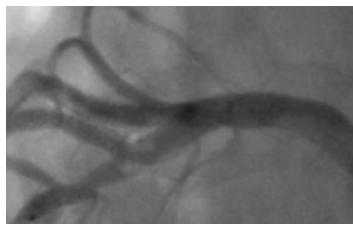
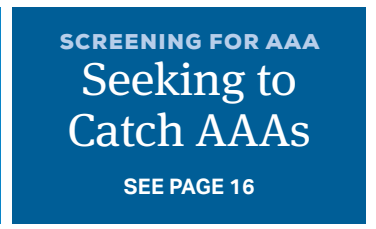




TRAUMATIC ICH
Sending Home from the ED?
 SEE PAGE 14



CASE REPORT
A Rare Congenital Heart Anomaly
 SEE PAGE 15



SCREENING FOR AAA
Seeking to Catch AAAs
 SEE PAGE 16

WILEY

American College of
 Emergency Physicians®
 ADVANCING EMERGENCY CARE

ACEP Now

The Official Voice of Emergency Medicine

APRIL 2024 Volume 43 Number 4

FACEBOOK/ACEPFAN

INSTAGRAM/ACEPNATION

X/ACEPNOW

ACEPNOW.COM

PLUS



TOX Q&A
The Grim Reaper
 SEE PAGE 3



CASE REPORT
Sugar, It's Goin' Down: A Case of THS
 SEE PAGE 11



FIND IT ONLINE
 For more clinical stories and practice trends, plus commentary and opinion pieces, go to:
www.acepnow.com

Emergency Medicine Shows Rebound in 2024 Residency Match

Record number of EM applicants leads to more filled residency spots than in previous two years

by JONATHAN FISHER, MD, MPH, FACEP; MIKE KIEMENY, MD, FACEP; NANCY GALAWAY, CAE; AND CEDRIC DARK, MD, MPH, FACEP

After a surprisingly low number of applicants and a shockingly high unfilled rate last year, emergency medicine (EM) appears to be leveling off as it regains its status as one of the medical profession's most sought-after specialties. There was a collective exhale from the emergency medicine community after the emergency medicine results of the 2024 Match, but relief remains elusive as concerns about the specialty's program growth linger.

This year, 135 emergency medicine positions went unfilled across 54 programs—considerably down from the 554 unfilled positions across 132 programs last year. This decrease—from 18 percent to just 4 percent—in unfilled positions is encouraging news for the specialty.

For years, emergency medicine enjoyed tremendous success in the Match with near-

CONTINUED on page 6

STOCK.ADOBE.COM

A NEW SPIN

Hasta La Vista, Scribes

Can a machine, an AI, learn the value of human life?

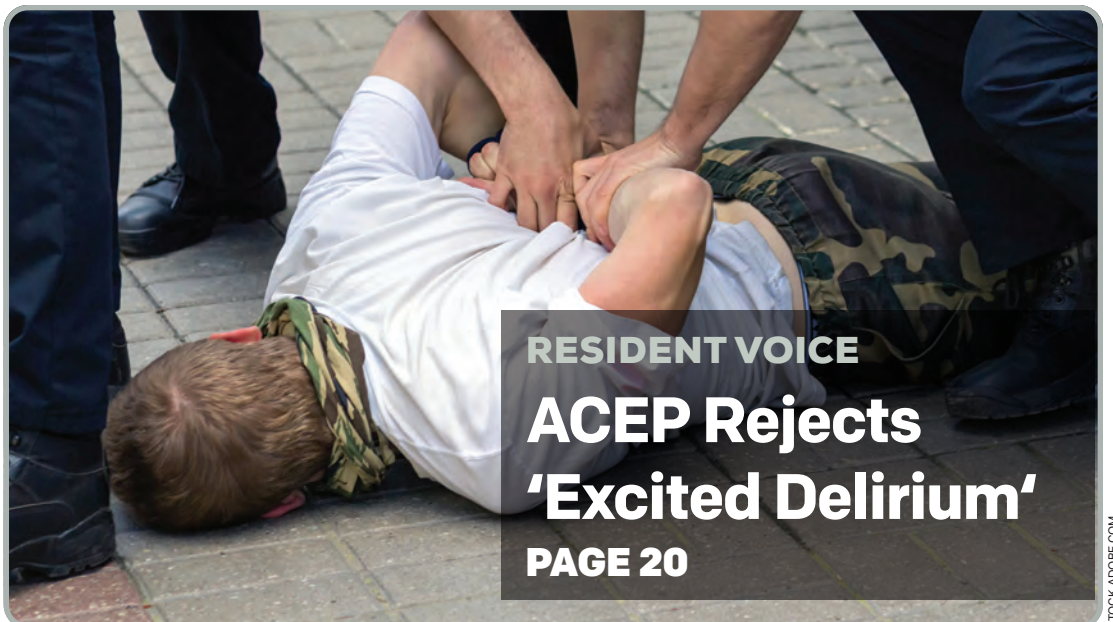
by JULIA HUTCHISON, DO

A few months ago, I received email notification at work that indicated our phones would soon be automatically downloading a generic, HIPAA-compliant artificial intelligence (AI) scribe. I was intrigued. Could an AI scribe really get all the complexities of an emergency department (ED) encounter? How would it know what to leave in—and sometimes more importantly—what to leave out?

Testing Out New Tech

With all this in mind, I tried out the generic AI scribe. I first tried it with my husband. He pretended to be a physician, and I pretended to be a nightmare historian. I'm referring to the type of person who rambles about pickleball when you are asking them about their chest pain and has a hard time

CONTINUED on page 10



RESIDENT VOICE
ACEP Rejects 'Excited Delirium'
 PAGE 20

STOCK.ADOBE.COM

WILEY PERIODICALS LLC
 C/O THE SHERIDAN PRESS
 PO BOX 465,
 HANOVER, PA 17331
 If you have changed your address or wish to contact us, please visit our website www.wileycustomerhelp.com

ACEP Now

PERIODICAL

ACEP Now

The Official Voice of Emergency Medicine

EDITORIAL STAFF

MEDICAL EDITOR Cedric Dark, MD, MPH, FACEP cdark@acep.org	EDITOR Danielle Galian-Cooloorgeon, MPS dgalian@wiley.com
ASSOCIATE EDITOR Catherine A. Marco, MD, FACEP cmarco@acep.org	ART DIRECTOR Chris Whissen chris@quillandcode.com
ASSISTANT EDITOR Amy Faith Ho, MD, MPH, FACEP amyho@acep.org	RESIDENT FELLOW Carmen Marie Lee, MD, MAS carmen.marie.lee@gmail.com

ACEP STAFF

EXECUTIVE DIRECTOR/ CHIEF EXECUTIVE OFFICER Susan Sedory, MA, CAE ssedory@acep.org	SENIOR VICE PRESIDENT, COMMUNICATION Jana Nelson jnelson@acep.org
CHIEF OPERATING OFFICER Robert Heard, MBA, CAE rheard@acep.org	MANAGING DIRECTOR, CONTENT AND COMMUNICATION INTEGRATION Nancy Calaway, CAE ncalaway@acep.org

PUBLISHING STAFF

PUBLISHING DIRECTOR Lisa Dionne Lento ldionnelen@wiley.com	ASSOCIATE DIRECTOR, ADVERTISING SALES Tracey Davies tdavies@wiley.com
------------------------------------------------------------------	--------------------------------------------------------------------------------

ADVERTISING STAFF

DISPLAY & CLASSIFIED ADVERTISING
Kelly Miller
kmiller@mrsvica.com
(856) 768-9360

EDITORIAL ADVISORY BOARD

ACEP VICE PRESIDENT OF COMMUNICATIONS
Ryan A. Stanton, MD, FACEP

James J. Augustine, MD, FACEP	Jessica Adkins Murphy, MD, FACEP
Richard M. Cantor, MD, FACEP	Sandra M. Schneider, MD, FACEP
Jonathan M. Glauser, MD, MBA, FACEP	Jeremiah Schuur, MD, MHS, FACEP
Michael A. Granovsky, MD, FACEP	Robert C. Solomon, MD, FACEP
Mitchell Kentor, MD, MBA, FACEP	Annalise Sorrentino, MD, FACEP
Phillip Luke LeBas, MD, FACEP	Rade B. Vukmir, MD, JD, FACEP
Ricardo Martinez, MD, FACEP	

INFORMATION FOR SUBSCRIBERS

Subscriptions are free for members of ACEP. Free access is also available online at www.acepnow.com. Paid subscriptions are available to all others for \$348/year individual. To initiate a paid subscription, email cs-journals@WILEY.com or call (800) 835-6770. ACEP Now (ISSN: 2333-259X print; 2333-2603 digital) is published monthly on behalf of the American College of Emergency Physicians by Wiley Periodicals LLC, 111 River Street, Hoboken, NJ 07030-5774. Periodical postage paid at Hoboken, NJ, and additional offices. Postmaster: Send address changes to Wiley Periodicals LLC, c/o The Sheridan Press, PO Box 465, Hanover, PA 17331. Readers can email address changes and correspondence to acepnow@ACEP.org. Printed in the United States by Sheridan of Ohio (SOH), Brimfield, OH. Copyright ©2024 American College of Emergency Physicians. All rights reserved. No part of this publication may be reproduced, stored, or transmitted in any form or by any means and without the prior permission in writing from the copyright holder. ACEP Now, an official publication of the American College of Emergency Physicians, provides indispensable content that can be used in daily practice. Written primarily by the physician for the physician, ACEP Now is the most effective means to communicate our messages, including practice-changing tips, regulatory updates, and the most up-to-date information on healthcare reform. Each issue also provides material exclusive to the members of the American College of Emergency Physicians. The ideas and opinions expressed in ACEP Now do not necessarily reflect those of the American College of Emergency Physicians or the Publisher. The American College of Emergency Physicians and Wiley will not assume responsibility for damages, loss, or claims of any kind arising from or related to the information contained in this publication, including any claims related to the products, drugs, or services mentioned herein. The views and opinions expressed do not necessarily reflect those of the Publisher, the American College of the Emergency Physicians, or the Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, the American College of the Emergency Physicians, or the Editors of the products advertised.

NEWS FROM THE COLLEGE

UPDATES AND ALERTS FROM ACEP



ACEP Executive Director/CEO Announces Retirement

Susan E. Sedory, MA, CAE, will step down from her role as ACEP Chief Executive Officer effective June 2025.

Recruited and hired in a completely virtual format, Ms. Sedory took the helm at ACEP as the COVID pandemic accelerated in July 2020 and deftly adapted ACEP staff and strategy to meet member needs in unpredictable times. Under her direction, ACEP shifted to and from virtual meetings, initiated work-from-home protocols and began a comprehensive technology overhaul. Through her tenure, ACEP was repeatedly named an employee-friendly workplace, recognized as a Best Place for Working Parents three years in a row.

Ms. Sedory sharpened ACEP's focus by establishing a member-centric strategic plan and expanded the association's capabilities with the launch of the Emergency Medicine Data Institute. She steered ACEP through contentious legislative and policy battles, including efforts to fix the flawed implementation of the surprise billing law, as well as campaigns to prioritize emergency physician leadership when defining scope of practice lanes of medical authority. Ms. Sedory has dedicated her nearly 40-year career to improving health care, from research through organizational leadership, and currently serves as the president of the Council of Medical Specialty Societies.

"It has been an honor to serve ACEP and its members during unprecedented times," said Ms. Sedory. "I am fiercely proud of our achievements in support of the nation's emergency physicians and their patients."

The ACEP Board of Directors will form a search committee and enlist a search firm to identify Ms. Sedory's successor. Plans for a smooth transition will be implemented and the new leader will be chosen in early 2025, with a transition period of executive overlap to follow.

"We deeply appreciate Sue's leadership and the significant steps she took to make ACEP stronger during tumultuous times," said Aisha Terry, MD, MPH, FACEP, president of ACEP. "ACEP's voice on physician workforce issues has grown louder and more resolute at Sue's direction. She leaves ACEP well-positioned to be heard by policymakers, regulators, hospital decision-makers and others in the house of medicine. On behalf of the ACEP Board, we thank her as she plans for a well-deserved retirement."

Research Forum Submissions Accepted Through April

If you have original research you would like to see showcased at the world's premier emergency medicine research event, now is the time.

ACEP Research Forum—which will take place in conjunction with ACEP24, Sept. 29 to Oct. 2 in Las Vegas—is accepting abstract submissions through April 30. The Research Forum typically selects more than 400 abstracts per year, presented live during the event.

Find out more about the criteria, format and submission process online at acep.org/RF.

ACEP Anytime, 'The Netflix of Emergency Medicine' is Now Available

This all-in-one, online medical education library offers conference content, webinars, podcasts, and more. When time is limited, efficiency matters—trust ACEP Anytime. Subscribe and learn pearls you can use on your next shift at acep.org/anytime.

Discover Employer Practices with ACEP Open Book

Make career decisions that are best for you and your needs with the help of ACEP Open Book, developed with Ivy Clinicians. This online resource offers actionable insights about group structure, leadership, policies and more. Explore the tool today at <https://openbook.acep.org>.

Expand Your EM Business Knowledge

Practice essentials—an online curriculum developed by Emergency Medicine Residents' Association (EMRA) and ACEP—dives into reimbursement, contracts, operations and risk management, and other topics that may not have been covered in depth during medical school or residency. Free for EMRA and ACEP members at acep.org/practiceessentials.

CORRECTION

The figure for fascia iliaca block in the February 2020 issue incorrectly labeled the location of the femoral vasculature. The femoral artery lies between the femoral nerve (lateral) and the femoral vein (medial).

SEND YOUR THOUGHTS AND COMMENTS TO ACEPNOW@ACEP.ORG

THE BREAK ROOM



'Revisiting Nitroglycerin in MI with Right-Side Ventricular Involvement' (March 2024)

Another question to ask is why do we give nitrates at all to patients with acute myocardial infarction. There is no benefit to morbidity or mortality.

—Andrew Schare, MD, FACEP

Nitroglycerin will cause venodilation in every patient. If they are dependent on right ventricular filling for contraction as during myocardial ischemia/infarction, then you will expect this effect to be pronounced. It's not that you can't give NTG for the anti-anginal effect of potentially pain relief (that's all the benefit you will ever get from NTG unless there is actual coronary artery spasm without complete coronary occlusion/thrombosis) but you need to be ready to intervene by stopping the NTG (it should be IV and not SL or topical since you need the effect to go away quickly) and give an IV fluid bolus. If you give a SL NTG and do not have IV access yet to give an IVF bolus, you will never forget this mistake even if the patient hopefully doesn't arrest.

—Joseph Shiber, MD, FACEP

'Survival Tactics for Emergency Department Boarding' (March 2024)

Thank you, Shari. Your contribution to addressing this and other serious health care issues over the years has been laudable.

The failure of inpatient bed capacity to keep up with population is stark, albeit same day outpatient surgery with new techniques have changed a two-day hospital stay into a long afternoon in post-op. And changes in health care funding policy have forced hospitals and others to dramatically change business practices.

In Arizona, in the late 1990s to late 2000s the Arizona ACEP Chapter had a huge impact on hospital crowding, to which you alluded.

But, now, here we are again and what appears to be worse and more wide-spread. So once again, the Arizona Chapter Board is taking action to draw attention to and impact this serious issue.

This time, we have chosen to employ data (not readily available in the past) to incentivize hospitals to take appropriate action & join with the emergency medicine community to lobby for policy changes. Anyone interested may contact me for a summary.

Thanks again for summarizing this timely topic.

—Todd B. Taylor, MD, FACEP

'Case Report: Acute Urinary Retention and Fever in a Man' (January 2024)

Acute urinary retention (AUR) is an important clinical issue especially with an aging population. But, fever is also common in these patients, since many of them have urinary tract infections (UTIs). Prostatitis is sometimes the cause, but far less often than the article implies. The article neglects the most common cause: benign prostatic hypertrophy (BPH). Prostatitis is far less common than BPH, and most men with AUR and evidence of UTIs do not need four to six weeks of antibiotics (in spite of some urologists' recommendations).¹ In reality, BPH is the cause of AUR more than 50 percent of the time.

—W. Anthony Gerard, MD, FAAFP, FACEP

Reference

Coker TJ, Dierfeldt DM. Acute bacterial prostatitis: diagnosis and management. *Am Fam Physician.* 2016;93(2):114-20. [+](#)

TOXICOLOGY Q&A



PHOTO: JASON HACK (OLEANDER PHOTOGRAPHY)

The Grim Reaper

by JASON B. HACK, MD, FACEP

QUESTION: What fiery ingredient brings tears to your eyes and irritation upon exposure?

ANSWER on page 18

By the Numbers

MALARIA

SYMPTOMS

FEVER
CHILLS
HEADACHE
NAUSEA



VECTOR

ANOPHELES
MOSQUITOES

EPIDEMIOLOGY

ACQUIRED

85%

in Africa

>90

countries reported

GLOBAL INFECTIONS

228
MILLION

WORLDWIDE DEATHS

405,000

in 2018

IN THE U.S.

2,000

Cases

Source: Tan K, Abanyie F. Centers for Disease Control and Prevention. Malaria CDC yellow book 2024. Available at: <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/malaria>. Updated May 1, 2023. Accessed March 1, 2024.

RESIDENCY SPOTLIGHT

UNIVERSITY OF CINCINNATI COLLEGE OF MEDICINE

Location: Cincinnati, OH
Social media: @TamingtheSRU
Year founded: 1970
Number of residents: 56 (14 per class)
Program length: 4 years

What Does Your Program Offer That Residents Can't Get Anywhere Else?

Our residency has three very unique characteristics. First, we have a graduated responsibility model at our primary academic site designed to consolidate learning procedural (R2), resuscitation (R3), and supervisory skills (R4), so that residents get a lot of reps of each in a defined period so as to build muscle memory and to allow residents to incorporate recent feedback. Residents still get procedural and resuscitative experiences through all four years at our community sites, but the graduated responsibility model really reinforces the learning of those critical skill sets. Alumni feedback routinely states, "whatever you do, do not get rid of the graduated responsibility model."

Second, we also incorporate leadership development into our curriculum as this is one of our core values as a training program. We believe leadership development is critical to being a well-trained emergency physician and all residents get some element of intentional



R1 and R4 Class during Camp B Pod (ABOVE), R2 Class (TOP RIGHT), R3 Class (BOTTOM RIGHT)

leadership development no matter what their potential career path may be.

Lastly, our residency program is well integrated into our Helicopter EMS (HEMS) transport program Air Care. Unlike many other residency programs with HEMS experience and exposure, all of our residents serve as members of the flight team and the majority of air care flights in the greater Cincinnati region carry a resident-nurse flight team.

What Are Some Fun Activities Residents Like to Partake in Or Recently Participated in?

Like many programs, our residents appreciate being outdoors and do a lot of hiking

and climbing. We have a lot of great hiking within a day's drive of Cincinnati, including Red River Gorge, which is also one of the best climbing spots in the country. Many of our residents also enjoy running and biking in Cincinnati's nationally recognized park system or along its extensive bike trails. Our Wellness Committee also organizes a lot of social events to include "Wellness Wednesdays" (typically post-Grand Rounds workouts), group trivia nights, canoeing/paddle boarding, helipad yoga, faculty-resident kickball, and various theme parties. The Wellness Committee also sponsors various interest groups, with topics such as running, book club, "The Batchelor," Peloton, new



UNIVERSITY OF CINCINNATI EMERGENCY MEDICINE RESIDENCY PROGRAM

restaurants, events and concerts, and even dog walking or dog sitting.

