EM Resident

Official Publication of the Emergency Medicine Residents' Association

December 2017/January 2018

VOL 44 / ISSUE 6

Bedside Assessment of Cardiac Output in Undifferentiated Shock

Apneic Oxygenation in RSI

Navigating LVAD Emergencies

Tamponade and Valvular Catastrophes

EMRA

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Letter from the Editor

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EM Resident magazine is EMRA's bi-monthly publication that serves as the platform from which we amplify the many different voices that make our organization extraordinary.

In my first Editor's Letter, I'd like to outline our vision for *EM Resident* and briefly highlight some of the ongoing work being done to ensure that our publication continues to be engaging, up-to-date, and valuable to you — our readers.

First and foremost, we will continue to develop content that celebrates the diversity of our organization, supports the unique needs of emergency medicine learners, and provides a forum for discussing critical issues facing our specialty and training process. As residents, we train in a wide variety of environments- from massive academic centers in major cities to small critical-access hospitals in rural areas. No matter where we are found, EM residents are hard at work providing emergency care to people at their worst moments. Our goal at *EM Resident* is to serve as a venue in which we can learn from each other- not only about the practice of emergency medicine, but about the important issues that we face now and in the future. This has always been our mission, and we will continue to serve this role.

Articles for *EM Resident* are generally written by residents, medical students, and fellows. Traditionally, we have also accepted strong pieces from non-physician authors that deliver important messages to our audience. The EMRA Committees and Divisions (C&D) serve as an excellent starting point for inquiry about ongoing projects or ideas for articles. We are extremely lucky to have an active Medical Student Council (MSC) at EMRA, and we have created many opportunities specifically for students to get involved through this group. Contact information for our C&D and MSC leaders can be found on our website.

Since its humble beginnings, *EM Resident* has continuously evolved as a publication. As EMRA membership continues to expand to record highs, we believe that this ongoing process of self-evaluation and change is something that provides value to the organization. With this, any recommendations for areas of improvement are taken seriously and always welcomed. We are currently in the process of developing new design features for the print edition, and we believe that this will continue to enhance the way that our content is experienced. We will also be making some changes to the overall layout of our print and online content to better represent the way that modern medical learners consume content. Our goal in this is to ensure that the magazine remains a vibrant, reliable host for the high-quality content that you produce for us.

This magazine is truly driven by you, and we ask for your continued support in our goal to maintain our role as the premier source of resident-generated emergency medicine content. If you have ever considered publishing with us, please feel free to reach out to me directly with any questions or concerns that you might have. I enjoy working with authors throughout the entire writing process and would love to hear from you, whether you have a completed article or just an idea. Our submission guidelines and publication timeline can be found on our website. For those of you interested in becoming a part of the *EM Resident* editorial team, I encourage you to consider joining the EMRA Editorial Committee.

Thank you for being a part of EMRA. This organization was created by EM residents who cared deeply about the value of our training and specialty, and we continue to advocate on behalf of our members every day. It is a privilege to serve as your editor-in-chief, and I will do everything in my power to maintain the high standard for *EM Resident* established by our past editors. ✶

TABLE OF CONTENTS

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

Categories

UPCOMING EVENTS

January 1
EMRA Regional Meeting Funding Requests Due

January 15
EMRA Committee & Division Vice-Chair applications Due
EMRA Spring Awards Nominations Due
EMRA Medical Student Council applications Due

March 7
EM Residents' Appreciation Day

April 22-25
CORD Academic Assembly, San Antonio, TX

May 20-23
ACEP Leadership & Advocacy Conference, Washington, DC

EMRA HangOuts

First Thursday of every month

EMPOWER: STORIES FROM EM LEADERS
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Maintenance of CERTIFICATION

EMRA believes emergency physicians are residency-trained and board certified by ABEM or AOBEM. But what does that mean for physicians-in-training? What steps must we take to become board certified? And what is the value of certification?

Initial Certification

Emergency physicians may consider themselves "board eligible" for no longer than 5 years after graduating from residency. Initial ABEM certification includes a one-day written exam than can be taken at testing centers throughout the US during one week of fall, and an oral exam offered in the spring or fall at "ABEM General" a.k.a. the Chicago O'Hare Marriott Hotel. Candidates who successfully complete both of these tests are recognized as ABEM diplomates.

Nuts & Bolts of Maintenance of Certification

Becoming an ABEM diplomate is only the first step of a lifelong process of continuous learning. The American Board of Medical Specialties (ABMS) has created recommendations for an integrated 4-part framework for maintenance of certification (MOC).

Part I: Professional Standing and Professionalism

ABEM Diplomates must maintain a current, active, valid, full, unrestricted, and unqualified license to practice medicine in at least one jurisdiction of the U.S., its territories, or Canada to meet the requirements for MOC.

Part II: Lifelong Learning and Self-Assessment (LLSA)

ABEM's LLSA activity is an annual set of 10-15 readings with an open-book, online test in the areas of EM, EMS, or medical toxicology. Diplomates must complete 4 LLSA tests in each 5-year period. For a small fee, diplomates can claim CME credit for their LLSA activities which can be applied to the 25 AMA/AOA CME credits per year on average that is required for MOC.

Part III: Assessment of Knowledge, Skills, and Judgement

Since being founded in 1979, ABEM has always required recertification with a time-limited 10-year certificate. In 2004, this exam was rebranded the ABEM ConCert (Continuous Certification) Exam. It is a high-stakes, proctored exam of approximately 200 multiple choice questions. ConCert can be taken during any year of the second 5-year period after initial certification, and if passed, extends certification by an additional total time of 10 years, meaning diplomates could go 14 years between ConCert exams.

Part IV: Improvement in Medical Practice

ABEM diplomates are expected to regularly assess and improve the quality of the care they provide. Previously this has been done through attestation to participation in quality improvement projects in their departments or institutions; in the future, ACEP members participating in the Clinical Emergency Data Registry (CEDR) can meet this requirement by logging into CEDR to review their performance and adherence with quality measures over time.

The Value of MOC

In 2017, Texas lawmakers passed a bill to restrict the use of MOC as a credential for hospital privileging, asserting that MOC programs are excessively costly, time-consuming, irrelevant to the practice of medicine, and fail to improve patient care. Similar legislation has been introduced in other states.

The annualized costs of ABEM's MOC program are approximately $265 per year, or less than 0.1% of the average diplomate's annual pay, placing ABEM fees near the 50th percentile relative to all ABMS member boards. A 2013 ACEP salary survey showed board-certified emergency physicians earn $34,800 more per year than non-board-certified physicians.

Surveys of ABEM diplomates report that MOC increases and reinforces medical knowledge, primarily through extensive studying to prepare for the exam, and that board certification increases employment options.

Future of MOC and the Coalition to Oppose Medical Merit Badges

Society has traditionally granted physicians the privilege to regulate themselves. Efforts to undermine self-regulation may have unintended consequences. Emergency physicians care for people during their greatest time of need, and board certification demonstrates that we hold ourselves to a higher standard.

Some objections to MOC programs focus on the high-stakes nature of 10-year recertification. ABEM recently held a summit to discuss alternatives to the ConCert exam, the findings of which will be announced in the spring.

ABEM and AOBEM have also organized the Coalition to Oppose Medical Merit Badges, a group of EM organization representatives who believe board certification obviates the need for any additional certifications for medical staff privileges or disease-specific care center designations. Emergency physicians are masters of resuscitation who operate beyond the algorithms of ACLS and ATLS. We are expert in caring for patients with strokes and heart attacks. And we should not need permission from departments of anesthesiology to perform sedation in our own departments, as administering these medications and managing airways are key components of our training. **Board certification is the highest standard, and with it, we have proven ourselves ready to handle anything that comes through our doors, 24/7/365.** ✶

References available online.

FOR SOME OF OUR MOST ELITE SOLDIERS, THIS IS THE FRONT LINES.

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NEW EMRA LEADERS

ZACH JAROU, MD
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At any given moment, Zach Jarou's to-do list is filled with everything from presenting at an American Medical Association conference to mentoring students to applying for fellowship. Fellow EMRA board members claim he's been part of EMRA longer than EMRA has been around, after joining early in medical school and serving in 3 different capacities on the EMRA Board. As he begins his yearlong presidency, Dr. Jarou keeps one question at the heart of every discussion: What is best for EMRA members?

Why medicine? Because I wanted to do something meaningful. I am proud to be part of a specialty full of dreamers and doers. The founders of EM knew there had to be a better way. They fought battles to create something from nothing. They built a specialty that has transformed the way acute, episodic care is delivered in the U.S. and around the world. Emergency physicians are experts in resuscitation and risk stratification. As the front porch of the medical home, we are proud to be the safety net of the health care system. EDs also serve as important hubs for care coordination and harm reduction.

When did you know emergency medicine was for you? I think I knew very early on through involvement with my EMIG. I really enjoyed all of my classmates that self-selected to pursue emergency medicine, I loved the hands-on procedure labs, and we were fortunate to have incredible mentors. There are two mentors in particular that I will never forget, Dr. David Overton, now Chair of Emergency Medicine at Western Michigan University, who would drive from Kalamazoo to Lansing to help with our skills sessions, and Dr. Jacob Manteuffel, now President of the Michigan College of Emergency Physicians, who helped me co-found the MCEP Medical Student Council.

EMRA's biggest challenge? I think residents have more opportunities than ever before to get involved, so it's important to make sure we're their go-to resource.

Last non-medical book you read? It's a book that former ACEP President Jay Kaplan gave to me: "It's Your Ship: Management Techniques from the Best Damn Ship in the Navy." It's incredible.

Favorite way to relax? I always enjoy a nice IPA or sour from a craft brewery. I like to travel and visit the national parks, and if I can combine the two then that's it right there.

Keeping track of your leadership roles is a fool's errand because there have been so many. What's driving you? The belief that my environment can be a product of me and not the other way around. I also believe that if we don't step up and claim a seat at the table and make decisions for ourselves, then other people will make them for us and we might not like them. You can't whine if you don't participate in the process.

