

# EM Resident

A photograph of a person's hand and torso, bound with multiple strands of rusty barbed wire. The hand is clenched into a fist, gripping the wire. The person is wearing a light blue and white striped garment. The background is a plain, light-colored wall.

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## Infectious Trek

A Migrant's Journey and a Case of  
Malaria, Dengue, and COVID-19

Clonidine Overdose  
Management

The Fentanyl-Tainted  
Drug Supply

What's Pacing?  
A Leadless  
Pacemaker?

Hidden Triggers:  
Unmasking Anaphylaxis

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# Signs of Spring: The Job Hunt Begins



**Morgan Sweere  
MD, MPH**

Editor-in-Chief, EM Resident  
Secretary, EMRA Board of Directors  
University of Florida – Jacksonville

## “So, what are we doing for your plan when you graduate?”

I sat in a meeting with one of my mentors earlier this year, focusing on next steps after residency.

“I have no idea. I feel like I could see myself doing a lot of things — fellowship, academics, community — but I don’t know how to make that choice.”

For me, becoming a physician was a natural choice that I’ve been working toward as long as I can remember. Becoming an emergency physician was somehow an even easier choice. I was a tech in the emergency department for 8 years before residency, and I know I’ll love the ED for the rest of my life. How can figuring out my career pathway be such a difficult choice?

At this time of my second year of residency, it feels like everyone but me has a plan. I know that’s simply not the case, and I’m sure many other residents

are feeling the same way, but that’s what it feels like. Some people are sure they’ll go into academics and become a clinician-educator. Some people are totally focused on patient care and know they want to work in the community. We’ve spent so much time in school and training, knowing exactly what our next step in life will be — and now we are finally at a point where we get to make a choice. We are finally in uncharted waters. It is scary and exciting.

One of the best things about emergency medicine is the abundance of post-residency career options. There are many different pathways we can take because of the breadth of our specialty, so considering values is important.

As Gregory L. Henry, MD, FACEP, past president of ACEP, said, “Know thyself and plan accordingly.”

There is much more at hand in this discussion than simply applying for jobs. Some aspects of a career that are important to look into are wellness, geography, family, kind of practice, finances, and opportunities for education and advancement. We have to be willing to look at our personal and professional missions and ask the important questions when looking into accepting a position.

One of the reasons it’s difficult to choose your first job is because it’s difficult to look into the future. Most emergency physicians change jobs within their first 3 years post-training. It’s impossible to know what our lives will look like years into the future. This is where mentorship comes in. It’s imperative to draw on the wisdom of those who have been through the process and those who know you best.

All in all, it’s not an easy choice. And it shouldn’t be. We all want to build a fulfilling career that lasts. When I look back at each step I’ve taken to get to this point in my career and what my past self would think about where I am today, I almost laugh at this stressor in my life. We’ve accomplished so much to get to where we are in this step of our training. I think the best plan for after graduating is to simply enjoy our careers. Every one of us has the best job in the world: emergency physician. ★

Morgan Sweere, MD, MPH

Email [emresidenteditor@emra.org](mailto:emresidenteditor@emra.org) | Instagram [@sweerecheer](https://www.instagram.com/sweerecheer) | X (formerly Twitter) [@morgansweere](https://twitter.com/morgansweere)

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Emergency Medicine Residents' Association

# NORTE

## Long Journey Upward Brings Power of Perspective



**Derek Martinez, DO**

Director of Leadership Development  
EMRA Board of Directors  
The University of Oklahoma  
Tulsa School of Community Medicine

**N**orth. That's the direction my father went when he left his small town of El Espanol, Mexico, for the first time. He was 13 years old. He left his mother, father, and 9 siblings in search of opportunity.

The road is dangerous. Many people never make it across the barren landscape between the United States and Mexico. Some fall ill. Some are murdered. Many never make it back home.

My father's guide, his uncle, abandoned him at the border. Alone and 13 years old, he had to find his own way.

Why am I sharing this with you, in EM Resident?

Perspective.

My father's experiences changed how I view the world. The childhood and adult traumas I faced because of my background shaped my perspective and who I am. They shape what kind of person and doctor I am. When I was a child, I spoke little English and was harassed to no end over my limited English proficiency. When I was a teenager, a police officer called my mom "a spic." When I became a physician, I was called a "gang member" by a fellow physician based solely on my appearance.

These experiences are meant to devalue you. Like you're not enough. Like you'll never be enough.

I know I am not alone in these experiences.

Often, a different perspective makes people uncomfortable. To be different, to think differently, causes discordance. It

shakes the status quo and causes friction and discomfort. It's in this discordance that we find our voice.

Your perspective is power. It is your gift. For those of us from marginalized communities, perspective gives us strength. It affects how we treat patients. It affects how we view our specialty. It affects whom we mentor and how we connect with our institutions and colleagues. It generates ideas and drives difficult discussions.

This year, I challenge you to bring your unique perspective and voice. This is a call to action. Bring your thoughts and opinions to us at EMRA. Help us make EMRA a space where you can unapologetically be yourself. Only by doing this can we improve the culture of EM. Only through your voice can we leave emergency medicine better than we found it. At EMRA, I assure you, we are listening. ★

*Derek Martinez, DO, holds the position of director of leadership development on the EMRA Board of Directors. The EMRA Board encourages you to run for a seat on the 2024-25 EMRA Board of Directors so that you have more opportunities to use your voice, be a leader, and actively shape the future of our specialty. Reach out to current board members for advice and guidance. We're here to listen, and we're here to help.*



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# HIDDEN TRIGGERS: Unmasking Anaphylaxis

## Lynnsey Moss, MD

Resident, PGY-2  
Emergency Medicine  
Nuance Health EM Residency

## Andrew Michalak, MD

Resident, PGY-1  
Emergency Medicine  
Nuance Health EM Residency

## Raymond Isenburg, DO

Emergency Medicine Faculty  
Director of Simulation  
Nuance Health Emergency Medicine Residency

**A**naphylaxis is under-recognized and undertreated. This seems counterintuitive, as it's hard to imagine the stereotypical anaphylaxis patient being difficult to diagnose. This is likely influenced by pop-culture portrayals of the classic anaphylaxis patient with respiratory distress, rash, and the TV physician who nails the diagnosis immediately. Anaphylaxis is also commonly discussed in the media, and many schools have policies to limit potential exposures. This highlights the prevalence of public awareness of the diagnosis.

In reality, anaphylaxis is much more complex than commonly portrayed.<sup>1,2,3</sup>

In 2004, a multidisciplinary group developed the National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network (NIAID/FAAN) criteria to define anaphylaxis. This criteria has since been widely adopted and prospectively validated.<sup>2</sup> A summary of the criteria is in **Figure 1**. To summarize for the emergency physician: If a patient has skin, GI, or respiratory symptoms or hypotension after a known or possible exposure, consider anaphylaxis.

Unsurprisingly, with such a broad definition, anaphylaxis can go unrecognized by health-care providers and is often undertreated, especially in children with predominantly GI symptoms.<sup>4,2</sup> The severity of this presentation can vary widely, with loss of airway and hemodynamic collapse at the most severe end to the spectrum.

**CASE**

“Code urgent, ED lobby” is called overhead, prompting half the department to rush to the lobby where a young man is found in a private vehicle, unconscious in the passenger seat. He is breathing spontaneously, but cannot be aroused; there is mild edema to his lips, but no audible stridor. He receives a dose of intranasal narcan as he’s being transitioned to a stretcher with minimal effect. The driver of the vehicle is frantic and crying, but mentions that he had antibiotics for his ear that he took earlier today. The patient is emergently transitioned back to a resuscitation bay.

He groans as the team brings him to the trauma bay, but otherwise has no change in mental status. On exam, he has bilateral breath sounds and is tachypneic without stridor or wheezing, has a palpable femoral pulse, and has equal, midsize pupils. Additionally, he is noted to have mild edema of the lips with generalized diaphoresis, piloerection, and trackmarks. Initial blood pressure is 54/28, heart rate is 120, and oxygen saturation is 100% on 2L via nasal cannula. With the reported antibiotic exposure, therapeutic interventions pivot and the patient is given 0.3mg of intramuscular epinephrine, with improvement in blood pressure and mental status.

Eventually, this patient was able to provide further history, describing symptoms including lip swelling, pooling of secretions in his mouth, stridor with difficulty breathing, fatigue, and eventual loss of consciousness. He remained stable after his initial resuscitation in the emergency department. He was weaned off nasal cannula 9 hours after arrival. He received additional H1 and H2 blockers, as well as intravenous steroids and nebulized albuterol-ipratropium every 6 hours with marked improvement of his angioedema. At discharge, he was counseled extensively regarding avoidance of all medications in the penicillin class, and his allergy status was updated.

**DEVELOPING A DIFFERENTIAL, INITIAL MANAGEMENT**

In patients presenting with a decreased

Consider anaphylaxis with any of the following criteria:	Sudden mucocutaneous symptoms with respiratory symptoms or hypotension	
	2 or more of the following in the setting of a likely trigger:	Mucocutaneous symptoms
		Respiratory symptoms
		Hypotension
		GI upset
Sudden hypotension in the setting of known triggers		

FIGURE 1

level of consciousness, it is important to develop an appropriate differential diagnosis. Overdose of prescription medications, recreational drugs, or alcohol is high on the differential, especially in young patients. Inadequate perfusion of the brain secondary to hypotension covers a range of disease states including hemorrhage, sepsis, and arrhythmia. Other considerations include, but are not limited to, neurologic pathology like stroke or seizure, endocrine emergencies such as diabetic ketoacidosis or myxedema coma, and environmental exposures such as hypothermia and heat stroke. In many cases, the history and initial assessment will guide your evaluation toward one of these diagnoses.

**MAINSTAYS IN MANAGEMENT**

The mainstay management of anaphylaxis is early administration of epinephrine and supportive care, including management of the patient’s airway and hemodynamics.<sup>2</sup> Administration of epinephrine in the prehospital setting decreases the

likelihood of hospitalization,<sup>4</sup> while delayed administration is linked in increased risk of mortality.<sup>3</sup>

Epinephrine should be given intramuscularly at 0.01 mg/kg of 1:1,000 solution with a max dose of 0.3mg in children and 0.5 mg in adults.<sup>2</sup> For patients with refractory symptoms despite repeated intramuscular doses, an intravenous epinephrine infusion should be considered.<sup>5</sup>

Epinephrine works by combating cardiovascular collapse by increasing chronicity of the heart and causing peripheral vasoconstriction; it also addresses airway compromise by triggering the relaxation of smooth muscles in the airways and attenuating the activation of mast cells, thereby decreasing airway edema.<sup>4</sup>

Supportive measures can include fluid resuscitation for hypotension, oxygen supplementation, and placement of a definitive airway.<sup>1,4</sup> Glucagon may be considered in hypotensive patients taking beta-blockers, as it can increase heart rate and contractility independent of beta-adrenergic receptors,<sup>6</sup> and inhaled



beta-2 agonists may be considered in patients with reactive airway disease.<sup>4</sup> However, determining their use will be on a case-by-case basis. See **Figure 2**.

While adjuvant medications such as antihistamines and glucocorticoids are often administered, they are unlikely to benefit in the acute phase. Evidence for their use is weak and largely based on expert consensus versus RCTs.<sup>1,4</sup>

The 2020 practice parameter update by the Journal of Allergy and Clinical Immunology recommends against the use of glucocorticoids for the prevention of biphasic reactions,<sup>2</sup> while the 2021 European Academy of Allergy and Clinical Immunology (EAACI) describes glucocorticoids as potentially deleterious in children, but states that there is insufficient evidence regarding their utility for preventing biphasic reactions.<sup>1,7</sup>

Antihistamines, especially combined H1 and H2 blockers, can provide improvement of cutaneous symptoms. They have not been proven to address the life-threatening sequelae of anaphylaxis — angioedema and shock — or the prevention of biphasic reactions.<sup>1,4,8</sup>

Biphasic reactions occur in 1%-20% of patients presenting with anaphylaxis, which is why observation in the emergency department remains important and why patients should be counseled about this possibility, given reports of biphasic reactions as delayed as 78 hours after initial exposure.<sup>2</sup> With that being said, the amount of time necessary for observation remains a topic under investigation, and the length of observation will often vary by severity of reaction and patient factors. Features that increase likelihood of a biphasic reaction include severe reaction, wide pulse pressure, cutaneous symptoms, drug reactions in children, unclear trigger, and multiple doses of epinephrine.<sup>2</sup> Patient factors that warrant prolonged monitoring include limited access to health care, history of severe asthma, and prior biphasic reaction.<sup>1</sup>

Epinephrine:	0.01 mg/kg of 1:1,000 (1 mg/ml)
Adult max dose: 0.5 mg (0.5mL)	Pediatric max dose: 0.3mg (0.3mL)
Adjuvant therapies to consider:	Glucagon: Consider if taking beta-blockers
	Albuterol: Consider in reactive airway disease

FIGURE 2

**ANAPHYLAXIS AIRWAY PEARLS**

Some patients require establishment of a definitive airway and mechanical ventilation; however, airway edema increases the likelihood of a difficult airway. Many societies have recommended algorithms for addressing the difficult airway, and early recruitment of support is essential.<sup>9</sup> This is not always possible, and providers may have to proceed on their own. Use of direct or indirect laryngoscopy with a bougie near at hand is a familiar technique that many physicians would choose to start with, while fiberoptic intubation, either orotracheally or nasotracheally, can be considered if a fiberoptic scope can be obtained within the necessary timeframe — that is, if it is in the department and the provider already knows how to use it.<sup>9</sup> In adults and older children (5-12 years or older), depending on which reference is being used,<sup>10</sup> a surgical cricothyrotomy can be considered. In infants and younger children, or those on whom a surgical cricothyrotomy cannot be performed, a needle cricothyrotomy can be used instead. If using a needle cricothyrotomy, it is imperative to remember that this will provide oxygen, but will not adequately ventilate the patient and requires definitive airway due to worsening hypercarbia.<sup>10,11</sup>

**DISCHARGE CONSIDERATIONS**

In up to 20% of patients, the causative agent is not identified<sup>4</sup> and may represent either idiopathic anaphylaxis or the patient may not realize that they encountered a trigger. When a patient presents with anaphylaxis, it is

important to provide close follow-up recommendations. Patients generally follow up with their primary care provider; however, they can also be offered follow-up with an allergist. This may be particularly beneficial for a patient with no identified trigger. In addition to outpatient follow-up, patients should be prescribed epinephrine IM and provided with counseling on recognizing

anaphylaxis. Patients should be informed about the importance of early use of epinephrine and ensuring they have the means to activate EMS in case of possible exposure.<sup>1,4</sup>

Anaphylaxis is a true and potentially life-threatening emergency. Understanding that this condition has broader diagnostic criteria than are commonly recognized will help with early recognition and treatment. The mainstay of treatment is with IM epinephrine, as well as provision of appropriate supportive care. The patient must be monitored for biphasic reactions. Administration of common adjuvants has not been demonstrated to decrease the likelihood of recurrence. Ultimately, extended observation of high-risk patients and thorough counseling of all patients on discharge, as well as a prescription for epinephrine, remain important aspects of anaphylaxis management. ★

**KEY POINTS**

- Early recognition of anaphylaxis, even in the absence of cutaneous symptoms, and early treatment with epinephrine is potentially life-saving.
- Know what difficult airway tools and resources you have available and how to use them.
- Adjuvant medications have not been proven to prevent biphasic reactions, but they can help with symptoms.



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Information accurate as of 4/15/2024.



## The Fentanyl-Tainted Drug Supply Requires EDs to do More

**Timothy Kelly, MD**

Resident, PGY-4  
Emergency Medicine  
Icahn School of Medicine at Mount Sinai

**A** middle-aged male found at the bottom of stairs, mild abrasion to his head. Pinpoint pupils and unresponsive. Improved mental status post-naloxone.

A 60-year-old male patient found unresponsive alongside his friend in a subacute rehab facility. Status for both post-naloxone: alert and oriented.

A 19-year-old female found in

respiratory distress. She was given naloxone in the field and became hyperactive, tachycardiac, and hypertensive.

And a 43-year-old man found by his neighbors, with altered mental status and barely breathing, given naloxone in the field. He was here yesterday for the same thing.

These were 4 of the patients I cared

for in just 2 weeks at my busy emergency department in New York City. They all had something in common beyond receiving naloxone: They admitted to using crack cocaine and denied intentionally using opiates. Yet when first responders found them, they were in acute opiate overdoses. Four self-admitted crack cocaine users — all accidentally overdosed on opiates.

It's clear that the scourge of fentanyl has taken a new deadly turn.

Fentanyl's widespread infiltration of the black-market opiate supply has been a devastating phenomenon that emergency physicians have been battling for years in both urban and rural communities.<sup>1,2</sup> But as my recent experiences demonstrate, fentanyl is increasingly ending up in other drug supplies, presenting a new threat to patients who use recreational drugs.

Between 2010 and 2014, the rates of cocaine overdose deaths in New York

and into the bodies of unsuspecting consumers, it can easily lead to death. Without knowing if it is present in their drug supply, and in what concentration, users don't know how much to consume at one time, drastically increasing the risk of overdose.

Fentanyl is a perfect embodiment of the unintended, yet inevitable, dangers of prohibition. Because of heroin's illegal status, drug traffickers are tasked with smuggling a highly criminalized product from its country of production to its country of consumption. This provides

— be it Percocet or Oxycodone or even benzodiazepines — as a safer option; they knew what drug they were getting and its strength. But the rise in fentanyl-tainted counterfeit pills completely upended that harm reduction approach, leading to innumerable accidental overdose deaths.

Now fentanyl and related compounds are blamed for up to 150 overdose deaths a day in the United States.<sup>8</sup> Fentanyl analogs are being increasingly identified in the drug supply. Drugs like acetylfentanyl, furanylfentanyl, carfentanil, and the ominous-sounding

## The ever-growing frequency of patients presenting to the emergency department with fentanyl overdoses — and fentanyl's surging presence in cocaine and other black-market drugs — demands that we, as emergency medicine providers and front-line stewards of public health, do more to protect our patients and our communities.