How Should Potential Applicants Learn More About Your Program?

We would highly encourage applicants to follow us on social media, but they can also check out our department's website at <https://med.uc.edu/depart/emergency-medicine/home> (you can find more residency-specific links in the drop-down menu on the left side of the page).

—Erin McDonough, MD, FACEP, Residency Program Director and Professor of Emergency Medicine at the University of Cincinnati College of Medicine



SPLIT DECISION?

NOT EVEN CLOSE

9 out of 10 providers surveyed chose the T-RING as their preferred digit tourniquet.

RING™ ADVANTAGES

- 1 **EFFECTIVENESS** Immediately stops bleeding
- 2 **RISK MANAGEMENT** Applies the safest pressure of all methods & allows better exams
- 3 **SIMPLICITY** One-Size-Fits-All
- 4 **VERSATILITY** Able to stretch and apply over more severe injuries
- 5 **NERVE EXAM** 2 Point Discriminator for Digital Nerve Exam



INQUIRIES
info@theTring.com



MORE INFO AT
www.TheTring.com

ACEP4U: Driving Impact Through Committee Work

COMMITTEES DRIVE EMERGENCY MEDICINE WORK PROJECTS, APPLICATIONS OPEN

By serving on an ACEP committee, members can have a direct impact the work important to all emergency physicians. If you're passionate about a topic or niche within the specialty, getting involved with committee work in that area allows you to join forces with other professionals to multiply your impact.

Any ACEP member, including resident members, can apply to be on a committee. This year, committee terms begin at ACEP24, Sept. 29–Oct. 2, in Las Vegas.

If you are interested in volunteering for a national committee, visit acep.org/committees for more information and to fill out the application. The deadline to apply is May 15.

What have some of the committees been up to this year?

Coding and Nomenclature Advisory

The purpose of this Committee is to identify and analyze Medicare, Medicaid, and private payer claims processing policies that deviate from current procedural terminology (CPT) principles and/or documentation guidelines and recommend strategic solutions.

Recent activity includes:

- Track payer issues such as denials, rates, appeals, and pay for performance.
- Track activity related to the 2023 CPT documentation guideline changes.
- Monitor the Recovery Audit Contractor (RAC), and other audit activities, and react appropriately to issues affecting emergency medicine. Monitor changes in facility reimbursement.
- Represent ACEP interests at the AMA CPT Editorial Panel and WHO ICD-10 Coordination and Maintenance Committees.
- Identify and develop educational materials such as articles, webinars, and Frequently Asked Questions (FAQs) to provide members with up-to-date information that will facilitate an effective balance between optimal coding and compliance. Check out these resources at acep.org/reimbursement-faqs.

Clinical Policies

The Clinical Policies Committee currently has 12 clinical policies in development. ACEP has also partnered with the Society of Post-Acute and Long-Term Care Medicine (AMDA) to draft guidance on asymptomatic hypertension in nursing home residents and planning documents for emergency department (ED) nursing home telehealth. A few recent highlights include:

- The clinical policy on the management of severe agitation was published in the January 2024 issue of the *Annals of Emergency Medicine*.
- A consensus guideline on the management of corneal abrasions, which involved several members of the Clinical Policies Committee, was posted online in the *Annals of Emergency Medicine* on Feb. 6, 2024.
- A revised clinical policy on seizures will be

considered by the ACEP Board of Directors in April.

Clinical policies expected to be submitted to the ACEP Board of Directors by the end of 2024 include blunt trauma, asymptomatic hypertension, thrombolytics, carbon monoxide poisoning, and airway management.

International Emergency Medicine

- Co-hosted a Virtual Ambassador Conference in February with the International EM Section
- Reviewing an ACEP policy about “International Development & Promotion of Emergency Medicine”
- Working to increase international attendance at ACEP24
- Working with international societies to support their efforts to build EM as a specialty around the world
- Volunteers are attending several international conferences to build goodwill and promote the ACEP brand (including ICEM24 in Taiwan, EUSEM Congress 2024 in Copenhagen, ESEM24 in Dubai and ACEM in Botswana)

Membership Committee

- Working on possible new membership models for the ACEP Board of Directors to consider, including options for attendings in the first few years post-residency.
- Helping to educate section leaders on their responsibilities and how to increase engagement.
- Developing new ways to recognize leaders for their tenure and volunteer contributions.

Pediatric Emergency Medicine

The Committee works on objectives and topics related to pediatric emergency medicine and the care of pediatric patients. They ensure ACEP is involved and represented in national efforts to improve the emergency care of children. Some of the topics and objectives they are currently working on include:

- Participation and support in the National Pediatric Readiness Project and the national Pediatric Readiness Guideline.
- Development of information papers on multiple topics such as opioid use disorder, acute overdose, agitation, and suicidal ideation.

Public Health Committee

This Committee works to examine and analyze the role of emergency medicine in public health and to make recommendations to the ACEP Board of Directors in such areas as health promotion, prevention and management of infectious diseases, and the prevention and control of violence and injuries.

Committee members are working on a diverse array of objectives, including:

- Creation of several policy statements related to firearms, reproductive health services and climate change.

- Development of resources including information papers and smart phrases.

Reimbursement

This Committee's purpose is to identify and analyze the governmental reimbursement environment as it pertains to emergency medicine and assist in positioning the College appropriately on issues of importance.

Recent activity includes:

- Identify and analyze reimbursement challenges that impact emergency medicine and recommend strategic solutions by monitoring government and commercial payer claims activity including ongoing implementation of the *No Surprises Act*.
- Continue to represent ACEP interests at the AMA RBRVS Update Committee (RUC) to ensure our services are appropriately valued.
- Ongoing development of educational materials such as articles, webinars, and frequently asked questions (FAQs) to provide members with practical information on developing reimbursement trends. Develop specific content for residents and young physicians. Read more at acep.org/reimbursement.
- Develop a strategy for emergency medicine to be represented in alternate payment models, including episodes and population health, to prepare for the transition from fee-for-service reimbursement to value-based reimbursement. Look for a breakout session at LAC!
- Monitor Medicaid reforms at the state level and provide resources as appropriate. Monitor the impact of reimbursement changes in rural areas.

State Legislative and Regulatory Committee

- Examining the concerns our members have interacting with law enforcement in the emergency department and how ACEP can work together with policing organizations to find solutions.
- Identifying ways in which emergency physicians are put in harm's way and how emergency physicians can work more safely and effectively to stem violence and provide a safer environment for our members to work.

Well-Being

The primary focus of the Well-Being Committee, which often works closely with ACEP's Wellness Section, is to address the tough issues that hinder wellness and career satisfaction for emergency physicians, using evidence-based tactics to solve these challenges and support well workplaces.

Examples this year include:

- Published ACEP's new wellness guidebook, “From Self to System—Being Well in Emergency Medicine,” which offers in-depth solutions to many systemic issues plaguing emergency physicians.
- Hosted a series of “Reinvigorating Emer-

ACEP'S 31 COMMITTEES

1. Academic Affairs
2. Audit
3. Awards
4. Bylaws
5. Bylaws Interpretation
6. Clinical Emergency Data Registry
7. Clinical Policies
8. Clinical Resources Review
9. Coding & Nomenclature Advisory
10. Communications
11. Compensation
12. Disaster Preparedness & Response
13. Diversity, Equity, and Inclusion
14. Education
15. EMS
16. EM Practice
17. Ethics
18. Federal Government Affairs
19. Finance
20. Health Innovation Technology
21. International Emergency Medicine
22. Medical-Legal
23. Membership
24. National Chapter Relations
25. Pediatric Emergency Medicine
26. Public Health & Injury Prevention
27. Quality & Patient Safety
28. Reimbursement
29. Research
30. State Legislative/Regulatory
31. Well-Being

gency Medicine” webinars, funded in part by a cooperative agreement with the Centers for Disease Control and Prevention. These on-demand courses feature experts who discuss systemic transformation toward workplace well-being, burnout and compassion fatigue, second victim syndrome, and narrative medicine.

- Solicit nominations and recommend a recipient for the Emergency Medicine Wellness Center of Excellence Award, which recognizes an emergency medicine group, department, or clinical site that incorporates wellness and resilience on an institutional level. +



Benjamin Aiwonodagbon - University of Pittsburgh Medical Center



Justine Wang - Harbor UCLA Medical Center



Alexandra Sappington - Louisiana State University (New Orleans) pictured with her fiancée David Cooper, who matched in a surgery residency at Johns Hopkins

PHOTOS COURTESY OF MATCHING RESIDENTS.

MATCH | CONTINUED FROM PAGE 1

ly every spot filled. In 2021, when emergency physicians were hailed as health care heroes in the wake of the COVID-19 pandemic, EM applicants reached a peak of more than 4,300. But in 2022, the number of EM-bound students sharply dropped. With more than 700 fewer applicants, the 2022 Match saw 219 unfilled spots across 69 programs. The 2023 cycle continued the downward trend with a continued but smaller drop in EM-bound applicants, and an even larger rise in unfilled spots, which shocked the EM community; some even questioned its future.¹

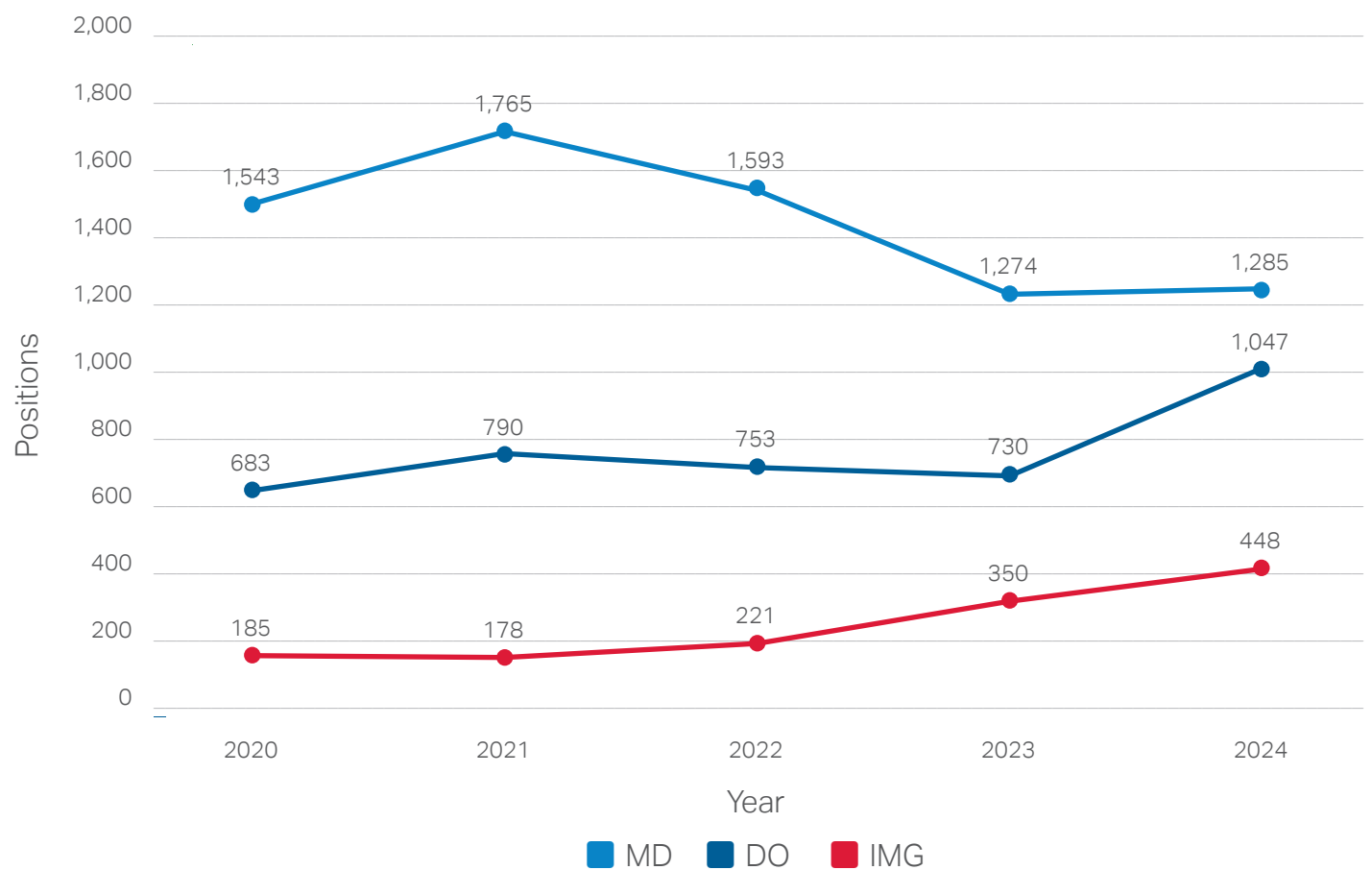
The 2024 cycle marked the greatest number of students applying to emergency medicine, according to preliminary data from ERAS. More than 4,400 applicants signed up for emergency medicine this year—nearly 1,200 more EM applicants than the previous year and with nearly double the amount of international medical graduate (IMG) applicants. While emergency medicine’s Match rates have not returned to pre-COVID numbers, it certainly is a sign of renewed interest in the field.

“We are very encouraged that the interest in EM has seen a rebound over the last year,” said Chinmay Patel, DO, the emergency medicine clerkship director at the Burnett School of Medicine at Texas Christian University. “The increase in EM interest mirrors what anecdotally many residency programs around the country experienced this interview season with increased applications.”

The increase in number of applicants and subsequent Match has been mostly driven by an increase in osteopathic and IMG applicants. The results of the 2024 Match showed that 35 percent of EM positions were filled by osteopathic students and 15 percent by international medical students and graduates. Natalie Zink, a graduating medical student at the Medical College of Georgia, said she anticipated the increased competition in emergency medicine this year, but it did not deter her decision. Although applicants from allopathic U.S. schools like Ms. Zink remained relatively flat, competition from osteopathic students and international graduates contributed to the rebound.

“After such a tough year last year, I as-

EM Positions, 2020-2024



sumed there would be a large rebound. EM is a very welcoming specialty where many types of people fit - our strength is in our motley crew,” Zink said. “EM is the only specialty that allows me the depth and breadth of pathophysiology, plus the added flexibility of fellowship training. There is no recipe for a perfect career; you have to follow your passions.”

Many applicants, like Nsikak Daniel who graduated medical school in St. Lucia, felt like they would never have a chance at matching in EM were excited at the opportunity to be given a chance. At ACEP’s Scientific Assembly in Philadelphia last October, Dr. Daniel had no plans to participate in the 2024 Match. She doubted she could earn a spot in an emergency medicine residency program in the United States.

There were financial limitations. She wasn’t personally impressed with her U.S. Medical Licensing Exam test scores. And she thought there would be steep competition from U.S.-based students. But a sponsor she found at ACEP’s annual meeting encouraged her to continue her dream of practicing emergency medicine.

Following ACEP24, “I bought my ERAS token, prepared my entire application in less than two weeks, including my personal statement and letters of recommendation, and submitted to 47 programs,” she said. “The next few weeks, I received eight interview offers and now, so help me God, I matched into EM! It has been a rollercoaster ride but personally, I think it makes this latest achievement all the more worth it.”

Dr. Daniel, who graduated medical school in 2022, is just one of 2,891 applicants who matched into emergency medicine in the 2024 Match program this spring.

“Our residency program leadership was very deliberate with recruitment, interviewing, and ranking as were many other programs,” said Annahieta Kalantari, DO, vice chair of education at the Penn State Health Milton S Hershey Medical Center. “They spent hundreds of hours finding the right candidates for our rank list.”

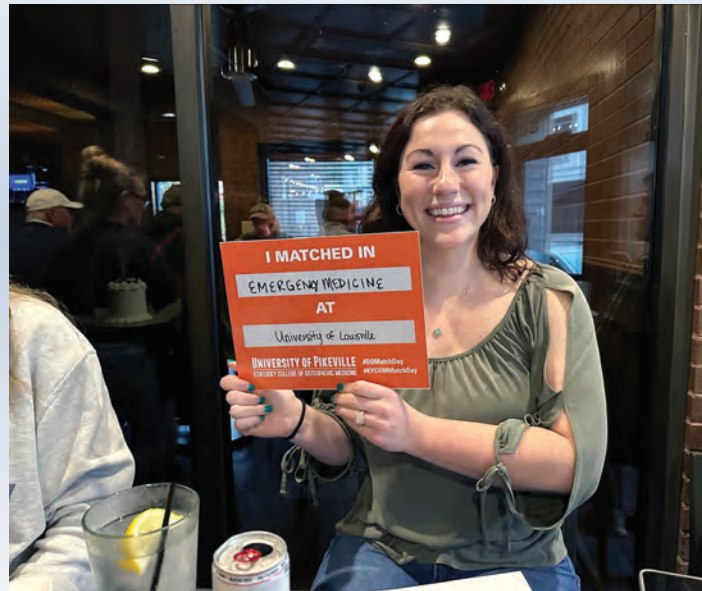
Many experts have noted that top grades and board scores do not always predict who will become the best emergency physicians. There are a number of emergency medicine leaders who have said that they themselves were just average students. Identifying future



Nsikak Daniel - Conemaugh Memorial Medical Center



Natalie Zink - University of Chicago



Rebekah Samuels - University of Louisville



Meg Hayslip - Carolinas Medical Center

residents who fit the mission and values of a program and have genuine interest in serving that specific patient population is also an important part of a successful Match.

The concept of “program signaling” was introduced by ERAS two years ago to further this aim and is a way for applicants to show interest in programs before applying. Signals serve as a way for an applicant to indicate to a select few programs that they are highly interested. This year, applicants to EM could signal up to seven residency programs when submitting applications. On average, 13 percent of a program’s applicants used a signal when applying to the program. Preliminary 2024 ERAS data showed applicants to EM who used a signal received an interview offer roughly 55 percent of the time compared to 28 percent for those who did not signal the program.² Program directors can use applicant signals in various ways in order to focus their efforts on those most interested in their programs and, hopefully, this leads to a successful match.

Benjamin Aiwonodagbon, MD, MPH, knew EM would be competitive this year, but for him, “it was EM or nothing.” He feels that the increase in IMG residents will positively impact the future of EM in meaningful ways. “Data has shown that the more diversity in a team or organization, the better the outcome,” he said. “When a managing team mirrors the patient population, the better the health outcomes for such patients.”

Dr. Aiwonodagbon added that the influx of IMG applicants to U.S. residency programs might be beneficial to workforce distribution challenges, noting that some visa sponsorships require board-certified physicians to practice in rural, under-served communities. Additionally, the impact could transcend the United States and have a global influence. “The more IMG EM physicians we have in the future, the better for global EM and EM health systems in developing countries,” he said. “EM is the missing piece of health care in most sub-Saharan African countries, for example. I, for one, would love to contribute to building EM in my home country Nigeria in the future.”

