

EM Resident



Official Publication of the Emergency Medicine Residents' Association

June/July 2018

VOL 45 / ISSUE 3

First Shift of Residency

**Examining the DAWN
and DEFUSE 3 Trials**

**Simplified Approach
to TEG and ROTEM**

**Modern Trends
in Blast Injuries**

ENVISION PHYSICIAN SERVICES OFFERS ...

PROGRAMS

THAT ALIGN PHYSICIANS TO BECOME

LEADERS



MANSOOR KHAN, MD, MHA, FAAEM
EMERGENCY MEDICINE



Why EM Residents choose Envision Physician Services

- Professional Development and Career Advancement
- Employment Flexibility:
Full-Time, Part-Time, moonlighting and travel team. Employed and Independent Contractor options
- Practice Variety: Coast-to-coast opportunities at well-recognized hospitals and health systems
- Unparalleled practice support
- Earn While You Learn Program:
Provides senior residents with \$2,500/month while you complete your residency

For more information, contact:

877.226.6059

Success@evhc.net



Letter from the Editor

ENOUGH IS ENOUGH

Tommy Eales, DO
Editor-in-Chief, EM Resident
Indiana University
@tommyeales



Editor's Note: Gun violence continues to have a dramatic impact on our society, and the EMRA Representative Council is discussing the topic to form EMRA's official stance. This letter reflects my opinions.

"Time of death — 2:31 am."

I stared at the lifeless child in front of me — the focal point of a quiet, well-disciplined trauma resuscitation. There were blank faces around the room. And for a moment, absolute silence.

Then, from beyond the curtain, a slow, piercing cry.

I carefully removed my blood-stained gloves and gown, pausing to ensure that my scrubs bore no evidence of the grisly scene that just unfolded. I washed my hands and took a deep breath. As I stepped out of the resuscitation bay, I came face-to-face with the patient's mother. Words cannot capture her desperate, glassy stare as her eyes met mine.

Before I could even speak, she knew.

In the moments that followed, we shared a simple discussion that would change her life forever. I explained that her child had suffered a gunshot wound to the chest that caused her heart to stop beating just prior to reaching the hospital. Without divulging too many details about the exhaustive measures that were attempted to revive her upon arrival to the ED, I assured the grief-stricken mother that every effort was made to save her baby. "I'm sorry," I concluded. "She died."

Not 20 minutes later, I was back at my workstation and catching up on charts during a rare lull in the steady onslaught of new arrivals.

Gun violence has become so routine in the ED that not even the gruesome death of a young child can interrupt the daily grind.

In fact, the U.S. now has the highest

rate of gun-related deaths among industrialized countries.¹ Every year, the number of Americans who will die from gunshot wounds rivals the number of those who die from sepsis.² Perhaps a striking statistic to some, this should come as no surprise to those of us working in crowded EDs across the country.

Despite the media attention and public outcry associated with the violent deaths of young children, the sobering reality is that the majority of gunshot-wound fatalities in America occur in adults and are self-inflicted.² These stories will never make the evening news. If only we could do a better job of identifying those at risk and intervening earlier, perhaps these deaths might one day be preventable.

Embarrassingly, we have dangerously limited data pertaining to gun violence. This is critical information we need to save lives.

Compared with other leading causes of death, gun violence was associated with less funding and fewer publications than predicted based on mortality rate, with approximately 1.6% of the funding and 4.5% of the volume of publications predicted by a regression analysis incorporating the leading causes of death reported by the CDC between 2004-2014.³ While the reasoning for this is multifactorial, the major driving force is the gun lobby — a collection of various groups working tirelessly to restrict federal funding for researchers investigating gun violence.

Life in the ED is unpredictable. We routinely come face-to-face with the struggles of our communities. Over time, there is a tendency to normalize the

ugliness and even accept it as unchangeable, insurmountable. Yet, there are some things that should never be normalized.

The next time you hold a parent's hand while confirming the worst possible news, here's my advice.

Apologize.

Apologize that our society normalizes gun violence to the extent that no action will be taken to address the systemic flaws that contributed to her child's death.

Apologize that our professional organizations have failed to reverse the caustic legislation preventing us from collecting and analyzing the data we need to create evidence-based guidelines to fight gun violence across the country.

Apologize that emergency medical and surgical staff have become immune to the emotions associated with gun violence and death.

Talking to my patient's mother that night, I told her that we had done everything in our power to save her child.

But what about my next patient? Have I done everything in my power to prevent others from becoming victims of gun violence?

As the frontline of the healthcare system, gun violence is our problem. It is our responsibility to stand up and take ownership of this. Short of that, we are doing an injustice to our patients. Every time we quietly go back to work after another young person's violent death, we make it easier for this to remain the status quo. As physicians, it is our duty to speak up for those who cannot speak for themselves.

I speak for my deceased patients when I say that enough is enough. ★

EDITORIAL STAFF

EDITOR-IN-CHIEF

Tommy Eales, DO
Indiana University

DEPUTY EDITOR

Brian Fromm, MD
Thomas Jefferson University

EDITORIAL TEAM

Jeremy Lacocque, DO
Midwestern University/CCOM

Megan Cobb, MD
University of Maryland

Jayram Pai, MD
Mount Sinai

Leah McDonald, MD
NYU/Bellevue Medical Center

Karen Bowers, MD, MS, MEEd
Emory University

Whitney Johnson, MD
UCSF-Fresno

Danny VanValkinburgh, MD
University of Tennessee
College of Medicine

ECG Editor

Jeremy Berberian, MD
Christiana Care Health System

MSC Editor

Morgan Bobb
University of Iowa Carver
College of Medicine

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

© Copyright 2018

Emergency Medicine Residents' Association

Categories

14 Welcome to Emergency Medicine

Blake Baker, MD, MPH, completed his first shift as a physician on the night of a mass shooting in Dallas. How can this year's interns prepare for their own first shifts — and first month of residency?

On the cover: Blake Baker is beginning his final year of residency at UT Southwestern, rotating at Parkland Health & Hospital System.

COVER STORY



5 PRESIDENT'S MESSAGE #EMRAatCORD18



Event Recap



6 ACGME RC-EM UPDATE ACGME Review Committee for Emergency Medicine

Updates

8 LEADERSHIP REPORT Introducing EMRA's New Administration & Operations Committee

10 CRITICAL CARE Examining DAWN and DEFUSE 3

Endovascular Therapy Option for Late-Presenting Ischemic Stroke Patients

13 AIRWAY Delayed Sequence Intubation

Basics for Residents

16 COVER STORY SUPPLEMENT How Did You Survive the First Month of Residency?

18 WELLNESS Emotional Intelligence in the Emergency Department



20 WELLNESS Applying Cognitive Load Theory to Emergency Medicine Handoffs



22 TRAUMA Modern Trends in Blast Injuries



24 PREHOSPITAL CARE
Cervical Collar



Friend or Foe?

25 PULMONARY DISORDERS
Super Bowl-induced Spontaneous Pneumomediastinum



Super-Fan Life

26 PROCEDURE/CRITICAL CARE
The Use of the Angiocatheter in Central Line Insertion



28 CRITICAL CARE
Hepatic Syndromes



30 ORTHOPEDICS
Posterior Sternoclavicular Joint Dislocation



Recanting Impressions

32 RESPIRATORY
Considerations Performing ED Thoracentesis
"Trapped Tap"

34 INFECTIOUS DISEASE



Tamiflu
To Use or Not to Use?

37 TRAUMA
A Simplified Treatment-Based Approach to TEG and ROTEM

40 PREHOSPITAL
Rescue Task Force

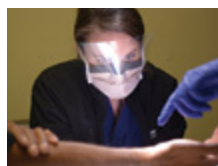


42 RESEARCH
How to Get Published



Paper Hack 101

44 MEDICAL STUDENTS
Required Clerkships



Setting the Foundation for a Career in Emergency Medicine

46 EM POWER
Jo Linder, MD, FACEP



47 ECG CHALLENGE



50 BOARD REVIEW
Questions from PEER IX

UPCOMING EVENTS

June 15: 20 in 6 Resident Lecture Entries Due

June 19-22: Resuscitation 2018 — discount for EMRA members! Baltimore, MD

July 15: Fall Award Application Due

Aug. 5: *EM Resident* Articles Due

Aug. 18: EMRA Board Nominations Due

Aug. 18: Fall Resolutions Due

Sept. 15: 2019 Main Registry Match opens @ Noon EDST

Sept. 28-Oct. 4: EMRA Events at ACEP18, San Diego

Sept. 30: EMRA Residency Program Fair @ ACEP18

Oct. 1: EMRA Job & Fellowship Fair @ ACEP18

Oct. 13-16: ABEM Fall Oral Certification Exam

Oct. 5: *EM Resident* Articles Due

Nov. 30: NRMP standard registration deadline

Jan. 30: NRMP rank order list entry opens @ Noon ET

Feb. 20: NRMP rank order lists due

EMRA
Hangouts

First Thursday of every month

EMPOWER: STORIES FROM EM LEADERS

EMRA-Cast:
Listen at your convenience



PRODUCED BY EMRA-CAST

ADVERTISE WITH US

PRINT AND ONLINE MARKETING OPPORTUNITIES AVAILABLE

Contact **Cynthia Kucera** | 201-767-4170
advertising@emra.org

Download **EM Resident Media Kit**
emra.org/advertise

Be sure to check **EMResident.org** for exclusive online content!

Want to improve your CV?

Write for *EM Resident!*
Submit online at **emresident.org**.



EmBassador Travel Team

Seeking the Best and Brightest EM Physicians

Enjoy the flexibility to live where you want and practice where you are needed.

EMBASSADOR TRAVEL TEAM PHYSICIANS RECEIVE:



Practice variety



Paid travel and accommodations



Concierge support



Travel convenience package



Regional engagements, equitable scheduling and no mandatory long-term employment commitment



Paid medical staff dues, licenses, certifications and applications



Exceptional compensation package



Fast track to future leadership opportunities

For More Information:

Alan W. Biggs
National Vice President, EmBassador Program
877.370.0805 | alan.biggs@emcare.com





LEADERSHIP ACADEMY



CHAOS IN THE ED

#EMRAatCORD18

Zach Jarou, MD
Denver Health
 @zachjarou

It was one year ago that EMRA announced we would be moving our spring programming to the CORD Academic Assembly. As advocates for physicians-in-training, it made sense for EMRA to be at the emergency medicine conference focused on student and resident education, where we would have the most opportunity to interact with residency program and clerkship directors. Last month, more than 400+ residents came to San Antonio to participate in EMRA and CORD events during Academic Assembly! Here are the highlights...

Leadership Academy

Nearly 100 #EMRALeaders participated in the kickoff for our Leadership Academy. Members of the EMRA Board, EMRA Committees, EMRA Reps to ACEP, EMRA Medical Student Council, and EMRA Representative Council were divided into teams for a scavenger hunt on the Riverwalk. Participants learned to quickly build rapport, establish roles, divide tasks, seek consensus, and had an opportunity to debrief about communication and leadership styles.

EMRA RepCo

Representatives from 49 residency programs participated in the Spring 2018 meeting of the EMRA Representative Council. Bylaws amendments were passed to allow fellows at programs not affiliated with residency programs to independently vote, and to allow the EMRA Medical Student Council Chair to have a vote on the EMRA Board of Directors so long as each appointment is confirmed by the Rep Council.

RepCo also adopted policies on procedural sedation and opioid harm

reduction, stating that graduation from an EM residency should be the only credential needed to perform sedation with access to an unrestricted breadth of pharmacological agents, and that physicians-in-training should receive teaching about risks of opioid prescribing and alternatives to opiates, and that EMRA should support increased access to naloxone, needle exchange programs, and ED-initiated medical assisted therapy. A bylaws resolution to end the reciprocal membership between EMRA and ACEP was defeated.

The Town Hall featured robust discussions of firearms-related injuries and MOC. Resolutions are forthcoming.

AEROS

The inaugural meeting of All EM Resident Organizations and Students (AEROS) was a huge success. Leaders from EMRA, AAEM-RSA, AAMC-ORR, ACOEP-RSO, AMA-RFS, CORD, and SAEM RAMS met to discuss the AAMC Standardized Video Interview, procedural sedation, proposed changes to the ACGME Common Program Requirements, and overapplication to residency. While we

planned for this to be an annual meeting, the discussion was so productive, we will meet again at ACEP18, where EM workforce issues will be a major topic of discussion.

EMRA Quiz Show

Kudos to the EMRA Education Committee for another amazing EMRA Quiz Show! A big thanks to Rosh Review for their sponsorship. And congratulations to this year's winners... **Mount Sinai BETH ISRAEL!**

Chaos in the ED

Thanks to the hard work of EMRA's Simulation Committee, the first-ever Chaos in the ED event was a big hit — and we couldn't have done it without the support of our incredible sponsors: ACEP, SonoSite/Fujifilm, Simulab, and SonoSim, plus above-and-beyond contributions from the ACOEP RSO. Competitors signed up by correctly answering a PEER question, and teams were formed by lottery. They competed head-to-head in a series of procedural demands that culminated in an airway challenge featuring multiple MVC victims trapped in a car (shout out to ACOEP RSO for building the car on-site!). ★



AEROS



QUIZ SHOW

ACGME Review Committee for Emergency Medicine

UPDATES

Eric McDonald, MD
ACGME RC-EM Representative
University of Mississippi

The ACGME Review Committee for Emergency Medicine has met multiple times during the past year to review program applications, discuss common requirements, and manage the transition to single accreditation as the AOA/ACGME merger deadline approaches in 2020.

Common Program Requirements

The ACGME Common Program Requirements ensure that ACGME-accredited specialty and subspecialty programs follow a consistent set of standards. The RC-EM has been helping to revise these standards over the past several years, and EMRA has provided input on the proposed changes at each step.

The ACGME approved major revisions to Section VI on July 1, 2017, with changes focusing on clinical experience and education (formerly known as duty hours); patient safety, supervision, and accountability; professionalism; well-being; fatigue mitigation; and clinical responsibilities, teamwork, and transitions of care. Implementation is underway, with a July 1, 2019, deadline for all programs to comply with all changes.

This year, the ACGME Common Program Requirements Phase 2 Task Force has proposed revisions to Sections I-V, and the ACGME Board is now considering the task force recommendations. The proffered changes focus on scholarly activity requirements, residency outcomes, well-being, diversity, patient safety, doctor-patient communication (specifically regarding end-of-life goals), the role and responsibilities of program directors (as well as faculty and staff), and more.

For details of the requirements currently in effect, along with a timeline for implementation plus FAQs on the Common Program Requirements changes, visit acgme.org/What-We-Do/Accreditation/Common-Program-Requirements.

New Programs

Programs that have received initial accreditation in 2018 include:

- Allegheny Health Network Medical Education Consortium (Pittsburgh, PA) — initial accreditation for a new EMS fellowship
- Arrowhead Regional Medical Center (Colton, CA) — initial accreditation for a new EMS fellowship
- Case Western Reserve University (MetroHealth) Program (Cleveland, OH) — initial accreditation for a new EMS fellowship
- Charleston Area Medical Center (Charleston, WV)
- Florida State University College of Medicine — Sarasota Memorial Hospital
- HCA West Florida GME Consortium Program (initial accreditation for programs at Oak Hill Hospital in Brooksville and Brandon Regional Hospital in Florida)
- Mercy Memorial Hospital System Program (Monroe, MI)
- Metro Health University of Michigan Health (Wyoming, MI)
- Midwestern University Osteopathic Postdoctoral Training institute Program (Kingman, AZ)
- Oklahoma State University Center for Health Sciences (Lawton) Program
- Rowan SOM/Jefferson Health/Our Lady of Lourdes Health System (Stratford, NJ)
- Rutgers New Jersey Medical School — initial accreditation for a new medical toxicology fellowship
- St. Joseph's Medical Center Program (Stockton, CA)
- Unity Health/White County Medical Center Program (Searcy, AR)
- University Hospitals Osteopathic Consortium (UHOC) Program (Westlake, OH)
- University of Vermont Medical Center (Burlington, VT)

Prior to these new programs there were a total of 221 accredited EM programs. The RC-EM has accredited 49 AOA programs in the past 3 years as the single accreditation merger continues. *

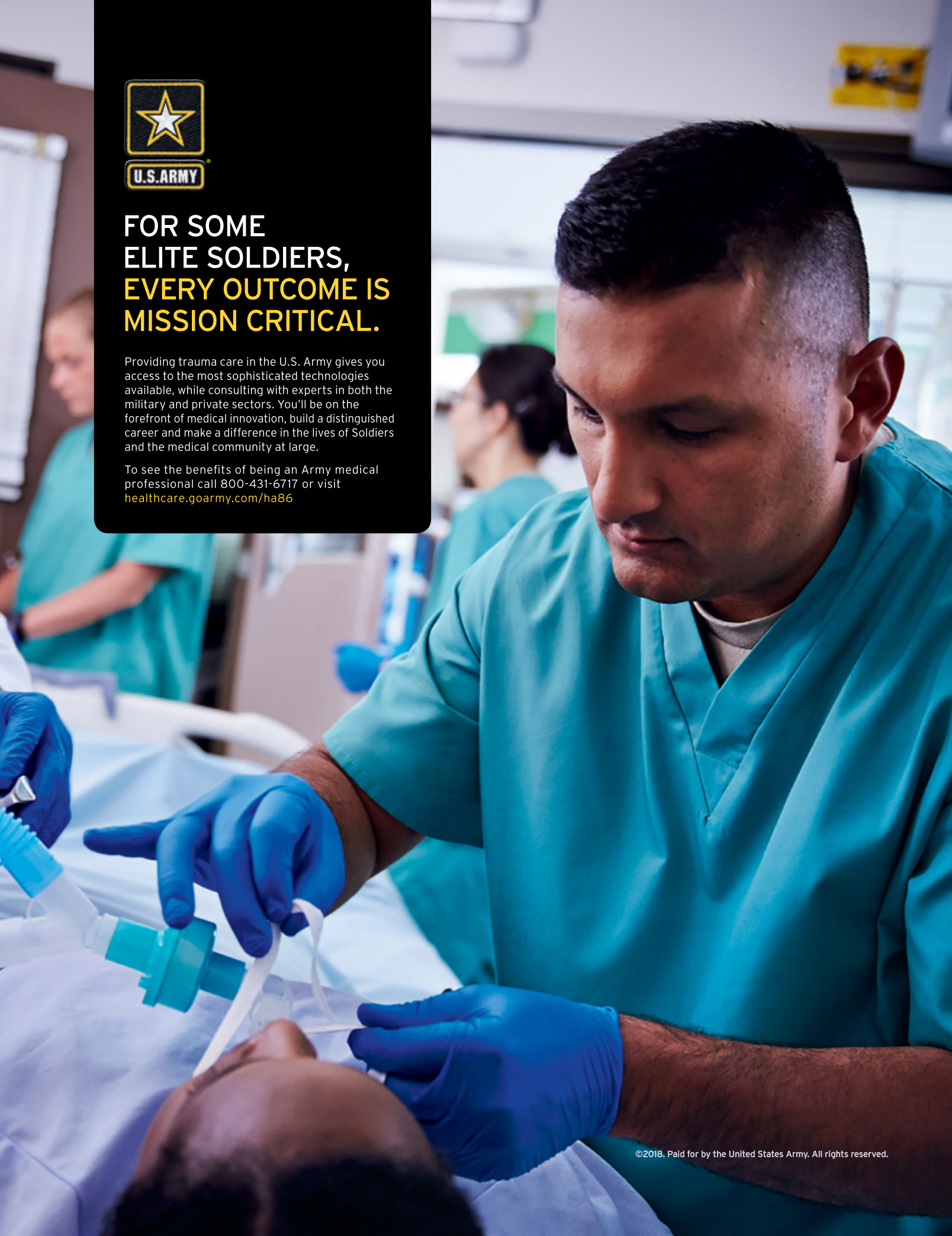


U.S. ARMY

FOR SOME
ELITE SOLDIERS,
EVERY OUTCOME IS
MISSION CRITICAL.

Providing trauma care in the U.S. Army gives you access to the most sophisticated technologies available, while consulting with experts in both the military and private sectors. You'll be on the forefront of medical innovation, build a distinguished career and make a difference in the lives of Soldiers and the medical community at large.

To see the benefits of being an Army medical professional call 800-431-6717 or visit healthcare.goarmy.com/ha86



INTRODUCING

EMRA's New Administration & Operations Committee

Joshua Gauger, MD, MBA

EMRA Administration & Operations
Committee Chair
University of Cincinnati
@jgauger43

The practice of emergency medicine is constantly changing as populations, demographics, and best practices evolve. Increasing patient volumes coupled with decreasing numbers of emergency departments have contributed to significant ED crowding across the United States. Further, innovative technologies and care delivery advancements have enabled emergency physicians to provide unprecedented care in the ED setting. All of these changes require

optimization of the systems and processes by which we deliver care to our patients. Regulatory bodies are focusing on metrics of patient safety, health care quality, and patient experience – and tying reimbursement to those metrics. Emergency physicians are uniquely qualified to design, implement, and lead our specialty through these exciting changes.

The new EMRA Administration & Operations Committee focuses on the science of monitoring, managing, and improving processes (administration) and on delivering high-quality, efficient services or products to consumers (operations).

ED operations includes the systems and processes we use to care for patients every day, along with strategies for improving these systems. These concepts are becoming more and more important in medicine. It is incumbent upon the emergency physician to understand these ideas to lead improvements in care delivery processes and patient-oriented outcomes.

As an example, think about the complex processes involved in operating an airline. Customers buying tickets, arriving to airports, boarding planes, and traveling to their destinations. Pilots flying aircraft from destination to destination. Flight attendants seating

BE READY

to respond to targeted
job alerts.

It's like a dating service. Only better.



*em*Careers.org
WHERE DO YOU WANT TO BE?

ACEP and EMRA's
Official Online Career Center

customers and serving them in flight. Baggage handlers ensuring luggage arrives at the correct baggage claim station. Mechanics keeping the aircraft in peak working order. The list goes on and on. All this needs to happen in a coordinated and rapid fashion without mistakes. Furthermore, customers should enjoy the service they receive, and the airline should make a profit. These things take constant dedicated study and management.

Although comparing airline operations to health care is not perfect, one can see how this example relates to the processes required by an emergency department to provide care to patients. Emergency medicine consists of out-of-hospital providers, techs, nurses, patient care assistants, physicians from various specialties, ancillary services, physical emergency department space, and various floors and units throughout the hospital. It only makes sense that we should be monitoring, managing, and improving our processes like any other industry.

Operations usually focuses on broader issues as opposed to individualized treatment plans for specific diseases. Operations in emergency medicine includes concepts such as patient progression (flow), quality improvement, patient safety, and patient experience. Processes such as direct to bed, bedside registration, triage protocols, provider in triage models, clinical decision units, and fast-track area are all operations-based attempts at improving ED function.

Emergency physicians are constantly doing quality improvement projects to improve the care of our patients. Patient safety is a paramount concern for every provider and health care system. Just like every other service industry, our patients' experiences matter, and we should work to make our patients as comfortable and satisfied as we can while providing the best possible care.

Does emergency medicine operations management or quality improvement interest you? Do you have an interest in medical direction and administration or want to learn more about them? Are you

interested in patient safety or patient experience? If so, please consider joining the new EMRA Administration & Operations Committee, which held its first committee meeting at CORD Academic Assembly in San Antonio. We had a great time and developed a lot of exciting project ideas. We have been working hard on updating the EMRA administration fellowship database, compiling a research database, developing collaborations with other EMRA and ACEP committees, and we hope to start a mentorship program in the near future. We are looking at ways to increase the baseline level of operations understanding of all emergency medicine residents through publications and other FOAMed sources. We are looking for active members who want to get involved, and we have many project leadership opportunities available.

Join us on the EMRA website at <https://www.emra.org/be-involved/committees/administration-and-operations-committee>. ★

PEER 

Find out why emergency physicians say it's "closest to the boards."

www.acep.org/peer

Critical decisions
in emergency medicine

ACEP's official CME publication is a no-frills, hard-hitting look at clinical issues

www.acep.org/cdem

ACEP
eCME 

More than 100 hours of education – the best EM education – free to members.

www.acep.org/ecme

**ACEP's
Big Three**

KEEPS YOU CURRENT

 American College of
Emergency Physicians®
ADVANCING EMERGENCY CARE 

acep.org

EMR_0618_1110_0518

Examining DAWN and DEFUSE 3

Endovascular Therapy Option for Late-Presenting Ischemic Stroke Patients

Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging. Albers GW, et al, for the DEFUSE 3 Investigators*

Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct. Nogueira RG, et al, for the DAWN Trial Investigators*

Meghan Gorski, DO

Einstein Medical Center

Yanika Wolfe, MD

Einstein Medical Center

@ywolfe

Clark Owyang, MD

Mount Sinai

@clark_owyang

At 11 am, EMS brings in a 76-year-old female with history of HF, CAD, HTN, DM, atrial fibrillation on warfarin, and Wegener's granulomatosis. She was reportedly last seen normal by family at 2100 last night and is usually A&O x 3 at baseline, but family called EMS reporting altered mental status when they checked on her just PTA. You help the nurses place the patient on the monitor and notice she is in atrial fibrillation with RVR, with HR 130-140BPM, BP 160/100, RR 25, SPO₂ 97% on 4L NC with bedside blood sugar of 203. On exam, she is awake and is moving her Left side, with no purposeful movements of her right side, and she is not following commands. She is taken for CTH which shows no ICH but age-indeterminate infarct of the left basal ganglia. CTA shows occlusion of proximal M1 of LT MCA.

Background

Ischemic stroke is one of the most common causes of death and devastating permanent disability worldwide. Current standard care for stroke consists of giving thrombolytics up to 3-4.5 hours in select patients. Administration of thrombolytics in stroke patients is associated with risk of ICH. NINDS data from 1997 as well as more recent meta-analysis findings have shown an approximately 6% risk of symptomatic ICH when tPA is given within the 3-hour window.

With the evolution of neuroradiology, multiple recent trials have shown the potential benefit of mechanical thrombectomy for select patient groups whether or not they also received systemic thrombolytics. Prior to the recent trials detailed below, mechanical thrombectomy was limited to those presenting with large artery occlusion within 6 hours of symptom onset.

