EM Resident
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VOL 49 / ISSUE 1

Your Year to Advocate

Home-Based Community Paramedicine

Managing VP Shunt Complications

MedWAR 2021

Medical Students Weigh in on SLOEs

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EM SPECIALISTS 40 CELEBRATING 40 YEARS 1981-2021

Kindling the Fire

Jessica Adkins Murphy, MD
Editor-in-Chief, EM Resident
University of Kentucky
@DrAdkinsMurphy

As the snow settles into a downy blanket over my little home in Lexington, Ky., I get to spend a few hours nestled on the couch with my big, sweet dog, the fireplace glowing, doing one of my new favorite things: reading your submissions to *EM Resident*. What struck me most this time around was the diversity of your unique interests within emergency medicine. To name just a few EM niches we've showcased in this edition:

- EMRA's Health Policy Academy fellows describe their experiences in legislative advocacy through the HPA program.
- EMS fellows, residents, and faculty have published their experience with a home-based community paramedicine program to optimize ED utilization.
- The Administration and Operations Committee provides both a primer on administration fellowship programs and a literature review on urgent care and telemedicine.
- The Wilderness Committee recaps MedWAR 2021 and celebrates the winners of the fierce competition.
- And for those in medical student education and program leadership, our medical student members penned a compelling letter to the editor on increasing the transparency of SLOEs.

You may be the kind of resident who enjoys a wide range of topics across EM, and finds something to incorporate into your own practice from each of these subspecialty interests. On the other hand, if you are developing a niche and are considering leadership or fellowship in that field, take an extra moment with those most relevant articles. Ask yourself how you could use this information to make a difference in the topic you are passionate about.

You could take action at the organizational level by writing EMRA policy. For example, if you are passionate about medical education and were inspired by the medical student members' letter to the editor, you might contact the authors to partner on an EMRA resolution to support increased transparency in SLOEs. If that resolution were then voted on and adopted by our Representative Council (composed of residents from EM programs across the country), this opinion piece written by a group of student leaders would become the official stance of EMRA. EMRA could then advocate to organizations like CORD in favor of aligning the SLOE with our members' values.

If health policy is for you, advocate for your patients by meeting with your state ACEP chapter to tackle local healthcare issues. To participate at the national level, residents can register for ACEP's next Leadership and Advocacy Conference in May 2022. It's an extraordinary opportunity to join other leaders in EMRA and ACEP to learn more about policy-making and discuss healthcare issues with your state's representatives in U.S. Congress.

Whatever your passion in EM, be it health policy, EMS, wilderness, administration, medical education, clinical research, or a new frontier you're illuminating, I hope something you read in this issue adds a little fuel to that fire. And I hope by sharing your ideas and experiences in *EM Resident*, this magazine serves as a warm hearth for us to gather around and inspire each other to be better doctors, better people, and a better EMRA family. ✶

Let's keep in touch!
Email emresidenteditor@emra.org | **Instagram** @jessadkinsmurphymd | **Twitter** @DrAdkinsMurphy

TABLE OF CONTENTS

EM Resident (ISSN 2377-438X) is the bi-monthly magazine of the Emergency Medicine Residents' Association (EMRA). The opinions herein are those of the authors and not of EMRA or any institutions, organizations, or federal agencies. EMRA encourages readers to inform themselves fully about all issues presented. *EM Resident* reserves the right to edit all material and does not guarantee publication.

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We Can Make a Difference Together

Angela G. Cai, MD, MBA
EMRA President
@angelagcai

"What have I gotten myself into?"

Last October, I was elected EMRA President-Elect the same month I became pregnant with my first baby. Even more overwhelming, her due date coincided with residency graduation and moving for fellowship. Should we pack our things, sleep on the floor until she arrives, then drive 400 miles in a moving van to move our 3-day-old baby into a new apartment?

Fortunately, that was a dilemma we didn't have to face, thanks to EMRA's advocacy on family medical leave.

In the fall of 2018, EMRA Representative Council (RepCo) debated a resolution asking EMRA to advocate for more flexible family and medical leave policies. The amount of leave is in part determined by the American Board of Emergency Medicine (ABEM), as they determine eligibility for board certification, including criteria such as the number of weeks of training. Some RepCo members were concerned that the wording of the 2018 resolution would have unintended consequences, and instead suggested EMRA collaborate with ABEM to find the right language.

After a working group between ABEM and EMRA examined the issue, RepCo passed an improved resolution that established EMRA's official position and advocacy ask. EMRA brought this proposal to ABEM, and the policy changed! EM residents now have access to an additional 2 weeks of leave separate from vacation time.

Back in 2018, I didn't know how resolutions worked or how EMRA had the power to change my residency experience. Now, it has become deeply personal. The leave policy EMRA advocated for allowed me time to settle into a new city without delaying graduation. I got to drive my newborn 4 miles to a furnished apartment instead of 400 miles to an empty one.

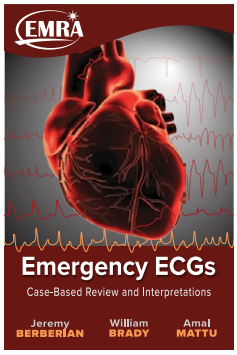
How does EMRA work for you? My story was impacted by every piece of the process.

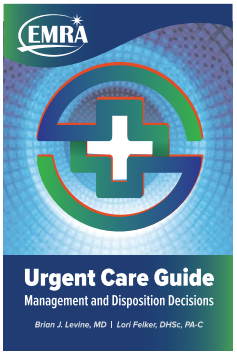
- **Relationships**. We build relationships with organizations that affect your life as a trainee. In the governing societies that control graduation requirements, residency standards, and legislative agendas, EMRA ensures a resident seat at every table that matters to us.
- **Representation**. The Representative Council is like a House of Representatives of all emergency medicine residents, with a Program Representative for every EM program in the U.S. This process lends authority to our voice on these issues.
- **Residents**. Most importantly, EMRA is created by and for EM residents, fellows, and EM-bound medical students. You bring us ideas and help us put them into action from policy resolutions to *EM Resident* articles, the MobilEM app, and committee events.

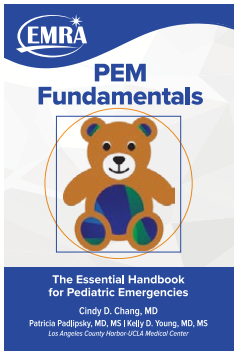
I am so honored to be your EMRA President this year and look forward to building on our strong legacy of serving you. ✶

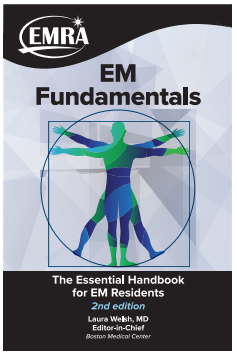
Take EMRA with you on every shift!

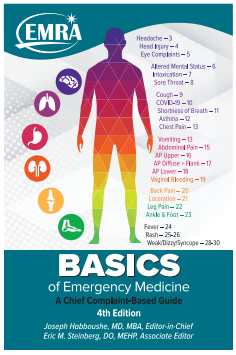
NEW



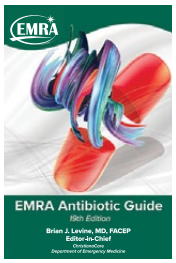


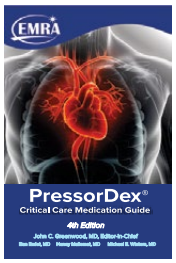


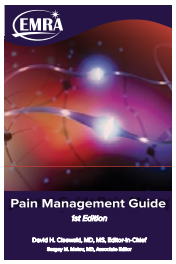


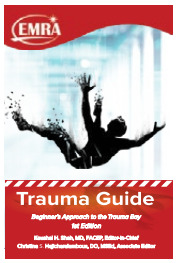


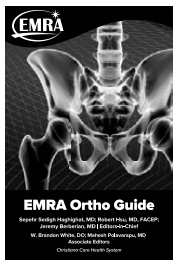
Trusted and True

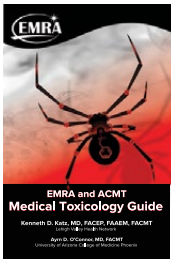


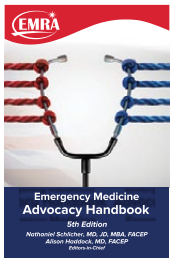


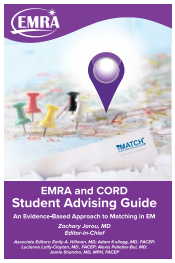


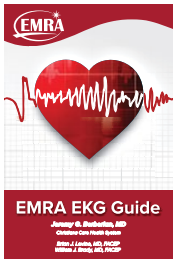












Pocket Cards

Airway Card
Ventilator Management
Critical Medications Badge Set
Adult Infusion Card
Pediatric Qwic Card
Neonatal Pocket Card
Stepwise Approach to ECG Interpretations

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EMRA and YPS Health Policy Primer

Why Attend the Leadership and Advocacy Conference

The ACEP Leadership and Advocacy Conference puts advocacy in the spotlight and makes it easy to get involved. Held in-person this year — May 1-4 in Washington, D.C. ACEP LAC brings together hundreds of emergency physicians and EM-interested medical students to work for a better political environment for the specialty and for patients.

EMRA and YPS Health Policy Primer

The EMRA and YPS Health Policy Primer will be held Sunday, May 1. This is a must-attend event for advocacy newcomers (and veterans), first-time attendees of LAC, and all those interested in the nuances of today's policy issues.

The Health Policy Primer explains:

- ✓ Basics of health policy and advocacy
- ✓ Politics of policy
- ✓ How to advocate effectively

As a key collaboration between EMRA and the ACEP Young Physicians Section, the Health Policy Primer offers not only high-yield education and context, but also a chance to meet colleagues at every level of policy expertise.

Why You Should Attend

Advocacy is increasingly important in the healthcare climate today. But it doesn't have to be intimidating. Brittany Hudson-Walsh, DO, and Chris Johnson, DO, were first-time LAC attendees in 2021. They shared their key takeaways and reasons you should make time for this important event.

Brittany Hudson-Walsh, DO
University of Kansas

Favorite thing about LAC: My favorite part of LAC was learning from other residents about their involvements and projects at their respective programs. I was inspired by watching other residents create policies and advocate for improvements in their respective residents, in medicine, and in our scope of practice as emergency physicians.

Most unexpected aspect of LAC: I found the most unexpected, and yet still my favorite, was watching how influential residents can be in policy making. We often feel like it is hard to have a voice in residency, and yet at LAC I felt like the collective of residents had one of the strongest voices.

What do you look forward to most for next time? I look forward to growing the relationships with the other residents when I return next year. I look forward to again being inspired by their successes and contributions to our profession.

Why should others get involved (in LAC and/or advocacy)? It is imperative that we understand how to affect policies and communicate with decision makers who influence our scope of practice. Our support for various causes, and the advocacy groups spearheading those causes, can be vital to impact we can make on our patients.

Any additional thoughts? LAC was a welcoming conference, and I appreciated how speakers were able to speak to me, a novice within the policy and advocacy world, in a way that made me feel well-informed. The health policy primer from EMRA was also so crucial to my understanding of how I can get involved as a resident.

Chris Johnson, DO
University of Alabama at Birmingham

Favorite thing about LAC: I thoroughly enjoyed the ability to engage with emergency medicine physicians across the country who are passionate about what we do and who we serve. I saw a refreshing resilience in how we advocated for our colleagues, our patients, and our profession that expands outside of the emergency department.

Most unexpected aspect of LAC: I was not expecting the boldness of many conference attendees to stand up and ask critical questions in regard to the future and stability of emergency medicine in the future

What do you look forward to most for next time? I look forward to in-person meetings with members of Congress on Capitol Hill.

Why should others get involved (in LAC and/or advocacy)? This is a thankless, behind-the-scenes job, but is absolutely necessary as we continue to strive for excellence in patient care and physician wellness. ✶

REGISTER TODAY FOR LAC MAY 1-4

Details at emra.org/lac
Register at acep.org/lac

ACEP's Upcoming

2022 Educational Meetings

APRIL 11-13	MAY 1-3	MAY 23-25
Advanced Pediatric Emergency Medicine Assembly	Leadership & Advocacy Conference	ACEP SIM TRAINING COURSE
Virtual	Washington, DC	Tampa, FL

AUGUST 2022	OCTOBER 1-4	NOVEMBER 2022
ACEP/CORD Teaching Fellowship	acep Scientific Assembly SAN FRANCISCO 2022	embrs Emergency Medicine Basic Research Skills
Dallas, TX	San Francisco, CA	Fort Worth, TX

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WANT TO BE A POLICY PRO?
Join the EMRA/ACEP Health Policy Academy!

Michaela Banks, MD, MBA
Louisiana State University Health Sciences Center, New Orleans
@michaelabanks
Chris Counts, MD, MSc
Mount Sinai Hospital/Elmhurst Hospital Center
@ChrisCountsMD
Miya Smith, MD
University of Chicago
@MiyaSmithMD

The EMRA and ACEP Health Policy Academy (HPA) is a year-long academy that trains residents to engage in policy at both the level of EMRA and ACEP through multiple opportunities to review, discuss, and write policy. Additionally, residents are given the opportunity to engage with stakeholders on the national level through the ACEP Leadership and Advocacy Conference (LAC). The HPA program takes place in a hybrid format, with monthly meetings to discuss general health policy and in-person meetings during CORD, ACEP, and LAC.

Who would benefit from the program?

This program is a great fit for anyone who is interested in health policy and becoming knowledgeable in the process of policy writing for national and international organizations. It's a great way to meet other trainees with similar interests, and to interact with leaders shaping policy within EMRA and ACEP on the national level.

Whether you have significant experience in health policy or none at all, the HPA will provide you with learning opportunities and the chance to influence the future of the specialty of Emergency Medicine. Are you interested in health policy but feel overwhelmed by the complexity of the American healthcare system? This program will bring you up to speed and give you the tools you need to create meaningful change.

Dr. Banks **Dr. Counts** **Dr. Smith**

INDIVIDUAL EXPERIENCES

HPA Fellow Dr. Banks

Why did you apply for the EMRA and ACEP Health Policy Academy?

I was first exposed to health policy during my gap years working in research; the hospital I worked for corralled and encouraged research assistants to talk to local policymakers on advocacy days. I saw the impact that medical professionals can have in influencing policy. As someone who is interested in the intersection of policy and international medicine, I applied to HPA and was so excited to learn about parliamentary procedure and resolution writing.

What was your most memorable experience during the academy?

My most memorable experience of HPA was when my co-fellows Chris and Miya and I worked for hours on the EMRA Reference Committee report after resolution hearings during CORD (2020). It really gave me insight into how difficult it can be to incorporate feedback into resolutions in order to influence and enact change.

How do you hope to utilize your learnings from this academy in the future?

Long-term, I would like to combine my interests in health policy and international medicine to work towards improved treatment and care for people entering the United States specifically through the Texas and California borders, in conjunction with practicing medicine on both the US and Mexico border. While in residency, I look forward to continuing advocacy through policy at both the local and state levels here in Louisiana, and I am thankful for the opportunities HPA has offered.

HPA Fellow Dr. Counts

Why did you apply for the EMRA and ACEP Health Policy Academy?

My first exposure to health policy was during medical school when I worked on a project aiming to address generic drug shortages and price spikes that affect patients in the US every day. I was hooked and wanted to get involved with policy-making that would have a meaningful impact on my patients and on the specialty of EM.

What was your most memorable experience during the academy?

One of the most memorable experiences of the academy was publicly testifying for (and against) policies at ACEP Council, hoping to encourage the adoption of resolutions that would benefit my patients and fellow trainees.

How do you hope to utilize your learnings from this academy in the future?

In addition to bringing me up to speed on key policy issues facing our nation and our specialty, the HPA experience provided me with the knowledge and skills to engage with the policymaking process, which I will put into action as I develop my career as a fellow, emergency medicine physician, and patient advocate.

HPA Fellow Dr. Smith

Why did you apply for the EMRA and ACEP Health Policy Academy?

While involved with my state's medical-legal council during residency, I developed a passion for the process of creating policy. It was exciting to participate in discussions about how various resolutions would impact physicians in the state of Illinois, and even meet some of the authors of these resolutions to hear their points of view. I was intrigued by the idea that I could have an impact on the future directions of medicine.

What was your most memorable experience during the academy?

My most memorable experience was the ACEP Council. It was a great experience to prepare for the council by reviewing all of the proposed resolutions and understanding how each made an impact through the lens of EMRA and its constituents. It gave me great insight into how organized medicine works, and how important my voice can be in the process. I was able to testify during one of the Reference Committee meetings, which was a scary but empowering experience.

How do you hope to utilize your learnings from this academy in the future?

I hope to use my experience to incorporate health policy and advocacy into my career in forensic medicine. I want to build on my current work and create policy that provides and protects healthcare delivery to patients who are experiencing sexual assault, human trafficking, or intimate partner violence. ✶

TAKE-HOME POINTS

- EMRA/ACEP HPA is a great way to learn about policy, resolution writing, and the current issues facing the United States healthcare system during a year
- HPA is for anyone interested in policy; no prior experience necessary!
- Apply to HPA's next cycle! **Applications are due every January.**

WELCOME
2022 HPA Fellows!

Jacob Altholz, MD
Evelyn Huang, MD
Kenneth Kim, MD
Vishnu Muppala, MD, MPH

Luke Hartman, MD
Pediatric Residency
St. Christopher's Hospital for Children
Shahfar Khan, MD, FAAP
PEM Fellow
St. Christopher's Hospital for Children
Norrell Atkinson, MD, FAAP
Child Abuse Pediatrician
Section Chief of Child Protection
St. Christopher's Hospital for Children
Ife Changa Ford, MSW, LSW
Coordinator, Child Protection Program
St. Christopher's Hospital for Children

Navigating Suspected Child Abuse

A simple framework for the evaluation of suspected abuse, and the role of social workers, child protective services, and forensic pediatricians in cases of suspected maltreatment

Introduction

You have just evaluated a child in the ED and are concerned for abuse. You know you must make a report, but how? And who should be involved? The process of filing a child abuse report can be daunting. With this article we hope to provide a simple framework for the evaluation of suspected abuse, and the role of social workers, child protective services, and forensic pediatricians in cases of suspected maltreatment.

Identifying Potential Abuse

In cases of suspected abuse, the importance of a detailed history cannot be overstated. Not only will a detailed history provide you, as the clinician, with the information you need to make a proper assessment, but it will also provide you with the details necessary for filing the report and preparing documentation that may later be used in legal proceedings.

Data from the Children's Bureau Annual Maltreatment Report revealed that in 2019, 45.4 % of child fatalities occurred in children less than 1 year of age.[1] Obtaining a history in non-verbal children, such as infants, children with special health care needs, and children with disabilities is challenging, therefore any injury should prompt the consideration of possible abuse.[2]

When obtaining history from a verbal child, be mindful of what information a child is capable of conveying. Children from ages 3 to 5 are unlikely to be able to chronologically order events or accurately describe the number of abuse occurrences, but it is likely that they will be able to identify an alleged perpetrator, where they were injured, and if they were injured once or multiple times.[3] Children ages 6 to 11 will be able to provide more detailed answers but will struggle to give accurate dates and times of events.[3] Above the age of 12, children are able to provide detailed histories with complexity. Challenges in this age group are helping the child to feel comfortable sharing with you, overcoming embarrassment, and addressing their concerns regarding consequences of disclosure.[3]

It is imperative to speak with a child separate from their parent, particularly if the parent may have caused injury to the child.[3,6] When talking with a child, be mindful to not ask leading or yes or no questions as children, especially younger children, are likely to guess the answer or provide information that is difficult to verify.[3] When in doubt, it is safest to ask questions beginning with "who," "what," "when," and "where" and allow the child to speak uninterrupted with only short interruptions for clarification (ie, "When you said 'she hurt me,' who is 'she?'").[3]

When speaking with the guardian of a suspected victim, it is equally important to obtain a detailed history and refrain from the use of leading questions. While obtaining this history, be mindful of red flags such as injuries not consistent with the age and development of the child, a history that is unclear or frequently changing, a denial of trauma when trauma is clearly observed, blaming the child or a sibling for injuries, and lack of acknowledgement of the seriousness of an injury.[3-6]

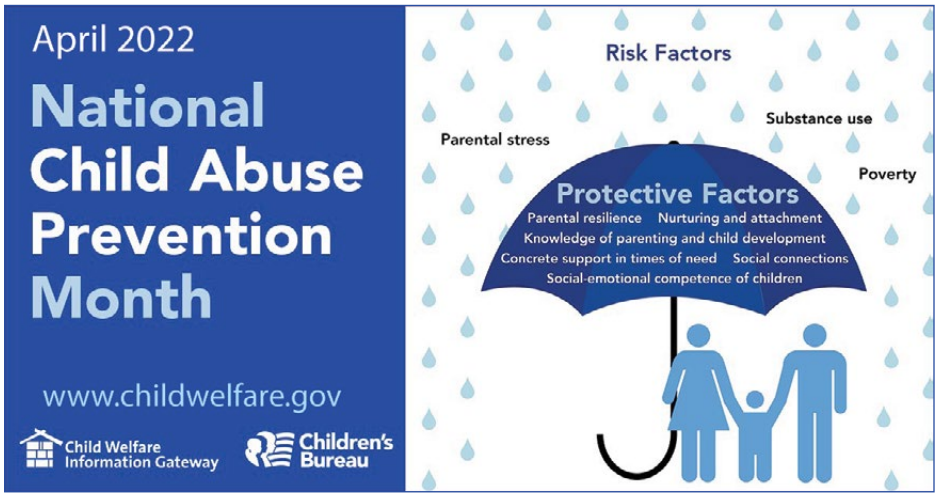
Lastly, before making a report, obtain demographic details about the family and alleged perpetrator, as this information will be asked on your reporting documentation. This information would include such things as: names and ages of all people living in the home of the suspected victim, address, and contact information of the guardian; name, relationship, age, and address of alleged perpetrator; and presence of weapons or potentially violent animals in the home of the victim or alleged perpetrator. If there is information that you do not know, then simply state that when you are making your report. Not knowing the name or address of the alleged perpetrator is not a reason for not filing a report.

