

Professional self-concept, job stress, and triage competency among emergency nurses: Secondary data analysis of a cross-sectional survey: JEN. (2022). Journal of Emergency Nursing, 48(3), 288-298. doi:https://doi.org/10.1016/j.jen.2022.01.010

IntroductionThis study aimed to evaluate the indirect relationship of job stress with triage competency through professional self-concept among emergency nurses in Korea.MethodsA secondary data analysis of survey data from 132 questionnaires was used. A convenience sample of emergency nurses working in regional or local emergency centers in 2 Korean cities was recruited for the survey. Study variables were analyzed using descriptive statistics, correlation, and a model tested using the Hayes PROCESS macro (Model 4) mediation model.ResultsJob stress alone was not associated directly with triage competency (β = 0.01, P = .74). An indirect pathway was observed between job stress and triage competency through professional self-concept (F = 5.85, P < .001, R2 = 0.33). In the tested model, job stress was associated with professional self-concept (β = −0.05, P < .05) and professional self-concept was associated with triage competency (β = 0.79, P ≤ .001).ConclusionProfessional self-concept may be an important determinant of triage competency among emergency nurses. To increase triage competency among emergency nurses, individual nurse and management efforts are recommended to foster professional self-concept and reduce emergency nurse job stress.

Board of directors: JEN. (2022). Journal of Emergency Nursing, 48(3) doi:https://doi.org/10.1016/S0099-1767(22)00071-X

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ECRI boldly called out the impact of precipitating workplace factors stemming from electronic health records (EHRs), time pressures, heavy patient workload, patient complexity, rapid change, and limited resources on a workforce largely comprising high achievers.4 They emphasized the importance of listening to clinician concerns, leveraging change at the system level to address the underlying causes such as improper resource allocation, and ending the treatment of employees as "cogs in a wheel." Workplace elements solidly coupled with emergency nurse burnout and turnover include difficult work schedules and shift work, inadequate support by leadership, and escalating workplace violence toward staff.7,8 Layer on frustrations caused by a lack of essential supplies and equipment, barriers to patient flow, inadequate staffing relative to demand, and ever-increasing regulatory burdens. COVID-19 added the threat of infectious disease contagion, potentially without adequate or appropriate personal protective equipment, and worsened the nurse-specific trauma of caring for scores of critically ill and dying patients in a time of insufficient and even rationed resources.9-11 The system dysfunction that created the conditions for nursing burnout and turnover before the pandemic was magnified by COVID-19–related surges and stressors.12,13 While temporary and travel nurse staffing agencies have long filled a need for short-term nursing labor demands, the value and demand for nursing skills multiplied during the pandemic.14,15 For institutions that had undervalued long-term nurse employees and nurse retention, the pay gaps between loyal nurse employees and temporary or travel nurses

created further backlash from employees, contributed to additional turnover, and saw institutional attrition spiral. The prolonged pandemic disaster context exposed emergency nurses to additional risk factors for burnout, grief injury, fatigue injury, moral injury, and traumatic injury.11,13,21 In the resulting gaps in stable existing workforce supports, we also discuss how quintessentially timely and important regional and specialty-wide resources and infrastructure will be for new nurse transition support.21,22Transition Stages and Transition Shock Models The first year of professional nursing is profoundly transformative.19 Assuming supported and evolutionary developmental knowledge and skill pathways were offered during nursing education, one might expect that new nurses would be able to anticipate a relatively stable postgraduate period rather than the steep, dynamic, and tumultuous learning curve they actually find.

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Clinician wire puncture injury to the hand from chest compressions on a patient with a median sternotomy: A case report: JEN. (2022). Journal of Emergency Nursing, 48(3), 253-256. doi:https://doi.org/10.1016/j.jen.2022.01.011

Standard precautions, including protections from blood and body fluid exposure, are designed to protect health care providers from infections. Sharps safety practices rarely include the potential for the unconscious patient's own body to be a potential source of clinician percutaneous injury from sharp objects outside of the perioperative setting. This case report reviews a percutaneous injury to the hand of a physician who was performing chest compressions on a patient with an out-of-hospital cardiac arrest. The 76-year-old patient in cardiac arrest had undergone a medial sternotomy surgery 15 years before the arrest. The sternal wire rotated owing to the initial chest compressions, breaking the clinician's nitrile glove and producing an open wound on the thenar region of the clinician's right hand. Application of a 10 × 10 12-ply gauze pack on the chest of the patient in cardiac arrest allowed the resuscitation team to continue with the compressions with no further wounds from the wire. This case report is a novel contribution to the published literature and advances standard precautions considerations in patients with out-of-hospital cardiac arrest, with the sternotomy wire from previous surgery as a source of percutaneous clinician injury during chest compression.