While the 2024 Match numbers paint an optimistic picture, many of the factors that led to the 2023 drop off have not changed. Hospital boarding, workforce concerns, economic

challenges, ED violence, corporatization of the practice of medicine, and payer and governmental administrative burdens still continue to plague emergency physicians. These systemic challenges require continued efforts to improve conditions for emergency physicians and their patients.

“I don’t think a few setbacks are going to deter what an ED represents at its core—humanity,” said Sreenidhi Vanyaa Manian, another student who successfully matched. “Only time will tell how everything works out but as long as people who are passionate about EM comprise it, I am not worried about the future of the specialty.”

This article updates a previous online post on March 15, 2024. Nsikak Daniel, was incorrectly identified as a medical student in the prior version. She has already graduated medical school.



DR. FISHER is an emergency physician and serves as Senior Director, Workforce and EM Practice for ACEP.



DR. KIEMENY is program director at Loma Linda University Medical Center.



MRS. CALAWAY is the managing director of content and communication integration at ACEP.

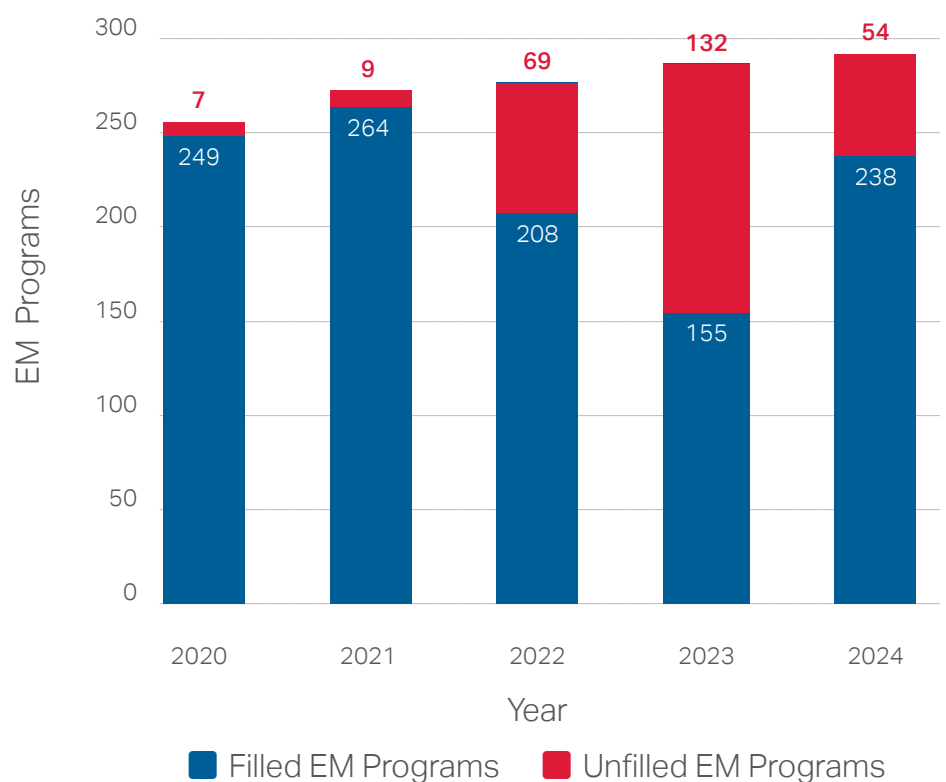


DR. DARK is medical editor in chief of ACEP Now and associate professor or emergency medicine at Baylor College of Medicine.

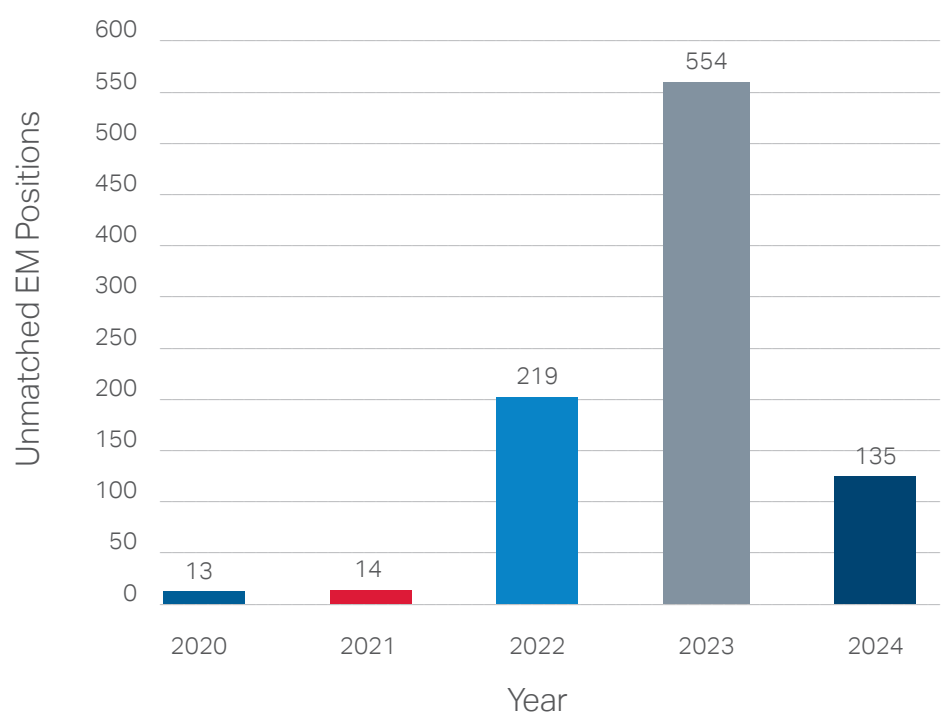
References

- Adelman L, Fisher J, Dark C. A profession in peril. *ACEP Now*. 2023;42(3). Available at: <https://www.acepnow.com/article/a-profession-in-peril/>
- ERAS statistics. Association of American Medical Colleges. Available at: <https://www.aamc.org/data-reports/data/eras-statistics-data>. Accessed March 19, 2024.

EM Programs, 2020-2024



Unmatched EM Positions, 2020-2024



Hey, Doc! I'm Dizzy

How not to miss posterior circulation stroke

by CHUCK PILCHER, MD, FACEP; AND
TONY DAJER, MD, FACEP

Posterior circulation strokes make up 20 percent of all strokes but account for 40 percent of stroke misdiagnoses.¹ Vertigo and dizziness are often the hallmarks, but distinguishing a central (brain) from a peripheral (vestibular) etiology is difficult. Dizziness is especially tricky, with up to 40 percent of strokes presenting with dizziness being missed.² Vertebral artery dissection (VAD) is notoriously elusive, producing anatomically scattered symptoms that may stutter for days.³

Case 1: Posterior Stroke Presenting as Food Poisoning

A 42-year-old man presents to the emergency department (ED) with sudden onset of severe vertigo, headache, nausea, and vomiting after eating Italian food. His blood pressure is 190 over 115. On exam he is in moderate distress, is pressing his eyes shut, and has horizontal nystagmus (not further characterized by the emergency physician). His neurological exam is described as normal, but gait and truncal ataxia are not tested. He is assumed to have benign positional vertigo, is treated with IV Reglan, Benadryl, and Valium, but is not improved two hours later. A neurologist is consulted and a CT shows a large left cerebellar infarct. Craniotomy is ultimately required to relieve brainstem compression.

Case 2: Posterior Stroke Presenting as Intoxication or Malingering

A 62-year-old man awakens from sleep with a headache, trouble speaking, and inability to move his arms or legs, all witnessed by his partner. Symptoms last 10-15 minutes. On

arrival in the ED, symptoms have resolved except for the headache. His neurological exam on arrival is documented as normal. Although his ETOH or blood alcohol level is zero, the consulting neurologist concludes that the patient's symptoms are likely related to drinking wine the night before. At shift change the oncoming emergency physician re-evaluates the patient and notes direction-changing horizontal nystagmus. MRI/MRA reveals a right VAD. The patient is anti-coagulated and does well.

Takeaways

Nystagmus can be complex; its presence in a patient with any neuro symptoms should raise the possibility of a posterior circulation stroke. If nystagmus is the sole finding, we teach that the only potentially "benign" form is horizontal, unidirectional and extinguishable.¹

Gait is key. If unable to test gait, check truncal ataxia by sitting the patient up.

VADs are notoriously difficult to diagnose. Symptoms, it is worth repeating, may be scattered, non-anatomic and stutter for days. Worse, odd symptoms like transient quadriplegia or phonation difficulty may be ascribed to malingering or intoxication. Posterior circulation strokes, especially VADs, may manifest with only a single neurological abnormality, so a thorough neurologic exam is critical.

Bilateral symptoms are more frequent in posterior circulation strokes and can be deceptive.² Vertigo (or "dizziness") plus *any other symptom*, e.g., headache, diplopia, numbness or motor weakness raises concern for posterior CVA. While vertigo, headache, neck pain and nausea are common, they are rarely all present.²

Benign positional vertigo or labyrinthitis should only cause vertigo without other neurological signs or symptoms. Speech abnormalities are not limited to anterior circulation strokes. In the setting of vertigo or dizziness, speech must be carefully tested. Accepting basic conversation as normal is inadequate.

"Dizziness" as a chief complaint at triage may not find its way into physician notes. Such a vague sensation may get lost in the shuffle of repeated interviews. Always consider dizziness a vertigo equivalent. Think twice before attributing a patient's symptoms to "Italian food" or "a few drinks." Humans have usually just eaten something or had "a few beers."

The gold standard for distinguishing a central versus peripheral etiology is possibly the HINTS exam (Head Impulse, Nystagmus, Test of Skew).¹ Unfortunately, patients who most need this might not be able to tolerate it. For such patients, we adopted a rapid, easily tolerated version of the HINTS exam. Its elements include:

1. Eyes: Nystagmus (if horizontal, is it direction-changing?), pupillary response (Horner syndrome), visual fields and skew.
2. Finger-to-nose/heel-shin tests: (basic tests of cerebellar function)
3. Speech: Cerebellar scanning, aka "staccato speech" e.g., phrases like "British Constitution" will sound like "Brit-tish const-ti-tu-tution."⁴ If in Spanish try, "Todos tenemos talento."
4. Gait or truncal ataxia: sit up on stretcher or exam table if too uncomfortable to walk.
5. Sensory: Test symmetry of light touch perception. Asymmetry may reveal lateral medullary syndrome (Wallenberg).

Conclusion

We have never reviewed a missed posterior circulation stroke where all elements of neurological exam were documented. Diagnosis of posterior circulation stroke requires an astute clinician who performs and documents a detailed neurologic examination. +



DR. DAJER was ED medical director at NY Presbyterian Lower Manhattan Hospital for 13 years. He has served as a quality and medical malpractice case reviewer for 25 years.



DR. PILCHER is a retired emergency physician and ED medical director at EvergreenHealth in Kirkland, WA. He has served as a medical-legal consultant in malpractice cases throughout his career and is the editor/publisher of a free opt-in monthly newsletter "Medical Malpractice Insights – Learning from Lawsuits."

References

1. Kattah JC, Talkad AV, Wang DZ, et al. HINTS to diagnose stroke in the acute vestibular syndrome: three-step bedside oculomotor examination more sensitive than early MRI diffusion-weighted imaging. *Stroke*. 2009;40(11):3504-3510.
2. Tamutzer AA, Lee SH, Robinson KA, et al. ED misdiagnosis of cerebrovascular events in the era of modern neuroimaging: A meta-analysis. *Neurology*. 2017;88(15):1468-1477.
3. Tamutzer AA, Lee SH, Robinson KA, et al. ED misdiagnosis of cerebrovascular events in the era of modern neuroimaging: A meta-analysis. *Neurology*. 2017;88(15):1468-1477.
4. Gottesman RF, Sharma P, Robinson KA, et al. Clinical characteristics of symptomatic vertebral artery dissection: a systematic review. *Neurologist*. 2012;18(5):245-254.

HAVE AN IDEA?

Submit your story pitch to *ACEP Now*

If you have a story idea or drafted article, e-mail the word document file to Editor **Danielle Galian-Coolgeorgen, MPS**, and Medical Editor in Chief **Cedric Dark, MD, MPH, FACEP**. We'll review your submission and update you on next steps.

To submit a story pitch, please send a 250 word summary along with bullet points of the following:

- Why our readers would value the story.
- How the story would influence the provision of emergency medicine.
- What you hope the reader would learn from your article.
- Potential outside experts or sources for the story.

The usual length of standard articles (departments, columns, one- to two-page articles) is about 800 words. The usual length of feature articles (two or more pages) is about 1,200 words. A reference list is also required to support researched material and the practice of evidence based medicine.

Preference will be given to new voices.

Submit a Case Report

To be considered for publication, send your case presentation to Medical Editor in Chief **Cedric Dark, MD, MPH, FACEP**, with the following:

- 200-word introduction of the patient's presentation, followed by,

- 600 word description of the diagnosis and management of the case including up to three bulleted teaching points,
- 10 reference maximum.

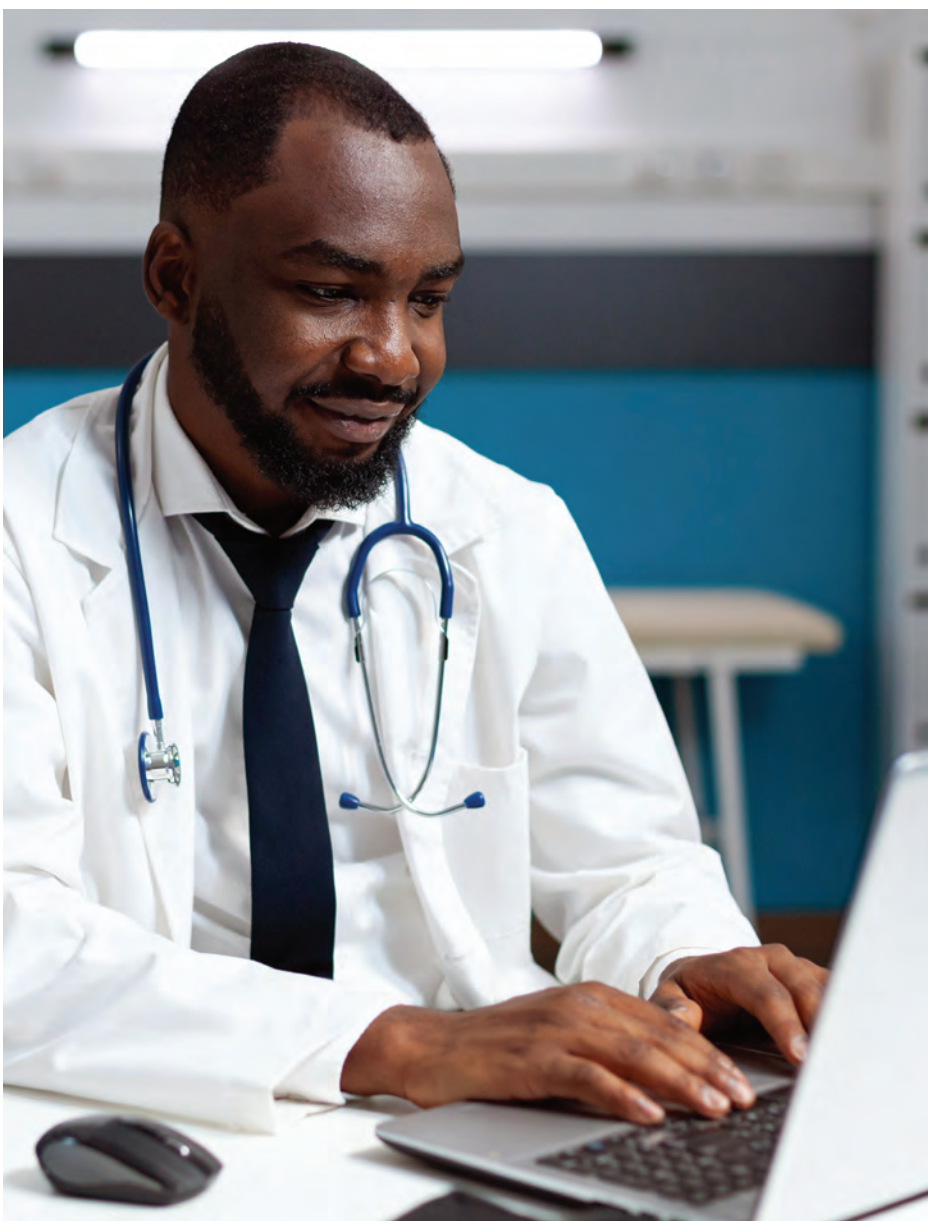
Rare, but not unusual, cases with clinical importance to emergency medicine will be considered. Those with clinical images preferred.

Submit a Letter to the Editor

ACEP Now welcomes letters to the editor from our readers. Letters should be 250 words or less, may be edited for length and style, and are published online and/or in print at the editorial team's discretion. Submit your letter including your name, title, organization, and contact information to Editor **Danielle Galian-Coolgeorgen, MPS**.

Interested in Joining ACEP Now's Medical Freelance Corps?

ACEP Now welcomes guest articles by physician writers. **Send us an email** with a brief writing sample to discuss opportunities. +



SHUTTERSTOCK.COM

acep Scientific Assembly **LAS VEGAS 24**

HIT THE JACKPOT OF UNFORGETTABLE EXPERIENCES WITH US IN

Las Vegas

SEPTEMBER 29 - OCTOBER 02, 2024

CONNECT	EXPLORE	LEARN
With old friends and new.	The science. They city. The possibilities.	How to recover. How to do things differently. What the future holds.

American College of Emergency Physicians
ADVANCING EMERGENCY CARE

acep.org/acep24

American College of Emergency Physicians®
ADVANCING EMERGENCY CARE

Defending you.
Demanding better.
We pick every single fight. For you.

staying on track. The result was surprisingly good; the program omitted nonmedical information and provided a succinct non-judgmental history. I tried it next at work, with less success. I found that the generic AI scribe didn't have as much detail as I would have wanted in some areas. It also included certain information that was extraneous or worded in a way that I did not appreciate, such as describing all pain as "severe." I ended up spending more time editing the document than it would have taken to just come up with my own history via dictation.

So, for now, I'm not switching over. But I am impressed. I don't doubt that AI will continue to improve, and there might be a day where AI could replace traditional ED scribes.

The profession of scribing dates to Mesopotamia and the beginnings of human civilization. Scribes have been essential throughout history in keeping a variety of documents, including historical records, legal codes, copying manuscripts, and texts. This isn't the first time where scribes' jobs have been challenged by modern inventions. The advent of the printing press 585 years ago caused a significant decrease in the prominence and use of scribes. However, in the past several years with the release of the electronic medical record, there has been a boom in the use of medical scribes to help with the burden of increased clinical documentation.