The newest evidence from the recent DAWN and DEFUSE 3 trials suggests benefit to endovascular therapy in patients presenting up to 16 and 24 hours after their symptoms manifestation.

Discussion

At 31 months into the DAWN trial, enrollment was stopped when the interim analysis showed a predictive probability of 95% for superiority for thrombectomy regarding mean disability at 90 days after intervention. Similarly, enrollment in the DEFUSE 3 Trial was also stopped at its interim analysis due to statistically significant results in favor of treatment with thrombectomy and standard medical therapy.

Prior to the DAWN and DEFUSE 3 trials, studies had shown that benefits associated with endovascular thrombectomy diminished as the time from stroke onset to intervention increased beyond the 6-hour window. However, these two studies concluded that thrombectomy performed as far as 6 to 16 and even 24 hours, as concluded by the DAWN trial, has better functional outcomes than standard medical therapy alone does.

The main difference between these two studies was the inclusion of patients with a penumbra in the DEFUSE 3 trial. This requirement allowed for selection of patients with a slower growing infarct likely due to better collateral circulation.

Both trials used the same automated software to measure the volume of infarct. Whereas the DAWN trial selected for patients with a discrepancy between the severity of the clinical deficit and the infarct size, the DEFUSE 3 trial included a broader patient population by enrolling patients with milder stroke symptoms and larger core infarcts. Regardless, both studies resulted in less disability and higher functional independence when thrombectomy plus standard medical therapy were used versus standard therapy alone.

With research favoring the utility and extension of the thrombectomy window, many questions will arise regarding the management of late presenting stroke cases. It is unclear how broad the actual benefit of these findings can be applied clinical practice. We need to pay close attention to the specific criteria of patient selection. Available collateral circulation is the key for success in applying endovascular therapy in late presenting stroke cases. Frequent repeating of neuro exam is crucial as an indicator of available collateral circulation to guide intervention considerations.

— DAWN Trial —

DWI or CTP Assessment with Clinical Mismatch in the Triage of Wake up and Late Presenting Strokes Undergoing Neuro Intervention with Trevo

QUESTION

In patients with ischemic strokes last known to be well between 6 to 24 hours prior to hospital arrival with mismatch between clinical deficit and infarction, are outcomes for disability at 90 days, as judged by the Modified Rankin Score, better for treatment with thrombectomy and standard care or for standard care alone?

DESIGN

- Multicenter (26 centers throughout the U.S., Canada, Australia, Europe)
 - All centers annually perform at least 40 mechanical thrombectomy cases
- Prospective
- Open labeled
- Blind assessment to end points

POPULATION

- 206 patients
- Age 55-83 y/o
- Median NIHSS 17
- 107 treated with thrombectomy and medical management
- 99 treated with medical management alone (control)

INCLUSION CRITERIA

- Age > 18 y/o
- No ICH
- Last known to be well 6-24 hours PTA
- Infarct < 1/3 the MCA territory
- Occlusion located within the intracranial internal carotid a. or the M1 segment of the MCA
- Mismatch between severity of clinical deficit and infarct volume

OUTCOMES

Primary	Thrombectomy and Medical Management	Medical Management (Control)
Mean Disability Score at 90 days	5.5	3.4
Functional Independence at 90 days	49%	13%

- Mean Disability Score assessed by utility weighted Modified Rankin, in which 0=death and 10=no symptoms/no disability
- Modified Rankin Scale measures the disability and/or the dependence of stroke patients on assistance with activities of daily living. Please see Modified Rankin chart for reference.

Secondary	Thrombectomy and Medical Management	Medical Management (Control)
Early Response	48%	19%
Recanalization at 24 hours	77%	36%
Change from median baseline infarct volume at 24 hours on CTA/MRA	1mL	13mL
Infarct volume at 24 hours	8mL	22mL

- Early Response was defined as a decrease in NIHSS by ≥ 10 from baseline OR NIHSS of 0 or 1 on day 5,6,7 of hospitalization or at discharge if occurred before day 5.

Safety Outcomes	Thrombectomy and Medical Management	Medical Management (Control)
Stroke Related death at 90 days	16%	18%
Death from any cause at 90 days	19%	18%
Symptomatic ICH	6%	3%
Neurological Deterioration	14%	26%

- Symptomatic ICH is the presence of extravascular blood in the cranium causing increase in NIHSS ≥ 4 or death and deemed to be predominant cause of deterioration
- Neurological Deterioration as an increase in NIHSS of ≥ 4 points within 5 days and not attributable to edema or hemorrhage

— DEFUSE 3 —

Endovascular Therapy Following Imaging Evaluation for Ischemic Stroke

QUESTION

Does endovascular thrombectomy for ischemic stroke cases as identified by perfusion imaging 6-16 hours after last seen normal offer better functional outcomes as defined by the Rankin Scoring system than standard medical therapy alone?

(More specifically in patients with **proximal MCA or internal carotid artery occlusions** and ischemic but not infarcted tissue)

DESIGN

- Multicenter (38 U.S. hospitals)
- Randomized
- Blinded to outcome assessment
- Open labeled (no placebo)

POPULATION

- 182 patients
- Age 59-80
- Median NIHSS 16
- 92 to endovascular therapy and medical management
- 90 to standard medical therapy alone

INCLUSION CRITERIA

- Ischemic stroke within 6-16 hours of last seen normal
- Location in MCA or intracranial or cervical internal carotid artery
- Tissue not infarcted
- Infarct size < 70mL
- *equivalent to <1/3 MCA territory as required by the DAWN trial
- Penumbra > 15mL
- Ratio of ischemic volume: infarct volume >/= 1.8

OUTCOMES

Primary	Thrombectomy and Medical Management	Medical Management (Control)
Modified Rankin at 90 days	Median of 3 IQR of 1-4	Median of 4 IQR of 3-6

Secondary	Thrombectomy and Medical Management	Medical Management (Control)
Functional Independence at 90 days	45%	17%
Mortality at 90 days	14%	26%
Symptomatic ICH within 36 hours*	7%	4%
Serious Adverse Effects	43%	53%

- Functional Independence as defined above in the DAWN trial using the Modified Rankin Scale with scores of 0, 1, or 2
 - Symptomatic ICH defined as NIHSS increasing by >/= 4 points from baseline over 36 hours
- *Difference was not statistically significant

Imaging Outcomes	Thrombectomy and Medical Management	Medical Management (Control)
Infarct Volume at 24 hours	35mL	41mL
Lesion Growth at 24 hours	23mL	33mL
Reperfusion of >90% at 24 hours	79%	18%
Complete Recanalization	78%	18%

EFFICACY as by Thrombolysis in Cerebral Infarction (TICI) Assessment

- 57% of patients achieved a score of 2b with 50% to 90% reperfusion
- 19% of patients achieved a score of 3 with complete reperfusion

Modified Rankin Scoring System

*Of note, this differs from the utility-weighted scoring system that was used in the DAWN trial

0	Asymptomatic	No symptoms
1	No Significant Disability	Despite mild symptoms, able to independently carry out daily activities
2	Slight Disability	Can look after their own affairs but limited in ability to carry out all prior activities
3	Moderate Disability	Can walk unassisted but assistance required for other activities
4	Moderately Severe	Unable to attend to own bodily functions and unable to walk unassisted
5	Severe Disability	Require around the clock nursing care, bedridden and incontinent
6	Death	

Delayed Sequence Intubation

BASICS FOR RESIDENTS

Tim Montrief, MD, MPH

Jackson Memorial Hospital

@EMinMiami

We all learn our ABCs as kids, but after a couple years of medical school and residency they take on a much different meaning — airway, breathing, and circulation. In emergency medicine, there are many different methods of managing a patient's airway, including one of the newest modalities: delayed sequence intubation (DSI).^{1,2}

Defining DSI

The easiest way to think of DSI is as procedural sedation, with the procedure being preoxygenation, after which the patient can be paralyzed and intubated. As with any procedural sedation, we want our patients to be calm, spontaneously breathing, and protecting their airway, making ketamine the ideal induction agent, as it preserves respiratory drive and airway reflexes.

DSI may be useful in patients for whom rapid sequence intubation would inevitably result in significant hypoxemia because they cannot tolerate preoxygenation by any other means, such as patients with agitated delirium from hypoxia, hypercapnia, or an underlying medical condition.

Doing a DSI

Following the DSI algorithm (Fig. 1), the first and arguably most critical step is identifying the patient who meets the indications for DSI:

1. The patient is agitated or cannot tolerate preoxygenation via nasal cannula, nonrebreather mask, bag-valve-mask, or non-invasive ventilation such as continuous positive airway pressure.
2. Another procedure is required before intubation, but the patient will not tolerate it well (eg, nasogastric tube placement before intubation in the setting of a GI bleed).³

If possible, position the patient head-up at roughly 30 degrees with the auditory meatus above the sternal notch. Use the induction agent to help facilitate positioning if necessary. The ideal agent

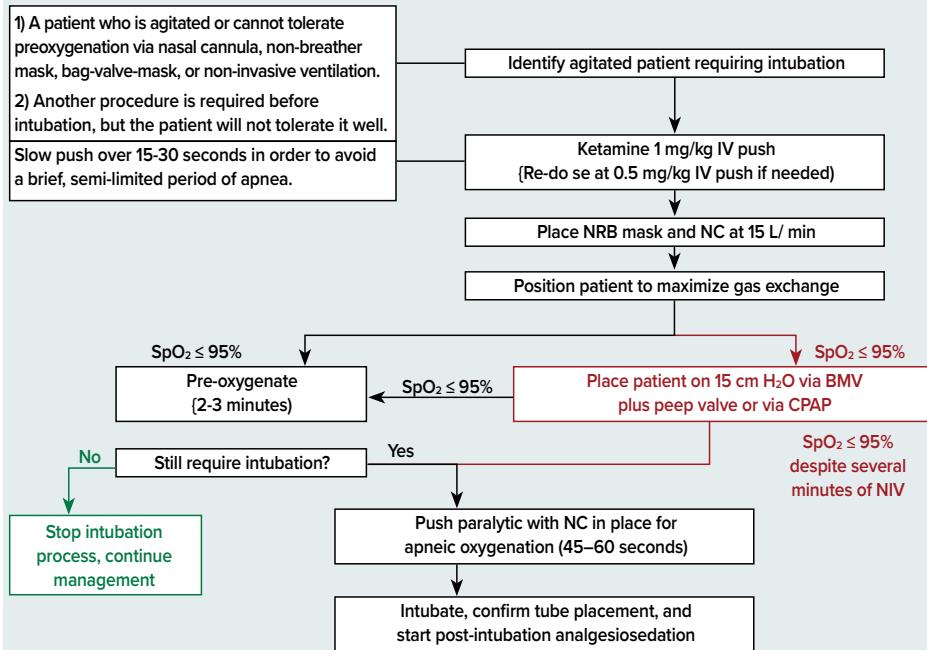


FIGURE 1. Delayed Sequence Intubation (DSI) Algorithm.

Adapted from Nickson, C. (2016). Delayed sequence intubation. LITFL. Life in the Fast Lane Medical Blog.

is ketamine, administered as a 1 mg/kg slow IV push over 15–30 seconds to prevent apnea. Because the effects of ketamine are almost instantaneous, and many side effects are dose-dependent (including hypersalivation), administer 1 mg/kg first, then give further doses of 0.5 mg/kg IV as needed to achieve complete dissociation.^{1,2} Other induction agents have been suggested for use in patients with hypertension or tachycardia, in which the sympathomimetic effects of ketamine may be undesirable. Dexmedetomidine, remifentanyl, and droperidol are all promising agents, but these lack ketamine's reassuring safety profile, rapidity of onset, and preservation of both airway reflexes and respiratory drive.⁴⁻⁶

For preoxygenation, use Anton Helman's "triple 15" rule.⁷ It consists of 15L O₂ by NC, plus 15 L O₂ by NRB, and if oxygen saturation ≤95%, adding 15 cm H₂O of positive end-expiratory pressure by CPAP or BVM with a PEEP valve while maintaining NC.^{8,9} Preoxygenate for 2-3 min, then reassess for oxygenation,

ventilation, and need for intubation. Rarely, DSI will avert the need for intubation by alleviating agitation and improving oxygenation to an acceptable level. In these select cases, it is reasonable to stop the DSI process and allow the induction agent to wear off, or continue managing the patient with boluses to maintain oxygenation. However, it is imperative to realize that DSI should only be initiated with the end-goal being intubation and securing the airway.

If intubation is required, administer the neuromuscular blockade, leaving the preoxygenation devices in place for 45-60 seconds while the paralytic takes effect. When ready to intubate, leave the NC in place for apneic oxygenation, intubate, confirm endotracheal tube placement, and begin post-intubation analgesia sedation.

Take-Home Point

DSI may be a useful technique to preoxygenate your patients who cannot tolerate other means of preoxygenation, and when rapid sequence intubation would be otherwise unsafe because of the risk of hypoxemia. ★

Welcome to Emergency Medicine

Sudden, panicked shouting fills the halls. Patients — so many in uniform — appear out of nowhere. Multiple unannounced traumas peel away layer after layer of backup until no backup is left, and he finds himself alone, in charge of caring for a potentially critically injured police officer.

It's July 7, 2016 — Blake Baker's first-ever shift as an EM resident at Parkland Hospital. He's the sole intern on duty when a troubled man ambushes Dallas law enforcement who are standing guard as citizens march to protest nationwide incidents of police brutality.

Armed with a handgun and an assault rifle, a sniper adds another mass shooting to America's story, making gunshot wounds the focus of Dr. Baker's inaugural shift as a physician.

Five officers would die during that shift; 9 more would be hospitalized, and a flood of bystanders would seek care. The night would dissolve into tragic chaos.

But it started peacefully.

Like nearly every intern in every specialty, UT Southwestern EM resident Steven Blake Baker, MD, MPH, had arrived for his first shift equally excited and nervous. He drew the overnight straw, assigned to the trauma ED with upper-level residents and an attending. With 110 exam rooms in the ED and nearly 275,000 emergency visits per year, Parkland Hospital can test your mettle; it's one reason UT Southwestern was Dr. Baker's first choice for residency training. He'd prepared for this moment for what seemed his entire life. He found his station, reported to his attending, and checked in on a patient with kidney stones, diligently absorbing every detail.

So far, so good.

"With absolutely no warning, the whole place just erupted," he said. "This was maybe 90 minutes into the shift. Nurses were shouting, the police were

yelling, and we weren't really sure what was going on. I remember rounding the corner with my attending and my senior resident and seeing a police officer in full uniform being carried through the doors by his fellow officers, with blood pouring out of his body, looking very pale and obviously already deceased.

"It's so clear in my mind, that image," Dr. Baker recalls nearly 2 years later, entering his final year of residency. "It has stayed with me to this day."

Other pieces of that night are also burned into his memory:

- Speaking with a Dallas police officer who arrived conscious and lucid. "He was right there with us, talking to us. He needed a chest tube. At that point we were so short of personnel, it was me and our senior trauma faculty — and the officer's partner. I remember her with her bare hands, trying to help us save him. But his injury was essentially irreparable, and he passed away."
- Seeing more and more injured officers and bystanders arriving by car rather than ambulance, stretching resources ever further — and being proud of how every member of the Parkland team, from the attendings to the transport techs, responded as one.
- Struggling to keep his first patient of the night (remember the kidney stones?) calm and in bed; coincidentally, she was a Dallas Police Department assistant chief who was determined to be with her stricken officers.

- Looking up at 2 am when the Chair of Emergency Medicine arrived and pointed to him, saying, "You — come with me." They opened Parkland's urgent care clinic across the street from the main ED and began working through the backlog of "regular" patients. "It was our chairwoman, myself, and 2 Internal Medicine residents who happened to be nearby at the time. This was still my first day, and not only was I working alongside the chairwoman, which was intimidating in itself, but she had those 2 IM residents reporting to me. Meanwhile I'm just hoping I remember how to order things correctly."

- Getting into his car sometime after dawn, hearing grossly inaccurate news reports of the incident — then driving the rest of the way home in silence.

Barely 10 hours later, Dr. Baker was back on shift, along with the rest of his department. "We were right back at it, which wasn't true for any other department," he said. "Some people took months off to deal with that night. I think it just goes to show the emergency medicine mindset."

History Repeats

That mindset has been uniquely ingrained in Dr. Baker. When he was almost 8 months old, Blake's father, then an assistant principal at a suburban Dallas high school, was shot by the mother of a student he had sent home for shaving a banned symbol into his hair. Steve Baker was saved by emergency physicians that day, and his family —

“

“You can’t always prepare for everything. We are trained and capable of stepping up and handling it, whatever ‘it’ is. That’s the job.”

”



including infant Blake — was protected by Dallas police during the ensuing months when a local gang targeted the school administrator because of the incident.

It shaped Blake Baker’s life. His passion for emergency medicine can be traced to that shooting, and his gratitude for law enforcement has never wavered.

“I believe things happen for a reason,” he said. “When I went to high school, there were still bullet fragments in the walls from where they missed killing my dad. My life could have been totally different had the doctors not worked so hard to save his life. It’s all

the motivation I ever need. It’s why I ended up at Parkland as an emergency physician.”

A Lasting Lesson

After that first shift — on a night so remarkable that it led to a commendation from the Texas Legislature for the caregivers involved — Dr. Baker has spent time trying to put it in perspective.

“The shock was intense,” he said. “You don’t really expect that on your first day — or at least I didn’t.”

Yet the unexpected is exactly what draws most EM residents to the specialty. It’s what nearly 2,300 interns en route to their own first shifts this July are both counting on and fearing.

Dr. Baker has one underlying message for those interns: “That’s the job — and we’re prepared for it, even if we feel vastly unequal to the task,” he said. “When things go bad — the very worst, in fact, for society or for individuals — you’re the person people are going to rely on. We are trained and capable of stepping up and handling it, whatever ‘it’ is. You’ll rise to the occasion.

“That’s what I learned from this whole experience,” he added. “You can’t always prepare for everything. You have to be resilient and roll with it as best you can, and remember to pick up the pieces later.

“But that’s the job we signed up to do, and we can do it.”

How Did You Survive the First Month of Residency?

Rich Bounds, MD, FACEP, FAAEM

Program Director, University of Vermont

What did you expect your first month of residency to be like?

I expected my first month of residency to be incredibly challenging, and somewhat overwhelming. I had been told by a number of mentors that would be the case. I did a lot of reading and studying in the 3-4 months before July, and I used my elective time to do ICU sub-Is while many of my peers were having fun and doing more relaxing rotations. I think I was afraid... afraid of failure, or looking stupid, I don't know. I just wanted to be as prepared as possible. I also liked critical care and dealing with sick patients, and I felt like if I was going to pay all this money for medical school, I was going to get my money's worth!

What was it actually like?

My first month of residency was in the MICU on q4 call. I came in at 5 am for my first day and learned that it was my long call day. As bad luck would have it, I set the all-time record with 14 MICU admissions that night. I was destroyed. And I was still learning the new system so I finished my notes and post-call tasks

at 4pm. Welcome to residency! (After that, they set up a "cap" for interns in the MICU.) Fortunately, although a few of them tried, none of my patients died that night.

I had a great senior resident who was not only smart, but also very supportive, and a great communicator. The rest of the month was just as hard, with little rest or time outside the hospital, lots of end-of-life discussions, and patient deaths — but also lots of procedures and learning. Although I had considered critical care fellowship after residency, that month changed my mind. It was just too much — the long hours, the emotions, the sad cases — and I realized I wanted to focus on EM.

How did you cope?

That month, I just had to focus on the task in front of me, and "stay in the present." (It actually helps you to focus when a patient's life is at stake.) Also, I was honest about asking for help anytime I needed it or felt overwhelmed. I asked lots of questions, and I think my peers and supervisors trusted me and gave me autonomy because they realized that if I didn't know something, I would

immediately ask for help. I wasn't afraid to admit my weaknesses, and I think that this insight and honesty was critical to getting through that first month.

Best advice for the new interns?

You have to study hard and try your best to be prepared as you get ready for July. It is no longer a test score at stake. It is the life and health of your patient. These are people in your community or city, someone's family member, and they are depending on you, as their physician, to provide them with great care. They depend on you to make the right clinical decisions and to communicate with them as fellow human beings. Do not take this responsibility lightly. And don't try to look smart. If you don't know, ask. If you are not comfortable, get help. This will establish your integrity, and your supervisors, nurses, and peers will grow to trust you. They will see that you are comfortable in your own skin, and insightful about your skills (or lack thereof) as a new physician. This will set you up for success throughout your residency and the rest of your career.

Elena DiMiceli, MD

PGY2, NYULMC/Bellevue Hospital Center

What did you expect your first month of residency to be like?

Who doesn't get nervous when you start to think about July 1st? I know I was! I expected the first month to be fun, challenging, and a lot of hard work but I was excited to be spending the month in the ED with my intern class.

What was it actually like?

It was a blast! July is a special month because not only are there new interns but across the hospital each resident is stepping into a new role. You're seeing new faces each day but

it's amazing how quickly you start to feel at home.

How did you cope?

I leaned on (and continue to lean on) my intern class. Being an intern is a shared experience and talking through your difficult days with people both inside and outside of your work environment can really help get you through your ED shifts and off-service rotations.

If you knew then what you know now, what would you do differently?

I would trust the process. You are training to become the best emergency

medicine physician you can be and it takes time. Intern year is especially challenging because you're not only learning medicine but an entire hospital system. Try to focus on the medicine and the rest will fall into place.

Best advice for the new interns?

The first few times you introduce yourself as Dr. [insert name here] might surprise you. Always remember how hard you've worked to get to this point, and recognize that everyone has been in your shoes. Don't forget to take breaks both on and off shift, and make time to do the things you enjoy.

Sean Ochsenbein, MD

PGY2, Wake Forest University

What did you expect your first month of residency to be like?

Fun. Hard work. Hitting walls and overcoming them. Starting a new chapter in life. Growing as a doctor. Finding a new family in a new city.

What was it actually like?

All the above and more! It has been amazing and I credit that to my program! We have been in school for a long time and the first month of residency is like being a horse in the Kentucky Derby and finally being let out of the gates.

How did you cope?

I loved intern year — we are finally getting to do what we love! Just try and be the nicest and hardest working person in the room; if you do this, intern year will be great! Work out! Run, lift weights, swim, hike as much as you can. Don't fall victim to the intern 15lb. Trust me, you will have more energy and feel better if you work out and eat healthy.

If you knew then what you know now, what would you do differently?

I would have paid more attention to my ED upper levels regarding how they manage critical patients.

Best advice for the new interns?

Don't act like you know everything — people know you don't, so don't act like it! Ask questions of everyone (attending, co-residents, nurses, techs, radiologists, etc.). The more questions you ask the better your first year will go. If you think, "Maybe I should do this for the patient, but I'm busy — it can wait" STOP and do it. Cutting corners as an intern to save time will bite you every single time — *patients* come first, NOT your off-service upper level resident. Have FUN! And make sure to make time for all the other activities you love in life.

Linelle F. Campbell, MD, MS

PGY2, Jacobi/Montefiore

What did you expect your first month of residency to be like?

I had heard some horror stories about the first month of residency, not specifically my program, but just in general. I thought I would be expected to know everything about every disease that could possibly walk through the door. I thought I would get pimped and hazed. I thought the nurses would ignore me. I thought after my first week my program director would send me an email saying they made a mistake and would need me to resign immediately.

What was it actually like?

It was the complete opposite. My senior residents were extremely helpful from my first shift. They gave me the rundown of how the department worked, showed me how to use the EMR, and gave many useful tips on how to be efficient. My attendings also made me feel very supported. When they realized I didn't know where something was or who to ask or even how to put in an order they always took the time to show me. One thing I struggled with was learning

how to write my notes effectively and with proper documentation. I didn't realize how this can determine if you leave on time or stay late. I also had to learn how to prioritize tasks that needed to be done for my patients and how to and who to ask for help. One thing that was an adjustment was the level of exhaustion I felt. While on shift I felt I had a lot of energy and rarely felt tired, but as soon I came home I just jumped in bed and went straight to sleep. There were definitely some weeks where I felt all I was doing was working and sleeping and didn't have time for much else.

How did you cope?

One way I coped with trying to become more efficient was watching how my seniors prioritized. I also asked them to show me how they prioritized things that needed to be done for their patients. As far as time management, I made sleep a priority when I was working back-to-back shifts. On my days off I made sure to meal prep. When I had consecutive days off I would use one day to meal prep, do laundry, clean, run

errands, and then I would use the next day to do something fun like go to movies, hang with friends, do something outdoors.

If you knew then what you know now, what would you do differently?

I wouldn't be so hard on myself. As people in medicine we inherently hold ourselves to very high standards which can cause us to get easily disappointed when we don't meet those high expectations.

Best advice for the new interns?

Residency is hard, but remember many other have been through it before you and made it out. You have to wake up every day and be thankful for the opportunity you have been given. Work as hard as you can, be open to learning, be nice to everyone — nurses, clerks, housekeeping. If you don't know how to do something, ask. Get your rest, take care of yourself- eat well, exercise, continue to do the things you like outside of medicine. Finally — invest in blackout curtains and a good mattress. ★

Try to focus on the medicine and the rest will fall into place.

EMOTIONAL INTELLIGENCE

in the Emergency Department



Stephen Donnelly, MD

Christiana Care Health System

Brian Levine, MD, FACEP

EM and EM/FM Program Director
Christiana Care Health System

Daily life in the emergency department is engulfed with teamwork, delivering bad news, and encountering challenging patients and personalities. Performing at a high level in this environment can be mentally, emotionally, and physically taxing. To address this demand, there is a skill that forms one of the cornerstones of a successful emergency physician: emotional intelligence.

Emotional intelligence (EI), as defined by Adele Lynn, is the “ability to manage ourselves and our relationships with others so that we can live our intentions.”¹ Our ultimate intention in emergency medicine is to improve the wellbeing of patients. If it is recognized that this desired outcome is not solely dependent on our cognitive abilities (medical knowledge, procedural skills, and understanding of the most up-to-date evidence based medicine), the role of EI becomes clear. EI involves making choices about how to respond to our feelings in relation to others’ behaviors and feelings. If our cognitive abilities and EI are combined, we can navigate an ever-changing and demanding environment to successfully achieve our ultimate intention.