I think EMRA has been the best thing I've ever done, professionally and personally. One of my biggest accomplishments within EMRA is the collaboration I've been able to foster with EMRA Match, between EMRA and CORD and CDEM and ACEP and the students. I'm also incredibly proud of the way EMRA has been the voice of students regarding the Standardized Video Interview and that we were able to protect resident & program director autonomy in deciding what constitutes ACGME scholarly activity.

Favorite Twitter feed? @medicalaxioms @MDaware @mcsassymd @S_P_MD @efunkEM ✶

OMAR MANIYA, MD, MBA
PRESIDENT-ELECT

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Omar Maniya has advocated for health care practitioners as the youngest member of the Board of Trustees for the American Medical Association. He has earned an MBA in hopes of improving care from an administrative standpoint in the future. So as he begins his three-year term with the EMRA Executive Council, he's looking forward to bringing those experiences to bear on behalf of the specialty.

What's your top goal in your new role with EMRA? The future of emergency medicine is fluid, because the science, the clinical practice, the reimbursement system and quality metrics, and even the definition of our specialty are all changing. As residents, we are the future, so we have to help shape it. That's why I want to give residents an even bigger role in shaping the future of our specialty.

Describe your leadership style in 25 words or less. Find great people and let them run with their craziest ideas. I want to say "yes" as many times as possible.

If your fellow residents picked a motto for you, what would it be? My co-residents at Sinai were split 50/50 between "Despacito" and "#illnevertell." Friend me on Facebook to learn more!

Favorite life-balancing hack? Laundry service & Seamless (NYCs food delivery app)

Best advice you've ever heard? "Be the stupidest person in the room."

Why EM? Because I loved everything but get bored really fast. Plus, we occasionally get to actually save lives!

What goes on pizza? Vegan cheese (unfortunately, I'm lactose intolerant).

Most-used app on your phone? Snapchat

Who is your superhero alter-ego? Sleeping beauty. I'm really good at sleeping (when I get the chance!). ✶

TOMMY EALES, DO
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After serving as editor for the Medical Student Council, Tommy Eales stepped up as vice-chair of the EMRA Research Committee. Now he's getting back to his roots in publications and looking to continue the momentum of *EM Resident*'s print and digital editions.

What's your top goal in your new role with EMRA? My top goal is to ensure that *EM Resident* continues to be the premier venue for resident-generated emergency medicine content.

Describe your leadership style in 25 words or less. My leadership style is to facilitate everyone's individual strengths.

If your fellow residents picked a motto for you, what would it be? "Life's short — stunt it!"- Rod Kimble (Stunt Man extraordinaire)

Favorite life-balancing hack? My favorite life-balancing hack is to set my coffee pot to brew 10 minutes before my alarm clock. The result? I wake up to a fresh pot of coffee and have extra time to take my dog for a long walk before work. As a bonus hack, I also use a slow cooker to make meals several times a week.

Best advice you've ever heard? Overheard at 3 am in a drunk hallway bed section of a county ED: "You can have chest pain or you can have a turkey sandwich, but you can't have both…" Later dubbed the "turkey sandwich" rule-out. Pure genius.

Why EM? I love the wide variety of patients and pathology that we see in the ED. We truly see it all. In no other specialty can you deliver a baby, diagnose a fatal cardiac arrhythmia, and stabilize a crashing trauma patient all in the same shift.

What goes on pizza? Pepperoni!

Most-used app on your phone? Tie between Spotify and UpToDate.

Who is your superhero alter-ego? Probably Spiderman. We're both nerdy and like to climb. I'm more into rock climbing than building climbing, though. ✶

NATHAN P. VAFAIE, MD

VICE-SPEAKER OF THE COUNCIL

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As he transitions from EMRA Health Policy Committee Chair to Vice-Speaker of the Council, Nathan Vafaie continues to keep his eyes on all aspects of advocacy — and to promote that same engagement among all EMRA members.

What's your top goal in your new role with EMRA? Empower our members to participate

Describe your leadership style in 25 words or less. Thinking out loud, empowering people around me, and hopefully leading by example

If your fellow residents picked a motto for you, what would it be? Calm down: why acapella singing isn't necessary on every shift

Favorite life-balancing hack? To-do lists, short and long term

Best advice you've ever heard? Only compare yourself to the best

Why EM? The adrenaline rush, the huge scope of practice

What goes on pizza? Nothing that crunches

Most-used app on your phone? Associated Press News

Who is your superhero alter-ego? Neuroses Man ✶

GEOFF COMP, DO, FAWM

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You know Geoff Comp as the Wilderness Medicine Division chair and a founding organizer of the wildly popular EMRA MedWAR. Now he is joining the EMRA Board as the Ex-Officio Member, representing the membership at large.

What's your top goal in your new role with EMRA? My main goal will be to provide programming and guidance to help residents develop into exceptional leaders in their residencies and future careers.

Describe your leadership style in 25 words or less. Community engagement and collaboration with guidance and respect

If your fellow residents picked a motto for you, what would it be? Have fun, and always find something to smile about!

Best advice you've ever heard? One of my medical school mentors gave me advice on how to keep myself balanced throughout residency. Imagine your energy and motivation as liquid filling a cup. Lots of things slowly empty out this cup — challenging patients, difficult shifts, and codes that don't go well. Part of learning how to be a great physician is figuring out what you need to do to keep this cup full, and be the best possible versions of yourself.

Why EM? I enjoy the variety, from the wide range of patient complaints to the fast pace and necessity for rapid decision-making and action. Each shift presents an opportunity to meet someone new and interact with many different, interesting personalities.

What goes on pizza? Extra cheese and any type of meat the pizza joint offers. Vegetables go in salad, not on pizza.

Most-used app on your phone? Probably the notes app. I use it to store ideas, projects, to-do lists, random thoughts. Also, Facebook — I'm not proud of the amount of time I have spent on that app.

Who is your superhero alter-ego? Batman. I know he doesn't have a specific super-power, but I like his ingenuity and ability to problem-solve... and his badass toys. ✶

SARA PARADISE, MD
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Whether she's evaluating 20 in 6 entries or hosting the EMRA Quiz Show in full Elsa regalia, Sara Paradise goes all-in for medical education (which is a good thing, since she's also completing a fellowship in the arena). She plans to put her background to work for medical students and residents as she serves on the EMRA Board of Directors.

What's your top goal in your new role with EMRA? I'm hoping to review the great resources that EMRA already has and organize them to see where we can fill in the gaps. Specifically, I'm interested in creating resources on leadership & communication, which are generally not emphasized enough during residency.

Describe your leadership style in 25 words or less. Genuinely enthusiastic! I love brainstorming with a team and creating action items to accomplish a common goal.

If your fellow residents picked a motto for you, what would it be? "Work hard, drink coffee, stay sweet, enjoy life."

Favorite life-balancing hack? Happy hour meetings.

Best advice you've ever heard? Admire someone? Send them an email to meet for coffee or just to chat about how they landed where they are!

Why EM? Huh? Oh, sorry, I was distracted by something shiny.

What goes on pizza? Prosciutto, mmmmmmm

Most-used app on your phone? I'm new to Southern California, so probably Waze.

Who is your superhero alter-ego? Moana! She's a boss. ✶

What's your top goal in your new role with EMRA? To make the best resident organization in the country even better, through EMRA's IT initiatives (website, communication, medical apps) and by acting on member feedback and ideas to enhance and expand services and benefits provided to our constituents.

Describe your leadership style in 25 words or less. Form teams of great minds to identify needs and areas of improvement. Assign leadership roles and delegate tasks based on an individual's strengths.

If your fellow residents picked a motto for you, what would it be? "If you genuinely want something, don't wait for it — teach yourself to be impatient." *Gurbaksh Chahal*

Favorite life-balancing hack? I cherish my time with my wife and son, and I do my best work when my mind is fresh. To balance my shift schedule, side projects, studying, and spending time with the family, I go to bed early and wake up hours before them in order to get my work done while they sleep. This frees up my day so we can enjoy our time together.

Best advice you've ever heard? You can always make time for smaller, less important things, but when you take on too much it becomes difficult to find room for the more crucial aspects of your life. Prioritize appropriately. Don't overbook yourself at the expense of spending time doing what matter most to you.

Why EM? For me, emergency medicine is the best specialty because it requires me to strive to become an expert in the fundamentals of EVERY specialty. We take care of the sickest patients when they are at their worst, and are the first line of care to the underserved. I love the environment we work in, as the ED requires a team-like atmosphere, where clinicians of all levels work together with the same goal: to take care of every patient coming to us in need. I left the business world because I was unsatisfied with my day-to-day. Here, in medicine, our "product" is patient care. And I know that at the end of my life I will find much satisfaction in knowing that I put my abilities to good use, having impacted tens (if not hundreds) of thousands of sick patients throughout my career as an emergency physician.

What goes on pizza? The "what" is less important than the ratio. On pizza, the meat:vegetable ratio must be >3:1. ✶

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Chapter and Verse

Resident and Medical Student Leadership Development Opportunities

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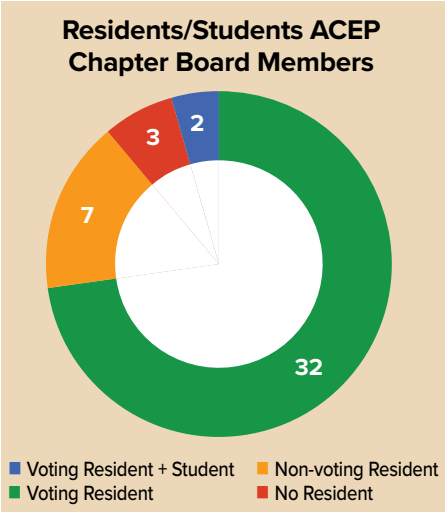
Increasingly, physicians are called on to serve as leaders. **EMRA wants to empower each of you to develop these skills**. When you join EMRA, you also join ACEP and your ACEP state chapter. EMRA has partnered with ACEP's National-Chapter Relations Committee to assess current opportunities for students, residents, and young physicians.