City were relatively stable, but between 2015 and 2016 the rates increased significantly. Whereas fentanyl was involved in only 0.7% of cocaine-related overdose deaths in the first half of 2010, that percentage jumped to 48% during the second half of 2016. Researchers found that this increase in fentanyl's contribution to cocaine overdose deaths accounted for 90% of the overall increase in cocaine overdoses during their study period of 2010 to 2016.<sup>3</sup> According to federal data, the prevalence of fentanyl's involvement in cocaine overdose deaths has continued to rise sharply since then.<sup>4</sup>

The ever-growing frequency of patients presenting to the emergency department with fentanyl overdoses — and fentanyl's surging presence in cocaine and other black-market drugs — demands that we, as emergency medicine providers and front-line stewards of public health, do more to protect our patients and our communities.

Drugs are not inherently good or bad. It's nearly impossible to imagine getting through a trauma shift without relying on fentanyl to treat patients. When it is pure and the potency is clearly marked on the bottle, fentanyl is an extremely reliable way to alleviate immense pain and suffering. However, when fentanyl finds its way into the illicit drug supply

motivation to find the most potent product: The more potent the drug, the smaller its volume, and the easier it is to move while evading detection. Thus, this market shift from less potent and more bulky heroin to the more powerful, less voluminous fentanyl is one that prohibition encourages. And the shift from heroin to fentanyl has had profound impacts on our emergency departments and the lives of our patients.

The doses of fentanyl that we use in medicine are measured in micrograms, an order of magnitude smaller than the milligrams that doses of heroin are measured in. Commonly cited as being 50 times more potent than heroin, when even the smallest amounts of fentanyl find their way into the illicit drug supply, it can lead to fatal overdoses.<sup>5</sup>

While fentanyl has likely been present in the heroin supply for decades, in 2013 the DEA started to see a sharp rise in the percent of seized heroin samples testing positive for fentanyl. In 2014, the DEA seized 5,343 drug samples that tested positive for fentanyl. By 2015, that number jumped to 13,882.<sup>6</sup> It was also in 2014 that the DEA noted that many prescription pills available on the black market were counterfeits and contained fentanyl.<sup>7</sup> Previously, many recreational drug users would rely on buying pills

U-47700 belong to a broad class called synthetic opiates, and some are many times more potent than fentanyl.<sup>9</sup> Whereas fentanyl is thought to be 100 times as potent as morphine, carfentanil is thought to be 10,000 times as potent.<sup>10</sup>

In 2020 alone, 56,000 deaths were attributed to fentanyl and other synthetic opiates, representing 82% of all opiate overdose deaths. Overdoses attributed to synthetic opiates increased by 56% in just one year, from 2019 to 2020. Compared to 2013, in 2020 there were 18 times as many overdose deaths attributed to synthetic opiates.<sup>4</sup>

When fentanyl first started infiltrating the opiate supply in greater numbers, many long-time users lamented this change, preferring the heroin that they were used to, given its more predictable effects and longer duration of action.<sup>11</sup> But a shift has occurred over the past several years with recreational opiate users now often seeking out fentanyl for its more intense high.<sup>12</sup> This change in preference has large implications for the health and safety of users, as the shorter duration of action leads to more frequent consumption. Increased frequency of use and increased potency deepens users' tolerance and degree of physical dependency, resulting in more agonizing withdrawals. For first

responders and front-line providers, this potency also means that the doses of naloxone required to reverse an overdose are often far greater than what we are used to.

Investigators are beginning to study ED patients who use recreational opiates to assess the prevalence of fentanyl in the illicit drug supply. A study published in 2018 looked at patients of an urban, New England-based emergency department who presented after receiving naloxone for presumed opiate overdose.<sup>13</sup> All participants reported seeking heroin, and zero participants reported intentionally seeking fentanyl. All but one of the participants' urine samples tested positive for fentanyl. The presence of the even more potent fentanyl analog acetylfentanyl was found in 30% of the urine samples, whereas the less potent yet less tested and understood analog, U-47700, was found in 7% of the urine samples. Of those testing positive for fentanyl, 55% correctly self-identified their drug as containing fentanyl, 31% were unsure if their drug contained fentanyl, and 14% incorrectly thought their drug contained no fentanyl. In 2020, researchers reported that 91% of self-identified recreational opiate users presenting to a medium-sized urban emergency department preferred heroin, while only 4% reported a preference for fentanyl. Despite this, of the participants who provided urine samples, 81% tested

other patients. In the absence of strong harm reduction messaging from the government, community leaders, and health-care providers, drug users and their advocates are filling this gap by coming up with new harm reduction strategies and disseminating them among their community. Through tactics like switching from injecting to smoking or sniffing, taking test shots (using a much smaller amount initially to see how potent it is before increasing their dose), injecting very slowly, and asking their friends about the potency of a new batch before consuming, opiate users are doing their best to adapt to the unpredictability of the illicit opiate supply.<sup>15</sup>

Deadly overdoses from recreational opiate use are not inevitable, and we don't have to wait until an overdose has already occurred before we can help our patients. We can educate ourselves about fentanyl, about the specifics of drug use, and about harm reduction. The growing number of emergency departments that provide naloxone kits to patients who use drugs is an encouraging and life-saving new trend.<sup>16</sup> But we should not stop there. We can encourage our leadership to start providing fentanyl test strips to our patients, helping to prevent overdoses instead of merely responding to them.

Fentanyl test strips allow users to detect the presence of fentanyl by dissolving a small amount of their drug

public health and rates of fatal overdoses that these test strips can engender, the CDC and the Substance Abuse and Mental Health Services Administration announced in 2021 that their grant funds can now be used to purchase fentanyl test strips.<sup>18</sup>

However, there is skepticism about these test strips among many who work in the emergency department. In light of the tragic consequences of opiate addiction that we face shift after shift and the ways we observe that opiates seem to hijack our patients' free will, one might think that these strips will do little to impact our patients' behavior. If our patients are routinely chasing the highest high, will knowing that their drug contains fentanyl truly lead to less overdoses?

As is often the case in the world of medicine, it is best to listen to and learn from our patients directly. Significant research is starting to be published exploring the attitudes of recreational opiate users on fentanyl test strips and their impact on behavior. One study investigated clients of a harm reduction service in North Carolina who had previously used fentanyl test strips.<sup>19</sup> Of the respondents who reported detecting fentanyl in their most recent batch of opiates, 43% reported subsequent changes in their drug consumption. Changes in behaviors included using less of the drug at one time, snorting

**Drugs are not inherently good or bad. It's nearly impossible to imagine getting through a trauma shift without relying on fentanyl to treat patients. When it is pure and the potency is clearly marked on the bottle, fentanyl is an extremely reliable way to alleviate immense pain and suffering. However, when fentanyl finds its way into the illicit drug supply and into the bodies of unsuspecting consumers, it can easily lead to death.**

positive for fentanyl.<sup>14</sup>

While it is easy as emergency medicine providers to become cynical about the challenge of opiate addiction and see our patients as being reckless with their health, it is imperative that we understand that these patients want to stay safe as much as any of our

in water, into which the test strip is dipped. These strips are a low-cost harm reduction strategy supported by the Center for Disease Control (CDC) and are becoming increasingly available at harm reduction and needle exchange organizations throughout the United States.<sup>17</sup> Signaling the positive impact on

instead of injecting, injecting the drug more slowly, and throwing out that batch. Furthermore, 77% reported that the availability of fentanyl test strips increased their sense of protection against overdoses.

In a study surveying young people in Rhode Island who recreationally used



opiates or cocaine and were subsequently trained in how to use fentanyl test strips, 70% reported concern that their drug supply may have fentanyl, 95% stated that they plan to use fentanyl test strips when given the chance, and 71% thought that their friends who also use drugs would be interested in using these strips.<sup>20</sup> In this study, 38% of respondents who had a positive test result engaged in subsequent harm reduction strategies.<sup>21</sup>

While most fentanyl test strips are distributed by harm reduction organizations, more and more emergency departments are also starting to supply them. One hospital in Chicago started including fentanyl test strips alongside

naloxone in its take-home opiate overdose prevention kits, which are distributed by an ED pharmacist who also provides overdose education. The results of a pilot study that focused on this initiative supported the feasibility of such ED-based fentanyl distribution programs and again found that, when confronted with a positive test result, patients altered their behaviors to reduce their exposure to harm.<sup>22</sup>

The substantial individual and community-wide harms that can be caused by a tainted illicit drug supply demand innovative solutions and bold advocates who are willing to speak up on behalf of one of the most marginalized populations we serve. As emergency

physicians, we are uniquely equipped with the skills and experiences that lend credence to our voices, prompting decision-makers to pay attention when we sound the alarm about growing public health crises like fentanyl overdoses.

We can use our experiences and hard-earned expertise to not only help the patient in front of us, but also to create societal and policy-level changes to improve public health. We can, and we must, start by insisting that our emergency departments become disseminators of harm-reduction knowledge and supplies. Handing out naloxone kits is a meaningful start, and distributing fentanyl test strips is the logical, and critical, next step. ★

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## Case Series: Successful Management of Primary Post-Tonsillectomy Hemorrhage With IV Tranexamic Acid

### Dillon Schneider

Medical Student, MS-4  
A.T. Still University Kirksville  
College of Osteopathic Medicine

### Francisco Javier Andrade Jr., MD

Director of Ultrasound Education,  
Core Faculty  
Abrazo Health  
Emergency Medicine

### Nancy Churosh, MD

Attending Physician  
Emergency Medicine  
Abrazo Health  
Emergency Medicine

### Brian Casillas, MD

Resident, PGY-3  
Emergency Medicine  
Abrazo Health  
Emergency Medicine

### ABSTRACT

Primary post-tonsillectomy hemorrhage (PTH) is a potentially life-threatening complication with high mortality rates. The lack of clear stepwise guidelines for its management poses a challenge for health-care providers.

We discuss 2 cases of patients who presented with severe primary PTH. Our cases highlight the successful use of alternative treatment options. Due to limited access to specialized care and a compromised airway, we employed an

alternative approach by administering intravenous (IV) tranexamic acid (TXA) to control bleeding. The successful use of IV TXA, along with surgical intervention for bleeding, resulted in the cessation of the hemorrhage.

These cases highlight the potential role of IV TXA as an effective treatment option in patients with PTH and high risk for compromised airways, emphasizing the need for further investigation and consideration of alternative strategies in the absence of clear guidelines.

### INTRODUCTION

PTH refers to the occurrence of bleeding within 24 hours of tonsillectomy, typically involving active bleeding, hypotension, and tachycardia. This complication is well-recognized in previous studies<sup>1</sup> and occurs in 0.2% to 2.2% of patients undergoing tonsillectomy; current U.S.-reported mortality rates for tonsillectomy are 1 per 2,360 and 1 per 18,000 in inpatient and ambulatory settings, respectively. One-third of deaths are attributable

to bleeding. The association between different surgical techniques and rates of primary post-tonsillectomy bleeding remains unclear due to conflicting evidence.<sup>2</sup> Additionally, research has shown that post-operative instructions given to patients concerning diet and physical activity vary greatly.<sup>3</sup>

In emergency settings, health-care providers face significant challenges in managing PTH due to the absence of well-defined stepwise guidelines and limited availability of ear, nose, and throat (ENT) specialists to deliver specialized care. Currently, the American Academy of Otolaryngology Head and Neck Surgery does not provide specific guidelines for managing PTH.<sup>1</sup>

Research shows that various management strategies are employed in the pediatric population to address post-tonsillectomy bleeding.<sup>4</sup> These include administration of intravenous (IV) fluids, direct pressure application, clot suctioning, silver nitrate use, placement of vasoconstrictor-soaked pledgets, epinephrine injections, topical epinephrine application, utilization of thrombin powder, and laboratory investigations. However, an optimal management approach lacks consensus.

Recent studies demonstrate the use of nebulized tranexamic acid (TXA) as a potential treatment option for acute bleeding as a result of PTH. TXA is an antifibrinolytic agent that inhibits the breakdown of blood clots. A study by Schwarz et al. (2019) reported the successful use of nebulized TXA in managing pediatric secondary PTH.<sup>5</sup> Additionally, nebulized TXA offers a non-invasive method of administration and has shown promising results in controlling bleeding prior to definitive surgical intervention.<sup>6</sup>

In this case series, we discuss the management of 2 patients who experienced PTH, emphasizing the successful use of IV TXA in the presence of a compromised airway and limited access to specialized care. This alternative approach highlights the potential role of IV TXA as an effective treatment option in patients with PTH and compromised airways. These cases underscore the need for further research

and the development of evidence-based guidelines to optimize the management of this potentially life-threatening complication.

## CASE DESCRIPTIONS

### Case 1

A 16-year-old female patient with a history of tonsillitis underwent an uneventful tonsillectomy. On the first postoperative day, the patient presented to the ED with a 30-minute history of hemoptysis, expectorating blood into a receptacle, and reported significant blood loss since onset. This was verified through an examination of the receptacle containing an estimated volume of 2 liters of blood, corroborating the reported extent of hemorrhage.

The patient exhibited pallor and concerns for a compromised airway due to copious volumes of blood within the oropharynx, accompanied by persistent hemoptysis, necessitating urgent intervention to maintain airway patency. She was anxious-appearing and tachycardic with a heart rate of 173. The patient's oral cavity exhibited a substantial accumulation of clotted blood, resulting in a complicated visualization of the posterior oropharynx and impeding further identification of the bleeding source. Despite the patient's ongoing expectoration of substantial volumes of blood from the oral cavity, she maintained adequate oxygen saturation and clear breath sounds, effectively averting aspiration concerns for the time being. Given that the patient was currently protecting her airway, the decision was made to trial medical management with a low threshold for intubation if needed.

Immediate intervention was initiated, including seating the patient upright and suctioning the airway. Two large-bore IV lines were established, and massive transfusion protocol (MTP) was initiated. Nebulized TXA was attempted initially. However, it was complicated by the patient's repeated efforts to maintain a patent airway as well as bleeding, which could limit the nebulized effects of TXA. During attempts to administer blow-by nebulized TXA to the patient via a mask, she consistently expectorated

significant quantities of blood, rendering the treatment administration ineffective. IV TXA was then administered in an attempt to control the significant amount of bleeding.

While resuscitative efforts were ongoing, a consultation was sought from the patient's otolaryngology (ENT) surgeon but was unsuccessful due to lack of hospital privileges. Therefore, the on-site trauma surgery team was engaged for surgical management. Additionally, anesthesia consultation was obtained for assistance in airway management.

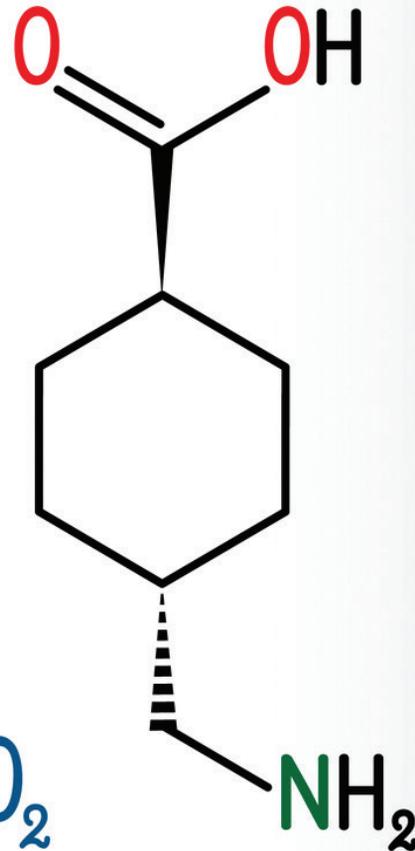
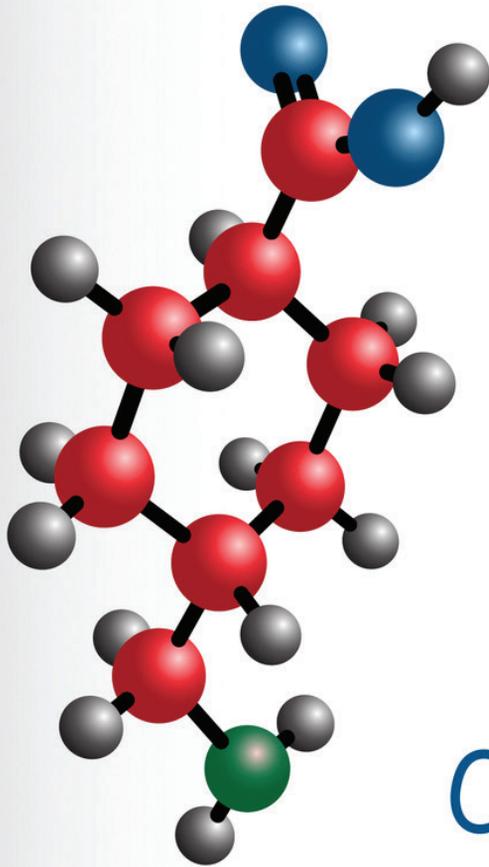
As bleeding began to slow, the interdisciplinary team engaged in discussions regarding airway management, particularly the option of endotracheal intubation. After careful consideration of the patient's ability to protect her own airway, endotracheal intubation in the ED was postponed. This was due to the potential risk of compromising muscle tone in the oropharynx, which could exacerbate the bleeding. Additional concerns arose regarding the patient's ability to effectively clear her airway once sedated. Meanwhile, the patient was managed in an upright position, and the airway was suctioned in preparation for transferring her to the operating room.

She was promptly taken to the operating room for surgical intervention. Upon the patient's arrival in the operating room, hemorrhage had ceased, enabling the surgical team to proceed safely with sedation and endotracheal intubation without encountering any subsequent complications. Intraoperative findings revealed a clotted arterial bleed from the right tonsillar fossa, which was successfully cauterized. The patient had an uneventful postoperative course and was discharged 2 days later in stable condition.

### Case 2

A 26-year-old female patient who underwent a routine tonsillectomy procedure presented to the ED 1 day after the surgery with a distressing episode of bright red, bloody emesis, accompanied by the expulsion of clots. Notably, the emesis bag contained approximately 1 liter of blood. On examination, the

# Tranexamic acid



patient appeared anxious and was found to be tachycardic, with a heart rate of 100 beats per minute, while all other vital signs remained within normal ranges. Physical examination revealed bright red blood oozing from the right tonsillar fossa, consistent with active bleeding, alongside bright red emesis and clots. Despite the alarming presentation, the patient maintained a patent airway, and her oxygen saturation level was stable at 100%.

Immediate intervention was initiated to manage the hemorrhage. As a first-line measure, an attempt was made to administer nebulized TXA to control the bleeding. However, the patient did not show significant improvement with this treatment approach. Given the urgency of the situation, ENT specialists were promptly consulted for further management guidance.