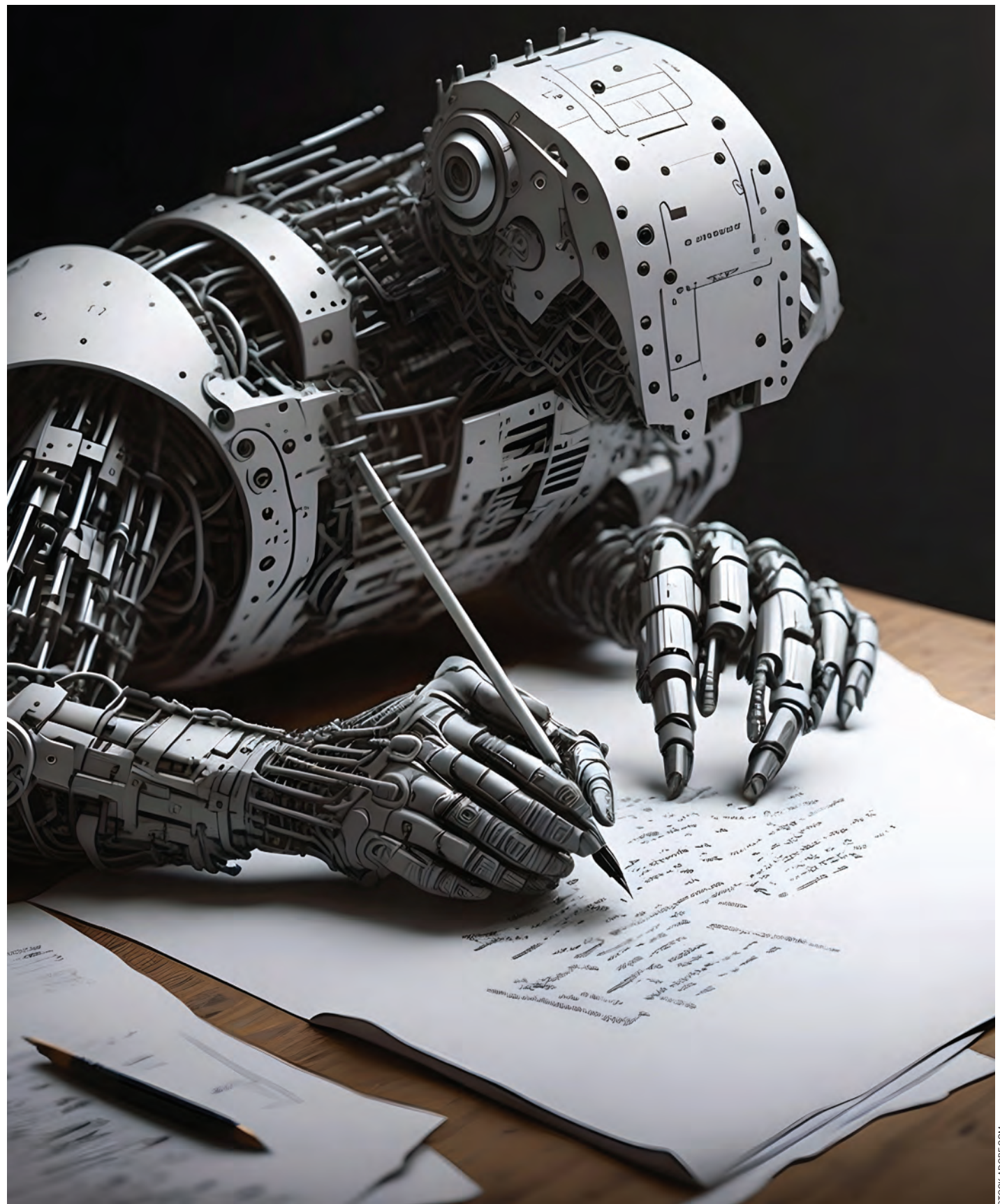
The American College of Medical Scribes estimated an increase in 80,000 scribes between 2015 and 2020.¹ Medical scribes have been shown to be beneficial to emergency physicians in terms of billing and coding, physician satisfaction, improved documentation in the emergency department, and patient volume.^{2,3} Surveyed ED scribes have also described benefits of experiencing being a scribe in terms of mentorship, increased clinical experience and medical knowledge, and improved chances of getting into medical school.⁴

A Personal History

I became an ED scribe my senior year of college while applying to medical school. Using a generic AI scribe has made me reflect on my time as an ED scribe and what a great influence that experience had in my overall decision to pursue emergency medicine. I first fell in love with the undifferentiated patient and the scope and excitement of emergency medicine when I was a scribe. I found role models and mentorship from the attendings I scribed for and made connections that have lasted throughout my career.

Would I have even gone into emergency medicine if I hadn't had the opportunity to be exposed to the ED as a scribe? Probably not. My emergency medicine rotation wasn't until my fourth year after sub-internship applications were due. According to the Association of American Medical Colleges (AAMC), in 2019 only 61 percent of medical schools required emergency medicine as a core clerkship. Unless we provide medical students with early exposure to emergency medicine, they might not realize that emergency medicine is their calling.

I have reviewed hundreds of emergency medicine residency applications and personal statements over the past few years. This experience leads me to believe that early ex-



STOCK-ADOBECOM

posure to emergency medicine through experiences such as EMS and ED scribing may play a crucial role in recruiting talented individuals to pursue emergency medicine. In the 2022 Match, emergency medicine residency programs were rocked by an unprecedented 219 unmatched positions; nearly one-quarter of programs were impacted before the SOAP. This trend worsened in 2023 with initially 554 unfilled positions prior to the SOAP.⁵ The decline in applications to emergency medicine programs is already concerning. Transitioning to AI scribes could potentially impact the pipeline of future applicants and further exacerbate the challenges faced by emergency medicine residency programs in filling their positions.

I worry that transitioning to AI and away

from scribes, who have traditionally been pre-medical students looking to enhance their resumes to improve their chance of gaining acceptance to medical school, will influence future applications and interest of those ultimately wanting to apply to emergency medicine in a time when applications to emergency medicine are tenuous. Although I see the potential in AI scribes for ED documentation and expect that their use will become more widespread, I think our specialty should consider the broader implications and how AI might impact the pipeline of future applicants to emergency medicine. Strategies and pipeline programs may need to be developed to make sure that medical students continue to have early opportunities to gain exposure and mentorship in emergency medicine. +



DR. HUTCHISON is an assistant program director for the Kaiser Central Valley Emergency Medicine Residency Program.

References

1. Geller G, Ramirez R, Webster L. The rise of the medical scribe industry: implications for the advancement of electronic health records. *JAMA*. 2015;7(13):1315-1316.
2. Allen B, Banapoor B, Weeks EC, et al. An assessment of emergency department throughput and provider satisfaction after the implementation of a scribe program. *Adv Emerg Med*. 2014;2014: Article ID 517319.
3. Dawkins B, Bhagudas KN, Hurwitz J, et al. An analysis of physician productivity and self-sustaining revenue generation in a free-standing emergency department medical scribe model. *Adv Emerg Med*. 2015;2015: Article ID 518179.
4. Eley RM, Allen BR. Medical scribes in the emergency department: the scribes' point of view. *Ochsner J*. 2019;19(4):319-328.
5. Lewis M, Williams K, Timpe J, et al. The 2022 and 2023 Emergency Medicine Residency Match: A Cautionary Tale. *Cureus*. 2023;15(5):e38601.



"A New Spin" is the personal perspective of the author and does not represent an official position of ACEP Now or ACEP.



Sugar, It's Goin' Down

A case of toxic hypoglycemic syndrome

by ANDREW FRANCO, MD; BRIANNA TAYLOR

An 18-year-old woman presented to the emergency department (ED) with symptoms of nausea, vomiting, diarrhea, and abdominal pain. She reported that these symptoms started two days prior, shortly after consuming a fruit known as ackee. Since the onset of illness, she had been unable to tolerate any oral intake. Before arriving at our ED, the patient sought care at an urgent care clinic, where she was prescribed ondansetron without improvement.

Upon physical examination, the patient was noted to have dry mucous membranes. Abdominal exam was benign. Most pertinently, her point of care glucose was 24 mg/dL.

Brief History of Toxic Hypoglycemic Syndrome

Ackee, the national fruit of Jamaica, is a dietary staple; however, consuming unripe ackee can lead to Toxic Hypoglycemic Syndrome (THS), also known as Jamaican Vomiting Syndrome. THS is generally characterized by the acute onset of profuse vomiting within six to 48 hours of ingestion of the unripe ackee, with subsequent hypoglycemia.¹ In severe cases altered mental status, seizures, coma, or even death have been observed.² The persistent consumption of ackee has been shown to cause acute liver injury, however, abstaining from eating the fruit can lead to improvement in liver health.³ Additionally, it has been demonstrated that ackee toxicity is dose-dependent; individuals who consume multiple unripe fruits or ackee seeds tend to develop more severe symptoms. Similarly, death is more prevalent in children with Toxic Hypoglycemic Syndrome compared to adults.¹ An estimated 5000 fatalities were attributed to what was then called Jamaican Vomiting Syndrome between 1886 and 1950.⁴ The association between ackee ingestion and the illness was initially recognized in 1875 and officially documented in 1904.⁵ Despite being endemic to Jamaica, cases of THS have been reported across the world, with the first case in the United States documented in 1993.⁶

The aril (flesh), rind, and seeds of ackee contain heat-stable hypoglycin A and hypoglycin B. The fully ripened aril is the only edible portion of the fruit, as concentration of these toxins drastically decreases in the flesh of ripened ackee fruit. It's crucial to note that the seeds and the rind of ackee should never be consumed, as they contain toxic levels of hypoglycin, even when the fruit is ripe. Studies indicate that THS is primarily caused by the toxin hypoglycin A. While the mechanism of hypoglycin A is not thoroughly understood, research demonstrates that its metabolism leads to the production of methylene cyclopropyl acetic acid (MCPA-CoA), which inhibits long-chain fatty acid beta-oxidation and ultimately causes depletion of glycogen stores.⁷

As hypoglycin A is a heat-stable toxin, cooking unripe ackee does not decrease its toxicity. Due to concerns regarding THS, the import of ackee fruit was outlawed in 1972, but since 2000 canned exports have been allowed by certain "green listed" manufacturers by the Federal Drug Administration.⁸

Diagnosis and Treatment

Food poisoning may result in a similar clinical manifestation as Toxic Hypoglycemic Syndrome. THS should be considered in individuals of Jamaican descent or in individuals who recently visited Jamaica, and of course in anyone who reports gastroenteritis symptoms after ingesting ackee. Workup should include blood glucose, serum electrolytes, liver function tests, and urinalysis.⁹ Initial treatment should focus on rapid correction of blood sugar via intravenous and oral dextrose, with close monitoring for recurrent hypoglycemia. Other support-



CRAIG SCOTT & KREVE SCOTT PHOTOGRAPHY - STOCK.ADOBE.COM

ive care includes rehydration with intravenous fluids and antiemetics. Activated charcoal could be considered if presenting immediately after ingestion.

Case Resolution

During further inquiry, the patient mentioned consuming all four pieces of the fruit but denied ingesting any seeds. She specified that the fruit was canned, but brought illicitly by a family member into the country.

The rest of her workup was notable for hypokalemia of 3.3 mmol/L. Other lab work was unremarkable, including creatinine and liver function tests. Her blood sugar improved after IV dextrose bolus and infusion. Poison control was consulted, and they concurred with the diagnosis of THS. Under their recommendation, the patient was admitted to the hospital for observation on an intravenous dextrose infusion. The next day she tolerated oral intake, her blood sugar was maintained, and she was discharged with instructions to monitor her glucose levels at home. +



DR. FRANCO is an emergency medicine attending physician at St. Francis Hospital and Medical Center, as well as an assistant professor at University of Connecticut School of Medicine and Quinnipiac University School of Medicine.



MS. TAYLOR is the chief scribe for ScribeAmerica at Saint Francis Hospital and Medical Center, as well as an undergraduate student studying Neuroscience and Biology at Wesleyan University.

References

1. Katibi OS, Olaosebikan R, et al. Ackee fruit poisoning in eight siblings: implications for public health awareness. *Am J Trop Med Hyg.* 2015;93(5):1122-3.
2. Joskow R, Belson M, et al. Ackee fruit poisoning: an outbreak investigation in Haiti 2000-2001, and review of the literature. *Clin Toxicol.*

KEY POINTS

- Toxic Hypoglycemic Syndrome should be considered in individuals with symptoms of gastroenteritis in individuals who recently visited Jamaica.
- A thorough toxicological history is critical in cases of suspected Toxic Hypoglycemic Syndrome, as toxicity is dependent on quantity and parts of the fruit ingested, time since ingestion, and means of preparation.
- Treatment should include close monitoring of blood glucose levels, with intravenous dextrose administration as needed.

2006;44(3):267-73.

3. Ajayi AM, Ayodele EO, et al. Evaluation of neurotoxicity and hepatotoxicity effects of acute and sub-acute oral administration of unripe ackee (*Bliha sapida*) fruit extract. *Toxicology Rep.* 2019;6:656-65.
4. Centers for Disease Control (CDC). Toxic hypoglycemic syndrome--Jamaica, 1989-1991. *MMWR Morb Mortal Wkly Rep.* 1992;41(4):53-55.
5. Scott, HH. On the 'vomiting sickness' of Jamaica. *Ann Trop Med Parasitol.* 1916;10(1):1-78.
6. McTague JA, Fomey R Jr. Jamaican vomiting sickness in Toledo, Ohio. *Ann Emerg Med.* 1994;23(5):1116-8.
7. Sanford AA, Isenberg SL, et al. Quantification of hypoglycin A and methylenecyclopropylglycine in human plasma by HPLC-MS/MS. *J Chromatogr B Biomed Appl.* 2018;1095:112-118.
8. Hypoglycin A and Ackee Fruit. U.S. Food and Drug Administration website. <https://www.fda.gov/food/natural-toxins-food/hypoglycin-and-ackee-fruit>. Updated 03/05/2024. Accessed March 23, 2024.
9. Holson DA. Ackee fruit toxicity: workup. Medscape website. <https://emedicine.medscape.com/article/1008792-workup?form=fpf#t5>. Published March 28, 2022. Accessed March 23, 2024.



STOCK.ADOBE.COM

Targeted Temperature Management

Is the science cooling?

by WILLIAM REIS, MD, MS; BENJAMIN ABELLA, MD, MPHIL, FACEP

Post-arrest patients with more significant reperfusion injury (for example, Pittsburgh Cardiac Arrest Category (PCAC) greater than or equal to 3, revised post-Cardiac Arrest Syndrome for Therapeutic hypothermia score (rCAST) greater than 6, evidence of shock, and/or longer arrest times) may benefit from mild hypothermia to 33 degrees Celsius, while less severe post-arrest patients may benefit from fever prevention at less than 37.5 degrees Celsius.

How Did We Get Here?

Targeted temperature management (TTM) for patients following cardiac arrest resuscitation has gone through several dosing iterations in the past two decades. Early work on TTM in 2002 showed benefit to cooling to 33 degrees Celsius, which subsequently influenced international resuscitation guidelines to recommend mild hypothermia at 32 degrees to 34 degrees Celsius in 2005.^{1,2} However, the European TTM1 trial in 2013 showed similar outcomes for those cooled to 33 degrees Celsius compared to 36 degrees Celsius, leading to a 2015 AHA class I recommendation of “cooling between 32 degrees Celsius–36 degrees Celsius.”^{3,4} The Hyperion trial in 2019 demonstrated that TTM at 33 degrees Celsius was efficacious for non-shockable rhythms, reinforcing the guidelines recommendation for post-arrest TTM.^{5,6}

In 2021, the TTM2 trial was published. TTM2 was a multicenter, randomized trial that enrolled 1850 OHCA patients and randomized them to 33 degrees Celsius or normothermia. Patients were maintained at their assigned target temperatures for 28 hours and then maintained at normothermia less than 37.5 degrees Celsius for 72 hours. Outcomes, including survival at 6 months and neurologic outcome, between the two groups were not clinically or statistically different, but the hypothermia group had a higher incidence of hemodynamically compromising arrhythmias (24 percent versus 17 percent in the normothermia group; RR 1.45 (1.21–1.75)).

The TTM2 trial, while rigorously performed, has important limitations to generalizability for the US patient population. TTM2 primarily enrolled patients in Northern Europe and thus had a number of characteristics not seen in the U.S. As seen in Table 1, the TTM2 population had markedly more favorable prevalence of positive prognosticators of arrest, compared to an American population from the same year.⁷ TTM2 is generally interpreted as favoring normothermia for post-arrest care, but the question is whether this trial is broadly applicable to many countries with less developed community CPR involvement.

Current International Resuscitation Recommendations

In August 2023, the American Heart Association and the International Liaison Committee on Resuscitation published a scientific advisory

that derived three conclusions.^{8,9} First, based on TTM2, they recommend that cooling OHCA patients of cardiac or unknown cause, excluding those with unwitnessed asystole, to less than 37.5 degrees Celsius “is a reasonable and evidence-based approach.” Second, as TTM2 did not address in-hospital cardiac arrest or OHCA of noncardiac (other medical) cause, the guidelines remain essentially equivocal as to “whether some of these patients might benefit from temperature control at temperatures between 33 degrees C and 37.5 degrees C.” Finally, the guidelines support active temperature management’s (though not necessarily hypothermia) role in improving post-arrest outcomes. This is best demonstrated by the TTM2 data showing that 46 percent of patients in the normothermia group required active cooling, on top of pharmacological antipyresis.

Recent Clinical Evidence on Post-Arrest TTM

The accumulated post-arrest care literature makes clear that careful fever avoidance following resuscitation is essential. But the question remains, is there ever an explicit indication for hypothermia to 33 degrees Celsius, based on the earlier trials and the strong laboratory evidence supporting this more aggressive form of temperature control? Growing evidence suggests that there may be utility for TTM in the sicker phenotype of arrest patients. Several recent studies yield insights into this hypothesis:

In a single site retrospective cohort study, Callaway et al demonstrated that TTM efficacy may be impacted by arrest severity.¹⁰ In this observational study of 911 American post-arrest patients, sicker patients (PCAC greater than or equal to 3) had improved outcomes when treated at 33 degrees Celsius while less sick patients (PCAC less than or equal to 2) had better outcomes when treated at 36 degrees Celsius. This finding is consistent with the large animal model literature on post-arrest TTM, where a dose effect relationship of TTM is related to arrest model severity.

In a multisite retrospective cohort study, a study by Nishikimi, et al., adds to the hypothesis that TTM efficacy is dependent on arrest severity.¹¹ Similar to the Callaway study, this study of 1,111 Japanese patients replicated the finding that low-severity post-arrest patients did not benefit from hypothermia while patients with moderate-severity arrests significantly benefited from hypothermia. Adding nuance, this study also showed that the highest-severity arrests did not benefit from hypothermia. While TTM may attenuate injury, it does not reverse it, so it is unsurprising to discover a profoundly injured subset of patients who do not benefit from TTM. In summary, this study shows that there is a subset of post-arrest patients who experience neither too much, nor too little injury and are therefore disposed to benefit from expeditious hypothermic intervention.

Several studies have shown that after TTM1 (2013), in cases where hospitals changed post-

arrest temperature targets from 33 degrees Celsius to 36 degrees Celsius, patients had an concomitant increase in fever, poor neurological outcomes and increased mortality.¹²⁻¹³ These are challenging studies to draw definitive conclusions from, however they suggest that some of these post-TTM1 patients who were cooled to 36 degrees Celsius did worse, supporting the notion that there exists a subset of patients who benefit from cooling to 33 degrees Celsius.