While many books and research papers have explored the details of EI,

you can apply these 5 basic tenets of EI during your next shift:¹⁻²

- ❶ Self-awareness and self-control
- ❷ Empathy
- ❸ Social expertness
- ❹ Personal influence
- ❺ Mastery of purpose and vision

Self-Awareness and Self-Control

While these components build off of each other, they all start with self-awareness and self-control. In fact, this first component can be utilized on a daily basis. We all know of a patient (co-worker, boss, administrator) who, as soon as we encounter them, makes our stomachs sink while we silently plead “Not again!” If we are self-aware, it allows us to examine why this feeling exists, providing reflection on what is *actually occurring* versus what we *feel*. It then becomes our choice to use this new understanding to reframe our thoughts and actions.

This change in approach helps realign a potentially negative encounter with our true intention. If this does not occur, we are at risk of “emotional hijacking,” which is when an emotion prevents us from communicating and achieving our true intentions.¹ In the ED, this may come in the form of a demanding chronic pain patient, upset family members, or a skeptical consultant. With a combination of self-awareness and self-control in the ED, emotional hijacking can be minimized.

Social Awareness

The next two components, empathy and social expertness, can fall under a broader category, “Social Awareness.”² These two components mold well together, as they both relate to relationships and build directly off self-awareness and self-control. Once we are able to understand our own emotions, our next goal is being able to understand and relate to others’ emotions — in other words, developing empathy. This will lead to “social expertness,” which exists when all parties involved can share both positive and negative feedback in a healthy manner. These types of relationships can be fostered in many ways, such as active listening, intentionally expressing gratitude, seeking out an empathetic mentor, offering an unexpected act of service, or getting others to talk more about themselves.¹

Relationship Management

Finally, the last two EI components, personal influence and mastery of purpose and vision, fall under a broader category, “Relationship Management.”² Once relationships are created, the goal is to positively influence others, enact change, and continue to pursue and refine intentions.¹

The more EI is crafted and perfected, the more self-aware we become. This increases our ability to lead and positively affect the dynamic and often stressful ED environment to reach our ultimate intention — improving the wellbeing of patients. ★

References available online.



IT'S TIME TO
STAND OUT!



EMRA Residency Program Fair

Sunday, September 30
2:30 p.m. - 4:30 p.m.

Are you a medical student looking to do a little reconnaissance to help better prepare for the interview trail? With close to 150 residency programs in attendance, here is an opportune time to get a head start on the process. Save yourself time and money by doing some early prep.

EMRA Job & Fellowship Fair

Monday, October 1
5:00 p.m. - 7:00 p.m.

Looking for the next opportunity after you graduate? Don't miss the largest recruiting event in emergency medicine with nearly 250 organizations from all over the United States. This is your chance to network and find your dream position.

Exhibitor Registration Now Open!

emra.org/exhibitors

Need more information?

James Bryant
jbryant@emra.org
469.499.0187



My Brain Hurts

Applying Cognitive Load Theory to Emergency Medicine Handoffs

Danielle Miller, MD

Northwestern Memorial Hospital
@DTMillerMD

Matthew Klein, MD

Northwestern Memorial Hospital
@MKleinMD

Have you ever been on a shift in the ED and thought, “My brain hurts,” or, “If I put one more detail in my brain, it may explode?”

Emergency medicine requires synthesizing large amounts of data in a short amount of time for multiple patients. Think of a busy post-overnight sign-out, when multiple patient-care plans need to be safely communicated from one team to the other. Why are these handoffs so difficult? Is there some theory

that may illuminate this phenomenon and provide ways to improve it?

What is Cognitive Load Theory?

Cognitive load theory (CLT) was initially developed in the 1980s from research in cognitive psychology. Much of the research in CLT involves working memory, which is the memory required for operating a current task. Working memory holds information for a few seconds. Almost all information in your working memory is lost after 20 seconds unless the information is rehearsed. This type of memory is limited and can hold no more than 5–9 information elements (think of memorizing a phone number, ie, 7+/-2). Working memory is critical to

completing a successful handoff, but it can be easily overwhelmed.

Working memory is impacted by 3 different types of cognitive load:

- **Intrinsic load:** the load associated with performing the task itself, such as communicating the names, comorbidities, and plans for patients at sign-out. The goal in a handoff is to manage intrinsic load.
- **Extraneous load:** the load associated with non-essential aspects of the task, such as what is happening in the environment at sign-out or what is happening in someone’s personal life. The goal in a handoff is to *reduce* extraneous load.

- **Germane load:** the load associated with synthesizing the information gathered and developing long-term memories. The goal in a handoff is to *optimize* germane load.

Strategies to Manage Intrinsic Load in the ED Handoff

Reducing the number of information elements decreases intrinsic load. For example, learning about 20 patients and their comorbidities during sign-out causes a greater load than learning about 10 patients. In the ED, it is difficult to control the number of patients requiring sign-out. However, discharging individuals prior to sign-out and listing only the critical comorbidities for each patient when signing out will reduce information elements and thus reduce cognitive load.

Setting an appropriate amount of time for the handoff reduces intrinsic load. For example, rapid handoff and decision-making consumes more working memory than a handoff allotted adequate time to access necessary patient information. Again, this is difficult to control in the ED, but

allowing sufficient time for sign-out is key.

Reducing element interactivity, or how information elements interact with each other, reduces intrinsic load. The more the elements interact, the greater the intrinsic load. The goal, then, during handoff is to attempt to limit uncertainty and give contingencies. For example, one could say, “If the RUQ is normal, I would then consider PE as the cause of the patient’s pleuritic pain and send a dimer.”

Strategies to Reduce Extraneous Load in the ED Handoff

Minimizing interruptions during sign-out reduces extraneous load. It is difficult to control the physical environment and distractions in the ED, but a culture of limited interruptions during handoffs decreases this cognitive load.

Minimize personal distractions during handoffs as well. Trying to avoid stressful emails before shift or turning off personal phones during sign-out are examples of how to reduce this load.

Strategies to Optimize Germane Load in the ED Handoff

Asking clarifying questions and summarizing data optimizes germane load by rehearsing and synthesizing information. Thus, encouraging clarifying questions during handoff would be a strategy for improvement. Additionally, having the incoming physician repeat a summary at the end of sign-out may also prove useful.

Conclusion

Cognitive load theory gives a framework for illuminating why handoffs can be challenging in the ED. Working memory is the memory utilized during handoffs. Working memory is limited and influenced by intrinsic, extrinsic, and germane cognitive loads. By implementing strategies to manage intrinsic load, reduce extraneous load, and optimize germane load, ED physicians can create more successful handoffs.

Note: For more advice on effective patient handoffs, watch “Transitions of Care,” a video collaboration between EMRA, CORD, CDEM, and SAEM: <https://www.emra.org/students/advising-resources/transitions-of-care>. ★

Courses | Labs | Exhibits | Parties | Networking Events | And More...

acep Scientific Assembly **18**
SAN DIEGO, CA

October 1-4, 2018
REGISTER NOW FOR ACEP18
AND JOIN US TO CELEBRATE 50 YEARS!
Use promo code* **MARINA** to SAVE \$100
acep.org/acep18

**American College of
Emergency Physicians®**
ADVANCING EMERGENCY CARE

Approved for AMA PRA Category 1 Credit™ *Code valid until August 31

Modern Trends in Blast Injuries

Kristen Whitworth, DO
Lakeland Health
@kwhit_EM

Tiffany Proffitt, DO
Lakeland Health
@ProMammaDoc

Jesse Kellar, MD, MBA
Assistant Program Director, Lakeland Health
@emempathy

You are working the night shift in a small community hospital when you get a call from EMS. There has been a large explosion at a nearby nuclear power plant, and there are multiple casualties. Are you prepared?

Blast injuries are a subset of trauma with a unique spectrum of injuries. While historically blast injuries were primarily encountered in the military, they are becoming more common in civilian life secondary to an increase in domestic and international terrorism attacks. Unrelated to terrorism, there is always the potential for explosions in our communities from neighboring nuclear power plants, chemical production facilities, or illegal drug production. It is important for emergency physicians to be aware of the types of injuries that can be sustained from explosions and be prepared to treat these injuries, as there is no way to predict when they will be encountered (Table 1).

TABLE 1. Blast Injury Categories

Category	Mechanism	Injuries
Primary	Direct effect of the blast wave	Concussion, globe rupture, bowel perforation, tympanic membrane (TM) rupture, middle ear injury and blast lung injury
Secondary	Impact of airborne debris from the blast wind	Penetrating or blunt trauma
Tertiary	Victim being thrown by the blast into an object or from structural collapse	Blunt trauma, crush injuries, fractures, amputations, or head injuries
Quaternary	All other injuries	Burns, radiation exposure, inhalation injury, chemical exposure, asphyxia, and exacerbation of chronic disease

Explosives

High order explosives are categorized as military quality and are manufactured (TNT, C-4, and dynamite). These explosives produce a supersonic over-pressure shock wave. Low order explosives, including gunpowder, do not produce this pressure wave. The severity of injuries is determined by the explosion’s location, type, and amount of explosive used, proximity and position of victims in relation to the blast, and explosion occurrence in an open or closed space.

Categories of Injuries

Blast injuries fall into 4 categories — and patients can suffer more than 1 type of blast injury.

Primary injuries are a direct effect of the blast wave from a high order explosive (Figure 1). These injuries are secondary to the rapid air pressure changes and occur at air/fluid interfaces and in gas containing organs. Examples include: concussion, globe rupture, bowel perforation, tympanic membrane (TM) rupture, middle ear injury, and blast lung injury. Blast lung injury results from tearing of the alveolar-capillary interface, presenting similar to acute respiratory distress syndrome (ARDS) or contusion, with a mortality rate of up to 70%.¹ Complications include hemothorax, pneumothorax, and air embolism from pulmonary lacerations.

Secondary injuries are caused by the impact of airborne debris from the blast wind (Figure 2). These injuries include penetrating and blunt trauma, and they comprise the majority of the injuries of patients presenting to the ED.²

Tertiary injuries are caused by a victim being thrown into an object by the force of the blast, or from structural collapse (Figure 3). These injuries may present as blunt trauma, crush injuries, fractures, amputations, or head injuries. Complications include rhabdomyolysis, compartment syndrome, and acute kidney injury.



FIGURE 1. Primary blast injuries can lead to hemothorax, pneumothorax, air embolism.

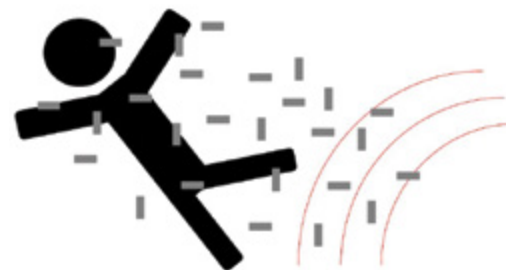


FIGURE 2. Secondary blast injuries include penetrating and blunt trauma.

FIGURE 3. Tertiary blast injuries can lead to rhabdomyolysis, compartment syndrome, acute kidney injury.



Quaternary injuries comprise all other injuries, including burns, radiation exposure, inhalation injury, chemical exposure, asphyxia, and exacerbation of chronic disease (Figure 4). Decontamination is of the utmost importance with chemical or radiation exposure.

FIGURE 4. Quaternary blast injuries include a range of presentations.



Triage Challenges

Triage after an explosion is unique, as approximately 50% of victims will arrive in the emergency department within the first hour after detonation.^{2,3} This first wave is composed of the “walking wounded” — or the less seriously wounded victims who bypass EMS and present to the hospital by other means of transportation. The initial number of victims seen can help you estimate the remaining casualties and plan for further resources.

Assessment

ATLS protocol should be followed for victims presenting to the emergency department. Secondary and tertiary surveys should focus on ENT, ocular, and neurological examination as secondary and tertiary injuries may distract from primary blast injuries.

While classically taught that blast victims with an intact TM are at low risk for primary blast injuries, one study found that an intact TM missed up to 50% of patients with PBI to the lung.⁴ A perforated TM should raise suspicion for additional primary blast injuries. Patients presenting with complaints of chest pain or shortness of breath should receive a chest x-ray to assess for blast lung injury. If there is evidence of blast lung injury, provide supplemental oxygen as needed and be cautious with fluid administration to avoid fluid overload. Positive pressure ventilation should be avoided if possible, however if necessary, small tidal volumes and low pressures are preferred to decrease risk of pneumothorax or arterial air embolism.⁵

Conclusion and Take-Home Points

Follow ATLS.

Don't forget to decontaminate.

Patients suffering primary blast injury are more likely to have greater injuries from secondary and tertiary injuries.

Secondary blast injuries comprise the majority of the injuries.

Don't take an intact TM for granted. ★

Stroke or vertigo?
If emergency patients
guess wrong, Anthem Insurance
could send them the bill.

Help us fight this unlawful practice
at faircoverage.org.

 American College of
Emergency Physicians®

ADVANCING EMERGENCY CARE 

Cervical Collar

FRIEND OR FOE?

Tim Montrief, MD, MPH

Jackson Memorial Hospital

@EMinMiami

Most emergency medicine systems (EMS) around the world apply semi-rigid cervical collars routinely to all injured patients with a significant mechanism of injury. While placing these patients in cervical collars is one of the most common interventions performed by EMS providers, the science behind this practice is limited, and the consequences may not always be beneficial. Re-evaluation of routine cervical spine immobilization is challenging the current dogma.^{1,2}

Benefits of Cervical Spine Immobilization

The concept of cervical spine immobilization was developed as a mechanism to keep the spine in neutral alignment after a suspected injury and to prevent further harm by immobilizing a potentially unstable injury. This practice has been adopted by the American College of Surgeons, which recommends immediate neck immobilization for all trauma patients, since all are considered to be at risk of cervical spine injury.³ However, the evidence behind this practice originated from expert and consensus opinion after minimal studies performed in hospital-based spinal units at a time when EMS and trauma systems were in their infancy.⁴⁻⁶ While efficacy of cervical spine immobilization has never been examined in actual trauma patients, there remains a limited number of studies examining spine movement in a simulated environment. For example, one study used healthy volunteers and measured their neck movements in a variety of immobilization devices. Results showed that sandbags, rigid collar, and tape were the most effective form of neck immobilization.⁷ Overall, there doesn't seem to be any clear evidence available to support the use of cervical collars — the benefit seems to be largely theoretical.

Risks of C-Spine Immobilization

Although the data describing the benefits of spinal immobilization is limited, several studies have questioned the near-universal use of c-collars given that the overall incidence of cervical spine injury in trauma patients is low. In two studies on trauma patients who were considered at high risk for head and neck trauma, there was an overall incidence of 0.7% for significant cervical spine injury.^{8,9} Furthermore, multiple studies have shown that cervical collars do not restrict neck movement, but allow for approximately 30 degrees of flexion/extension/rotation.^{10,11}

Likewise, immobilization has not been shown to affect the incidence of neurological injuries in patients with cervical spine trauma. In a 4-year prospective patient cohort with confirmed cervical vertebral injury, 8% of patients did not have their spine immobilized — resulting in no clinical consequences or progress to neurological deficits.¹² In a recent study comparing the incidence of neck injuries in a first-world country in which cervical collars are almost universally applied, to a third-world country that does not use cervical collars, there was less neurologic disability in the non-immobilized patients.¹³ While there are numerous flaws in this study, we would still expect to see a sharp rise in the number of secondary spine injuries in the non-immobilized patients, but that was not found. Finally, there is a growing body of literature showing that cervical collars are downright harmful,¹⁴ as they increase aspiration risk,¹⁵ make airway management more difficult,¹⁶ and increase intra-cranial pressure (ICP) by reducing venous return.^{17,18}

Current Recommendations

Within the guidelines from the American College of Emergency Physicians, the American Association for Neurological Surgeons, the National



Registry of Emergency Medical Technicians, and the Congress of Neurological Surgeons, there is a clear consensus in recommending spinal immobilization of all trauma patients with a known or suspected cervical spine injury in the prehospital setting.¹⁷⁻¹⁹ Additionally, multiple guidelines recommend utilizing clinical decision tools — the NEXUS criteria or the Canadian C-spine rule — to guide cervical spine immobilization use and recommend that the fully awake and communicable patients who are not intoxicated, without neck pain or tenderness, without distracting injuries, and are neurologically intact should not be immobilized.

These guidelines are generally in line with the ACS policy statements as well as the growing body of pre-hospital literature and management guidelines for cervical spine injuries, as they all state that collars are effective in limiting motion of the cervical spine and should therefore be used until the patient is properly assessed and the cervical spine is cleared.

Conclusions

Cervical spine immobilization has long been a staple of out-of-hospital medicine. It has been instituted as a necessity of prehospital management though benefits of universal immobilization are unclear and potential harm has been demonstrated. While guidelines continue to support cervical spine immobilization, there is a growing body of literature challenging the current dogma and prompting re-evaluation of cervical spine immobilization. ★

SUPER-FAN LIFE

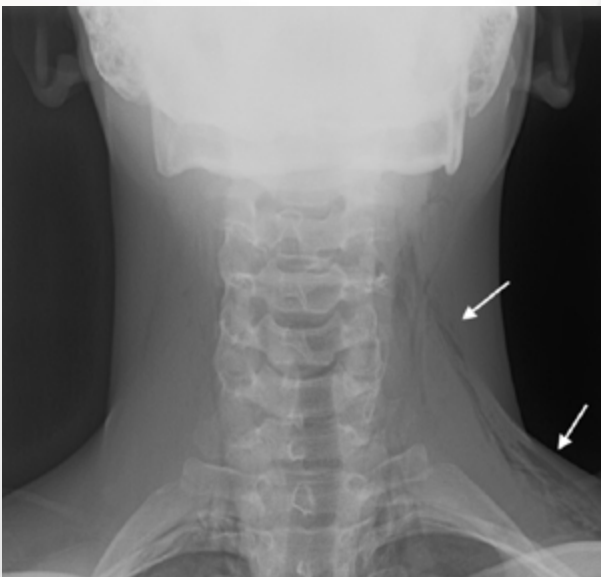
Super Bowl-induced Spontaneous Pneumomediastinum

Joshua Glick, MD

Hospital of the University of Pennsylvania

Brett Guido, MD

Hospital of the University of Pennsylvania



Chest and neck radiography (top and middle) and chest CT (bottom) reveal pneumomediastinum.

Case Report

A 21-year-old male presents to the emergency department with one day of neck discomfort and right-sided pleuritic chest pain. The patient had been celebrating the victory of a local sports team by screaming outdoors for several hours, at which point he had the sudden onset of an uncomfortable sensation in his neck and chest.

He denies trauma, tobacco or recreational drug use, repeated episodes of vomiting, recent illnesses, or a history of lung disease. His examination is notable for crepitus along the lateral neck and a faint “crunching” sound heard on cardiac auscultation.

Discussion

Spontaneous pneumoediastinum, also known as Hamman’s Syndrome, occurs when air leaks through the alveolar structures and dissects back through the bronchovascular sheath and into the mediastinum.

The most common causes include exacerbations of chronic lung diseases and lower respiratory tract infections, but repeated Valsalva maneuvers (such as coughing or screaming) and the inhalation of helium gases or drugs are less common etiologies.

Patients typically present with chest and neck pain, dyspnea, and a dry cough. Common exam findings include subcutaneous air in the neck and a crunching sound heard over the precordium, also known as Hamman’s Sign. Most patients without underlying lung disease and uncomplicated spontaneous pneumomediastinum do well with conservative management.

Conclusion

Our patient was ultimately discharged home with plans to follow-up in one week for resolution of symptoms. ★

Spontaneous pneumomediastinum is a rare clinical entity defined as the presence of free air in the mediastinal structures without an apparent cause such as trauma.

The Use of the Angiocatheter in Central Line Insertion

THE ADVANTAGE AND THE TECHNIQUE

Danielle Miller, MD

Northwestern Memorial Hospital

Two techniques are currently utilized for guidewire insertion during central venous catheterization: introducer needle and angiocatheter over an introducer needle. But is one technique truly better than the other?

Introducer Needle

The vein is cannulated with the introducer needle, and the guidewire is directly passed through the hollow needle and into the vein. The disadvantage to this technique is that it requires the proceduralist to hold the needle steady as the guidewire is being introduced into the needle and subsequently the vein, resulting in the possibility of needle migration out of the vessel during guidewire insertion.

Angiocatheter Over an Introducer Needle

The vein is cannulated with the angiocatheter device, and the angiocatheter is threaded over the introducer needle into the vein. The needle is removed, and then the guidewire is inserted through the angiocatheter. The advantage to this technique is that it may provide more stable venous access during guidewire

insertion and subsequently reduce the possibility of posterior wall puncture. The angiocatheter also facilitates using manometry to ensure the cannula is inside the vein and not the artery, particularly in situations where ultrasound cannot be utilized, such as subclavian central line placement.

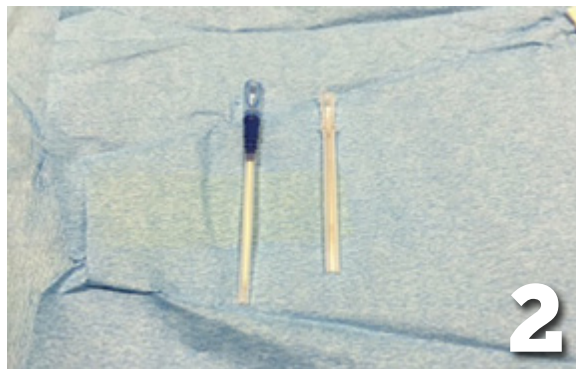
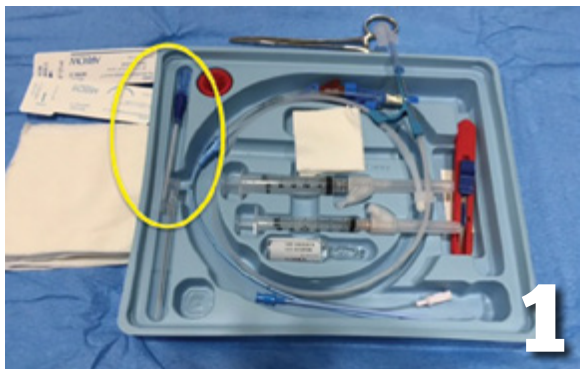
Which Is Better?

Multiple studies have been performed to analyze this question in anesthesiology literature, but no studies have been performed in emergency medicine literature. Song et al. randomized pediatric patients undergoing surgery to either the use of an introducer needle alone versus the angiocatheter-over-introducer needle.¹ In this study, both resident and attending anesthesiologists who had performed more than 50 central line insertions performed right or left internal jugular central venous catheterizations under ultrasound guidance. Ultimately the angiocatheter technique showed no superiority over using the introducer needle.

Two other studies by Lee et al. and Kim et al. used similar methods in adults. Lee et al. concluded that the rate of successful guidewire insertion on the first attempt was higher in the introducer needle group compared with the cannula-

over-needle group (87.3% vs. 77.3%; $p = 0.037$).² There were no significant differences in major complications. In the Kim et al. study, the introducer needle alone showed superiority.³ First-pass success rate was higher in the needle group compared with the catheter group (62.0% vs. 35.4% ($p < 0.001$), and the incidence of complications was significantly lower in the needle group compared with the catheter group (5.8% vs. 15.5%, respectively, $p = 0.001$).

While these 3 studies have concluded that the angiocatheter technique is not superior and may even be inferior to the introducer needle, there is still a role for using the angiocatheter. Arguably the angiocath may be most beneficial for early learners. In all 3 of the studies, the proceduralist was a skilled anesthesiologist who had performed 50+ lines, presumably using the traditionally taught Seldinger technique with the introducer needle alone. However, one of the most difficult steps in central line placement for beginners is keeping the introducer needle steady and threading the guidewire into the vein. The angiocath requires little skill to thread, and once the catheter is in, threading the guidewire is easy.



HOW TO PERFORM THE PROCEDURE

- 1** Start the central line as usual. Wash your hands and don personal protective equipment. Prep the patient's skin, create your sterile field, anesthetize the patient, and prep the central line kit. In the picture of the central line kit, the angiocath is circled in yellow.
- 2** Select the angiocatheter introducer needle, which is on the left in this picture. On the right is the regular introducer needle.
- 3** Cannulate the vessel with the angiocatheter introducer needle, which can be confirmed by a flash of venous blood and on ultrasound. From personal experience, the angiocatheter introducer needle appears less echogenic on ultrasound than the regular introducer needle.
- 4** Holding the introducer needle steady, thread the catheter over the needle, until the catheter hub is flush with the skin
- 5** Remove the introducer needle. *Optional step:* Now that you have stable venous access the angiocatheter can also facilitate venous confirmation with tubing used as a manometer.
- 6** Insert the guidewire into the catheter. Thread the guidewire.
- 7** Once the wire is threaded, remove the angiocatheter.
- 8** Continue the rest of the procedure as usual. Nick the skin with a scalpel, insert and remove the dilator, insert the multi-lumen catheter. Once the central line is in place, flush all ports, suture, and dress the line. Finally, confirm placement with chest x-ray. ★





Hepatic Syndromes

Josh Glick, MD

University of Pennsylvania

Clinton Orloski, MD

Critical Care Medicine Fellow

University of Washington

Stephen Hallisey, MD

University of Pennsylvania

One of the top 10 leading causes of death in the United States, cirrhosis is defined as the end result of progressive hepatic fibrosis, most commonly due to infection (viral hepatitis) or long-term alcohol use. Cirrhosis is characterized by the progressive destruction of the underlying hepatic architecture, followed by the eventual loss of intrinsic function and an increase in portal venous pressures. Chronic increases in portal pressures lead to the majority of emergent complications due to cirrhosis, such as variceal bleeding, refractory ascites, hepatic encephalopathy, and spontaneous bacterial peritonitis (SBP). These conditions are frequently the cause for ED presentation, and standardized management guidelines are well-established.

While many of these complications are widely known and frequently recognized in the ED, hepatic dysfunction and increasing portal pressures can have additional effects on several other organ systems. These interactions, namely the hepatorenal and hepatopulmonary syndromes, can be easily diagnosed by initial clinical exam and laboratory findings. Prompt recognition and treatment of these conditions from within

the ED can have a profound downstream impact on morbidity and mortality. This article will review these conditions and highlight key management strategies to streamline and improve downstream evaluation and care.