The ENT team recommended the IV

administration of TXA to address the ongoing hemorrhage. Following the IV TXA administration, there was notable improvement in the oozing from the hemorrhage site, indicating a positive response to the intervention. Continuous monitoring and reassessment demonstrated a resolution of the oozing bleeding, providing initial relief and stability for the patient.

However, despite initial improvement, the patient experienced another concerning episode of bright red, large-volume emesis during subsequent evaluation. Reassessment of the right tonsillar fossa revealed ongoing oozing of blood, though to a lesser degree than before, suggesting that the bleeding had been slowed but not fully controlled.

Once again, ENT specialists were consulted, and in light of the persistent hemorrhage and potential complications, they recommended the transfer of the

patient to a hospital equipped with specialized ENT coverage. Following the ENT team's advice, arrangements were made to facilitate the patient's transfer to a suitable facility for further evaluation and targeted management.

## DISCUSSION

PTH is a critical complication that can result in life-threatening situations, necessitating prompt and appropriate management. However, the absence of well-defined stepwise guidelines for PTH treatment poses significant challenges for health-care providers, particularly in emergency settings.

The patients in our 2 cases experienced substantial and potentially fatal hemorrhages, posing high risks for compromised airways requiring immediate intervention. In these cases, the successful use of IV TXA highlights its potential role in controlling bleeding

The lack of clear stepwise guidelines for managing severe post-tonsillectomy bleeding emphasizes the importance of ongoing research and the development of standardized protocols. With standardized guidelines, health-care providers would have a clear framework for prompt and appropriate management, ultimately improving patient outcomes and reducing morbidity and mortality associated with this potentially life-threatening complication.

in PTH. Nebulized TXA was initially attempted, but IV administration was necessary due to risk for airway compromise. The administration of TXA resulted in decreased blood loss and cessation of hemorrhage.

The effectiveness of TXA in stopping bleeding in patients with traumatic bleeding is evident in the CRASH-2 trial.<sup>7</sup> The study demonstrated a clinically significant reduction in all-cause mortality, including complications of vascular occlusive events, at 28 days with TXA compared to a placebo. Furthermore, the risk of death, specifically due to bleeding, was significantly reduced in the TXA group (RR 0.85; 95% CI 0.76 to 0.96;  $p = 0.0077$ ). Importantly, the effect of TXA on death due to bleeding varied based on the time from injury to treatment, with early administration ( $\leq 1$  hour from injury) showing a significant reduction in the risk of death due to bleeding (RR 0.68; 95% CI 0.57 to 0.82;  $p < 0.0001$ ).

These findings provide strong evidence for the efficacy of TXA in reducing mortality due to bleeding, particularly when administered early after injury, and address the concern for vascular occlusive events, which were included in the study as a primary outcome event and demonstrated a decrease in all-cause mortality.

The administration of TXA in pediatric trauma patients has been a subject of interest due to its potential to reduce bleeding and improve outcomes. A study by Eckert et al. (2014) specifically evaluated the use of TXA in a combat setting and its impact on pediatric trauma patients.<sup>8</sup> Patients who received TXA had greater injury severity, hypotension, acidosis, and coagulopathy than those in the no-TXA group. Findings indicated that TXA administration was associated

with decreased mortality rates in this population. Moreover, the study provided evidence of the safety profile of TXA in pediatric patients. The authors reported no significant adverse complications related to TXA administration in their cohort. This supports the notion that TXA can be utilized safely in pediatric patients without posing significant risks of clotting.

In addition to the aforementioned study of pediatric trauma patients, substantial research supports the use of TXA in various surgical procedures involving pediatric patients. Urban et al. conducted multiple studies exploring the benefits of TXA in major spine, cardiac, and craniofacial surgeries.<sup>9</sup> The findings from these studies and meta-analyses examining TXA use in pediatric surgery consistently demonstrate favorable outcomes associated with TXA administration.

The safety of TXA use in bleeding patients has been studied by Myles et al in more than 4,000 patients undergoing cardiac surgery with primary outcomes of death and thrombotic events.<sup>10</sup> The results showed that TXA administration was associated with a lower risk of bleeding compared to the placebo group, without an increased risk of death or thrombotic complications within 30 days after surgery. A primary outcome event occurred in 386 patients (16.7%) in the TXA group and in 420 patients (18.1%) in the placebo group (relative risk, 0.92; 95% confidence interval, 0.81 to 1.05;  $P=0.22$ ). The total number of units of blood products that were transfused during hospitalization was 4,331 in the TXA group and 7,994 in the placebo group ( $P<0.001$ ). Major hemorrhage or cardiac tamponade leading to reoperation occurred in 1.4% of patients in the TXA group and 2.8% of patients in the placebo group ( $P=0.001$ ),

and seizures occurred in 0.7% and 0.1%, respectively ( $P=0.002$  by Fisher's exact test).<sup>10</sup> These findings suggest that TXA effectively reduced bleeding without compromising patient safety in the short term. However, it was noted that there was a higher risk of postoperative seizures in patients receiving TXA. Despite this observed risk, the overall safety profile of TXA remains favorable, and its benefits in reducing bleeding complications are apparent.

Most recently, research published in the American Journal of Otolaryngology evaluated the safety and efficacy of TXA in PTH. The study involved a retrospective chart review of 1,428 adult and pediatric patients who underwent tonsillectomy at a tertiary care hospital with continuous otolaryngologic coverage over a 2-year period.<sup>11</sup> According to the study, 27 out of 55 PTH patients received topical, nebulized, or IV TXA. No adverse effects were noted with TXA administration. The usage of TXA in treating PTH demonstrated a resolution of hemorrhage in 77.8% of patients. Additionally, the study observed a reduction in the need for operating room cauterization in those patients treated with TXA compared to those who did not receive TXA. These findings support the safety and effectiveness of TXA administration, regardless of the mode of delivery (IV, nebulized, or topical applications), in pediatric and adult populations with PTH.

In cases of primary PTH where attempts at surgical control are ineffective, research has shown that the use of endovascular embolization has been considered as an alternative intervention.<sup>12</sup> Endovascular embolization involves the selective occlusion of bleeding vessels using embolic agents, thereby promoting hemostasis. However, in the presented

cases, the timely and effective administration of IV TXA played a crucial role in avoiding the need for endovascular embolization. The administration of IV TXA, along with surgical cauterization of the arterial bleed, successfully halted bleeding and achieved control of the hemorrhage. The findings from these cases align with the trends reported in the literature, highlighting the importance of exploring non-invasive approaches such as IV TXA before resorting to more invasive measures like endovascular embolization.

Based on our findings, TXA appears to be a safe and effective treatment option for managing post-tonsillectomy bleeding in both pediatric and adult populations. However, further research, including prospective studies and randomized controlled trials, would be beneficial to establish standardized guidelines and optimize the use of TXA in PTH.

**CONCLUSION**

The presented cases of severe PTH highlight the potential role of IV TXA as an effective treatment option in acutely bleeding patients, particularly in cases with high risk for airway compromise. In our cases, the successful administration of IV TXA, along with surgical intervention for arterial bleeding, resulted in effective control and resolution of the hemorrhage.

The efficacy of TXA in managing bleeding in various clinical scenarios, including trauma and major surgeries, is supported by a body of research. Studies have demonstrated that TXA administration leads to decreased blood loss and a reduced need for blood product transfusion, contributing to improved patient outcomes. Furthermore, recent research specific to PTH has shown promising results regarding the safety and effectiveness of TXA in resolving hemorrhage, with a reduction in the need for additional invasive interventions.

While the presented cases and existing research highlight the potential benefits of IV TXA in managing severe PTH, further investigation is still needed. Prospective studies and randomized controlled trials are necessary to establish standardized guidelines for using TXA in this specific context. These guidelines would help health-care providers in emergency settings to navigate the challenges posed by severe PTH and ensure appropriate and timely interventions.

The lack of clear stepwise guidelines for managing severe post-tonsillectomy bleeding emphasizes the importance of ongoing research and the development of standardized protocols. With standardized guidelines, health-care providers would have a clear framework for prompt and appropriate management, ultimately improving patient outcomes and reducing morbidity and mortality associated with this potentially life-threatening complication. ★



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# What's Pacing? Could it be a Leadless Pacemaker?

**Julia Z. Guo, MD**

Resident, PGY-3

Department of Emergency Medicine  
McGovern Medical School at Univ. of Texas  
Health Science Center at Houston

**Salil Bhandari, MD, FACEP**

Associate Professor

Department of Emergency Medicine  
McGovern Medical School at Univ. of Texas  
Health Science Center at Houston

**Puneet Ghayal, MD, FACC**

Assistant Chief of Cardiology

Department of Cardiology  
Ontario Medical Center, Southern California  
Permanente Medical Group

**A** 68-year-old woman with a history of end-stage renal disease, hypertension, diabetes, bradycardia, coronary artery disease, and hypothyroidism presented to the emergency department with bradycardia and hypotension. She was unable to participate in hemodialysis due to hypotension. The patient was persistently bradycardic with HR in the 50s and hypotensive with SBP in 70s-80s. She reported taking midodrine 15 mg TID and was compliant. Physical exam revealed an alert woman in no acute distress. Lungs were clear to auscultation bilaterally. Cardiac exam showed bradycardia with normal peripheral perfusion. Chest wall was normal, without signs of trauma or palpable

artificial devices.

Immediately a 12-lead EKG was obtained (**Image 1**) and was notable for p-waves unrelated to any ventricular beat, consistent with an underlying 3rd degree heart block in addition to a wide complex ventricularly paced rhythm with pacer spikes noted. A prior EKG had shown atrial sensed ventricular pacing.

So, what was pacing the patient, if the patient had no automatic implantable cardioverter defibrillator (AICD)/pacemaker on physical exam?

A CXR was ordered (**Image 2**) and read by the radiologist as “cardiac loop recorder is seen over the left lower chest.” A leadless loop recorder, however, is a subcutaneously placed device used to evaluate unexplained episodes of

palpitations or syncope and has no pacing function.

If the device wasn't a loop recorder, then what was it?

This device was, in fact, a permanent leadless cardiac pacemaker (**Image 3**). This cardiac conduction device was introduced in 2020 and has been slowly gaining in popularity since.

These pacemakers are inserted percutaneously via the femoral approach, and they are implanted directly in the right ventricle with the help of 4 small metal tines. The device is MRI compatible and can be appreciated on CXR and on CT as a bullet-shaped and radiolucent object located in the right ventricle.

Currently there are 2 leadless



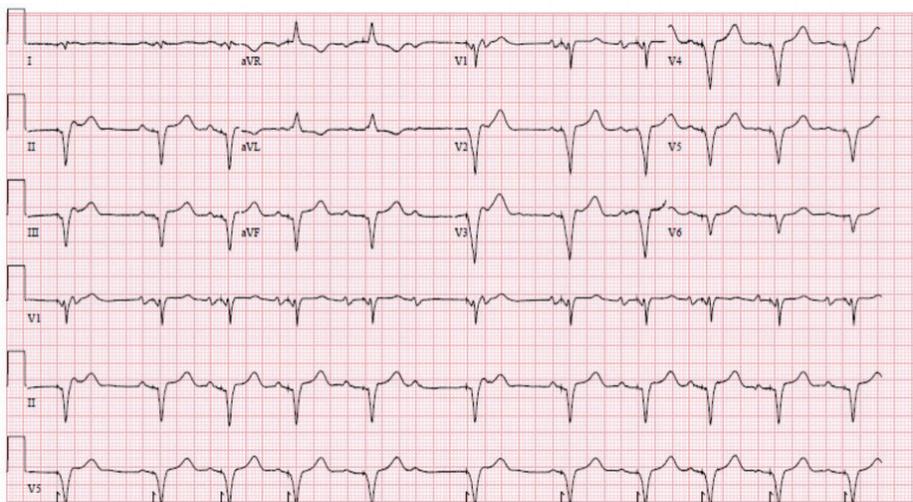


IMAGE 1: EKG of the patient on arrival

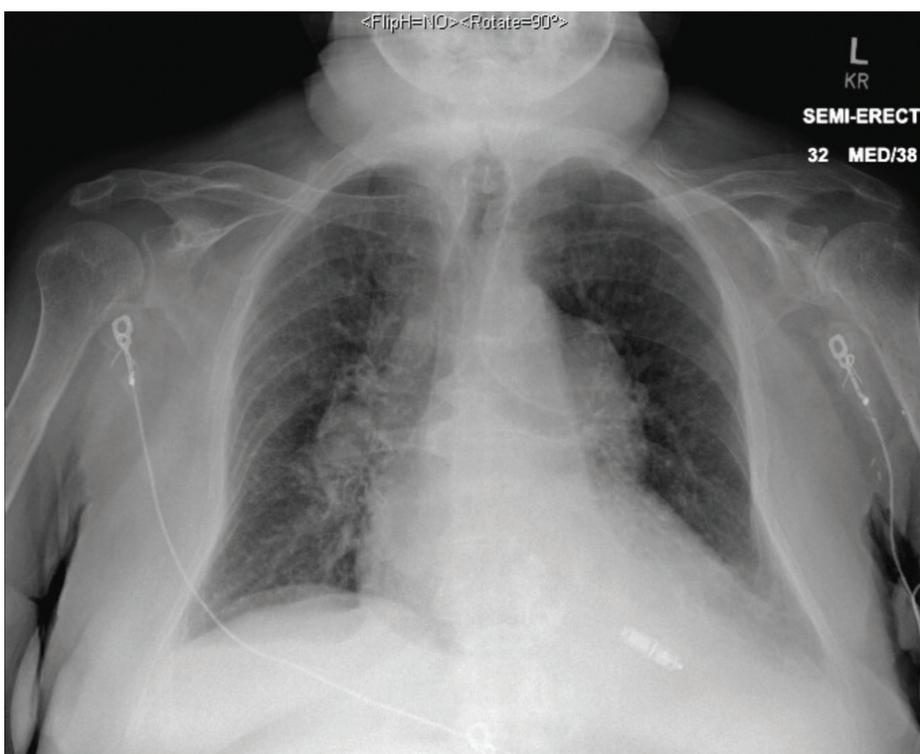


IMAGE 2: Chest X-Ray of patient on arrival

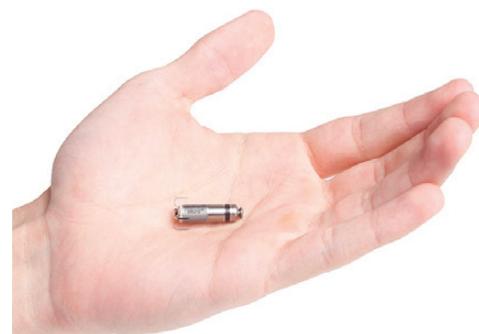


IMAGE 3: A permanent leadless cardiac pacemaker device

pacemakers on the market: Micra, made by Medtronic (our patient’s device), and Nanostim, made by Abbott Medical.

Leadless pacemakers are advantageous because many complications of traditional implantable transvenous pacemakers — such as pocket infections, lead dislodgement, hematomas, and lead fractures — are eliminated. Conversely, they only apply single chamber ventricular pacing and also lack defibrillation capacity.

It is also important to differentiate a leadless cardiac pacemaker from a cardiac loop recorder. The difference is subtle on the AP view as they may look similar, but the difference is clear on the lateral view and on physical exam as the loop recorder is placed subcutaneously whereas the permanent leadless cardiac pacemaker is within the ventricle.

This patient was ultimately admitted to the CCU and had her permanent leadless cardiac pacemaker interrogated. Atrial sensing thresholds were found to be too low and adjusted. The patient did have improvement of HR after adjustment but ultimately passed away in the CCU due to multiple comorbidities. ★

**KEY POINTS**

- A leadless pacemaker can be appreciated on CXR and on CT as a bullet-shaped and radiolucent object located in the right ventricle.
- A leadless pacemaker can be easily mistaken as a cardiac loop recorder on AP view of CXR. It can be differentiated on CXR lateral view and on physical exam.
- Leadless pacemakers only apply single chamber ventricular pacing and lack defibrillation capacity.
- Low atrial sensing threshold can lead to serious conduction abnormality and hemodynamic instability and require emergency evaluation by EP cardiology.

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the Representative Council meeting  
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(In conjunction with ACEP's Scientific Assembly)

#### 45 Days prior to Representative Council Meeting:

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- Bylaws Resolution Submission Deadline
- Election Candidate Deadline

#### 30 Days Prior to Representative Council Meeting:

- Vote Cut-Off Deadline
- Conference Committee Volunteer Deadline

#### 10 Days Prior to Representative Council Meeting:

- Late Resolution Deadline

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## CNS Manifestations in IgAV: A Pediatric Case Report

### Erin Bell, MD

Resident, PGY-3  
Department of Emergency Medicine  
University of Virginia Medical Center

### Abby Halm, MD

Resident, PGY-1  
Department of Pediatrics  
University of Utah Health

### Jakob Ottenhoff, DO

Assistant Professor of Emergency Medicine  
Ultrasound Faculty  
Department of Emergency Medicine  
University of Virginia Medical Center

### INITIAL PRESENTATION

A 10-year-old girl presented to the emergency department with 10 days of fever and sore throat, 1 day of arthralgias, and a lower extremity rash.

Approximately 1 week prior to presentation, the patient's father and brother had tested positive for strep throat. Due to the patient's ongoing symptoms, her primary care provider treated her empirically with a course of azithromycin, which the patient started 4 days prior to presentation. While her fever and sore throat improved after starting the antibiotic, they did not resolve, and she developed arthralgias and a lower extremity rash.

In the emergency department,

the patient was afebrile with normal vital signs. On exam she had perioral excoriations, mild tonsillar erythema, bilateral knee swelling with mild tenderness, an erythematous petechial rash on her abdomen, and 5-10 millimeter palpable purpura on bilateral lower extremities with excoriation (**Image 1**). Laboratory tests were notable for mild leukocytosis (9.57 K/UL, ref. range), elevated erythrocyte sedimentation rate (62 MM/H, ref. range 0-12 MM/H), and elevated C-Reactive protein (5.7 MG/DL, ref. range <0.5 MG/DL). Her anti-streptolysin O titer was elevated to 3620 IU/mL (ref range 0-640 IU/mL). Urinalysis was notable for trace

proteinuria but was concentrated.