Residents and Students on ACEP Chapter Boards

The vast majority of ACEP chapters encourage at least one resident position on their board of directors (93%). Of these, more than three-quarters of residents hold a voting position (77%) and more than 10% allow for a non-voting resident (16%). Several chapters allow for multiple resident representatives, and two chapters (Texas and Iowa) allow medical students to serve on the board in addition to residents.



Residents as ACEP Councillors

Almost half (43%) of ACEP chapters allow resident members to serve as either a full or alternate ACEP councillor. However, only 4% of credentialed councillors are physicians-in-training. Nine chapters permit residents to serve as a full ACEP councillor for their chapter, which is an increase from 5 chapters in 2015. Availability of these positions varies based upon resident and faculty interest. Inquire with your chapter to indicate your interest!

Chapters with Leadership Development Programs

Approximately one-fifth of all chapters now offer structured leadership development programs. Additionally, California, Ohio, and Texas offer advocacy-specific longitudinal training. While the content and structure of such training varies by chapter, participation offers a strong foundation for lifelong leadership and a basic understanding of organized medicine as a whole.

Chapters Performing Annual Residency Visits

Residency visits allow chapter leaders to encourage residents and students to become engaged in organized medicine. Typically visits involve chapter board members or otherwise active members travelling to each residency program within their purview to offer lectures and networking sessions. Approximately one-third of chapters (34%) perform residency visits.

Chapters with a Medical Student Council

The average U.S. allopathic medical student applying to EM has approximately 6.8 volunteer experiences, 3.5 work experiences, and 2-3 research experiences /publications, per the 2016 NRMP Charting Outcomes Report. More than ever, medical students want to make an impact. ACEP chapters are taking note, with more than 15% creating a medical student council that allows students to plan and execute their own goals and objectives. Similarly, 15% of chapters are also conducting EMIG visits. Find out if your chapter has a medical student council, and if not, inquire whether it is possible to create one.

Chapter	Resident / Student on Board[1]	Resident ACEP Councillor[2]	Student and/or Resident Specific Programming	Research Grants	Chapter Awards	LAC Travel Grants	Chapter Dues	Leadership Development Program	Chapter Level Health Policy Fellowship	Annual Residency Visit	Medical Student Council	Annual EMIG Visits
Alabama	NV	AC	Yes	No	Yes	Yes	None	No	No	No	No	No
Arkansas	NV	No	No	Yes	Yes	Yes	None	No	No	No	No	No
Arizona	Yes	No	No	Yes	No	Yes	None	No	No	Yes	No	Yes
California	Yes	C + AC	Yes	No	Yes	Yes	None	Yes	Yes	Yes	No	No
Colorado	Yes	AC	No	Yes	No	Yes	None	Yes	No	No	Yes	Yes
Connecticut	No	No	Yes	Yes	Yes	Yes	None	No	No	Yes	No	No
Delaware	Yes	AC	No	No	No	Yes	None	No	No	No	No	No
District of Columbia	Yes	No	No	No	No	No	$20	No	No	No	No	No
Florida	Yes	C + AC	Yes	Yes	No	No	None	Yes	No	Yes	Yes	No
Georgia	Yes	No	Yes	No	Yes	No	None	No	No	No	No	No
Government Services	Yes	C + AC	Yes	Yes	Yes	Yes	None	Yes	No	Yes	Yes	No
Illinois	Yes	No	Yes	No	No	No	$30	No	No	No	No	No
Indiana	Yes	No	Yes	No	No	Yes	None	No	No	No	No	No
Iowa	Yes + Stu	No	No	No	No	Yes	None	No	No	No	No	No
Kansas	Yes	No	No	No	No	No	None	No	No	No	No	No
Kentucky	NV	No	No	No	No	Yes	None	Yes	No	No	Yes	No
Louisiana	Yes	No	No	No	No	Yes	None	No	No	No	No	No
Maine	NV	No	No	No	No	Yes	None	No	No	Yes	No	No
Maryland	Yes	No	No	No	No	No	$20	No	No	No	No	No
Massachusetts	Yes	AC	Yes	Yes	Yes	Yes	None	Yes	No	No	No	No
Michigan	Yes	C + AC	Yes	No	Yes	Yes	None	Yes	No	Yes	Yes	No
Minnesota	Yes	No	No	No	No	Yes	None	No	No	No	No	No
Mississippi	Yes	No	No	No	No	No	None	No	No	No	No	No
Missouri	Yes	AC	No	Yes	Yes	Yes	None	No	No	No	No	Yes
Nebraska	Yes	No	No	No	No	Yes	None	No	No	No	No	No
Nevada	No	No	No	No	No	Yes	$50	No	No	No	No	No
New Hampshire	Yes	No	No	No	Yes	No	None	No	No	No	No	No
New Jersey	NV	No	Yes	No	Yes	No	None	No	No	No	No	Yes
New Mexico	No	AC	Yes	Yes	No	Yes	None	No	No	No	No	No
New York	Yes	C + AC	No	No	Yes	Yes	$20	No	No	Yes	No	No
North Carolina	Yes	C + AC	Yes	No	Yes	No	None	No	No	Yes	No	No
Ohio	Yes	AC	Yes	No	No	No	$5	Yes	Yes	Yes	Yes	Yes
Oklahoma	Yes	No	No	No	Yes	No	None	No	No	Yes	No	No
Oregon	Yes	No	No	Yes	No	Yes	None	No	No	No	No	No
Pennsylvania	Yes	C + AC	Yes	No	No	Yes	None	No	No	No	No	No
Puerto Rico	No	No	Yes	No	Yes	No	None	No	No	No	No	No
Rhode Island	Yes	C + AC	No	No	Yes	Yes	None	No	No	No	No	No
South Carolina	NV	No	Yes	No	Yes	Yes	None	No	No	Yes	No	No
Tennessee	Yes	AC	No	No	No	Yes	None	No	No	Yes	No	No
Texas	Yes + Stu	AC	Yes	Yes	Yes	No	None	Yes	Yes	Yes	Yes	Yes
Utah	Yes	No	No	No	No	Yes	None	No	No	No	No	No
Virginia	Yes	C + AC	Yes	No	No	Yes	$15	No	No	No	No	Yes
Washington	NV	AC	No	No	No	Yes	None	No	No	No	No	No
West Virginia	Yes	No	Yes	No	Yes	No	None	No	No	No	No	No
Wisconsin	Yes	No	No	No	No	Yes	None	No	No	Yes	No	No

*North Dakota charges student members $25, Vermont charges student members $50
States without residency programs: Alaska, Hawaii, Idaho, Montana, North Dakota, South Dakota, Vermont, Wyoming

KEY
[1]Yes = Voting Resident Member, NV = Non-voting resident, Yes + Stu = Voting Resident Member + Medical Student
[2]C = Councillor, AC = Alternate Councillor, C + AC = either councillor or alternate councillor

Other Ways Chapters Engage Physicians-in-Training

ACEP Chapters also want to support physicians-in-training via:

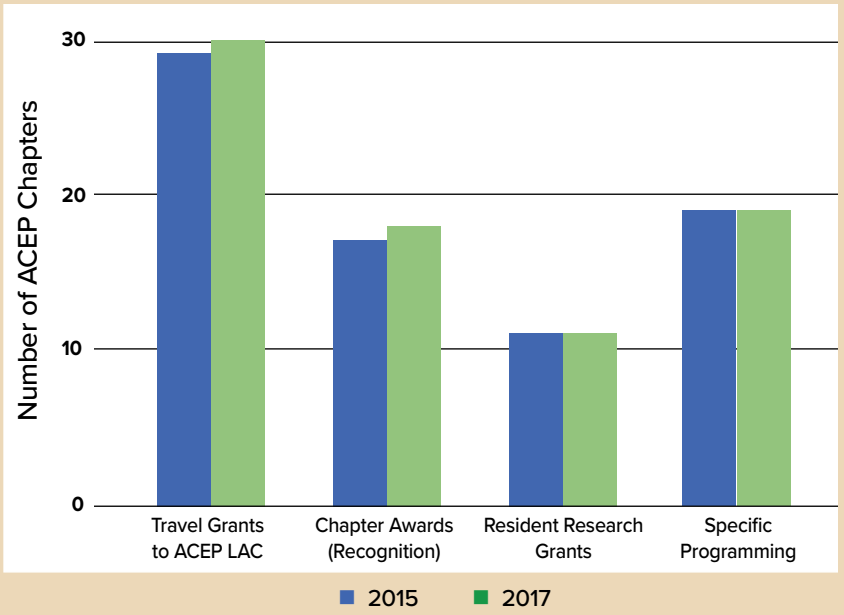
- Travel grants to ACEP's Leadership and Advocacy Conference in Washington, D.C.
- Chapter level awards/grants to support or recognize outstanding residents and students
- Research grants for students and residents
- Resident and student programming at either the annual conference or as a stand-alone event

Next Steps

Review the ACEP Chapter Opportunities table that lists the most recent offerings by ACEP chapters, and contact your chapter to see how you can get involved! Also consider making a splash with EMRA Committees and Divisions or by serving as your residency's representative to the EMRA Representative Council. If you're looking to start small, join EMRA's mentorship program. Finally, be sure to take advantage your complimentary membership to one of ACEP's 37 sections (acep.org/sections). You can also apply to serve on the ACEP committees (deadline May of each year!). These are great ways to contribute to EM and network your way to success. Now let's go out there and achieve amazing things together!