Photo Documentation

After obtaining a detailed history, it is important to begin the documentation process. One sometimes overlooked aspect of this documentation is photo evidence. As ED physicians, you are often the first to evaluate a suspected inflicted injury. This is especially important considering that many injuries will heal within days making future documentation difficult or impossible.

When taking photos, it is important to ensure that the images are clearly shown to be that of the child.[3,5,7,8] This may be done by including patient identification in each individual image or before and after an image sequence. When taking pictures be sure to take several images of each injury. A good technique is to take several perspectives (ie, overview and close-up).[3,5,7-9] If the child is moving and difficult to settle, another option is to take a video that later can be split up into still images.[3] Images should be captured at a perpendicular angle from the injury.[5,7]

If you have access to a ruler, such as an ABFO forensic ruler, these are great to place in the same plane of an injury for scale.[3,5,7-9] The most common errors in photo documentation are not properly focusing the camera, excessive blurring of images, and over and under exposure of the images.[3,9] Therefore, it is crucial to be mindful to keep the camera in focus, ensure proper lighting, and double check your images after taking them to be certain that there is an adequate number of clear images. Lastly, keep in mind that most digital cameras number each image. Be careful not to delete any photos as this will be evident later on and make it appear that there are gaps in evidence.



ED Social Workers

Social Workers (SWs) provide invaluable assistance during child abuse evaluations. SWs are trained to obtain social histories and uncover details regarding social stressors and home dynamics. Many SWs also have experience working closely with Child Protective Services (CPS) and local law enforcement.

Some ways in which SWs can provide assistance are remaining with the patient and family after your initial assessment to acquire further details while you begin the work up, communicating with CPS, and updating you and the family regarding the patient's disposition. SWs can also serve as important observers during an evaluation making note of the behaviors of the child and caretaker[10] and their documentation can prove useful in the CPS investigation. Discussion of abuse is often very distressing to children and may make the child uncomfortable to discuss openly, or the parent may be unwilling to discuss the case with you in the presence of the child.[3] SWs can help address this by speaking with the parents while you talk with the child. Be mindful of repetitively questioning children about what may have happened to them as children may become fatigued with repeat questions or may even feel as if you are questioning the validity of their story. Therefore, it is preferred that the physician, nurse, and social worker obtain the history together. It is most important to be mindful that your role as the physician is to address the medical concerns of the child and to not function as that of the investigator.

Child Protective Services

When making a child abuse report, you are most often reporting to your statewide hotline. After this report, the case is referred to the local children and youth agency of the city or county where the child lives. This local agency decides whether or not the case meets the state's definition of abuse or neglect. If the case is accepted, a supervisor will be assigned to the case who will then identify a case worker. The case worker will work closely with you and SWs to determine patient disposition and a safety plan. A common misconception regarding CPS is that their primary function is to remove children from their homes. This may cause many medical providers to be hesitant to file a report. In reality, the role of CPS is to assess the safety of a child and other children that may be in the home and provide resources for families in need for those children who may be at risk.[11,12] The supervisor and case worker accomplish this through scene investigation, scene reenactments, home evaluations, and interviews of family and friends. The investigation process will take place in the weeks that follow the filing of your report.[12]

Forensic Pediatrics

Many hospitals have a forensic pediatrics department specializing in child abuse and neglect, especially hospitals with pediatric residency programs. In all cases of suspicion for abuse, it is wise to alert your hospital's forensic pediatrician regardless of whether or not you need an in-person consultation. CPS almost always prefers this consultant be involved. ✶

Be mindful of red flags such as injuries not consistent with the age and development of the child...

TAKE-HOME POINTS

- A common question that many practitioners ask is, "Am I seeing or being told enough to warrant filing a child abuse report?" I there is doubt as to whether or not you should file, it is likely that there is enough concern in your mind to warrant a report.
- The reporter does not need to know or have proof that abuse occurred but should have a reasonable cause to suspect abuse.
- It is better to err on the side of caution and request the intervention of CPS to conduct an investigation. A child's life may depend on it.

References available online

BOUVERET SYNDROME

A Rare Cause of Gastric Outlet Obstruction

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A 67-year-old male with a past medical history of hypertension, poorly controlled Type 2 diabetes mellitus, obstructive sleep apnea, and a pacemaker presented to the ED with dry heaving and nausea for 5 days. He had not eaten for the past 3 days. He had been prescribed ondansetron and a BRAT diet by his primary care physician 2 days prior to arrival, with little relief. He denied fevers, chest pain, or dyspnea. On presentation, his vital signs were normal. On physical examination, the patient had mild tenderness to palpation of the epigastric region, but no rebound or guarding.

Abdominal labs along with a CT abdomen and pelvis with contrast were ordered. Morphine, ondansetron, and fluids were administered. Blood work was significant for leukocytosis to 21.2 and lactic acid of 2.8. CT scan demonstrated a gastric outlet obstruction secondary to a gallstone that had eroded through the gallbladder wall into the duodenum with markedly distended stomach and distal esophagus. There was an air-filled communication between the gall bladder and duodenum consistent with a choledochofistula (Figure 1).

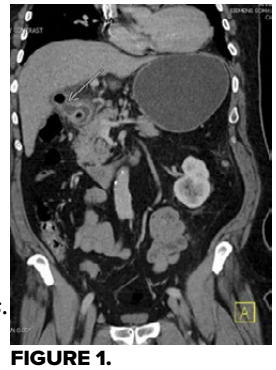


FIGURE 1.

The attending radiologist remarked this was consistent with Bouveret syndrome, a finding he had never seen in his 35 years of work. Both general surgery and GI were consulted. The patient started antibiotic treatment with metronidazole and ceftriaxone. He had a nasogastric tube placed and was admitted to the surgical floor for GI endoscopic retrieval the following day.

Discussion

Gallstone-induced ileus is a rare complication of cholelithiasis. Gastric outlet obstruction caused from a gallstone is even rarer. Bouveret syndrome is named after the French physician Léon Bouveret (1850-1929), who reported the manifestation of gastric outlet obstruction caused by an impacted gallstone in 1896.[1]

Gallstones that are too large to pass through the cystic and common bile ducts can result in chronic irritation and inflammation of the gallbladder wall. This can lead to formation of a bilioenteric tract with gallstone migration into the upper gastrointestinal tract causing obstruction of the duodenum.

Classic gallstone ileus involving the terminal ileum complicates only 0.3%-0.5% of patients with cholelithiasis. Bouveret syndrome represents approximately 1%-3% of all gallstone ileus cases.[2]

Diagnosis

The typical presentation involves an older person with nausea, vomiting, and possible hematemesis from duodenal or celiac artery erosions. Up to 82% of patients have had a history of abdominal pain or biliary colic prior to presentation.[3] Patients often have increased bilirubin and alkaline phosphatase.

Diagnosis is best achieved with CT scan, patient presentation, and the Rigler Triad: bowel obstruction, pneumobilia, and an ectopic gallstone.[4] The mortality is between 12-30% due to patients' advanced age, comorbidities, and high rate of surgical complications.[5]

Management

Due to the relative rarity of the condition, there are no standardized guidelines for management. Several endoscopic, laparoscopic, and open surgical techniques have been mentioned in management. Endoscopy is a useful initial diagnostic and possible therapeutic measure. Endoscopy facilitates mechanical lithotripsy, laser lithotripsy, and extracorporeal shock wave lithotripsy.

With large impacted gallstones (>4 cm), early surgical intervention should be considered for removal.[6] Various open and laparoscopic surgical techniques have been used depending on location of the obstruction and presence of inflammation or ulceration. Examining the remaining small intestine is crucial to ensure intestinal gallstones broken up by lithotripsy do not cause future obstruction.[7]

Case Conclusion

The patient underwent upper endoscopy with GI the following day. The entire stomach was normal. A large (approximately 3 cm) stone was found in the duodenal bulb causing complete obstruction (Figures 2 and 3). Initial attempts to remove the gallstone with snare, tripod, and roth net were unsuccessful. Electrohydraulic lithotripsy was then done to break down the stone. A jagwire was passed under fluoroscopic guidance into the distal duodenum and pyloric dilation was performed to remove the remaining stone parts. A 1.5 cm fistula was found in the duodenal bulb (Figure 4). This was suspicious for cholecystoduodenal fistula. The patient had no complications and was discharged from the hospital the next day. He had a follow-up EGD 8 weeks later that was unremarkable. There was no indication for cholecystectomy, as the patient was asymptomatic and the fistulous tract was decompressed. ✶

FIGURE 2.

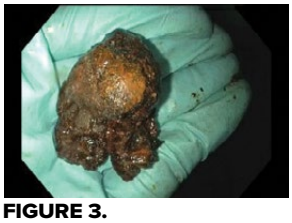


FIGURE 3.

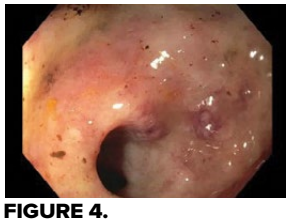
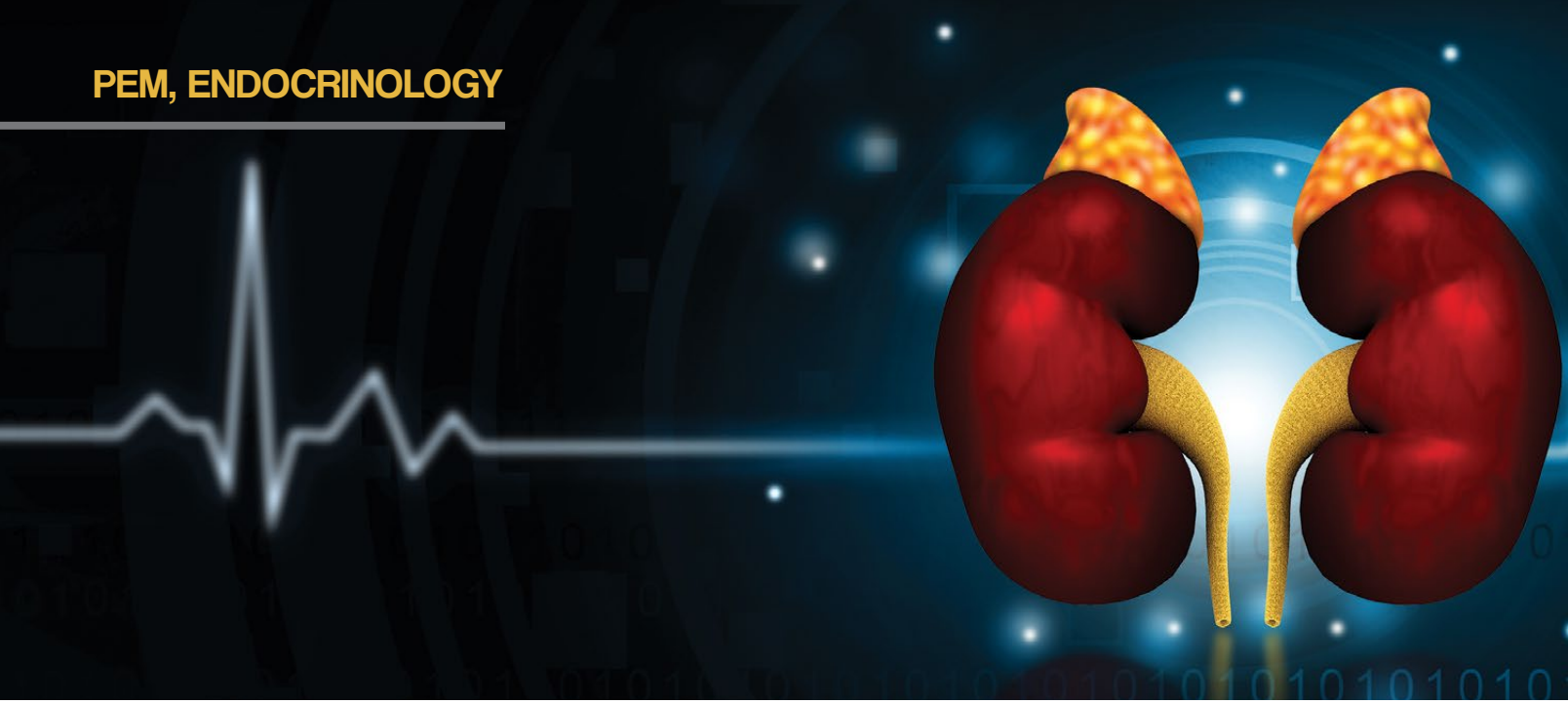


FIGURE 4.



Pediatric Emergency Management of Adrenal Insufficiency and Adrenal Crisis

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Adrenal insufficiency (AI) is a rare diagnosis in childhood and adolescence; however, it can become a major cause of morbidity and mortality in pediatric patients, as 1 in 200 cases of adrenal crisis leads to death.[1]

AI often presents with nonspecific, variable findings, but early recognition and treatment of these signs and symptoms can prevent detrimental outcomes. If AI goes unrecognized or treatment is delayed, children may progress to significant cardiovascular compromise and collapse.[2] In the emergency department, a child may present in adrenal crisis as the initial presentation of disease or a child with a known diagnosis of primary or secondary AI may present requiring resuscitation.

In North America, the most common cause of AI is glucocorticoid withdrawal in patients on prolonged steroid therapy. Therefore, it is extremely important for primary care and emergency providers alike to recognize and take action when the condition arises.

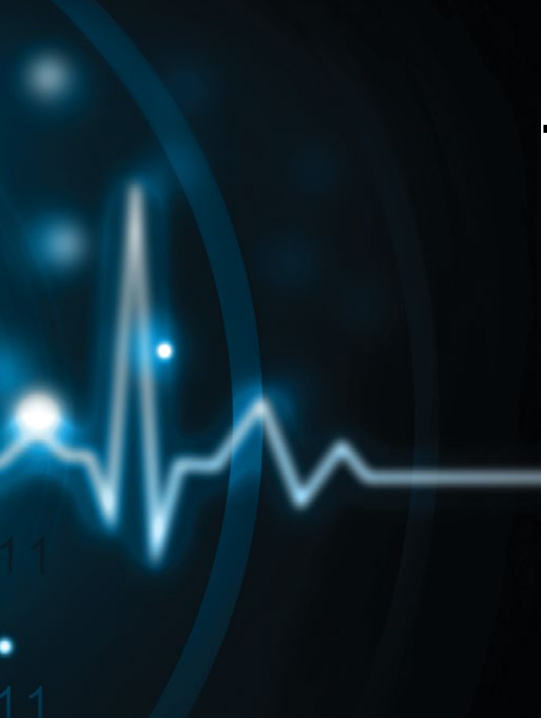
Etiology

AI is classified as either primary (adrenal gland dysfunction) or secondary (central, hypothalamus or pituitary gland dysfunction) and includes both congenital and acquired etiologies. Causes of adrenal insufficiency in children are extensive and include enzyme deficiencies in steroidogenesis (Fig 1), metabolic and genetic disorders, autoimmune pathology, hemorrhage or infarction of the adrenal gland secondary to trauma, infection or anticoagulation, or possible drug side effects (ketoconazole, medroxyprogesterone, etomidate, rifampin, phenytoin, barbiturates).[3]

Congenital adrenal hyperplasia (CAH) due to 21-hydroxylase deficiency is the most common cause of primary adrenal insufficiency with an incidence of 1:10,000 to 1:15,000 people in the United States and Europe.[3] All newborns in the United States are screened for 21-hydroxylase deficiency that could lead to classical CAH, a subtype of CAH that can include salt wasting and virilization, especially in female infants. Due to the absence of the 21-hydroxylase enzyme, there is a lack of cortisol, and in the case of salt-wasting CAH, a loss of aldosterone. In severe and untreated forms, this can lead to dehydration, hypotension, and shock.

Additionally, a diversion in the steroidogenesis pathway will result in androgen excess. Clinically, this can present and be diagnosed in female newborns with ambiguous genitalia at birth, whereas males will often present later at 2-3 weeks of age in a salt-wasting crisis.

The most common cause of secondary (central) AI is iatrogenic suppression of the HPA axis following prolonged use of oral glucocorticoid therapy. Long-term glucocorticoid therapy is used to treat numerous pediatric illnesses including autoimmune disease, hematological and oncological disease, inflammatory bowel disease, hematopoietic and solid organ transplants, to name a few. Chronic glucocorticoid therapy causes suppression of ACTH, which subsequently leads to atrophy of the zona fasciculata of the adrenal cortex, the area of the adrenal gland responsible for the secretion



In the emergency department, a child may present in adrenal crisis as the initial presentation of disease or a child with a known diagnosis of primary or secondary AI may present requiring resuscitation.

of endogenous glucocorticoids. The duration and dosage of therapy can make a difference as well, however there are few published studies on the duration of HPA axis suppression after glucocorticoid treatment in children, ranging from 5 days to 9 months.[4] This wide variation in the timing of recovery after a course of prolonged glucocorticoid use should make providers aware of the circumstances in which AI can occur.

Diagnosis and Workup

As with any patient, paying attention to past medical history, birth history, and medications can be crucial to swift intervention for a deadly, yet oft-overlooked disease process. Adrenal crisis can be tricky to diagnose due to the nonspecific constellation of symptoms that it can present as. Additionally, the onset may be gradual. Triggers may include acute illness, physiological stress, injury, induction of anesthesia, or surgery.[5]

Clinically, pediatric patients may present with hypotension, tachycardia, fatigue, dizziness, nausea, vomiting, diarrhea, abdominal pain, diaphoresis, or seizures. When considering your initial differential, it is easy to assume these findings could be related to infection, other metabolic syndromes, ingestion, anaphylaxis, or a surgical process.

Initial workup should include obtaining accurate vitals, a fingerstick glucose, and a basic set of electrolytes, as well as a CBC.

In acute AI, hyponatremia is the most common lab finding. Hyperkalemia is seen in primary, but not secondary AI, and can also be accompanied by hypercalcemia and metabolic acidosis.[6] Hypoglycemia is more prevalent in neonates and infants in all types of AI. Lab work may also show normocytic anemia, lymphocytosis and eosinophilia. Initial screening for primary AI can be done with a low cortisol level, <140 nmol/L (5 mcg/dL), and a plasma ACTH level greater than two-fold the upper limit of normal for the reference interval. Additionally, according to clinical practice guidelines, the gold standard of diagnostic testing with the cosyntropin test can be done to rule out primary AI in patients with unexplained symptoms as described. However, do not delay the initiation of treatment while awaiting results for cosyntropin testing. This can also be done as a confirmatory test after treatment and patient stabilization.[6]

Treatment in the ED

As always, first assess your patient's ABCs, and establish IV access as soon as possible, with lab workup as discussed. However, if the blood draw is proving to be difficult, do not delay treatment.

The initial stress dose of 100 mg/2mL hydrocortisone sodium succinate should 50 mg/m^2 or if BSA is not available, can also be based on the child's age: children ≤3 years: 25 mg; >3 and <12 years: 50 mg; and older children and adolescents ≥12 years: 100 mg as an initial stress dose. This should be followed by 50–100 mg/m2/day divided into 4 doses given every 6 hours, or as a continuous IV infusion.[7,8] If hydrocortisone is not available, you can use prednisolone as an alternative.

Prompt fluid resuscitation for hypovolemic shock should be administered with 20 ml/kg boluses of isotonic fluid such as 0.9% normal saline. Additionally, hypoglycemia should be treated with an initial bolus 2-4 mL/kg D25W infused slowly at 2-3 mL/min or 5-10 ml/kg D10W IV and repeated as necessary. Start 1.5-2x maintenance fluids with D5NS.

For hyperkalemia, always be sure to obtain an EKG to check for peaked T-waves. These can progress to a prolonged PR interval or QRS duration. Usually, hyperkalemia improves with steroid and fluid therapy and rarely requires administration of insulin and glucose. Be sure to monitor and treat any other electrolyte abnormalities.

When treating an adrenal crisis, don't forget to consider the trigger. If infection or sepsis is suspected, make sure to add on systemic antibiotics accordingly.

Once the patient is stabilized, pediatric endocrinology should then be contacted and the patient should be admitted to ICU level care with continuous hemodynamic monitoring.

Children with known AI should be on maintenance glucocorticoid replacement therapy managed by their pediatrician or endocrinologist in order to help prevent acute AI. Families should also be provided injectable intramuscular hydrocortisone sodium succinate to use at home in the event of stress/illness with vomiting or altered mental status and instructions on when to seek emergent medical care. It is recommended that primary providers also give patients an ED letter, steroid card with appropriate stress dosing, or medical alert bracelet in order to inform EMS or ED providers about their diagnosis and how to quickly initiate treatment for adrenal crisis. These steps can greatly reduce morbidity and mortality.