The patient was admitted to the hospital overnight for monitoring. She was clinically diagnosed with Henoch-Schönlein purpura (HSP) immunoglobulin A vasculitis (IgAV) and peri-oral impetigo, for which she was prescribed a 10-day course of cephalexin. Additional recommendations included outpatient monitoring of blood pressure and repeat urinalysis to assess for secondary effects of IgAV.

### SECOND PRESENTATION

Five days after discharge, the patient re-presented to the ED with left-sided tingling and weakness. She also noted



IMAGE 1: Palpable purpura

that she developed an achy feeling in her torso and back that she continued to feel with deep breathing. She additionally endorsed persistent diffuse abdominal pain, nausea, and vomiting that had been occurring since her discharge from the hospital.

In the ED, she had diastolic hypertension (118/91) with otherwise normal vital signs. Her skin exam was notable for erythematous patches without clear borders on her bilateral wrists and forearms and light purple macules scattered on bilateral legs that had improved from purpura at her prior presentation. Her neurological exam was notable for left patellar

hyperreflexia, 4 to 5 beats of left ankle clonus, and decreased pinprick sensation over her left lower extremity.

Pediatric neurology was consulted. Magnetic resonance venography of the brain and spine revealed diffuse restriction in the right frontoparietal white matter extending to the right putamen/globus pallidus with acute/subacute infarction, for which she was started on baby Aspirin. General pediatrics admitted the patient to their service.

Pediatric neurology, nephrology, dermatology, rheumatology, cardiology, and genetics (due to concern for carrier trait of familial Mediterranean fever)

were consulted. A skin biopsy was diagnostic for IgAV.

Rheumatology labs were unremarkable, and genetic testing for familial Mediterranean fever was negative. Due to concern for vasculitis stroke, the patient received 125 mg of methylprednisolone every 6 hours for 3 days. She was ultimately discharged with daily 20 mg prednisone and rheumatology follow-up.

At an outpatient neurology follow-up 77 days after discharge, the patient's mother reported with concern for mild residual cognitive deficits (difficulty with measurements) and left-hand drooping while playing piano. The patient was otherwise doing well and had a full return of strength, sensation, and energy levels.

## DISCUSSION

IgAV is the most common form of present vasculitis in children,<sup>1</sup> accounting for an estimated 58% of primary vasculitis in children,<sup>2</sup> and with an estimated annual incidence of approximately 10-20 cases per 100,000.<sup>3,4</sup>

Immunoglobulin A (IgA) is an immunoglobulin present in mucosal tissues. While the exact pathophysiology of IgAV is unknown, it is thought to be related to abnormal glycosylation of the hinge region of IgA1, which serves as an antigen to autoantibodies that then form immune complex.<sup>1,5</sup>

Diagnosis is clinical and includes the presence of palpable purpura with at least 1 of the following: a biopsy demonstrating IgA deposition with gastrointestinal (abdominal pain), musculoskeletal (arthralgias or arthritis), or renal (hematuria or proteinuria) involvement.<sup>3</sup>

Less commonly, patients with IgAV will present with involvement of the neurologic system, cardiopulmonary system, or scrotum.<sup>5</sup>

The patient in this case met several criteria: biopsy, arthralgias, and trace proteinuria.

Treatment varies based on the severity of organ system involvement, but it is typically supportive.<sup>2</sup>

Interestingly, infection —

particularly infection with streptococcus bacteria — has been identified as a common trigger for the development of IgAV.<sup>2</sup> This was seen in this particular case. In a study of 1,200 pediatric cases of IgAV in China, potential infection was present in almost 51% of cases, with streptococcal infection being present in approximately 17% of cases.<sup>6</sup> Streptococcal involvement was found to be even higher (18.9% of cases) in a study examining more than 2,000 cases of IgAV in Chinese children.<sup>2</sup>

Central nervous system involvement in IgAV can occur; however, it is considered rare and only occurs in 1-8% of pediatric cases.<sup>7</sup> CNS involvement has been reported to include headaches, seizures, focal neurologic deficits, and posterior reversible encephalopathy.<sup>7,8</sup>

In one study that reviewed all CNS-involved HSP cases from 1969 to 2009, 44 of the 54 patients were younger than 20 years old.<sup>9</sup> Thirty-five of these patients had neuroimaging, which had a wide array of findings: vascular lesions involving 2 or more vessels, intracerebral hemorrhage, brain edema, and thrombosis of the superior sagittal sinus.

Interestingly, the patient in this case had neither any vascular abnormality nor thrombosis on the MRI/MRV. As there is a varying presentation of CNS involvement in HSP, this makes the diagnosis challenging.

Ideal management of CNS involvement in HSP has not been fully elucidated. Steroids and cyclophosphamide are reasonable choices in patients with cerebral lesions. Additional rheumatologic testing is often performed, as other vasculidities are more common to have CNS manifestations than HSP.<sup>9</sup> Consider ANA and ANCA testing in these patients.

## CONCLUSION

The general consensus for patients with HSP is that the majority of morbidity results from renal involvement. While HSP is relatively easy to diagnose, this case demonstrates that a thorough neurologic examination is prudent so as not to miss any CNS involvement, which

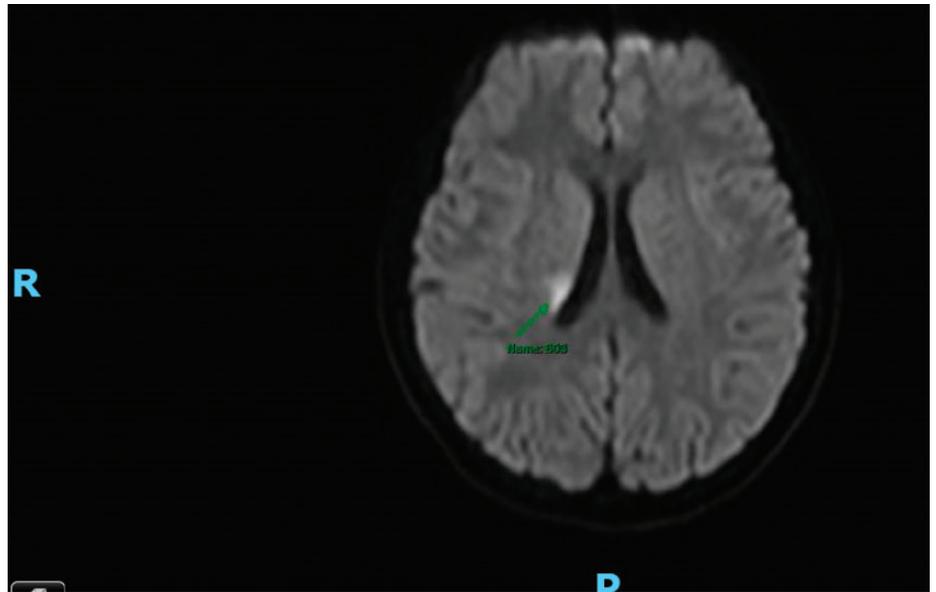


IMAGE 2: MRI

is more variable. CNS involvement, while rare, can also lead to morbidity.

This case was also complicated by a likely incorrectly treated streptococcal infection. Azithromycin was chosen due to family preference as the patient's

parents had penicillin allergies.

Fortunately, this particular patient had a good outcome with minimal neurologic sequelae. ★

## Henoch-Schönlein purpura (IgA vasculitis)



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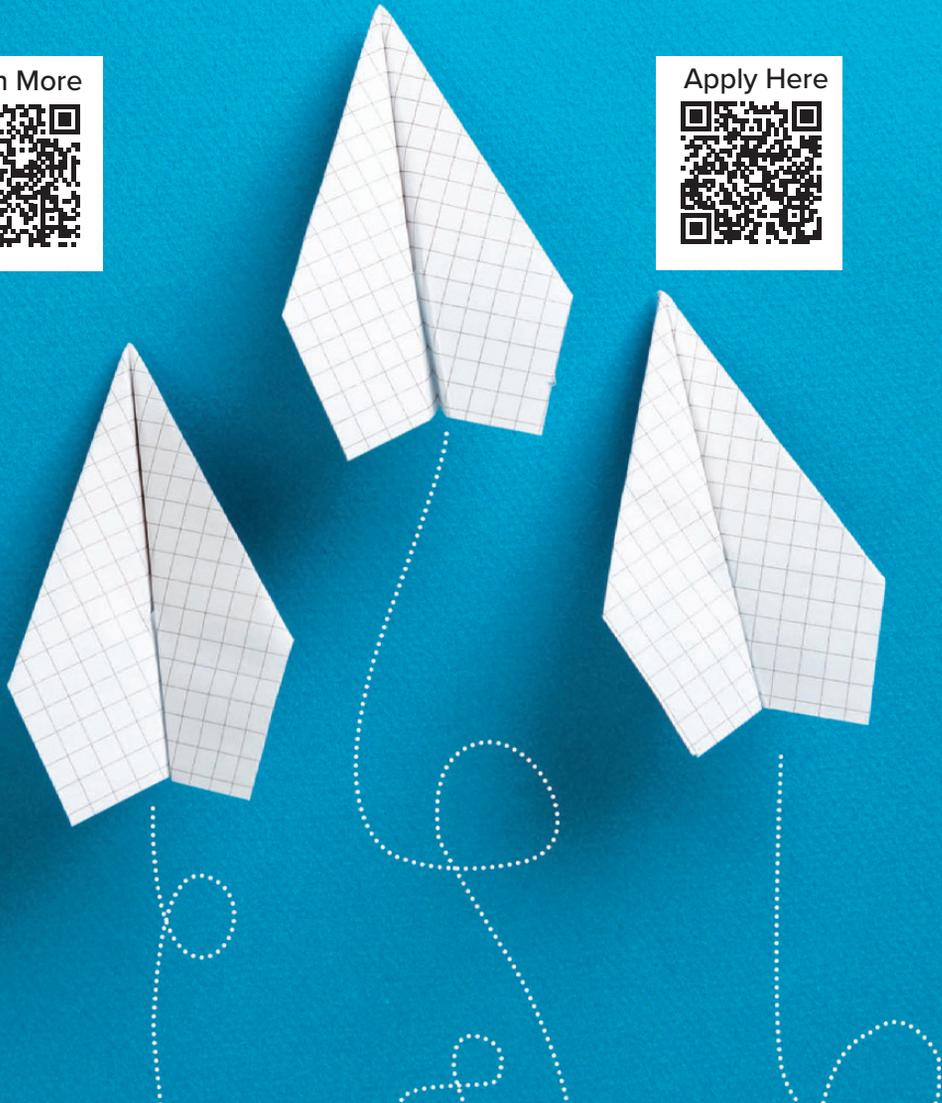
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# Case Report: Malaria, Dengue, and COVID-19 in a Migrant Entering the United States

## Russell Baker, DO

Assistant Professor  
Dept. of EM  
Director of EMS Division  
Texas Tech University Health Science  
Center of El Paso

## Brian Elmore, MD

Resident  
Dept. of EM  
Division of EMS  
Texas Tech University Health Science  
Center of El Paso

## Cynthia Rincon, DO

Resident  
Dept. of EM  
Division of EMS  
Texas Tech University Health Science  
Center of El Paso

## INTRODUCTION

In 2022, a record number of migrants arrived at the southern border of the United States.<sup>1</sup> Many of them traveled through regions of Central America where neglected tropical diseases such as malaria and dengue are endemic.<sup>2</sup>

Malaria is a mosquito-borne protozoal disease that commonly presents with cyclical fevers and myalgias and can manifest with profound anemia.<sup>3</sup> Dengue is a mosquito-borne arbovirus commonly presenting with fevers, myalgias, rash, and retro-orbital pain.<sup>4</sup>

In 2018, the most recent year for which data is available, the CDC reported 1,823 malaria cases diagnosed in the

United States. Many of these cases were in travelers from West Africa.<sup>5</sup>

Here, we present the case of a migrant from Venezuela with malaria, dengue, and COVID-19 co-infection.

## CASE DESCRIPTION

A 35-year-old Venezuelan man presented to the emergency department via EMS. He reported feeling generalized weakness and fatigue for 2.5 months. The patient had traveled on foot from Venezuela through Central America and Mexico. During his journey, the patient traveled through the Darien Gap, a large jungle between Colombia and Panama. He reported that physicians in

Panama treated him for dengue fever with an unknown injection; he had brief improvement in symptoms, but the symptoms quickly returned.

The patient presented to the ED 6 days after crossing the U.S.-Mexico border, with complaints of generalized body aches, headache, fevers, and darkened urine since his journey began 2 months prior.

On presentation, the patient was hemodynamically stable but febrile with a body temperature of 104.4 degrees Fahrenheit and tachycardic with a heart rate of 149 beats per minute. On physical exam, the patient appeared ill and diaphoretic but could speak

coherently in complete sentences. He was jaundiced; however, no rash was present. The patient's abdomen was soft and non-tender without palpable hepatosplenomegaly. His lungs were clear to auscultation bilaterally, and he remained tachycardic with a sinus rhythm. A tourniquet test for dengue fever was performed by inflating a blood pressure cuff over the patient's arm for approximately 5 minutes. No petechiae were observed following the test, and it was considered negative.

Laboratory studies were remarkable for severe normocytic anemia (hemoglobin 5.9 g/dL), hyperbilirubinemia (total bilirubin 2.1 mg/dL), and a positive COVID-19 rapid antigen test. The patient also had an elevated alkaline phosphatase (262 u/L), but AST/ALT were within normal limits. The patient did not have leukocytosis (**Table 1**). The initial chest X-ray was unremarkable and not concerning for infectious pneumonia.

The patient was admitted to the hospital to manage presumed plasmodium and dengue virus infection. He had persistent fevers and tachycardia despite antipyretics and IV fluid resuscitation. Malaria and dengue viral studies were pending at the time of admission. On day one of admission, *Plasmodium* ring-form trophozoites were identified on a blood smear, and a 3-day course of atovaquone-proguanil was initiated. The patient reported improved symptoms following the initiation of antimalarials, and tachycardia and fever began to improve. By the completion of his antimalarial course, the patient reported that his symptoms had resolved, and he remained asymptomatic for the remainder of his hospitalization.

*Plasmodium vivax* was eventually detected on PCR, and the patient was discharged on 14 days of oral primaquine after G6PD levels were normal. Additionally, the patient tested positive for IgG dengue viral antibodies during his hospital admission. Hemoglobin improved to 9.3 on the day of discharge without administering blood products. The patient was discharged after several days with

**TABLE 1**  
Presenting Lab Values Obtained in the Emergency Department

WBC	8.95 x 103/UL
Hemoglobin	5.9 G/DL
Hematocrit	17.7%
Platelets	210 x 103/UL
Sodium	135 mmol/L
Potassium	4.2 mmol/L
BUN	12 mg/dL
Creatinine	0.6 mg/dL
Albumin	2.6 G/dL
Bilirubin	1.3 mg/dL
AST	45 Unit/L
Alkaline Phosphatase	262 Unit/L
ALT	42 Unit/L
Lactic Acid	0.7 mmol/L

improved symptoms and clinical condition.

## DISCUSSION

Migrant patients presenting with fever can represent a diagnostic challenge. Migrants from Central and South America often traverse regions where neglected tropical diseases are endemic. The recent influx of migrants from South and Central America means that clinicians should have a high suspicion for tropical diseases in migrant patients presenting with fever and weakness.

In this case, the patient presented with a suspected co-infection of *Plasmodium vivax* malaria, dengue fever, and COVID-19 — infectious diseases with overlapping symptoms.

Malaria is a protozoal disease caused by *Plasmodium* sp. It is spread through the bites of infected Anopheles mosquitoes. Malaria is endemic to tropical regions of South and Central America, sub-Saharan Africa, and Asia, having been eradicated from the United States and Europe.<sup>3</sup> *Plasmodium vivax* is the most common malaria species in South and Central America, accounting for most cases.<sup>6,7</sup> *Plasmodium falciparum* is also endemic to this region, but is less common. *Falciparum* is typically responsible for more severe manifestations of malaria, including cerebral malaria, which can result in

**TABLE 2**  
2021 Malaria Cases in Common Migrant Transit Countries

Panama	4,585
Costa Rica	189
Nicaragua	29,457
Honduras	2,290
El Salvador	0
Guatemala	1,493
Mexico	242

seizures, coma, and death.<sup>3</sup>

Uncomplicated vivax and falciparum malaria manifest as cyclical fevers, myalgias, and chills. Laboratory manifestations include hyperbilirubinemia, thrombocytopenia, and anemia.<sup>3</sup>

Treatment depends on species and severity. Severe malaria, regardless of species, is typically treated with intravenous artesunate. Uncomplicated non-*Falciparum* malaria can be treated with oral chloroquine or an artemisinin-based combination therapy (ACT). Due to increasing resistance levels, chloroquine should be avoided when *Falciparum* infection is suspected, or the species is unknown. Three days of ACT is the first-line treatment for *Falciparum* malaria. It is safe and well tolerated in children and adults (after the first trimester in pregnant patients). It is rapidly effective in reducing parasite burden and improving symptoms, as seen in this case. Treatment should not be delayed when malaria is suspected. Second-line treatments include different ACT regimens or 7-day treatments with quinine or artesunate with doxycycline or clindamycin.<sup>3</sup>

*Plasmodium vivax* has a dormant hepatic stage (*hypnozoite*) that can lead to relapses over a year after initial infection. Patients infected with *Plasmodium vivax* malaria require 14 days of primaquine to eliminate the *hypnozoite* stage and prevent relapse. However, patients must be tested for



G6PD deficiency before initiation of primaquine because this medication can induce hemolysis in patients with G6PD deficiency. Lower dosing of primaquine can be used for these individuals.<sup>3</sup>

Dengue fever is an arbovirus transmitted by the *Aedes* mosquito. Its distribution significantly overlaps with malaria and is endemic to Central and South America, sub-Saharan Africa, and Asia. Unlike the *Anopheles* mosquito, *Aedes* sp. is also found in the southern United States and serves as a vector for dengue virus, zika virus, chikungunya, and yellow fever.<sup>14</sup>

Because *Aedes* sp. is endemic to the United States, local transmission of dengue fever can occur. However, most cases of dengue fever are imported by travelers. In 2022, 1,188 cases of dengue fever were reported to the CDC; of these, only 4.9% were suspected to be locally transmitted.<sup>15</sup>

Dengue classically presents with fever, retro-orbital headache, and severe myalgias. A macular, erythematous rash is sometimes present during the end of the febrile period. Most episodes of dengue resolve within 5-7 days. Laboratory abnormalities include leukopenia and thrombocytopenia.<sup>4</sup>

More severe manifestations of dengue include dengue hemorrhagic fever, which is notable for severe coagulopathy and hemorrhage.<sup>4</sup>

Given this patient's rapid clinical improvement following ACT, it is likely that *Plasmodium vivax* infection was the primary source of his symptoms. The patient's positive IgG antibody to dengue virus likely represented a more remote infection, plausibly at the start of his journey to the United States. IgM and the dengue NS1 antigen were not detected. Both the NS1 antigen and IgM antibody to dengue are markers of recent infection. The NS1 antigen is detectable from days 1-18 following infection, and the IgM antibody is detectable 5 days after infection and can persist for up to 3 months following infection. IgG will typically be detectable for years following infection.<sup>16</sup>

Based on the patient's recent reporting of a dengue viral diagnosis, we presume he likely acquired a dengue viral infection that was then closely followed or overlapped by subsequent malaria infection. The patient reported frequently being bitten by mosquitoes while crossing the Darien Gap, and he likely contracted malaria and dengue during

this period. Both *Aedes* and *Anopheles* mosquitoes are common in the Darien jungle, as well as in Central America.<sup>8,9</sup> His dengue fever likely self-resolved prior to admission. The time since infection (more than 2 months) likely contributed to a heavy parasite load and was responsible for the severity of his symptoms, including profound anemia.