Hepatorenal Syndrome

Hepatorenal syndrome (HRS), characterized by renal failure and major impairment in circulatory function, is a common complication of advanced cirrhosis and fulminant liver failure. In one prospective study of 229 patients with cirrhosis complicated by ascites without elevation in their BUN, 18% had HRS at 1 year, and 39% had HRS at 5 years. The pathophysiology of HRS is defined by the derangements of vasoconstriction and vasodilation that occur in advanced cirrhosis. Increased intrahepatic resistance and portal hypertension leads to an increased production of vasodilators within the splanchnic circulation, and subsequent dilation of both the splanchnic and systemic circulation as well as a low effective circulating blood volume. These effects cumulatively result in activation of the renin-angiotension-aldosterone system, increased cardiac output, and intense renal vasoconstriction, leading to renal failure and sodium retention, both hallmarks of HRS.

There are two types of HRS, classified based on the onset of renal failure. Type 1 HRS is characterized by rapid, progressive renal failure defined by a doubling of the serum creatinine to a level

greater than 2.5 in less than 2 weeks and occurs as the result of a precipitant, such as SBP and/or GI bleeding. Type 2 HRS is a more gradual and less severe form of renal failure.

Diagnosis

Diagnosis of HRS can be challenging and is based on clinical findings. The ED clinician should consider HRS in patients presenting with stigmata of liver disease (spider angiomas, ascites, clubbing) and new or worsening renal failure as defined by rising creatinine and blood urea nitrogen (BUN). Importantly, HRS is a diagnosis of exclusion and can only be made once other etiologies of renal failure have been ruled out. Workup should be broad to exclude other etiologies of renal failure including infection, systemic shock, use of nephrotoxic drugs, and presence of proteinuria or hematuria.

Treatment

Management of HRS focuses on reversal of kidney injury by improving renal blood flow through the use of vasopressors and albumin.

In patients who do not require ICU level of care, **midodrine, octreotide, and albumin have shown a mortality benefit and resolution of HRS.** Terlipressin, a vasopressin analogue, has been shown to be effective in the treatment of HRS, but is currently not available in North America.

For patients who require ICU level care, norepinephrine has also been shown to improve survival. Transjugular intrahepatic portosystemic shunt (TIPS)

may have a role in treating HRS, but data is limited and more studies are needed.

Ultimately, liver transplant is the treatment of choice.

Hepatopulmonary Syndrome (HPS)

Hepatopulmonary Syndrome (HPS) is the triad of liver disease, hypoxemia, and evidence of intrapulmonary vasodilation. In patients with liver disease, intrapulmonary vasodilatation is qualitatively identified through contrast enhanced echocardiography (“bubble study”) where agitated saline is injected through a peripheral vein and identified in the left atrium within 3-6 cardiac cycles. The severity of HPS is based on the degree of hypoxemia as measured by the partial pressure of arterial oxygen in patients with an elevated alveolar-arterial (A-a) oxygen gradient.

The prevalence of HPS varies depending on study site, with a reported average of approximately 25% of patients with chronic liver disease developing the syndrome. A majority of patients with HPS have underlying chronic liver disease with cirrhosis and portal hypertension; however, the criteria for HPS can be met

with acute liver failure and ischemic hepatitis as well as in patients without evidence of portal hypertension or cirrhosis. The severity of liver disease is not correlated to the development of HPS.

The underlying pathogenesis of HPS is not well understood. The prevailing theory is that liver disease increases the risk for bacterial translocation and endotoxin release, leading to both increased production and decreased clearance of pulmonary vasodilators such as nitric oxide. Inhibition of hypoxic pulmonary vasoconstriction due to dilatation of pulmonary precapillary and capillary vessels is a defining feature of HPS leading to ventilation-perfusion mismatch. Diffusion limitation and, in some cases, intrapulmonary shunting are other pathophysiologic changes that occur in HPS.

The ED clinician should consider HPS in patients presenting with stigmata of liver disease, dyspnea, and hypoxemia. **Patients may experience increased dyspnea (platypnea) and worsened hypoxemia (orthodeoxia) upon sitting upright from the supine position.** Workup should be broad and

include arterial blood gas analysis, chest radiography, and consideration of other etiologies for an increased A-a gradient, including pneumonia, cardiogenic pulmonary edema, pulmonary embolism, atelectasis, and pleural effusion.

There is no medical treatment available for HPS at this time. Supplemental oxygen is used to maintain saturations until liver transplantation can be performed. Even after transplant, resolution of arterial hypoxemia can take months.

Conclusion

Despite improvements in recognition and optimization of medical management, the ultimate prognosis of HRS remains poor. In one series, patients with type 1 HRS had a median survival of 1 month, and type 2 patients had a median survival of 3 months if their MELD was >20, and 11 months if MELD was <20. Mortality even after transplant is also known to be higher in patients who have developed both types of HRS.

On the other hand, patients with HPS undergoing liver transplant have a similar 5-year mortality compared to individuals without HPS going into transplant. *

FIGURE 1. Overview of HRS vs. HPS

	Hepatorenal Syndrome	Hepatopulmonary Syndrome
Clinical Presentation	<ul style="list-style-type: none"> — Cirrhosis with ascites — New Degree of renal failure — Absence of shock, active diuresis, hypovolemia, nephrotoxic drugs, nephrotic syndrome, glomerulonephritis 	<ul style="list-style-type: none"> — Liver dysfunction (chronic > acute) — Orthodeoxia (hypoxemia worsened with sitting upright) and platypnea (dyspnea worsened with sitting upright)
ED Lab/ Imaging Findings	Increase in serum creatinine of 0.3 mg/dL (26.5 micromol/L) or more within 48 hours — OR— Increase creatinine from baseline of 50% or more within 7 days <i>*ED workup should exclude other etiologies for acute kidney injury.</i>	While breathing ambient air: — Elevated A-a oxygen gradient ≥ 15 mmHg — OR— P_aO_2 of <80 mmHg <i>*ED workup should exclude other etiologies for dyspnea/hypoxia.</i> <i>**To confirm diagnosis, must have evidence of pulmonary vascular dilatation on contrast enhanced ECHO or radioactive lung-perfusion scanning</i>
Classification	Type 1 HRS: doubling of serum creatinine to a level greater than 2.5 in less than 2 weeks Type 2 HRS: more gradually progressive increase in creatinine	Mild: $P_aO_2 \geq 80$ mmHg Moderate: $P_aO_2 \geq 60$ to <80 mmHg Severe: $P_aO_2 \geq 50$ to < 60 mmHg Very Severe: $P_aO_2 < 50$ mmHg
Treatment	Midodrine (7.5-15 mg TID) with octreotide(50 mcg/hr) and albumin (1g/kg/day up to 100 g for 2 days, followed by 25-50 g/daily), norepinephrine (titrate to increase in MAP of 10), TIPS, liver transplant	Supplemental O2, liver transplant

Recanting Impressions

Posterior Sternoclavicular Joint Dislocation

Richard L. Grantier III, MD

EMRA Sports Medicine Committee Chair
University of Mississippi

Puja Craddock, MD

Assistant Professor, Dept. of Pediatrics
University of Mississippi

An 11-year-old male presents to the ED with inability to move the right upper extremity because of pain. He was playing pick-up football at school about an hour prior to arrival. He tackled his opponent, and they both fell to the ground. The patient landed onto the point of his right shoulder with his opponent landing directly on top of him. Immediately, he noted significant pain in the right upper chest and shoulder that was exacerbated by any right upper extremity movement. His mother brought him to the ED for further evaluation and management.

On exam, his right upper extremity was maintained in flexion at the elbow and internally rotated, his left hand holding the right elbow in a stable position. He was noted to be in severe pain. He was neurovascularly intact with no dysphagia or dyspnea. His

lungs were clear to auscultation. Plain films of the chest, shoulder, clavicle, and humerus were obtained and showed no occult injury. (Figure 1, 2, 3, 4)

The patient was still in severe pain despite analgesia, so the decision was made to obtain a CT of the chest (Figure 5). The CT demonstrated a right posterior sternoclavicular (SC) joint dislocation. The clavicle was noted to be displaced posteriorly into the mediastinum. There was no evidence of vascular injury. A possible small cortical fragment avulsion of the anterior aspect of the proximal right clavicle was noted.

Clinical Picture

On inspection, posterior SC dislocations are usually more subtle than anterior SC dislocations. An anterior dislocation will most likely present with a bulge at the site, while a posterior dislocation will often be a minor depression. If the time between injury and presentation to the ED is delayed, more obvious swelling overlying the joint might be appreciated. A posterior SC dislocation is typically caused by indirect

lateral shoulder compression instead of direct impact at the joint. Our patient's injury was caused by an indirect lateral compression at the shoulder.

Most patients will not want to move their upper extremity because of pain at the SC joint.¹ They must be evaluated for severe life-threatening findings such as aerodigestive and neurovascular compromise. This manifests clinically as stridor, dysphagia, shortness of breath, sensation loss, and pulse deficits.

The SC joint is the only true articular joint between the arm and the axial skeleton.² It participates in all movements of the upper extremity. So, any movement at the shoulder will elicit pain when this joint is disrupted. In addition, patients often do not tolerate lying supine because of pain.

Because of the vital structures that lie posterior to the medial clavicle (the innominate artery, innominate vein, brachial plexus, trachea, superior lung, esophagus, and thoracic duct), a posterior sternoclavicular joint dislocation makes this a true orthopedic emergency.



FIGURE 1. Normal CXR. No acute cardiopulmonary abnormality. No fracture or dislocation seen. Repeat Impression: In retrospect, there is a slight offset of the medial clavicles at the sternoclavicular joint, which was subsequently proven to represent a right posterior sternoclavicular dislocation by CT.



FIGURE 2. Right Clavicle XR
No definite fracture. Bone alignment maintained.

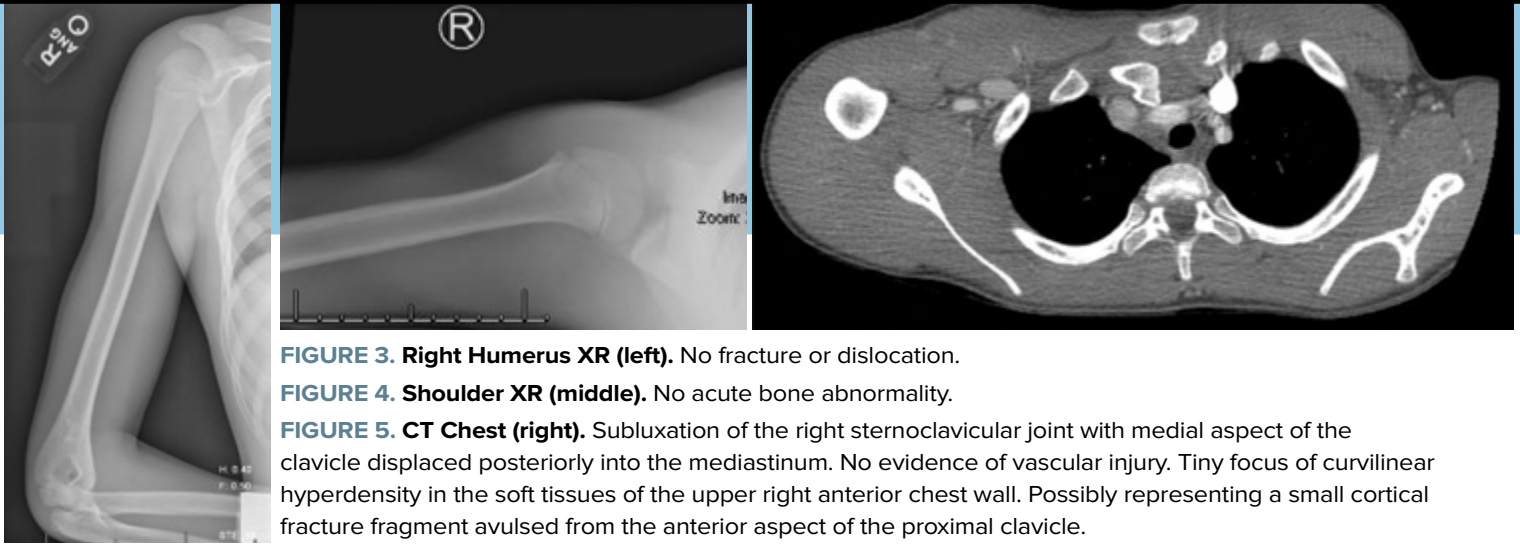


FIGURE 3. Right Humerus XR (left). No fracture or dislocation.

FIGURE 4. Shoulder XR (middle). No acute bone abnormality.

FIGURE 5. CT Chest (right). Subluxation of the right sternoclavicular joint with medial aspect of the clavicle displaced posteriorly into the mediastinum. No evidence of vascular injury. Tiny focus of curvilinear hyperdensity in the soft tissues of the upper right anterior chest wall. Possibly representing a small cortical fracture fragment avulsed from the anterior aspect of the proximal clavicle.

Imaging Difficulties

This case highlights the difficulty of seeing a posterior sternoclavicular dislocation on plain films. Radiographs have low sensitivity, but are important for ruling out a pneumothorax, pneumomediastinum, and hemopneumothorax. Sometimes, imaging can demonstrate the asymmetric and inferiorly displaced medial clavicle. However, as in our initial CXR (Figure 1), the displacement on plain films is not apparent. The repeat CXR impression was read as “In retrospect, there is a slight offset of the medial clavicles at the sternoclavicular joint, which was subsequently proven to represent a right posterior sternoclavicular dislocation by CT.” Again, this is common not to see a dislocation on an AP or PA view.

If CT or MRI are not readily available, then obtain a serendipity view. This is a plain film of the chest angled at 40 degrees cephalad. The preferred imaging would be an MRI/MRA or CT/CTA chest, depending on what is available at your site.³

Reduction

Consult Orthopedics immediately. If they are unavailable at your facility and the patient starts having aerodigestive or neurovascular compromise, then reduction should be attempted immediately in the ED.

First, obtain consent for the sedation and reduction, then sedate the patient.

Place the patient in a supine position with a rolled towel positioned between the scapula and the table. Have the affected

arm to the edge of the bed, abducted, use traction and countertraction. This is usually about 80% successful.² If this doesn’t work and you have Orthopedics available, then use sterile towel clips and apply percutaneously around the clavicle. Continue with anterior traction of the clavicle with countertraction of the upper extremity. Some sources recommend admission for observation due to potential injury to important structures if it dislocates again.⁴ Others recommend applying a post reduction figure-eight sling and follow up with Orthopedics in 4–6 weeks to allow for ligamentous healing.²

Another reduction technique in the literature is the Buckerfield and Castle. While shoulders are pushed posteriorly by an assistant, the ipsilateral arm is adducted against the torso and caudal traction is applied.

Important Facts

The superior mediastinum runs just posterior to the medial portion of the clavicles. Sternoclavicular dislocations account for less than 1% of all dislocation injuries. Although the diagnosis is rare, **if you have a patient presenting with a posterior sternoclavicular dislocation, the patient will have a 30% chance of developing life-threatening complications.**²

The SC joint has the least amount of bony stability of any major joint in the body, as less than half of the medial end of the clavicle articulates with the upper sternum. The medial clavicular epiphysis is the last epiphysis of the body to appear radiographically at 18 years old, and the last to close at the age of 22–25 years old.⁵ This

means younger patients are less likely to dislocate and more likely to fracture.

Pearls

Interestingly, on this patient there was a small cortical fracture fragment that had avulsed from the anterior aspect of the proximal right clavicle. The cortical fragment was likely present because the epiphyseal plate had not yet fused because the patient was 11 years old. As stated previously, the physis of the medial clavicle remains open until 22–25 years of age.⁵ One would think the patient would have a more pronounced fracture and not a dislocation due to the non-closure of the epiphysis.⁶ Thus, even in this age group (<18 years old) consideration of posterior sternoclavicular dislocation is critical for the differential diagnosis.

Case Conclusion

Our patient was taken to the operating room with Orthopedics and Cardiothoracic Surgery on standby. The patient underwent a successful reduction in the OR and has had no complications to date.

Take-home Point

If there is suspicion for posterior sternoclavicular joint dislocation, then obtain CT or MRI if available. If not, get a serendipity view. If Orthopedics is not available, consider options of reduction and attempt the closed reduction technique. If successful, place the patient in a figure-eight sling and have them follow up with Ortho in the next 4–6 weeks. If not, transfer the patient to a hospital with Orthopedics and Cardiothoracic Surgery consultants. ★

“Trapped Tap”

Considerations when Performing ED Thoracentesis

John Joseph, MD

University of Michigan

Mary Haas, MD

University of Michigan

Ivan Co, MD

Assistant Professor, Emergency Medicine

Assistant Professor, Internal Medicine,

Critical Care

University of Michigan

A 65-year-old female presents to the ED for worsening shortness of breath. She has a history of limited medical care and was recently diagnosed with widely metastatic breast adenocarcinoma after discovery of pulmonary embolism for which she has remained on enoxaparin. She has a history of malignant (fluid cytology positive) pleural effusion drained two weeks prior to presentation and discharged home on 5 liters (L) of oxygen via nasal cannula (NC). Her chief complaint on presentation was worsening dyspnea on exertion over the last several days.

On arrival to the ED, she was saturating 92% on 8L NC and then placed on heated high-flow nasal cannula (HHFNC). Workup was negative for acute coronary syndrome or metabolic derangements but did show a new anemia with hemoglobin 8.4 g/dL from 11.3 g/dL. Chest x-ray revealed large right and moderate left pleural effusions that were increased in size from prior as well as bilateral airspace opacities. She was unable to lay flat for CT and was declining intubation. She was started on empiric broad spectrum antibiotics for pneumonia and supplemental oxygen requirements continued to increase on HHFNC. The team was planning a diagnostic thoracentesis to evaluate for hemothorax given new anemia and consideration was also given to perform therapeutic thoracentesis to help improve her oxygenation.

Causes of Hypoxemia

This patient was suffering from acute on chronic hypoxemic respiratory failure. There are 5 mechanisms of hypoxemia to consider:

- 1. Decreased inspired partial pressure of oxygen (normal A-a gradient)** — Not a factor at sea level
- 2. Hypoventilation (normal A-a gradient)** — Lack of respiratory acidosis on blood gas suggested adequate minute ventilation
- 3. Diffusion limitation (elevated A-a gradient)** — Classically caused by pulmonary fibrosis with impaired gas exchange across the alveolar-capillary membrane
- 4. Right-to-left shunt (elevated A-a gradient + inability to achieve 100% S_pO_2 with 100% F_iO_2)** — Bedside echo with agitated saline showed no intracardiac shunt and CTA with contrast of the chest from month prior was without evidence of intrapulmonary shunt. Physiologic shunt was a possibility if hydrothorax causing compressive atelectasis.
- 5. V/Q mismatch (elevated A-a gradient)** — Patient had a history of PE as well as lung cancer, both of which can cause disruptions of normal V/Q ratio.

The patient was at risk for shunt and V/Q mismatch. To further investigate the presence of shunt physiology, an ABG before and after increase in supplemental oxygen (eg, nonrebreather at 15L should give roughly 80% F_iO_2) could have been used to evaluate the A-a gradient response. No change in the A-a gradient would suggest shunt

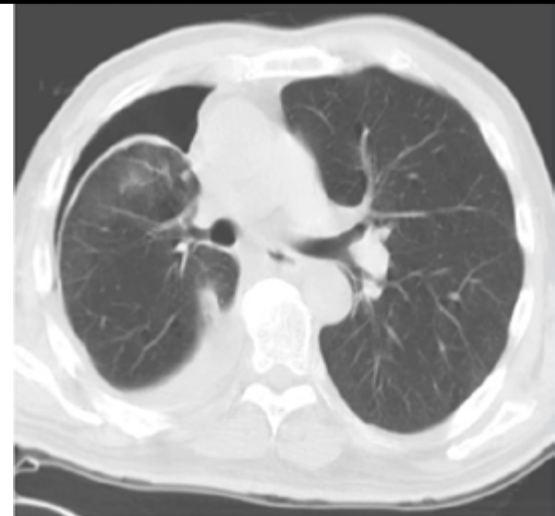


FIGURE 1. CT chest after therapeutic thoracentesis showing hyperdense fibrous peel over visceral pleura²

physiology or diffusion limitation; a decrease is consistent with another cause of V/Q mismatch. Fluid in the pleural space can contribute to compression atelectasis and subsequently shunting of blood through poorly ventilated alveoli resulting in worsening V/Q matching.

Case Continued

A thoracentesis was performed with vacuum bottles which yielded 2L of bloody pleural effusion. There was subjective improvement in work of breathing and she was de-escalated from HFNC to 6L NC. Pleural fluid LDH was 127 (serum 227) and protein was 2.7 (serum 5.5). This does not meet Light's Criteria for exudative effusion; however, it does meet by Two-test and Three-test rules as $LDH > 0.45$ upper limit of normal.¹

Several hours after thoracentesis, the patient's work of breathing again increased and a chest x-ray was performed, which revealed a small right hydropneumothorax. CT imaging was initially delayed given respiratory distress but was completed hours later and revealed large right hydropneumothorax. Thoracic Surgery was consulted and recommended small bore chest tube via Seldinger technique, which yielded 400cc of serosanguinous fluid.

The patient stabilized on 6L NC and was ultimately admitted to the floor.

While on the floor, she had decreasing output from chest tube but persistent pneumothorax on chest x-ray. On day 3 of admission, she decompensated from a respiratory standpoint, requiring transfer to ICU. Pleural manometry performed in the ICU revealed low pleural pressures consistent with pneumothorax ex vacuo.

Pneumothorax Ex Vacuo

There are three types of iatrogenic pneumothorax (ie, complications post-thoracentesis) seen in the ED. The first is caused by injury to the visceral pleura by the needle or catheter/tube or from ruptured blebs in high airway pressures. The second is characterized by violation of the parietal pleura as seen during subclavian line placement, for example. The third is termed pneumothorax ex vacuo (PEV), which occurred in this case.

PEV occurs when there is a fibrous peel over the visceral pleura that prevents re-expansion even when the pleural space is drained. This can be due to lung entrapment, which describes an active process such as malignancy or infection causing acute inflammation, or trapped lung as a result of past inflammation. The other etiology of PEV is an endobronchial lesion completely occluding the bronchus preventing lung expansion despite thoracentesis. Cancer patients such as this one are at risk for this type of lesion given her widely metastatic disease.

PEV differs from a typical pneumothorax because the air in the pleural space is filling a void that would otherwise be filled with fluid and not lung parenchyma. The lung parenchyma in the case of PEV cannot expand to fill the evacuated pleural space due to the restrictive fibrous peel which can sometimes be visualized on CT (Figure 1). The development of PEV can thus result in an increase in pleuritic pain for the patient without benefiting the patient's respiratory status.

PEV should be anticipated as a complication of the drainage of chronic pleural effusions secondary to an inflammatory or malignancy-related exudative effusion where there has been time to develop a thick, fibrous ring around the lung parenchyma that limits

its re-expansion. In these cases, pleural manometry should be considered.

Pleural manometry is often employed by pleural consult services and has been suggested as a tool to help prevent excessive fluid drainage as well as in the diagnosis of trapped lung. This involves measuring, with a water column or electronic manometer, the intrapleural pressure and facilitates draining to a point which can promote lung re-expansion without the complications of re-expansion edema or pneumothorax ex vacuo. The regular use of manometry in therapeutic thoracentesis has been proposed as a method to avoid complications;³ however, a validated cutoff point for pressure or volume of evacuation has not been established based on limited studies.^{3,4}

The techniques for fluid removal include negative pressure bottle, manual aspiration, and gravity-dependent drainage. Negative pressure bottles have been shown to average roughly -100 mmH₂O of negative pressure depending on fill level, while manual aspiration is more variable.⁶ Both methods can evacuate fluid beyond the -20mmH₂O intrapleural pressure threshold recommended based on data from multiple small studies^{5,6} as well as the -40mmH₂O threshold, which has been shown to lead to re-expansion edema in animal studies.⁷

Case Outcome

The patient's respiratory status continued to decline in the MICU, and she died on day 6 of admission from respiratory failure after transition to comfort care.

Take-Home Points

- Consider all causes of hypoxemia in patients with a pleural effusion. Consider using A-a gradient to aide in diagnosis.
- Consider pneumothorax ex vacuo in your differential of pleural air after large volume thoracentesis. It is a benign process; chest tubes are not helpful.⁸
- Manometry may be helpful during thoracentesis to help confirm diagnosis, or to prevent excessive fluid removal that increases pleuritic pain without improving respiratory status.
- There are no hard and fast rules for therapeutic thoracentesis in the ED setting but there are some accepted best practices.
 - Consider limiting volume evacuation to 1 L, as this should help any acute respiratory issues from compressive atelectasis and V/Q mismatching, limiting complications.
 - Avoid negative pressure bottles and use manual aspiration or gravity drainage. ★

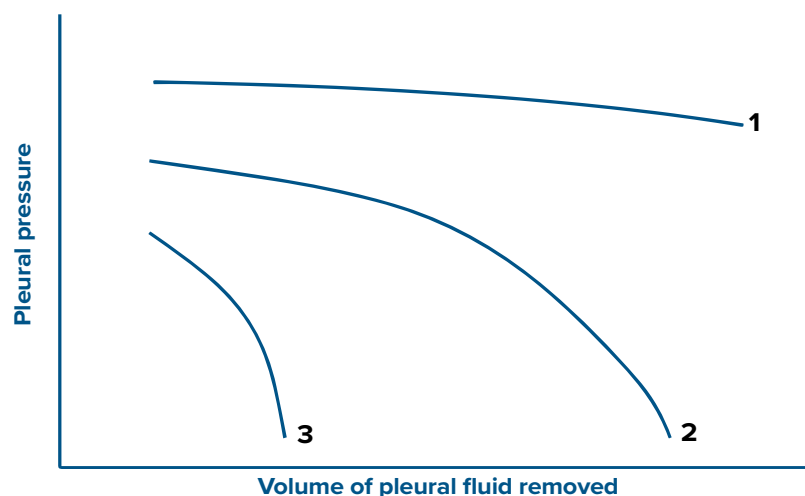


FIGURE 2. Pleural elastance curves.

The slopes of the different curves represent pleural space elastance. Curve 1 represents a normal pleural elastance and curve 3 represents abnormally high pleural elastance (“trapped lung”), whereas curve 2 represents an initial normal elastance that becomes abnormally high as more fluid is removed (“entrapped lung”)⁵

Tamiflu

To Use or Not to Use?