Have further questions? Let us know how we can serve you better: **MembershipDir@emra.org.** ✶

ACEP Chapter Residents/Student Awards, Grants, Programming



Management of Shock

Bedside Assessment of Cardiac Output

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A 75-year-old male with a past medical history of congestive heart failure, diabetes mellitus, hypertension, and coronary artery disease presents to the emergency department (ED) with generalized weakness, shortness of breath, productive cough, and chills for the past three days. On arrival he is diaphoretic and ill-appearing but alert and following commands. Initial vital signs include blood pressure: 88/60 mmHg, heart rate: 126 BPM, rectal temperature: 99.0 F, respiratory rate: 22, oxygen saturation: 98% on room air. The patient has diminished breath sounds at the lung bases and 1+ pitting edema bilaterally to the knees. Initial labs reveal a leukocytosis of 14,000 with an 89% neutrophilic predominance, an elevated lactate of 3.0 and an elevated BNP of 4000. A portable chest x-ray reveals pulmonary vascular congestion and cannot exclude an underlying infiltrate.

The team correctly identifies that the patient is in shock; however, it is difficult to determine the etiology. With the most likely culprit being cardiogenic shock, vasodilatory shock, or some combination of the two, the team must determine the correct etiology in order to treat the patient appropriately. Resuscitation for cardiogenic shock may require administration of inotropic agents, diuresis, and respiratory support if necessary. Conversely, vasodilatory shock from sepsis necessitates fluid boluses, early administration of antibiotics, and possible administration of pressors.

Are there any diagnostic tools that can help differentiate shock in a timely and non-invasive manner? *Have you considered measuring the patient's cardiac output with bedside ultrasound?*

Many ED providers are familiar with gross assessment of systolic function either by visual estimation of the "squeeze" or by other techniques such as EPSS (E-Point Septal Separation).[1] Here we will demonstrate how to calculate the cardiac output to provide objective data about cardiac function and volume status.

Definition of Cardiac Output

Cardiac output (CO) is the amount of blood pumped by the heart per minute, determined by the product of the stroke volume (SV) of the left ventricle, which is the volume of blood pumped per cardiac cycle, and the heart rate (HR).

CO (L/min) = SV (L/cycle) x HR (cycle/min)

In order to calculate stroke volume using ultrasound, we need two measurements of cardiac function: LVOT (left ventricular outflow tract) diameter and VTI (Velocity Time Integral). The LVOT diameter is used to estimate the area of the LVOT. The VTI, which is the mean velocity of blood traveling at a selected location over the time period of systole, is measured at the location of the LVOT.

Using these measurements, the volume of cylinder represents a column of blood traveling from the left ventricle to the aorta during systole. This is the stroke volume (Figures 1,2).

Technique for Measurements

LVOT diameter

Step 1: Using a low-frequency phased-array transducer, obtain a parasternal long axis view. Freeze the image during systole.

Step 2: Measure the LVOT anterior to the aortic valve leaflets (Figure 3).

VTI

Step 1: Using the same phased-array transducer, obtain an apical 5-chamber view. Select Doppler mode and adjust the angle to coincide with the direction of blood flow (Figure 4).

Step 2: Freeze your image. Trace the outline of one of the ejection waveforms. Depending on the model of ultrasound machine, VTI calculator functions may be enabled for this measurement (Figure 5).

The Evidence

Non-invasive measurement of cardiac output using ultrasound was first described in the literature in the 1980's.[2-5] During this time, a number of studies demonstrated that Doppler measurements were comparable to other methods of determining cardiac output.[6] Predominantly using animal models, correlation coefficients ranging from 0.87 to 0.99 were obtained when comparing measurements of cardiac output using ultrasound to then-established techniques including indicator dye dilution, the Fick method (the "gold standard"), and experimental in vivo pump monitoring.[7-9]

Subsequent investigations involving human subjects also showed remarkable agreement.[10] Correlation coefficients ranging from 0.83 to 0.96 were obtained when comparing ultrasound measurements of cardiac output to thermodilution via Swan-Ganz catheter, pulsed Doppler, and Fick measurements during cardiac catheterization.[4,11-13] In patients with aortic stenosis, two studies showed correlation coefficients to be 0.91 and 0.86 between pulsed Doppler and respective reference methods when the Doppler gate was placed in the LVOT proximal to the aortic stenosis.[14,15] More recent studies by Lefrant et al. and Gentles et al. found correlation coefficients of 0.84 and 0.96, respectively, although these investigators obtained measurements of the VTI from the ascending aorta using a suprasternal view.[16,17]

Limitations

Sources of error associated with ultrasound-obtained cardiac output measurements are related to the operator, device limitations, and patient factors. Measuring the LVOT surface area using ultrasound assumes that the aortic outflow tract is circular. Realistically, the anatomical shape of the outflow tract is not a perfect circle, and its diameter is constantly changing due to elasticity of the muscular aortic wall. While the operator may attempt to measure the LVOT diameter during

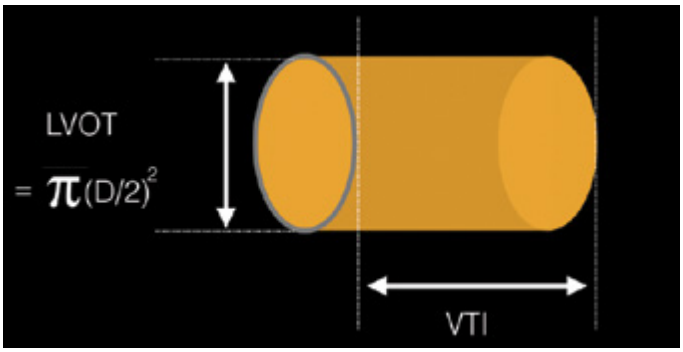


FIGURE 1. Estimation of the stroke volume using the LVOT diameter and VTI to calculate cylinder volume

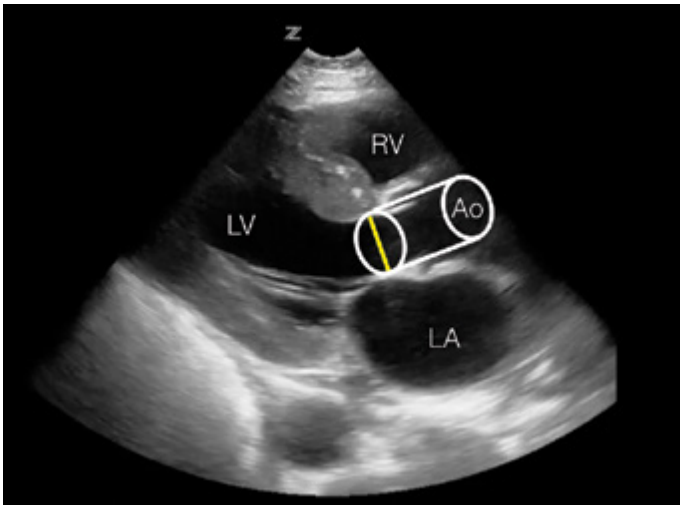


FIGURE 2. Projection of the estimated stroke volume cylinder onto the parasternal long axis view. The measured LVOT diameter can be seen as a yellow line. RV = right ventricle, LV = left ventricle, LA = left atrium, Ao = Aortic outflow tract

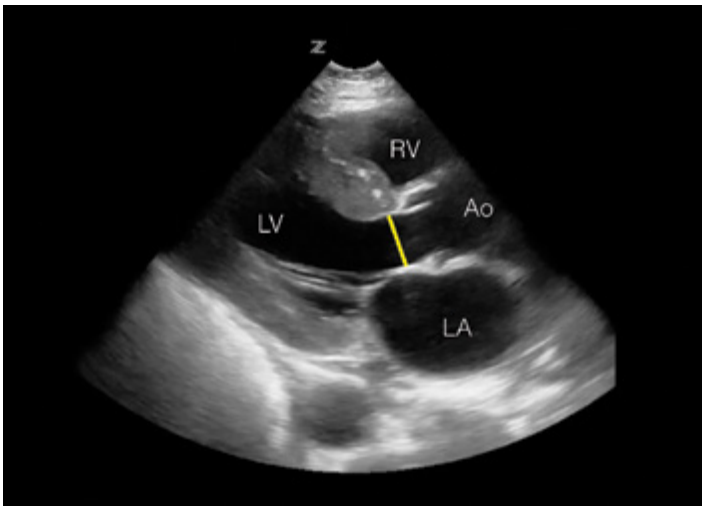


FIGURE 3. Image of parasternal long view with highlighted LVOT

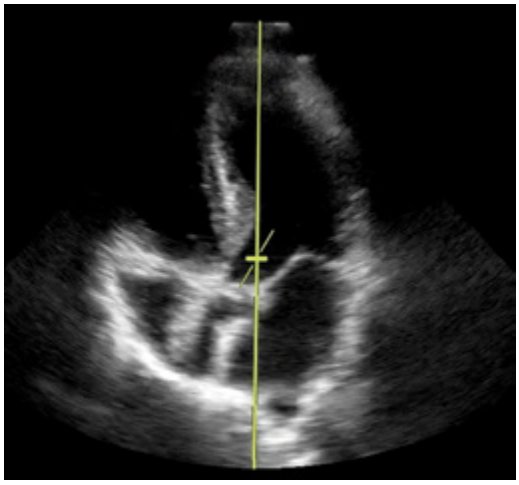


FIGURE 4. Image of apical 5-chamber with pulsed wave Doppler gate in position

TABLE 1. Cardiac Output Calculation Steps

Calculation Steps	
Step 1	Calculate the LVOT area: LVOT area (cm^2) = [π x (LVOT diameter)^2]/ 4
Step 2	Determine the VTI (cm)
Step 3	Calculate stroke volume by multiplying the LVOT area by the VTI. SV (cm^3, or ml) = LVOT area (cm^2) x VTI (cm)
Step 4	Calculate cardiac output by multiplying the SV by the HR: CO (L/min) = SV (L/cycle) x HR (cycle/min)

TABLE 2. Cardiac Output Calculation Steps

Step 1	**LVOT area** = [π x (LVOT diameter)^2]/ 4 = [π x (**2.0 cm**)^2]/ 4 = 3.14 cm^2
Step 2	The calculated VTI is **20.0 cm**
Step 3	**Stroke Volume** = LVOT area (cm^2) x VTI (cm) = 3.14 cm^2 x 20.0 cm = 62.8 cm^3, or 62.8 ml, or 0.0628 L
Step 4	**Cardiac Output** (L/min) = Stroke volume (L/cycle) x HR (cycle/min) = 0.0628 (L/cycle) x 126 (cycle/min) = **7.9 L/min**

Calculating cardiac output using bedside ultrasound can provide immediate objective data about cardiac function to aid in the diagnosis of specific shock states to guide treatment.

systole, this is not an exact point in time but a time period in which the aortic lumen can rapidly change size and shape. Therefore, multiple measurements of the LVOT diameter taken during systole can have similar but non-identical values.[6]

Turbulent blood flow across the aortic valve may also cause imprecise measurements when calculating the VTI. To ensure an accurate pulse wave is obtained, the Doppler gate should be oriented as parallel as possible to the direction of blood flow. Fortunately, this error can be somewhat forgiving, as less than twenty degrees of angulation between the gate and blood flow will produce only mild (<10%) deviations in velocity measurements.[18] If a uniform column of blood is in parallel orientation with the Doppler gate, a pulse wave with an open black window at the base of the wave can be seen.