There is a current vigorous debate regarding post-arrest TTM. Who should receive it? At what dose? For how long? There are a number of trials in progress that may help address these questions; notably, ICECAP, IH-TTM, and PRINCESS-2, each focusing on different aspects of TTM dosing and timing. Until then, we propose that it's worth considering mild hypothermia (33 degrees Celsius) in our sickest post-arrest patients, while avoiding fever in every patient resuscitated from cardiac arrest. +



DR. ABELLA is the William G. Baxt professor of emergency medicine and vice chair for research in the department of emergency medicine and the director of the center for resuscitation science at the University of Pennsylvania.



DR. REIS is a PGY2 resident in the department of emergency medicine and a member of the center for resuscitation science at the University of Pennsylvania.

Table 1: Comparison of the TTM2 population to 2021 CARES population (and one other source, as annotated)

	TTM2 POPULATION	US CARES 2021 POPULATION
Witnessed Arrest	91.5 percent	49.6 percent
Initially Shockable Rhythm	67.4 percent	16.0 percent
Bystander CPR	79.9 percent	41.5 percent
STEMI as Etiology	40.2 percent	4.6 percent

References

- Hypothermia after Cardiac Arrest Study Group. Mild therapeutic hypothermia to improve the neurologic outcome after cardiac arrest [published correction appears in *N Engl J Med* 2002;346(22):1756]. *N Engl J Med*. 2002;346(8):549-56.
- Group W, Nolan JP, et al. Therapeutic hypothermia after cardiac arrest. *Circulation*. 2003;108(1):118-21.
- Nielsen N, Wetterslev J, et al. Targeted temperature management at 33°C versus 36°C after cardiac arrest. *N Engl J Med*. 2013;369(23):2197-206.
- Andersen LW, Berg KM, et al. Temperature management after cardiac arrest an advisory statement by the advanced life support task force of the international liaison committee on resuscitation and the American Heart Association emergency cardiovascular care committee and the council on cardiopulmonary, critical care, perioperative and resuscitation. *Circulation*. 2015;132(25):2448-56.
- Lascarrou J-B, Merdji H, et al. Targeted temperature management for cardiac arrest with nonshockable rhythm. *N Engl J Med*. October 2019;381(24):2327-37.
- Soar J, Berg KM, et al. Adult advanced life support: 2020 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Resuscitation*. 2020;156:A80-A119.
- CARES Annual Report. Cardiac Arrest Registry to Enhance Survival website. https://mycares.net/sitepages/uploads/2022/2021_flipbook/index.html?page=1. Accessed March 26, 2024.
- Tran AT, Hart AJ, et al. A risk-adjustment model for patients presenting to hospitals with out-of-hospital cardiac arrest and ST-elevation myocardial infarction. *Resuscitation*. 2022;171:41-47.
- Perman SM, Bartos JA, et al. Temperature management for comatose adult survivors of cardiac arrest: a science advisory from the American Heart Association. *Circulation*. 2023;148(12):982-8.
- Callaway CW, Coppler PJ, et al. Association of initial illness severity and outcomes after cardiac arrest with targeted temperature management at 36 °C or 33 °C. *JAMA Netw Open*. 2020;3(7):e208215-e208215.
- Nishikimi M, Ogura T, et al. Outcome related to level of targeted temperature management in postcardiac arrest syndrome of low, moderate, and high severities: a nationwide multicenter prospective registry. *Crit Care Med*. 2021;49(8):E741-50.
- Nolan JP, Orzechowska I, et al. Changes in temperature management and outcome after out-of-hospital cardiac arrest in United Kingdom intensive care units following publication of the targeted temperature management trial. *Resuscitation*. 2021;162:304-311.
- Johnson NJ, Danielson KR, et al. Targeted temperature management at 33 versus 36 degrees: a retrospective cohort study. *Crit Care Med*. 2020;48(3):362-9.
- Bray JE, Stub D, et al. Changing target temperature from 33 °C to 36 °C in the ICU management of out-of-hospital cardiac arrest: A before and after study. *Resuscitation*. 2017;113:39-43.

ACEP PEERprep
For Programs

Quality Questions. Advanced Analytics. A Name You Trust.

All for a Budget-Friendly Price.

Learn more, email peer@acep.org

For Your Residents:

- NEW: Mobile App**
Your residents can take tests from anywhere they have their phones!
- Aligns with all 3 Foundations of EM**
Your residents can test their skills with weekly PEER quizzes aligned with each Foundations of EM unit.
- Over 2,500 Questions and Counting**
About 50 questions added each month plus current questions continue to be reviewed and refined.

For You and Your Program:

- State-of-the-Art Dashboard**
Monitor and strengthen your residents' progress.
- Create Custom Quizzes**
Bolster weak areas that need improvement.
- Earn CME Hours**
You can earn CME hours as you help your residents with their board prep needs.

No other EM board prep today has the quality, capabilities, AND decades of experience in launching EM careers that PEERprep does.
acep.org/PEERprepforPrograms



Learn the Business of EM from the Experts with

PRACTICE essentials
OF EMERGENCY MEDICINE
Developed by EMRA and ACEP

FREE for EMRA and ACEP Members

Featuring Modules and Quizzes On:

- Contracts and Practice Models
- Legal and Regulatory Issues
- EM Informatics
- Negotiations
- Quality and Patient Safety
- Operations
- Reimbursement
- Risk Management
- Billing and Coding
- Leadership and Innovation
- Personal Finance
- Plus More!

Approved for AMA PRA Category 1 Credit(s)[™].

Learn more acep.org/PracticeEssentials

SENDING HOME TRAUMATIC ICH FROM THE ED

Should you do it?

by BRUCE LO, MD, MBA, FACEP; GREG WEINGART, MD, FACEP; GRACE GARTMAN, MD

A 39-year-old male presents to your emergency department (ED) with complaints of a headache after a roll-over motor vehicle accident. He was a restrained driver traveling 65 miles per hour on the highway when he lost control in the rain, hit a guardrail, and had a brief loss of consciousness. His only medical history is hypertension and does not take any anticoagulation. He has a normal neurological exam with a glasgow coma scale (GCS) of 15. Due to the mechanism of injury, a head CT was obtained. The patient was found to have a small intraparenchymal hemorrhage. Neurosurgery was consulted at the regional trauma center where the consultant recommended observing the patient in the ED with a repeat head CT in six hours. Should you do it or should you look for another transferring facility?

Background

Patients who are found to have traumatic intracranial hemorrhages (tICHs) are frequently transferred for neurosurgical evaluation.^{1,2} Patients with isolated mild tICH typically do not experience neurological deterioration nor undergo neurosurgical intervention. The vast majority of mild tICH patients can be discharged within 24 hours including from the ED.¹ Transferring these patients can lead to unnecessary costs, strain on the health care system, and inconvenience to patients and families who have to travel far distances without accruing any added benefit. Unnecessary transfers can also worsen bed shortages, lead to emergency department crowding, and worsen hospital boarding at trauma centers. This ultimately delays care for other patients who may benefit from a transfer. Recent studies have started to look at identifying patients with an isolated tICH who do not need intensive monitoring or intervention and could be discharged from the ED after a short period of observation.

Evidence

Several tools have been evaluated to risk stratify patients with mild tICHs for deterioration and neurosurgical intervention. The first is the Brain Injury Guidelines (BIG), which looked at various factors to risk stratify patients into three categories (See Table). In their multi-center validation study of 2033 patients, they found that patients who were classified as BIG 1 and BIG 2 (around 30 percent of all patients) had zero TBI-related post-discharge ED visits or 30-day readmissions. BIG 1 patients (around 15 percent of patients) also did not require repeat neuroimaging or neurosurgical consultation. They were discharged from the ED after only six hours of observation.³

The SafeSDH tool defined low risk patients as those who had none of the following: taking anticoagulation or clopidogrel, more than one discrete type of hematoma, subdural hematoma (SDH) greater than 5 mm, midline shift, and GCS less than 14. The primary composite outcome included not only the need for neurosurgical intervention (both immediate and delayed), but also any neurological decline and death. In a validation study of 753 patients at 6 hospitals (including both trauma and non-trauma centers), 21.5 percent of patients were deemed low risk. Sensitivity of the tool was 99 percent and a negative predictive value of 0.03. Only two cases fell out due to neurological decline which were felt to be related to medical reasons and not from the SDH. Repeat neuroimaging showed no change in the size of the SDH and no neurosurgical intervention was required.¹

How to Implement

Other studies utilizing ED observation pathways have been shown to safely discharge patients home without the need for an admission to the hospital.^{4,5} Multidisciplinary teams involving neurosurgery, trauma, and emergency medicine can cre-



ROSSANDELEN - STOCK.ADOBE.COM

Table. Brain Injury Guidelines (BIG).

Variables	BIG 1	BIG 2	BIG 3
Neuro Exam	Normal	Normal	Abnormal
Intoxication	No	No/Yes	No/Yes
Coumadin/Aspirin/Plavix	No	No	Yes
Skull Fracture	No	Non-displaced	Displaced
Subdural Hematoma	<= 4mm	5-7 mm	> 7 mm
Epidural Hematoma	<= 4mm	5-7 mm	> 7 mm
Subarachnoid Hemorrhage	Trace	Localized	Scattered
Intraparenchymal hemorrhage	<= 4mm, 1 location	3-7 mm, 2 locations	> 7 mm, multiple locations
Intraventricular hemorrhage	No	No	Yes

ate pathways for isolated tICH that do not require admission or transfer. A phased approach can be used starting with a protocol like BIG and having neurosurgery review images for all patients with tICH. In the authors' experience of more than 120 patients at several community sites, no unexpected adverse outcomes have been seen over the last two years. While local validation is important, safely reducing unnecessary transfers and admissions can not only reduce costs and inconvenience to the patient, it also helps referral centers that struggle with capacity.

Conclusion

You decided to take the consultant's recommendation and while waiting for the repeat CT, read this *ACEP Now* article on the practicality of discharging tICH from the ED. Six hours later, the repeat CT head showed no difference in the size of the hemorrhage. Your patient's neurologic exam remained unchanged. After discussing with neurosurgery again, they recommended discharge and you felt comfortable and in agreement. +



DR. LO is the chief of emergency medicine at Sentara Norfolk General Hospital and professor at Eastern Virginia Medical School. He is a partner at Emergency Physicians of Tidewater, a private, democratic group in Norfolk, Virginia.



DR. WEINGART is the assistant medical director at Sentara Norfolk General Hospital emergency department and an assistant professor at Eastern Virginia Medical School. He is a partner at Emergency Physicians of Tidewater.



DR. GARTMAN is an education fellow and Instructor at Eastern Virginia Medical School department of emergency medicine in Norfolk, Virginia.

References

- Borcuk P, Van Ornam J, Yun BJ, et al. Rapid discharge after interfacility transfer for mild traumatic intracranial hemorrhage: frequency and associated factors. *West J Emerg Med.* 2019;20(2):307-315.
- Pruitt P, Castillo R, Rogers A, et al. External Validation of a Tool to Identify Low-Risk Patients With Isolated Subdural Hematoma and Preserved Consciousness. *Ann Emerg Med.* 2023;18:S0196-0644(23)01138-1. Epub ahead of print.
- Joseph B, Obaid Q, Dultz L, et al. Validating the Brain Injury Guidelines: Results of an American Association for the Surgery of Trauma prospective multi-institutional trial. *J Trauma Acute Care Surg.* 2022;93(2):157-165.
- Singleton JM, Bilello LA, Greige T, et al. Outcomes of a novel ED observation pathway for mild traumatic brain injury and associated intracranial hemorrhage. *Am J Emerg Med.* 2021;45:340-344.
- Wheatley MA, Kapil S, Lewis A, O'Sullivan JW, Armentrout J, Moran TP, Osborne A, Moore BL, Morse B, Rhee P, Ahmad F, Atallah H. Management of Minor Traumatic Brain Injury in an ED Observation Unit. *West J Emerg Med.* 2021;15(4):943-950.



A Rare Congenital Heart Anomaly

Acute proximal LAD myocardial infarction in a patient with dextrocardia

by HEAVEN AHDI, MD; PATRICE BARISH, MD

A 59-year-old male with a past medical history of a repaired ventricular septal defect (VSD), dextrocardia, hypertension, hyperlipidemia, and current smoker presented to the emergency department (ED). This patient had known coronary artery disease (CAD), and previously required drug eluting stents to the obtuse marginal and diagonal arteries. The patient expressed epigastric pain, nausea, and fatigue followed by non-exertional, constant right-sided chest pain with radiation to his right arm.

The patient initially presented to an outside ED and was subsequently transferred to our facility for continuity of care. Patient had stable vital signs with an oral temperature of 36.4 degrees Celsius, heart rate of 91, blood pressure of 118 over 76, respiratory rate of 23, and pulse ox of 96 percent on room air. He was asymptomatic upon presentation.

A traditional, left-sided EKG was initially obtained, which demonstrated inverted P waves in lead I, deep Q waves in lead V1, negative QRS complex in V1, and RBBB. It was immediately discerned that the patient had dextrocardia from previous records, and an EKG for dextrocardia was obtained.

The second EKG was concerning for STEMI in the precordial leads (see figure 1). The patient's first and second troponins from the outside hospital were less than 0.01 ng/mL. The third troponin at our facility resulted as greater than 50.00 ng/mL. The patient was started on IV heparin and immediately taken for cardiac catheterization.

In the cath lab, the patient was found to have evidence of a proximal thrombus and significant stenosis of the LAD (see figure 2). He underwent successful revascularization and stenting of the proximal to mid LAD.

Discussion

Dextrocardia is a rare congenital anomaly where the heart is intrinsically positioned in the right hemithorax with the apex pointing towards the right caudal position.¹ It has a prevalence of 0.01 percent.¹ Dextrocardia can be associated with an overall situs inversus, where all internal organs are in the reversed position or be limited to situs ambiguus, where only some organs are in the reversed.¹

Despite the rarity of dextrocardia, coronary artery disease can occur with a similar frequency to that of the general population.³ Coronary artery disease in a patient with Dextrocardia can present with particular findings on a traditional left-sided EKG that raise suspicion for this anomaly. However, there may be diagnostic dilemmas if these findings are not immediately recognized. This delay in recognition can result in the inadvertent underdiagnosis of STEMIs. Thus, it is important to recognize dextrocardia and adjust our diagnostic tools appropriately.

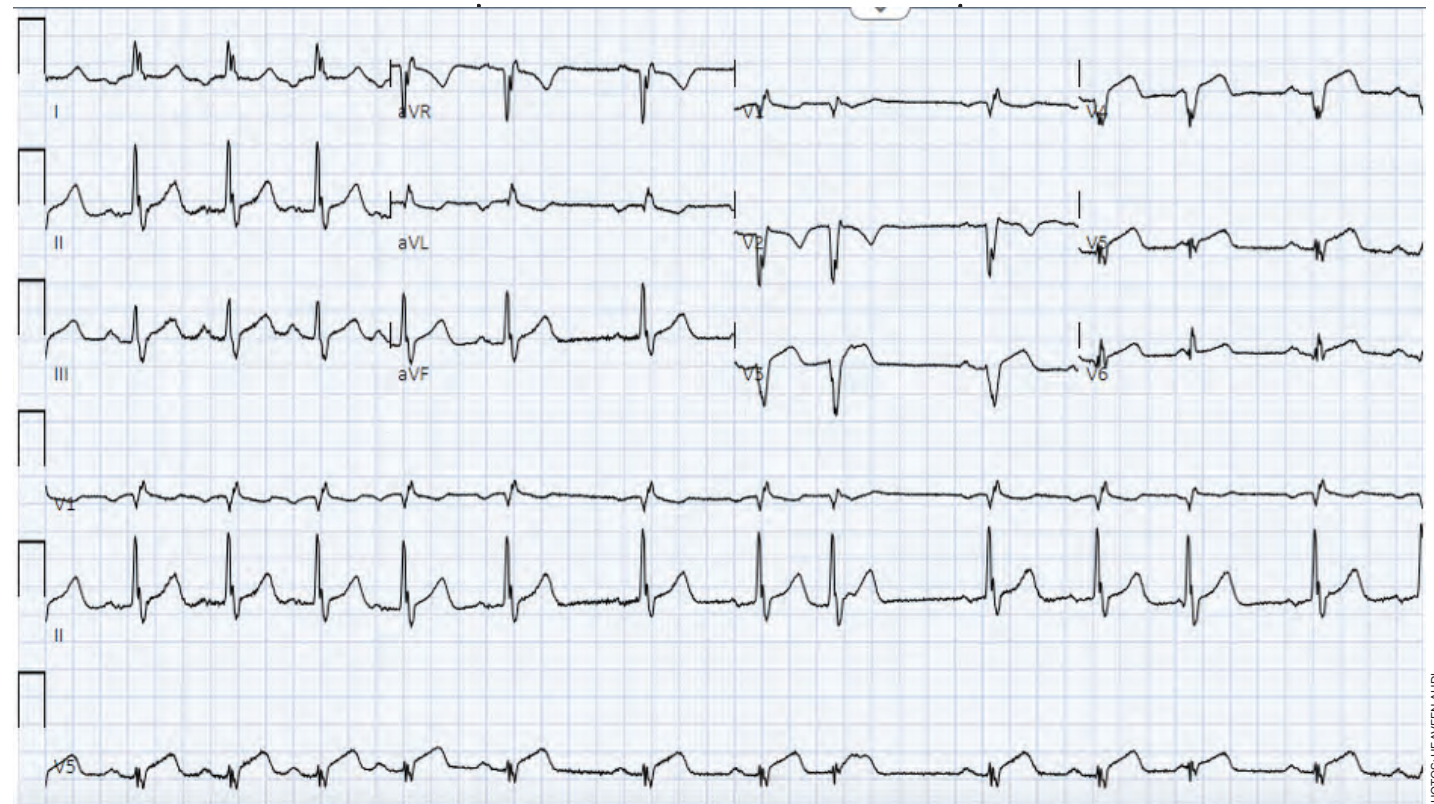


Figure 1: EKG for Dextrocardia showing STEMI.



Figure 2: Cardiac cath.

Dextrocardia with STEMI is a rare clinical presentation that presents with both diagnostic and technical challenges. A literature search through PubMed yielded fewer than 80 case reports of this presentation. Further, patients with dextrocardia may have atypical presentations of STEMIs. Dextrocardia can have features of right axis deviation, positive QRS complexes (upright P and T waves) in aVR, negative P and T waves and QRS complexes in lead I, and absent R wave progression in the precordial leads with dominant S waves.⁴ In cases of dextrocardia, precordial leads should be placed in a mirror image on the right side of the chest, as is done for a right-sided EKG, with the additional reversal of the right and left limb leads.⁴

Symptoms of acute coronary syndrome classically present on the left chest wall, however, our patient's pain was all localized to the right side of the chest, which has been described with other cases of dextrocardia.⁵

The patient's initial left-sided EKG did not demonstrate concerning ST segment changes. However, the patient had known dextrocardia based on documented medical history and was confirmed with a recent chest x-ray. Upon the prompt reversal of EKG leads for dextrocardia, the patient was found to have an obvious STEMI in the precordial leads. The patient was then emergently taken for cardiac catheterization. It is important to discern cardiac anomalies, such as dextrocardia, early in a patient's clinical presentation, as it can significantly impact the timely interpretation of EKGs and the appropriate management of the patient's care. +



DR. AHDI is a senior emergency medicine resident at Corewell Health William Beaumont University Hospital.