Lucy Liu, MSIV

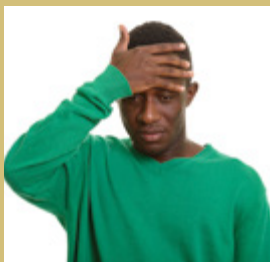
University of Maryland
lucy.liu@som.umaryland.edu

Carmen Avendano, MD

University of Maryland

Case One.

23-year-old male with no significant past medical history presents to the adult ED with a 5-day history of fever to 100.6°, myalgias, cough and general malaise. Rest of vital signs are within normal limits. Rapid influenza performed in the ED is positive.



Case Two. 6-year-old female with no past medical history presents to the pediatric ED with a 24-hour history of fever to 102°, headache, and rhinorrhea. Rapid influenza performed in the ED is positive.

Case Three.

30-year-old HIV positive female on HAART with a CD4 count of 400 presents to the adult ED with a 3-day history of fever to 101.5°, myalgias, and sore throat. Rapid influenza performed in the ED is positive.



With the CDC reporting a 36% efficacy rate in the 2017-2018 flu vaccine, an increasing number of both adult and pediatric populations sought care in the ED for influenza-related symptoms and complications.¹ CDC reports cite a total of 84 influenza associated pediatric deaths, and a rate of 67.9 influenza related hospitalizations per 100,000 people this 2017-2018 season.¹ Currently, the CDC recommends the use of antiviral treatment in children under the age of 2, adults age 65 or older, residents of nursing homes and other chronic care facilities, Native Americans or Alaskan Natives, children younger than age 19 who are receiving long-term aspirin therapy, individuals with a body mass index ≥ 40 , women who are pregnant or postpartum (within 2 weeks after delivery), persons with immunosuppression, including that caused by medications or by HIV infection, and individuals with chronic pulmonary (including asthma), cardiovascular (excluding hypertension), renal, hepatic, hematologic (including sickle cell disease), or metabolic disorders (including diabetes mellitus) or neurologic and neurodevelopmental conditions.¹ However, with increased morbidity and mortality rates of this season's influenza viral strains, providers

are more likely to prescribe antiviral treatments to previously healthy patients outside of the CDC recommended populations, leading to a nationwide shortage in medications and risk of drug resistance. As contraindications to antiviral therapy are limited to hypersensitivity reactions, the real questions become: who benefits from it and what evidence is necessary to administer treatment?

Children

In addition to CDC recommendations, the American Academy of Pediatrics recommends the consideration of treatment with antiviral therapy for any healthy child with presumed influenza.² The efficacy and benefit of antiviral therapy in children is widely debated. The latest 2014 Cochrane review reports that in healthy children antiviral therapy reduced the time to first alleviation of symptoms by 29 hours (95% CI, 12-47 hours). However, no effect was seen in asthmatic children. In addition, the review found no evidence of a reduction in hospitalization or serious influenza complications including pneumonia, bronchitis, sinusitis, or ear infection in either healthy or asthmatic children.³ On the other hand, a 2017 systematic review of 5 randomized control trials of 2,561 patients comparing oseltamivir to placebo in children found antiviral therapy

reduced duration of illness by 17.6 hours. When excluding patients with asthma, antiviral therapy was shown to reduce duration by 29.2 hours.⁴ In addition, the risk of subsequent development of otitis media was 34% lower in the antiviral group.⁴ Similar results were also seen in a large randomized control trial of 695 healthy children, in which duration of illness was reduced by 36 hours, and subsequent development of otitis media was reduced by 44%.⁵

Studies also have also suggested that early antiviral treatment may reduce the rate of influenza related morbidity. One retrospective trial of 4,447 previously healthy children with physician diagnosed influenza found that children who received oseltamivir were 51.7% less likely to have a subsequent diagnosis of pneumonia.⁶ This reduction was also associated with a statistically significant decrease in antibiotic use, as well as outpatient and emergency room visits.⁶

In children with chronic medical conditions (including those with asthma treated with bronchodilators or steroids, and diabetes treated with medication) antiviral therapy was associated with a reduction in hospitalizations 14 days after influenza diagnosis.⁷ The study, however, did not find any significant reduction in hospitalizations attributable to pneumonia or otitis media.⁷ The

most common statistically significant reductions in hospitalizations 14 days after influenza were found to be related to hypovolemia (30%), other manifestations of influenza (18%), gastrointestinal tract-related causes (15%), and infections (9%), all of which could be influenced by these patients' chronic medical conditions.⁷

In children, the use of antiviral therapy has also been associated with a few side effects, with the most common relating to gastrointestinal issues. These issues are typically limited to vomiting, diarrhea, poor appetite, and nausea.^{4,8} While case reports predominantly from Japan have suggested a relationship between oseltamivir in children and neuropsychiatric events (including delirium, convulsions, and encephalitis),⁹ this has not been proven in controlled studies or preclinical research.^{10,11}

While there seems to be conflicting data in the literature for the benefits of antiviral therapy in healthy children, most of the data in favor of antiviral therapy cite around a 24 hour reduction in symptom duration, but also an increased risk of gastrointestinal side effects such as nausea, vomiting, and diarrhea.^{4,5,8} Putting this data into a clinical context, a shortened duration of influenza-related symptoms may be negated by the medication side effects, which are similar to the symptoms themselves. Thus while the evidence does suggest some modest decrease in duration, it may not be clinically relevant.

In addition, in terms of the efficacy of antiviral therapy in preventing

complications of influenza, most of the data suggest a decrease risk of otitis media with the use of antiviral therapy;^{4,5} however, the most serious risk of superimposed bacterial pneumonia is one that was not well quantified. In the Cochrane review trial, of the 107 clinical trials obtained, there were inconsistent definitions of pneumonia: some trials defined pneumonia as a radiologically confirmed consolidation while other trials a more clinical diagnostic criteria was used.³ While the Cochrane trial found that antiviral therapy reduced self-reported unverified pneumonia, in the 5 trials that used a detailed radiological diagnostic definition no reduction was seen.³ Barr et al. found that antiviral use was associated with a decrease in subsequent development of pneumonia, but again this end point was not well-defined. It was also a clinical diagnosis, which may differ between providers.⁶ In the Pedro et al study, pneumonia was defined using hospital ICD 10 codes with no strict definitions as to clinically versus radiologically diagnosed disease.⁷ Thus assessing the efficacy of antivirals in preventing influenza associated pneumonia has been complicated by inconsistencies in diagnostic definitions.

Lastly, when reviewing the literature, there seems to be a gap between the CDC recommendations and the literature evidence on the efficacy of antivirals in asthmatic children. While Cochrane review trial found a modest reduction in symptom duration among healthy children, no effect was evident on

asthmatic children.³ In addition, antiviral therapy was not associated with any reduction in influenza complications such as pneumonia or otitis media among children with asthma.^{3,7} When excluding children with asthma, Malosh et al. found a twofold increase in symptom reduction time in children given antiviral therapy.⁴

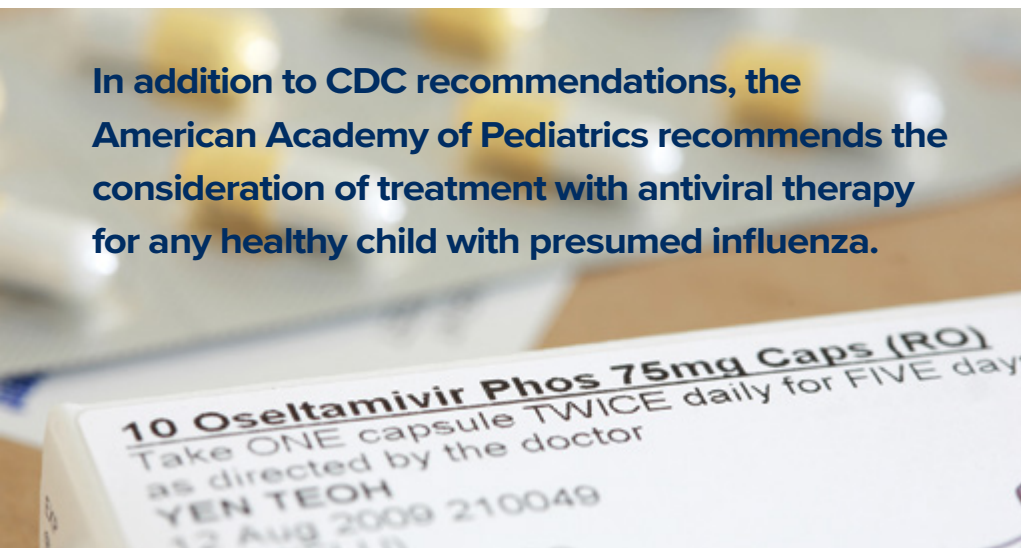
Adults

The recommendation for use of antivirals in previously healthy adults is mostly based on clinical judgment. A meta-analysis of randomized control trials from 2001-2007 of antiviral treatment in outpatient adult population found that in four trials with a total of 1410 participants comparing oseltamivir to placebo in healthy adults; the mean reduction time of symptom resolution to be 0.55 days. At-risk individuals had shortened time to symptom resolution by a mean of 0.74 days for oseltamivir (based on four trials with a total of 1472 participants).¹² While results of this study suggest some efficacy in the use of antivirals in not only high risk or healthy adult populations, a meta-analysis of unpublished manufacturer data conducted by the AAFP found that in terms of healthy adults, oseltamivir reduced the time to alleviation of symptoms by 0.7 days, with no differences in hospitalization rates between oseltamivir and placebo. In addition, the study found that vomiting and nausea were increased with treatment and the needed number to harm (NNTH) being 28 in the placebo group and 22 in the oseltamivir group.¹³

Similarly, a 2014 systematic review of randomized control trials comparing oseltamivir to placebo found that antiviral therapy reduced time to symptom alleviation by 16.8 hours in healthy adults but did not find any difference in hospital admissions. The use of oseltamivir was also associated with an increased risk of psychiatric adverse events (NNTH 94 in placebo vs. 36 in antiviral group), headaches (NNTH 32 in placebo vs. 18 in antiviral group), and nausea (NNTH 25 in placebo vs. 11 in antiviral group).¹⁴

The results of these studies suggest that in terms of healthy adults, the benefits of antiviral therapy is limited to reduction in symptoms for less than one day, but may also be associated with adverse effects

In addition to CDC recommendations, the American Academy of Pediatrics recommends the consideration of treatment with antiviral therapy for any healthy child with presumed influenza.



such as vomiting, nausea, headaches, and psychiatric symptoms.

Immunocompromised

Various studies have reported higher rates of hospital admission and influenza associated complications in immunosuppressed patients, including; HIV/AIDS patients, solid organ and bone marrow transplant recipients, chemotherapy and hemodialysis patients, as well as those on chronic systemic corticosteroids.¹⁵ In addition, immunocompromised patients exhibited longer lengths of viral shedding with a mean of 19 days vs. 6.4 in healthy patients.¹⁶ Initiation of oseltamivir was shown to reduce the progression to pneumonia as well as decreased duration of viral shedding in patients undergoing hematopoietic stem cell transplantations.^{17,18}

Similar results were found in HIV infected patients. A 2009 study of 15 HIV infected school age children with CD4 counts >350, reported decreased viral shedding duration from three to six days as measured by viral culture, potentially reducing transmission rates.¹⁹ In addition, a study of 126 HIV infected patients in Mexico City showed that absence of administration of oseltamivir was associated with increased mortality.²⁰ The literature on antiviral treatment among the immunocompromised population is limited with small sample sizes and mostly retrospective studies. While the increased risk of influenza associated complications is well-established in these populations, more evidence is needed to determine the benefit of antivirals in reducing these complications.

Timing of Treatment

Considering efficacy of antiviral therapy among different population subsets, the timing of symptoms also plays a key role in the determination of treatment initiation. A randomized control trial of 1,190 previously healthy individuals in Bangladesh showed that in participants enrolled greater than 48 hours since illness onset there was no difference in duration of symptoms between placebo and treatment groups, while the duration in symptoms was reduced by one day in treated patients who enrolled less than 48 hours since symptoms onset.²¹ In patients presenting at or before 48 hours of onset, treatment within the first 12 hours reduced median illness duration by 75.4 hours.²² However, in patients with compromised immunity or severely ill requiring hospitalization, treatment up to 5 days after symptom onset was associated with improved survival.²³ Timing of treatment not only affects disease course, morbidity, mortality, but also can reduce viral shedding time and thus decrease risk of transmission.²⁴

Antiviral Resistance

While the initiation of antiviral therapy improved disease prognosis and severity in immunocompromised patients, it has also been linked to the development of antiviral resistance. Viral resistance to neuraminidase inhibitors has been reported in multiple immunocompromised patients after prolonged (ranging from 23-75 days) use of antiviral therapy.^{25,26} While resistance was identified using viral genetic sequencing, it is unknown if such resistance is clinically relevant.

Recommendation Discrepancies

The CDC recommends the use of antiviral therapy in high-risk populations, and advises antiviral therapy can be considered for any previously healthy, symptomatic individual on a basis of clinical judgement. CDC states that “clinical trials and observational data show that early antiviral treatment can shorten the duration of fever and illness symptoms, and may reduce the risk of complications from influenza (ie, otitis media in young children, pneumonia, and respiratory failure).”¹

This statement contrasts sharply with that of the FDA, which states that “oseltamivir phosphate does not prevent bacterial infections that may happen with the flu.”²⁷ In addition, the most recent 2017 World Health Organization list of essential medicines has downgraded oseltamivir from a “core” drug to a “complementary” drug, citing that the use of antivirals should be limited to “severe illness due to confirmed or suspected influenza virus infection in critically ill hospitalized patients.”²⁸

In light of the Cochrane review trial and other literature suggesting only modest benefits of antiviral therapy, especially among healthy individuals, there seems to be a shift toward more conservative policies towards the use of these medications. The conflicting recommendations, as well as inconsistency among the literature as to the real benefit of antivirals, has made the practice of prescribing antivirals one that is widely variable and difficult to establish a firm evidence-based approach.

Case One Conclusion: Given that it has been 5 days since the onset of symptoms, this patient would likely not benefit from antiviral therapy. The patient is a healthy adult, without worsening of this condition, antiviral therapy will most likely not significantly affect clinical progression or outcomes. If this patient had worsening of illness that required hospitalization, he would potentially benefit from antiviral treatment up to five days after symptom onset.

Case Two Conclusion: Since this patient is presenting within 48 hours of symptom onset, antiviral therapy could potentially decrease the duration of illness by a half a day to a day (17-29 hrs). However, the decision to give antiviral medication should be weighed by the potential adverse events of nausea and vomiting which may negate benefits of illness duration. In addition, it could be argued to give antiviral therapy to prevent complications such as a superimposed pneumonia, however the literature is mostly mixed on the efficacy of therapy to prevent such complications. With limited data suggesting the true benefit of antiviral therapy in decreasing morbidity and mortality, we are left without a firm recommendation.

Case Three Conclusion: Since this patient is immunocompromised secondary to her HIV infection she would benefit from antiviral therapy as it is shown to decrease mortality and post viral complications. While the patient is past 48 hours since symptom onset, she can still benefit from treatment up to five days after onset. She will also benefit from reduction of viral shedding and thus reduce the risk of transmission. ★

A Simplified Treatment-Based Approach to TEG and ROTEM

Adam Morcom, MD

Virginia Tech Carilion Clinic

@adammorcom

You receive a 40-year-old trauma patient who is hypotensive after a motor vehicle collision. As your team completes its secondary survey and FAST, you initiate massive transfusion protocol according to the standard 1:1:1 ratio of packed red blood cells to platelets to plasma. But what comes next? Are there additional tools you can use to help guide your resuscitation?

The use of viscoelastic hemostatic assays (VHAs) such as thromboelastography (TEG) and rotational thromboelastometry (ROTEM) are becoming increasingly common in the ED and trauma bay. While most EM physicians have likely heard of these diagnostic tests before, experience and comfort levels may vary widely when it comes to interpreting and ultimately using these test results to guide blood product transfusions and resuscitation endpoints.

Hades or Pluto?

Much like Greek and Roman mythology are filled with analogues—gods and goddesses who are eerily similar to one another but go by different names depending on which version of the story you read—so can ROTEM, TEG, and other VHAs be thought of as directly analogous to one another. The same properties are being measured, but are labeled with different names from one test to another. The advantage is that once you learn the specifics of a particular platform, it becomes very easy to apply the principles to any of its alternatives.

So what is actually happening in this assay? As blood clots form and strengthen, they exhibit increasing viscosity and elasticity. Physically speaking, both ROTEM and TEG involve the oscillating motion of a cylindrical shaft through a small sample of blood. As the blood forms into a clot, it exerts

increasing resistance on the shaft. By measuring this resistance, we are able to track the strength of the forming clot over time. The results of TEG and ROTEM can be displayed as either a two-dimensional graph forming in real-time, or as a numerical list of pre-selected time intervals. Test results are often available in 30 minutes or less.

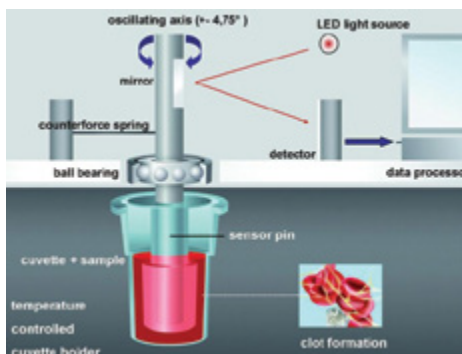


FIGURE 1. ROTEM Illustration

From Haemoview Diagnostics

Both ROTEM and TEG provide a great deal of quantitative data; however, a simple approach to VHA-based treatment begins with focusing on 3 questions about clots: “How fast?” “How strong?” and “For how long?”

How fast?

The first question to address is how quickly a new clot begins to form. This stage is represented by the linear portion on the left side of the graph, labeled clotting time (*CT*) for ROTEM (or specifically ROTEM’s *EXTEM* test, with re-agents added to isolate the extrinsic pathway of the coagulation cascade), or reaction time (*R*) for TEG. The time it takes a new clot to begin forming indicates the cumulative functionality of all the higher-level clotting factors within the coagulation cascade, leading up to the conversion of prothrombin to thrombin. Although there may be a great deal of complexity in this portion of the coagulation cascade, for the purposes of emergent bleeding, we can reduce this entire section to a single numerical

value. Prolonged *CT* or *R* can be treated with fresh frozen plasma (FFP) or prothrombin complex concentrate (PCC).

How Strong?

How strong is the new clot once it’s formed? This should be thought of as a two-part question, because there are two major components that give a clot its strength: fibrin and platelets. You may recall that a clot is composed of a platelet plug, reinforced by cross-linked strands of polymeric fibrin chains. A deficiency in either fibrin or platelets will result in a pathologically weak clot. So how can we tell which of these two is deficient? With earlier generations of the technology, we would use a secondary test within either TEG or ROTEM to measure the contribution of fibrin directly, and then we would have to infer the contribution of platelets to clot strength indirectly. More recently, however, the companies that make TEG and ROTEM have released technologies capable of measuring platelet functionality directly, specifically TEG’s PlateletMapping® Assay or ROTEM® Platelet. These newer technologies may or may not be available at a given institution, and so it is still worth learning both the previous and newer methods. (Note that we are focused on platelet *functionality*, not simply platelet count.)

When assessing clot strength, we are looking at the highest amplitudes within the middle of the graph, namely the maximum clot formation (*MCF*) in ROTEM, or the maximum amplitude (*MA*) in TEG. If each of these values is normal, then there is likely no clot strength deficiency. However if the clot is too weak overall, then we have to assess the two main components separately. Each platform has a devoted test to measure the contribution of fibrin to clot strength: the *FIBTEM MCF* in ROTEM, or the Functional Fibrinogen (*FF*) level in TEG. If the fibrin component is deficient, then we should replete it by

giving cryoprecipitate. Using the older inference method, if the *FIBTEM MCF* or *FF* test is normal, but the overall clot strength (*MCF* or *MA*) is deficient, then we can infer that there is a deficiency in platelet functionality, and these should be repleted accordingly.

In some cases, *both* fibrin and platelets may be deficient. In order to detect this combination using the inference method, whenever you find and treat a deficiency in fibrin, you should run the test a second time. If the fibrin component has been corrected but the overall clot strength remains deficient, this indicates there must be a concurrent platelet deficiency, which should also be treated. Or alternatively, using the newer

technologies, we can measure both fibrin and platelets individually and replete whichever is lacking.

For How Long?

Is the patient's clot as durable as it needs to be, or is the clot breaking down sooner than it should? This is a question of fibrinolysis, represented by the rightward portion of the graph where the amplitude begins to decrease again, corresponding to the process by which plasminogen converts to the active plasmin and begins breaking down fibrin strands. This process occurs normally in healthy patients, however *overactive* plasmin causes hyperfibrinolysis, which is a treatable

form of coagulopathy. To detect hyperfibrinolysis, you may examine the lysis index at 30 minutes (*LI30*) in ROTEM, or the lysis at 30 or 60 minutes (*LY30*, *LY60*) in TEG. If your bleeding patient's clots are being lysed too quickly, you may treat with tranexamic acid (TXA). (Note that this targeted treatment differs from the guidelines based on the *CRASH2* trial, which advises that *empiric* TXA must be given within the first 3 hours of injury to confer mortality benefit. However, bleeding patients with an identified hyperfibrinolysis represent a different patient population than that of *CRASH2*, and therefore not subject to the same 3-hour window.)

FIGURE 2. ROTEM

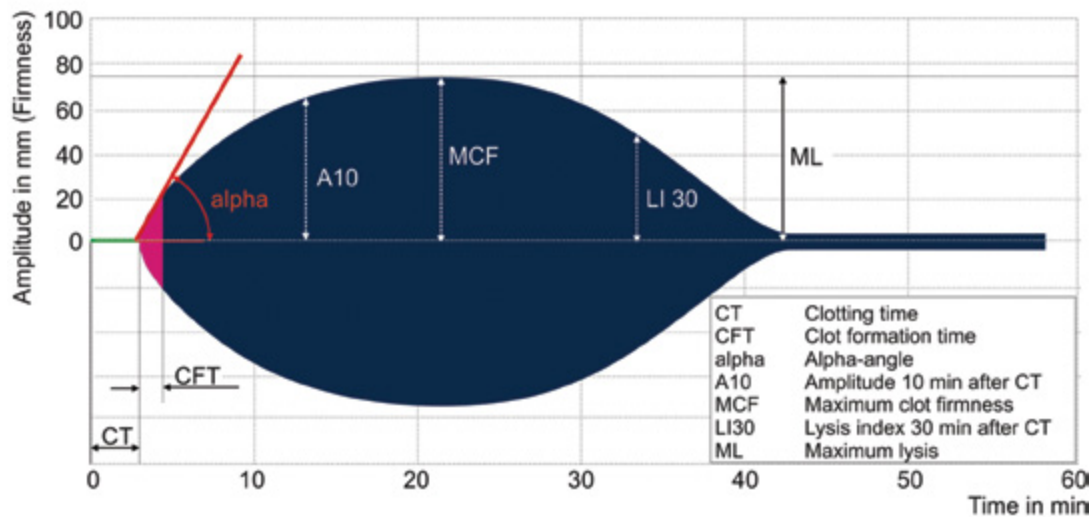
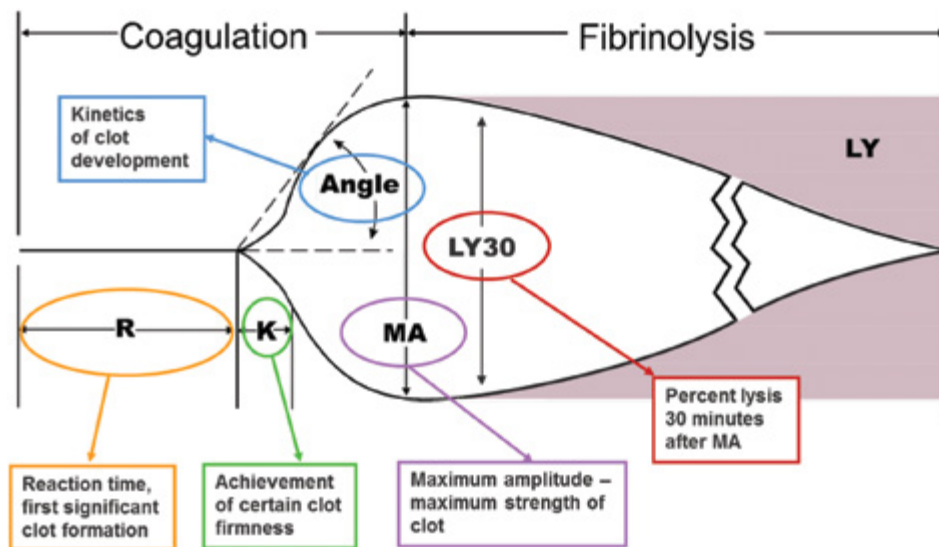
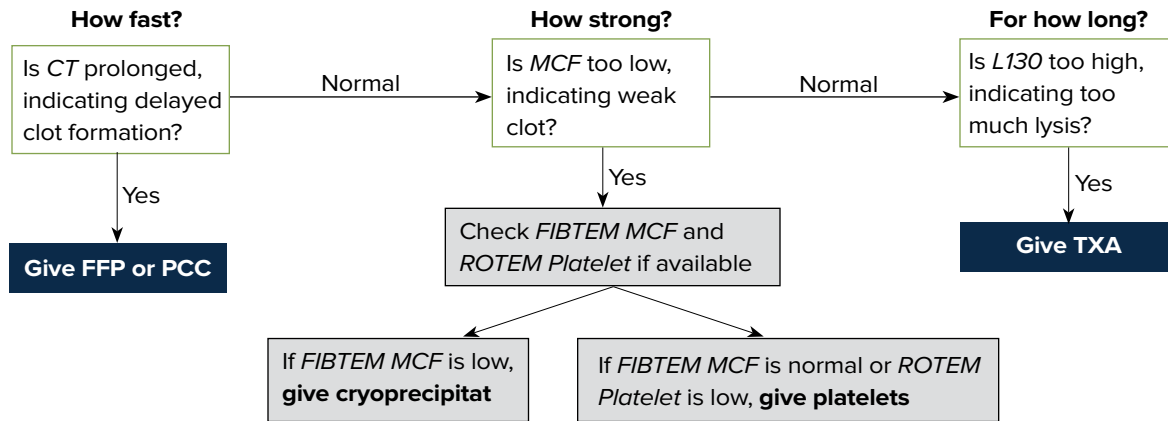


FIGURE 3. TEG

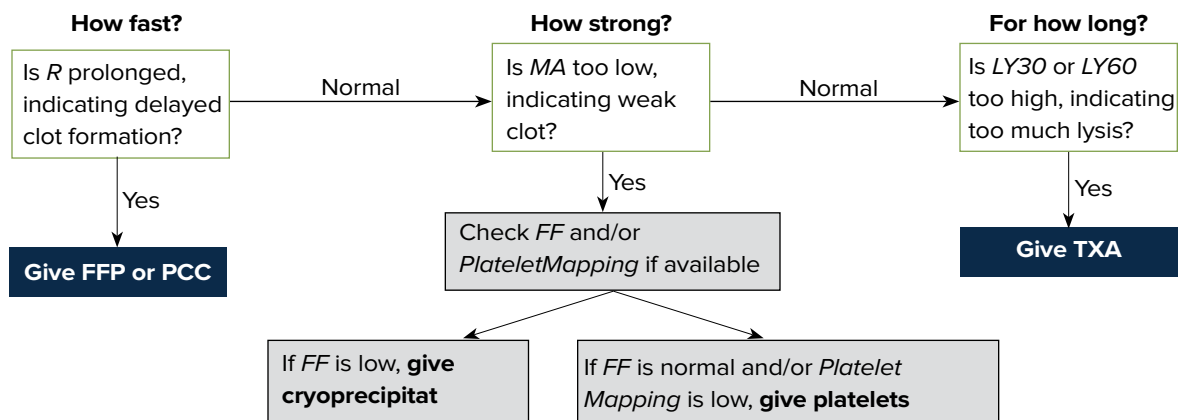


Figures 2-3 from Anderson L, Quasim I, Steven M, et al. Interoperator and Intraoperator Variability of Whole Blood Coagulation Assays: A Comparison of Thromboelastography and Rotational Thromboelastometry. *J Cardiothorac Vasc Anesth.* 2014;28(6):1550-1557.