Conclusion

Adrenal insufficiency in the pediatric population may stem from a myriad of causes, however what is of utmost importance is to consider acute and life-threatening adrenal crisis. This requires timely recognition and initiation of appropriate medical management with steroid therapy in order to avoid further decompensation. ED providers should be aware of this diagnosis and have a high index of suspicion for AI in critically ill patients in the setting of electrolyte abnormalities. ✶

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Ventriculoperitoneal Shunts in the ED

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Hydrocephalus is the excessive accumulation of cerebrospinal fluid (CSF) in the ventricular system around the brain. An increase of volume within this closed system causes an increase in intracranial pressure (ICP) that compresses brain tissue and can result in brain injury and death.[1] The National Institute of Neurological Disorders and Stroke (NINDS) estimates that hydrocephalus occurs in 1-2 out of every 1000 children born in the U.S.[2]

The process is either congenital (spina bifida, neural tube defects, myelomeningocele, Dandy-Walker malformation, etc.) or acquired (tumors, malignancy, infection, hemorrhage).[1] It is diagnosed by brain imaging, and managed by placement of a shunt to drain the excess CSF and reduce the elevated ICP.

Emergency physicians should be familiar with the shunt concept and aware of potential complications that can arise in this population.

Anatomy

Although there are several different types of shunts, the most common is the ventriculoperitoneal. It consists of 4 main components: a proximal catheter that inserts directly into the lateral ventricle in the posterior-occipital region, a one-way valve, a reservoir, and a distal catheter that runs down the neck and chest wall and terminates in the peritoneal cavity.

The valve is programmed by a neurosurgeon and works by draining CSF when ventricular pressure exceeds a set value (normal 8-12 mmHG). The reservoir is a small, localized collection of CSF that is available for removal if indicated. Both the valve and reservoir are palpable beneath the posterior scalp.[1]

Potential Issues

Complications with VP shunts are common, in particular shunt malfunction and infection. Malfunction can be further categorized into proximal shunt obstruction, overshunting, slit ventricles, and distal shunt obstruction. On average, VP shunts have a 98% failure rate over 10 years, and mortality from malfunction is estimated to be between 1-2.7%.[1]

When the proximal portion of the catheter becomes obstructed, excess CSF is unable to drain out of the ventricle. This is a neurosurgical emergency. Obstruction can be caused by migration of intraventricular catheter, intracranial hemorrhage, tumor, fibrosis, or debris. The distal portion of the shunt can also become obstructed by thrombosis, clogging, kinking, fracture or migration of distal catheter portion. Surrounding intra-abdominal organs, omentum, and pseudocysts can also compress the distal portion.

Another well-known shunt complication is overshunting, also known as over-drainage. If minor, this can result in postural headaches; however, if sudden, can precipitate herniation. There is an accompanying risk of subdural hematoma if the bridging veins get torn in the process. Management of overshunting in the immediate period includes lying the patient down, and eventually, reprogramming of the system by the neurosurgeon. If the overshunting is chronic, slit ventricle syndrome can result. This manifests as minor episodic headaches, nausea and vomiting, and ataxia.[1,3]

Infection of the shunt is another common complication that occurs most frequently in the first six months after placement and in infants under 3 months of age.[3] Mortality is as high as 60%. The typical pathogens are Gram positive organisms within the Staphylococcal species.[1] Gram-negative and anaerobic bacteria are also implicated and precipitate more lethal infections. In general, a high index of suspicion should be maintained when evaluating a patient with a shunt to avoid missing potentially devastating pathology.[3,4]

Presentation

A patient with a shunt complication can present with any spectrum of symptoms ranging from lethargy or slight change in behavior to full-blown, life-threatening hydrocephalus. The most common presenting symptoms suggestive of shunt complication are vomiting and lethargy.[5] Other presenting symptoms include severe headache, photophobia, meningismus, and altered level of consciousness.

Concerning findings on examination of the pediatric cranium include bulging fontanelles, increasing cranial size, thin or shiny scalp, palpable splitting of the

cranial sutures, or changes in percussion of the cranium (Macewen sign).[1]

On neurologic assessment, you may identify a new deficit, papilledema, or limited upward gaze.

If the patient has severely increased ICP with impending herniation, you may see autonomic instability, coma, or respiratory compromise.

If the shunt or CSF is infected, the patient may present with signs of cellulitic changes overlying the shunt.[3]

Patients may or may not present with a fever, so lack of fever does not rule out infection in this population.[5]

Evaluation and Management

A systematic approach should be employed when evaluating a patient with a possible VP shunt complication.

First, perform a thorough neurological exam. Compare this to the patient's documented baseline in the EMR and by consulting with the patient's guardian or caregiver.

Next, palpate the shunt. If the shunt is flat or slow to refill (more than 3-5 seconds), it is possible that the excess CSF is not being drained from the ventricles and a proximal malfunction should be considered. If the shunt is firm or difficult to compress, it can indicate that CSF is not draining into the peritoneum and is suggestive of distal malfunction. Any overlying redness, swelling, or tenderness can indicate shunt infection.[1,3]

If the patient is stable, your workup will include laboratory studies and imaging. Several imaging modalities are used to evaluate a VP shunt. The shunt series, which is a set of AP and lateral radiographs of the skull, chest, and abdomen, will reveal if any portion of the shunt has migrated or kinked, and is extremely specific for malfunction although not sensitive. Sensitivity improves when the shunt series is combined with a head CT that can reveal any acute intracranial pathology and reveal the size of the ventricles.[1] MRI or ultrasound of the optic nerve sheath diameter can also be utilized.[6]

If infection is suspected, the typical workup with CBC, blood cultures and inflammatory markers is appropriate.

If the patient is hemodynamically unstable and presenting with signs and symptoms of hydrocephalus (seizing, unresponsive, significantly altered, not protecting airway, etc.), consult Neurosurgery immediately and consider emergent intubation and VP shunt tap. Elevate the head of bed, hyperventilate with BVM, and initiate hyperosmolar pharmacotherapy.

When intubating, take caution to avoid further increases in ICP. Do not use ketamine or a depolarizing paralytic, pretreat pain with fentanyl (1 mg/kg), sedate with propofol, and consider lidocaine (1mg/kg) for cough suppression.[3]

If an emergent shunt tap is indicated, speak with a neurosurgeon. A shunt tap is best done by a specialist, but is within the ED scope of practice when a patient is critically ill and a neurosurgeon is not immediately available. Be aware of complications, which include precipitating an intraventricular hemorrhage, but know that infection caused by shunt tap is rare (<1%).[1] Remember to send CSF samples for typical meningitis/encephalitis workup.

Disposition

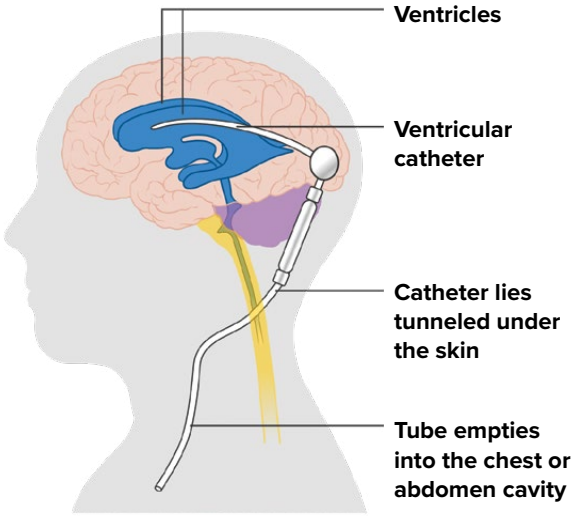
Prompt neurosurgical consultation should be sought whenever a shunt complication is suspected, as shunt revision or replacement may be necessary for definitive treatment. The patient should be admitted for close monitoring and intervention if indicated.

In patients in whom infection is suspected, treatment with broad-spectrum antibiotics should be initiated and CSF samples sent for analysis.

In the rare event that a complete workup of the shunt is negative, and the patient looks and feels well, the neurosurgeon may determine that the patient can follow up in an outpatient setting. ✶

Procedure: VP Shunt Tap[1,3,7]

1. Gather supplies: sterile gloves, chlorhexidine cleansing swabs, fenestrated drape, 25G butterfly catheter, lumbar puncture kit with manometer, 3-way stopcock, and tubes for CSF samples, sterile gauze and tape for dressing.
2. Place the patient in lateral decubitus with the reservoir facing up.
3. Sterilize reservoir and surrounding area and apply sterile drape.
4. Insert 25G butterfly needle almost perpendicular to the skin at the apex of the reservoir until a pop is felt or heard. CSF should begin flowing easily.
5. Measure opening pressure.
   a. Hold the manometer at the level of the ear.
   b. If ICP >15, attempt to drain off CSF until normalized for decompression. Avoid aspirating CSF quickly!
   c. If the proximal portion is occluded, little or no CSF will drain and this intervention will not be effective. Get the patient to the OR immediately.
6. Obtain samples for CSF analysis.
7. Remove needle and hold pressure with sterile gauze for two minutes.
8. Apply dressing.



References available online

Atraumatic Splenic Rupture

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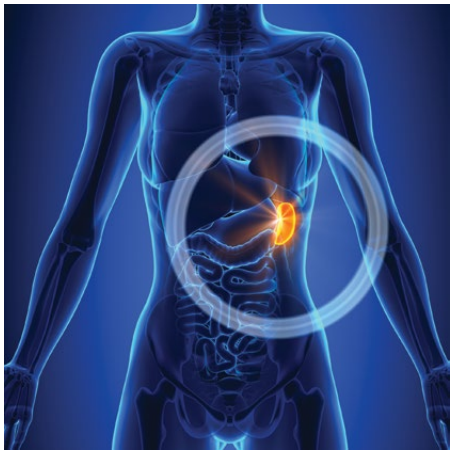
PGY 3

Traumatic splenic injury and hemorrhage is a diagnosis familiar to most emergency physicians. However, a condition that some may not be familiar with is atraumatic splenic rupture. Although an uncommon diagnosis, atraumatic splenic rupture is a critical diagnosis that should be included on the differential for abdominal pain, especially in the setting of associated undifferentiated hypotension, as it can quickly lead to instability and life-threatening intra-abdominal hemorrhage.

Case

A 52-year-old female presented to the emergency department late one evening by ambulance with complaints of sudden onset, intense, left-sided abdominal pain. On arrival, EMS reported that they could not obtain a blood pressure but that she was tachycardic, diaphoretic, pale, and almost passed out while they were helping her to the stretcher. On our initial evaluation her vitals were: heart rate 130 bpm, systolic blood pressure 60 mmHg with an undetectable diastolic pressure, respiratory rate 25 breaths per minute, temperature 97.4F, and SpO2 96% on room air. She was in significant distress and demonstrated notable pallor, significant abdominal tenderness with guarding, rebound, and distention, as well as a fluctuating level of alertness.

A brief history obtained from the patient revealed that the pain had woken her from sleep, was primarily in the left upper quadrant, and was associated with nausea, weakness, and an episode of near syncope. There were no reports of trauma to the abdomen, and she had never experienced symptoms like this before. She denied fever, chills, or recent illness. She provided the additional pertinent information that she was currently undergoing work-up of a large pelvic mass by gynecologic oncology in the outpatient setting, but otherwise she did not have any significant past medical or surgical history.



Large bore IV access was immediately established, and an initial liter of normal saline was given rapidly via pressure bag, with minimal improvement in her vitals and mentation. Point of care ultrasound was performed to identify a potential source of the hypotension and abdominal pain, which revealed a significant amount of free fluid within the abdomen. This was presumed to be hemoperitoneum of unknown etiology, but initially thought to be potential hemorrhage from the aforementioned pelvic mass. Upon identification of this free fluid, emergency release blood was requested, as well as an emergent surgical consult. The patient was stabilized after receiving the initial fluid bolus and 2 units of emergency release blood. She was then taken to the CT scanner, where she was found to have a ruptured subcapsular splenic hematoma with active extravasation (Image 1 and 2). The pelvis mass was again identified and was unchanged from prior imaging. Additionally, workup in the ED showed a BMP within normal limits, normal PT/INR, EKG with sinus tachycardia, and a negative UA and pregnancy test. CBC revealed a leukocytosis of 19.4, Hgb 6.5, Hct 21.5, and platelets 476.

Atraumatic Splenic Rupture

The first documented case of atraumatic splenic rupture was recorded by Rokitansky in 1861, and the condition was specifically defined by Weidemann in 1927 as "rupture resulting from an incident without external force".[1] This definition was further delineated in 1966 to distinguish atraumatic rupture of a pathologic spleen from true "spontaneous splenic rupture" of a normal, healthy spleen.[1] Atraumatic splenic rupture is quite rare, so there is a significant lack of information regarding its typical clinical presentation, general pathophysiology, and guidelines for management. Currently the majority of descriptions within the literature are in the form of case reports with only a handful of published retrospective reviews. Additionally, due to its rarity, the exact incidence of atraumatic splenic rupture is unknown, however, one retrospective review looked at 251 cases of splenic rupture, and found a total of 8 cases identified as atraumatic rupture with an estimated incidence rate of around 3.2%.[2] Atraumatic rupture tends to occur more commonly in males and has an estimated associated mortality rate of around 12.2-20%.[2,3] The majority of cases of atraumatic splenic rupture involve a spleen with some form of underlying pathology. There are many conditions associated with its occurrence; however, a systematic review found that the most common associated conditions are hematologic malignancies, viral infections, and systemic or local inflammatory conditions.[3] Non-Hodgkin's lymphoma, acute leukemia, mononucleosis, CMV, amyloidosis, and chronic pancreatitis were the most common specific conditions.[3] Further literature review found that anticoagulation use and active malaria infections are additional conditions that can lead to atraumatic splenic rupture.[4,5]

ED Management of Splenic Injury and Hemorrhage

The majority of splenic injury and hemorrhage presenting to the ED will be of traumatic etiology, specifically blunt abdominal trauma most commonly from an MVC.[6] Therefore, initial management

is to perform a primary survey to address any issues with airway, breathing, and circulation following ATLS protocol. Concurrently, large bore IV access should be established, and resuscitation initiated. Following the primary survey and initial interventions, the next step is to determine stability of the patient. If the patient is unstable, FAST exam should be performed to identify sources of hemorrhage. An unstable patient with signs of significant abdominal injury with associated peritonitis or positive FAST exam should undergo an emergent surgical evaluation and be taken to the operating room for laparotomy.[7] Additionally, these patients should receive resuscitation with emergency release blood products, and any anticoagulation that may be present should be reversed. Ultimately, in the unstable patient, splenic rupture will most likely be identified during laparotomy and managed via splenectomy.[7]

Conversely, patients who are stable may undergo further workup in the ED with CT imaging to identify the grade and severity of the splenic injury. Once identified, surgical consultation will be needed to determine operative versus nonoperative management. Nonoperative management focuses on less invasive and conservative treatments such as embolization or close observation with repeat abdominal exams and trending of hemoglobin and hematocrit. Some indications for when to consider embolization include: Grade III injuries or greater, presence of contrast blush, active extravasation, or moderate to severe hemoperitoneum.[7] The decision to perform operative versus nonoperative management may vary depending on additional injuries or complications, surgeon preference, local resources, and facility practice.

The management of atraumatic splenic rupture is not too dissimilar to that of traumatic splenic injury. Initial focus should be on ABCs and establishing IV access to begin blood product resuscitation and management of any hemodynamic instability. Surgical management via splenectomy does seem to be the most common treatment of atraumatic splenic rupture, especially in cases of hemodynamic instability or underlying malignancy.[8] Patients with low grade rupture or those who are hemodynamically stable tend to be managed with less invasive measures similar to the treatment of traumatic injuries. This includes embolization or even conservative management with close observation, especially in the cases of atraumatic splenic rupture in pediatrics with an underlying infectious etiology.[8] Regardless of the underlying cause of atraumatic rupture, the role of the emergency physician is to accurately make the diagnosis, stabilize patients with significant hemorrhage, and make the appropriate consultation for definitive management.

Case Conclusion

Upon stabilization of the patient in the emergency department, the emergency surgical team promptly took the patient to the OR where an exploratory laparotomy was performed. Approximately 6 liters of blood and clot was present within the abdomen and removed throughout the operation. Additionally, the operative report described the removal of the spleen which demonstrated a complete rupture of the splenic capsule. The patient tolerated the surgery well and post-operatively she was resuscitated in the surgical ICU with several more units of blood products. She received her post-splenectomy vaccinations and was ultimately discharged from the hospital on postoperative day four with general surgery and gynecological-oncology follow up. Pathologic examination of the spleen did not show any evidence of metastatic disease and the spleen appeared grossly normal. The patient tested negative for mononucleosis and did not have any associated underlying hematologic malignancy. The exact cause of rupture in this case was of undetermined etiology. ✶

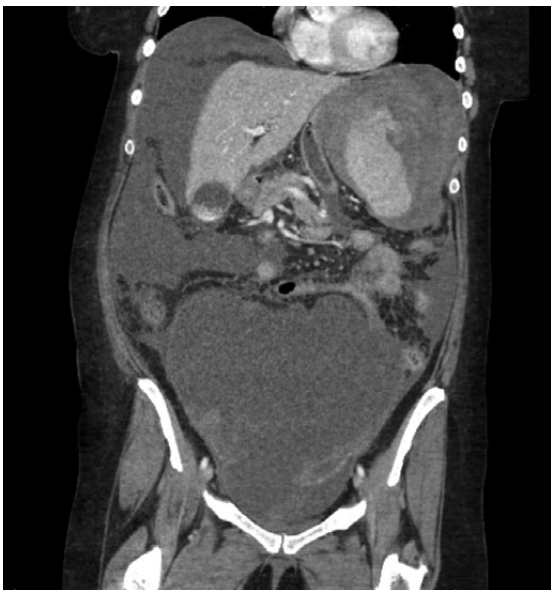


FIGURE 1. Coronal CT scan demonstrating hemoperitoneum, large ruptured subcapsular splenic hematoma, and large pelvic mass

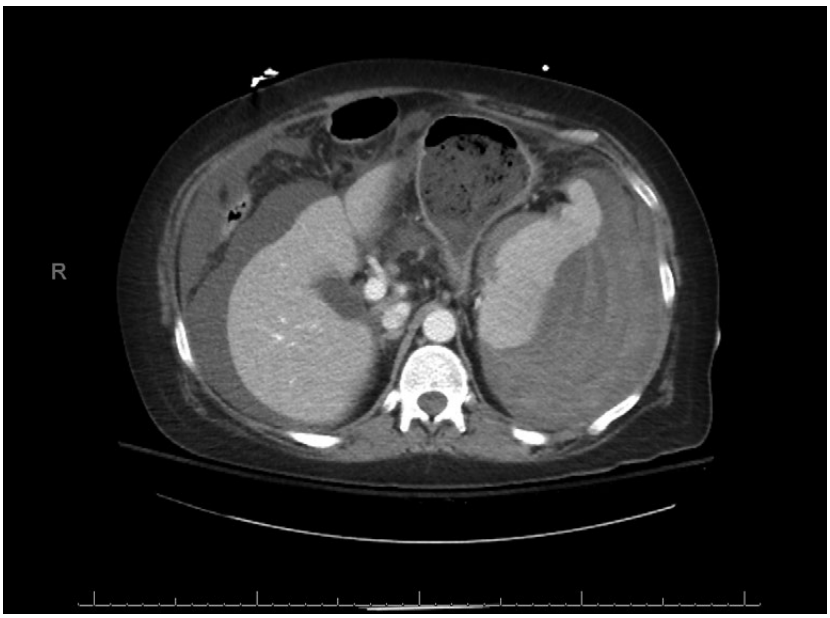


FIGURE 2. Axial CT again showing hemoperitoneum and large subcapsular splenic hematoma

References available online

Female hypospadias is an exceedingly rare congenital anomaly that can cause obstructive AUR in a few isolated cases.

Acute Urinary Retention in a Female Patient with Hypospadias

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Acute urinary retention (AUR) is a frequent urologic complaint in the adult emergency department with a broad differential including obstructive processes, medication side effects, infections, and neurologic dysfunction.[1,2] Female hypospadias is an exceedingly rare congenital anomaly that can cause obstructive AUR with few isolated cases reported in the literature.[3,4] We present a female patient with the chief complaint of AUR who presented to the emergency department with hypospadias.

Case

A 32-year-old female visiting from out of state with a history of recurrent urinary tract and vaginal infections presented to our emergency department with a complaint of urinary retention. She woke up in the morning unable to void and after a few hours developed significant suprapubic discomfort. She reported one similar episode of urinary retention four months prior that required catheter placement.

On initial evaluation, she appeared uncomfortable and was tachycardic to the 130s with otherwise unremarkable vitals. The patient reported she was in the process of being evaluated further by a urologist for her recurrent genitourinary infections and had recently been told her urethra was located inside the vagina. Nurses attempted to place a Foley catheter but were unable to successfully locate the urethra. A speculum was used to fully visualize the vaginal canal in an attempt to catheterize the patient. After being unable to locate any urethral opening, the speculum was rotated sideways, which allowed visualization of the anterior vaginal wall. An orifice was then identified — suspected to be the urethral meatus — approximately 2.5 cm from the introitus in the anterior wall in the vagina.

A Foley catheter was successfully placed through the urethra with subsequent return of clear urine and immediate patient relief. The patient's tachycardia resolved after bladder drainage. A urinalysis showed rare bacteria. Additional workup for urinary retention in this patient was not performed due to known history of urogenital structural abnormality and previously established care with urology. The patient was offered a urinary leg bag because she was scheduled to travel to her home state later that day. She refused and agreed to seek medical attention if she developed recurrent retention. She was discharged and encouraged to follow up with her urologist for definitive management of her urethral abnormality.