Table of contents: JEN. (2022). Journal of Emergency Nursing, 48(3) doi:https://doi.org/10.1016/S0099-1767(22)00069-1

Srinivasan, S. S. (2022). Respiratory care innovation in times of crisis: JEN. Journal of Emergency Nursing, 48(3), 250-252. doi:https://doi.org/10.1016/j.jen.2022.03.002

System-based modifications such as resistors, clamps, and valves have enabled varying levels of control in carefully matched patients.10,11 In addition, the ability to monitor, overcome ventilator self-tests, exposure, and alarms have been overcome by recent systems.11 Splitting high flow oxygen delivered by a mask or a nasal cannula is certainly less risky, although the rate of oxygen consumption would be increased without special valving leading to accelerated depletion of oxygen reservoirs. In 2021, insufficient oxygen reserves and widespread use for COVID-19 patients created drastic shortages, leading to increased mortality in India.12 Technologies to cost-effectively expand high-flow nasal oxygen systems without wastage would benefit health care infrastructures experiencing high caseloads.—Shriya S. Srinivasan, PhD, Department of Mechanical Engineering, Massachusetts Institute of Technology, Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, David H. Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Project Prana Foundation, Cambridge 02139, Boston 02115, MA, United States; E-mail: shriyas@mit.edu. Twitter: rajibmndl; Khalil B. Ramadi, PhD, Department of Mechanical Engineering and David H. Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology; Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School; Project Prana Foundation, Cambridge 02139, MA, United States.

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The nurse workforce consists of people with varying levels of education and experience in specialty areas.1 Nurses often seek to distinguish clinical and professional expertise through specialty certification.2,3 As the healthcare environment is becoming more complex, some healthcare leaders are advocating for specialty certification as a national standard to increase nurses' professional standing and prepare nurses to better meet the specific needs of the patient populations they serve.4 Board certification demonstrates excellence and recognition of the specialized knowledge, skills, and clinical judgement validated by the achievement of standards identified by nursing specialty to promote optimal health outcomes.5 The first large-scale, rigorous study examining the value of emergency nursing certification to nurses, their patients, and their employers, “The Value of Certification Study,” was conducted by the Human Resources Research Organization and commissioned by the Board of Certification for Emergency Nursing (BCEN).6 Study results were based on survey data from over 8,800 certified and non-certified emergency nurses and over 1,000 emergency supervisors. Previously, ENA has collaborated with stakeholders, including the American Academy of Emergency Nurse Practitioners (AAENP) and the National Association of Clinical Nurse Specialists, to further establish core competencies and expand opportunities for APRNs in the emergency setting.20,21 In 2019, the ENA Position Statement, Advance Practice Registered Nurses in the Emergency Setting, established the importance of APRNs in the ED setting and outlined gaps in national certifications.22 AAENP developed a strategic partnership with ENA to establish the emergency nurse practitioner (ENP) specialty scope and standards, thereby paving the way for professional certification mechanisms.17,23 Emergency nurse practitioners may attain an Emergency Nurse Practitioner Certification (ENP-C) through a program offered by the American Academy of Nurse Practitioners in collaboration with AAENP.24 For clinical nurse specialists (CNSs) who practice in the emergency setting, there is currently no emergency certification method for the CNS APRN role. ...]variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in this position statement. ...]this position statement should not be construed as dictating an exclusive course of management, treatment or care, nor does adherence to this position statement guarantee a particular outcome.