Intrinsic cardiac comorbidities altering hemodynamic function, such as valvular insufficiency or arrhythmia, pose a theoretical risk in obtaining an accurate measurement of cardiac output using ultrasound. Studies have shown ultrasound to be effective in evaluating cardiac output for patients with aortic stenosis, however there is a lack of data assessing cardiac output in significant valvular insufficiency and atrial fibrillation. For patients with atrial fibrillation, recommendations indicate that it is adequate to use the average value of five to ten cycles of the pulse wave when calculating VTI.[18]

Case Resolution

Bedside ultrasound is performed on the patient using the methods described: his LVOT diameter is **2.0 cm** and VTI is **20.0** cm (see Table 2).

The patient's cardiac output is calculated to be 7.9 L/min. Given the increased cardiac output (in contrast to an expected reduced cardiac output in acute systolic heart failure), vasodilatory shock secondary to sepsis from a likely pulmonary source was suspected. The patient was given a 30 cc/kg bolus of crystalloid and administered broad-spectrum antibiotics after blood cultures were drawn. Serial cardiac output measurements during the resuscitation trended to a normal value of 6.0 L/min. A repeat lactate was 1.6. The patient was closely monitored for volume overload and was eventually transferred to the step down unit for further management.

Bottom Line

Calculating cardiac output using bedside ultrasound can provide immediate objective data about cardiac function to aid in the diagnosis of specific shock states in order to guide treatment, particularly because treatment for one shock state may worsen another. Furthermore, monitoring changes in cardiac output can reflect volume status and accurately assess a patient's response to resuscitation. ✶

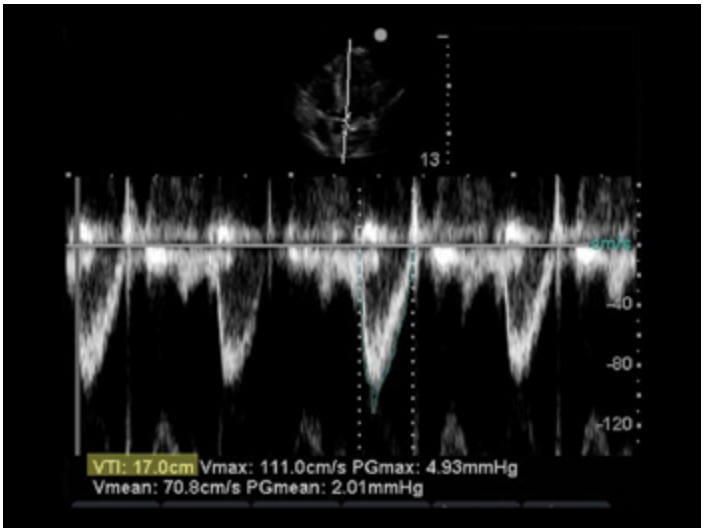
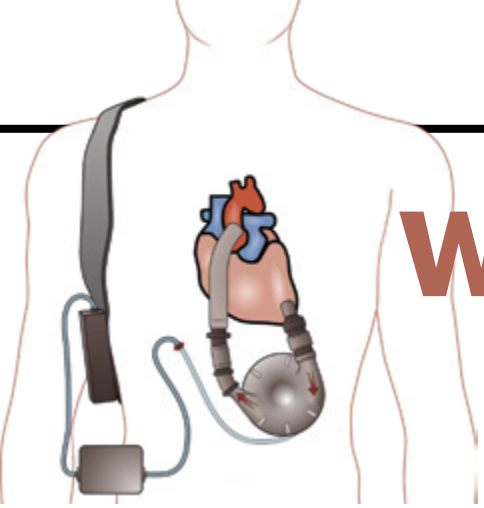


FIGURE 5. Image of pulse wave with tracing

References available online.



Who Ya Gonna Call?!

A Primer on Left Ventricular Assist Device Emergencies

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Background

Patients with end-stage systolic heart failure (defined as New York Heart Association Class IV or Ejection Fraction <25%) have high mortality and limited treatment options for this disease.[1] Given the limited supply of donor hearts available for transplant, LVADs have emerged as a revolutionary treatment to bridge these patients to transplantation. More recently, LVADs were approved as a destination therapy for end-stage heart failure patients who were not candidates for heart transplantation.[2]

LVADs initially were pulsatile flow pumps that proved to be too bulky and demonstrated a 2-year failure rate above 70%.[1] Second generation LVADs are continuous flow pumps with a rotary motor, and have been used almost exclusively since 2012.[3,4] Thoratec HeartMate II and HeartWare HVAD are the most common LVADs currently used. LVADs are implanted in the thorax with the inflow cannula taking blood from the weakened left ventricle and pumping it into the ascending aorta. This pump receives its power supply via a driveline that runs subcutaneously and exits the body to a controller connected to a battery. The controller is the point where you can see the parameters from the LVAD, including pump speed, power, estimated blood flow, and pulsatility index.[5]

The general approach to these patients is twofold:

1. Airway, breathing, circulation, IV, O2, monitor as you do with any patient.
2. Assessment of the LVAD (Figure 1).

When you examine the device, the first step is to listen for the VAD "hum" to see if it is running, followed by a check of the battery level. Most patients will come with backup batteries and/or a cord. **The next step is to examine the controller box and see if there are any alarms active** that can help guide therapy. With regard to vital signs, automatic blood pressure cuffs may be inaccurate because of the low pulse pressures in LVAD patients.[4] A manual cuff and Doppler ultrasound may be necessary to estimate systolic blood pressure. **Finally, you may need to call the LVAD team**, often led by a nurse coordinator who manages outpatient LVAD concerns. This person can be helpful in notifying cardiology, arranging for an inpatient bed, and expediting overall care.

Following are some patient cases and associated LVAD complications.

CASE 1. *A 51-year-old male with history of nonischemic cardiomyopathy status post LVAD 6 months ago presents with episodes of lightheadedness. Of note, patient had his warfarin dose decreased about one month ago secondary to a GI bleed and symptomatic anemia requiring 3U pRBCs. What are the crucial steps in management?*

Thrombosis and Bleeding

As with any patient on systemic anticoagulation, there is a balance between the risk of bleeding and the risk of thrombosis. LVAD patients are generally on antiplatelet agents and anticoagulation. The target INR for patients on warfarin is usually 2.0-3.0. As expected, patients with elevated INRs have an increased risk of bleeding events often manifesting as epistaxis, melena (often from arteriovenous malformations), or altered mental status (intracranial bleed)[5]. These are treated by directing therapy at the underlying cause. **Occasionally, this may require reversing the coagulopathy with fresh frozen plasma or prothrombin complex concentrate, but this increases the risk for device thrombosis and embolism.** Also, shear forces from the LVAD rotor cause destruction of the large von Willebrand factor monomers and in turn causes an acquired von Willebrand disease which further increases bleeding risk.[3,5-7] These patients will benefit from cryoprecipitate or desmopressin. Platelet transfusions may also be required for decompensating thrombocytopenic patients. **The LVAD control box will be alarming for low flow or low pulsatility index, which are consistent with undifferentiated hypovolemia** (Table 1).[5]

Conversely, patients with sub-therapeutic INRs are at risk of thrombosis. Even patients with therapeutic INRs are at risk of thrombosis because the chronic low-level hemolysis leads to an

increase in reactive oxygen species causing increased platelet activation, vascular tone, hypofibrinolysis and net hypercoagulability that cannot be offset by the natural heme-scavenging mechanisms.[3] Diagnosis of this complication is critical and multiple laboratory markers have been studied with consensus placed on using LDH.[3] **Thrombosis should be considered if LDH is greater than 2.5 times the upper limit of normal at your institution.**[3,5] However, given that the LDH is expected to be chronically elevated because of low-level hemolysis, **this diagnosis needs to be made in conjunction with signs of pump malfunction or alarms for increased pump power** (Table 1).[3,5] Treatment should be made in conjunction with the LVAD team and often results in temporary heparin infusions or thrombolysis in an unstable patient.