Unfortunately, this patient's hospital stay was prolonged, pending the PCR identification of the malaria species responsible for his infection to determine whether primaquine was necessary. Hospitals treating migrant patients may consider utilizing malaria rapid diagnostic tests (RDTs) to prevent delays in care. The malaria RDT, approved for use in the United States, has a sensitivity and specificity of 84.2% and 99.8%, respectively.<sup>10</sup> Malaria RDTs can differentiate between *Falciparum* and non-*Falciparum* species of malaria.<sup>10</sup>

It is unclear to what degree COVID-19 contributed to the patient's presentation. Given his rapid improvement following antimalarials, he likely had an asymptomatic or mild COVID-19 infection. Treatment with Paxlovid was deferred as it was unknown when the patient contracted COVID-19,

and Paxlovid has significant interactions with atovaquone.<sup>17</sup>

Prior to arrival, the patient was staying at a shelter. Many migrants initially rely on shelters for housing after crossing into the United States. These shelters, often run by non-governmental organizations, are frequently over maximum capacity with poor infection-control measures. COVID-19 should be considered in any migrant patient presenting with a fever.

The Central American tropical lowlands, through which migrants traverse enroute to the United States, are host to many endemic tropical diseases. Malaria is endemic in each country migrants commonly transit through, except for El Salvador (**Table 2**).<sup>18</sup> Areas of particularly high incidence along the transit route include southern Panama and the Caribbean coasts of Nicaragua and Honduras.

This patient became symptomatic after traveling through the Darien Gap,

a jungle where migrants sleep outside, are constantly exposed to mosquitos, and drink dirty stream water. Mosquito-borne arboviruses, such as dengue, chikungunya, and zika, are increasingly concerning in this region.<sup>11</sup> The prevalence of dengue in Central America increased by 288% from 2000 to 2017.<sup>12</sup>

In the border community of El Paso, Texas, where this patient was treated, malaria cases are increasing. From 2018-2021, 3 cases of malaria were reported. In 2022 and the first several months of 2023, 19 malaria cases were reported, a 533% increase.

As more migrant patients travel to the United States through Central America, clinicians must be able to recognize the tropical diseases they are exposed to during their journey.

#### CONCLUSION

In 2022, U.S. Customs and Border Protection reported 2.76 million encounters with migrants at the southern

border of the United States.<sup>1</sup> A common route for migration is through the tropical lowlands of Central America, including the Darien Gap. In 2022, more than 200,000 migrants crossed the Darien, according to Panama government officials.<sup>13</sup>

Migrants are vulnerable to various neglected tropical diseases as they traverse this region, including malaria, mosquito-borne arboviruses, and helminth diseases. The congregate settings where migrants shelter also render them vulnerable to communicable diseases such as COVID-19.

As more migrants arrive at our southern border, clinicians will likely encounter migrant patients with fevers. Clinicians must have high suspicion and familiarize themselves with managing tropical diseases. Co-infection of multiple tropical and communicable diseases, as seen in this case, should also be considered. ★



# CASE REPORT: A Review of Clonidine Overdose Management

## Rachel Martin, MD

Resident, PGY-2  
Emergency Medicine Residency Program  
Charleston Area Medical Center

## Andrew Morgan, DO

Attending Physician  
Department of Emergency Medicine  
West Virginia University

## Mark Gustafson, DO, FACEP

Program Director  
Department of Emergency Medicine  
Charleston Area Medical Center

### CASE PRESENTATION

A 15-year-old male arrives via EMS approximately 1 hour after an intentional overdose of an estimated 20-25 0.3 mg tablets of clonidine. The patient denied co-ingestion with other agents. Triage blood pressure was 107/74 with heart rate of 84 bpm. The patient was initially drowsy but awake and oriented. However, the patient became more somnolent throughout the ED course, approximately 80 minutes post-ingestion. He became bradycardic and hypotensive and was minimally responsive with markedly reduced respirations.

### DISCUSSION

Clonidine was initially marketed

as a nasal decongestant. However, a commonly observed side effect was hypotension, leading toward its use as an antihypertensive agent.<sup>1</sup> Although clonidine is primarily used for hypertension, it can also be a useful treatment for other conditions including ADHD, Tourette's syndrome, cancer-related pain, neonatal opioid withdrawal syndrome, alcohol or opioid withdrawal, anxiety, PTSD, restless leg syndrome, menopausal hot flashes, and vascular migraine prophylaxis. It can be administered via oral tablets, oral suspension, injectable solution, transdermal patch, and topical cream.<sup>2</sup>

Clonidine acts on  $\alpha_2$ -adrenergic receptors in the CNS, which inhibits the release of peripheral catecholamines.

This leads to a decrease in heart rate, cardiac contractility, and peripheral vascular resistance. The sympatholytic effect is modulated by nitric oxide and gamma-aminobutyric acid, which can lead to variability on the individual level in presentation of toxicity.<sup>3-5</sup>

Additionally, clonidine has been shown to activate I1-imidazoline receptors, which also has an antihypertensive effect.<sup>6</sup>

It has been proposed that clonidine may promote the release of endogenous opioids and/or directly stimulate opioid receptors.<sup>7,8</sup> The opioid-like effect is believed to be from interaction with I2-imidazoline receptors, which are involved in pain reception modulation, as well as promotion of  $\beta$ -endorphin release,



which can directly interact with opioid receptors.<sup>9</sup>

Because of its mechanism of action, clonidine toxicity may present as bradycardia, hypotension, decreased respiratory rate, and CNS depression. In some cases, patients may present with hypertension, especially shortly after ingestion or exposure.<sup>10</sup>

The onset of action is typically 30-60 minutes after ingestion.<sup>11</sup> Clonidine reaches peak serum around 2-3 hours, and effects can last up to 8 hours.<sup>12</sup> It is found to be 20-40% bound to protein in circulation. The majority is renally excreted.<sup>13</sup> The pharmacokinetics may vary based on a patient's serum protein concentration, metabolic rate, and renal function.

Overdoses can be intentional or accidental. In intentional overdose, clonidine is often co-ingested with other agents. Compounding abnormalities can lead to accidental overdose, as it can be unclear how large of a dose is being administered.<sup>14</sup> Although overdose is typically seen with oral formulations, there has been documentation of overdoses with topical formulations, especially within the pediatric population.<sup>15,16</sup>

Effects of overdose can vary based on the dose ingested and the patient's age. Adult patients may be asymptomatic or have mild effects, while a single tablet can lead to significant symptoms in a child.<sup>17</sup> Differences between different age groups within pediatric patients have been observed, as younger children present with severe bradycardia while severe hypotension is seen more in adolescents.<sup>18</sup>

### MANAGEMENT

Management of clonidine overdose is case-dependent. Clonidine is not included in most serum or urine assays. The diagnosis of acute toxicity is based on historical information or clinical suspicion based on patient presentation and hemodynamic abnormalities.

The mainstay of treatment is supportive care. Evaluation of airway compromise, breathing abnormalities, and cardiovascular disruption should take precedence. Endotracheal

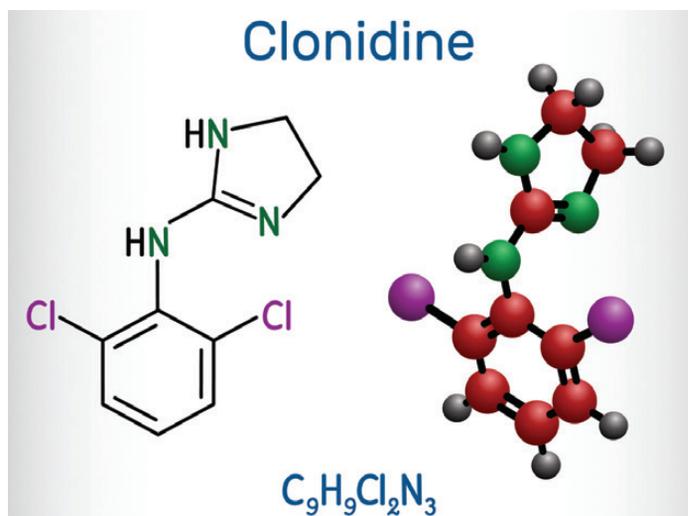
intubation may be considered but comes with the risk of increased morbidity and longer hospital stay. Supplemental oxygen also may be considered.

Hypotension may be addressed with crystalloid fluid resuscitation. Symptomatic bradycardia may be treated with atropine. In severe and prolonged hypertension, antihypertensive agents such as nicardipine or nitroprusside can be used. Historically, tolazoline, furosemide, and diazoxide have also been used successfully.<sup>19,20,21</sup>

Naloxone administration has been shown to have a beneficial effect in acute clonidine toxicity, especially in pediatric patients with CNS depression. This is likely due to the association of endogenous opioid release and agonism of opioid receptors. Dosage of naloxone for reversal may be higher than exogenous opioid reversal and can be up to 10 mg. Repeat administration may be necessary. In rare instances, naloxone infusions have been utilized after boluses. Naloxone administration usually improves somnolence, but patients may remain persistently bradycardic. Patients may also experience transient hypertension after administration, but this typically self-resolves.<sup>22</sup>

Naloxone may not be beneficial in some cases. In a study focused on adult patients, naloxone administration was not clinically significant.<sup>23</sup> Some pediatric cases are refractory to naloxone but responsive to isotonic crystalloid and atropine.<sup>24</sup>

However, naloxone has a safe drug profile and has not been shown to produce adverse effects when used for clonidine toxicity reversal. It can reduce the need for endotracheal intubation and CT imaging in pediatric patients, thus decreasing morbidity and mortality. Therefore, it should be considered.<sup>22</sup>



### CASE RESOLUTION

EKG showed sinus bradycardia with incomplete right bundle branch block. Laboratory studies — including CBC with differential, CMP, serum toxicology, and urine drug screen — were within normal limits. Given the decline in mental status and worsening vital signs, the patient was given a 4 mg IV bolus dose of naloxone, with no improvement. After an additional 6 mg bolus dose of naloxone, the patient immediately became more alert. He was subsequently placed on a naloxone infusion at 10 mg/hr and admitted to the pediatric ICU. The patient did not require additional medical intervention and was discharged to an inpatient psychiatric facility after a 2-day ICU course.

### CONCLUSION

Clonidine is a widely available drug and has been seen as the culprit in an increased number of intentional and accidental overdoses. Symptoms of toxicity include hypertension or hypotension, bradycardia, respiratory depression, and CNS depression. The mainstay of treatment is supportive care. Naloxone may play a role in pediatric patients with CNS depression and can decrease the need for endotracheal intubation and improve morbidity. Clinicians should be cognizant that higher than typical doses for opioid overdose may be required when clonidine ingestion is suspected or known. ★



## Caring for LEP Populations in the ED: A Quick Guide

### Denise Marte, MD

Resident, PGY-4  
Emergency Medicine  
New York Presbyterian -  
Columbia & Cornell University

### Victoria Pereira, MD

Resident, PGY-2  
Emergency Medicine  
New York Presbyterian -  
Columbia & Cornell University

### Trudi Cloyd, MD, MS

Assistant Professor  
Emergency Medicine  
Columbia University Medical Center

**EDs are critical entry points for establishing medical care in the United States for marginalized and immigrant populations. It is imperative to actively address issues specific to these individuals, who often have limited English proficiency (LEP). Language and communication — including having appropriate language or translation services available when needed — are essential for effective medical care and disposition. By implementing standardized high-quality language services for our patients with LEP, we can improve quality of care and health outcomes for these individuals and communities.**

**L**imited English proficiency (LEP) is a federal term used to describe individuals who do not speak English as their primary language and have limited ability to read, speak, write, or understand English.<sup>1</sup> The U.S. Census Bureau defines those with LEP as individuals over age 5 who speak English “less than very well.”

Eight percent of the U.S. population (approximately 25.7 million people) had limited proficiency in English as of 2021. That number nearly doubled from the 1980s, when LEP individuals accounted for only 4.8% of the population.<sup>2</sup>

In the United States, the majority (62%) of individuals with LEP are Hispanic adults who speak Spanish

as their primary language, and more than a fifth (22%) are Asian.<sup>3</sup> The highest populations of LEP individuals traditionally have been found in 6 states: California > Texas > Florida > New York > Illinois > and New Jersey.

Although the distribution of LEP patients varies from region to region, language-concordant care is a prescient issue that affects all health-care systems.

Under Title VI of the Civil Rights Act, LEP individuals are entitled to language assistance when receiving any service, benefit, or encounter provided by facilities that accept federal dollars (including reimbursement via Medicare or Medicaid).<sup>4</sup> National Culturally and Linguistically Appropriate Services

Standards (National CLAS Standards) provide guidance to health-care and health-care-related entities on best approaches for implementing and monitoring services for LEP individuals. Federal requirements mandate that all recipients of federal funds achieve and adhere to these standards, which aim to advance health equity, improve quality, and reduce health-care disparities.<sup>5</sup>

EDs are critical entry points for establishing medical care in the United States for marginalized and immigrant populations. Some studies have shown, though, that LEP patients have lower rates of testing and procedures, shorter ED durations, less medication, and decreased frequency of intravenous

placement compared to English-speaking patients (ESP).<sup>3</sup>

To prevent further delays to appropriate treatment and care, it is imperative to actively address issues specific to LEP individuals. Language and communication — including having appropriate language or translation services available when needed — are essential for effective medical care and disposition. By implementing standardized high-quality language services for our patients with LEP, we can improve quality of care and health outcomes for these individuals and communities.

### RISK FACTORS, CLINICAL OUTCOMES

LEP is an important and frequently encountered social determinant of health in the emergency department. LEP patients face significant communication barriers, which often intersect with health literacy and other structural determinants of health. Individuals with LEP are more likely to be uninsured than their ESP counterparts. Despite increases in coverage after the passage of the Affordable Care Act of 2010, LEP patients remain 3 times as likely as ESPs to be uninsured.<sup>6,7</sup>

Studies clearly demonstrate that LEP patients who are not provided interpreters receive markedly different medical management and care than ESPs in the ED.<sup>2</sup> LEP status is associated with increased risk of delayed presentations for strokes and heart attacks secondary to limited knowledge of pertinent warning symptoms. According to some reports, individuals with LEP have been found to have higher rates of diagnostic testing in the ED and higher rates of hospitalization,<sup>8</sup> and LEP status is associated with longer length of stay and increased ED return visits when professional interpreters are not utilized at time of admission or discharge.<sup>9,10</sup>

Additionally, language barriers place patients at increased risk for clinically significant adverse patient safety events. In an analysis of these adverse events, a majority were found to be secondary to communication errors and, in particular, errors of omission on behalf of patients

or providers (for example, an omitted medication allergy disclosure from the patient or an omitted procedural risk from the provider that then becomes clinically relevant). Adverse events affecting those with LEP are associated with a higher incidence of physical harm and more severe levels of harm than those that occurred in the care of ESPs.<sup>11,12</sup>

### BEDSIDE AWARENESS

As emergency physicians, we are charged with caring for diverse groups of patients, determining who is the sickest among them, and appropriately allocating our resources to screen for and treat life- and limb-threatening emergencies. As such, timely and accurate communication in emergency medicine is imperative, as it has a profound impact on our differential diagnoses and subsequent health outcomes.

We can help reduce health inequities at the bedside for individuals with LEP by:

- Routinely screening for language preference in the health-care setting, and utilizing EMR systems to trigger the need for language interpretation on current and future visits. Do not assume that patients with LEP are equally comfortable discussing nuanced and complex topics about their health in English. Have a low threshold to inquire with any patient: “Is there a language other than English that you would prefer to speak in for this visit?”
- Clearly documenting the use of interpreter services in the HPI and subsequent progress notes. It is important to use interpreter services not just for the initial HPI, but also for reassessments, shared decision-making, disposition planning, procedural or blood consents, and goals-of-care discussions.
- Considering additional social determinants of health likely to impact LEP patients, as they are more likely to have poorer patient outcomes, difficulties accessing care, lack of insurance, and higher rates of ED return visits compared to their

English-speaking counterparts.<sup>2</sup>

### KEY ACTIONS

As emergency physicians, we can address these social/structural determinants of health by actively engaging in the following actions.

**Ensure all patients with LEP receive official (either in-person or remote via video or phone) interpretation during ED visits.** While this will require additional preparation and apparent delay upfront, it will assure the visit progresses smoothly with less risk for misunderstanding and adverse patient outcomes.

- Recognize when your own language abilities are limited. If you are not certified to speak medical terminology in a language other than English, do not attempt to provide care in that language. Your language skills will limit your ability to obtain an accurate history and provide appropriate care. You must be able to discuss complex and nuanced topics (e.g., sexually transmitted infections, new cancer diagnoses, breaking bad news) to ensure that your patient fully understands the treatment and plan.<sup>13</sup>
- It is not appropriate to assume that bilingual ED staff can provide accurate medical interpretation. For example, many individuals may feel confident speaking another language conversationally but lack the proficiency and vocabulary to discuss complex health topics and medical care.