For ROTEM



For TEG



What About Those Other Parameters, Not Discussed Here?

You may notice there are additional parameters listed that have been omitted from this discussion, such as the *K* value in TEG, the *A10* value in ROTEM, and the α -angle in both. Each of these parameters occurs after the linear portion of the graph but before the highest amplitude is reached. Therefore, these values will be impacted by a combination of both the higher-level coagulation cascade factors that initiate clot formation and also the components of clot strength, fibrin and platelets. Although abnormalities in *K*, *A10*, or α -angle do represent true coagulopathy, we recommend beginning with a simplified treatment algorithm based only on the “purer” parameters we have chosen to highlight here. It should also be noted that abnormalities in *K*, *A10*, or α -angle will often be accompanied by abnormalities in our highlighted

parameters, and so treatment will still be indicated by our algorithm.

What About Patients Taking NOACs?

Novel oral anticoagulants (NOAC's) such as rivaroxaban, apixaban, and dabigatran are being used with increasing frequency. Typically these agents target either Factor Xa (in the case of rivaroxaban and apixaban) or thrombin (in the case of dabigatran) within the coagulation cascade. While TEG and ROTEM will accurately identify coagulopathies caused by NOACs, it must be noted that the treatments recommended in our algorithms are likely to be much less effective in countering such coagulopathies, as is regrettably the case with NOACs in general. A careful history must be taken in order to identify patients taking dabigatran, which has a targeted reversal agent, idarucizumab. Currently there are no targeted reversal agents available for Factor Xa-inhibiting drugs.

When to Use TEG or ROTEM?

In the ED setting, TEG and ROTEM have been studied primarily in the setting of trauma. However, these tests have also been studied to a lesser degree in patients with post-partum hemorrhage, GI bleeding, severe epistaxis, and in selected perioperative patients. In general, ED physicians should consider using TEG or ROTEM in any patient with a serious or life-threatening bleed in order to identify coagulopathies that may be corrected.

In the setting of trauma, studies have shown that both ROTEM- and TEG-guided treatment algorithms result in non-inferior patient outcomes and result in decreased overall usage of blood products compared to empiric massive transfusion protocols.

TEG, ROTEM, and other VHAs are powerful tools that can guide your transfusion of blood products in real-time. Hopefully the simplified algorithms listed here will help you make use of this valuable information. ★



Rescue Task Force

Cooling Down the Warm Zone

Linh Nguyen, MSII

Florida State University College of Medicine

Andrew M. Kropp, MSIII

Florida State University College of Medicine

Jared L. Ross, DO, FF/EMT-T

*Ascension St. John Hospital
and Medical Center*

Detroit Fire Department EMS

@JaredEMS

In recent years, America has experienced an alarming increase in the frequency of mass shooting incidents. The country's deadliest mass shooting to date took place in Las Vegas in October 2017, when Stephen Paddock fired more than 1,100 rounds into a crowd of 22,000, killing 58 people and injuring 851. These figures could have been even more tragic if it were not for the deployment of 16 rescue task forces (RTF). An RTF includes EMS providers and law enforcement officers who work as a team to provide rapid treatment

and extrication of victims while Special Weapons and Tactics (SWAT) teams work to locate and neutralize threats. This interprofessional dynamic represents a new standard of operations in response to high threat mass casualty incidents.

Background

The 1999 mass shooting at Columbine High School brought attention to the threat of domestic terrorism. In the wake of the shooting it became clear that the traditional emergency response philosophy of "contain and wait" was not effective, delaying both law enforcement and EMS entry into the building and resulting in an unnecessary loss of life. Previously, officers would form a perimeter and await the arrival of specially trained tactical teams. During this time, EMS responders staged at a safe distance,

designated as a safe zone, preventing them from becoming casualties. However, this hindered access to life-saving care. An aggressive response is now the standard, and police will seek out and attempt to neutralize the shooter — which often renders a portion of the scene relatively safe, or a warm zone. It is here that the RTF can be employed to treat and evacuate victims.

Rescue Task Force Model

In 2009, the RTF model was pioneered by the Arlington County Fire Department in Virginia. RTF takes the evidenced-based principles of Tactical Combat Casualty Care (TCCC) that were developed by the military for field combat and adapts them to civilian populations under the framework of Tactical Emergency Casualty Care (TECC).

The RTF approach dictates that the initial law enforcement response is to enter the building and quickly engage the shooter while identifying threats and clearing a “warm zone.” The RTF is then formed by first arriving EMS providers and law enforcement officers to move quickly into the warm zone and initiate treatment and evacuation of victims. The traditional RTF team includes 2-4 law enforcement officers and 2 EMS providers who typically wear ballistic gear and carry supplies to treat up to 14 patients. In contrast to the “contain and wait” model, the RTF team is composed of ordinary “street” law enforcement and EMS, not SWAT team members and tactical medics.

Each member of the team has a defined role. Law enforcement officers provide front and rear security and are responsible for coordinating movement, but do not provide or assist with any medical care. EMS providers in the warm zone treat only immediately life-threatening injuries such as major bleeding or airway compromise, focusing on evacuating the patient to the cold zone for further evaluation and care. Different systems may choose to employ basic life support (BLS) or advanced life support (ALS) EMS personnel or utilize fire department first responders while reserving EMTs and Paramedics to provide higher level care in the cold

zone. Additional models of RTF allow for a protected corridor approach where unescorted EMS providers move freely in an area with fixed law enforcement guards. Alternatively, a “protected island” casualty collection point (CCP) can be established and hardened within the hot zone with law enforcement transporting victims to the CCP for stabilization. In systems with significant law enforcement resources but a lack of EMS providers, police rescue teams can be utilized to evacuate patients to the cold zone. RTF allows for continual pursuit of the suspect while simultaneously decreasing the length of time needed for injured victims to receive medical care.

While the RTF model involves EMS providers working in close proximity to an area of hostility, this system should not be confused with Tactical Emergency Medicine Services/

and law enforcement to rapidly access, treat, and extricate victims from an active threat event.

Moving Forward

As the RTF model continues to gain support, emergency physicians can provide valuable medical oversight and training to help EMS and law enforcement work together efficiently. This should be practiced long before an actual event takes place. An example of this was done by the New York State Division of Homeland Security and Emergency Services. Over a 2-day course, responders practiced RTF movement, hemorrhage control, and triage. They also applied concepts such as decision making and peer leadership to culminate in a scenario-based simulation. This is the type of cooperation and effort it will take for RTF to reach its full potential and save lives in the future. ★



Photo courtesy of Lake EM

Support (TEMS), detailed in previous *EM Resident* articles. TEMS providers receive extensive tactical training and are embedded within SWAT teams with the primary mission of providing preventative and emergency medical care to team members. TEMS providers may be armed and accompany the team on all routine and emergency call-outs. In contrast, RTF pairs “street level” EMS

America has experienced an alarming increase in the frequency of mass shooting incidents.

How to get published

Xiao C. Zhang, MD, MS

EMRA Simulation Division

MDCalc Fellow, Medical Education Fellow

Thomas Jefferson University

@xzhang09

Peter Tomaselli, MD

Thomas Jefferson University

@pjtomaselli

Sara Capobianco, MSIV

University of New England

College of Osteopathic Medicine

Dimitrios Papanagnou, MD, MPH

Thomas Jefferson University

Paper Hack 101

“Wanna write that up?”

Not many phrases in emergency medicine can induce as much fear, despair, nausea, and sometimes even visceral pain as these four innocuous words, chained together in a manner that can unnerve even the most seasoned emergency physician.

But why? We, as physicians, are constantly at the forefront of exploring our fields of expertise through a dynamic process involving a seamless integration of existing knowledge with novel information. Thus, we bear the responsibility of exploring and disseminating new findings to the scientific and medical communities. Whether you encountered an exciting patient case, developed a new wonder-drug, or piloted a new educational curriculum, you owe it to yourself to showcase your hard work and

immortalize your status in the pantheon of academicians.¹

While publications can be considered as promotional currencies to get into your next job (ie, residency, fellowship, or faculty position), it is more than just another line on your curriculum vitae. These works represent the opportunity to provoke debate, share your experiences, change potential practices.²⁻³

Now that you have been reinvigorated with the passion to publish your hard work, let us address the major elephant in the room: *how* to publish scientific articles. While there are numerous online resources and peer-reviewed journal articles on “How to write **insert blank** in a scientific journal,” we aim to tackle an even larger theme that transcends specific journal categories, writing styles, and citation formatting. We want to provide a simple-to-follow guideline to gain and

maintain the momentum required to start and finish any scientific publication during a pre-determined time frame.

The process of writing a scientific article requires more than one dedicated individual. There must be a collaborative effort of all of the research stakeholders, from the planning to the final approval process of the article. The conceptual framework for these steps follows the basic guidelines behind the popular SMART acronym for goal-setting (Specific, Measurable, Achievable, Relevant, and Time-bound).⁵

In order to guide new researchers in navigating the expansive ocean of scientific publications, authors with various research and mentorship experiences reviewed, discussed, revised, and compiled these **10 Easy Steps to Get Published FAST**, based on available research literature.

10 Easy Steps to Get Published FAST

STEP 1. Work effectively with a mentor.

While you feel like you are the only person responsible for publishing, you are likely working with a mentor, whose primary purpose is to train you to become an independent researcher. One of the most crucial elements to publishing is for both you and your mentor to articulate specific and tangible expectations for all responsible stakeholders (aka authors) during the write-up.⁶

Instead of asking your mentor open-ended questions (“What should I do?”) ask targeted questions for more constructive feedback and guidance:

- How does our research impact the scientific community? Is this an original study? (“What’s our elevator pitch?”)
- Are there any particular journals you would like us to submit to? If so, why?
- Which category (ie, original research, technical report, brief report) should we construct the manuscript in?

- How often would you like to meet on a scheduled basis to review our progress?
- Are there any institutional research personnel (ie, statistician, librarian) who can assist with the data analysis?
- Do you have any supporting literature regarding our research topic?
- What is our backup plan?

The purpose of these questions is to construct a basic foundation (think of it as a mission statement) for you to spearhead the rest of team into a final, successful deliverable.

STEP 2. Find the *perfect* journal and court the editor.

Let's be honest, we'd all like to submit to high-end journals with one-word names such as *Nature*, *Lancet*, *Science*, *Cell*, or perhaps one of the popular acronym-al giants like JAMA, NEMJ, BMJ. However, unless your name rhymes with -attu, -eingart, -rman, or -aminathan, you likely need to work up on your research game first.⁷

That being said, there are numerous domestic EM journals, such as *Annals of Emergency Medicine (Annals)*, *Academic Emergency Medicine (AEM)*, *Shock*, *Western Journal of Emergency Medicine (WestJEM)*, *Journal of Emergency Medicine (JEM)* that may fit your research.⁸ This is a high-level discussion that should be addressed by your mentor in Step 1.

Once you select a journal, the next step is figure out which category you want to construct your manuscript in, follow the author guidelines to the letter (ie, word count, reference styles), and pitch your idea to the editor-in-chief. This may be a contentious topic among mentors, but a well-drafted letter of intent and a "would you be interested" email may pique the editor's interest, help them remember your submission, or worst-case scenario, save you from hours of formatting in a work they won't use. Given this is a high-stakes proclamation, show it to your mentor before clicking the "send" button. (*Disclosure: The authors have no financial affiliation with any of these journals.*)

STEP 3. Establish early backup plans.

Why talk about a backup plan at Step 3? Isn't this bad voodoo? Not necessarily.

Each journal receives countless submissions on a monthly basis, so if your submission meets resistance, don't fret and definitely don't give up. Having a backup plan — if Journal A doesn't accept, then reformat and re-submit to Journal B → C → D — can be helpful for the team when receiving bad news.

STEP 4. Determine authorship early.

This is very important, as you are dedicating a large chunk of your time to something that you hope will be immortalized in scientific literature. As a result, you should be compensated

appropriately for your time spent.⁹ While first and last authors hold the highest academic currency value, this is only pertinent for people going into hardcore academic settings. Being an author on any paper will be beneficial to your career.

As the primary author, you are ultimately responsible for getting all the pieces together and reformatting it in the correct vernacular and context. Realize there's always a chance you'll need to write the entire piece if your team members aren't pulling their weight in time for the deadline.

STEP 5. Make a deadline and stick to it!

Having a reasonable timeline agreed to by all authors allows everyone to contribute their weight in digital characters and justify their authorship. The key is to have group consensus with the agreed-upon deadline and send it via a traceable platform (ie, email) so it can be readily referenced.

Common deadline items include:

- 1) literature search; 2) data analysis;
- 3) abstract compilation; 4) manuscript compilation, 5) abstract revision + submission, 6) manuscript revision + submission.

"Tomorrow" may be variable, but deadlines are always constant.

STEP 6. Seek out the incentive.

In order for the entire team to work together, it is imperative to dangle the appropriate carrot in front of each author to ensure successful publication. Here are some common publication incentives

- Department promotion (mentor)
- Residency requirement (ie, scholarly project)
- Departmental funding for abstract acceptance + presentations
- CV fodder

STEP 7. Start writing what you know.

Sometimes the best way to build momentum and overcome writer's block is to write what you know. Whether it's the method section or results section, start jotting down as much as you can and allow the momentum to carry you from start to finish. Save the abstract for last; it's often the most challenging part of any manuscript.

STEP 8. Look up articles for reference.

Work smart, not hard. While your research may be original, chances are that many authors have tried to implement

certain aspects of your study design. This creates a perfect opportunity to consider how to phrase your research terminology and methodologies in a professional vernacular. Just don't forget to cite any pertinent references.

STEP 9. Sharing is caring — but use with caution.*

Shared documents (ie, Google Drive) allow each author to contribute in real time; however, it can also result in procrastination. Consider it as an option after the initial rough drafts are compiled to allow for easier group revision.

Of note, one of the most challenging aspects of paper-writing is assigning the citation after it has already been written, and this is exacerbated by multiple authors. Granted, the introduction section contains the most amount of references, but it is not uncommon for the discussion method or section to contain references as well. The best thing to do is cite as you write in a format that is required by the publishing journal. Free software like Mendeley can simplify all of your citation goodness.

STEP 10. Follow directions!

Review all of the specific requirements, no matter how mundane (ie, margin size, font, citation style) of each journal submission. When you click submit, you are guaranteeing the editors of a finalized product ready for prime-time consumption. If your submission is riddled with errors, formatting faux pas, or poorly referenced citations, you may receive a flat rejection solely based on inability to follow directions.

BONUS: Impressing your mentor

In case those 4 words "Wanna write that up?" don't come up, but you have a research idea you'd like to pursue, you will have to broach the topic. Be sure to clearly state your research question and what direction you want to take. Show your interest and commitment to the research, and ask if s/he has both the time and similar interest to pursue this with you. You may need to supply your previous research experiences/CV, so be sure to have both updated.

Next Steps

Now that you've survived reading this research guide, let's get to work! Be proud of your scientific achievements and declare your findings to the rest of the world. ★



Ross Christensen, DO

*Education Committee Vice Chair
Maricopa Medical Center*

Tabitha Cheng, MD

*Medical Student Education Subcommittee
UCLA*

Few times in a medical student's life are more exciting than the start of third year. Coursework is complete, Step 1 is in the rearview mirror, and clinical rotations are starting. It's an entirely new and exciting phase of your medical career!

Third year is all about creating a solid clinical foundation, not to mention choosing your future career. While it's important to keep an open mind while completing your clinical rotations, if you're dead-set on emergency medicine, this guide will set you up for success.

Surgery

Important Concepts: Try to identify the most common reasons for ED consults. Become comfortable doing a thorough abdominal exam and get the differential diagnosis of abdominal pain down cold. Learn what a healing incision and an infected incision look like. Choose surgical subspecialties rotations to become more comfortable with common complaints and diagnoses in those fields.

Important Skills: Wound closure is a great skill to master during your surgery rotation. Many rotations will have a day with mock skills lab; use that time wisely to help you prepare for the real thing. The single-handed suture tie will get you rockstar status as a future ED resident.

Pediatrics

Important Concepts: Learning common pediatric illnesses and how to treat them will give you a leg up in the ED. Diaper rash, strep throat, and newborn exams are all essential parts of treating kids! Learn how to navigate the parent-child relationship.

Required Clerkships

Setting the Foundation for a Career in Emergency Medicine

Important Skills: Learn how to do a thorough pediatric exam at various ages. If you do outpatient pediatrics, you'll see a lot of well child checks. Use that time wisely to understand what a "well" child looks like and what milestones they should be meeting at typical ages.

Psychiatry

Important Concepts: In many ways, psychiatry and emergency medicine are sister programs. You will see many suicidal, psychotic, anxious, depressed, and "everything in between" patients in the ED daily. Determine which patients meet the hold criteria and why, as well as what makes a person have capacity or not. Understand psychiatric medications and their side effects.

Important Skills: Learn to identify which medications are best used to manage acutely agitated patients and how to interview psychiatric patients safely (you should always have a clear path to the door).

Family Medicine

Important Concepts: As ED visits for non-emergency purposes skyrocket, you will often serve as a surrogate "primary care provider" in the ED. Get comfortable with prescriptions and contraindications for first line agents for blood pressure management, diabetes, and other common chronic diseases.

Important Skills: Do as many head-to-toe physical exams as possible. This will help you to do a solid, speedy ED physical as a resident! Also, simple office procedures like abscess drainages or skin biopsies are good to learn.

Internal Medicine

Important Concepts: IM is the bread and butter of medicine. Dive deep into every diagnosis and learn the appropriate inpatient workup and

treatment. Go to the ED for admissions to understand how others may view its chaos and speed.

Important Skills: Learn how to take a thorough History & Physical and differential diagnosis. Become comfortable with inpatient procedures such as thoracentesis and paracentesis.

OB/GYN

Important Concepts: Like surgery, try to attend as many ED consults as possible. Learn how to take a history and manage vaginal bleeding at all life stages including pre-menopausal, pregnant, and post-menopausal.

Important Skills: Get comfortable doing a pelvic exam, checking for signs of imminent delivery, and doing a typical infant delivery.

Neurology

Important Concepts: Pay attention to the evaluations of ED consults. Learn everything you can about seizure and stroke patients and their management; these will be typical patients in the ED. Stroke symptoms can be very subtle; learn to recognize a pattern of deficits and where the lesion is located in the brain.

Important Skills: Become comfortable doing a full neurologic exam, including the NIH stroke scale. If possible, learn how to do a lumbar puncture.

All Rotations

- Learn how to write orders and prescriptions (under supervision, of course).
- Make yourself use every patient to guide your self-study; read and learn about medical and surgical conditions you have not previously studied.
- Common things are common. On whatever rotation you are on, find the 4-5 most common things you see and become expert at the symptoms, diagnosis, and treatment. ★



PARTY

parq
RESTAURANT & NIGHTCLUB

TUESDAY, OCT. 2, 2018
10 PM-2 AM

AN UNPARALLELED NIGHTLIFE EXPERIENCE
615 BROADWAY ■ SAN DIEGO, CA 92101

■ ■ **Envision**
■ ■ PHYSICIAN SERVICES

Visit Envision Physician
Services' Booth #1335
First 500 residents receive a
wristband for a free drink at the party.



Scientific Assembly
SAN DIEGO, CA **18**



When Jo Linder, MD, FACEP, was elected to the EMRA Board in 1982, her first order of business — as the resident voice for education — was to help study the length of residency training. There were 16 programs represented at the meeting where she was elected, and the ACGME had just approved standard requirements for EM residency programs. It would be 7 more years before CORD was founded. The work Dr. Linder and her colleagues were doing formed the underpinnings of today's training.

Get to Know Jo Ellen Linder

What makes you laugh every time?

My husband's puns — he brings me joy and laughter every day.

How do you “unplug” from work?

Books, especially fiction — I read several at the same time and try to keep up with two book groups. And cooking, which relaxes me.

Most-used app on your phone:

Reminders — nothing exciting. I attend a lot of meetings and use Notability with microphone. I'm seriously trying to unclutter and minimize paper. Of course I use open table and google maps. And I have an iPad Mini that I use Notability on.

empower

Sharing our Stories

Your Time, Your Legacy

Jo Linder, MD, FACEP

Medical School: University of Iowa Carver School of Medicine

Residency: UCSF Fresno

Current Position: Director of Student Affairs, Maine Medical Center; Associate Professor of Community Medicine & Public Health and Associate Professor of Emergency Medicine, Tufts University School of Medicine

Public service: Director, ACGME Board of Directors; Chair, Journal Oversight Committee, ACGME *Journal of Graduate Medical Education*; Senior Director, American Board of Emergency Medicine; Former President, Maine Medical Association

If you were starting residency this year, what would you do differently?

Be open to anything. Stay connected with colleagues and friends. Say yes to as much as possible, and learn to say no. Know basics included in Advanced Cardiac Life Support and trauma triage.

Which 3 traits are most important for a successful emergency physician?

Flexibility, ability to grasp complex concepts quickly, ability to sleep anytime/anywhere.

Education has been your passion since your time with EMRA. How can residents retain a learner's mindset after they get into the daily routine of a career?

From the moment we are accepted to medical school, we understand our professional journey is one of life-long learning. New knowledge is growing exponentially, and learning how to continuously learn is key to staying up to date.

What makes you want to keep coming to work every day?

Caring for others in the emergency department is a team sport and we all need to bring our top game to our work every day. I try to stay focused on how

my work impacts patients and the team members who care for them today and in the future. In the Department of Medical Education, we truly believe what we do, who and how we teach, has an impact today and for generations.

I'm spending about half a day a week now in a triage center at the Maine Medical Center Preble Street Learning Collaborative, which is a clinical setting across the street from our largest organization serving the homeless. It's a place for learners to actually get experience in caring for a very vulnerable population. It has made quite an impact.

Top tip for managing difficult consults?

Keep cool and use your best diplomacy with respectful discourse — “I see your point, however this patient needs your expertise.” We are all in this together and we need to find ways to connect with your specialty colleagues so they're not just an angry voice you've woken up in the middle of the night. Remember, we're up 24 hours a day and they are not. We don't know what's going on in their lives. They want to make sure it's worth their time.

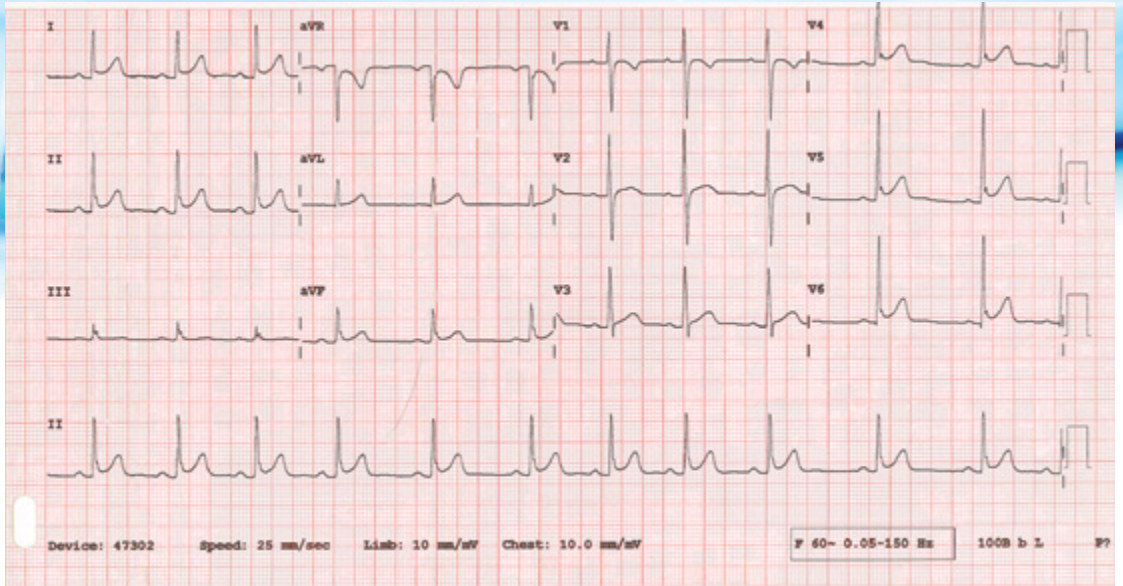
What's on your desk right now?