Discussion

In female patients, the two most frequent causes of AUR are obstruction or inherent dysfunction of the bladder.[1] Undiagnosed congenital urethral abnormalities are a rare cause of AUR that have the potential to result in severe renal complications.[4] The prevalence of hypospadias is, not surprisingly, much higher in males than females with an estimated ratio of 150:1.[5] Female hypospadias is thought

to be caused by a failure of appropriate urogenital fusion, and most patients with female hypospadias have additional genitourinary abnormalities.[6,7]

The diagnosis of isolated female hypospadias is extremely rare and most often made incidentally during difficult catheterizations for unrelated events such as surgical procedures.[4] The most common problems that arise in patients with isolated female hypospadias include repeated urinary and vaginal infections.[5] These infections typically become recurrent after the patient begins engaging in sexual intercourse and are likely related to the urethral position in the vagina [4]. Other rare complications have been reported including one patient who was found to have vaginal stones, possibly due to longstanding pooling of urine in the vaginal canal.[5]

In female patients with hypospadias, the severity of outflow obstruction varies depending on the location of the urethral meatus.[8] Urethral diameter is more likely to be significantly constricted in patients with a meatus located in the upper two-thirds of the vagina.[8] Because of this, patients with a urethra located more proximally inside the vaginal canal are more likely to present during childhood or adolescence due to an increased probability of developing severe obstructive retention.[7] Our patient's urethra was located in the distal third of the vagina, which may have contributed to her delayed diagnosis as an adult. The patient's recurrent urinary and vaginal infections without prior reported history of severe renal complications also led us to confirm isolated female hypospadias.

Regardless of etiology, the standard treatment for patients who present to the emergency department with urinary retention is bladder decompression.[2] Female patients with hypospadias are difficult to catheterize for a few reasons. In addition to inherent difficulty locating a true urethral meatus, recurrent infections and repeated catheterization attempts in these patients may predispose them to urethral stenosis. If attempts at urethral catheterization are unsuccessful, patients require a suprapubic catheter. Once the bladder is drained, unless there are additional renal complications that need to be addressed, the patient can be safely discharged and managed outpatient with prompt urology follow-up.[2] Surgical correction is the only definitive treatment for this condition.[4,6]

Conclusion

Patients with urethral abnormalities should be evaluated by urology for definitive management because of the high probability of future complications. Women with urethral anomalies who present during adolescence or later in adulthood with dyspareunia and recurrent genitourinary infections are more likely to have true isolated hypospadias, which is extremely rare.[7] Because isolated female hypospadias may remain asymptomatic for years, it is likely that many patients may initially be diagnosed in the emergency department. Emergency medicine physicians should be aware of this anomaly and may have to utilize unconventional methods to identify the urethra in these patients. If presenting with urinary retention, it may be helpful to ultrasound the bladder once a foley has been inserted to confirm appropriate placement.

This diagnosis may also be considered in patients who present with recurrent urinary tract infections that do not respond to antibiotics.[5] It is a condition that is especially relevant for specific patient populations that may not have had access to thorough neonatal physical exams, and should also be considered in pediatric patients who present with recurrent urinary tract infections or urinary retention.

The progression of our patient's symptoms reinforces the need for definitive management of any patient with congenital urethral abnormalities. Emergency medicine physicians should ensure that all patients with this diagnosis establish prompt follow-up care with urology to prevent worsening urogenital symptoms and future complications. ✶

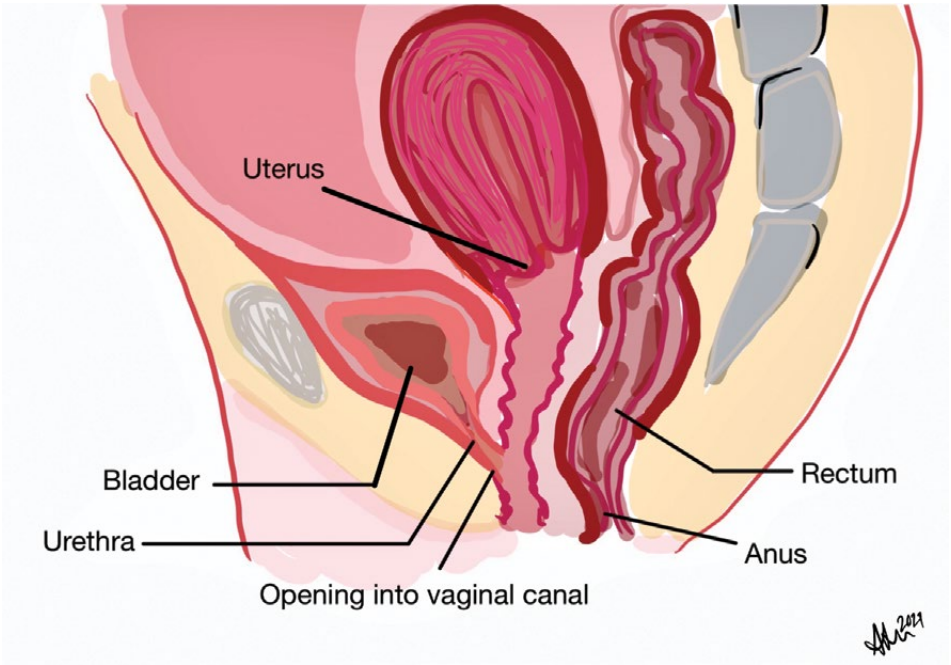

FIGURE 1. Representative Drawing of Isolated Female Hypospadias

In isolated female hypospadias, the urethra opens directly into the vaginal canal.

References available online

Not so FAST
Intraperitoneal Bladder Rupture

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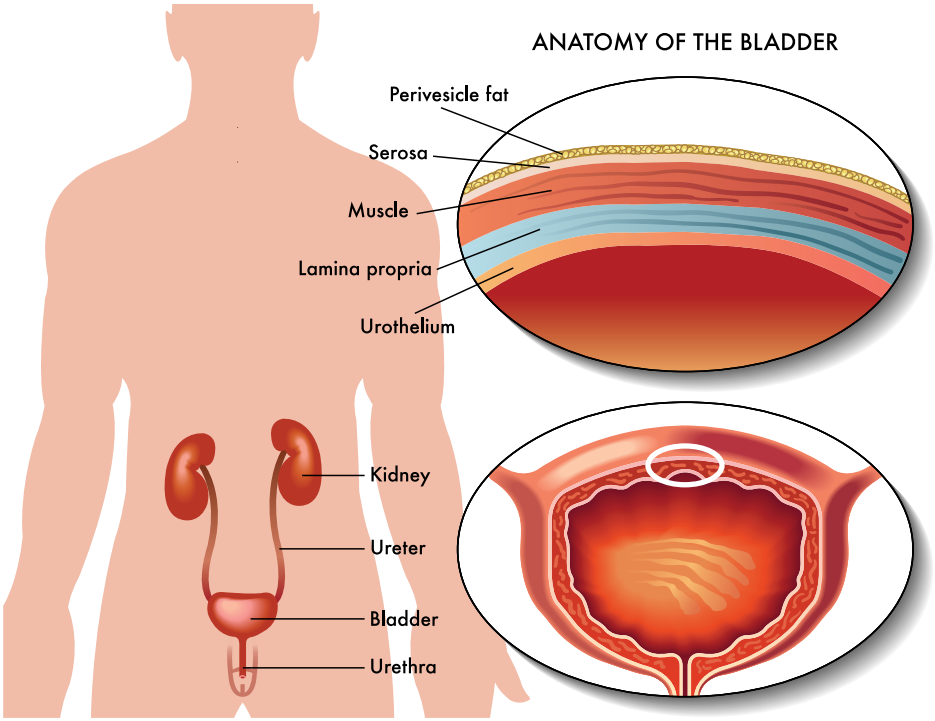

Case

A 29-year-old healthy male presented to the ED with a chief complaint of abdominal pain and blood in his urine. The patient was given an emergency severity index (ESI) of three and was placed in a hallway bed. On history, the patient stated that yesterday after dinner, he developed mild, cramping upper abdominal pain that subsided without intervention. The next day, his abdominal pain had spread and was now diffuse and severe in character. He stated that he went to the bathroom early that morning and urine was grossly bloody. He stated, "Now I can't pee."

The patient reported he had no abdominal trauma and no medical or surgical history, although he did report a family history of nephrolithiasis. He was afebrile, tachycardic in the 110s, with mildly elevated blood pressure. He appeared uncomfortable. Physical examination revealed a tender abdomen with diffuse, involuntary guarding. Genitourinary exam was unremarkable, and there was no blood at the urethral meatus.

An immediate focused assessment with sonography for trauma (FAST) exam was performed and revealed some surprising findings: anechoic fluid cephalad to a full bladder (see Figure 1). A right upper quadrant view was obtained, and free fluid was seen at the caudal liver edge in the superior paracolic gutter (see Figure 2). No free fluid was readily identified on the left upper quadrant view. For completeness, a subxiphoid view was obtained and was negative for pericardial effusion.

A Surprising Twist

At that time, the patient endorsed that he had previously withheld information out of embarrassment. He and his roommate were wrestling the previous night when his roommate tackled him, hitting him in the abdomen. He experienced immediate cramping pain, but because it resolved spontaneously, he did not seek medical attention. When symptoms returned and had worsened the next day, he presented to the ED.

The patient was provided with IV analgesia and fluids. Given his mild tachycardia but otherwise hemodynamic stability, he was taken for a stat CT scan. The scan read: "Mild to moderate ascites. Otherwise, normal CT scan of the abdomen and pelvis." Bloodwork was still pending, but the patient remained tachycardic despite analgesia and fluid resuscitation. At that time, surgery was consulted for peritonitis and positive FAST exam. After evaluation by surgery, the patient was brought to the operating room where the report read: "4 cm vertical bladder rupture at the dome of the bladder with moderate clear fluid in the abdominal cavity."

Discussion

Bladder rupture is a relatively rare condition due to the protection of the bladder in the bony pelvis. The most common cause of bladder rupture is blunt force trauma.[1,2] Motor vehicle accidents account for most cases; however, iatrogenic injuries associated with surgical or endoscopic procedures have also been described.[2,3] Spontaneous bladder rupture is associated with a high risk of mortality. Most patients with bladder rupture have gross hematuria and complain of pelvic pain with

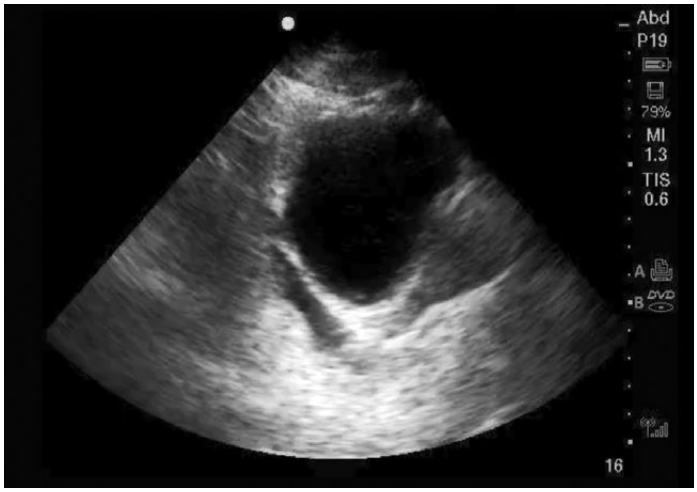

FIGURE 1. The FAST exam suprapubic view demonstrating free fluid cephalad of the bladder

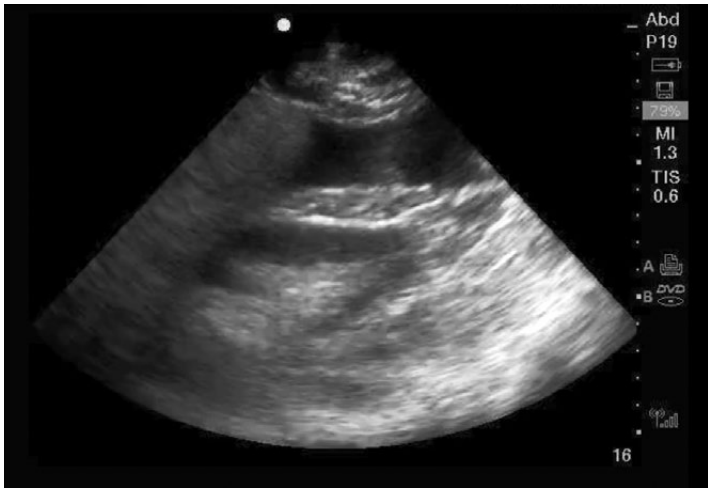

FIGURE 2. The FAST exam RUQ view demonstrating free fluid along the caudal edge of the liver

difficulty voiding. In stable patients, the gold standard for diagnosis is a retrograde cystogram.[1]

Bladder rupture is classified as extraperitoneal or intraperitoneal.[1-3] Most cases of bladder rupture are extraperitoneal. Extraperitoneal bladder ruptures are often associated with pelvic fractures and occur in deceleration injuries.[1] Pelvic fractures should therefore raise suspicion for bladder injury. If the bladder rupture is below the peritoneal reflection (an anatomical landmark separating the intra- and extraperitoneal portions of the rectum), urine extravasation will be extraperitoneal and confined around the bladder. Therefore, FAST examination will not be positive in isolated extraperitoneal bladder ruptures.[1,2]

Intraperitoneal bladder rupture occurs when compressive forces act against a full bladder.[1-3] This can occur in motor vehicle collisions when a full bladder is compressed by the steering wheel or other forces. If the bladder rupture is on the bladder dome and above the peritoneal reflection, urine extravasation will be intraperitoneal. Therefore, FAST examination may be positive in intraperitoneal bladder ruptures as urine enters the abdominal cavity.[1,2]

Management

Extraperitoneal bladder rupture is typically managed conservatively, as the bladder often heals spontaneously with urinary catheter drainage.[1,2] A Foley catheter is placed and remains for a minimum of 10-14 days. On follow-up with urology, a repeat cystogram is performed to confirm healing of the bladder, and the Foley can then be removed.[2]

According to the American Urological Association guidelines, intraperitoneal bladder ruptures should be surgically repaired.[2] This is because intraperitoneal ruptures are associated with an increased risk of larger lacerations that rarely heal with the placement of urinary catheter drainage alone.

Additionally, untreated intraperitoneal bladder ruptures can lead to peritonitis and electrolyte derangement as urine is resorbed. It can also lead to intraabdominal infection, sepsis, and renal failure. Following operative repair, a Foley catheter is placed for 10-14 days. A follow-up cystogram is then performed to confirm healing of the bladder, and the Foley can then be removed.

Case Conclusion

Urology was consulted intraoperatively by general surgery after no further traumatic injuries were identified. Urine had already been evacuated from the abdominal cavity and the patient had a Foley in place. Following its closure, the bladder was filled through the Foley catheter with approximately 300 mL of normal saline with no leakage identified. A pelvic drain was placed.

The patient was already in the operating room when his blood work resulted. His pre-operative creatinine was 2.30, nearly triple his baseline. The patient remained on the general surgery service. On hospital day two, he regained bowel function and tolerated a soft diet. His creatinine normalized by hospital day four. He was discharged after six days in the hospital. He followed up with urology fourteen days later. Repeat cystogram revealed no evidence of residual bladder leak. The Foley catheter was removed, and the patient was able to spontaneously void. He reported no further complaints on further follow-up notes. ✶

TAKE-HOME POINTS

- ✓ In a patient with signs of peritonitis on clinical exam, FAST examination may help identify those who need early operative intervention.
- ✓ Be wary of CT reads that do not fit the clinical picture. In a completely healthy 29-year-old, findings such as "moderate ascites" on a CT should prompt further investigation.
- ✓ Although rare, intraperitoneal bladder rupture must remain on the differential in blunt abdominal trauma. This injury is managed operatively due to risk of electrolyte derangements, sepsis, and renal failure as urine is resorbed into systemic circulation.

References available online

Event Medicine and Mass Casualty Response

with Matt Friedman

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Class of 2023

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In November 2021, a music festival called Astroworld in Houston, Texas, claimed the lives of 10 individuals ranging in age from 9 to 27 years old, and injured hundreds. The tragedy occurred in part because of poor execution of public health safety measures, leading to a $2 billion lawsuit against the performers and event planners.[2] Such events prompt healthcare professionals to evaluate safety measures for mass gatherings, and to utilize technology, research, and interprofessional collaboration to limit morbidity and mortality related to mass gatherings.

Matt Friedman, MD, FACEP, serves as Associate Medical Director of Prehospital Care and Director of Event Medicine at Maimonides Medical Center and Medical Director of CrowdRx, which provides physician-led teams to staff medical services at mass gatherings. He is an expert in international mass gatherings. In this Q&A, Dr. Friedman shared his insights about event medicine and how residents and fellows can join this growing field.

What is event medicine and how did you get involved?

Event medicine is an emerging subspecialty that strives to improve the medical care offered at mass gatherings based on the understanding that such events generate a higher incidence of injury and illness than a similarly sized group of individuals, despite typically being a gathering of healthy individuals.

I became involved in event medicine after completing an EMS Fellowship at the Fire Department of New York (FDNY). There were two fatalities at the music festival Electric Zoo in New York in 2013, and I believe morbidity and mortality could be improved at these types of events if specialty-trained physicians are there to oversee them. I also noticed there were many young kids in their early 20s dying across the country and throughout the world, and I wanted people familiar with the pathophysiology to be able to treat them on-site.

What additional training can prepare EM physicians to be proactive and effective members of an MCI response team? Any fellowships you would recommend?

I believe that an EMS fellowship is essential training for the subspecialty of event medicine. EMS fellowship is generally an option for emergency medicine residents. I imagine that a resident completing any residency, with a strong interest in EMS, would be considered, although it would more likely be a challenging feat graduating from other specialties.

The skills and knowledge obtained during an EMS fellowship are instrumental to an MCI response team such as an Urban Search and Rescue team or a Disaster Medical Assistance Team. While there are fellowships that focus solely on disaster and not on the

EMS aspect, and I may be biased, I think an EMS fellowship does a fabulous job of encapsulating the content of both in a one-year fellowship.

When preparing for mass gatherings, what safety measures are implemented to promote preparedness? Who are the key players in an efficient and effective MCI response?

There is a list of predictive variables that have been proven to determine the patient presentation rate (PPR), a statistic used to standardize the risk associated with all mass gatherings. The PPR for each event is calculated as the number of patient presentations per 10,000 patrons in attendance. The type of event is clearly important, for example, an electronic dance music concert versus a jazz fest. The ambient temperature, specifically the heat index, is an important variable contributing to the PPR. Whether the event is bounded like a music festival or unbounded like a marathon, and whether the patrons are seated or standing are all important predictive variables.

The key players are undoubtedly the producers of the event as they have to approve all decisions and all expenditures. However, producers must obtain permits from the hosting community to hold an event. Therefore, by granting permits to the producers, the local municipality has the power to get the promoters to do the right thing. The local municipality also typically involves their transit division to streamline the process of transporting tens of thousands of people to the event, as well as engaging local law enforcement and fire prevention services. Additionally, promoters hire a third-party security company to manage the crowd and ensure that critical access points and lanes are maintained for emergency vehicles.

What are some common medical emergencies related to mass gatherings?

This depends on the type of event. At EDM festivals, we commonly see MDMA-induced hyperthermia causing critical end-organ dysfunction and life-threatening arrhythmias. At outdoor participant events like triathlons and extreme obstacle courses, we see more orthopedic injuries, such as joint sprains and fractures. At heavy metal rock concerts, we tend to see blunt trauma from the mosh pits that inevitably arise. But common things being common, we see a ton of asthma and abdominal pain at mass gatherings. The difficult part is distinguishing between abdominal pain that is gastroenteritis or pancreatitis without laboratory diagnostic capabilities or imaging on-site.

How does the relationship between EM physicians and EMS play a role in an efficient response to an MCI?

It is so important for the EM or EMS physician on-site to understand the capabilities of the EMS providers on-site. In an MCI, EMS providers are empowered to quickly triage patients and act on those triage decisions. Therefore, the on-site physicians need to know if the EMS providers are competent at triaging. We should not spend 10 minutes on-site treating a black-tag patient when those interventions are unfortunately medically futile. We need to devote all of our resources to rapidly stabilizing and transporting the red-tag patients. It is key during an MCI for physicians to be able to instruct paramedics to intubate and transport a patient. If a physician is unsure of the EMS providers' capabilities, it will lead to confusion and wasted time rechecking EMS's actions.

What is your perspective on the recent Astroworld fatalities and what challenges do you believe the EMS and MCI response teams faced?

Unfortunately, the disaster at Astroworld was quite predictable. Stampedes have killed hundreds if not thousands of people at mass gatherings over the past 20 years, most notably at the Hajj, an incredibly large religious gathering in Saudi Arabia where the stampede risk factor is a concerning risk. Crowd control is a factor that many patrons are largely absent-minded about, but there is a reason why egress points are twice as large as ingress points and considerations like total attendance and forward flow are closely monitored. The particular problem with Astroworld was that 50,000 people were watching a single stage, which generally festival promoters try to avoid, instead of having multiple stages set up so there are fewer people per square foot. Additionally, this particular artist is known to incite mosh pits and reckless behavior by encouraging patrons to jump over barricades, push forward, and disrespect the presence of security.

What is fairly notable about Astroworld was that there were children as young as 10, 13, and 14 among the injured, so these were smaller people who were generally trampled and presumably asphyxiated. The decision not to stop the event immediately was probably the correct one because then there would be the potential for more stampedes among this crowd. What is still unknown is the precipitating factor for the stampede. Presumably, it was that people were just trying to get closer to the stage and not any sort of mass opioid overdose event that was initially reported. Also, some healthcare worker attendees at the festival later reported to the media that there were not enough trained medical personnel or equipment on-site to handle the casualties, though we cannot validate these claims. Having said that, it is fairly easy to get overwhelmed with more than two critically ill patients on-site. This is why critical access points and pedestrian-free lanes for first responders are vital during a mass gathering. It is incumbent upon security to ensure these lanes are maintained in order to quickly access critical patients.