**Refrain from using family members or friends as interpreters.** Preparation here is key! Quickly glance at any documented preference in your medical record before evaluating your patient, and show up at the bedside with your official interpretation modality ready.

- While often eager to assist, family members and friends likely do not possess the medical vocabulary or knowledge to discuss or describe medical events.
- Patients may be less likely to disclose



sensitive components of their medical history (such as HIV status), sexual history, and pertinent social history (such as substance use or abuse, interpersonal violence, or concerns of forced labor/trafficking) if family is present.

**Follow best practices for interpreter use.** This includes:

- Always speak to your patient in the first person.
- Maintain your gaze on the patient and not the interpreter. This imitates having a 1-on-1 conversation with the patient.
- Speak in short sentences, and take breaks to allow the interpreter to convey everything you are saying. Empower your interpreter to notify you if they need the pace of the conversation modified.
- Brief your interpreter prior to sensitive discussions so they know the tone of the conversation. Examples of this might include a goals-of-care discussion, new HIV diagnosis, or the finding of a new malignancy.

**Consider the effective use of interpreters as a procedure** in which you can and should become very skilled and competent. Simulation can be an excellent educational tool that can help trainees and other members of your department learn how best to use in-person or remote interpreters in various clinical scenarios.

**Provide language-concordant care plan updates.** Use interpreters to discuss updates. Many LEP patients leave with a sense of not understanding what medical services were done for them. This should be just as important as gathering an HPI. If admitting the patient to the hospital, it is imperative that you share the plan and rationale in their language, employing teach-back methods to assess for understanding.

**Use clear, simple-to-understand, vetted discharge instructions** for common ED diagnoses. Know that translation applications such as Google Translate are inconsistent between languages and should not be relied on routinely for discharge instructions.<sup>14</sup> If no other options are available, be aware that these applications are meant to work with simple sentences (e.g., a sentence with only 1 subject and 1 verb).

**When prescribing medication, always write out medication instructions in the patient's preferred language** in your discharge instructions. Most pharmacies do not collect primary language information and do not print medication instructions in a patient's primary language.

**Know that LEP patients have a higher chance of poor access to follow-up care and high rates of being uninsured.** If close follow-up is required, inquire about insurance status,

stating clearly that this is important for you to help them best navigate the health system. Be sure to involve patient navigators, care managers, or social workers early to help ensure adequate access to timely follow-up.

**TERMINOLOGY**

The term “LEP” is not without criticism, and more people and groups are demanding a shift away from that term, especially as it relates to health care and research. Those who support a change in terminology feel that “LEP” reinforces negative stereotypes and may be seen as pejorative to members of that population. The push for change includes attempts by non-health-care-related entities, such as the American Communities Survey, to change “LEP” to “LOTE” (Language other than English). However, neither the U.S. Census Bureau nor the federal government has formally adopted new terminology; thus LEP remains the most widely used term.<sup>15</sup> ★

*This article is part of an EMRA Social EM Committee initiative to disseminate information about social EM topics encountered in the emergency department. More information can be found in the EMRA MobileEM app's Patient Conversation Toolkit, available for download via iTunes and Google Play.*

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## Palliative Care vs. Hospice: The Role of the Emergency Physician

**Syna Daudfar, DO**  
Resident  
Emergency Medicine  
Creighton University

**Geoff Comp, DO, FAWM**  
Assistant Professor  
University of Arizona College  
of Medicine, Phoenix  
Assistant Professor  
Health Sciences Associated Faculty  
Creighton University School of Medicine

**Jonathan Burton, DO**  
Hospice & Palliative Medicine Specialist  
Internal Medicine  
OhioHealth Riverside Methodist Hospital

*“All patients with serious illness should have access  
to quality palliative care.”*

— Center for Advancement of Palliative Care

**T**he role of EM in the house of medicine has traditionally included preserving and prolonging life. We have contributed to high end-of-life costs and placed significant financial, emotional, and professional burdens on patients and family members. In

one study, 77% of patients seen in the emergency department in their last month of life were admitted to a hospital in the last month of life, with 68% of those dying in the hospital.<sup>1</sup>

Meanwhile, those enrolled in hospice at least a month before death rarely

visited the emergency department.<sup>2</sup>

### **PALLIATIVE CARE**

Several studies have indicated that involving palliative care earlier during a patient’s hospitalization has numerous advantages. One study found that

having a palliative care provider in the ED may reduce costs. Another study demonstrated the personal benefits of early implementation of palliative care, including improving patients' quality of life, longer median survival estimates, and reduced length of stay. By receiving palliative care, patients and their families experience a decrease in the burden of medical costs and an increase in their quality of life.<sup>3,4,5,6</sup> These services are available to patients through Medicare Part A, Part B, and most private insurance providers.

Palliative care services are defined as patient-centered care for any patient, irrespective of age, with a severe or chronic life-limiting illness, not necessarily based on a patient's prognosis.<sup>7</sup>

An analysis by the Institute of Medicine Committee on Approaching Death in 2011 indicated that 11% of health-care costs went to those with a life expectancy of less than 1 year.<sup>8</sup> For those whose life expectancy was greater than 1 year, 40% had persistent, year-after-year high spending.

Palliative care specialists best serve this population of patients and their families. For those living with chronic illness, palliative care services can be available for decades. Specifically, patients who benefit from palliative care are those with functional dependency, frailty, cognitive impairment, caregiver exhaustion, social vulnerabilities, and multiple comorbidities. Patients may receive this service concurrent with disease treatment from disease onset.

Palliative care specialists help patients understand their underlying disease, provide disease-mediated and treatment-associated symptom management, and facilitate goals-of-care discussions. They provide social support for patients and families, answer questions regarding symptom management and new symptom onset, and facilitate therapy sessions with social work teams as well as spiritual guidance. Caregivers also have physical, emotional, and practical needs assessed and supported.

Patients qualify for this service under fee-for-service billing under Medicare

Part B or contracts with payers using various payment models. Complex illnesses are chronic with multi-year trajectories, periods of crisis, and emotional and physical exhaustion for patients and their families. Understanding the services provided by palliative care and the impact palliative care can have on meaningful patient outcomes can significantly improve quality of life while minimizing emergency department or hospital utilization.

### HOSPICE

Hospice is a model of palliative care for patients whose natural progression of disease(s) is expected to result in death within 6 months. Patients may benefit from this specialty service if curative treatments are unavailable or no longer desired.<sup>9</sup>

Enrollment allows patients to receive comprehensive medical care outside the hospital, including nursing visits, medications, equipment, social work support, and spiritual support. Patients and families on hospice care also have access to a 24/7 hotline for questions

and support, as well as opportunities for family respite care. Other facilities include inpatient hospice units, where patients can be directly admitted, that provide a good option for rapid ED disposition. Admission criteria for general inpatient hospice require that patients have uncontrolled pain or symptoms that cannot be managed in the standard hospice setting, or respite care for family members. Whether at home or in inpatient facilities, hospice teams maximize the opportunity for patients to spend their last moments in their chosen setting, instead of the one chosen for them.

### BARRIERS

Barriers to providing patients with palliative care services exist due to limited availability in emergency departments and inpatient admissions.

Despite the growth of palliative care programs in larger hospitals, a tiny fraction of eligible patients receives these services, often due to limited resources and staffing. As a result, primary care and ED providers must be comfortable with advance directives and goals-of-care



conversations.<sup>10</sup>

Historically, primary care providers have led these conversations at the initiation of referrals to disease-modifying treatments. In that setting, patients are not yet suffering from serious illnesses causing loss of quality of life.

Emergency physicians can be more present in discussing disease processes and patients' goals of care, but barriers exist in the fast-paced ED environment; physicians often shoulder multiple responsibilities, making it challenging to hold such ongoing conversations with the patience and compassion that patients seek. As a result, such conversations often begin during admission or in the actively dying process.

Additional barriers include limited understanding of the prognosis for both patient and provider, time constraints, anxiety surrounding such conversations, and inability to coordinate with specialty teams and family resources. If emergency physicians are able to

initiate conversations and provide early intervention, then the ED presents a unique opportunity to substantially improve quality of life and capture patients who may benefit from palliative care services.

In 2013, ACEP and the Choosing Wisely Campaign engaged patients suffering from serious illnesses with conversations about palliative care and hospice services. ED presentations of seriously ill patients open up opportunities to discuss code status, care goals, and the role of palliative care in subacute disease management.

For admitted patients, early consultation with palliative care can facilitate multidisciplinary communication. Patients discharged home may benefit from referrals to outpatient palliative care or social workers and case management teams to minimize recurring ED visits. This especially applies to patients who qualify for hospice services.

For critically ill patients, emergency

physicians' hyperacute conversations regarding goals of care are crucial in changing the direction of treatment.<sup>12</sup> Both ACEP and EMRA offer toolkits to recognize patients with serious illnesses and improve goals-of-care conversations. Exploring patients' and families' prior experiences with determining their primary goals and understanding hospice care — and explaining how their goals align with hospice — can be an effective way to introduce a potential transition in care to one of these services.

Palliative care providers exist to give expert consultation and assistance with complex decision-making conversations; however, emergency physicians and primary care providers carry initial palliative care conversations, especially early in the disease course. Clinicians should use this paradigm to provide clear communication, caregiver support, well-coordinated care, and symptom management, particularly in patients with serious illnesses. ★



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Emergency Medicine Residents' Association

# Health Literacy in the ED: A Quick Guide

**Denise Marte, MD**

Resident, PGY-4  
Emergency Medicine  
New York Presbyterian - Columbia & Cornell  
University

**Gabriela Galli, MD**

Resident, PGY-2  
Emergency Medicine  
New York Presbyterian -  
Columbia & Cornell University

**Trudi Cloyd, MD, MS**

Assistant Professor  
Emergency Medicine  
Columbia University Medical Center

**P**ersonal health literacy is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.

*Organizational health literacy* is the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform these same health-related decisions.

Health literacy also incorporates numeracy, which is the ability to read and understand numbers.<sup>1</sup>

Low health literacy is very common.

According to the CDC, nearly 9 out of 10 adults struggle to understand and use personal and public health information when it's filled with unfamiliar or complex terms.<sup>2</sup> Those with lower educational attainment, the elderly, underserved minorities, and those with limited English proficiency are at higher risk of low health literacy.<sup>3,4</sup>

**RISK FACTORS, CLINICAL OUTCOMES**

Poor health literacy is one of the most common social determinants of health that we encounter daily in the ED.

Limited health literacy results in higher rates of morbidity and mortality.

One 2017 research study found that after adjusting for covariates, patients with limited health literacy had 2.3 (95% CI 1.7–3.1) times the number of potentially preventable ED visits resulting in hospital admission, 1.4 (95% CI 1.0–2.0) times the number of treat-and-release visits, and 1.9 (95% CI 1.5–2.4) times the number of total preventable ED visits when compared to individuals with adequate health literacy.<sup>6</sup>

Limited health literacy increases costs for the health-care system. Through its impact on medical errors, increased illness and disability, loss of wages, increased ED utilization, and



compromised public health, low health literacy is estimated to cost the U.S. economy up to \$236 billion annually. Improving health literacy nationwide could prevent nearly 1 million hospital visits and save health care more than \$25 billion a year.<sup>5</sup>

### BEDSIDE AWARENESS

As emergency physicians, we are responsible for adequately communicating with patients about everything from why we are performing certain tests to the risks of specific interventions. Clear communication in our specialty is imperative, and it is therefore very important that we know how to best assess and address low health literacy in the ED.

We can help reconcile health inequities at the bedside for individuals with low health literacy by:

- Leading with the assumption that patients do not understand what is happening to them or why. Patients often do not understand how the history and events they report determines our workup or medical decision-making.
- Asking patients what they understand about their evaluation and testing. This gives a sense of where key misunderstandings exist, what needs to be re-explained, and how to best guide the patient through the rest of the ED visit.
- Documenting concerns of low health literacy and any mitigation steps you will employ throughout the visit. (Consider implementing the ICD-10 code “Problems related to health literacy” to flag future health-care providers.)
- Carefully considering your discussions of risk, percentages, or options. Avoid using non-medical language or terminology. Be mindful of bias in your language when employing methods such as shared decision-making or expressing recommendations during goals-of-care conversations.
- Considering a history of poorer patient outcomes, increased rates of morbidity, and higher rates of ED return visits throughout the patient interview and again when discussing disposition with patients.



### KEY ACTIONS

As emergency physicians, we can address these social/structural determinants of health by actively engaging in the following actions.

**Skills training.** Consider effective communication of test results, risks and benefits, procedural consents, or end-of-life discussions to be a key skill that you can and will become competent in during your training. As such, using role play or simulation can be a useful tool to help you, your co-residents, and other members of your department improve communication skills. If you keep the patient with low health literacy in mind at all times, all of your patients will benefit from more effective communication.

**Care coordination and social work.** Involve care coordination and/or social work often and early, especially if you will be relying on outpatient providers to continue care after the visit, such as when referring a patient to urology after they had a foley placed in the ED for acute urinary retention. This can be key in preventing loss to follow-up care and ED return visits.

#### When handling discharge:

- Use the teach-back method as a way of checking understanding by asking patients to state in their own words what they know or need to do about their health. It is a way to confirm that you have explained things in a manner that patients understand. With

the teach-back method, remember to “chunk and check.” Chunk information into small segments rather than employing teach-back at the end of a lengthy and complicated medical discussion.<sup>7</sup> A wealth of practical information on teach-back strategies can be found at [www.teachbacktraining.org](http://www.teachbacktraining.org).

- Use simple language handouts for common ED discharge diagnoses. These are premade in most EMRs.
- For uncommon diagnoses or care plans, consider the readability of your instructions. Write out anticipatory guidance and return precautions with simple sentence structure, using no more than 1 noun and 1 verb per sentence. Use videos when possible. For example, many EMR handouts contain video options for explaining to patients how to care for splints.
- If available in your ED, always use patient navigators (or other institutional resources), who are instrumental in helping patients navigate the complex health-care system. ED patient navigators are associated with higher rates of initiation of primary care following an ED visit, higher rates of attending follow-up visits, and lower rates of ED return visits.<sup>8,9</sup> If patient navigators are not available in your ED, be part of the solution! Talk to your operational leaders about starting a patient navigator program at your institution.



**When prescribing medication,** explain to patients why it is important that they take the medicine you are prescribing. Specify the timeframe you want them to take it. Is this a potentially lifelong prescription for fluticasone for their poorly controlled persistent asthma, or is this a 7-day course of doxycycline

for an infection? Be sure to also explain the specific outcome intended from the medication you are prescribing. If a medication is meant to cure an infection, for example, be sure to clarify that the patient’s symptoms should improve while taking the medicine. If a medication is instead intended for the prevention of

symptoms, be sure to clearly state this and verify patient understanding.

**Return ED visits.** If a patient returns to the ED, make an extra effort to understand why. Allow the patient to explain what has happened since their last ED visit. Was there something regarding the previous workup, diagnosis, or treatment that they did not understand? Was there an issue picking up necessary medications or accessing follow-up care? Involve social workers and patient navigators early in order to help these patients get the support they need to be successful managing their care after ED discharge. ★

*This article is part of an EMRA Social EM Committee initiative to disseminate information about social EM topics encountered in the emergency department. More information can be found in the EMRA MobileEM app’s Patient Conversation Toolkit, available for download via iTunes and Google Play.*

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## Tension Pneumocephalus: Rare Brain Air Complication Requires Emergent Care

**Jibril Ashiru-Balogun, MD, MS**

Resident, PGY-3  
Emergency Medicine

RWJBH – Community Medical Center, Tom's River, NJ

**Danielle Biggs, MD, FACEP**

Associate Program Director  
Emergency Medicine Residency

RWJBH – Community Medical Center, Tom's River, NJ

**P**neumocephalus, or the presence of air in the brain cavity, is an uncommon but potentially fatal condition that must be evaluated and treated right away in the ED. Air accumulation under pressure within the skull cavity can result in tension pneumocephalus, which may require emergency surgery. This complication may be brought on by injuries, surgeries, or, less frequently, infections or neoplasms that affect the paranasal sinuses or skull.

Health-care personnel caring for patients after head trauma or neurosurgical procedures must be knowledgeable about the causes, clinical manifestations, diagnostic techniques, and management approaches of tension pneumocephalus.

### CASE

We present a case of a 48-year-old male with past medical history of hypertension and Rathke's cleft cyst. The patient, post-transsphenoidal resection

approximately 4 weeks prior, presented to the ED for evaluation of left lower extremity weakness, a symptom he noted he had not had before that day. The patient noted that these symptoms started approximately 3 to 4 hours prior to presentation. He noted that his left leg felt "heavy." His symptoms were associated with 10/10 headache, nausea, and 2 episodes of non-bilious, non-bloody vomiting.

The patient's family also noted a change in his mental status, noting he

**Tension pneumocephalus** — which can result from air accumulation under pressure within the skull cavity — is a potentially fatal condition and may require emergency surgery. It is difficult to diagnose and treat; therefore, a thorough understanding of its cause, clinical manifestation, and management is required. Although this complication is uncommon, it is important for emergency physicians to maintain a high index of suspicion when evaluating patients who have recently undergone neurosurgical procedures, have a history of head trauma, or have had sinus surgery.

had been increasingly confused over the past week, although there were no signs of slurred speech. Of note, the patient stated his post-op course was complicated by rhinorrhea and diabetes insipidus. He was readmitted to the hospital 2 weeks after the procedure and was diagnosed with a CSF leak; a procedure to stem the leak was performed. Otherwise, he had no history of head trauma, syncope, seizure-like activity, or stroke.

Physical exam revealed a patient who was alert and awake in moderate distress, and seemingly mildly confused. Vital signs were remarkable for BP of 144/100mmHg and HR of 102bpm. The rest of the patient's vital signs were unremarkable. They included RR of 20 bpm, oxygen saturation of 100% on room air, and temperature of 97.2. The patient's cardiac and pulmonary exams were within normal limits. His neurological exam was significant for an NIHSS of 1 due to his left leg drift, intact extraocular movement with no visual deficits, gaze preference, facial drooping, tongue deviation, with intact and equal

sensation throughout.