Several articles including BEME Guide No. 23 on Case-based Learning, and several on social justice and health disparities. ★

ECG Challenge

Christopher Parks, MD
 Christiana Care Health System

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



CASE.

A 22-year-old female presents with chest pain.

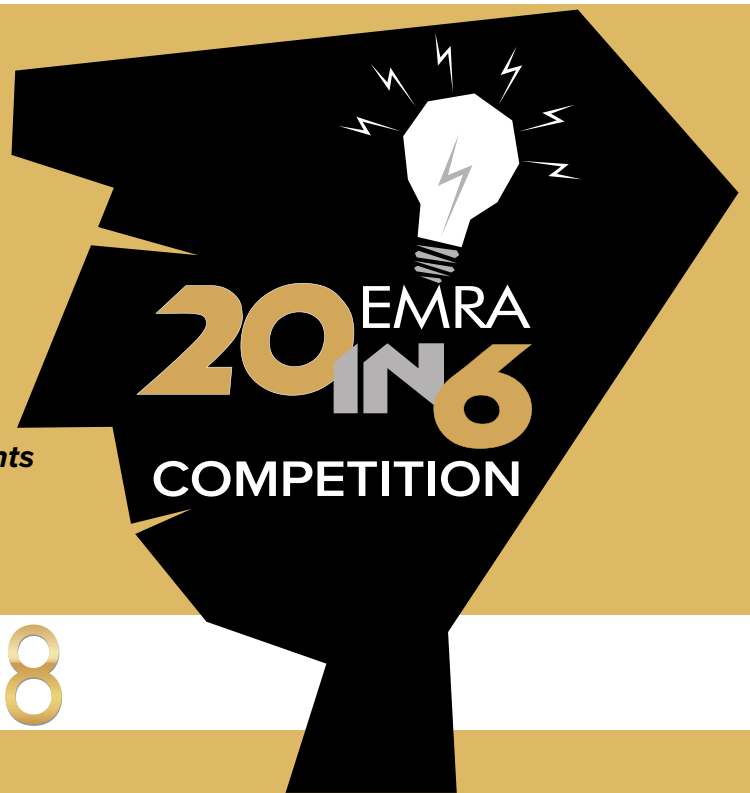
What is your interpretation of the following EKG?

See the ANSWER on page 48

Searching for
 Best Resident
 Lecturer

Is it You?

Apply now at emra.org/be-involved/events
 Submission deadline June 15, 2018



in conjunction with
 Scientific Assembly
 SAN DIEGO, CA 18

This EMRA event sponsored by **HIPPO**  Emergency Medicine Board Review

ECG Challenge



Please see pages 1, 2, and 7-10 of the EMRA EKG Guide

ANSWER

The ECG shows a sinus rhythm at 70 bpm with a normal axis and normal intervals. There are STE >1 mm in leads I, II, aVF, V4-V6 and STD >1 mm in aVR with no other reciprocal changes. This distribution of ST segment changes is not consistent with an expected anatomic distribution of a coronary artery and suggests a non-ACS etiology. The differential for non-ACS causes of STE is broad and includes conduction abnormalities (eg, LBBB, pre-excitation syndromes), structural abnormalities (LVH, LV aneurysm), and metabolic abnormalities (eg, hyperkalemia). This ECG is consistent with Early Repolarization, commonly referred to as Benign Early Repolarization (which may be a misnomer as current research suggests this may be associated with an increased incidence of arrhythmic sudden cardiac arrest). The terms Normal Variant ST Elevation and Normal Variant Early Repolarization are typically used to refer to isolate ST in V1-V4. Given this patient's age, chief complaint, and diffuse distribution of STE without non-aVR reciprocal changes, pericarditis should also be considered. To distinguish between pericarditis and BER, compare the J point elevation to the T-wave amplitude in V6. A ratio of <0.25, as seen in the case ECG, suggests BER. The other "classic" finding in this ECG that suggest BER is the "fishhook" or notching pattern at the J point in leads V4-V6. The other ECG findings associated with BER and pericarditis are listed in the Learning Points.

Case Resolution

After a thorough history and examination, a chest x-ray was performed which was normal and patient was discharged home with ibuprofen for suspected musculoskeletal chest pain. She later presented to another ED where she underwent CTA imaging, bilateral leg ultrasounds, and serial troponin testing, all to no avail.

LEARNING POINTS

2013 ACCF/AHA ECG Criteria for Acute Myocardial Infarction

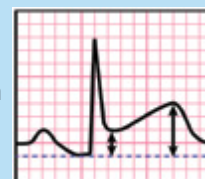
- New, or presumed new, STE at the J point in ≥ 2 anatomically contiguous leads
 - ST-segment is measured from the isoelectric baseline, typically the TP segment
 - ≥ 1 mm in all leads other than V2-V3
 - ≥ 1.5 mm in women in V2-V3
 - ≥ 2 mm in men in V2-V3 (2013 guidelines simplified V2-V3 cutoffs in men from 2012 guidelines)
 - ≥ 0.5 mm in V7, V8, or V9 (posterior leads) in posterior MI
- Absence of LVH, LBBB, or paced rhythm
 - New LBBB is no longer considered a STEMI equivalent
- STE < 1 mm in a clinically suggestive presentation should prompt concern for STEMI

Benign Early Repolarization

- Widespread concave STE, most often in V1-V4 (can include II, aVF, V5 and V6)
- "Fishhook" or notching pattern, typically in V4
- QRS to T-wave concordance
- Asymmetric T-waves (descending limb steeper than ascending limb)
- No reciprocal ST-segment changes (except in aVR)
- Normal R-wave progression
- ECG stability over time
- Found most often in younger patients

Pericarditis

- 4 stages of transient ST and PR segment changes
- EKG features (stage 1)
 - Concave upward STE typically 2-4 mm
 - STE and PR-segment depressions diffusely in all leads except aVR and V1
 - Prominent T waves
 - Spodick's sign (down sloping TP segment)
- To distinguish between pericarditis and BER, compare J point elevation to T-wave amplitude in V6 (see image)
 - Ratio ≥ 0.25 suggests pericarditis
 - Ratio < 0.25 suggest BER *



Editor's Note: I received some feedback from my close friend and fellow EKG aficionado Dr. Joe Polinski on the ECG Challenge from the April/May issue of EM Resident. He pointed out that the last sentence of the 1st paragraph states the treatment options for stable irregular WCT include amiodarone, which is not an ideal choice if there is suspected underlying WPW, as amiodarone has nodal blocking properties and questionable efficacy on increasing the refractoriness of the accessory pathway. Of note, section 8.1.3.1.6 of the ACC/AHA/ESC 2006 Guidelines for the Management of Patients with Atrial Fibrillation states "In hemodynamically stable patients with [Afib and] preexcitation, type I antiarrhythmic agents or amiodarone may be administered intravenously." This recommendation was not changed in the 2011 Focused Update of the 2006 Guidelines. The take-home point is that procainamide or cardioversion are the safest treatment options for hemodynamically stable irregular WCT with suspected WPW.

2018 FALL AWARDS

You've done outstanding work all year long.
It's time to be recognized for it!



Apply Now! Submit applications at emra.org/awards by July 15, 2018.



5 Reasons to GIVE \$5

Donate at
[emfoundation.org/
donate](http://emfoundation.org/donate) or TEXT
@emf 5 to 52014

The best \$5 you'll ever spend.

EMF Emergency
Medicine
Foundation
research → education → patient care

Support colleagues doing the
research that enhances your practice.

Cultivate young
investigators
starting their careers.

Improve your clinical
practice with results from
cutting edge research.

Fund
studies
that
strengthen
health
policy.

Lay the foundation for the future of EM.

Board Review

QUESTIONS



NEW! PEER IX QUESTIONS NOW AVAILABLE!

PEER (Physician's Evaluation and Educational Review in Emergency Medicine) is ACEP's gold standard in self-assessment and educational review. These questions are from *PEER IX*, which made its print debut in June 2017.

For complete answers and explanations, visit the [Board Review Questions](#) page under "Features" at [emresident.org](#). To order PEER IX, go to [acep.org/bookstore](#).

1. A 23-year-old woman presents with anxiety of 30 minutes' duration. She has no medical history and is not taking any medications. She feels short of breath, reports palpitations, and feels tingling around her mouth and in both hands. Vital signs include BP 112/76, P 90, R 20; Spo₂ is 97%. Results of her physical examination are within normal limits. What is the correct approach to evaluating this patient for PE?
 - A. Draw a D-dimer and proceed if positive
 - B. No further evaluation is necessary
 - C. Order CT angiography of the chest
 - D. Order Doppler ultrasonography of the lower extremities
2. A 32-year-old man presents after passing out in his living room. Vital signs are stable, and he is asymptomatic. Physical examination is unremarkable. An ECG is obtained.
 - A. Brugada syndrome
 - B. Prolonged QT syndrome
 - C. Third-degree AV block
 - D. Wolff-Parkinson-White syndrome
3. A mother brings in her 3-year-old son for evaluation of a 2-day progressive nonproductive cough, runny nose, and fever. Vital signs include P 105, R 26, T 37.6°C (99.7°F); Spo₂ is 95% on room air. He has inspiratory stridor, moderate intercostal retractions, and a seal-like barking cough. After treatment with systemic corticosteroids and nebulized racemic epinephrine, he has no further stridor, retractions, or cough. What is the best next step in management?
 - A. Arrange admission to the hospital
 - B. Discharge home
 - C. Monitor for 3 hours in the emergency department
 - D. Start nebulized albuterol treatment
4. A 21-year-old woman presents with frequent recurrent seizures soon after ingesting a large quantity of isoniazid. Blood glucose level is normal. Which of the following should be administered intravenously?
 - A. Niacin
 - B. Phytonadione
 - C. Pyridoxine
 - D. Thiamine
5. Which of the following features of fingertip amputations warrants hand surgery consultation?
 - A. Exposed bone
 - B. Involvement of the fingernail
 - C. Pediatric patient
 - D. Visible volar fat pad ★

ANSWERS
1. B; 2. A; 3. C; 4. C; 5. A

CLASSIFIED ADVERTISING

ALABAMA

Mobile: ACADEMIC EMERGENCY MEDICINE POSITIONS ON THE GEORGEOUS GULF COAST – The University of South Alabama, is seeking faculty for growing EM academic programs at both hospital ED's (level 1 University Medical Center and the Children's Hospital). Must be EM or Peds EM trained and board eligible/certified. Fellowship in PEM, EMS, education/admin or research is a plus. Opportunities to lead, initiate or contribute to new programs and services. Also recruiting for Chief, Division of Peds EM and Research Director. Applicants are invited to submit CV and letter of interest to: Edward A. Panacek, MD, MPH, Chair of Emergency Medicine, USA-COM, Mobile, AL (eapanacek@health.southalabama.edu). Further information at www.southalabama.edu/departments/academicaffairs/resources/healthsciencepositions/medicine/USA.EM.%20Recruitment_notice_2015.pdf.

ALASKA

Fairbanks: New full-time position for a BC/BE Emergency Medicine physician to join a stable, democratic group of 10 physicians. This is a hospital practice based at Fairbanks Memorial Hospital. Annual visits exceed 36,000. Fairbanks Memorial Hospital is a JCAHO accredited 159-bed hospital that is the primary referral center for the 100,000 citizens of Alaska's interior. Fairbanks is a truly unique university community with unmatched accessibility to both wilderness recreation and urban culture. We aim to strike a balance between life and medicine, offering excellent compensation and benefits with a 2-year partnership track. 10 hour shifts with excellent mid-level coverage. For additional information please contact: Michael Burton MD, President (907) 460-0902 mrb5w@hotmail.com or Art Strauss MD, Medical Director (907) 388-2470 art@ghepak.com.

CALIFORNIA

Los Angeles – Culver City: Southern California Hospital at Culver City! Rare opportunity to join a Westside Los Angeles ER group. Group seeks BC/BE emergency physician to work Part Time/Full Time as an independent contractor. Excellent compensation in top 15% locally with malpractice insurance and tail paid. Nine hour shifts with 11 hours of PA double coverage. 85% of the night shifts are covered by night doctors. Very manageable 1.6 - 1.9 patients per hour. Our emergency department sees 25,000 patients per year. A complete

ED refurbishment has been completed with an ER rebuild and expansion in the future. Brand-new Sonosite SII Ultrasound machine and Glidescope video laryngoscope in the department. Computerized Charting and PACS at every physician station. Email CV and references to clumel@repmg.com; Phone 951-898-0823.

Riverside: Parkview Medical Center – Great opportunity to join an established 16 year ER group. Group seeks BC/BE Emergency Physician to work Part Time/Full Time as an independent contractor. Excellent Top 10% Compensation based on productivity with malpractice insurance and tail paid. Ten hour shifts with MD double coverage and 12 Hour mid level triple coverage. Our emergency department sees 48,000 patients per year. Computerized equitable shift scheduling. Efficient Computerized Charting and PACS at every physician station. New Sonosite Ultrasound machine and Glidescope video laryngoscope in the department. A brand new ER expansion has already broke ground and will quadruple the size of the existing ER! Join us and practice in a brand-new ER Department! Email CV and references to clumel@repmg.com; Phone (951) 898-0823.

Ventura: New hospital under construction and scheduled to open in the spring of 2018 with a state-of-the-art Emergency Department. Practice with a stable ER group on the central coast of California and only 70 miles from LAX. Positions available in two facilities for BC/BE emergency physician. Main facility is a STEMI Center, Stroke Center with on-call coverage of all specialties. This is a teaching facility with residents in Family Practice, Surgery, Orthopedics and Internal Medicine. Admitting hospital teams for Medicine and Pediatrics. 24-hour OB coverage in house and a well-established NICU. Annual volume is 48K patients with nearly 70 hours of coverage daily and 12 hours of PA/NP coverage. All shifts and providers have scribe services 24/7. Affiliated hospital is a smaller rural facility 20 minutes from Ventura in Ojai. Malpractice and tail coverage is provided. New hires will work days, nights, weekends and weekdays. Come work with a well-established high caliber group with expected volume growth potential at our new facility. Enjoy the life style of a beach community yet outside the hustle of the LA area. Please send a resume to Alex Kowblansky, MD, FACEP, at kowblansky@cox.net.

It's about Medicine. Careers. Lifestyle.

Frisbie Memorial Hospital serves the health care needs of the greater Rochester and beautiful Seacoast Region of New Hampshire.

We are currently seeking a BC/BE Emergency Medicine Physician to join our ED team. Frisbie Memorial Hospital's Emergency Department is one of the largest and busiest facilities in the Seacoast Region of New Hampshire, treating more than 30,000 patients each year.

Frisbie Memorial Hospital is a full-service Medical Center in Rochester, NH, that provides expert medical care using advanced, cutting-edge technology to diagnose and treat patients with acute and chronic health conditions. In addition, Frisbie has access to nearly thirty specialty care services so patients can be close to their healthcare specialists.

At Frisbie, people are the foundation of what health care is all about. People like you, who are looking for the best health care careers possible – and people like the professionals at Frisbie Memorial Hospital who are dedicated to providing it. We use the latest technology to help our dedicated staff find solutions that benefit our patients. Technology that promotes faster healing, better health, higher quality of life and in-turn, career satisfaction. It's this approach that has allowed us to develop trust with our staff and our patients, and to become top-rated nationally for outstanding patient care, patient safety, quality medical services and exceptional health care careers.

Frisbie offers a competitive salary and benefits package.

For inquiries or to apply, please contact:
Jeanette Rowlinson, PHR, SHRM-CP, RACR
Human Resources Business Partner
Office: 603-330-7989
Email: J.Rowlinson@FMHospital.com

All inquiries will remain confidential.

 **FrisbieCareers.com**

Frisbie
Memorial
Hospital

Frisbie Memorial Hospital is an Equal Opportunity Employer

Own your tomorrow, today!

Practice with us.

VEP
HEALTHCARE

Rewarding opportunities available in:
California, Kansas, North Carolina, Ohio,
Tennessee, Texas & West Virginia!

Ask us about our:

- Sign-on Bonus
- Residency Stipend
- Leadership Development

Founded in 1981, VEP Healthcare is a democratic, provider owned and led physician organization. VEP provides flexibility and a path to ownership after just 150 hours of service.

For more information, contact:
recruiting@vephealthcare.com
925- Call VEP (225-5837)
www.vephealthcare.com



To enter our drawing & meet our
recruiters, visit us at booth #917!



SBH
Health System
BRONX

ST. BARNABAS HOSPITAL
DEPARTMENT OF EMERGENCY MEDICINE

FELLOWSHIP IN SOCIAL EMERGENCY MEDICINE

A one-year fellowship designed to train and educate the fellow in the field of Social Emergency Medicine. The fellowship will emphasize research and innovation around focused and systemic interventions promoting health equity along with operational, policy and legislative interventions.

CORE FACULTY POSITIONS

We seek EM faculty dedicated to advancing the specialty and practice of emergency medicine, and contributing to our missions of clinical, educational and research excellence.

St. Barnabas Hospital is a 461-bed safety-net hospital in the Bronx. St. Barnabas Hospital is the principal teaching affiliate of CUNY's School of Medicine, and is also affiliated with Albert Einstein and NYCOM. Our ED provides critical emergency care to over 90,000 patients/year and we are home to a well-established four year EM residency program.

For more information, please contact:
Daniel G. Murphy, MD, MBA, ED Chair
dmurphy@sbhny.org, 718.960.6103

WESTERN PENNSYLVANIA

EMERGENCY MEDICINE

UPMC and University of Pittsburgh

UPMC has a long history of emergency medicine excellence, with a deep and diverse EM faculty also a part of the University of Pittsburgh. We are internationally recognized for superiority in research, teaching and clinical care. With a large integrated insurance division and over 25 hospitals in Pennsylvania and growing, UPMC is one of the nation's leading health care systems. We do what others dream – cutting edge emergency care inside a thriving top-tier academic health system.

We can match opportunities with growth in pure clinical or mixed careers with teaching, research, and administration/leadership in all settings – urban, suburban and rural, with both community and teaching hospitals. Our outstanding compensation and benefits package includes malpractice without the need for tail coverage, and employer-funded retirement plan, generous CME allowance and more.

To discuss joining our large and successful physician group, email emcareers@upmc.edu or call 412-432-7400.

See us
at Booth
1618!

UPMC | EMERGENCY
MEDICINE

EOE Minority/Female/Vet/Disabled

72714C HR&E 02/17

Emergency Medicine Board Review Exam Preparation!

Ohio ACEP Emergency Medicine Board Review Courses

Trusted Expert Faculty. Concentrated Focused Review. Essential Exam Prep.
For 34 years, our renowned course has helped thousands of physicians pass their boards!

Highlights

- Printed & Electronic Daily **Course Syllabus**
- Pre, Post & Daily Tests - **Over 400 Questions**
- **Rapid Review** Prep Sessions



Date Options

5-DAY COURSE

August 18 - 22, 2018
October 12 - 16, 2018

3-DAY COURSE

August 23 - 25, 2018

Discounted Resident Rates!



Dr. Carol Rivers' Written Board Review

- Eighth Edition -

- 500+ **Questions & Answers**
- Hundreds of **Images**
- End-of-Chapter **Clinical Scenarios**
- Includes Access to **Textbook App**
- **Flash Cards** & App also Available

www.ohacep.org

(614) 792-6506

CLASSIFIED ADVERTISING

INDIANA

Richmond – Long standing Emergency Medicine group of 12 – recruiting 3 BE/BC residency trained EM physician. Partnership day one! Excellent compensation package including \$50K signing bonus, \$100K student loan repayment and \$10K relocation. 401(k) with match and profit sharing! Community hospital with annual volume of 48,000 emergency room visits. New 217-bed hospital featuring 33-bed ER designated as Level 3 trauma. Epic EMR, no admitting orders, and strong specialty support. Richmond is a college community of 40,000 with draw area of 150,000. Three major metro cities within one hour – Indianapolis, Dayton and Cincinnati. Family oriented community with relaxed lifestyle and excellent schools. Outdoor Recreational activities abound. Great place to live and practice medicine. **Contact Amy Powell, Recruiter, Reid Health, PhysicianRecruitment@ReidHealth.org or 765-983-3104.**

South Bend – Memorial Hospital. Very stable, Democratic, single hospital, 24-member group seeks additional Emergency Physicians. 60K visits, Level II Trauma Center, double, triple and quad physician coverage. Equal pay, schedule and vote from day one. Over 375K total package with qualified retirement plan; group health and disability insurance; medical, dental and CME reimbursement, etc. Very favorable Indiana malpractice environment. University town, low cost of living, good schools, 90 minutes to Chicago, 40 minutes to Lake Michigan. Teaching opportunities at four year medical school and with FP residency program. Contact Joseph D'Haenens MD at southbendemergency@gmail.com.

OREGON

Salem – Outstanding BC/BE EM physician partnership opportunity at Salem Health Emergency Department (SEPS). Well-established, independent, democratic group with 37 physicians and 6 APPs who staff 110K annual visit, Level II trauma center, with excellent specialty backup. Competitive pay and benefits including scribes, flexible scheduling, malpractice, 401k, and more. We structure our practice to minimize turnover through maximizing work-life balance. We love living in Salem, the heart of Oregon wine country, as it is convenient to the bounty of Oregon's recreational opportunities, and is a safe and affordable community. See what we're about at sepspc.com, then send your CV, cover letter, and a recent photo to sepspc@salemhealth.org or call us at 503-814-1278.

TEXAS



Leading Edge Medical Associates is a one-of-a-kind, private, independent group of all board-certified EM physicians in northeast Texas, offering a full range of clinical opportunities in EM. Our physicians enjoy shifts in a tertiary care trauma center as well as in nearby, lower volume clinical settings, all with high compensation and excellent full benefits. We are known for innovation in the industry and for developing strong EM leaders through LEMA's Leadership Development Institute. Almost half our physicians are former chief residents. LEMA is unique in its ability to offer physicians the best of both worlds, hospital-based and freestanding, academic and community medicine. LEMA is a group of exemplary physicians who work together as a team, value each member's input, and have a level of integrity, honesty, and trust that makes this innovative group truly one-of-a-kind. Interested in joining Texas's premier private group? Contact: SUZY MEEK, MD, CAREERS@LEMA-EM.COM.

WISCONSIN

Milwaukee – Emergency Medicine Specialists (EMS) is a Physician-owned democratic EM group of approximately 40 EM Physicians based in Milwaukee, WI, just 1 hour north of Chicago. We are seeking full time and/or part time BC/BP Emergency Medicine Physicians to join our growing but well-established practice. Our group staffs five EDs in Southeastern Wisconsin, including a new contract starting in January 2018! Partnership tracks are available. Excellent work environment, benefits, compensation. We pride ourselves on being fair, equitable, and democratic. Interested Physicians contact Matthew Deluhery, MD, matthew.deluhery@ems-wi.com, 414.877.5350.



Practice Emergency Medicine in Award-Winning Community of Saratoga Springs, NY



Saratoga Hospital Medical Group - Emergency Medicine

seeks Emergency Medicine physicians to join its well-regarded group in Saratoga Springs, NY. Practice at one of our two state-of-the-art facilities, a spacious, 8-year-old, 41-bed ED, with annual census of 40,000 visits, or at Malta Med Emergent Care (MMEC), a five-year-old, 24-bed advanced Urgent Care center with 36,000 annual visits, open 24 hours, located 10 miles from the hospital. We seek full-time, part-time and per diem employees. We also staff a third urgent care, Wilton Medical Arts with 33,000 annual visits.

The Saratoga Hospital Medical Group is the hospital's 160+ member multispecialty group, offering a shared-governance model of leadership.

An enhanced compensation package for BC/BP Emergency Medicine physicians includes competitive pay; a sign-on bonus, moving expenses, and loan forgiveness/retention bonuses. Differentials: 20% nights; 10% weekend days; 30% weekend nights; and time-and-a-half holiday pay. Benefits: \$5K CME; 403 (b) Retirement Plan; family health, prescription, dental, vision, insurance waiver credit, Flexible Spending Account, Company Paid Life Insurance and Long Term Disability; \$200 YMCA discount; and more!

Saratoga is a great place to live and work, offering a variety of neighborhoods, upscale apartments, shops, eateries, and businesses. This small award-winning city is known for world-class entertainment and abundant, year-round recreational and athletic opportunities. Famous venues include Saratoga Race Course, Saratoga Performing Arts Center, Saratoga Spa State Park. Outdoor enthusiasts will love the beauty of the Adirondacks, nearby Berkshires and Green Mountains, Saratoga Lake, Lake George, waterways, and more!

View our website at www.saratogahospital.org.

Visit our community at:

<http://www.saratoga.org>

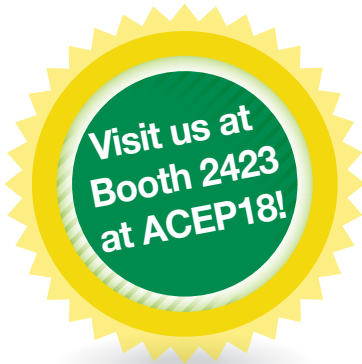
<http://discoversaratoga.org>

<https://www.iloveny.com/places-to-go/capital-saratoga>

Contact: Denise Romand, Medical Staff Recruiter,
Saratoga Hospital:
dromand@saratogahospital.org
Phone: (518) 583-8465



Health System



BC/BE EMERGENCY PHYSICIANS NEEDED to join current staff of 40+ physicians

- **Level I Trauma Center with 75 beds and fast track**
- **Medical Observation Unit with 16 beds**
- **Pediatric ED with 16 beds**
- **Community hospital ED with 21 beds**

EXCELLENT COMPENSATION PACKAGE!

- **Competitive salary with RVU-based incentives, CME, paid vacation, health/life/malpractice, 401k**

Huntsville Hospital is looking for additional coverage for our progressive Emergency Department. We see approximately 150,000 patient visits per year across our 4 different units (Level I Trauma Center, Medical Observation Unit, Pediatric ED at Children's hospital, community hospital in Madison - plus an OB ED staffed by our OBGYN Hospitalist team. Our physicians work an average of 14-15 shifts per month (9-10 hours per shift), allowing for an excellent work/life balance. Teaching opportunities with 3rd/4th year medical students from UAB and Family Medicine and Internal Medicine residents at UAB-Huntsville rotate through our ED.