TABLE 1. Common LVAD Alarms (adapted).[6,12]*

Cardiology can adjust speed on LVADs to affect the parameters below. Speeds vary by device (HeartMate II LVAD 6,000-15,000 RPM, HeartWare HVAD 1,800-4,000 RPM[7])

Alarm	Meaning	Treatment
Battery	Low battery or battery malfunction	Switch to backup battery or plug device into outlet
High Flow	LVAD is trying to compensate for a vasodilatory state	Diagnose and treat presumed sepsis. Consider vasopressor
Low Flow/ Suction Event	Hypovolemia/Bleeding/ Arrhythmia	Bolus fluid/Transfuse Blood/ Treat Arrhythmia
High Power	Pump thrombus	Heparin – (possibly thrombolysis if life-threatening[12])
Low Power /Low Pulsatility Index	Pump failure/disconnection Hypovolemia/suction event Myocardial Ischemia	Check connections, intravenous fluids to increase preload, inotropic support

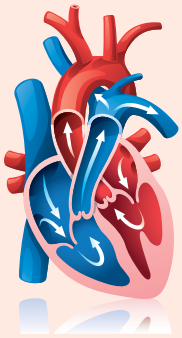
Discuss all LVAD patients with their primary team

Case 2. *A 62-year-old female with a history of non-ischemic cardiomyopathy status post LVAD 12 months ago presents with expressive aphasia upon waking from sleep. The patient noticed a similar episode last night, which resolved spontaneously within 2 hours. On physical exam, the patient is found to have focal neurologic deficits. The CT scan does not show any acute abnormalities. How should the clinician manage this patient?*

Cerebrovascular Accidents

While systemic anticoagulation reduces the risk of thromboembolic events, there is a significant rate of cerebrovascular events reported in the literature that range from 10 to 25%, with nearly two-thirds involving the right hemisphere.[8,9] Interestingly, the risk of ischemic stroke increased in patients with concomitant infection, thought to be related to the infection-induced hypercoagulable state.[8] **Treatment options are limited in this population** and decisions on thrombolytics or neurointerventional radiology must be made between cardiology, neurology, and emergency providers.

Case 3. *A 63-year-old female with a prior stroke and residual aphasia and visual deficits, non-ischemic cardiomyopathy status post LVAD, VAD thrombosis, and LVAD exchange presents with multiple syncopal episodes and 3 days of diarrhea, and LVAD is alarming for suction alarms. How should the clinician approach this patient?*



Suction Events

A suction event refers to decrease in blood volume leading to increased negative pressure in the left ventricle causing wall collapse over the inflow cannula.[1,5] These patients present with low mean arterial pressures and low flow alarms, signifying that either the heart is not supplying the LVAD enough blood or the LVAD is not pumping properly.[1,5] Treatment is primarily fluid resuscitation and is etiology-focused. **LVADs are preload dependent, and the left ventricle preload is dependent on the right ventricle (RV),** so anything that causes worsening in RV flow or contractility can decrease LVAD function and forward flow. Worsening pulmonary hypertension (hypoxia, hypercarbia), pulmonary emboli, arrhythmias, RV ischemia, tension pneumothorax, or pericardial tamponade can cause severe RV failure.[4] **In some cases, patients will need inotropic support with milrinone, epinephrine, or dobutamine until the underlying cause is reversed.**

Case 4. *A 56-year-old patient with history of ischemic cardiomyopathy presents 8 months after implantation of LVAD with 3 days of pain, erythema, and discharge from the driveline site. What is your approach?*

Infection

Infections can occur at any time but are most common in the first 3 months after device placement.[5] The incidence of driveline infections has been reported to be as high as 30%.[10] The most easily recognized clinical sign of a driveline infection is drainage from the entry site with surrounding cellulitis, but severe infections can involve the pump pocket or the pump itself. This can lead to pump endocarditis.[5] CT scans can help to identify fluid collections, but will be limited by device artifact. Ultrasound may be helpful to detect fluid pockets, but this still comes with its limitations in proving whether the device is actually infected.[5,10]

Treatment should include broad spectrum antibiotics to target the most common pathogens such as Staphylococcus and gram negative organisms like Klebsiella or Pseudomonas.[5,10] Sources vary on fungal coverage, but it has been reported in nearly 10% of patients.[5,10] Surgical exploration is often necessary for definitive treatment.

Case 5. *A 53-year-old man with a history of idiopathic cardiomyopathy is brought in by his wife 3 weeks after transplantation of a LVAD, after multiple episodes of low flow alarms at home. In triage, his EKG shows ventricular tachycardia. His device is alarming, but he is sitting up talking to you.*

Dysrhythmia

These patients are at high risk for dysrhythmias given the underlying heart disease that led to LVAD placement. Luckily, these patients often tolerate dysrhythmias well because the device supports cardiac output. It is important to note, however, that dysrhythmias may impair right heart function, which will decrease cardiac output, and may lower the LV preload, and in return drop the LVAD flow. LVAD patients can be managed per regular ACLS algorithms. **Pad placement for emergent cardioversion is recommended in an anterior and posterior placement to avoid the LVAD and driveline**.[6] Dysrhythmias can be triggered by postsurgical scarring, cannula migration, or suction events secondary to hypovolemia (diuresis, bleeding).[5,7] **Ventricular dysrhythmias are most common, and amiodarone is considered first line therapy, followed by lidocaine and procainamide.** A fluid challenge may also be appropriate, followed by bedside echocardiogram to help guide further treatment in consultation with the LVAD team.

Case 6. *Overhead page: EMS en route with a 42-year-old LVAD patient, vitals unstable, device is reading low flow, ETA 5 minutes. What is your plan?*

Shock/Cardiac Arrest Case

While cardiac arrests are not unfamiliar to emergency physicians, LVADs pose additional considerations. To start, device manufacturers advise chest compressions only if necessary, given the risk of dislodging the cannulas. That said, some early evidence suggests this may be theoretical and compressions are not absolutely contraindicated for patients in extremis.[5,11]

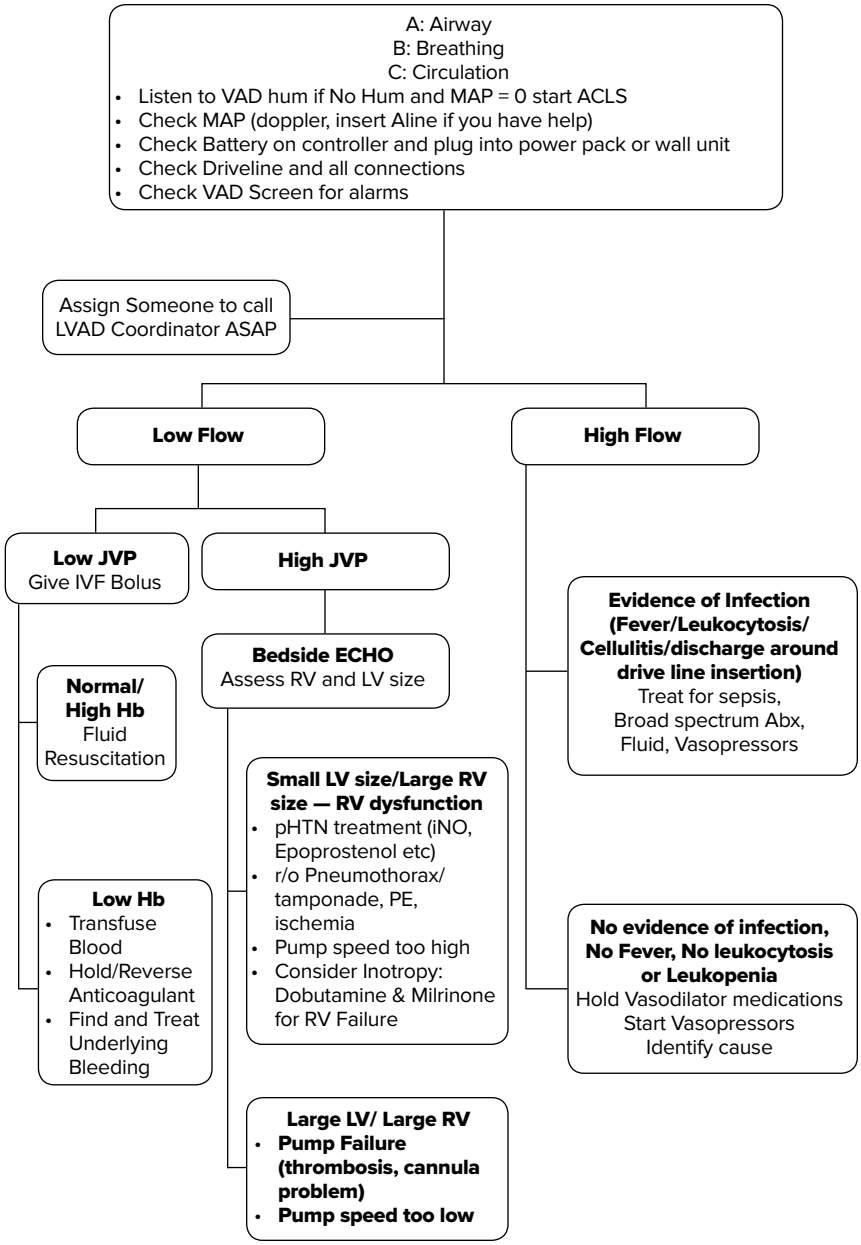
A recently published Scientific Statement for the American Heart Association states that, "A $PETCO_2$ (Partial Pressure End-Tidal CO_2) value of <20 mm Hg in an unresponsive, correctly intubated, pulseless patient with a left ventricular assist device (LVAD) would seem to be a reasonable indicator of poor systemic perfusion and should prompt rescuers to initiate chest compressions."[4]

Rapid device assessment is essential to triage a device cause or non-device cause. Ensure the device is running by listening for the LVAD "hum" over the left chest and left upper abdominal quadrant, checking the battery and blood flow/manual blood pressure.

Look at the cardiac rhythm. Dedicate a person to check the device connections: are the lines secure? Is the battery alive? Is the power source connected? Does the controller need to be replaced? Look at the alarm! Assess tissue perfusion using the usual clues of skin temperature, appearance, mental status and capillary refill. These patients may benefit from an arterial line to help guide resuscitation, in addition to $ETCO_2$. Unconscious patients with undetectable pulse but good MAPs likely have a functioning LVAD.