Laboratory findings on the CBC, inflammatory markers, and urinalysis were noted as WBC of 24,500 per microliter (4,800–10,800 per microliter), neutrophile count of 88% (36–66%), and ESR and CRP of 3 millimeters per hour (0–20 millimeter per hour) and 18.7 milligrams per liter (0–3 milligrams per liter), respectively. Coagulation panel showed a PT of 10.3 with an INR of 0.88 and a PTT of 25.6. The electrolyte panel was noted for sodium-139, potassium-3.3, and glucose-108. Urinalysis was remarkable for a WBC of 0-5/HPF and an RBC of 0-5/HPF. It also contained no bacteria.

The patient was noted to have extensive pneumocephalus throughout the subdural and subarachnoid space, and prominent right-sided subdural pneumocephalus resulting in the leftward mass effect with leftward subfalcine herniation, with no intracranial hemorrhage.

Due to imaging findings and the patient's presentation, which included signs of elevated intracranial pressure,

management of the patient required neurosurgical intervention. The case was discussed with the patient's neurosurgical team. They noted pneumocephalus is a complication of neurosurgical procedures and advised that the patient be transferred to their facility for continued management.

Prior to transfer, the patient was placed on high-flow oxygen, given antiemetics, and provided with other interventions that were noted to improve symptoms. During the patient's admission, the team initially opted for conservative management. However, after approximately 36 hours, repeat imaging showed no decrease in pneumocephalus and revealed a suprasellar/skull base defect. This finding prompted an endoscopic endonasal transsphenoidal approach for repair of suprasellar/skull base defect using naso-septal flap. The patient was discharged home 2 weeks after the procedure with no further complications.

## DISCUSSION

Tension pneumocephalus is difficult

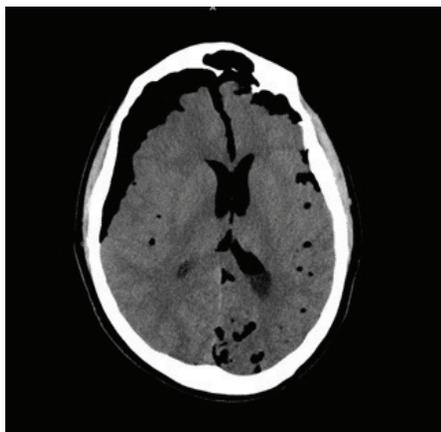


IMAGE 1

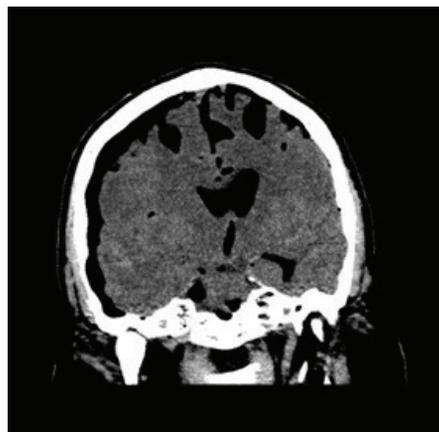


IMAGE 2

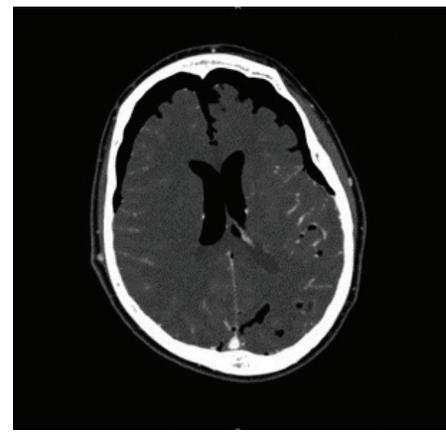


IMAGE 3



to diagnose and treat; therefore, a thorough understanding of its cause, clinical manifestation, and management is required. Although this complication is uncommon, it is important for emergency physicians to maintain a high index of suspicion when evaluating patients who have recently undergone neurosurgical procedures, have a history of head trauma, or have had sinus surgery.

Reducing intracranial pressure quickly is the main objective in the management of tension pneumocephalus in order to stop further neurological damage. Early patient stabilization is greatly aided by non-invasive techniques like oxygen delivery and head elevation. By producing a concentration gradient that favors the passage of nitrogen out of the cranial cavity, high-flow oxygen treatment aids in the resorption of intracranial air.

Surgery, such as craniotomies and burr holes, is frequently required to release trapped air and treat the underlying cause of tension pneumocephalus. Depending on the site and severity of pneumocephalus, neurosurgical competence is crucial in choosing the best surgical strategy. The particular clinical situation will

determine if burr holes or craniotomies are the best option. A careful risk-benefit analysis is crucial.

It is impossible to overestimate the importance of imaging in the diagnosis and treatment of tension pneumocephalus. When it comes to locating and diagnosing intracranial air, CT scans continue to be the gold standard, offering vital information for surgical planning. Even while MRI might provide more information, particularly in situations involving soft-tissue pathology, it is typically regarded as secondary to CT in the acute context.

A comprehensive approach to patient care is necessary to minimize long-term consequences and prevent complications. If tension pneumocephalus results from trauma, concurrent injuries need to be treated right away. In addition, treating any underlying infections or leaks of CSF fluid is critical to avoiding recurrent pneumocephalus.

Tension pneumocephalus continues to be linked to a considerable rate of morbidity and mortality, even with improvements in diagnostic techniques and treatments. In some instances, neurological effects such as localized neurological dysfunction and cognitive deficiencies may not go away. Thus,

rehabilitation and long-term follow-up are essential elements of the total care plan.

#### CONCLUSION

Tension pneumocephalus is an uncommon but sometimes fatal complication of head injuries, brain surgeries, or sinus surgeries. Neurological decline must be avoided in order to maximize patient outcomes, and prompt diagnosis and treatment are crucial. Management of tension pneumocephalus necessitates a multidisciplinary strategy that includes imaging tests, critical care management, and neurosurgery experience.

Further investigation into enhanced methods of diagnosis, approaches to therapy, and long-term prognosis is essential to improving our comprehension of tension pneumocephalus. Health-care practitioners must keep an open mind and maintain a high index of suspicion for tension pneumocephalus in pertinent clinical circumstances as our understanding of the condition advances. Further cooperation between researchers and physicians will improve our capacity to identify, treat, and eventually avoid tension pneumocephalus. ★



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# The Art of *Chin Chin*: A Multi-Year Partnership in the Dominican Republic Advancing POCUS

**Irbert L. Vega, MD, FAAFP**

Resident  
Emergency Medicine  
University of Connecticut

**Robert Fuller, MD**

Fellowship Director  
International Disaster  
Emergency Medicine Fellowship  
University of Connecticut School of Medicine

**Natalie J. Moore, MD**

Assistant Fellowship Director  
International Disaster  
Emergency Medicine Fellowship  
University of Connecticut School of Medicine

**Ybel Fermín Fernández, MD**

Magíster en medicina de emergencia y desastre  
Hospital Regional José María Cabral y Báez  
Santiago de los Caballeros, Dominican Republic

**Heather Hechter, MD**

Emergency Medicine Physician  
and Clinical Instructor  
Emory University

**José Raúl Vargas Estévez, MD**

Magíster en medicina de emergencia y desastre  
Hospital Regional José María Cabral y Báez  
Santiago de los Caballeros, Dominican Republic

**OUR U.S. POCUS INFRASTRUCTURE**

It is easy to take for granted the foundation that makes EM residency POCUS training so robust. The very things that make POCUS valuable in our training here in the United States also make it an ideal tool in low-resource settings. As such, global EM is well-suited for long-term initiatives such as starting a POCUS program.

Though POCUS may seem like an easy fix in settings that lack easy access to XR, CT, and MRI, many barriers must be addressed before POCUS can provide

tangible benefits to patients, providers, and the local system. Identifying and working to overcome these obstacles requires understanding the regional medical landscape and a commitment to long-term local partnerships.

When I (lead author Irbert L. Vega, MD) went to the Dominican Republic for my global EM elective, I suddenly found myself in an environment where POCUS was still a nascent technology instead of a standard part of the department workflow. I went from thinking about advancing my own skillset to joining a

team grappling with bringing the next generation of EM providers up to speed on a skill that is not yet widely taught or accepted.

**A SPECIALITY IN ITS INFANCY**

Emergency medicine, having been first recognized in 1979, is considered a relatively young specialty in the United States. EM in the Dominican Republic is even younger, having been founded in 2008. Consequently, the specialty is still finding its place within the island's complex medical landscape.



Understandably, advancing POCUS is just one of many competing priorities for a new specialty that is trying to gain recognition of its identity and scope of practice. POCUS education is not yet integrated into residents' education the way it is in the U.S., and there is a scarcity of machines, infrastructure, and funding to support these machines. There are few EM-trained physicians and even fewer fellowship-trained EM physicians in the Dominican Republic. EM graduates must travel abroad to pursue POCUS fellowships, and some who do may not return because of better job opportunities elsewhere. A lack of training among current physicians means few trainees are getting the exposure they need to be proficient at POCUS. The foundation for POCUS in the Dominican Republic is just starting to be laid.

#### LEARNING TO TEACH

For the past several years, our group has partnered with residents and faculty at the Hospital Cabral y Báez in the city of Santiago to run a yearly POCUS course aimed at training residents and faculty from regional EM programs. The course is taught entirely in Spanish, and I was tasked with teaching US-guided peripheral and central venous catheter placement.

Despite growing up in a Spanish-speaking home, I found POCUS terminology rather challenging. Phased array probe (*sonda multielemento*), biliary sludge (*barro biliar*), and sonographic cystic pedicle (*pedículo vasculobiliar hepático*), for example, are not terms I use in casual conversation at home or with most of my patients.

Though our presentation slides had been completed months in advance, as I presented throughout the week and asked for feedback, I continuously found ways to make my message clearer and more relevant. One of the most memorable breakthroughs our team had was in teaching ultrasound-guided needle placement.

#### THE ART OF CHIN CHIN

For some learners, US-guided procedures were a tough sell.



For context, our audience was a mixed group of 1st- through 4th-year EM residents, some of whom were already adept at anatomic landmark guided central venous catheterization. For them, the idea of abandoning a technique they were beginning to master to become novice learners of the US-guided approach seemed impractical. Those same residents also faced the hurdle of putting aside the fine motor skills that work well for anatomic landmark catheterization (purposeful and deeper needle advancement while looking for flash) but not for the US-guided approach (smaller, incremental advancement with visualization of needle tip at all times).

While working on phantom models and IJ central line training models, I found myself repeatedly having to say “stop” and “slow down” to our learners. Sensing their frustration, I simultaneously was becoming aware of the limitations and barriers residents would have to navigate after we left. I started to wonder about our mission and my decision to come to Santiago.

Thankfully, things were about to change.

Our breakthrough happened almost serendipitously. One night over dinner, a local faculty member taught us the Dominican expression, “un chin chin.” “Chin,” a word borrowed from the language of the Taíno, the first inhabitants of the Caribbean islands, is a colloquial way of expressing a small quantity or a little bit of something.

It can also mean “little by little” or gradually.

Our team decided to start using this expression at our workshop stations the very next day. We used “un chin chin” as a verbal cue to help students slow down and to teach them the concept of following the needle. Our learners' facial expressions in reaction to our new approach was now markedly different. A slight smile of recognition and surprise took the place of furrowed brows. This simple phrase, borrowed from an ancient language, had a noticeable impact on the teaching dynamic and made a challenging concept a bit easier and more fun to learn and to teach.

It wasn't until months later that I began to recognize the significance of what I had experienced in Santiago. I now understand that though our achievements may seem small and may be difficult to measure objectively at this stage, they represent a significant step forward for our partnership with Santiago. POCUS has not been integrated into daily teaching yet, but residents and faculty now expect and look forward to the yearly workshop.

Our learners are not ready to perform US-guided central lines placement without supervision, but thanks to a donation of several central line training models from the Center for Education, Simulation, and Innovation (CESI), residents and faculty are able to safely continue practicing and are becoming comfortable with the procedure long after we leave. ★

# A Deep Dive With Sandra Schneider, MD, FACEP



**Morgan Sweere, MD, MPH**  
EMRA Board Secretary  
EM Resident Editor-in-Chief  
University of Florida — Jacksonville

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Sharing Our Stories

Welcome BACK to EMpower! We're bringing back this popular, long-dormant piece of EM Resident that focuses on leadership in emergency medicine — where we share the incredible stories of leaders in the EM community. These leaders are pioneers in the field, innovators of our specialty, and often, former EMRA members! Our hope is to inspire and empower you, the future of emergency medicine, on how to effectively navigate, advocate for, and even change our specialty.

**O**ur first EMpower honoree is none other than **Sandra Schneider, MD, FACEP**. Dr. Schneider completed medical school and residency at the University of Pittsburgh and is board-certified in both internal and emergency medicine. She is a past president of ACEP, SAEM, and AACEM, past chair of the Residency Review Committee for Emergency Medicine, and past chair of the Emergency Medicine Foundation. Dr. Schneider previously was a prior professor of EM at Hofstra Northwell School of Medicine and senior research director for the North Shore/LIJ Department of Emergency Medicine. She was founding chair of the Department of EM at the University of Rochester.

Currently, Dr. Schneider is senior vice president for clinical affairs at ACEP and an adjunct professor at the University of Pittsburgh. During the COVID-19 pandemic, she led ACEP in its response to provide education and resources to emergency physicians and their patients in the United States and abroad; these resources included the COVID Field Guide and COVID EngagED discussion board. Dr. Schneider is a recipient of SAEM and AACEM leadership awards as

well as ACEP's prestigious Wiegenstein Leadership Award. Additionally, she is an honorary member of EMRA.

## First things first, why emergency medicine?

I am old(er). When I graduated from medical school, there were only a couple of 1-year training programs in EM, but none accredited, and none supervised. Jobs in the ER (many were just a room or 2 so I use "ER") did not pay well, and you needed no training to work there. I was deeply in debt from college and medical school. I needed a secure job, so I trained in internal medicine. During my 2nd and 3rd year of residency (averaging 80-100 hours a week), I would moonlight an additional 12 hours on most weekends (pay was \$10 per hour). During my U.S. Public Health Service payback in rural Kentucky, I worked the ER (okay, this one had 3 rooms) on the weekends while I had my IM office M-F. I loved my ER shifts. My first job after Kentucky was as faculty at a brand new residency at Pitt and medical director of an ED at a teaching hospital! I was fortunate to grandfather into EM. EM is the greatest specialty of them all. Our patients are

fascinating, every day is different, each patient is a mystery to be solved. Even if the shift is boring, there is the possibility that the unexpected will happen. We have flexibility in our schedule and in our job locations unlike any other specialty. As a mother, I was always able to trade away a day shift, so I never missed a school play or teacher conference. And we have the best stories!

## If you were restarting residency, what advice would you give yourself?

Read. Read at least 2 hours every day you are off, and if possible, at least an hour on the days you work. As a first and second year, read about patients you see. Read the relevant textbook chapter, and then read the literature. Texts are 5 years out-of-date but are comprehensive. Journals are only 1 year or so out-of-date. In your final year, pick a major textbook and read the entire book cover-to-cover over the year. This will prepare you for your boards and make you a better physician. Continue to voraciously read as an attending.

Don't be afraid of debt. Get the help you need — groceries delivered, housecleaning, nanny. You will make

# empower

## Sharing Our Stories

plenty of money later on.

### What is the best career insight that you want to pass along?

There is an old biology experiment: Put a frog in boiling water and they will jump out. Put them in cold water and heat it until it is boiling and the frog will stay in the water and die. Be sure to check the “temperature” of your workplace periodically. If you find yourself in a toxic environment, there is always a way out, especially when you are an attending. You can move, live apart from your spouse or partner, or commute even long distances. There is telemedicine and work outside the ED. There was a time I found myself in a toxic environment, but I had friends and family and a beautiful home, so I stayed too long and almost boiled. I left and found a wonderful work environment, and my job here at ACEP. Keep tabs on the temperature and be ready to jump out if the water is too hot.

### What keeps you coming to work every day?

The patients. I love when you ask someone, “What happened?” and they look around before answering. You know the best story is coming. And who else gets to save a life? It is tough when we lose one, but without us, all of them would be lost.

### What is your best time management tip?

Use all of your time. I work on airplanes, foregoing the movie or book. My daughter took equestrian lessons (and dance, and ice skating, and a myriad others). I would bring work and ask the other mothers to alert me when my daughter was actively riding, skating, etc. When she was just standing there, I

would work. I am an early riser (compared to my husband), so I often work or read while he is asleep. Have a to-do list. Put everything on that list — household, personal, and work. Find something to decompress after work so you are ready for your family. For me, classical music played VERY LOUD on the way home and on bad days, a game of solitaire made me human again.

### Share 2 things that are on your desk right now.

Hot (diet) cocoa and 15 thumb drives waiting to be organized

### What is the best on-shift snack?

Cashews. And I always have a Diet Coke, even when I had to hide it from The Joint Commission!

### What is the most recent book you read?

American Sirens by Kevin Hazzard. This is the story of the first professional paramedics and race in the 1970s. I gave medical command to these amazing guys. I worked in Peter Safar’s lab, and Nancy Caroline was my neighbor.

### What is your favorite song to hype you up before a shift?

Eye of the Tiger — especially the riff



Sandra Schneider, MD, FACEP

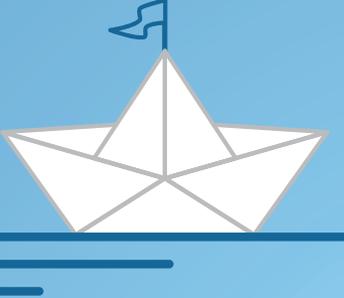
### If you were a part of EMRA or have worked with EMRA, how has that been impactful for you in your career?

Because I did not train initially in EM, I never belonged to EMRA. However, one of the greatest honors I received was honorary membership in EMRA.

*Editor's note: Dr. Schneider has been appointed interim executive director of ACEP.*

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## The EMF Grant Research Committee: A Fellow's Perspective

The Emergency Medicine Foundation (EMF) is a nonprofit organization founded by ACEP with the goal of funding research in emergency medicine science and health-care policy, improving patient care, and supporting research career development.

Each year, EMF awards multiple grants to a diverse array of applicants, from medical students to established researchers. Areas of research range from diversity, equity, and inclusion to telemedicine to resuscitative medicine.

In a new initiative to mentor young physician researchers, EMF has partnered with EMRA to provide a position on the EMF grant review committee to an EM resident or fellow. As its inaugural participant, I was invited to join in the grant application review meeting.