Emergency evaluation of nonfatal strangulation patients: A commentary on controversy and care priorities: JEN. (2022). Journal of Emergency Nursing, 48(3), 243-247. doi:https://doi.org/10.1016/j.jen.2022.03.003

Both leave few marks, both can result in loss of consciousness, both are used to assert dominance and authority over the life of the other, both create intense fear and potentially result in death and both can be used repeatedly, often with impunity.2Poststrangulation Diagnostic Imaging Computed tomographic angiography (CTA) is considered the preferred screening test to evaluate cervical vasculature for blunt cerebrovascular injuries (BCVIs).13-15 However, determining which poststrangulation patients should receive CTA to maximize utility and minimize risk is a topic of controversy. Increased incidence of thyroid cancer has been observed in patients exposed to high-dose radiation from atomic weapons or nuclear power plant accidents. ...]there is continued discussion in the literature about whether or not the increased incidence of thyroid cancer is associated with or caused by increased use of diagnostic computed tomography scans. Radiation specific studies have calculated the estimated cancer risk from CTA of the neck to be a maximum of 36 cancers per 1,000,000 studies or 0.0036% for a single CTA.23 The authors of the Eastern Association for the Surgery of Trauma PMGs concluded that this risk was outweighed by the benefits of diagnosing BCVI using a liberal or universal CTA screening protocol.15 We are unaware of any existing research on the psychological burden CTAs pose to patients presenting after strangulation.

Providing hearing assistance to veterans in the emergency department: A qualitative study: JEN. (2022). Journal of Emergency Nursing, 48(3), 266-277. doi:https://doi.org/10.1016/j.jen.2022.01.005

IntroductionEffective communication is essential to good health care, and hearing loss disrupts patient-provider communication. For the more than 2 million veterans with severe hearing loss, communication is particularly challenging in noisy health care environments such as emergency departments. The purpose of this qualitative study was to describe patient and provider perspectives of feasibility and potential benefit of providing a hearing assistance device, a personal amplifier, during visits to an emergency department in an urban setting affiliated with the Department of Veterans Affairs.MethodsThis qualitative descriptive study was conducted in parallel with a randomized controlled study. We completed a semistructured interview with 11 veterans and 10 health care

providers to elicit their previous experiences with patient-provider communication in the ED setting and their perspectives on hearing screening and using the personal amplifier in the emergency department. Interview data were analyzed using content analysis and Atlas.ti V8.4 software (Scientific Software Development GmbH, Berlin, Germany).ResultsThe veteran sample (n = 11) had a mean age of 80.3 years (SD = 10.2). The provider sample included 7 nurses and 3 physicians. In the ED setting, hearing loss disrupts patient-provider communication. Screening for hearing loss in the emergency department was feasible except in urgent/emergent cases. The use of the personal amplifier made communication more effective and less effortful for both veterans and providers.DiscussionProviding the personal amplifier improved the ED experience for veterans and offers a promising intervention that could improve health care quality and safety for ED patient populations.

Analysis of a consecutive retrospective cohort of strangulation victims evaluated by a sexual assault nurse examiner consult service: JEN. (2022). Journal of Emergency Nursing, 48(3), 257-265. doi:https://doi.org/10.1016/j.jen.2022.01.001

ObjectiveThe purpose of this study was to review the evaluation of strangulation victims assessed by a sexual assault nurse examiner (SANE) service. The primary objective was to produce observational results on documented injury frequency and secondarily to explore advanced imaging use, outcomes, signs/symptoms, and documentation.MethodsThis was a retrospective analysis of a cohort of 130 consecutive strangled patients over a 42-month period evaluated by a SANE consult service in a metropolitan area. A single investigator extracted medical records for demographics, history, imaging, injuries, disposition, and both presence and documentation of a number of signs/symptoms. A second investigator independently extracted greater than 30% of the total charts with universal agreement. Data were analyzed with descriptive statistics.ResultsPatients were primarily female (129:1) and their age averaged 30.6 years. Time from event to presentation varied. There were no major brain or neck injuries detected (0%; 95 confidence interval, 0-2.31), and all patients were discharged in stable condition. Imaging was used in 23 patients (17.7%). Certain signs and symptoms were more common than others, and documentation frequency of signs and symptoms varied.ConclusionIn this retrospective cohort of 130 consecutive nonfatally strangled awake patients seen as SANE consults in a single emergency department, there were no major injuries documented. The most common signs or symptoms were neck pain, neck markings, and loss of consciousness. Imaging was used in 17.7% of the patients. Presence or absence of neck pain, neck markings, and altered mental status were most consistently documented. Seizure, subcutaneous emphysema, and carotid bruit were least consistently documented.