KEY POINTS

- Dextrocardia has a prevalence of 0.01 percent, but coronary artery disease can occur at the same frequency as within the general population
- An EKG for dextrocardia requires precordial leads to be placed in the mirror positioning on the right side of the chest, with the addition of limb lead reversal
- Patients with dextrocardia and cardiac chest pain may have atypical presentations, such as chest pain across the right side of their chest



DR. BARISH has been a clinical emergency physician for 37 years and the system professor at William BEAUMONT Oakland University medical school.

References

1. Maldjian PD, Saric M. Approach to dextrocardia in adults: review. *AJR Am J Roentgenol*. 2007;188(6 Suppl):S39-S38.
2. Totaro P, Coletti G, Lettieri C, Pepi P, Minzioni G. Coronary artery bypass grafts in a patient with isolated cardiac dextroversion. *Ital Heart J*. 2001;2(5):394-396.
3. Hynes KM, Gau GT, Titus JL. Coronary heart disease in situs inversus totalis. *The American Journal of Cardiology*. 1973;31(5):666-669.
4. Nickson C, Buttner R. Dextrocardia. life in the fast lane. July 19, 2021. Accessed December 1, 2023. Available at: <https://litfl.com/dextrocardia-ecg-library>.
5. Kong B, Wang N, Dou L, Cao D. Coronary angioplasty in an adult with dextrocardia and single coronary artery with the right coronary artery originating from the left anterior descending artery. *Coronary Artery Disease*. 2019;30(5):390-392.
6. Burns E, Buttner R. Right Ventricular Infarction. Life in the Fast Lane. February 8, 2021. Accessed December 1, 2023. Available at: <https://litfl.com/right-ventricular-infarction-ecg-library>.

Screening for AAA

A new quality measure seeks to catch AAAs before they pop

by SANDRA M. SCHNEIDER, MD, FACEP

An abdominal aortic aneurysm (AAA) develops with age, occurring primarily in those older than 55 years. Risk factors include smoking, hypertension, male sex, atherosclerotic disease, and family history of AAA. Although AAA is less common in women, rupture is more common.¹ Most aneurysms are less than 4 cm, with the normal diameter of the aorta less than 3cm. When the aneurysm is greater than 5 cm, there is a risk of a rupture, which increases with increased aortic diameter.

The classic triad of abdominal pain, hypotension and pulsatile abdominal mass is present in less than 25 percent of patients.² Patients can present with back pain, or with focal neurologic signs such as numbness of the lower extremity. A pulsatile abdominal mass may be difficult to assess in patients with a higher BMI. About 35 percent of individuals with rAAA will die at home.³ The majority of those who arrive to the emergency department (ED) live for 2 hours or more, leaving a small window for surgical intervention.⁴ Depending on the study, rAAA is missed in 16-62 percent of cases.⁵ Untreated, nearly all patients die. The diagnosis is confirmed with bedside ultrasound (US) or CT. Bedside US can confirm the presence of AAA, but visualization of the actual rupture may be more difficult because most AAAs rupture into the retroperitoneal space. CT is more definitive but can take more time.

Recently, ACEP received a grant from the Gordon and Betty Moore Foundation to create a quality measure to improve the diagnostic accuracy of rAAA in patients. This measure has been approved by CMS and will be available for reporting soon. To meet the measure, and get credit for MIPS, all patients 55 years and older who present with new acute abdominal or back pain and hypotension (systolic BP less than 90mm Hg) must have an US or CT performed in the ED. Exceptions to this measure are patients who have been screened for an abdominal aortic aneurysm in the past, or have had a CT or US of the abdomen in the prior five years (for those 55-65 years old) or older than 65 years who demonstrate a normal size aorta. Other exceptions are patient refusal, patient death or immediate transfer to the operating room. It is hoped that more emergency physicians will use point of care bedside US, which can be performed more rapidly than a CT. Ultrasound of the aorta is a core competency of emergency physicians, but resources such as Sonoguide are available for a refresher at acep.org/sonoguide.

This measure has an additional advantage of increasing the number of patients screened for an abdominal aortic aneurysm. Screening (usually by US but can be by CT/MRI) is recommended by the United States Preventive Services Task Force (USPSTF) one time for men aged 65-75 who have ever smoked and should be considered in men aged 65-75 who never smoked, especially if there is a family history. The USPSTF is less clear on women, but screening can be considered in women aged 65-75 who have ever smoked.⁶ The Society for Vascular Surgery agrees with the one-time screening of men

Figure 1: Measure to improve diagnostic accuracy in patients with ruptured abdominal aortic aneurysm

Initial Population	All emergency department visits for patients aged 55 years and older coming to the ED with acute onset abdominal pain or back pain with hypotension.
Denominator	Same as initial population
Denominator Exclusions	None
Numerator	ED visits for whom a POC ultrasound performed, or CT scan was ordered/performed
Numerator Exclusions	Not applicable
Denominator Exceptions	Patients' refusal, patient expired, US/CT done in last one year (55-65) or after 65, previously screened for AAA, transferred to operating room.

aged 65-75 who have ever smoked but also recommends screening men 55 and older (one time) who have a family history of AAA, and women 65 and older with a family history of AAA.⁷ They recommend consideration of screening women over 65 years with a significant smoking history.

rAAA is a rare entity, however screening identifies individuals at risk and allows for monitoring of smaller AAAs, and elective repair of larger AAAs to avoid rupture. Elective repair carries a much lower mortality/morbidity risk than emergency repair, even when the latter is performed using an endovascular technique. However, nationally just 40 percent of patients are screened. Patients in lower resourced and socioeconomic areas are less likely to be screened.⁸ +



DR. SCHNEIDER currently is the Senior Vice President for Clinical Affairs at ACEP and adjunct professor of emergency medicine at the University of Pittsburgh.

References

1. Sweeting MJ, Thompson SG, Brown LC, et al. Meta-analysis of individual patient data to examine factors affecting growth and rupture of small abdominal aortic aneurysms. *Br J Surg* 2012;99:655-665.
2. Sayers R. Bailey & Love's short practice of surgery, 26th ed. Boca Raton, FL: CRC Press; 2013.
3. Gunnarsson K, Wanhainen A, Björck M, et al. Nationwide study of ruptured abdominal aortic aneurysms during twenty years (1994-2013). *Ann Surg* 2021; 274: e160-e166.
4. Lloyd GM, Bown MJ, Norwood MG, et al. Feasibility of preoperative computer tomography in patients with ruptured abdominal aortic aneurysm: a time-to-death study in patients without operation. *J Vasc Surg*. 2004 Apr;39:788-91.
5. Metcalfe D, Sugand K, Thrumurthy SG, et al. Diagnosis of ruptured abdominal aortic aneurysm: a multicentre cohort study. *Eur J Emerg Med*. 2016; 23:386-90.
6. US Preventive Services Task Force; Owens DK, Davidson KW, Krist AH, et al. Screening for Abdominal Aortic Aneurysm: US Preventive Services

Task Force Recommendation Statement. *JAMA*. 2019;322:2211-2218.

7. Patients with abdominal aortic aneurysm. <https://vascular.org/node/87>. Accessed 2/3/24.

8. Ho VT, Tran K, George EL, et al. Most privately insured patients do not receive Federally recommended abdominal aortic aneurysm screening. *J Vasc Surg* 2023;77:1669-1673.



COMING IN 2024

STANDARDS THAT ELEVATE THE PRACTICE OF EMERGENCY MEDICINE

ACEP, the leader in Emergency Medicine standards, will be accrediting hospital-based Emergency Departments who meet the standards designed to improve patient care and promote better physician working environments.

Apply for Emergency Department Accreditation and validate your hospital's commitment to following evidence-based policies across all practice settings and staffing models.

Meeting accreditation standards will add value for patients, physicians, the emergency team, and hospitals.

PATIENTS

will see the hospital's commitment to providing quality care in an optimal setting.

PHYSICIANS

and team members will work in fair, safe, productive, and efficient working environments.

HOSPITALS

will gain market distinction through their commitment to the highest standards in emergency care.

“Patients should know that their community emergency departments and hospitals are dedicated to delivering the best care possible. Emergency departments that meet ACEP's policies and evidence-based standards are committed to high-quality emergency care and practices that will benefit patients, physicians, and their communities.”

- Christopher S. Kang, MD, FACEP, Immediate Past President



Learn more at www.acep.org/edap

ACEP ED Accreditation

American College of Emergency Physicians
ADVANCING EMERGENCY CARE

Recognition and Treatment of TTP

by DR. MATTHEW TURNER, MD;
DR. ERICA BATES, MD

A 33-year-old woman presents with confusion, abdominal pain, and fever. Her vital signs are:

- Blood pressure of 118 over 93
- Heart rate of 120
- Respiratory rate of 18

She has a history of lupus. CBC shows a thrombocytopenia of $27 \times 10^9/L$ platelets.

What is the best management of this condition?

For six decades, the pentad of fever, thrombocytopenia, hemolytic anemia, renal injury, and neurological manifestations has remained the classic clinical diagnostic criteria for Thrombotic Thrombocytopenic Purpura (TTP).¹ Unfortunately, fewer than 10 percent of patients present with this constellation of symptoms. Although the treatment of TTP has improved significantly over the past 30 years, the disease still has a dangerously high mortality rate of approximately 20 percent. Most of these deaths can be attributed to a delay in diagnosis.²

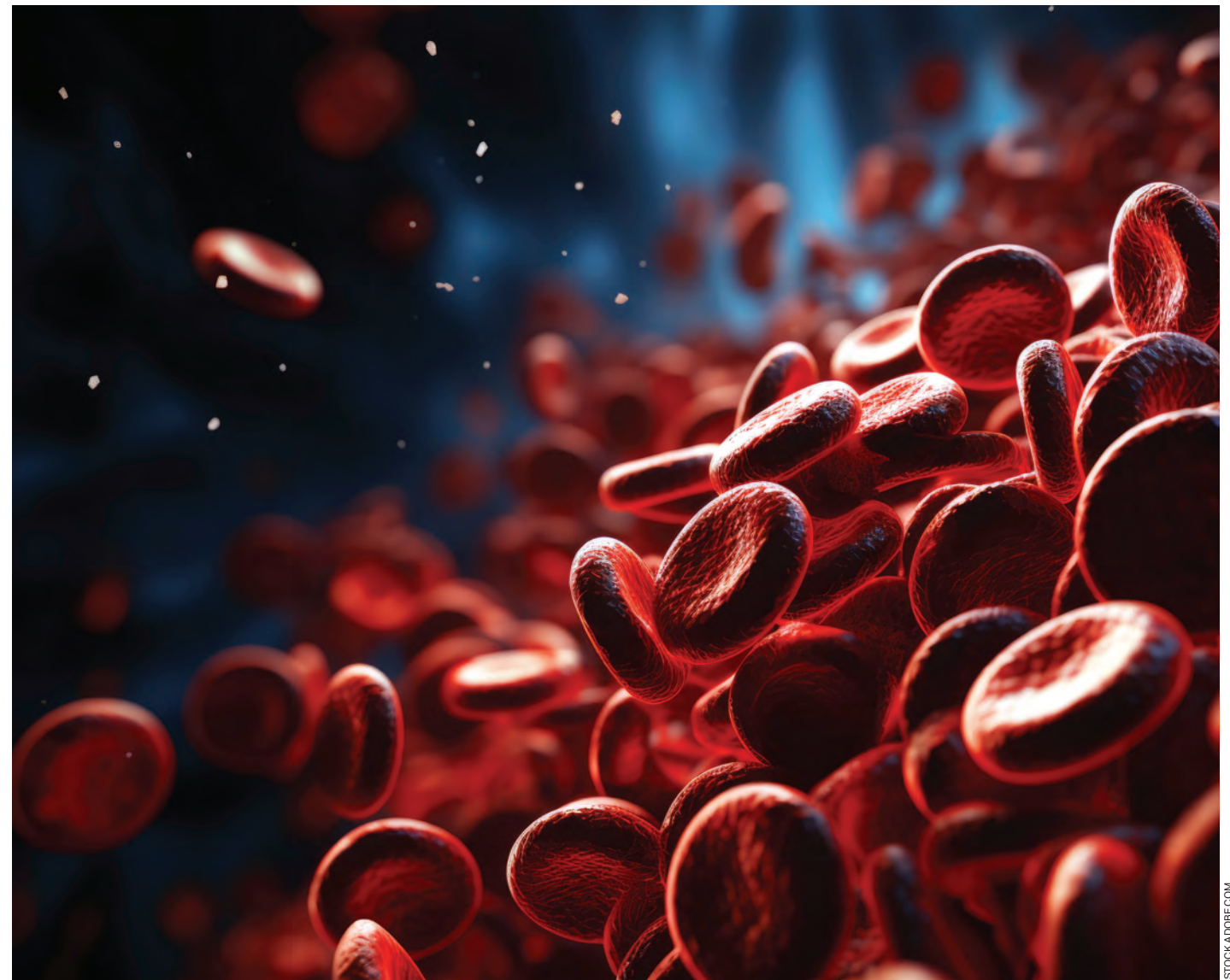
TTP often presents abruptly, and most patients that develop it first visit the emergency department (ED) as their symptoms worsen. It is thus imperative that emergency physicians be able to recognize and properly treat this disease, especially in the absence of its classical presentation.³

In TTP, patients undergo microangiopathic hemolytic anemia that leads to severe thrombocytopenia and, in severe cases, organ dysfunction. The disease may be congenital (cTTP) or immune-mediated (iTTP). The vast majority of cases are immune-mediated, with 90 percent presenting in adulthood, typically with a first incidence between 30-50 years of age.⁴ Women have a two to three times increased risk, and African-American patients have an eight-fold increased risk compared to the general population.¹ Both cTTP and iTTP are caused by a deficiency in ADAMTS13, an enzyme that regulates Von Willebrand Factor (VWF) multimers. When severe ADAMTS13 deficiency—less than 10 percent—is present, there is no regulated proteolysis of VWF, directly leading to uncontrolled platelet adhesion and aggregation. In TTP, this ultimately manifests as microvascular thrombosis, endothelial damage, and organ dysfunction.¹ iTTP is primarily due to acquired anti-ADAMTS13 antibodies, which can be either inhibitory via neutralization of the proteolytic function of ADAMTS13 or non-inhibitory, accelerating the clearance of ADAMTS13 from the circulatory system. Even relatively small amounts of anti-ADAMTS13 autoantibodies can lead to TTP.¹

Primary iTTP has no defined cause, but secondary iTTP has been associated with a number of etiologies, including pregnancy, autoimmune disorders, HIV infection, malignancy and iatrogenic medications.⁴

Diagnosis

Fewer than 10 percent of patients with TTP present with the classical clinical pentad of fever, microangiopathic hemolytic anemia, thrombocytopenia, neurological deficits, and renal insufficiency.¹ However, many clinical features are common: more than 60 percent of patients present with a degree of neurological involvement, ranging from confusion to stroke and coma.¹ 35 percent of patients present with gastrointestinal symptoms secondary to ischemic microthrombi.¹ 25 percent of patients may pre-



STOCK.ADBE.COM

sent with evidence of myocardial ischemia, including abnormal ECGs and elevated troponin levels.¹ Laboratory testing will show significant thrombocytopenia (below $30 \times 10^9/L$), in addition to markers of hemolysis such as erythrocyte fragmentation and elevated LDH.¹

Pregnant patients are particularly vulnerable to misdiagnosis of TTP in the ED. One 2009 study of four tertiary hospitals found that emergency physicians often misdiagnosed this presentation in pregnant women as “panic attack, domestic violence, or gastroenteritis.”⁵ Pregnant women comprise up to seven percent of TTP/Hemolytic Uremic Syndrome (HUS) patients. When thrombocytopenia is found in pregnant patients, clinicians should have a high degree of suspicion for TTP in addition to HELLP Syndrome, eclampsia, and HUS.⁵

Testing for TTP should include a CBC, CMP, blood smear, coagulation panel, fibrinogen, D-Dimer, LDH, troponin, HIV PCR, urinalysis, Coomb’s testing and ECG.⁴ ADAMTS13 level can be considered to assist the inpatient team. In TTP, Coomb’s testing will be negative, and the coagulation panel will typically not be significantly deranged. In the long term, the mechanism of ADAMTS13 deficiency should be determined—whether due to inhibitory or non-inhibitory autoantibodies, or due to the hereditary form of the disease. The labs that assess this, such as the FRET5-VWF73-based assay, take several days to result and are best pursued in an inpatient setting.⁷ Given the prolonged time that these labs may take to result, clinicians may consider using the PLASMIC score to aid in predicting the likelihood of TTP. One point is given for platelet count less than 30,000, presence of hemolysis, mean corpuscular volume less than 90 fL, INR less

than 1.5, creatinine less than 2.0 mg/dL, absence of cancer, and the absence of solid organ or stem cell transplant. A PLASMIC score higher than 5 suggests a high probability of TTP, with a sensitivity of approximately 99 percent and a specificity of 57 percent.⁶

Management

TTP’s mortality ranges from 4 to 31 percent, but the disease is associated with multiple comorbidities, including hypertension, major depressive disorder, and cognitive abnormalities. Thus, early management is essential for patient outcomes.⁴ Early hematology consultation should be obtained when TTP is suspected.

Therapeutic plasma exchange (TPE) with fresh frozen plasma (FFP) is the first-line treatment, by simultaneously supplying fresh ADAMTS13 and removing anti-ADAMTS13 autoantibodies. Delays in this treatment are directly correlated with increases in patient mortality.¹ The International Society of Thrombosis and Haemostasis also recommends corticosteroids in addition to TPE, given their possible mortality benefit.⁷ High dose pulse steroids, such as methylprednisolone 10 mg/kg/day for 3 days, or an oral prednisone taper may be used.¹ Rituximab may be given as well, largely due to prevention of relapse.⁷ Caplacizumab, a new medication that targets the A1 domain of VWF and prevents platelet aggregation has shown remarkable efficacy in improving clinical outcomes and reducing patient mortality and risk of relapse.^{7,8} Much like TPE and steroids, earlier treatment with caplacizumab is associated with improved patient outcomes.⁸

One third of TTP patients will experience a relapse within 30 days of initial treatment.⁴ Se-

rial ADAMTS13 activity should be monitored monthly for 3 months, every 3 months for 1 year, and then every 6-12 months thereafter.¹ +



DR. BATES is an assistant professor of emergency and internal medicine at the Penn State Milton S Hershey Medical Center.



DR. TURNER originally trained at the Medical University of South Carolina, is an EM intern at Hershey Medical Center in Hershey, PA.