Qualified candidates include: Emergency Medicine and Family Medicine physicians. Huntsville Hospital is a Level I Trauma Center and the Regional Referral Center for North Alabama and Southern Tennessee. Huntsville Hospital is Alabama's only Top 50 Heart Hospital by Truven Health Analytics and one of America's 50 Best Cardiac Surgery Programs by HealthGrades.

Huntsville is situated in the fastest growing major metropolitan area of Alabama, and with the highest per-capita income in the Southeast, Huntsville is the best place to live, learn, and work. We are a community on the move, rich with values and creative talents. These unique characteristics will certainly provide a place for you and your family to flourish. With a population of 385K, we are a high-tech, family-oriented, multicultural community with excellent schools, dining, and entertainment - all nestled in the foothills of the beautiful Appalachian Mountains.

**For further information, please contact Suzanne LeCroix
at (256) 265-9639 or suzanne.lecroix@hhsys.org**



huntsvillehospital.org

EMERGENCY PHYSICIANS of St. Petersburg, PA



Located in St. Petersburg, Florida
Seeking Fulltime BC/BE Emergency Physicians
at a Level II Trauma Center with 48,000 volume.

We are a rapidly expanding, well-established,
independent, democratic group.

Bayfront Health broke ground for a new 37,000 sq ft state-of-the-art
Emergency Department.

480-bed hospital with:

- Primary Stroke Center
- Chest Pain Center with PCI
- Level IV Epilepsy Center
- Aero-Medical Flight Program
- Regional Flagship hospital with a network of six hospitals along the Florida Gulf Coast
- 48-hour physician coverage
- 36-hour PA/ARNP coverage

A free-standing ED is also slated to open November 1, 2018.

We offer a comprehensive benefit package including health,
dental, vision, LTC, CME allowance, 401K, profit-sharing,
along with a partnership track.

Requirements: residency trained, ACLS, ATLS and PALS certified.

For more information, contact
the Emergency Physicians of St. Petersburg, PA at
(727)-553-7300, fax (727)-553-7395
or email: aaesp360@gmail.com
Our web site is EpspBayfront.com

RUTGERS

New Jersey Medical School

Academic Emergency Physician Rutgers New Jersey Medical School, Newark, NJ

The Department of Emergency Medicine at Rutgers New Jersey Medical School in Newark, NJ, is recruiting highly qualified, full-time BC/BE Emergency Medicine Faculty at the Assistant or Associate Professor level.

Join a diverse, enthusiastic faculty of academic Emergency Physicians in an expanding and dynamic department committed to scholarship, education, research, and outstanding clinical care. Clinical services are provided at University Hospital in Newark, NJ, a Level I trauma center.

Optimal candidates will have a desire for clinical, academic, or administrative excellence. Subspecialty of other training desired, but anyone with clinical and academic aspirations is strongly encouraged to begin or enhance your career at Rutgers NJMS. The salaries are competitive, the institutions and leadership are very supportive, and the patient population is highly in need of quality healthcare.

Live nearby in beautiful suburban or urban New Jersey or within a short commute from New York City. The medical school is blocks from the New Jersey Institute of Technology and the Rutgers Newark Campus, as well as the rejuvenating downtown Newark area, and is close to Newark Liberty Airport and Newark Penn Station Amtrak.

For more information or to submit a CV/cover letter please contact:

Lewis S. Nelson, MD

Chair, Department of Emergency Medicine

185 South Orange Avenue, MSB 609

Newark, NJ 07103

E-609

Email: Lewis.Nelson@njms.rutgers.edu

Rutgers University is an AA/EEO employer. All applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, citizenship, disability or protected veteran status.



Contact us at
recruitment@umem.org
or 410-328-8025

UMEM is an EOE/AE



UNIVERSITY of MARYLAND EMERGENCY MEDICINE

Academic and Community Openings for BE/BC Emergency Physicians

Vibrant and varied career possibilities in academic and community settings in the Baltimore metropolitan area as well as near Washington, Philadelphia and Maryland's coastline.

Live and work in an urban, suburban or rural community, in an atmosphere that encourages work/life balance.

Current EM Practice Opportunities

Downtown Baltimore – Volumes from 21 to 66K

North of Baltimore – Volumes from 32 to 65K

Eastern Shore – Volumes from 15 to 37K

DC Suburbs – Volumes from 34 to 60K

Our supportive team approach in the delivery of high quality patient care features:

- Dedicated fast track and intake units staffed by Family Practice physicians and PAs
 - ED scribes and medical information systems
 - Stroke centers & STEMI programs
 - Ultrasound programs with bedside US machines
 - Advanced airway equipment including GlideScope®

Generous Compensation and Benefit Package

- Additional incentive compensation
- Medical, dental, vision and life insurance
- Employer-paid CME, PTO and 401K safe harbor retirement plan
- Employer-paid malpractice insurance with full tail coverage



**Love where you work.
Love where you live.**

Central Montana Medical Center is a critical access hospital and Level 4 Trauma Center in the heart of Montana, providing care for a region that spans mountain ranges, streams, and plains. Since the nearest hospital is more than 100 miles away, CMMC is the backbone of the region. Our providers offer the community a full range of services — and the community, in return, offers an incredible place to live, learn, and grow.

Apply now!

Contact Torie Poser at

tposer@cmmccares.com or visit

www.cmmc.health/employment/provider-opportunities.



CAPE REGIONAL

**CAPE EMERGENCY PHYSICIANS
Emergency Medicine Physicians**

Cape Emergency Physicians is a small independent emergency medicine physician owned and operated practice that has been staffing Cape Regional Medical Center for over 20 years. It is a small community based hospital in Cape May County New Jersey with approximately 45k visits per year. The hospital is just minutes away from the beautiful beaches of Stone Harbor, Avalon and Cape May.

We are seeking BC/BE emergency medicine physicians for FT, PT, or per diem positions.

- Competitive hourly rates of \$175/200/225 per hour
- Sign on bonus
- Biannual bonuses
- Generous benefit package
- Profit sharing and 401K
- CME allowance,
- 10 hour shifts
- Allscripts EMR
- 11 bed acute care, 9 bed sub acute care, 9 bed fast track and 5 bed behavior health unit

If interested, please reply to Laura Ashley at staffing@urgentcarephysicians.org with your contact information and CV.



LEMA



**PRIVATE INDEPENDENT
GROUP HIRING NOW
LOOK FOR US AT ACEP!**

**WE BUILD
EM LEADERS**

TAKE THE LEAD, CONTACT US TODAY: SUZY MEEK, MD CAREERS@LEMA-EM.COM LEMAMD.COM

Emergency medicine physician opportunities at Geisinger

Geisinger, a national leader in healthcare innovation and technology, is seeking BC/BE Emergency Medicine trained physicians for opportunities throughout central, south central and northeast Pennsylvania.

Join Geisinger's growing team of Emergency Medicine staff physicians in practicing state-of-the-art medicine in one, or a variety of settings.

With Geisinger, you can take advantage of:

- Competitive compensation package
- Exceptional work life balance, defined clinical hours
- Support from a full range of dedicated specialists and subspecialists
- Scribes, pharmacists and Advance Practice support
- Ongoing enhancements to our fully-integrated Electronic Health Record (EHR) – Epic
- \$150,000 medical school loan repayment
- \$100,000 forgivable loan
- \$2,000 monthly stipend available to current residents upon signature of an offer letter

Locations throughout PA include:

- Geisinger Bloomsburg Hospital (GBH)
Bloomsburg
- Geisinger Wyoming Valley Medical Center (GWV)
Wilkes-Barre
- Geisinger South Wilkes-Barre (GSWB)
Wilkes-Barre
- Geisinger Holy Spirit (GHS)
Camp Hill
- Geisinger Shamokin Area Community Hospital (GSACH)
Coal Township

Geisinger is nationally recognized for our innovative practices and quality care.

A mature electronic health record connects a comprehensive network of 13 hospital campuses, two research centers and nearly 1,600 Geisinger primary and specialty care physicians.

For more information, visit geisinger.org/careers or contact Miranda Grace, Talent Management, at 717-899-0131 or mlgrace@geisinger.edu

Geisinger



AA/EOE: disability/vet

geisinger.org/careers

HIRING Emergency Medicine Physicians

Kettering Health Network is seeking a BC/BE Emergency Medicine physician to join a highly regarded, regional private group located in **Dayton, OH.**

- Strong group of 70+ physicians and advanced practice providers
- Provide care at six of Kettering Health Network's Emergency Departments, including 4 hospitals and 2 freestanding Emergency Centers
- Trauma Level II and III options
- Competitive salary, generous benefits package
- Sign-on bonus up to \$40,000 matched by group and hospital
- Epic EMR utilized across the network
- Warmth and charm of the Midwest

Site visits are being scheduled now!

Contact Cindy Corson
Physician Recruitment Manager
cindy.corson@ketteringhealth.org
(937) 558-3475 (office)
(503) 201-8588 (cell)



Southern NJ Democratic Group incorporated for over fifteen years looking for BC/BE EM physician.

Physicians interested in stability and lifestyle wanting to join a group dedicated to providing top-notch EM services at our Vineland Medical Center, Elmer Medical Center, and Bridgeton SED.

This family-oriented community is close to Philadelphia and New Jersey shore communities with the option of suburban, urban or shore living.

Salary competitive with an excellent benefit package including the maximum contribution to 401k and full partnership track.

Our Inspira Emergency Medicine Residency Program provides physicians with opportunities to work with residents.

Contact Matthew Warner, M.D.
Emergency Medicine, Inspira Health Network,
856-641-7733; e-mail matthew.warner@ihn.org



{ Job Opportunities }

ASSISTANT MEDICAL DIRECTOR

PEDIATRIC EMERGENCY MEDICINE LEADERSHIP OPPORTUNITIES

ASSOC PROGRAM DIRECTOR

VICE CHAIR, RESEARCH

EMERGENCY MEDICINE RESEARCHER POSITIONS



The Emergency Medicine Department at Penn State Health Milton S. Hershey Medical Center seeks energetic, highly motivated and talented physicians to join our Penn State Hershey family. Opportunities exist in both teaching and community hospital sites. This is an excellent opportunity from both an academic and a clinical perspective. As one of Pennsylvania's busiest Emergency Departments treating over 75,000 patients annually, Hershey Medical Center is a Magnet® healthcare organization and the only Level 1 Adult and Level 1 Pediatric Trauma Center in PA with state-of-the-art resuscitation/trauma bays, incorporated Pediatric Emergency Department and Observation Unit, along with our Life Lion Flight Critical Care and Ground EMS Division. We offer salaries commensurate with qualifications, sign-on bonus, relocation assistance, physician incentive program and a CME allowance. Our comprehensive benefit package includes health insurance, education assistance, retirement options, on-campus fitness center, day care, credit union and so much more! For your health, Hershey Medical Center is a smoke-free campus. Applicants must have graduated from an accredited Emergency Medicine Residency Program and be board eligible or board certified by ABEM or AOBEM. We seek candidates with strong interpersonal skills and the ability to work collaboratively within diverse academic and clinical environments. Observation experience is a plus.

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:



PennState Health



Susan B. Promes, Professor and Chair, Department of Emergency Medicine, c/o Heather Peffley, Physician Recruiter, Penn State Health Milton S. Hershey Medical Center, 500 University Drive, PO Box 855 Mail Code A595, Hershey PA 17033, Email: hpeffley@pennstatehealth.psu.edu

OR apply online at: <http://hmc.pennstatehealth.org/careers/physicians>

Department of Emergency Medicine Fellowship Opportunities

The Department of Emergency Medicine at University Hospitals Cleveland Medical Center is currently seeking ABEM/ABOEM certified or eligible physicians for the following fellowships in July 2018:

- **Global Emergency Medicine Fellowship**
Program Director: Dr. Justin Yax
- **Ultrasound Fellowship**
Program Director: Dr. Vicki Noble
- **Administrative Fellowship**
Program Director: Dr. Christopher Miller
- **EMS Fellowship (ACGME-Accredited)**
Program Director: Dr. Jeffrey Luk

University Hospitals Cleveland Medical Center (UHCMC) is a 1,032-bed Magnet facility on the campus of Case Western Reserve University (CWRU) located in the cultural heart of Cleveland: University Circle. UHCMC is a verified Level I Adult Trauma Center, Comprehensive Stroke Center, and STEMI Center. The Department of Emergency Medicine hosts a three-year emergency medicine residency training program with 10 residents/year. UHCMC also includes Rainbow Babies and Children's Hospital, which is a verified Level I Pediatric Trauma Center. UHCMC is a teaching affiliate of the CWRU School of Medicine.

Visit our website to learn more:
<https://www.uhdoctor.org/center-for-emergency-medicine>

Salary and academic rank will be commensurate with accomplishments and experience.

Qualified candidates should email a letter of interest to the appropriate fellowship director c/o Ms. Dildred Houston, Education and Practice Coordinator, Department of Emergency Medicine, at Dildred.Houston@UHhospitals.org

Where Quality of Life and Quality of Care Come Together



Big City Medicine, Hometown Feel.

We understand the importance of balancing work with a healthy personal lifestyle.

- Berkshires, a 4-season resort community
- Endless cultural opportunities
- World-renowned music, art, theater, and museums
- Year-round recreational activities from skiing to kayaking
- Excellent public and private schools make this an ideal family location
- **Just 2.5 hours from both Boston and New York City.**

Berkshire Health Systems Opportunity

- BC/BE Emergency Medicine Physician
- Annual Volume 60,000
- Regional referral center and Trauma center
- Hospitalist Support and Sub-Specialty support
- Patient-focused practice
- Teaching Affiliate with UMASS Medical School and UNE Osteopathic Medical School
- **Competitive compensation** and benefits package, including productivity option and relocation

Berkshire Medical Center, BHS's 302-bed community teaching hospital and Trauma Center, is the region's leading provider of comprehensive healthcare services.

Interested candidates are invited to contact:
Shelly Sweet, Physician Recruitment Specialist
msweet@bhsf.org
Apply online: www.berkshirehealthsystems.org



Berkshire
Health Systems

EMERGENCY MEDICINE OPPORTUNITIES



Baystate
Health



University of
Massachusetts
Medical School

Baystate Health is western Massachusetts's premier healthcare provider and home to the prestigious University of Massachusetts Medical School - Baystate. The cornerstone of our organization is Baystate Medical Center, a 716-bed tertiary care hospital that boasts the state's single busiest emergency department and the region's only Level-I trauma center. With 4 community hospitals, Baystate Children's Hospital and Baystate Primary Care Medical Practices, we offer an amazing, diverse culture that provides outstanding opportunities for physicians and advanced practice providers to start or advance their career.

Emergency Medicine Opportunities:

- **ASSOCIATE REGIONAL EMS MEDICAL DIRECTOR**
- **EMERGENCY MEDICINE PHYSICIAN - Baystate Medical Center, Springfield**
- **EMERGENCY MEDICINE PHYSICIAN - Baystate Eastern Region/Community Medicine**

The Pioneer Valley is a thriving area located in western Massachusetts and provides extensive access to urban, suburban and rural amenities. Anchored by the city of Springfield, our region boasts a myriad of opportunities for recreation, music, education and art enthusiasts. When you live and work in the Pioneer Valley, you will enjoy picturesque four-season living, excellent schools and year-round social and cultural events. In fact, Massachusetts was once again ranked #1 in Education nationally by U.S. News and World Report.

For more information please visit us online at: choosebaystatehealth.org or interact with us socially at facebook.com/BaystateCareers or on [Twitter @BaystateCareers](https://twitter.com/BaystateCareers).

All correspondence can be directed to: Niels Rathlev, MD c/o Kristin Richard, Senior Physician Recruiter
Telephone: 413.794.7847; Fax: 413.794.5059; Email: Kristin.Richard@BaystateHealth.org

Baystate Health is an Equal Opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, marital status, national origin, ancestry, age, genetic information, disability, or protected veteran status.

Exceptional Emergency Medicine Opportunities with EMMC and Affiliates in Maine!

Eastern Maine Medical Center is seeking BC/BE Emergency Medicine physicians for full-time permanent positions at primary locations in Bangor, Blue Hill, Waterville and Ellsworth

- Dynamic physician-led collaborative Emergency Medicine Model
- Supportive hospital administration
- Join well-established team at a primary site, with options to work at other sites within our system
- Flexible schedule/no call
- Medical student teaching options
- Full Spectrum of Sub-specialty backup and consultation
- In-house collaborative Radiology and Night Hawk Services
- In-System LifeFlight of Maine Air/Ground Critical Care Transport Program
- In-System ACS-Verified Level II Trauma Center <1 hr away
 - Trauma Service: on call consult
 - Critical Care Intensivists: on call consult
 - Pediatric Intensivists: on call consult

Visit Us!

**Booth 2546
at ACEP18**

**See you in
San Diego!**



EMMC and affiliates are located in highly desirable, family-centered locations throughout Maine! Enjoy year-round access to Maine's unmatched coastline, mountains and lakes with limitless outdoor recreational opportunities and unspoiled natural beauty!

J-1 Visa candidates welcome to apply!

For more information, please contact:

Amanda L. Klausing, AASPR, Physician Recruiter

Email: ProviderJobs@emhs.org

Phone: (207) 973-5358



**EASTERN MAINE
MEDICAL CENTER**

EMHS MEMBER

How do I approach working locum tenens?

How can I find the best assignment for me?

Who will pay for my malpractice?

Who can guide me through the process?

Who provides the best support?



**The answer:
Weatherby Healthcare.**



Alteon HEALTH



Truly physician led for nearly 50 years.

Empowering emergency physicians to focus on what matters most — making a real impact in the lives of patients.



Physician Led
At every level, including the c-suite.



Stable and Loyal
We partner for the long haul with clients and clinicians.



Patient Focused
Delivering the very best patient care.



Forthright Financials
Fair & merit based compensation with ample earning opportunities.



Impact Driven
Next gen analytics drive impactful practice.



Empowered People
We invest in our clinicians as people, not commodities.

Now Hiring — Opportunities Nationwide

- Top Tier Salary and Benefits
- Student Loan Refinancing
- Leadership Training Program
- Resident Early Signing Program
- Positive Work-Life Balance
- Robust Administrative Support



Expecting to be excited and challenged? Come join our team today!

SEEKING EMERGENCY DEPARTMENT PHYSICIANS

The busiest ED in North Carolina, and one of the top 15 busiest in the nation, treats 95k adult and 35k pediatric cases annually in its 92 beds. We are currently seeking residency trained BC/BE emergency physicians to work in the 75 bed adult ED. This ED serves a high acuity patient population with 28% annual admission rate. There are over 90 hours of adult physician coverage daily and over 110 hours mid-level coverage daily. It is a Level III Trauma Center with robust hospitalist service, interventional cardiology 24/7, cardiac surgery, neurosurgery, etc. The facility is Chest Pain and Stroke accredited. The EMS system is hospital owned and managed with an award winning paramedic program. Of note, the Pediatric ED is separate and has 17 dedicated beds with an additional 24 hours of physician coverage and 20 hours of mid-level coverage. We welcomed our inaugural class of Emergency Medicine Residents in July 2017. Opportunities exist for both clinical and academic emergency physicians.



MEDICAL DIRECTOR OF ULTRASOUND

The Department of Emergency Medicine at Cape Fear Valley Health is seeking a highly-motivated **Director of Emergency Ultrasound** to join our staff and faculty. The ideal candidate will be fellowship trained in Emergency Ultrasound and have experience with advanced ultrasound applications; resident, faculty, and staff education; research; ultrasound workflow; image management; equipment maintenance; and a working knowledge of credentialing, billing, documentation, and reimbursement.

Affiliated with Campbell University School of Osteopathic Medicine, the candidate will enjoy a Core Faculty appointment commensurate with experience, in our Emergency Residency Program with associated dedicated protected time.

TOP TIER COMPENSATION

The cash compensation package is valued at over \$250/hour, including evening, night, and holiday differentials, as well as a quarterly incentive bonus. We offer a generous sign-on bonus plus moving stipend. The comprehensive benefits package includes Malpractice Insurance Paid; CME Time and Allowance; 403(b) match and 457(b); and health, dental, and other desirable benefits.

THE AREA

Cape Fear Valley Health is located in the thriving and diverse community of Fayetteville, NC which consists of more than 319,000 residents. Fayetteville has received the prestigious All-America City Award three times from the National Civic League.

Known for its many golf courses (Pinehurst is located only 30 minutes away), our central location provides easy access to beautiful beaches to our east and to the majestic Blue Ridge Mountains to our west. Our mild climate, low cost of living, and patriotic spirit makes our location ideal for rising healthcare professionals and families.

**VISIT US AT BOOTH 2653
AT ACEP18!**



CAPE FEAR VALLEY HEALTH

Please contact Ashley Dowless, Interim Director, Physician Recruitment
at 910-615-1888

or adowl@capefearvalley.com for additional information.



**US Acute Care
Solutions**

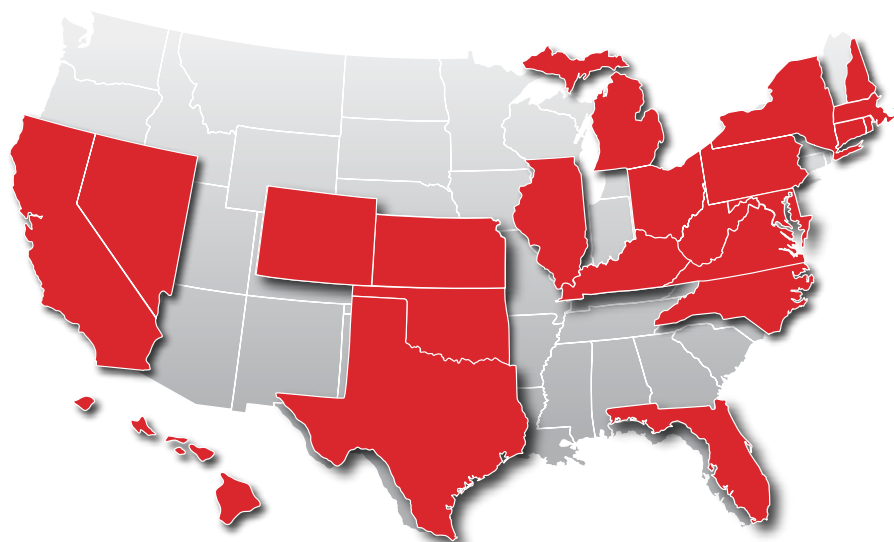
When you become an owner in one of the largest, fastest-growing physician-owned and led groups in the nation, you get the support you need, and the culture and benefits you want.

- Highly competitive financial/benefits package
- Physician equity ownership for all full-time physicians
- Industry-leading and company funded 401(k) (an additional 10%)
- Yearly CME/BEA (Business Expense Account)
- Student loan refinancing as low as 2.99%
- Groundbreaking Paid Parental Leave
- Pioneering Paid Military Leave
- Short- and long-term disability (own occupation)
- Comprehensive medical, dental, vision and Rx coverage
- The best medical malpractice including tail coverage
- Professional development programs
- Location flexibility and career stability of a national group



**SIGN ON BONUS FOR
SELECT LOCATIONS!**

**WORK WHERE YOU WANT TO LIVE.
LOCATIONS NATIONWIDE!**



**FEATURED
OPPORTUNITIES**

Visit usacs.com to view a complete list of locations.

Catholic Medical Center

Manchester, NH | 32,000 pts./yr.

Lawrence & Memorial Hospital

New London, CT | 47,000 pts./yr.

Marshall Medical Center

Placerville, CA | 33,000 pts./yr.

Doctors Hospital

Columbus, OH | 79,000 pts./yr.

Valley Children's Hospital

Madera, CA | 124,000 pts./yr.

Albany Memorial Hospital

Albany, NY | 42,000 pts./yr.

**Allegheny Health Network Emergency
Medicine Management**

Western PA | 12-55,000 pts./yr.

Saint Francis Hospital

Tulsa, OK | 104,000 pts./yr.

Frederick Memorial Hospital

Frederick, MD | 61,000 pts./yr.

Providence Health Center

Waco, TX | 69,000 pts./yr.

Valley Baptist Medical Center

Harlingen, TX | 49,000 pts./yr.

Peterson Regional Medical Center

Kerrville, TX | 29,000 pts./yr.

CHI St. Joseph Health Regional Hospital

Bryan, TX | 50,000 pts./yr.

Meritus Medical Center

Hagerstown, MD | 71,000 pts./yr.

Lake Health System

Eastern Cleveland, OH | 12-35,000 pts./yr.

Summa Health System

Akron, OH | 10-84,000 pts./yr.

Mercy Health

Cincinnati, OH region | 14-60,000 pts./yr.

Florida Hospital System

Florida Heartlands | 13-45,000 pts./yr.

Dignity Health Micro-Hospitals (4)

Las Vegas, NV | 17,000 pts./yr.

Carolinas HealthCare System

Charlotte, NC | 17-69,000 pts./yr.

CarolinaEast Medical Center

New Bern, NC | 67,000 pts./yr.



Practice
made
perfect.

Great Career vs. Great Life? **Have Both**

We provide the support and flexibility you need to balance your career and life outside of medicine.

Join our team
teamhealth.com/join or call **877.709.4638**

TEAMHealth[®]





Emergency Medicine Residents' Association

4950 W. Royal Lane

Irving, TX 75063

972.550.0920

emra.org

PRSR STD
U.S. POSTAGE PAID
BOLINGBROOK, IL
PERMIT NO. 467

**Where you live is a reflection of who you are.
Over 200 locations and growing.**



So is where you work. If you want to be part of a large, stable group, take a look at US Acute Care Solutions. We are the largest, physician-owned group in the country, with over 200 locations, each chosen to appeal to the different tastes and lifestyles of our clinicians. Best of all? Every USACS physician becomes an owner in our group, creating unbeatable camaraderie. Our commitment to physician ownership is a reflection of who we are and what we care about most: our patients, and living the lives we've always dreamed of.

Visit USACS.com and discover why more than 3,000 providers serving over 6 million patients a year are proud to call US Acute Care Solutions home.



Own your future now. Visit usacs.com
or call Darrin Grella at 844-863-6797 careers@usacs.com