A good history and physical in conjunction with a broad workup and discussions with the LVAD team are needed to provide care for these complex patients. ✶

LVAD Assessment Algorithm



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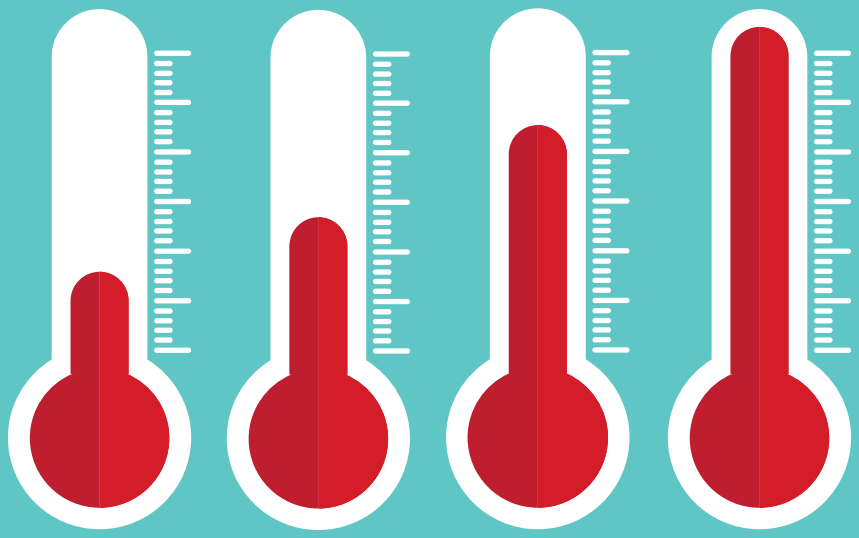
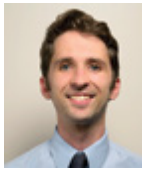


It's Getting HOT in Here

A Review of Serotonin Syndrome



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You are called to evaluate a 74-year-old woman who was found by her daughter, confused and unable to get out of bed. The patient's only medical history is depression, and she has taken a stable dose of fluoxetine for many years. She was recently started on ciprofloxacin for a urinary tract infection. On clinical exam, she is febrile to 40.8 °C and is moderately agitated. She responds inappropriately to questions; however, she is able to follow simple commands. She has dilated pupils, dry mucous membranes, and continuous horizontal eye movements while looking straight ahead. Her arms and legs are rigid, with a slight tremor, and she has significant, inducible ankle clonus.

Serotonin syndrome is one of only a handful of potentially life-threatening diagnoses that should be considered in patients presenting with profound hyperthermia and altered mental status. The condition is caused by an increased level of serotonergic activity, which can occur when a serotonergic medication is started, titrated, or combined with a second medication that augments the metabolism of the original drug. The condition represents a wide spectrum of clinical disease, ranging from a slight tremor to profound hyperthermia, autonomic instability, and death. While roughly 13% of Americans are prescribed serotonergic medications for depression, the true incidence of serotonin syndrome is unknown because of relative underreporting of less severe clinical presentations.[1]

Clinical Features and Presentation

Serotonin syndrome presents as an acute (<24 hour) process after ingestion of a drug that increases central nervous system serotonin levels. The classic features include a triad of altered mental status (anxiety, delirium, confusion), autonomic nervous system excitation (diaphoresis, hypertension, hyperthermia >38 °C), and neuromuscular excitation (clonus, tremor, hyperreflexia).[2] **Serotonin syndrome is a clinical diagnosis.** Several criteria have been developed to aid clinicians in diagnosis, with the most sensitive (84%) and specific (97%) being the Hunter Criteria (Figure 1).[3]

Differential

The differential for the febrile, acutely altered patient includes: infection (meningitis/encephalitis, sepsis), environmental (heat stroke), endocrine (thyroid storm), and drug-induced (serotonin syndrome, neuroleptic malignant syndrome, anticholinergic syndrome, and malignant hyperthermia). **The hallmark diagnostic findings in serotonin syndrome that differentiates it from other drug induced hyperthermia syndromes is hyperreflexia or clonus** (Table 1).

Management

Management of serotonin syndrome largely depends on the severity of the presentation. Mild cases (those without fever but with tremor and hyperreflexia) can be treated with supportive care, discontinuation of the causative agent, and benzodiazepine administration. **Supportive care is directed at the normalization of vital signs**, and patients should be placed on a monitor and given intravenous (IV) fluids and oxygen support as needed.

In the agitated patient, **benzodiazepines are the preferred method for sedation**, as they have been shown to blunt the adrenergic component of serotonin syndrome and improve survival in animal models.[4] When physically restrained, agitated patients are at risk of worsening hyperthermia as well as lactic acidosis and rhabdomyolysis. Haloperidol and other agents with anticholinergic properties should be avoided as these can inhibit sweating and worsen hyperthermia. For patients with

persistent hypertension and tachycardia, consider short acting agents, such as esmolol or nitroprusside.[1] On the other hand, persistent hypotension from MAOIs should be treated using small doses of direct acting vasoactive agents, such as phenylephrine, epinephrine, or norepinephrine.[2]

Should these measures fail to control agitation and improve vital signs, **treatment with cyproheptadine may be considered.**[2] Cyproheptadine is a histamine-1 receptor blocking agent with non-specific serotonergic blocking effects and is the recommended antidote for serotonin syndrome; however, its efficacy has yet to be determined in clinical trials. Dosing should begin with 12 mg orally (tablets can be crushed and out down a nasogastric or orogastric tube if needed) and redosed with 2 mg every 2 hours if symptoms persist. Once symptom control is achieved, maintenance dosing consists of 8 mg every 6 hours. A total of 12-32 mg in a 24-hour period may be required, as this dose has been shown to bind 85-95% of serotonin receptors.[5] Side effects include transient hypotension due to loss of vascular tone, which is short-lived and responds to IV fluids.

Hyperthermic patients with temperatures greater than 41.1 °C should be considered to be severely ill**.** In addition to the previously mentioned therapies, these patients require endotracheal intubation, sedation, and prolonged paralysis with a long acting non-depolarizing agent such as cisatracurium to help control temperature. Core temperature should be monitored using a temperature sensing Foley or rectal probe. Beyond this, severely hyperthermic patients should be cooled using standard measures such as misting, fans, cooling blankets, and ice packs.

There are several drugs that should be avoided in serotonin syndrome. **Succinylcholine should be avoided** given the risk of hyperkalemia caused by rhabdomyolysis. Acetaminophen and other **antipyretics are not useful** and should be avoided as hyperthermia is secondary to muscle activity, not an alteration in the central temperature set point. Long acting antihypertensives, specifically propranolol, also should be avoided because fluctuations in blood pressure may lead to shock.[2] Bromocriptine, an agent used in NMS, is contraindicated as case reports of its administration have led to clinical worsening and even death. Dantrolene should also be avoided, as it has not been shown to affect survival.

The patient immediately received cold IV fluids, ice packs to the armpits and groin, and was placed on a cooling blanket. Her temperature was lowered over 2-3 hours, although she required a cooling blanket for an additional period to maintain euthermia. She received serial low doses of IV lorazepam and a single dose of cyproheptadine. These measures slowly improved her agitation and rigidity. She did not require intubation. She was admitted to the intensive care unit and was discharged from the floor 2 days later. It was felt that the interaction between ciprofloxacin and fluoxetine might have triggered the episode. Her antibiotic regimen was adjusted and she was instructed to stop taking her fluoxetine for 2 weeks. ✶

FIGURE 1. Hunter's Criteria for Diagnosis of Serotonin Syndrome
(adopted from Dunkley et al)