References

1. Sukumar S, Lämmle B, et al. Thrombotic thrombocytopenic purpura: pathophysiology, diagnosis, and management. *J Clin Med*. 2021;10(3):536.
2. Kessler CS, Khan BA, et al. Thrombotic thrombocytopenic purpura: a hematological emergency. *J Emerg Med*. 2012;43(3):538-44.
3. Li XM, Mo XY, et al. Therapeutic plasma exchange for thrombotic thrombocytopenic purpura in the emergency department: A single center experience. *Am J Emerg Med*. 2021;46:556-9.
4. Long B, Bridwell RE, et al. Evaluation and management of thrombotic thrombocytopenic purpura in the emergency department. *J Emerg Med*. 2021;61(6):674-82.
5. Stella CL, Dacus J, et al. The diagnostic dilemma of thrombotic thrombocytopenic purpura/hemolytic uremic syndrome in the obstetric triage and emergency department: lessons from 4 tertiary hospitals. *Am J Obstet Gynecol*. 2009;200(4):381-e1.
6. Stanley M, Killeen RB, et al. Thrombotic thrombocytopenic purpura. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing;2022. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK430721/>. Updated April 7, 2023. Accessed March 26, 2024.
7. Zheng XL, Vesely SK, et al. ISTH guidelines for treatment of thrombotic thrombocytopenic purpura. *J Thromb Haemost*. 2020;18(10):2496-502.
8. Izquierdo CP, Mingot-Castellano ME, et al. Real-world effectiveness of caplacizumab vs the standard of care in immune thrombotic thrombocytopenic purpura. *Blood Adv*. 2022;6(24):6219-27.

Toxicology Q&A Answer

QUESTION ON PAGE 3

ANSWER: Hot Peppers and Chilis

“How bad could it be?” was the last thought before I took a small bite of the Carolina Reaper pepper I had grown in my (toxicology-required) garden. “Am I going to die?” was the next thought as I swigged milk to extinguish the blowtorch in my mouth, mopped sweat off my forehead, tried not to retch, and rethought recent life-choices.

The Chili Pepper

Chili peppers (*Capsicum* species; Greek *Kapto*, “to bite”) are thought to have been domesticated in central and south America in about 10,000 BCE. There are five primary species used commercially and are upright annual shrubs with dark green ovoid leaves that produce small white to yellow flowers that develop into round or elongated fruits. Because of the heat sensation they provide, they feature prominently as a key food ingredient in Latin American, African, and Asian cuisines. India and China are primary suppliers of chilies in the world.

Taxonomy

The chili pepper plants belong to the family Solanaceae which includes the genus *Solanum* (nightshade, tomato, potato); *Nicotiana* (belladonna, jimsonweed, tobacco); and *Capsicum* (including hot peppers and bell).

Nomenclature

The basic references to this plant are confusing and include “peppers” and “chili” (also spelled chile or chilli). Chili peppers are not actually ‘peppers’ (e.g., black pepper (*Piper nigrum*), which are berries that contain spicy piperine) but are the fruits of capsicum plants (originating from Central and South Americas and contain capsaicin). The misattribution began when they were brought back to Spain in the 15th century by Christopher Columbus from the West, and he called them ‘peppers’ because of its similar effects on his tongue and the name stuck.¹ Adding more confusion, some countries refer to these fruits as ‘peppers’ when they are fresh and ‘chilies’ when they are dried.

Carolina Reaper, under whose effects I was suffering, is a cultivar of (*Capsicum chinense*) and was declared in 2013 to be the hottest chili pepper in the world with greater than 1.6 million Scoville units. It was developed by Ed Currie (founder of Puckerbutt Pepper Co.), who considers hot pepper cultivation one of his life’s goals and a factor in his sobriety from a substance use disorder—in part because of capsaicin’s induction of endorphin release.

Toxin

Chili peppers’ pungency (spicy heat) when ingested or applied topically is due to capsaicin (8-methyl-N-vanillyl-6-nonenamide, (C₁₈H₂₇NO₃)) and several related chemicals, as a group called capsaicinoids. Humans perceive each capsaicinoid differently. Nordihydrocapsaicin’s sensation is described as “warm” and “least irritating,” which recedes rapidly; capsaicin and dihydrocapsaicin are described as “irritating,” and produce heat in the mouth, palate, and throat; and homodihydrocapsaicin is described as very “irritating,



The Carolina Reaper pepper I grew in my garden.

HOW HOT?

Wilbur Lincoln Scoville (1865–1942) created the “Scoville Organoleptic Test” or Scoville scale to measure degree of ‘hot’ in chili peppers in 1912. It used five human test subjects who tasted hot pepper extracts sequentially diluted with sugar water to determine when the spiciness disappeared—the hotter the pepper yields, a larger volume dilution needed and accordingly higher Scoville heat units.

Today, high-performance liquid chromatography is used to more accurately determine capsaicinoid concentration.

harsh, and very sharp,” affecting the back of the mouth and throat which comes on slowly and lasts a long time. Combinations of these toxins produce different heat profiles of different chilis.²

The concentration of these chemicals determines degree of the sensation and depends not only on the kind of chili, but on other factors including what part of the fruit you eat—the hottest part is the placenta (white part in the middle), followed by the flesh (exocarp, mesocarp, endocarp) and the seeds; fruit maturity and water content of the chili also affect pungency (unripe—ripe—dried).

In nature, the capsaicin is primarily used by the plant for defense to inhibit herbivorous mammals from eating it—the spice does not affect birds who eat the fruit and spread the seeds.

Mechanism of Action

Capsaicinoids are irritants and inflammatory molecules that interact with transient receptor potential vanilloid 1 (TRPV1) that reside on the ends of nociceptive A-delta and C- sensory fibers. These receptors are activated by capsaicinoids, noxious heat (greater than 109.4 degrees Fahrenheit), caustics (low pH), and voltage—causing a Ca⁺⁺ and Na⁺ action potential influx that confers the sensation of pain and burning to the brain. They are found in large numbers in the mouth, throat, and stomach, as well as throughout the body.³

Sensation, Not Taste

Capsaicin and the capsaicinoids are not detected by our taste buds and have no flavor—not salt, bitter, sweet, sour, or umami. They create a chemesthesis stimulus we interpret as “spiciness,” which is a multimodal somat-

ic sensation (not just taste, olfaction, pain, temperature, or itch). The resultant “heat” we feel after exposure is not thermally hot (a thermometer in my scorched mouth would read normal), but a result of the cross-stimulation of these vanilloid molecules binding to a thermal receptor—the sensory experience transmitted centrally is interpreted as ‘burning.’⁴

Despite not being a taste, a five part standardized lexicon for chili pepper hotness exists:⁴

- Development (how fast it comes on)
- Duration (how long the burn lasts)
- Location (where in mouth/throat)
- Feeling (“sharp” vs. “flat” heat)
- Intensity (analytically measured heat level)

Capsaicin has a unique attribute among natural irritants—the excitation it evokes is followed by a period of decline or cessation in sensory transmission (called defunctionalization) for a variety of other stimuli. This attribute is exploited by frequent eaters of spicy foods (they don’t feel it as much as novices), and pharmaceutical products.⁵

Human Effects

The human response to capsaicin exposure ranges from enhancing food enjoyment to uncomfortable to unbearable depending on the dose of exposure and resultant receptor agonism. Oral exposure creates a spicy burning sensation (or pungency) in the mouth that can extend to the throat and stomach (and eventually the rectum—“*fire tuchus*”). This is frequently accompanied by diaphoresis, facial flushing, lacrimation, and rhinorrhea. Higher dose exposures to the irritant can result in nausea, vomiting, chest, and abdominal pain.

Topical exposures to the skin can cause



Close-up of the Carolina Reaper pepper.

PHOTOS: JASON HACK (OLEANDER PHOTOGRAPHY)

burning sensation, erythema, and transient numbness; high dose exposure to the hands while cooking has a well-described syndrome of ‘Hunan hand’ which presents with severe pain in the fingers after chopping chili peppers.⁶ Inadvertent exposure to the eyes can result in severe pain, lacrimation, visual blurring, conjunctival injection, lid swelling; corneal injuries are possible.

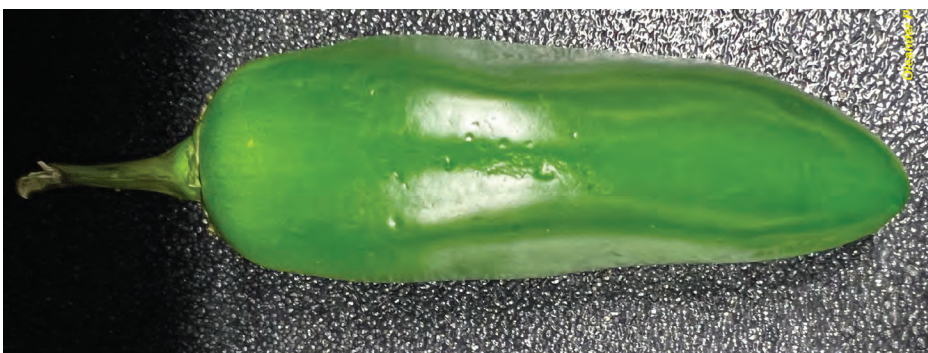
Capsaicin pepper exposures send about 300-350 people to the hospital annually.⁷ Boerhaave syndrome was described in a 47-year-old man after eating ghost pepper.⁸ Seizures and thunderclap headache from reversible cerebral vasoconstriction syndrome have been reported.^{8,9} There is one case of a 17-year-old who died from acute cerebellar stroke after participating in the “One Chip Challenge” (eating a capsaicin infused food chip as a game) that prompted Hershey Co. to recall the product.¹¹ Pepper spray (oleoresin capsicum) is also used by law enforcement (and others) as non-lethal means of defense and results in about 600 hospital visits annually after exposure with eyes being most common site of injury.^{7,12}

Medical Uses of Capsaicin

It is used primarily for control pain with application of capsaicin containing compounds. The purported effect is an overstimulation of the pain fibers that eventually become transiently unresponsive. Capsaicin is used in alternative or adjunctive medicine for many maladies including—Topically: uremic pruritus, post-herpetic neuralgia, osteoarthritis pain, cannabinoid induced hyperemesis; intravesical instillation: overactive bladder syndrome; intranasal capsaicin spray for rhinitis; oral rinses for burning mouth syndrome, among others.¹³



Cross-section of the Carolina Reaper pepper.



A Jalapeno pepper.



A Habanero pepper.

PHOTOS: JASON HACK (OLEANDER PHOTOGRAPHY)

Antidote

Treatment is generally supportive with copious irrigation for dilution as a mainstay. For ingestions there are many suggested techniques to assist with severe burning oral and throat pain. Effective agents include: milk and dairy products, which contain casein that works to break down capsaicin (found in whole, skim milk, ice cream), high sugar drinks (Kool Aid), and cooling the mouth with cold drink or ice.

Topical exposures (pepper sprays, etc.) should be washed off the face using copious water (adding mild dish detergent may help). Ocular exposures are managed with contact lens removal and application of topical anesthetic, flushing eyes with water or saline for at least 15 minutes. Referral for ophthalmology for patients with signs of corneal damage. The airway should be evaluated for bronchospasm and swelling, with supplementary oxygen or inhaled bronchodilators given if necessary.

After experiencing a burning mouth (that interestingly felt worse when I exhaled and improved when I inhaled), drenching scalp sweat, rhinorrhea, forearm piloerection, that lasted for about one hour, the sensation began to abate. Using the proposed lexicon, I would rate the experience as follows:

- **Development:** 8 seconds of peace before agony arrived
- **Duration:** 45-60 minutes
- **Location:** it was unescapably everywhere
- **Feeling:** very very sharp heat
- **Intensity:** the hottest pepper in the world—I agree. +



DR. HACK is chief of the division of medical toxicology and vice chair for research at East Carolina University in Greenville, North Carolina.

References

1. Barboza GE, García CC, et al. An amazing new Capsicum (Solanaceae) species from the Andean-Amazonian piedmont. *PhytoKeys*. 2020;167:13-29.
2. Guzmán I, Bosland PW. Sensory properties of chile pepper heat - and its importance to food quality and cultural preference. *Appetite*. 2017;117:186-190.
3. Rosenbaum T, Simon SA. Chapter 5. TRPV1 receptors and signal transduction. In: Liedtke WB, Heller S, eds. TRP ion channel function in sensory transduction and cellular signaling cascades. Boca Raton (FL): CRC Press/Taylor & Francis; 2007. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK5260/>. Accessed March 26, 2024.
4. Shuba YM. Beyond neuronal heat sensing: diversity of TRPV1 heat-capsaicin receptor-channel functions. *Front Cell Neurosci*. 2021;14:612480.
5. Sharma SK, Vij AS, et al. Mechanisms and clinical uses of capsaicin. *Eur J Pharmacol*. 2013;720(1-3):55-62.
6. Weinberg RB. Hunan hand. *N Engl J Med*. 1981;305(17):1020.
7. Gummin DD, Mowry JB, et al. 2022 annual report of the National Poison Data System® (NPDS) from America's Poison Centers®: 40th annual report. *Clin Toxicol (Phila)*. 2022;61(10): 717-939.
8. Arens A, Ben-Youssef L, et al. Esophageal rupture after ghost pepper ingestion. *J Emerg Med*. 2016;51(6):e141-e143.
9. Healy VO. Orland Park man credits hot sauce with saving his life. *Chicago Tribune*. March 13, 2015. Available at: <https://www.chicagotribune.com/2015/03/13/orland-park-man-credits-hot-sauce-with-savinghis-life/>. Accessed March 26, 2024.
10. Boddhula SK, Boddhula S, et al. An unusual cause of thunderclap headache after eating the hottest pepper in the world - "The Carolina Reaper". 2018. *BMJ Case Rep*. 2018:bcr-2017- 224085.
11. Wikipedia contributors. One Chip Challenge. Wikipedia, The Free Encyclopedia. Available at: https://en.wikipedia.org/wiki/One_Chip_Challenge. Last updated March 22, 2024. Accessed March 26, 2024.
12. Kearney T, Hiatt P, et al. Pepper spray injury severity: ten-year case experience of a poison control system. *Prehosp Emerg Care*. 2014;18(3):381-6.
13. Catalfamo LM, Marrone G, et al. The utility of Capsicum annum L. in Internal Medicine and In Dentistry: A Comprehensive Review. *Int J Environ Res Public Health*. 2022;19(18):11187.

GET READY FOR RESEARCH FORUM 2024

IMPORTANT DATES:

JANUARY 29 Submission site opens	JULY Email notifications
APRIL 30 Submission site closes	SEPT 29 - OCT 2 Presentations in Las Vegas

SUBMISSION REQUIREMENTS

Original research that has not been published in peer-reviewed form. Adherence to *Annals of Emergency Medicine* format: study objectives, methods, results, and conclusion. Abstracts are limited to 3,000 characters, not including spaces. Tables or figures must be black and white, with at least 300 dpi. Authors should not be identifiable via the title or body of the abstract.

REVIEW PROCESS

Abstracts will be peer-reviewed in a blinded manner. Review criteria focus on the validity, generalizability, and novelty of the findings, and the projected magnitude of impact on the quintuple aim.

CONTACT ACEP: 972.440.0911 | researchforum@acep.org



DR. LEE is a second-year resident in emergency medicine at Highland Hospital in her hometown of Oakland, California. Her primary interests are in ultrasound, machine learning, and health justice.

ACEP Rejects “Excited Delirium”

The College performs a cognitive autopsy on a controversial term

by CARMEN LEE, MD, MAS

By late 1988, 11 Black women had been found dead in the same area of Miami with low levels of cocaine in their blood. Forensic pathologist Dr. Charles Wetli of the University of Miami had conducted autopsies that he said, “conclusively showed that they have not been murdered.”^{1,2} He attributed their deaths to a female-specific manifestation of the mysterious phenomenon he had identified in men who had also died after consuming less-than-lethal amounts of cocaine. Antoinette Burns was the twelfth victim, a 14-year-old girl without any evidence of cocaine consumption at all. At the urging of her family and later the police, these autopsies were reexamined and eventually reclassified as homicides attributed to a single serial killer, responsible for as many as 32 murders in the area.^{3,4}

Dr. Wetli was referring to his and a colleague’s publication of a case report, in 1981, and a seven-case series in 1985 describing the novel “excited delirium syndrome” in individuals under the influence of cocaine, “a medical emergency but with a psychiatric presentation.”^{5,6} Of the seven, all had been restrained, six by police, and four had been hog-tied or hobbled in a prone position. All seven had died without an “anatomic cause of death,” leaving the reader to infer that the cause had been delirium itself.

It was shortly after these case series that Dr. Wetli, serving as deputy chief medical examiner in Miami, first began attributing the deaths of sex workers to excited delirium in 1986. “For some reason the male of the species becomes psychotic and the female of the species dies in relation to sex” after using cocaine, he said in an interview in the *Miami Herald* at the time, and speculated that this could be due to genetic traits that were more common in certain populations.⁷

In the decades since, excited delirium has come to be a frequently-cited cause of death for individuals dying in custody or during altercations with law enforcement. This is despite never being identified by a formal diagnostic framework, such as the diagnostic and statistical manual of mental disorders (DSM) or the international classification of diseases (ICD), as a valid diagnostic entity.

In 2009, the Excited Delirium Task Force convened by an ACEP Council resolution authored a white paper that endorsed the existence of excited delirium syndrome and made recommendations for identifying and managing it clinically.^{8,9} According to Dr. Fabrice Czarnecki, one of the members of the original task force, the use of a term borrowed from law enforcement was deliberate. “Excited delirium is a term that has been with the cops for 40 or 50 years,” he said. “My goal in joining the working group was, we don’t want people to die in the street. I personally don’t want people to



die in police custody. I want to be involved in training cops to recognize the signs of a medical emergency.”

In a comprehensive review of the history of this term, Bhatia, et al. writing for the advocacy organization Physicians for Human Rights note that “there is no clear or consistent definition, established etiology, or known underlying pathophysiology.”¹² They also summarize literature showing that it was identified as the cause of death in over one out of every six deaths in police custody in Texas, that 62 percent of deaths attributed to excited delirium in Florida involved the use of force by law enforcement, and that from the period 2010-2020, deaths in custody attributed to excited delirium were predominantly made up of people of color.

In October 2023, the ACEP Council and the Board of Directors issued statements withdrawing support for the 2009 white paper and affirming that that the term “excited delirium should not be used among the wider medical and public health community, law enforcement organizations, and ACEP members acting as expert witnesses testifying in relevant civil or criminal litigation.”¹⁰ This shift followed publication of a new 2021 position paper adopted by the Council and authored by a new task force convened to reexamine the issue. This more recent work uses the DSM-derived “hyperactive delirium with severe agitation” to highlight that patients with a variety of underlying causes of

delirium may be “at high risk of direct physical trauma, not only unintentional harm from trauma such as falls, but also the metabolic stress that may result from physical restraint that may be required to facilitate the safety of the patient, bystanders, and responding professionals.”¹¹

ACEP followed several other professional organizations in revoking formal support for “excited delirium,” including the National Association of Medical Examiners¹² and the American College of Medical Toxicology.¹³ To examine the death of Elijah McClain, in which excited delirium was ruled as the cause of death and in which two paramedics and a police officer have been convicted of homicide, the Colorado Department of Public Health and the Environment appointed an independent review committee on emergency use of ketamine.¹⁴ In recommending the rejection of excited delirium as a diagnosis, they identified the lack of clear criteria and the biased racial associations with some of the features often attributed to the syndrome, such as “‘hyper aggression,’ ‘increased strength,’ and ‘police noncompliance.’”¹⁵

In refocusing on the clinical relevance of hyperactive delirium as a secondary syndrome with underlying primary causes, the 2021 ACEP position paper also walked away from its use as a postmortem diagnostic entity.¹¹ “The 2021 report strives to highlight that ‘excited delirium with severe agitation’ is not a diagnosis in the living or the deceased,” ex-

plained Dr. Jeffrey Goodloe, who serves as an EMS Chief Medical Officer, ACEP Board member, and one of the authors of this recent work. “The terminology change is very purposeful to get everyone focused on the medical needs of these patients and not trapped in debates about older semantics. It’s important that we focus quickly and intently on stabilizing these patients, especially in the out of hospital environment, so that we can safely get them to an emergency department.”