What advice would you give to medical students and physicians attending large events who want to help as bystanders?

Some people carry an MCI trauma kit in their bag at these events. This kit might include a CPR pocket mask to act as a barrier during rescue breathing, non-latex gloves, gauze, a tourniquet, and perhaps a hemostatic dressing. CPR training is vital, however, if patients are in cardiac arrest during an MCI they are considered a black tag. It is better to move on to patients who can be saved by providing rescue breaths or hemorrhage control. ✶

References available online

TOGETHER AGAIN
MedWAR 2021

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After a 3-year hiatus fraught with blizzards and COVID, EMRA's Wilderness Committee organized and hosted ACEP21's most challenging test of endurance: MedWAR. The event occurred just south of Boston at Blue Hills Reservation, a picturesque state park featuring skyline views and a few rocky climbs, made more challenging after a Nor'easter the day before. Although rain clouds dissipated, temperatures remained in the mid-40s for the competition, requiring adequate layers and movement to stay warm.

What is MedWAR?

MedWAR, Medical Wilderness Adventure Race — is a competition concept developed at Medical College of Georgia and led by Michael Caudell, MD, FACEP. Teams race through an orienteering course peppered with medical quizzes and proctored wilderness medicine simulation challenges. It's a test of strength, endurance, adaptability, and medical knowledge all rolled into one.

Since its inception in 2000, MedWAR has been adopted internationally, with versions hosted by multiple medical societies. The EMRA MedWAR debuted in 2016, led by the Wilderness Committee's Carrie Jurkiewicz, MD, and Geoff Comp, DO, with faculty advisors Dr. Caudell and Paul Auerbach, MD, MS. It has become one of EMRA's most dynamic annual competitions.

Prep Time

For the return of the in-person, outdoor event this fall, more than 40 volunteers and staff met before daybreak to distribute medical quizzes at unmanned stations and prep the scenarios created by committee members. After they dispersed, 30 racers comprising 10 teams from around the country gathered to debrief and fuel up for a long day. Wilderness Committee Chair Lainey Yu, DO, MS, FAWM, introduced the competitors and welcomed everyone to a much-anticipated event. MedWAR faculty advisors Dr. Caudell and Taylor Haston, DO, FACEP, reviewed the rules, and Hillary Irons, MD, PhD, FACEP, the race's Chief Medical Officer, provided safety instructions. Then,

at 9 am sharp, the timer sounded and teams sprinted into the wilderness with the historic announcement, "The British are coming!"

Running Blue Hills

Throughout the 11-mile course, racers encountered 7 medical simulation scenarios and 4 optional unmanned stations. Whereas prior EMRA MedWAR races were run in sequential order, teams this year were simply told to find and complete all the challenges on the course — allowing them to plan their own race strategy on a course that included a steep summit and medical challenges both common and rare.

Prizes and Pulled Pork

Six hours after the starting bell, racers crossed the finish line and were greeted with a warm barbeque dinner while committee members worked hard to gather their supplies and tally the final scores.

All of the stations featured incredible actors who made the experience more realistic, but two volunteers stood out for their Oscar-worthy performances: Kimberly Sokol, MD, won for her impression of a crazed hiker with HAPE, while EMRA Medical Student Council Chair Chiamara Anokwute's intoxicated antics on the Appalachian Trail garnered rave reviews from racers and course directors.

The Spirit Award, honoring the late Paul Auerbach, MD, father of wilderness medicine, was awarded to Wreck'EM Tech from Texas Tech University Health Sciences, a team that embodied the positivity and perseverance required in austere environments. Team members received an autographed copy of Dr. Auerbach's book, *Wilderness Medicine*, courtesy of Elsevier.

In their matching tracksuits, the UCONN Huskiteers took third place with a time of 3:10 after time deductions, while the best facial hair and second place went to Stanford's Fear the Stache, with a time of 2:52. The champions of MedWAR 2021 were Status BAFERDicus from Albany Medical. Competing with a broken hand, Status BAFERDicus narrowly clinched the win and earned an invite back to MedWAR 2022 with a time of 2:49. Winners received a dry bag, stainless steel pint glass, water bottle, and an REI gift card. Many thanks to BTG Specialty Pharmaceuticals, whose funding helped provide transportation for the event.

Hard Work Pays Off

This event would not have been possible without the hard-working members of the Wilderness Committee: Chair Lainey Yu, DO; Chair-Elect Katie Kammert, DO; EMRA Board Liaison and Past Chair Yev Maksimenko, MD; Vice Chairs Michelle Skuba-Gray, MD; Matt Basinger, MD; and Kaitlyn Votta, MD; and Assistant Vice Chairs Jordan Brown and Sriram Venkatesan.

If you are interested in joining the committee for MedWAR at ACEP22 in San Francisco this October, please contact emrawildernessctte@emra.org, and join us for our planning meeting held during CORD Academic Assembly 2022 in San Diego this March. ✶

Migration of Implantable Loop Recorders

Why They Might Get Your Own Heart Hammering

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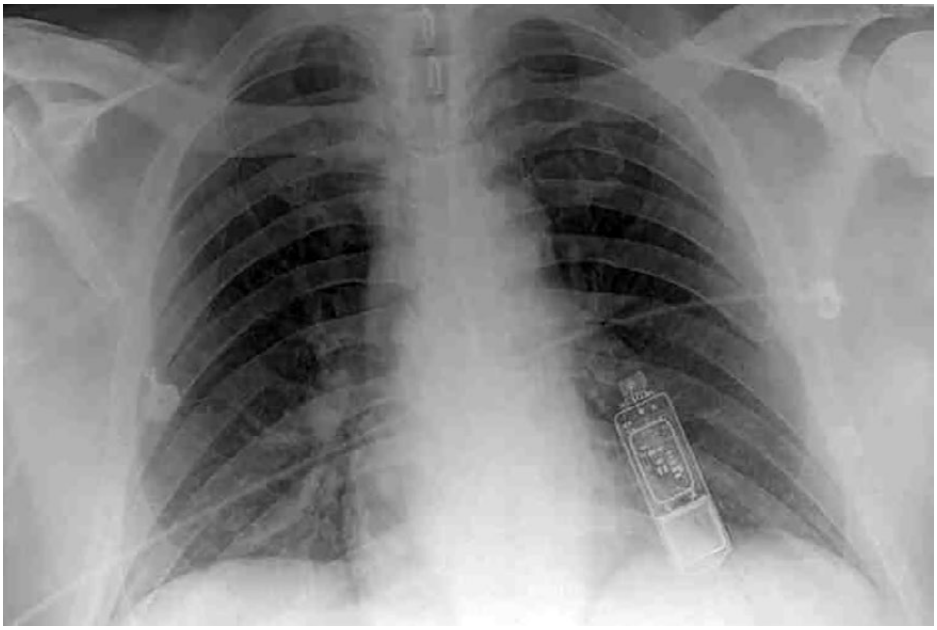


From unexplained syncopal events to undiagnosed palpitations, there are many cardiac conditions where patients benefit from closer monitoring.

Event monitors and Holter monitors have been traditionally used to observe cardiac rhythm in patients, but these devices are externally worn and cumbersome, limiting their use. Implantable loop recorders (ILRs), on the other hand, are inserted subcutaneously and are able to continuously record cardiac activity for up to 3 years.[1]

Unlike the more invasive implantable cardiac defibrillator, pacemaker, or biventricular device, insertion of ILRs is less invasive and is often placed in an outpatient setting under local anesthesia.

However, rare complications of infection or migration of the device can occur, and when these patients come to the emergency department (ED), the emergency physician must be able to discern which cardiac device the patient has implanted and just how life-threatening the presentation might be.

Case

A 63-year-old male presented to the ED with a chief complaint of "my cardiac device is coming out of my skin." The device had been implanted two weeks prior to monitor his palpitations. He reports he had woken up this morning and noticed the device sticking halfway out of his chest. Other than mild pain directly at the site of open skin, he denied any chest pain, palpitations, or dizziness. He denied any recent trauma to the chest, fevers, chills, erythema, purulent discharge, palpitations, shortness of breath, or diaphoresis.

The patient was afebrile and hemodynamically stable upon triage. Physical exam showed a small cardiac device protruding about 2 cm from the patient's skin on his anterior chest wall. There was mild erythema and tenderness to palpation but no purulent discharge. His cardiac exam demonstrated a regular rate and rhythm, without any evidence of murmurs, rubs, or gallops. Additionally, his lung exam demonstrated bilateral, clear breath sounds.

EKG showed normal sinus rhythm. Chest x-ray showed clear lung fields and a normal-sized heart. The ILR was seen to the left of the sternum between the fourth and fifth ribs. There was no visible hematoma, tracking gas, or pneumothorax evident on imaging.

Upon further investigation, he was able to tell us that the device was an implantable loop recorder. The cardiac electrophysiologist team came to assess the patient and extracted the ILR. The 1.5 cm wound was left open to heal, and the patient was discharged home on an oral antibiotic for 7 days without any further complications.

Discussion

When a patient presents to the emergency department with an implanted cardiac device extruding from the skin, the first question an emergency physician must ask after ensuring that the patient is hemodynamically stable is: what kind of device is this? As the patient may not always know the answer, it is useful to generally be aware of the different types and placement locations of cardiac devices.

The most commonly encountered devices are implantable cardiac defibrillators, pacemakers, biventricular devices, and implantable loop recorders. Of these, implantable cardiac defibrillators, pacemakers, and biventricular devices all share a common insertion and placement site with a

subcutaneous battery on the left side of the chest around the third intercostal space, wires traveling from the battery through the left subclavian vein, through the superior vena cava, and terminating inside the right ventricle (or the coronary sinus vein, in the case of the biventricular device). As opposed to the other devices, ILRs are minimally invasive — generally, a shallow incision is made at the left parasternal area at the level of the 4th–5th intercostals, the device is inserted subcutaneously, and the incision is closed with sutures, sterile strips, glue, or a combination.[1,2] Unlike the other devices, ILRs are not in any way connected to the heart or vasculature and therefore pose minimal risk of complications — unless they migrate.

While complications of implantable loop recorders are rare, devices can be subject to migration and erosion through the skin into the cardiac or pleural space, incision site infection, and device malfunction.

- In a study of 154 patients, only 1 patient (0.6%) had device erosion through the skin, and none had site infections.[2]
- In another study of 133 patients, 2 patients (1.5%) had device erosion and 3 patients (2.3%) had site infections.[3]
- A study of 386 patients reported complications in 3.3% of patients, including infection, pain, and device malfunction — but without mention of device erosion through the skin.[4]
- A retrospective study in India noted an unusually high rate of device erosion through the skin, with as many as 4 out of 85 implants (4.7%) spontaneously self-extruding.[5] These extrusions all occurred within 7-24 days of implantation, and it was postulated that the depth of the incision was the inciting factor.

A more worrisome case report documented the migration of an ILR through the pectoralis major muscle and into the left pleural space of the lungs.[6] This patient presented with pleuritic chest pain, shortness of breath, and diaphoresis. A CT scan confirmed the displaced ILR, for which the patient required thoracoscopic surgery for removal (but ultimately recovered well).[6]

Though exceedingly rare and only seen in case reports, migration of the ILR into the deeper tissue — including the pleural space and the mediastinum — rather than erosion through the skin is a potentially lethal complication the emergency physician must beware.

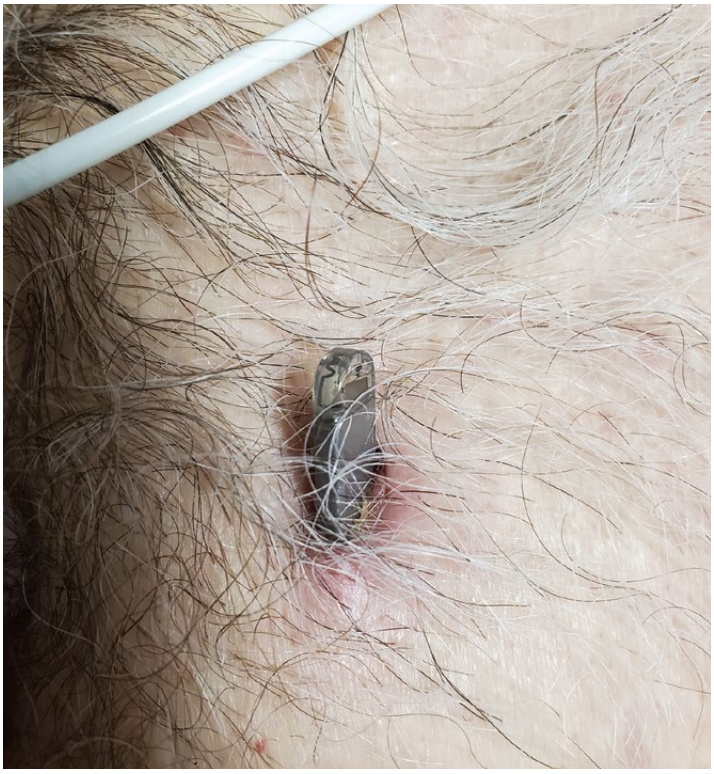
Management of Displaced ILRs

In a patient presenting with cardiac device complications, once the device has been successfully identified as an ILR rather than a more invasive device, the management is often straightforward.

Painful ILRs often require extraction. For those with suspected superimposed infection a trial of antibiotics is often attempted first. If unsuccessful, the patient will require extraction of the ILR and a subsequent antibiotic course.

Self-extruding ILRs can simply be pulled or milked out, with hemostatic pressure applied to the site afterwards. X-ray imaging is only necessary if it is thought there might be additional complications.

There are no guidelines on management of the site after a self-extruding ILR has been removed, so it is left to the physician's clinical judgment whether the patient requires wound closure or antibiotics. For the rarer and more dangerous cases of deeper ILR migration, further imaging (such as CT scan) and surgical intervention are required. ✶



KEY POINTS

- While implantable cardiac defibrillators, pacemakers, and biventricular devices are invasive and enter the right ventricle of the heart through the superior vena cava, implantable loop recorders are subcutaneous and not connected to any vasculature.
- Complications of ILRs include device migration and erosion through the skin, site infection, excessive site pain, device malfunction, and — rarely — migration into the pleural space.
- Removing an ILR that is eroding through the skin is as simple as milking the device out of the skin — no imaging is required prior to or after removal unless further complications are suspected.
- After removing the ILR, wound closure with glue, sterile strips, or sutures and prophylactic antibiotics are optional but may assist healing and help prevent future infections.

References available online

CASE REPORT

West Nile Encephalitis

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West Nile Virus (WNV) is a member of the Japanese Encephalitis antigenic complex and can lead to a wide range of clinical symptoms, from asymptomatic disease to severe meningitis and encephalitis. West Nile Virus is the leading cause of mosquito-borne disease in the continental United States.[2] This case report examines a case of headache, weakness, and gait ataxia in a 63-year-old male, with the resulting diagnosis being West Nile Virus encephalitis.

Introduction

The presentation of West Nile Virus ranges from asymptomatic disease to severe meningitis or encephalitis and even death. Approximately 25% of individuals infected develop a fever, and only 1 in 150-250[1] patients develops neuro-invasive disease. Risk factors for developing neurological manifestations include age, malignancy, organ transplantation, and other genetic factors.[2] WNV is most commonly spread to people by a bite of an infected mosquito, with a peak of cases occurring in summer and autumn. According to the CDC, the majority of cases in the U.S. are reported in South Carolina, Virginia, Delaware, California, and Arizona. This case report is a 63-year-old male in Philadelphia who was presumed to have WNV encephalitis and was documented as the second case in this region during the 2020 season.[1]

Case Report

A 63-year-old male with past medical history of HTN, HLD, and Type II DM presented to the ED for a 5-day history of headaches, fever (Tmax of 102°F), decreased oral intake, and unsteady gait. He did not experience falls, loss of consciousness, or known COVID-19 exposures. He lives at home with his wife and his granddaughter, both of whom are feeling well. Of note, he states he is an avid outdoorsman and enjoys camping, hiking, and doing work outside around his home, which he has been doing a lot of in the past few weeks. He smokes 1 PPD, denies alcohol use and other non-prescription drug use, or any high-risk sexual activity.

Upon arrival to the ED, vital signs were significant for tachycardia to 102, a mild fever of 100.7°F, oxygen saturation of 97% on room air, respiratory rate of 20, and a BP of 169/83. His physical exam revealed bilateral paraspinal tenderness, full ROM of the head and neck with mild pain, a positive Brudzinski sign, mild ataxia with an otherwise non focal neurological examination, and a blanchable petechial rash on the bilateral hands and palms. The remainder of his physical exam was unremarkable.

EKG performed in the ED was normal sinus rhythm with no concerning ST changes or T-wave abnormalities. Chest x-ray showed no signs of acute processes. CT of the brain showed no hemorrhage or signs of ischemia. Initial laboratory studies were pertinent for a leukocytosis of 18.9 with a neutrophil predominance, a venous lactate of 2.6, and hyperglycemia to 226, but otherwise grossly unremarkable.

Due to concern for meningitis and encephalitis a lumbar puncture was performed. An opening pressure was unavailable but per emergency physician documentation tube #1 was grossly purulent and yellow with no signs of blood. Tube #4 had 9 RBCs, 184 WBCs — 57% segs, 28% lymphocytes, 5% monocytes, 0% eosinophils. Other remarkable studies were as follows: elevated CSF glucose of 115, elevated CSF protein of 84, CSF culture showing rare WBCs and no organisms.

The patient was started on broad spectrum antibiotics and antivirals including ceftriaxone, vancomycin and acyclovir. Due to the patient's history and physical exam, which included outdoor activities, gait ataxia and other meningeal signs, in addition to a recent WNV case in Bucks County, Pennsylvania, WNV Ab IgM PCR was sent along with additional viral testing.

Throughout the hospital stay, infectious disease was consulted and discontinued ceftriaxone as they determined a bacterial cause was unlikely. In addition, they added Lyme antibodies IgM and IgG. COVID-19 PCR was negative and blood culture showed no growth. Over the next 4 days, the patient clinically improved. Lyme antibodies and HSV PCR were both negative, so the acyclovir was discontinued. The patient was discharged 4 days after admission with WNV studies pending. One day after discharge, the WNV Ab IgM resulted positive at 4.21 with a reference range of <0.90. The positive result was reported to the patient and to the Pennsylvania Department of Public Health and was documented as the second case of WNV encephalitis in the Philadelphia region of the 2020 season.

Discussion

There have been case reports of West Nile Virus infection and its clinical syndromes since its first case in 1937[3], however this case is rare for two reasons: the location of the patient that was infected and the symptoms that brought the patient to the Emergency Department.

Regarding location, Pennsylvania and Philadelphia in particular are not typical regions for WNV infection. Per the Pennsylvania Department of Public Health, there had only been one diagnosed human case of WNV in the Philadelphia area since tracking started in May 2020. This is either due to patient's having asymptomatic disease and not seeking testing, having symptomatic disease that goes unrecognized, or safe practices when doing outdoor activities that would subject them to mosquito encounters and possible infection.

Our patient also had an atypical presentation of WNV encephalitis. He did present with the typical fever, headache, meningeal signs, and anorexia; however, the presenting symptom of unsteady gait is atypical of this disease, concerning for cerebellar involvement. Common neurological manifestations of disease include coarse tremor, myoclonus particularly in the upper extremities, and parkinsonian features such as rigidity, postural instability, and bradykinesia. Other common manifestations include acute flaccid paralysis resulting from disruption of anterior horn cells. Less common neurologic manifestations of WNV include cranial nerve palsies, vertigo, dysarthria, seizures, cerebellar ataxia, and dysphagia.

Conclusion

As discussed, WNV can present with a wide array of clinical signs and symptoms, some rarer than others. This case offers a few lessons for physicians. First, it is our job as Emergency Department physicians to be aware of all local and regional outbreaks of mosquito-borne or other insect-borne illnesses and consider this in patients presenting with fever and headache. This case also illustrates the importance of a broad differential diagnosis especially during the COVID-19 pandemic. The emergency physician had seen multiple patients presenting with symptoms of COVID-19 in their shift that day and initially favored COVID-19 as a diagnosis. The patient's complaint of unsteady gait was concerning and prompted further evaluation for encephalitis, resulting in lumbar puncture and avoidance of premature closure bias. In the absence of an effective human vaccine, WNV disease prevention depends on community-level mosquito control and household and personal protection measures.[4] ✶

Balloon Tamponade to Stabilize Life-Threatening Rectal Bleeding

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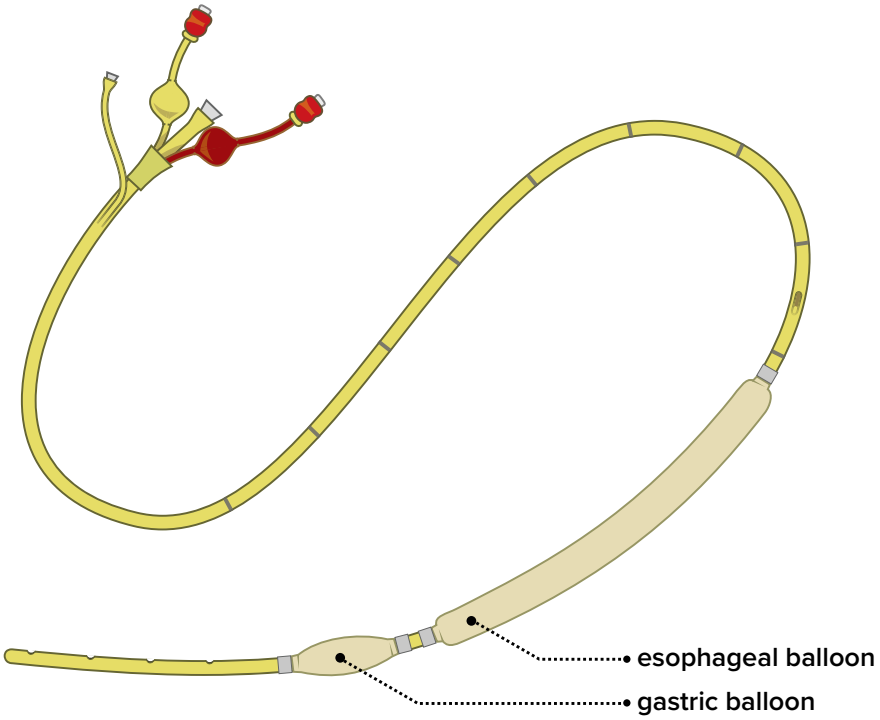
Gastrointestinal bleeding has classically been divided into upper and lower GI bleeds based on the location of the bleed in relation to the ligament of Treitz. Lower GI bleeding is less common.[1,2] Diverticulosis, hemorrhoids, neoplasm, and ischemic bleeding are the most common causes.[1] In-hospital mortality is relatively low (3.9%) when compared to upper GI bleeding.[3] Mortality is worse in older patients, those with comorbidities, coagulopathy, anticoagulation use, and bowel ischemia. Lower GI bleeds are typically treated medically and with angiography, colonoscopy, or surgery.[3] Balloon tamponade devices specifically designed for upper GI bleeding are well established as a temporizing measure in life threatening upper gastrointestinal bleeding, but rarely have been used for lower GI bleeding.