This was an unparalleled

opportunity for me to learn about the grant application review process, especially the thoughts and active discussions that precede any decisions and grant ratings.

After prospective researchers had submitted their research proposals, each application was assigned 2 or 3 reviewers. As the EMRA representative, I was tasked with reviewing 5 applications as the secondary reviewer. This would give me the opportunity to learn from the primary reviewer while still making my opinions and discussion points heard. Moreover, I had the ability to review and observe the discussion of all the other applications during the meeting, adding in my comments where I saw fit.

Partaking in the EMF grant review meeting did more than sharpen my analytic and critiquing skills. It also

gave me broader insight into what other researchers are pursuing and taught me how to create a successful grant application.

Additionally, it put me into contact with mentors in the field of research who can help guide my own research in the future and can provide career advice.



**Sophia Gorgens, MD**

*Sophia Gorgens, MD, is an EMS fellow at the New York City Fire Department and Northwell Health in New York City. For more information about the Emergency Medicine Foundation, visit [emfoundation.org](http://emfoundation.org).*

### NEWS & NOTES

## NEWS & NOTES in Emergency Medicine

### ABEM SETS IN-PERSON CERTIFYING EXAM

The American Board of Emergency Medicine (ABEM) is requiring a new in-person certifying exam in 2026 as the second step for physicians to become certified. Exam-takers will need to appear in-person at the AIME Center, a professional assessment center in Raleigh, NC. After 2025, the current virtual oral certification exam will no longer be available. The qualifying (written) exam will still be required for certification.

According to ABEM, the new certifying exam will be innovative, assess additional competencies valued by the specialty and important to patient care, and maintain the highest standards in the EM specialty. More information can be found on [abem.org](http://abem.org).

EMRA has released a statement on ABEM's new certifying exam; the statement can be found on [emra.org](http://emra.org).

### MED STUDENT PARTICIPATES IN EMRA ADVOCACY INITIATIVE

As part of her EMRA/ACEP Medical Student Health Policy Elective participation, EMRA medical student member Jackie King attended an event for Rep. Kim Schrier, MD (D-WA), in Washington, DC. At the event, King was able to meet special guest Rep. Nancy Pelosi (D-CA).



**EMRA medical student member Jackie King with Nancy Pelosi (D-CA)**

The EMRA/ACEP Medical Student Health Policy Elective provides EM-bound medical students the opportunity to research legislative issues pertinent to the practice of EM. Participants gain hands-on experience as advocates for

the specialty through interactions with local, state, and federal legislators.

### ABEM ELECTS NEW BOARD MEMBERS

The American Board of Emergency Medicine (ABEM) recently elected 2 new physician members: John T. Finnell, MD, MSc, and Melissa A. Platt, MD.

Dr. Finnell is a professor of clinical emergency medicine in the Department of Emergency Medicine at the Indiana University School of Medicine. He practices as a nocturnist at Eskenazi Health.

Dr. Platt is a professor and former program director in the Department of Emergency Medicine and associate dean of graduate medical education at the University of Louisville School of Medicine. She practices clinically at the UofL Hospital.

# Thank You for Your Support



Also thank you to our EMRA Awards Supporters: Augustine D'Orta Foundation, Family of Dr. Alexandra Greene, Rosh Review, and TeamHealth.

Information accurate as of 04/15/2024. For an updated list of supporters, please visit [www.emra.org/supporters](http://www.emra.org/supporters).





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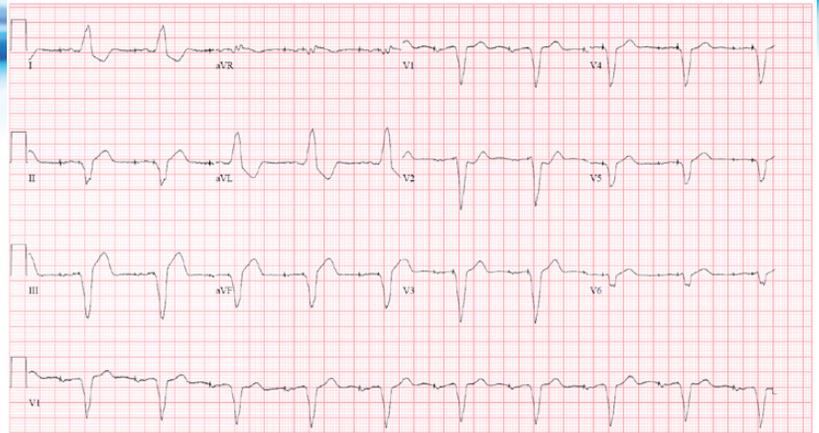
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# EMRA ECG Challenge

**Jonathan Dillen, MD**  
Resident, PGY-3  
Emergency Medicine  
Christiana Care

**Jeremy Berberian, MD**  
Associate Director of Emergency Medicine Resident Education  
Department of Emergency Medicine  
Christiana Care  
@jgberberian



**CASE**

An 89-year-old male with history of coronary artery disease, ESRD, diabetes mellitus, and dual chamber permanent pacemaker placement presents with chest pain. What is your interpretation of his ECG?

**What is your interpretation of his ECG?**  
See the **ANSWER** on page 64.

Image courtesy of Logan Weygandt, MD, MPH, Associate Program Director, Emergency Medicine Residency, and Edana Mann, MD, Johns Hopkins Hospital



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# ECG Challenge

**ANSWER**

**T**his ECG shows a dual-chamber paced rhythm at 60 bpm, left axis deviation, prolonged QRS complex duration with left bundle-branch block-like morphology, STE in leads II, III, and aVF, and STD in leads I, aVL, and V2. The STD in lead V2 is diagnostic of an acute myocardial infarction (AMI).

Dual-chamber pacing, also called A-V sequential pacing, involves pacing of both the right atria and right ventricle. There is one atrial lead in the right atrial appendage and one ventricular lead in the right ventricular apex. The ECG will show 2 pacer spikes: one preceding the P wave and one preceding the QRS complex. The major difference in the QRS complex morphology between an intrinsic LBBB and a right ventricular-paced rhythm is that the QRS complex will almost always be negatively oriented in leads V5-V6 with a right ventricular-paced rhythm.

As with an intrinsic LBBB, the expected repolarization abnormalities in an RV paced rhythm follow the “rule of appropriate discordance” which describes the relationship between the direction of the QRS complex and its ST-segment. In other words, if the main vector of the QRS complex points up, there will be STD, and if the QRS complex points down, there will be STE. These repolarization abnormalities confound the ECG’s ability to detect an AMI and other ACS findings, so interpretation of the ECG in a presentation suggestive of ACS requires using the Sgarbossa or Modified Sgarbossa criteria to diagnose an AMI<sup>1</sup>.

The Sgarbossa criteria are based on the underlying principle that concordance and excessive discordance in a LBBB or right ventricular-paced rhythm are abnormal. The modified Sgarbossa criteria (see Figures 1a-c) improve the sensitivity of the Sgarbossa



**FIGURE 1a.**  
Modified Sgarbossa criterion A: concordant STE  $\geq 1$  mm in  $\geq 1$  lead

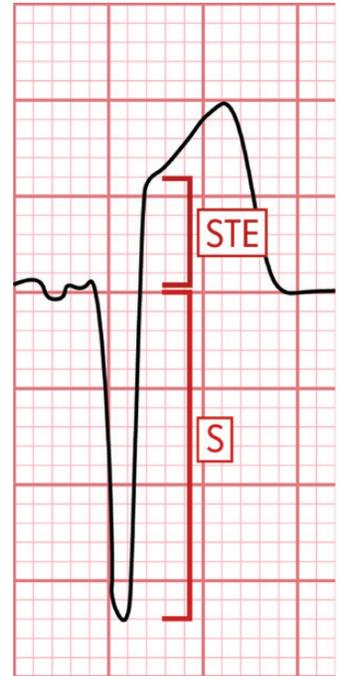


**FIGURE 1b.**  
Modified Sgarbossa criterion B: STD  $\geq 1$  mm in leads V1 or V2 or V3

criteria by defining excessive discordance as a ratio instead of a fixed number. Both criteria are included in the most recent AMI guidelines, but it makes sense to just use the modified Sgarbossa criteria since they are more sensitive than the traditional Sgarbossa criteria.

Unlike traditional STEMI criteria that requires STE in 2 contiguous leads, the Modified Sgarbossa criteria only require changes in 1 lead. It is also important to note that a significant number of patients with AMI and a ventricular-paced rhythm will not have any abnormalities, Sgarbossa or otherwise, on their ECG.

In the case ECG, the STE in leads II, III, and aVF and the STD in leads I and aVL are appropriately discordant and do meet modified Sgarbossa criteria. The STD in lead V2 is concordant and meets modified Sgarbossa criterion B, which is diagnostic of an AMI.



**FIGURE 1c.**  
Modified Sgarbossa criterion C: STE/S ratio  $\geq 0.25$  in  $\geq 1$  lead

**CASE CONCLUSION**

This patient had multiple chronic conditions, which made him a poor candidate for cardiac catheterization, and his symptoms were well-controlled medically, so he chose to be admitted for continued medical management.

**AMI IN RIGHT VENTRICULAR-PACED RHYTHMS LEARNING POINTS**

- Evaluate a right ventricular-paced rhythm for AMI as you would evaluate LBBB, using Sgarbossa or Modified Sgarbossa criteria<sup>1</sup>
- The presence of  $\geq 1$  of the following are diagnostic of AMI:
  - Concordant STE  $\geq 1$  mm in  $\geq 1$  lead
  - STD  $\geq 1$  mm in leads V1, V2, or V3
  - Discordant STE  $\geq 1$  mm with a ratio of STE to S-wave depth  $\geq 0.25$  in  $\geq 1$  lead
- STD  $\geq 1$  mm in any of leads V4-V6 increases sensitivity for AMI<sup>2</sup> but has not been externally validated at the time of this publication and is not included in the most recent 2022 ACC guidelines

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**1. A 69-year-old woman presents with 2 days of right upper quadrant pain. Her vital signs include BP 100/85, P 114, R 22, and T 39.3°C (102.7°F); she has a positive Murphy sign and scleral icterus. Ultrasound reveals a common bile duct diameter of 14 mm. Which intervention is the definitive management for this patient's condition?**

- A. Endoscopic retrograde cholangiopancreatography
- B. Intravenous antibiotic therapy
- C. Intravenous fluid bolus
- D. Oral antibiotics and GI follow-up

**2. Which action is most appropriate in the treatment of an adult patient with diabetic ketoacidosis?**

- A. Administer sodium bicarbonate when the pH level is below 7.15
- B. Delay insulin administration if the initial serum potassium level is below 3.3 mEq/L
- C. Give a bolus of regular insulin at a dose of 0.01 units/kg body weight
- D. Start 5% dextrose when the serum glucose level falls below 350 mg/dL

**3. A 58-year-old man presents with low back pain that shoots down the back of his left leg. He is having difficulty with straining and prolonged sitting. With the patient lying supine, which physical examination finding is most specific for a diagnosis of herniated disc?**

- A. Raising the patient's straight left leg causes back pain
- B. Raising the patient's straight left leg causes back pain and radiation of pain down the posterior left leg
- C. Raising the patient's straight right leg causes back pain
- D. Raising the patient's straight right leg causes back pain and radiation of pain down the posterior left leg

**4. A 39-year-old man presents with intermittent chest pain, palpitations, sweating, and feelings of anxiety over the past 8 hours. He has a history of asthma, migraines, and panic attacks; he wants a prescription for a benzodiazepine. Which part of this patient presentation suggests a diagnosis other than a panic attack?**

- A. Asthma
- B. Chest pain
- C. Duration of symptoms
- D. Migraine history

**5. When obtaining a cystourethrogram in an adult patient with pelvic trauma, what volume of contrast medium must be instilled into the bladder to prevent a false-negative evaluation?**

- A. 200 mL
- B. 400 mL
- C. 600 mL
- D. 800 mL



ANSWERS  
(1) A. (2) B. (3) D. (4) C. (5) B.

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- Student loan forgiveness and/or sign on bonuses at select locations
- Variety of opportunities to fit your lifestyle
- Wide variety of cases with diverse patient populations
- Supportive specialists available in all specialties

For more information, contact Veronica at [veronica.dupuis@aah.org](mailto:veronica.dupuis@aah.org)

Dr. Dvorany

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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 central Pennsylvania. We are the only medical facility in Pennsylvania to be accredited as a Level I pediatric trauma center and Level I adult trauma center. The system includes Penn State Health Milton S. Hershey Medical Center, Penn State Health Children’s Hospital, and Penn State Cancer Institute based in Hershey, Pa.; Penn State Health Hampden Medical Center in Enola, Pa.; Penn State Health Holy Spirit Medical Center in Camp Hill, Pa.; Penn State Health St. Joseph Medical Center in Reading, Pa.; Penn State Health Lancaster Pediatric Center in Lancaster, Pa.; Penn State Health Lancaster Medical Center (opening fall 2022); and more than 3,000 physicians and direct care providers at more than 126 outpatient practices in 94 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 the Pennsylvania Psychiatric Institute.

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 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

### FOR MORE INFORMATION PLEASE CONTACT:

Heather Peffley, PHR CPRP - Penn State Health Lead Physician Recruiter  
[hpeffley@pennstatehealth.psu.edu](mailto:hpeffley@pennstatehealth.psu.edu)

Penn State Health is fundamentally committed to the diversity of our faculty and staff. We believe diversity is unapologetically expressing itself through every person's perspectives and lived experiences. We are an equal opportunity and affirmative action employer. All qualified applicants will receive consideration for employment without regard to age, color, disability, gender identity or expression, marital status, national or ethnic origin, political affiliation, race, religion, sex (including pregnancy), sexual orientation, veteran status, and family medical or genetic information.

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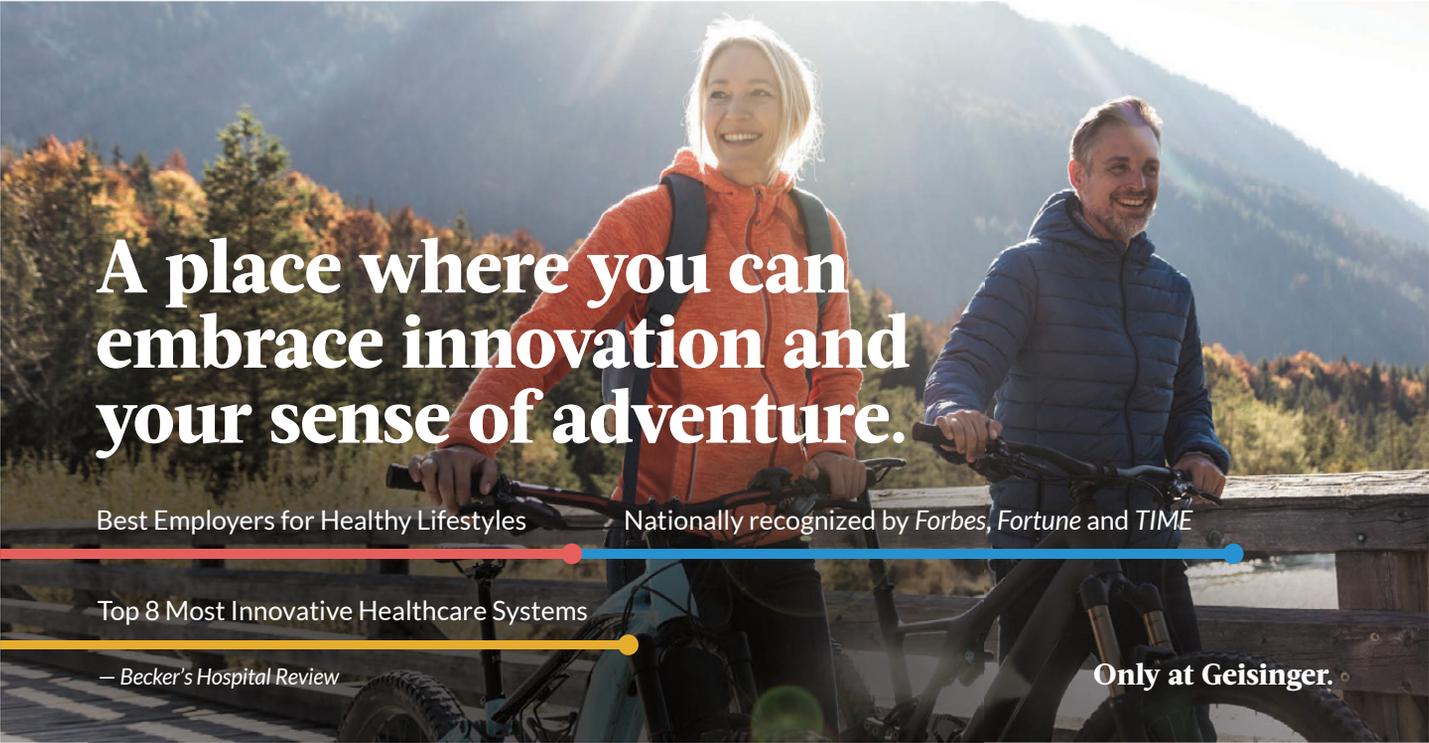
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- Full relocation reimbursement
- Fully integrated electronic health record (Epic)
- Professional opportunities for mentorship, growth, and advancement
- Robust emergency medical services program: nine state-of-the-art helicopters stationed at six bases across the system and two Critical Care Ground Transports
- New ACGME accredited emergency medicine residency program in the northeast to complement our long-standing emergency medicine residency program in the central region
- Ultrasound fellowship in the central region
- Growing pediatric emergency medicine program
- Embedded, multi-disciplinary team of care managers and clinical pharmacists in emergency departments to create a holistic, streamlined process from triage to discharge

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Interested candidates, please contact [Miranda Grace](#), Senior Provider Recruiter, at [mlgrace@geisinger.edu](mailto:mlgrace@geisinger.edu). Visit [jobs.geisinger.org/physicians](https://jobs.geisinger.org/physicians).

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Vishnu Mudrakola, DO  
EM Residency: OhioHealth Doctor's Hospital, 2019  
Emergency Physician

Louis Piper, MD  
EM Residency: Einstein Medical Center, 2017  
Emergency Physician

Adrienne Caiado, MD  
EM Residency: MedStar Georgetown, 2022  
Emergency Physician

Babak Missaghi, MD  
EM Residency: UCLA-Harbor, 2017  
Emergency Physician