This move is a recognition that “excited delirium,” as a syndrome whose description originated in forensics and law enforcement and never achieved clear diagnostic criteria, may have been a flawed guideline for clinical decision-making. Refocusing on the widely recognized diagnostic entity of hyperactive delirium may be an important way to restate the relevance of these symptoms in guiding law enforcement and clinical interventions on behalf of the patient.

Another author of the 2009 white paper, who spoke with *ACEP Now* on the condition of anonymity due to ongoing work in the carceral health community, confirmed that communicating with law enforcement about the safety of these patients was a primary motivator of the original work. “The White Paper was never intended to somehow justify in-custody deaths but rather to confirm that there was risk for these individuals and to increase awareness of the vulnerability of this population.”

Despite attempted outreach to each member of the 2009 task force, only Dr. Czarnecki agreed to speak on the record, with several citing the controversy with which their work is now viewed. “Do I think it was successful? No,” Dr. Czarnecki reflected when asked about his goal of improving safety for delirious patients in contact with law enforcement. “The case that always bothers me is that of George Floyd. Look at the loss of life and all the consequences. If the cops had just heard him say he was short of breath, and had responded to that and had just sat him up, called an ambulance and sat him up, you and I would never have heard of the case.”

The expansion of excited delirium from a description of behaviors into a cause of death also raises questions about the role of scientific review. Much of the evidence cited in the white paper and in subsequent literature establishing the diagnosis of excited delirium and exploring its pathology came from only a few individual authors, many of them also authors of the 2009 white paper.^{9,16} For example, in a 2011 review article looking at the evidence for excited delirium, 34 percent of the citations were authored by at least one of the excited delirium task force members or Dr. Wetli himself.¹⁷

There continues to be ongoing controversy over whether and to what extent positional asphyxia offers an alternate explanation for many of the deaths attributed to excited delirium. Small physiologic studies, involving healthy volunteers not in a state of physical or emotional agitation, have provided limited evidence both for and against hemodynamic

changes that could contribute to death in a prone or restrained position.¹⁸⁻²¹

In a recent systematic review, Strömmer, et al.²² systematically identified arguably all 168 cases of either excited delirium or agitated delirium described in the literature. Sixty-two percent of these were fatal, and the authors found that a diagnosis of excited delirium was nearly 10 times as likely to be applied in cases that were fatalities and nearly five times as likely in those that involved aggressive restraint such as hobbling and physical force. Aggressive restraint was itself also strongly associated with fatality (OR 7.4). Given that this review included most, if not all, of the evidence used previously to justify excited delirium as a fatal clinical entity, the authors conclude that “there is no evidence to support [excited delirium] as a cause of death in the absence of restraint.” With restraints employed in 90 percent of deaths where these diagnoses were applied, “when death has occurred in an aggressively restrained individual who fits the profile ... restraint-related asphyxia must be considered as a cause of the death.”

The 2023 ACEP statement reiterates that there are valid concerns related to hyperactivity and delirium in the setting of emergency assessment and treatment. It also recognizes that these concerns affect not just emergency physicians but many important partners in these settings, including first responders and law enforcement. The complex history of the terminology used to identify and respond to these agitated patients illustrates the power of ACEP to shape national dialogue. This organizational shift represents an opportunity

to reflect on the real-world consequences of that influence, and on the responsibility that comes with it. 📌

References

- Gehrke D. Missed calls, close calls mar serial killings case. *Miami Herald* April 2, 1990:1A.
- Bhatia BS, Heisler M, et al. “Excited delirium” and deaths in police custody. *Physicians for Human Rights* website. <https://phr.org/our-work/resources/excited-delirium/>. Published March 2, 2022. Accessed March 26, 2024.
- Bearak B. eerie deaths of 17 women baffle Miami. *Los Angeles Times*. May 14, 1989. Available at: <https://www.latimes.com/archives/la-xpm-1989-05-14-mn-413-story.html>. Accessed March 26, 2024.
- Kurmelovs R. ‘Excited delirium’: how a disputed US term found its way to Australian deaths-in-custody inquests. *The Guardian*. Jul 3, 2021. Available at: <https://www.theguardian.com/australia-news/2021/jul/04/excited-delirium-how-a-disputed-us-term-found-its-way-to-australian-deaths-in-custody-inquests>. Accessed March 26, 2024.
- Fishbain DA, Wetli CV. Cocaine intoxication, delirium, and death in a body packer. *Ann Emerg Med*. 1981 Oct;10(10):531-2.
- Wetli CV, Fishbain DA. Cocaine-induced psychosis and sudden death in recreational cocaine users. *J Forensic Sci*. 1985;30(3):873-80.
- Rymer R. Murder without a trace. *In Health*. 1990:55-56.
- American College of Emergency Physicians. 2008 council resolution 21: excited delirium. 2008. ACEP website. <https://webapps.acep.org/shoppingcart/printreport.aspx?vw=council&councilcode=SA08&resolutionnumber=21>. Page 84. Accessed March 26, 2024.
- DeBard ML, Adler J, et al. American College of Emergency Physicians white paper report on excited delirium syndrome. *Prison Legal News* website. Available at: https://www.prisonlegalnews.org/media/publications/acep_report_on_excited_delirium_syndrome_sept_2009.pdf. Published September 10, 2009. Accessed March 26, 2024.
- American College of Emergency Physicians. ACEP reaffirms positions on hyperactive delirium. ACEP website. Available at: <https://www.acep.org/news/acep-newsroom-articles/aceps-position-on-hyperactive-delirium>. Published October 10, 2023.
- Hatten BW, Bonney C, et al. ACEP task force report on hyperactive delirium with severe agitation in emergency settings. *American College of Emergency Physicians* website. Available at: <https://www.acep.org/siteassets/new-pdfs/education/acep-task-force-report-on-hyperactive-delirium-final.pdf>. Published Jun 23, 2021. Accessed March 26, 2024.
- Johnson CK, Foley RJ. Medical examiners group steps away from ‘excited delirium’. *The Associated Press* website. <https://apnews.com/article/excited-delirium-police-custody-restraint75c5138fbed-3c7911e0bd9bdc6c207>. Published April 3, 2023. Accessed March 26, 2024.
- American College of Medical Toxicology. ACMT position statement on end the use of excited delirium. ACMT website. <https://www.acmt.net/news/acmt-position-statement-on-end-the-use-of-excited-delirium/>. Published May 1, 2023. Accessed March 26, 2024.
- Slevin C, Brown M. Paramedics were convicted in Elijah McClain’s death. *The Associated Press* website. <https://apnews.com/article/elijah-mcclain-death-officers-trial-acef1eabe02b458f53d30d8fe3bf76a4>. Published December 23, 2023. Accessed March 26, 2024.
- France E, Boun S, et al. Ketamine investigatory review panel final report. *Colorado Department of Public Health & Environment* website. <https://cdphe.colorado.gov/press-release/ketamine-review-committee-publishes-report-with-several-recommendations>. Published December 1, 2021. Accessed March 26, 2024.
- Valentino-DeVries J, McIntire M, et al. How paid experts help exonerate police after deaths in custody. *The New York Times* website. <https://www.nytimes.com/2021/12/26/us/police-deaths-in-custody-blame.html>. Published Dec 26, 2021. Accessed March 26, 2024.
- Takeuchi A, Ahern TL, et al. Excited delirium. *West J Emerg Med*. 2011;12(1):77-83.
- Ho JD, Dawes DM, et al. Effect of position and weight force on inferior vena cava diameter—implications for arrest-related death. *Forensic Sci Int*. 2011;212(1-3):256-9.
- Chan TC, Neuman T, et al. Weight force during prone restraint and respiratory function. *Am J Forensic Med Pathol*. 2004;25(3):185-9.
- Michalewicz BA, Chan TC, et al. Ventilatory and metabolic demands during aggressive physical restraint in healthy adults. *J Forensic Sci*. 2007;52(1):171-5.
- Campbell M, Dakin R, et al. Thoracic weighting of restrained subjects during exhaustion recovery causes loss of lung reserve volume in a model of police arrest. *Sci Rep*. 2021;11(1):15166.
- Strömmer EMF, Leith W, et al. The role of restraint in fatal excited delirium: a research synthesis and pooled analysis. *Forensic Sci Med Pathol*. 2020;16(4):680-692. *Pathol*. 2020 Dec;16(4):680-692.

ACEP Anytime

NEW!
SUBSCRIBE TODAY!

**YOUR TIME IS LIMITED. EFFICIENCY MATTERS.
TRUST ACEP ANYTIME.**

BITE-SIZED


Removing barriers to learning with Netflix-style access to education.

ON DEMAND


From the common horse to the zebra, our education covers every presentation.

INTUITIVE

Tailored recommendations that adapt based on your behavior.





acep.org/anytime




Approved for AMA PRA Category 1 credit™

Have you missed your copy of Annals of Emergency Medicine?





Register for eAlerts today




- Immediate access to new content for journal subscribers
- Search articles by specialty or subject area
- Access to multimedia

Annals of Emergency Medicine is an official journal of the American College of Emergency Physicians. Full online access and bonus digital features for all ACEP members can be found at annemergmed.com.



ELSEVIER



ADVANCING EMERGENCY CARE



DR. MARCO is professor of emergency medicine at Penn State Health-Milton S. Hershey Medical Center and associate editor of *ACEP Now*.

Bougie: First Pass or Rescue Device?

Role of the bougie in airway management

by CATHERINE A. MARCO, MD, FACEP

A 68-year-old man presents to the emergency department (ED) with altered mental status and fever.

Vital signs on arrival are:

- Temperature: 38.8 degrees celcius
- Heart rate: 128
- Blood pressure: 74 over 48
- Respiratory rate: 10
- Oxygen saturation: 77 percent

Physical examination was notable for lethargy and confusion. He has an absent gag reflex. He has a Class I Mallampati view and lung sounds were diminished in all fields.

How Should His Airway Be Managed?

A study in the February issue of *Annals* conducted a meta-analysis of 18 studies and concluded that bougie use was associated with increased first-attempt intubation success.¹ The highest point estimate favoring the use of a bougie was in the subgroup of patients with Cormack-Lehane grade III or IV (only epiglottis seen or neither glottis or epiglottis seen on direct laryngoscopy). The authors conclude, “despite the certainty of evidence being low, these data suggest that a bougie should probably be used first and not as a rescue device.”

Is the Evidence from This Research Sufficient to Change Practice?

Some important limitations of this analysis should be recognized. The 18 studies represent a diverse group of patients and study design; 12 of the studies were randomized controlled trials. There was no analysis of operator experience or expertise. Only 60 percent of subjects underwent direct laryngoscopy, the only technique to which the Cormack-Lehane CL) classification technically applies. The study found a mean increase in time to intubation of 13 seconds in the ED setting. Finally, the authors note that intubation-related injuries may be more common in those intubated with a bougie. These limitations are sufficient to question the recommendation to use a bougie as first line airway management.

For patients requiring emergency airway management, the use of a bougie is an impor-



tant technique. Previous studies have demonstrated the success rate of using a bougie; however, there are conflicting reports about its success as a first pass technique. Most patients (95 percent) have a CL grade 1 or 2a view, and will likely be a successful first pass intubation.² A study published in *JAMA* in 2018 found that among patients with a difficult airway characteristic, bougie use resulted in higher first attempt intubation success (96 percent), compared to endotracheal tube with stylet (82 percent).³ Other studies have found that bougie use does not improve first attempt success rate.^{4,5} A recent study found that among 1102 critically ill adults, successful intubation on the first attempt was 80.4 percent with use of a bougie and 83.0 percent with use of an endotracheal tube with stylet, a difference that was not statistically significant.⁶ A study found that if a difficult airway is anticipated and a hyperangulated video laryngoscope is used, the first attempt success rate is higher when a bougie is used, compared with stylet.⁷ How then do we interpret these conflicting reports in the literature?

Use of a bougie has several important advantages, including improved visibility compared to ETT without bougie, and tactile

CLASSIFIEDS



Emergency Physicians OF TIDEWATER



www.ept911.com

Private Democratic Group in Norfolk/Virginia Beach

Since 1972, Emergency Physicians of Tidewater has been providing exceptional patient care via several Emergency Departments in Southeastern Virginia. Our physicians enjoy their choice of practice settings from an academic Level 1, Quaternary Referral Center to a community-based practice. EPT leads the longest running Emergency Medicine Residency program in Virginia as well as multiple fellowships. EPT physicians enjoy coastal living in Virginia Beach and Norfolk, with history-rich areas like Colonial Williamsburg and the Blue Ridge Mountains within a short drive.

Opportunities:

- **EQUITY/OWNERSHIP:** Accelerated two-year partnership track
- **LEADERSHIP:** Governing Board/Committee appointments
- **TEACH:** Faculty appointment at Eastern Virginia Medical School
- **COLLABORATE:** With a highly-cohesive, LOCALLY-governed group
- **EARN:** Rich Benefits & Top-Ranked Retirement Plan

Apply Now:



WHAT ARE YOU THINKING?



SEND EMAIL TO ACEPNOW@ACEP.ORG; LETTERS TO ACEP NOW, P.O. BOX 619911, DALLAS, TX 75261-9911; AND FAXES TO 972-580-2816, ATTENTION *ACEP NOW*.

Practice Variety • Democratic Group • Partnership • Leadership • Teaching

confirmation of endotracheal placement.⁷ However, the bougie should not be used as a substitute for proper laryngoscopy technique.

As with any procedural device, operator expertise is an important component of its successful use. Some argue that bougie should be used routinely to improve success rate. Others argue that routine use may subject patients to unnecessary airway trauma or intubation delays. Ultimately, the existing literature does not yet provide a clear resolution to this question.

Case Resolution

For this case, endotracheal intubation is indicated. In the setting of normal anatomy with Mallampati Class I view, intubation with video

laryngoscopy is appropriate. If the Cormack-Lehane classification is unexpectedly III or IV, the use of a bougie may be appropriate to facilitate endotracheal intubation. Having a bougie readily available with the usual airway equipment may expedite airway management.

Disclaimer

This is not an exhaustive review of airway management, but a commentary on a recent article published in *Annals of Emergency Medicine*. Readers should consult authoritative sources for in depth recommendations for airway management. +

References

1. von Hellmann R, Fuhr N, et al. Effect of bougie use on first-attempt success in tracheal intubations: a systematic review and meta-analysis. *Ann Emerg Med*. 2024;83(2):132-144.
2. Koh LK, Kong CE, et al. The modified Cormack-Lehane score for the grading of direct laryngoscopy: evaluation in the Asian population. *Anaesth Intensive Care*. 2002;30(1):48-51.
3. Driver BE, Prekker ME, et al. Effect of use of a bougie vs endotracheal tube and stylet on first-attempt intubation success among patients with difficult airways undergoing emergency intubation: a randomized clinical trial. *JAMA*. 2018;319(21):2179-89.
4. Waldron O, Sena R, et al. Using a bougie with C-MAC video laryngoscopy did not improve first-attempt intubation success rates in critical care air transport. *Air Med J*. 2023;42(6):445-9.
5. Brown CA 3rd, Bair AE, et al. Techniques, success, and adverse events of emergency department adult intubations [published correction appears in *Ann Emerg Med*. 2017 May;69(5):540]. *Ann Emerg Med*. 2015;65(4):363-370.e1.

6. Driver BE, Semler MW, et al. Effect of use of a bougie vs endotracheal tube with stylet on successful intubation on the first attempt among critically ill patients undergoing tracheal intubation: a randomized clinical trial. *JAMA*. 2021;326(24):2488-97.
7. Eum D, Ji YJ, Kim HJ. Comparison of the success rate of tracheal intubation between stylet and bougie with a hyperangulated videolaryngoscope: a randomised controlled trial. *Anaesthesia*. 2023: online ahead of print. Available at: <https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/10.1111/anae.16202>. Published December 19, 2023. Accessed March 26, 2024.
8. Cunningham R: The bougie as an airway savior. *ACEP Now*. 2021;40(2). Available at: <https://www.acepnow.com/article/the-bougie-as-an-airwaysavior/?singlepage=1>. Accessed March 26, 2024

CLASSIFIEDS



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 Lancaster Medical Center in Lancaster, Pa.; Penn State Health St. Joseph Medical Center in Reading, Pa.; Pennsylvania Psychiatric Institute, a specialty provider of inpatient and outpatient behavioral health services, in Harrisburg, Pa.; and 2,450+ physicians and direct care providers at 225 outpatient practices. Additionally, the system jointly operates various healthcare providers, including Penn State Health Rehabilitation Hospital, Hershey Outpatient Surgery Center and Hershey Endoscopy Center.

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 Pa.



FOR MORE INFORMATION PLEASE CONTACT:
Heather Peffley, PHR CPRP - Penn State Health Lead Physician Recruiter
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.



CLASSIFIED ADVERTISING

ACEP Now has the largest circulation among emergency medicine specialty print publications with more than 40,000 BPA-Audited subscribers including about 36,000 ACEP members.

TO PLACE AN AD IN ACEP NOW’S CLASSIFIED ADVERTISING SECTION PLEASE CONTACT:

Kelly Miller

kmiller@mrvica.com
(856) 768-9360

“ I really appreciate the format, the review and the personal take on the evidence.”

“ Excellent. I really like the new format.”

“ Easily one of the highest value (courses) for me.”

“ The first time in 25 years of practice that I showed up to all lectures.”

“ I love the new format!”

“ Course was fantastic. Just what this doc with a short attention span needed.”

THE YEAR IN REVIEW

EMERGENCY MEDICINE & ACUTE CARE

2024 COURSE



5 Remaining Locations

New Orleans, LA

April 24-27, 2024

New Orleans Marriott



Hilton Head, SC

May 1-4, 2024

Hilton Beachfront Resort & Spa Hilton Head Island (FKA Hilton Head Marriott)



New York, NY

June 19-22, 2024

New York Marriott Marquis



San Diego, CA

June 26-29, 2024

Coronado Island Marriott Resort & Spa



Key West, FL

December 2-6, 2024

Casa Marina Key West, Curio Collection by Hilton



Join Us in 2024 for an All-New Format!

The emphasis - clinical studies exclusively published in 2023 that have been specifically chosen to impact your practice and that will be simultaneously presented by a pair of enthusiastic faculty.



Evidence-Based Content

This is not a review course. Rather, it's a deep dive into the leading studies published in 2023 that will affect your practice. Immerse yourself in discussions regarding leading-edge emergency medicine as you engage with frontline "been there, done that" educators.



Tag-Team Faculty Format

Two physician faculty will jointly present and critique the studies while adding their perspective based on prior studies and their clinical experience. The faculty members are bright, know the medical literature, and enjoy interacting with the participants.



No PowerPoint

We leave the lights on and the slides at home to create an interactive environment to facilitate learning. Each topic is covered by a pair of our award-winning faculty as you're able to follow along in our detailed course manual.

“ This format is excellent and challenges the participants to think.”

“ Exactly what I wanted, needed, and have come to expect.”