Adapted from an image by Olek Remesz

Sengstaken-Blakemore Tube

This case is unique in that the patient left the hospital with the device in place. Here we highlight the utility of balloon tamponade as a temporizing measure for life threatening lower GI bleeding when more traditional means fail.

Case

A 58-year-old male with a past medical history of metastatic colon cancer status post subtotal colectomy with ileostomy, chemotherapy, radiation, and immunotherapy presented to the ED with bright red rectal bleeding and bloody output from his ostomy bag. He was found to be tachycardic and hypotensive with a hemoglobin of 7.1 g/dL. CT angiography of the abdomen and pelvis showed a necrotic rectal mass. Surgery was consulted but no operative management was pursued. He was transfused a total of 3 units of packed red blood cells and then admitted to the MICU. Due to a bed shortage the patient boarded in the ED overnight. He was transfused an additional 2u PRBCs and FFP during that time.

The next afternoon emergency physicians were called emergently to the patient's room for a change in clinical status. He was found with clothes soaked in blood and a copious amount of blood pooled in the hospital bed, with systolic blood pressures in the 50s. An emergent femoral venous introducer was placed, and massive transfusion protocol was initiated. Examination of the rectum revealed a large amount of blood with evident arterial pulsations against the examiner's finger interior

to the anal sphincter. External and internal direct pressure along with gauze packing soaked in tranexamic acid were attempted but the patient continued to exsanguinate bright red blood from his rectum. Despite multiple units of PRBCs, FFP and platelets systolic blood pressure remained in the 50s-60s. At that point, the decision was made to take more aggressive measures to control bleeding. Physicians from surgery, gastroenterology, MICU, and interventional radiology were at bedside. Surgical services confirmed the patient had approximately 11 inches of blind rectal pouch.

In an attempt to tamponade the arterial bleeding at or near the anal ring, a Sengstaken-Blakemore tube was inserted into the patient's rectum until the esophageal balloon was completely into the rectum past the anal sphincter. The distal gastric balloon was not inflated due to concern for ischemic necrosis and perforation of the rectal vault from over distention. The esophageal balloon was inflated with 40cc of air and drainage port clamped.

The initial hope was direct tamponade of the bleeding site. However, profuse bleeding continued. The balloon was repositioned so that proximal end of the esophageal balloon protruded from the anus, with the intent of either directly tamponade of bleeding, or occluding the exit of blood so that the closed space would eventually fill with blood and cause tamponade itself.

Upon re-inflation of the balloon SBPs rapidly improved to the 80s and then the 90s. There was no further active bleeding evident. The patient tolerated the procedure without complaint, stating the tube was not causing significant discomfort. He was taken emergently by IR for embolization and coiling of a left internal iliac artery pseudoaneurysm that communicated with his necrotic rectal mass. After the procedure, the patient was taken to the MICU.

During his admission he received a total of 15u PRBCs, 8 units FFP and 3 units platelets before being discharged to hospice. At the patient's insistence, the Sengstaken-Blakemore tube was left in place at discharge.

Discussion

Literature review shows only a few cases where balloon tamponade devices intended for upper gastrointestinal bleeding were used for lower GI bleeding.[4-10] Each of these involved life-threatening bleeding that was not stopped by traditional methods. In this case, rectal insertion of the Blakemore tube with repositioning to include the anal ring temporarily stabilized an otherwise exsanguinating patient, bridging them to definitive treatment. This case is unique in that the patient left the hospital with the device in place. Here we highlight the utility of balloon tamponade as a temporizing measure for life threatening lower GI bleeding when more traditional means fail. ✶

References available online

Using Home-Based Community Paramedics to Optimize ED Utilization for High-Risk Elderly Patients

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Community paramedicine and mobile integrated healthcare are forming a new paradigm. Using paramedics to evaluate and treat medically complex elderly patients in the home setting could have wide-reaching implications for health management, cost of care, and patient satisfaction. This article will examine the effect of TANDEM365, A home-based community paramedicine program (HBCP) on emergency department utilization, diagnostics and administered procedures, rate of transport and admission, and hospital length of stay.

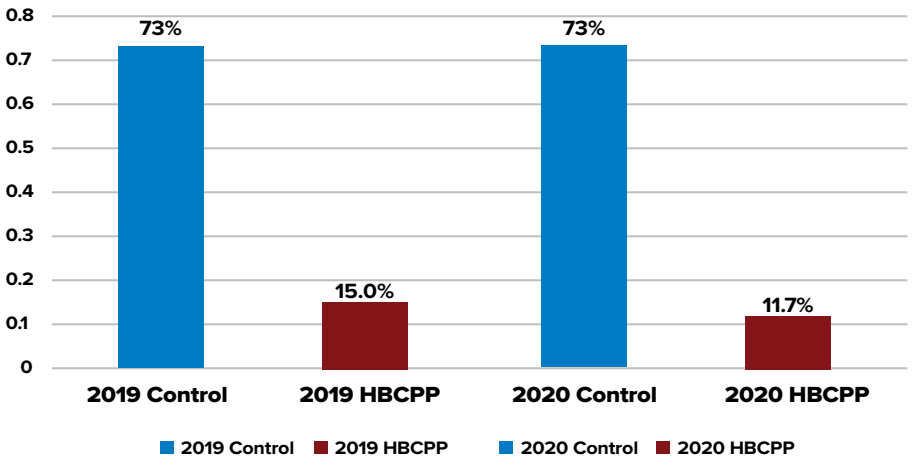
TANDEM365 is a highly integrated, mobile healthcare organization partnered with a private insurance payer, Priority Health, that provides comprehensive solutions for geriatric patients. Care is provided by skilled, community-integrated paramedics, nurses, and social workers. Utilizing integrated paramedic care visits, TANDEM365 focuses on performing in-home urgent assessments during which patients are evaluated, medications are given, and multi-specialty care is coordinated.[1] The program has since transformed into a community health system partner; hospital systems and insurance payers refer patients to TANDEM based on age, comorbidities, utilization, and projected life expectancy. Since its creation in 2014, TANDEM365 has treated more than 2800 patients.

Methods

This was a retrospective cohort analysis of elderly patients (>65 years) who triggered emergency medical services (EMS) dispatch with urgent medical calls with one EMS agency involved over a 2-year period (2019-2020) within the Grand Rapids, Michigan metropolitan area. The institutional review board of Spectrum Health Hospital in Grand Rapids approved the study. Data from 2019 and 2020 were considered separately due to the unforeseen effect the coronavirus (COVID-19) pandemic had in 2020. HBCP members were compared to non-members (control group) in terms of demographics, presenting complaints, prehospital inventions, transport to 2 emergency departments (Spectrum Health Butterworth and Blodgett ED), length of hospital stay (LOS), and in-patient medical costs. A total of 1,419 unique HBCP members were enrolled during the study period. The primary outcome consisted of emergency department utilization compared to control with secondary outcomes consisting of admission percentage, in-patient length of stay, mortality, and subsequent total cost of care.

For both populations, we calculated the percentage of patients who were transported to the ED and subsequent length of stay. For HBCP members, we also analyzed the proportion of those patients who were evaluated in the home via urgent assessment and not transported to the emergency department. We then calculated their probability of presenting to the emergency department within 1 day of in-home evaluation. Comparisons

FIGURE 1. 2019 and 2020: ED Transport



between categorical variables were evaluated using the Chi-square test. P-values of <0.05 were considered statistically significant.

Results

During the 2-year study period, there were 3808 unique EMS calls from elderly patients with high acuity conditions including fever, altered mental status, fall, dysuria, cardio-pulmonary complaints, fatigue or weakness, abdominal pain, back pain, hypertension, cellulitis, and anxiety. Demographic data as well as pertinent past medical history is compared in Table 1. In 2019 and 2020, a total of 1419 urgent assessment calls (37.3%) were from distinct HBCP members. Of this, 2389 (62.7%) were traditional EMS calls and served as our control. In terms of age, the mean age of the HBCP population was younger but within 1 SD (77.6 vs. 79.64).

Increased Medical Complexity

In both years as described, patients in the HBCP had increased medical comorbidities compared to the control population (Table 1): hypertension (66.3% vs. 47.5%), diabetes mellitus (41.3% vs. 18.8%), congestive heart failure (24.2% vs. 3.9%), and chronic obstructive pulmonary disease or asthma (34.5% vs. 12.7%).

In 2019 HBCP members had reduced ED transport compared to control (15.0% vs. 73%)(p<0.001) with higher admission rates (51.7% vs. 20.4%). Moreover, the patients within the HBCPP had an identical admission LOS (4.6d vs. 4.6d) (p<0.001). During the first year of the COVID-19 global pandemic, 2020, HBCP patients continued to have reduced ED transport (11.7% vs. 73%) with an increased admission rate of 63.6%, an 18.7% increase from the previous year. Additionally, patients in 2020 also had an increased LOS of 5.44, a 0.48 day increase.

Emergency Department and Hospital Utilization

Our primary outcome was the comparison of ED utilization rates of the HBCP program compared to control. Furthermore, we were interested in the ED utilization percentage and timing of those HBCP patients initially evaluated and treated at home and not transported. HBCP patients not transported to the ED had subsequent ED evaluation rates within 24 hours of assessment of 22.0% vs. 10.9% (2019 vs. 2020). In terms of discharge disposition, 2019 HBCP patients required increased skilled nursing facilities compared to control population (35% vs. 20%), reduced discharge to home (23% vs. 43%), and identical mortality rates (3% vs. 3%).

Diagnostics and Administered Therapy

Notably, 25% of HBCPP patients who received a 12-lead ECG were transported to the ED vs. 99.4% of the control population. Furthermore, as we analyze IV fluid administration, 55.6% of HBCP patients who received IV fluids were transported to the emergency department vs. 100% (n=539) in the control population.

Discussion

The Grand Rapids metropolitan area and specifically Kent County consists of a population of nearly 650,000 people with an annual call volume of 56,000

TABLE 1. 2019 & 2020

Demographics (%, #)	HBCPP	Control Population
Total Patients	37.3% (1,419)	62.7% (2,389)
Overall Mean Age (SD)		
Age < 70	13.6% (193)	14.4% (345)
70-79	33.7% (478)	39.5% (943)
80-89	36.9% (524)	32.2% (771)
>90	15.8% (224)	13.9% (332)
Gender	Female: 59.2% (840) Male: 42.4% (579)	Female: 45.6% (1087) Male: 54.5% (1303)
Chronic Conditions (%, #)		
Diabetes	41.3% (586)	18.8% (450)
Chronic kidney disease	23.3% (330)	19.4% (463)
Cerebral Vascular Disease	11.4% (162)	9.3% (221)
COPD/asthma	34.5% (489)	12.7% (303)
Coronary artery disease	28.0% (398)	18.2% (435)
Congestive Heart Failure	24.2% (344)	3.9% (92)
Hypertension	66.3% (941)	14.4% (345)
Major Chief Complaint Themes (%, #)		
Fever	2.4% (34)	41.6 (994)
Confusion	3.3% (47)	673 (28.2%)
Traumatic Injury	3.5% (50)	173 (7.3%)
UTI symptoms	3.5% (49)	30.1% (736)
Cardiopulmonary Complaints	21.9% (312)	76.1 (1819)
Gastrointestinal Complaints	9.0% (128)	11.8% (281)
Weakness	20.5% (291)	14.0% (334)
Non-traumatic Back Pain	3.6% (51)	1.7% (40)
Cellulitis/ Wound Evaluation	3.6% (51)	6.8% (162)

TABLE 2. Transport and Admission Rates 2019 and 2020

Demographics (%, #)	HBCPP 2019	HBCPP 2020	Control Population (2019 & 2020)
ED Transport rate	15.0%	11.7%	73%
Subsequent ED transport within 24 hours	22.0%	10.9%	N/A
Admission rate	51.7%	63.6%	20.4%
LOS	4.6d	5.4d	4.6d

References available online

EMS runs, and utilizes a mix of 3 private BLS and ALS ambulance providers (AMR, Rockford, and Life-EMS) transporting patients to three 9-1-1 receiving emergency departments. Roeper and colleagues commented that certain Medicare population patients experienced non-emergent chief complaints and were better suited from a patient's satisfaction, quality, and cost of care, to be treated at home by an HBCP. They further contended that approximately 15% of Medicare patients transported to the ED were non-emergent or primary care treatable, costing about $1 billion to the health system per year.[2] During the study years of 2019-2020, TANDEM365 HBCP reduced ED utilization (Figure 1) of high-risk and medically complex elderly patients by nearly 60% compared to traditional EMS. Our data is comparable to Bennet and colleagues, who described similar community paramedicine program metrics in a rural South Carolina EMS system that estimated 42% of EMS calls were non-urgent issues with the reduction of ED visits by 58.7% and decreasing in-patient visits by 69%.[3]

From year to year, at initial patient assessment, the HBCP reduced its ED transport by nearly 20%. Furthermore, the program reduced its subsequent 24-hour emergency department utilization by nearly 50% (22.0% vs. 10.9%). We attribute the decreased emergency department transport and re-utilization rates at 24 hours in part to key interventions made as a result of the initial 2019 data. This initial data suggested that patients had high ED utilization rates after not being transported. Nurse navigators reached out to patients within 24 hours after a home health assessment to discuss follow-up, which included primary care visits, sub-specialty outreach, and behavioral health or social service referrals. This is consistent with Nejtek and colleagues, who described a successful mobile integrated healthcare program that relied on patients and team members possessing a joint partnership to engage in navigational assistance and proactively assists patients seeking health resources outside of the ED.[4]

With the knowledge that the HBCP patients possessed more comorbidities at baseline (Table 1) this may also suggest the HBCP not only reduced emergency department utilization but also optimized it because EMS only transported those patients who truly warranted ED evaluation. Furthermore, this could suggest the triage and subsequent treatment performed by the community paramedics of this medically complex population is effective. One could also contend that the increased length of stay associated with the 2020 HBCP program was due to these patients who were initially treated at home, progressing in their illness, and thus were more appropriate to be evaluated (and subsequently admitted) in the traditional healthcare setting. However, as this study occurred during the COVID-19 pandemic with historically lower ED volumes, we cannot state with a degree of certainty the number of patients who were hesitant about emergency department evaluation, but rather delayed their presentation out of fear of contracting the virus. One piece of evidence that adds weight to this theory is that upon ED evaluation in 2020, HBCP patients were sicker, as suggested by the 19% increased HBCPP admission rates (63.6% vs. 51.7%) with an increased hospital length of stay of nearly half a day. Of note, patient mortality was the same as control at a rate of 3%, suggesting this program did not lead to increased mortality. Abrashkin and colleagues also identified in their community paramedicine program their members had higher admission rates of patients they transported than control (82.2% vs. 68.9%).[5,6]

Cost savings can be a difficult metric, given the many ways to calculate it. Stanhope and colleagues described a previous example of a Grand Rapids home-based primary community care model that described short-term increased costs upon entry to the program and substantial savings at the patient's end-of-life. Authors estimated cost savings of $14,446 per member.[7] The average claim for our control population (nearly 2,400 patients admitted in 2019) was $7,517.84. Using this estimate with the corresponding 2019 and 2020 admission percentages of the HBCP with those patients within the program who were not transported to the emergency department, the estimated and potential cost savings for the healthcare system excluding EMS was in the millions of dollars ($1.9 million to $3.2 million).

Limitations

Limitations of our study include limited ability to evaluate the true effect of COVID-19 on the program and its members. While HBCPs reduce ED utilization, it is difficult to tell the impact of COVID-19 stay-at-home orders and their effect on patient attitudes and decisions. In addition, the true cost savings are difficult to evaluate in terms of the average cost saved with EMS savings. In addition, lack of universal and consistent documentation in the prehospital setting of terms of chief complaints in the HBCP may lead to under-estimation of presenting complaints. Finally, it is difficult to determine whether a patient's initial reason for in-home urgent assessment was the same reason for their subsequent ED visit. Finally, while patients were encouraged to call the TANDEM365 staff with any acute medical needs, it is possible patients utilized traditional 9-1-1 services with transport to an emergency department not within our study.

Conclusions

Our home-based community paramedicine program was started as a solution for at-risk seniors who have difficulty navigating the healthcare system to get the care they need and maintain their independence at home. These results suggest that the HBCPs reduced ED utilization during the study years of 2019-2020 with no increase in mortality.

In addition, it is likely this program saved significant money to the health system through optimized utilization of hospital admission. Further research into the safety and expansion of such programs will be informative on the large-scale generalizability of such programs.

Furthermore, large data sets and predictive analytics will empower mobile integrated health networks to better determine the need for transport based on patients' comorbidities, symptoms, vital signs, response to prehospital treatment, and predicted re-utilization. ✶

References available online

Admin & Ops Literature Review

Impact of Urgent Care Centers and Telehealth in the ED

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Background: Emergency Department Volumes

The number of emergency department visits has gradually increased over the past few decades.[1] Increasing ED visits poses an issue when system capacity is reached and acute unscheduled care services are no longer able to handle patient volumes. This can lead to issues including ED crowding, increased cost, greater pressure on existing services, and longer wait times.[1] According to the article "Why Do People Choose Emergency and Urgent Care Services? A Rapid Review Utilizing Systematic Literature Search and Narrative Synthesis," 6 identifiable factors lead to patients' decisions to pursue ED visits:

- Access to and confidence in primary care
- Anxiety and value of reassurance from emergency-based services
- Views of family and friends
- Convenience
- Cost
- Perceived urgency or need for emergency medical services or hospital care[2]

The following literature review examines 2 methods that may reduce ED visits for non-emergent cases: telehealth and urgent care centers (UCCs). Use the QR codes to find the full text.

The Impact Of Urgent Care Centers

Impact of Urgent Care Openings on ED Visits to Two Academic Medical Centers Within an Integrated Health Care System

In this study, researchers analyzed medical records from visits to 2 EDs and correlated them to the use of UCCs by patients with similar presentations who lived within close proximity. Using logistic regression, they found at one of the EDs there was a statistically significant reduction in the likelihood of ED visits for low-acuity conditions by patients living within 1 mile of a UCC with an adjusted odds ratio of 0.87 (95% confidence interval 0.78 to 0.98). Further analysis showed a statistically significant temporal relationship between time since UCC opening and the likelihood of a low-acuity ED visit. There was approximately a 1% decrease in the odds of a low-acuity complaint presenting to an ED for every month that the nearby UCC was open (odds ratio 0.99; 95% confidence interval 0.985 to 0.997).[3]

Comparing Utilization and Costs of Care between Emergency Departments and Urgent Care Centers

Using Blue Cross Blue Shield of Texas claims data, the authors compared the types and costs of emergency and urgent care services delivered by EDs and UCCs between 2012 and 2015. Treatment costs were similar for visits to freestanding EDs compared to hospital-based EDs. The average cost of a visit to a UCC was significantly lower, at $168 compared to the average visit cost at freestanding EDs or hospital-based EDs, which were $2,199 and $2,259 respectively. There was

significant overlap in the presenting chief complaint of patients presenting UCCs, which have the ability to provide similar treatment for low-acuity conditions, compared to EDs, suggesting there could be improvement in resource usage and cost savings with delivery of acute care.[4] UCCs began as early as the 1970s and have rapidly expanded, primarily in urban settings.[5] Many low-acuity ED visits can be handled by a UCC, where the cost to the patient and the hospital would be reduced while still providing sufficient care.[4,6]

The Impact of Telehealth

Telemedicine Use Decreases Rural Emergency Department Length of Stay for Transferred North Dakota Trauma Patients

In this study, a cohort of adult trauma patients treated in North Dakota Critical Access Hospital was evaluated using multivariable generalized estimating equations. They examined associations between telemedicine consultation and outcomes, including transfer of trauma patients, timeliness of care, use of imaging in trauma patients, and patient mortality. Telemedicine utilization was independently associated with decreased length of stay in the ED (30 min, 95% confidence interval [CI] 14-45 min) for patients who were ultimately transferred to another hospital. Telemedicine availability was associated with an increase in the probability of interhospital transfer (adjusted odds ratio [aOR] 1.2, 95% CI 1.1-1.4) and more rapid transfer to the ED accepting the transferred patient. Interestingly, telemedicine availability was also associated with an increased total combined ED length of stay (LOS) (15 min, 95% CI 10-21 min), and greater usage of computed tomography scans in trauma patients (aOR 1.6, 95% CI 1.3-1.9).[7]

Impact of Emergency Department Tele-intake on Left Without Being Seen and Throughput Metrics

In this study, the authors attempted to evaluate whether tele-intake at the time of presentation would reduce "left without being seen" (LWBS) rates and ED throughput measures. In this pre- and post-implementation study at an urban community hospital, tele-intake providers performed an initial triage history and physical examination, documented their findings, and initiated orders in the medical record system. The 6-month tele-intake period was then compared to the year prior to the introduction of the telehealth intake providers. Total ED volume was similar in both study periods (19,892 patients vs. 19,646 patients). The 24-hour LWBS rate was reduced from 2.3% (95% confidence interval [CI] = 2.0% to 2.5%) in the pre-implementation period to 1.69% (95% CI = 1.51% to 1.87%; $p < 0.001$) after implementation of this intervention. Overall, median door-to-provider time decreased from 19 minutes to 16.2 minutes ($p<0.001$), but median ED length of stay for all patients minimally increased from 184 minutes to 184.3 minutes in the same period ($p<0.001$).[8]

Conclusion

Emergency departments have faced challenges as patient volumes have increased and sometimes surpassed capacity, leading to department overcrowding, boarding of inpatients, increased length of stay, and more patients leaving without being seen. During the past few decades, UCCs have expanded rapidly as an alternative for the treatment of acute conditions with lower acuity.[5] Studies on the usage of urgent care centers have found the opening of a UCC is associated with a lower likelihood of patients with low-acuity conditions presenting to the ED, and this effect increases over time. Additionally, the usage of urgent care centers can reduce costs to patients and the healthcare system while providing similar care for low acuity conditions. More studies are needed to determine whether this is a viable solution, but it offers hope that placing more UCCs within a populated area may help combat overcrowding.

Another service primarily targeted at lower acuity patients is telehealth, which has grown with advances in technology and become more widespread with the COVID-19 pandemic. Telehealth has a wide range of applications and can also be used within the ED. While telemedicine does not seem to greatly impact ED overcrowding, it does help to improve throughput metrics in addition to reducing the time for transfer of critical patients in a rural setting. Though there are potential challenges with the usage of telemedicine, including regulatory changes, economic considerations, and cultural barriers, this tool has the potential to help address issues in the delivery of care in the ED and improve access to care.[9]

The development of urgent care centers and telehealth systems has been found to have significant impacts on care in the ED in a variety of ways. These studies highlight some ways in which implementation of UCC and telehealth can impact the ED and patient care. Though there are challenges that must be addressed as they become more widespread, they also represent an opportunity to improve access to acute care and patient throughput.

EMRA Resources

Urgent Care Guide

Free in EMRA Alumni Member kits, the Urgent Care Guide ensures setting-appropriate care and clear disposition recommendations to confirm which patients should be sent to the emergency department, who can be discharged with follow-up care by their family doctor, and what might require follow-up with specialists.

Telehealth Appointments in EM

A 2-part video series offers pearls and pitfalls to conducting a good telehealth appointment, along with examples of how to do virtual physical exams. ✶

References available online

What You Need to Know About EM Administration Fellowships

Michael Muradian, MD
Beaumont: Royal Oak Emergency Medicine
Danny Novak, DO
Maimonides Medical Center Emergency Medicine
Nicholas Stark, MD, MBA
University of California San Francisco Emergency Medicine

EMRA's Administration and Operations Committee recently held a virtual panel of EM Administration Fellowship Directors and Co-Directors. The panelists included:

- **James Heilman**, MD, MBA, of Oregon Health and Science University
- **Mahesh Polavarapu**, MD, of Columbia Medical Center
- **Robert Tanouye**, MD, of New York Presbyterian/Cornell
- **Thomas Spiegel**, MD, MBA, MS, FACEP, of the University of Chicago

This article summarizes key points from the conversation as well as other important information about administration fellowships, from applications to fellowship structure.

What are Emergency Medicine Administration Fellowships?

EM administration fellowships are designed to prepare emergency physicians for careers in departmental and hospital leadership through training in everything from administration to quality and safety to operations. The first EM administration fellowship was founded in 1990, and many more fellowships have been developed since that time.[1] There are now dozens of these fellowships around the country, and each has unique structures and characteristics.

EM administration fellowships range from 1 to 2 years, and some of them include a master's degree as part of the educational curriculum. The type of degree can vary, but is commonly a Master's of Business Administration (MBA) or Master's of Health Administration (MHA). These degrees may be obtained at a university affiliated with the hospital, another nearby university, or remotely. Typically, EM administration fellowships that include a master's degree are 2-year fellowships. Most 1-year fellowships do not have an associated master's degree.

Many EM administration fellowships are affiliated with departments that have residency programs. Practice settings vary from academic centers to community programs. Others may be associated with regional practice groups, and some large contract management groups also offer their own administration fellowships.[2]

Each fellowship program offers unique training experiences, including opportunities to work on different quality, operations, and process improvement projects, as well as serving on various department and hospital committees. Most fellowships require at least one quality improvement project during the fellowship. Fellows tend to work closely with mentors in department and hospital administration. Fellows are also frequently involved in resident education, preparing lectures on topics in administration and operations. Additionally, fellows often attend national conferences such as ACEP's ED Directors Academy.

Why Should You Consider an EM Administration Fellowship?

When considering an EM administration fellowship, one should first examine his or her career goals. This type of fellowship may be most beneficial for those interested in roles in ED leadership, such as medical director or department chair, or hospital leadership roles, such as chief medical officer.

While a career in these areas doesn't require a fellowship, this opportunity provides additional experience and education in healthcare, business, and management. The mentorship and connections integrated in fellowship may also help accelerate a career.

Advice for Applicants

Applicants for EM administration fellowships should typically prepare to apply in the summer of their final year in residency. There is currently no formal match process for EM administration fellowships; to apply to these programs, candidates typically reach out directly via email to the program coordinator and program directors or fill out an online application. Many programs have rolling admissions, so it is helpful to be prepared and apply early. Offers are extended to candidates throughout the application cycle rather than on a single, specific day.

When considering where to apply, take into account several factors:

- Length of program (1 or 2 years)
- Associated master's degree
- Overall career goals

Each fellowship is different, and it is important to research each program to assess overall fit. Applicants tend to apply to a relatively small number of programs compared to residency application numbers.

When applying to a program with an affiliated master's degree, one should also consider that the program may require an entrance exam, such as a GRE or GMAT, prior to applying. Additionally, you may be required to complete a separate application to the master's program. Acceptance to the fellowship does not necessarily guarantee acceptance to the master's program.[2]

More Information

You can learn more about EM administration fellowship programs through EMRA's Fellowship Guide at www.emra.org/fellowships/administrative-fellowships. Additionally, if you are interested in learning more about various topics related to administration and operations, be sure to join EMRA's Administration and Operations Committee at https://www.emra.org/be-involved/committees. ✶

References available online

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Disability Insurance and Naloxone

AN INTERN'S PERSPECTIVE

Ellen Shank, MD
University of California, Davis, Medical Center
@EllenShankMD

The email arrived during lunch break in my cohort's Advanced Trauma Life Support (ATLS) course. Orientation for emergency medicine interns was just wrapping up, and I had tried to tie up the logistical ends that I could before my first ED shifts commenced in full force. The message read: ***"Your application for disability insurance hit a snag when we ran through your medical record. Can you tell me about a prescription for naloxone you got last year?"***

At first, I was confused. Did my primary care provider send my insurance broker the wrong patient information form? I had never been prescribed opiates. In fact, as a 26-year-old budding physician, I had no preexisting conditions and took no medications whatsoever.

But then, memories of an American Medical Association conference came floating into mind.

Past Surgeon General Dr. Jerome Adams had come to Chicago to talk to American Medical Association student

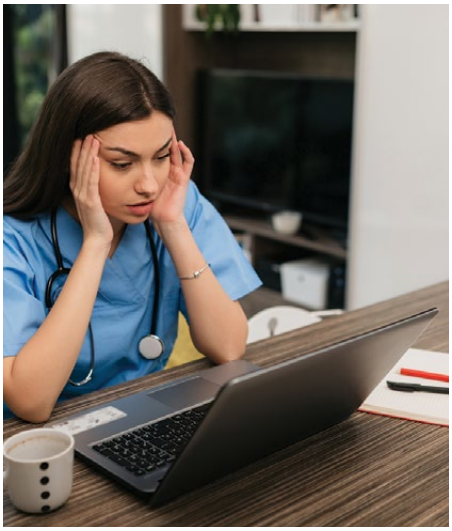
members about social determinants of health and naloxone. It was 2019, and the opioid crisis was in full swing. It would be several more months before Purdue Pharma and the Sackler family would reach an initial settlement with about two dozen states for their role in the opioid epidemic,[1] but many public voices had deemed it critical to advocate for harm reduction. Dr. Adams' mission in talking to us medical students was to ensure that as many of us as possible carried naloxone, equipping us to save a life outside of the hospital in case we came across an individual who had overdosed on opiates.

Convicted, I went home and marched into my local pharmacy to pick up some naloxone. I opted for the injectable medication, which cost $40 at the time, instead of the brand-name intranasal formulary that would have put me out nearly $200 (an expense I certainly could not afford as a medical student). The pharmacist seemed quite unaccustomed to providing naloxone to individuals without a prescription, but I proudly pulled up the executive order that enabled me to do so. She then hemmed and hawed a bit about giving me needles to go with the injectable formula, but I assured her that, as a medical student, I would be responsible and not hurt myself or others in the event that, say, I came across an individual who had overdosed on opiates on my walk home and actually had the opportunity to use the medication.

Eventually, I walked out of the drugstore with a paper bag, a vial of naloxone, and several sterile needle-tipped syringes. I deftly stuffed these into my backpack, and there they remained, untouched. In fact, the only time I pulled out that paper bag was when, a few weeks later, Dr. Adams unexpectedly came to speak at my own medical school. After his talk, I proudly reached into my backpack and showed him my naloxone. He posted a video of this on his Twitter account, a gentle reminder of why I did not go into public speaking.[2]

At any rate, there I was, on the day before my first shift as an EM resident, trying to be a responsible young physician and purchase disability insurance as I had been advised,[3] yet utterly confused by how this had delayed my application for almost a month. As a healthcare provider, albeit an initiate to the field, I presume I am more health-literate than most of the population, so I wondered how my patients applying for insurance after having been prescribed naloxone would be able to navigate this system.

California's Confidentiality of Medical Information Act specifies that healthcare providers and healthcare contractors must obtain written authorization before disclosing an individual's medical information, with some exceptions.[4] Insurance companies



A naloxone prescription can muddy the waters when applying for disability insurance as a young physician.

with a vested interest in a knowledge of clients' medical health for the purpose of selling them policies must therefore obtain individuals' consent before interrogating their health records to assess eligibility and the companies' risk in selling an insurance policy.[5] However, if consent is denied, approval of an application for insurance is very unlikely.

This kind of information sharing between direct clinical providers and insurance providers disincentivizes patients to seek care for stigmatized illnesses such as substance use disorders and mental illness, and potentially for individuals such as myself who would like to have access to naloxone, but may be wary of unintended consequences. Here, indeed, the role of harm reduction centers and other community providers of anonymized medical care for the treatment of stigmatized disease processes is reemphasized, and the necessity of programs such as the Naloxone Distribution Project is highlighted.[6]

Ultimately, I wrote back to the insurance broker, including a copy of the Surgeon General's Advisory[7] and a link to Dr. Jerome Adams' Twitter post in an effort to rectify my medical record. I closed my laptop and shoved it into my backpack, alongside a brown paper bag that now contained the intranasal formulary of naloxone, which I received free of charge at a conference.[6]

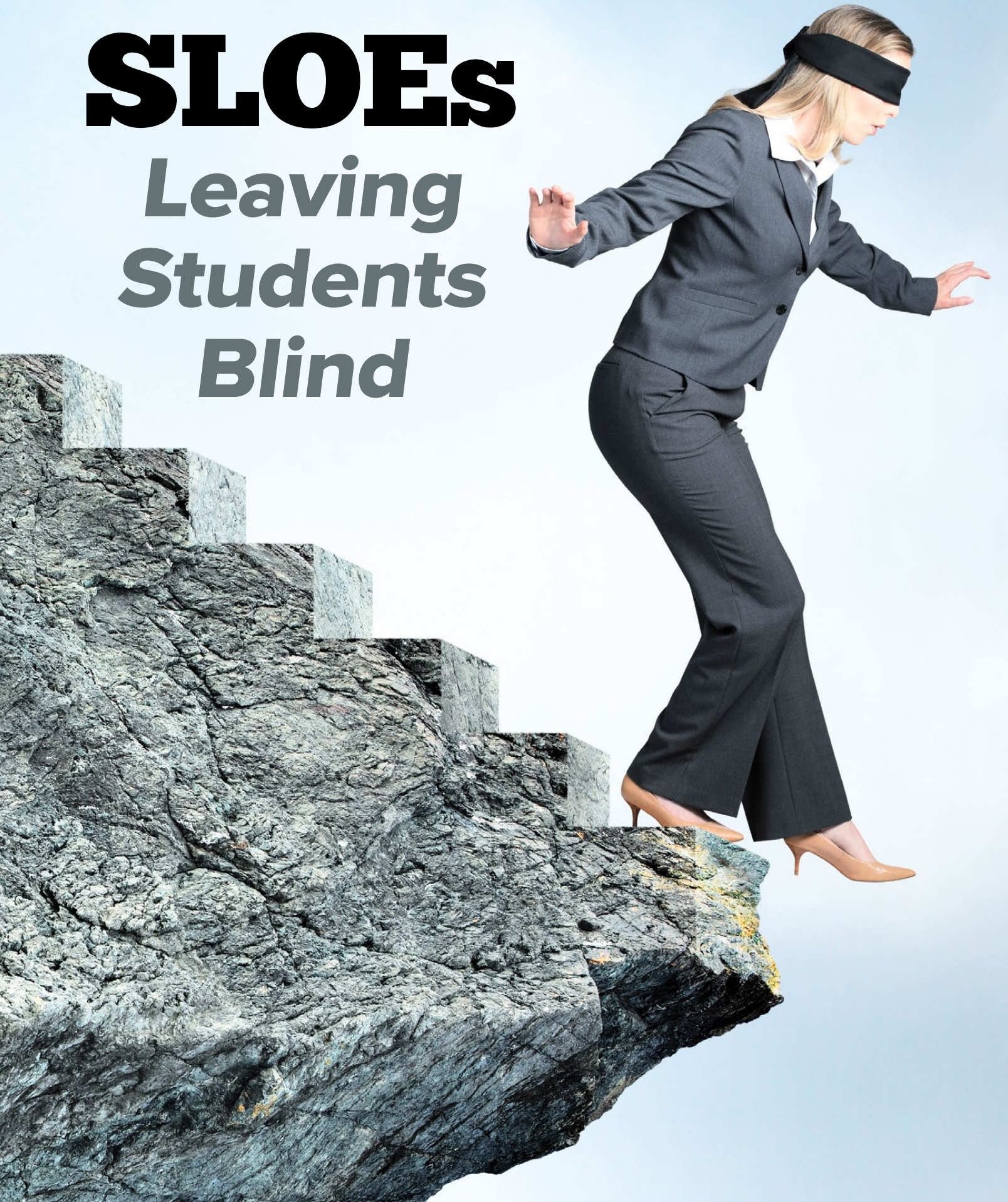
As I headed back upstairs to take my oral ATLS exam, I wondered at the hidden medical curriculum and the information about personal liability, patient throughput, and scholarly productivity with which my cohort and I were about to be bombarded as inductees to the provision of emergency medical care. In a few short months, we will receive our drug enforcement agency number, and be able to prescribe medications to patients ourselves. A good amount of us will even apply for and obtain our first disability insurance policy. In the meantime, I will be keeping that little brown paper bag in my backpack, just in case. ✶

TAKE-HOME POINTS

- ✓ Prescriptions aren't always private. Check out privacy rules from the Department of Health and Human Services.
- ✓ Get disability insurance.
- ✓ Take the next step to help people with opiate use disorders: it is easier than ever to **get your X-waiver**.

SLOEs

Leaving Students Blind



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Standardized evaluations have been a staple of emergency medicine residency applications since 1995, when the Council of Residency Directors in Emergency Medicine (CORD) established the Standardized Letter of Recommendation (SLOR). The SLOR was revamped in 2014; the name became Standardized Letter of Evaluation (SLOE) to better reflect its purpose of evaluating potential EM physicians.

Perhaps the best-known element of a SLOE is the global assessment, in which a candidate is ranked as top 10%, top third, middle third, or bottom third relative to their peers also pursuing an EM residency. A review of all SLOEs from 2016-2017 indicated that 18% of students were in the top 10%, 37% in the top third, 35% in the middle third, and 10% in the bottom third.[1] These rankings are skewed toward the more favorable levels. Still, they are a significant improvement from a whopping 40% of students ranked in the top 10% in a study examining a subset of 2011-2012 SLORs. This improvement likely can be attributed to the change of name and increased training of SLOE writers.[2] While the skew toward grade inflation still exists, it is theoretically rectified by reporting how many students received each rank from the institution the year before on each SLOE.

EM-bound medical students may not learn about SLOEs until their second, third, or even fourth year of medical school, yet SLOEs are the most critical element of the ERAS application. The 2020 Program Director Survey results show that letters of recommendation in EM (SLOEs) are the most important factor in an application when deciding to extend interview offers.[3] SLOEs remain critical when programs are ranking applicants, with all program directors who responded to the survey citing it as a factor when making rank lists.

SLOEs are arguably the most influential piece of a student's application to an EM residency. Yet, there is an important distinction from other factors such as board scores, grades, and experiences: applicants usually do not know their metrics. Even if an applicant did not waive their right to see the letter in ERAS, that only grants them the opportunity to see their SLOE after residency has started. Of course, students are historically expected to waive this right anyway and may open themselves to bias if they choose to retain their right of review. While some programs share components of the SLOEs they write with students, it is far from standard practice. Many students are left to guess their competitiveness based on the most crucial piece of their application.

As medical student leaders on EMRA's Medical Student Council, we feel some content of SLOEs should be shared with students who complete audition rotations with EM residency programs. Even if only the results of question one in the global evaluation section of SLOEs were shared with applicants, along with the program-specific evaluation distribution, students could make better-informed decisions when applying to EM residency programs. Therefore, making SLOE results available to students would allow the results to function much more like a board score report, with further evaluation components and comments within the SLOEs remaining hidden to students. This transparency would alleviate significant stress and uncertainty among anxiety-ridden applicants and allow students to have appropriate application strategies.

However, it would be irresponsible to question a decades-old practice of keeping SLOE results from students without considering the potential repercussions of changing the system. We will consider those ramifications below.

POINT 1. A blinded evaluation is more honest, and unblinding could lead to grade inflation.

Counterpoint: Students invest time, money, and professional opportunities in the medical training process. They want and deserve transparency in evaluations, even if that is uncomfortable for evaluators. Students should have an accurate understanding of how they are performing relative to both their peers and to the expectations of senior colleagues. Without this, students lose opportunities to improve and cannot effectively manage their career planning. Grade inflation would be counterproductive to these goals, though we do not believe unblinding will contribute to grade inflation.

While there is evidence that SLOEs have some inflation, with only 10% of applicants receiving lower-third rankings, it has improved.[1,2] A study of SLOE writers found that the most significant contributor to not strictly adhering to

SLOE guidelines was fear of adversely affecting a student's opportunity to match.[4] This would not change if the evaluation became unblinded. The SLOE guideline adherence has improved due to better training of letter writers and further education surrounding the stigma of a lower-third ranking. It will be essential to continue these efforts. However, it feels disingenuous to say that SLOE authors would not follow SLOE guidelines if SLOEs became unblinded. Rather, under scrutiny from students, we believe that the most logical step for a program would be strictly adhering to SLOE guidelines to justify their system for ranking.

As we enter a world of an unscored Step 1 and Level 1, it will be more important than ever for SLOEs to maintain their integrity as a tool to stratify applicants. While we respect the concern that grade inflation could be an unintended consequence, we feel this fear is overstated and does not outweigh the benefit of respecting students as future colleagues with honest, transparent evaluations.

POINT 2. This is a high-stakes evaluation, and students might resent a "poor" evaluation without the proper context.

Counterpoint: The opportunity for students to simply view subjective evaluations of their performance has long been in practice with core and elective rotations. Although student resentment and generally not accepting a grade with "grace" should be taken as legitimate concerns, there are better ways to address these concerns than leaving students blinded to evaluations. Further, student experiences point to students receiving feedback like professionals so long as they are treated as professionals.

Although students spreading negative reviews of an institution online or harboring resentment for a program after receiving a poor evaluation is a legitimate concern, we already have some insight into this experience. Social media channels connect us and give us valuable information that would otherwise be unavailable. Students already communicate about these matters without being able to view their SLOE. Contrary to popular belief, students with clear expectations from programs respect embedded program policies and acknowledge that the middle-third is still a credible ranking from programs that adhere to SLOE guidelines. From these medical student-created online gathering spaces, it is clear that students crave transparency and respect that programs follow SLOE guidelines, so long as they are given insight into their evaluation. Of course, if a student completes a full-month EM rotation and only finds out they may receive a lower-third ranking during an exit interview, it is reasonable to be concerned about how they may receive this evaluation. This concern points to a more significant issue: students and programs alike need a more robust feedback structure with clear expectations when giving and receiving feedback and evaluations. While many programs offer students feedback and meetings with a clerkship director throughout sub-internship, it is not standardized, and despite a whitepaper on feedback structure during an EM clerkship, there is not widespread implementation.[5]

Performing well on the EM rotation is understood to be necessary. This means excelling on objective measures of performance, as well as actively seeking out feedback and improving throughout the rotation. However, even when students seek out and receive feedback, they cannot accurately predict their SLOE rankings.[6] This suggests students should have a mid-rotation meeting with a clerkship director or SLOE author to address any areas of weakness the student may not perceive as deficiencies, priming them for the evaluation they are working for, and allowing them to improve. We posit that not only will this communication help determine if EM is the right fit for a candidate, but it will also reduce the chance of a student reacting poorly to an evaluation or resenting the rotating institution.

POINT 3. If students know their SLOE ranking, they might choose not to include it in their application.

Counterpoint: Medical education is a long journey that pushes students to operate at their best at all times. Students are conscious of every activity and opportunity they undertake and how it could affect their future careers. The SLOE plays a critical role for medical students. A poor SLOE has the potential to 'SLOEpedo' an application, as evidenced by a significantly increased risk of going unmatched for applicants with any lower-third global assessment ranking.[7,8] So, a student with a lower-third SLOE ranking may choose not to assign this SLOE as one of their letters. While this could certainly be a consequence of unblinding SLOEs, many potential solutions exist.

First and foremost, not including a SLOE from an EM rotation is already considered a red flag, and this would increase if SLOEs became unblinded. Most schools report early elective clerkships in the transcripts provided through ERAS, so it is easy to cross-reference EM rotations and SLOEs for any clerkship in the transcript. However, not all rotations are reported, especially after the September ERAS deadline, so another potential solution is a central reporting system for away rotations or SLOEs on the programmatic end. Given that a centralized letter-writing system exists for SLOEs housed by CORD, this could be a logical next step. Even without any infrastructure change, there is always the option to directly ask students if they received a SLOE from each EM rotation they completed. While student transparency is a reasonable hesitation to unblinding SLOEs, alternatives afford students the right to their evaluations while maintaining the integrity of the process.

Conclusion

As EM-bound medical student leaders, we are uniquely positioned to speak for the population we represent — all students interested in EM, osteopathic and allopathic, U.S. students and international students. We fervently believe students have the right to know their SLOE global ranking. We are pushing forward to allow students to determine their competitiveness with clarity. Unblinding SLOEs will have many downstream positive impacts for students and programs alike. While there are valid concerns with this change, solutions allow us to mitigate these concerns while respecting students as soon-to-be colleagues with the transparency they deserve. ✶

References available online

HEART OF EM
An Empty Loss

Our dead are never dead to us, until we have forgotten them.

— George Eliot

Sophie Karwoska Kligler
Medical Student
Icahn School of Medicine at Mount Sinai

When the time of death was called and the moment of silence was finished, we turned and went back to our work. The EMS staff left. The nurses and residents entered notes on the computer. The attendings turned their attention to the numerous other patients streaming into the emergency department in need of help.

I was struck at that moment by how little I felt, like a wall stood between me and the emotions I expected myself to be feeling.

The fact that I felt so little made me feel strange and guilty. I had known this moment would come at some point in my medical education, and I had been preparing for what it would be like, imagining how I would feel, how I would react to witnessing my first patient death. When it finally did come, though, in the first week of my first third-year rotation, it was not the emotionally haunting experience I had expected. I wanted to feel devastated, distraught, because I felt that would offer this man the respect he deserved in death. But the truth was, I didn't.

I was, perhaps, in shock, and I certainly recognized the sadness of the event, but the tears did not flow as I had thought they would. I did not need to step out or take some space. I simply went on with my day, trying to be helpful, trying not to embarrass myself, trying to be the eager third-year student I was supposed to be.

For this man, everything had changed. Everything was over. He had been brought to the emergency department unconscious with no identification, and despite the best efforts of the team he could not be resuscitated. Though in a theoretical sense I recognized that I had just witnessed something literally life-altering, the reality was that for me everything continued exactly as it had been. I did not know this man. I did not know the most basic things about him, not even his name. It is a strange thing to realize that a person's death has no real impact on the world besides its impact on the people who know and love that person. Every single other person on earth continues on living, not knowing that he is gone. There is no universal moment of silence, no international grieving. This reality is particularly acute when the patient is unknown, when there is no time to connect with them as a unique individual, but rather only as a body in crisis.

In thinking about this experience, I have come to realize that as medical professionals we have the responsibility to witness these unknown deaths, to remember these individuals.

Someday, someone will wonder what happened to their son, their brother, their friend, their lover, their father — but they will have no way of knowing. They have been deprived of the right to grieve, to remember, to reflect on what this man meant to them. And this man has been deprived of the right to be grieved, of the right to be remembered for the good things he did and the people he cared for.

I cannot take their place.

I cannot claim to, or even try to, experience the grief that they should feel. But I can remember this man for them. I can remember what he looked like, what he wore, and I can remember his last moments and the story of his death. It is not enough. It is not what he deserved. But it is something.

Heart of EM is EM Resident's *storytelling series sharing the triumphs, failures, experiences, and reflections that impact our personal wellness in the emergency department and beyond.* ✶

EMRA Emergency Medicine Residents' Association

The Emergency Medicine Residents' Association is the voice of emergency medicine physicians-in-training and the future of our specialty. With a membership of over 16,000 residents, medical students, and alumni, EMRA provides a like-minded community of your peers for a lifetime!

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Give Your Community A Boost! | April 2022

Office of Minority Health Announces 2022 Focus

Every April, the HHS Office of Minority Health (OMH) observes National Minority Health Month to highlight the importance of improving the health of racial and ethnic minorities and reducing health disparities.

OMH is proud to announce the theme for National Minority Health Month 2022: Give Your Community a Boost! This year's theme focuses on the continued importance of COVID-19 vaccination, including boosters, as one of the strongest tools we have to end the COVID-19 pandemic that has disproportionately affected communities of color. This theme supplements the CDC recommendations to prevent COVID transmissions, such as physical distancing, use of well-fitting masks, adequate ventilation, and avoidance of crowded indoor spaces.

Experiences with racism and discrimination can contribute to mistrust of the healthcare system among racial and ethnic minority groups, leading to mistrust of factual information on vaccines and boosters. Because of this, the Give Your Community a Boost! theme also supports the U.S. Surgeon General's recommendations on combating COVID-19 and vaccine misinformation at the individual, community, and organizational levels.

OMH encourages its partners and stakeholders to spread the word by accessing our sample social media messages, shareable graphics, and information about Give Your Community a Boost!

This year, OMH invites partners and stakeholders to join the National Minority Health Month Partnership Program to encourage vaccination and booster shots among their family, friends, patients, and students, and help improve health literacy skills to combat dangerous misinformation. More information on our National Minority Health Month Partnership Program will be available soon.

GET INVOLVED

This April, the Office of Minority Health will invite you to tell us how you #BoostYourCommunity and support your friends, family, and neighbors to get vaccinated and debunk misinformation!

Use the hashtags #BoostYourCommunity and #NMHM2022 to share your events, activities, and photos on social media to show what you are doing to boost your community.

Spring RepCo Resolutions Due

EMRA's Representative Council will meet March 28 to vote on the resolutions brought to the floor by EMRA members. Now is the time to submit resolutions!

Do you want EMRA to take a stand on a topic? Allocate resources to a specific initiative? Writing a resolution is how that begins. Prior resolutions have addressed everything from family leave for residents to educational requirements. **Without input from the Representative Council, EMRA cannot speak publicly on the issues impacting our members.** ✶

Advocate for Your Co-Residents

Advocacy happens at every level — and now's your chance. Here's how to get engaged and create the conditions you want to train and practice in.

- **Write a resolution.** EMRA has step-by-step instructions, an overview of deadlines, and sample resolutions at www.emra.org/repco.
- **Make sure you know your EMRA Program Rep.** Every EM residency program should designate one EMRA Program Rep and one alternate. These are the people who will vote on behalf of your program and will keep your program updated on EMRA initiatives, deadlines, opportunities, and more. Let us know who's representing your program! Choose "Program Rep Update Form" on the left-hand menu at www.emra.org/repco.
- **SHOW UP TO REPCO ON MARCH 28.** Every program should have someone speaking and voting on your behalf during the Spring RepCo Meeting on March 28. The event will be held in-person in conjunction with CORD Academic Assembly and will also provide for virtual attendance. Watch your email, check What's Up electronic newsletter, and visit www.emra.org/repco for updates. ✶

Get Ready for EM Residents' Appreciation Day

Heading into another year of pandemia, and following on the heels of the In-Training Exams in February, we are hyped about EM Residents' Appreciation Day 2022! What will you do on the official day — March 2 — to show your love for residents?

This national day of recognition was started by EMRA in 2000 as a way to publicly recognize the dedicated service residents provide on a 24/7 basis as a significant and vital workforce.

Join us in celebrating this day and especially the residents at the heart of it. Tag @emresidents so we can shine a spotlight on your efforts! ✶

Virtual Medical Student Forum

In a strategy meant to level the playing field and remain inclusive, EMRA will continue to host the Spring Medical Student Forum as a virtual event — making it easier and more convenient for every medical student interested in the specialty to zoom in.

Plan your day on **Saturday, March 12**, to take advantage of a morning full of key speakers from EM program around the country. General sessions will address big-picture topics, and breakout sessions (categorized per year of training) will help you plan your path to the Match.

This event is free to all EMRA medical student members! Register at https://www.emra.org/be-involved/events--activities/medical-student-forum/msf-registration. ✶

ABEM Announces Chadd Kraus as Director of Research

The American Board of Emergency Medicine (ABEM) has selected EMRA 25 Under 45 recipient and former EMRA board member Chadd K. Kraus, DO, MPH, DrPH, as its first Director of Research. In this position, Dr. Kraus will lead the effort to build the research group at ABEM. Research initiatives will include analyses of certification programs, the specialty, and physician education.

"I appreciate the opportunity to join ABEM as Director of Research," he said. "ABEM plays a leading role in establishing and maintaining the high standards for quality and excellence in Emergency Medicine. Developing and growing ABEM's research portfolio will help to advance ABEM's mission in service to the specialty of Emergency Medicine and to the public."

Dr. Kraus is System Director of Emergency Medicine Research and works as an emergency physician at Geisinger Health System. He is also Associate Professor of Emergency Medicine at the Geisinger Commonwealth School of Medicine, and Associate Program Director of the Geisinger Medical Center Emergency Medicine Residency. ✶

ECG Challenge

Diane Y. Wang, MD
ChristianaCare
Emergency Medicine & Internal Medicine PGY-3
Christiana Care

Jeremy Berberian, MD
Associate Director of Emergency Medicine Resident Education
Dept. of Emergency Medicine, Christiana Care Health System
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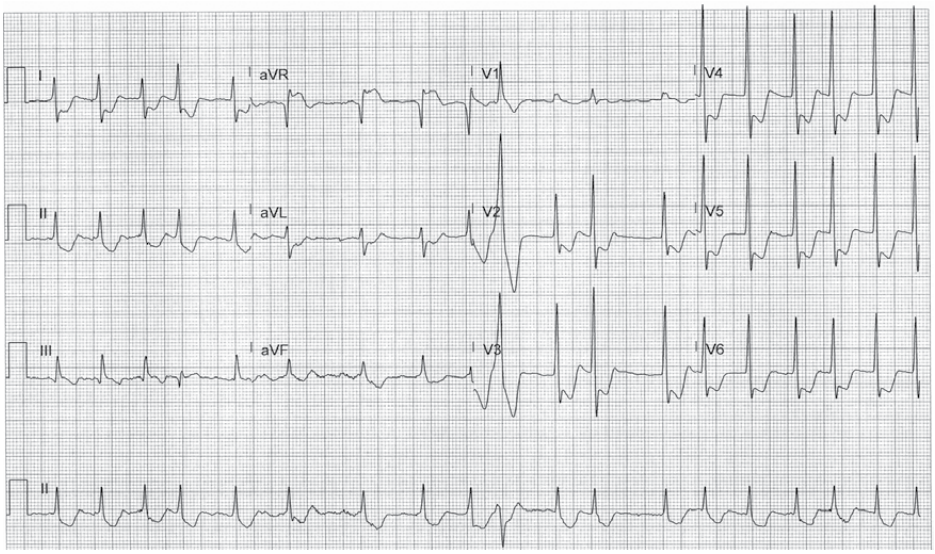
CASE.

A 79-year-old male with a past medical history of coronary artery disease s/p CABG in 2012 presents with chest pain. His initial ECG showed atrial fibrillation with RVR at 168 bpm. Despite rate control with IV diltiazem, he continued to have chest pain.

What is your interpretation of his ECG, obtained after giving diltiazem?

See the ANSWER on page 52



ECG Challenge

POSTERIOR MI

This ECG shows atrial fibrillation with an average ventricular rate of 110 bpm, normal axis, normal QRS complex duration, STE in lead aVR with STD in leads I, aVL, II, aVF, and V2-V6.

The differential diagnosis for the pattern of STE in lead aVR +/- lead V1 with diffuse STD includes both ACS and non-ACS etiologies. The patient's initial ECG showed this pattern in the setting of much faster ventricular rates, so it would be reasonable to assume that the ECG changes were due to rate-related global cardiac ischemia. When considering non-ACS causes, it is expected that the ECG changes will resolve with treatment of the non-ACS cause. Given that the ECG changes persisted and the patient continued to have chest pain despite rate control, a non-rate-related etiology must be considered.

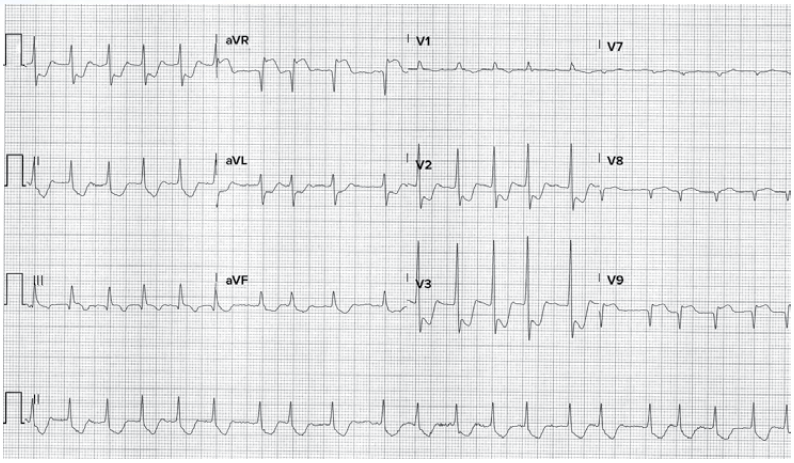


FIGURE 1. Repeat ECG with Posterior Leads V7-V9

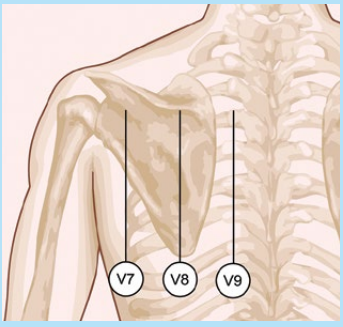
An important consideration for any ECG with STD in leads V1-V4, especially when seen with concurrent prominent R-waves and/or upright T-waves in these leads, is a posterior MI. Isolated posterior MI are easily missed as they do not show STE with the standard 12-lead placement.1 Posterior MI are typically seen with a concurrent inferior or lateral MI, but an estimated 5% of MIs are isolated posterior MI.

A repeat ECG with posterior leads (see **Figure 1**) was obtained and showed STE > 1 mm in lead V9 consistent with an isolated posterior MI. Note that the diagnostic criteria for a posterior MI only requires STE ≥ 0.5 mm (≥ 1 mm for men < 40 years old) in any one of the posterior leads (ie, STE in 2 contiguous leads is not required).

Lead aVR Learning Points

- STE in lead aVR +/- V1 with diffuse STD ≥ 1 mm in ≥ 6 leads can be due to ACS or non-ACS etiologies.
  - In ACS presentations, this pattern is highly suggestive of LMCA obstruction, proximal LAD obstruction, and triple vessel disease, and immediate angiography should be considered.[2]
  - In non-ACS causes, the ECG changes should resolve with treatment of non-ACS cause.
- Knotts et al. studied 113 patients with STE in lead aVR with diffuse STD, and of the 44% who underwent coronary angiography, only 23% were found to have left main (or equivalent) coronary artery disease.[3]
  - Always consider the clinical context when working through the differential diagnosis for this ECG pattern.

Posterior MI Learning Points



- Consider whenever there is STD in leads V1-V4, especially if there are concurrent prominent R-waves and/or upright T-waves in these leads.[4,5,6]
- The use of posterior leads is recommended but not mandated for the diagnosis of an isolated posterior MI, so local practice patterns typically dictate whether a posterior ECG is required for activation of the cardiac catheterization lab.
- Use posterior leads V7-V9 to evaluate for an isolated posterior MI if there is diagnostic uncertainty regarding STD in leads V1-V4.
  - V7: left posterior axillary line at the 5th intercostal space
  - V8: left midscapular line at the 5th intercostal space
  - V9: left paraspinal border at the 5th intercostal space
- STE ≥ 0.5 mm (≥ 1 mm for men < 40 years old) in posterior leads V7, V8, or V9 is diagnostic.
  - Diagnosis does not require 2 contiguous leads.

Case Conclusion

This patient was taken to the cardiac catheterization lab, where a 95% occlusion of the saphenous vein graft to the diagonal artery was successfully treated with a stent. ✶

References available online

Board Review Questions

PEERprep for Physicians is ACEP's gold standard in self-assessment and educational review.

For complete answers and explanations, visit the Board Review Questions page at emresident.org, under "Test Your Knowledge"

Order PEERprep at acep.org/peerprep

1. **A patient with long-standing alcoholic liver disease presents with an enlarging abdomen and gradually increasing shortness of breath. He is afebrile; the abdomen is distended but not tense or tender, and he has distended paraumbilical veins. Which mechanism is causing his distended abdomen?**
   A. Adherence to a low-sodium, fluid-restricted diet, leading to renal fluid reabsorption
   B. Increased permeability of the omentum vessels, causing plasma leakage
   C. Replacement of hepatic tissue with fibrosis, causing portal vein hypertension
   D. Thrombosis of the inferior vena cava with resulting venous obstruction

2. **A 24-year-old man presents with severe left-sided groin pain of 24 hours' duration after lifting weights. He says he has a lump in his groin that gets "worse" when he strains or lifts heavy objects but that he has always been able to "push it back in." This is the first time he has had pain. On examination, he is moderately distressed and diaphoretic. His vital signs are BP 126/78, P 126, R 25, and T 38.4°C (101.2°F); SpO_2 is 98% on room air. An abdominal examination reveals a 5-cm by 4-cm mass in the left inguinal area. The mass is firm and exquisitely tender to palpation with noted discoloration. What is the best next step in this patient's care?**
   A. Admit for serial abdominal examinations
   B. Attempt manual reduction of the mass
   C. Obtain a general surgery consultation
   D. Order immediate abdominal series x-rays

3. **What is the primary strategy for preventing hantavirus infection and hantavirus pulmonary syndrome?**
   A. Immunization
   B. Prophylactic medication
   C. Respiratory protection
   D. Rodent control

4. **A 25-year-old woman who is 1 week postpartum from spontaneous vaginal delivery presents with increased heavy vaginal bleeding and a large uterus. What is the most likely cause of her presentation?**
   A. Coagulation disorder
   B. Genital tract lacerations
   C. Retained uterine products
   D. Uterine atony

5. **A 65-year-old man presents with a nosebleed that started 30 minutes ago. His medical history includes hypertension, and he is taking warfarin for a recently diagnosed DVT. His vital signs are BP 170/65, P 82, R 16, and T 37°C (98.6°F); SpO_2 is 99% on room air. Laboratory test results are remarkable for an INR of 4. What is the most appropriate initial step in management?**
   A. Administer an antihypertensive medication
   B. Administer fresh frozen plasma and vitamin K
   C. Apply compression to the anterior nares
   D. Cauterize the bleeding vessel ✶

PEERprep For Physicians

ANSWERS
1) C; 2) C; 3) D; 4) C; 5) C

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Penn State Health Emergency Medicine

About Us:

Penn State Health is a multi-hospital health system serving patients and communities across 29 counties in central Pennsylvania. The system includes Penn State Health Milton S. Hershey Medical Center, Penn State Children's Hospital, and Penn State Cancer Institute based in Hershey, PA; Penn State Health Holy Spirit Medical Center in Camp Hill, PA; Penn State Health St. Joseph Medical Center in Reading, PA; and more than 2,300 physicians and direct care providers at more than 125 medical office locations. Additionally, the system jointly operates various health care providers, including Penn State Health Rehabilitation Hospital, Hershey Outpatient Surgery Center, Hershey Endoscopy Center, Horizon Home Healthcare and Pennsylvania Psychiatric Institute.

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EMERGENCY MEDICINE
OPPORTUNITIES AVAILABLE

In December 2017, Penn State Health partnered with Highmark Health to facilitate creation of a value-based, community care network in the region. Penn State Health shares an integrated strategic plan and operations with Penn State College of Medicine, the university's medical school.

We foster a collaborative environment rich with diversity, share a passion for patient care, and have a space for those who share our spark of innovative research interests. Our health system is expanding and we have opportunities in both an academic hospital as well community hospital settings.

Benefit highlights include:

- Competitive salary with sign-on bonus
- Comprehensive benefits and retirement package
- Relocation assistance & CME allowance
- Attractive neighborhoods in scenic Central Pennsylvania

PennState Health

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