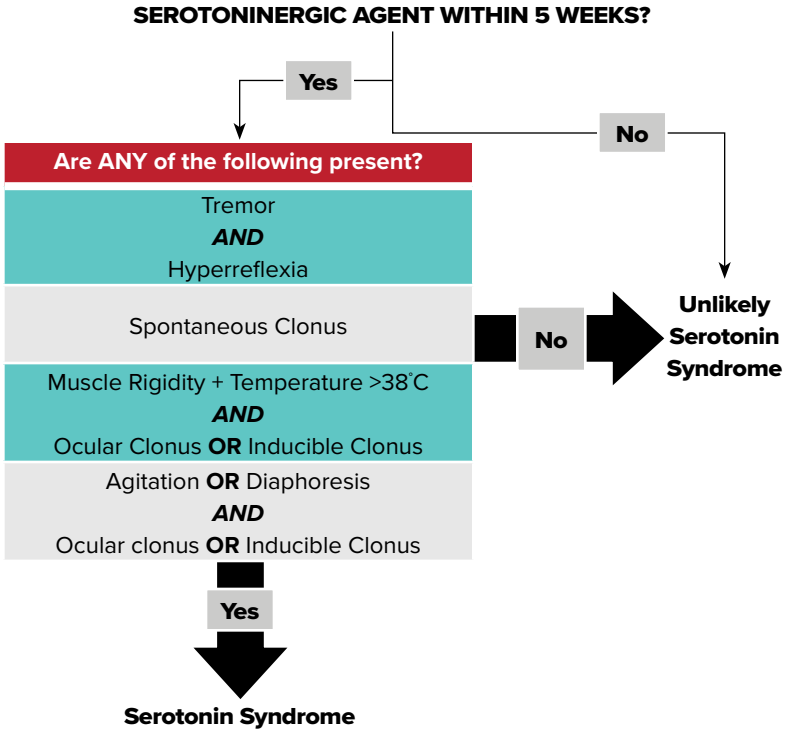


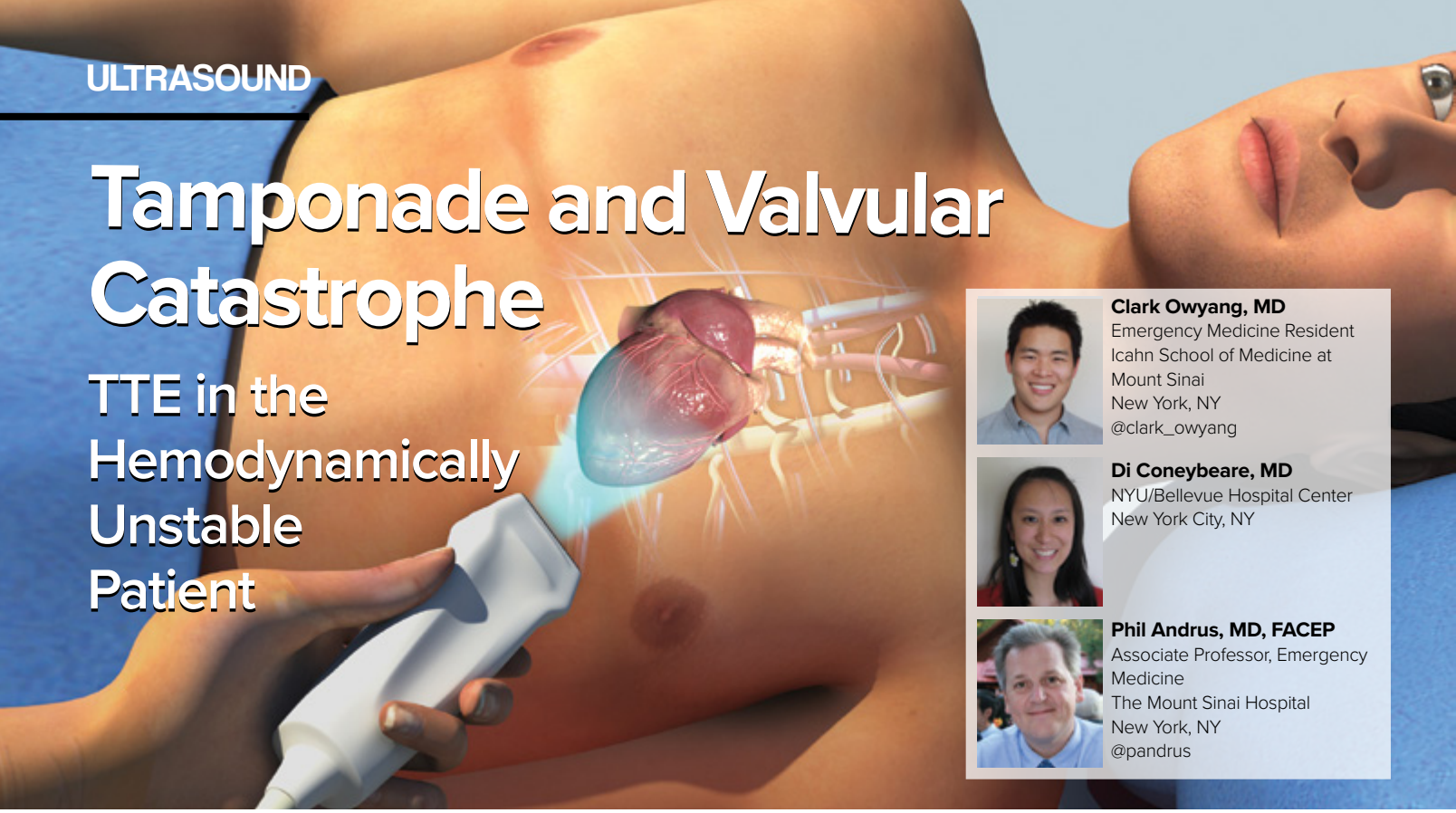
TABLE 1. Differential Diagnosis for Drug Induced Hyperthermia and AMS

	Time	Drug	Tone	Reflexes	Pupils
Serotonin Syndrome	<12h	**Serotonin Agonists**	Rigid		
		Anti-Depressants			
		Triptans		Hyperreflexia	Mydriasis
		Fentanyl		Clonus	Ocular Clonus
		Ondansetron			
		Linezolid			
		Cocaine			
Neuroleptic Malignant Syndrome	Days	**Dopamine Agonist** (Antipsychotics)	Rigid	Bradyreflexia	Mydriasis
Malignant Hyperthermia	<24h	Inhaled Anesthetics	Rigid	Hyporeflexia	Normal
		Succinylcholine			
Anticholinergic Toxidrome	<12h	Anticholinergics	Normal	Normal	Mydriasis
Sympathomimetic Syndrome	<24h	Cocaine	Normal	Normal	Mydriasis
		Amphetamines			

References available online.

Tamponade and Valvular Catastrophe

TTE in the Hemodynamically Unstable Patient



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A 70-year-old man with a history of coronary artery disease, hypertension, hyperlipidemia, and diabetes is brought to the resuscitation bay with severe dyspnea. The patient is in distress, tachycardic, and borderline hypotensive. You stabilize the airway, and the next question becomes what to do about his hemodynamic assessment.

Transthoracic echocardiography (TTE) is an essential tool in the resuscitation of hemodynamically unstable patients. Currently, global assessments of ejection fraction, right heart strain, and pericardial effusion are well-established methods in the practice of emergency medicine. Often, the point-of-care studies are limited to dichotomous answers like the presence or absence of right heart strain or the presence or absence of pericardial effusion. What hasn't been widely propagated is the use of advanced echocardiographic techniques like spectral Doppler (ie, pulsed wave and continuous), color Doppler, or M-mode to manage the heart-lung interactions as they evolve in the critically ill patient. The goal of this piece is to give a brief overview of the advanced echocardiographic techniques we can employ to resuscitate our sickest patients.

CASE 1. Transthoracic echocardiography shows a large pericardial effusion. Could this patient have tamponade physiology causing the symptoms? What signs do you look for to help determine the presence of tamponade physiology?

Beck's triad was discovered and integrated into medical training during the 1930s when surgical causes of acute tamponade were the most prevalent.[1] Because the spectrum from pericardial effusion to physiologic tamponade covers various etiologies (eg, idiopathic, malignant, purulent, uremic, etc.), the physical exam findings of dissection-related tamponade of Dr. Beck's era are less reliable in current practice.[1] Slowly accumulating "medical tamponade" will often lack the jugular venous distension or muffled heart sounds of an acute bleed into the pericardium. Patients exhibiting tamponade physiology are not always in shock but may have relative hypotension, making their diagnosis more subtle and difficult to detect. Furthermore, the classic pulsus paradoxus finding via manual sphygmomanometer is cumbersome and time-consuming to perform.

Described by Kussmaul in 1873, pulsus paradoxus is the classic sign of tamponade in which the equalization of intrapericardial pressures compromise cardiac output during inspiration. This manifests with a systolic blood pressure drop by greater than 10 mmHg with inspiration.[1] During normal inspiration, the negative intrathoracic pressure increases preload/venous return to the right ventricle (RV). Normally, the increase in volume to the RV causes expansion into the pericardium without significant deviation of the interventricular septum into the left ventricle (LV). In tamponade physiology, the constriction and pressure equalization from the effusion inhibits the RV from expanding into the pericardium. Therefore, the septum is pushed leftward, impinging on the LV decreasing cardiac output and systolic blood pressure.[2] This creates the phenomenon of pulsus paradoxus and the systolic blood pressure drop with inspiration exhibiting key concept in tamponade physiology: ventricular interdependence. This interaction between the right and left sides of the heart is seen in normal states, but exaggerated in tamponade as the two ventricles work in an increasingly confined pericardial space (Figure 1).

Ultrasound visualizes and quantifies the tamponade-induced changes in flow.

The definition of tamponade has changed considerably over the past two decades as detailed in Catherine Otto's "The Clinical Practice of Echocardiography."[4] Though the signs of tamponade vary depending on the definition *du jour,* the most useful immediate sign of acute elevation in intrapericardial pressure is RV diastolic collapse - a specific sign reflecting the intrapericardial pressure elevation precluding adequate ventricular filling. A simple memory aid for tamponade findings on echo is to ask, "*Is the RV collapsing during a time when it is supposed to be expanding?"* The most commonly used view to document diastolic RV collapse is the parasternal long view. It may be difficult to differentiate between systolic and diastolic movement of the free RV wall by visualization in B-mode. This is when M-mode provides a clearer analysis, allowing simultaneous visualization of the free RV wall and anterior leaflet of the mitral valve. The opening of the mitral valve composed of the E-wave (early diastole) and A-wave (atrial kick) mark diastole. The blue arrow in Figure 2 indicates the inward movement or collapse of the RV free wall during the time between points A and B demarcating diastole (the time when the RV should be moving outward or expanding).

Additional echocardiographic evidence of tamponade physiology is mitral Doppler flow changes with inspiration. Simply put, mitral flow changes on Doppler reflect the pulsus paradoxus phenomenon. Mitral inflow velocity is blunted as inspiratory flow of venous return into the right heart pushes the septum into the left heart; Doppler flow across the mitral valve is therefore decreased. This is measured in the apical four-chamber view of the heart with the gate of the pulsed wave Doppler placed at the tip of the mitral valve. Normally, there is some minor respiratory variation in flow velocity, but this normal respiratory variation is exaggerated in tamponade. A drop of greater than 25% in mitral valve inflow velocity is consistent with tamponade physiology. This represents a sonographic version of pulsus paradoxus.

As a direct corollary, Doppler evaluation of the flow across the tricuspid valve and within the hepatic veins shows similar physiologic changes in response to the exaggerated ventricular interdependence.[4] Expiration in the setting of tamponade amplifies the normal increase in pulmonary venous return to the left heart. This amplification pushes the septum into the right heart, resulting in hepatic vein flow reversal and decreased flow across the tricuspid valve during expiration. Similar to the mitral valve, tamponade will show a 25% decrease in the trans-tricuspid velocities with expiration.[5]

While the overall theme of tamponade can be distilled down to acute elevations in intrapericardial pressures to a degree that inhibits normal hemodynamic function, advanced echocardiographic techniques are necessary to diagnose when the tipping point of elevated intrapericardial pressure has been reached and cardiac output has been significantly compromised. By using Doppler flow patterns over serial exams, tamponade physiology can be more completely characterized beyond solely RV free wall diastolic collapse. Equalization of the intrapericardial pressures affects the downstream right atrial pressure commonly producing signs like a static inferior vena cava seen using M mode (Figure 3). As the intrapericardial pressures increase in tamponade, the flow across cardiac chambers becomes increasingly sensitive to respiratory cycle changes. The Doppler signals in surrounding areas like the IVC and hepatic vessels and across the tricuspid and mitral valve shows characteristic changes in the evolution of pericardial effusion to physiologic tamponade.[4]

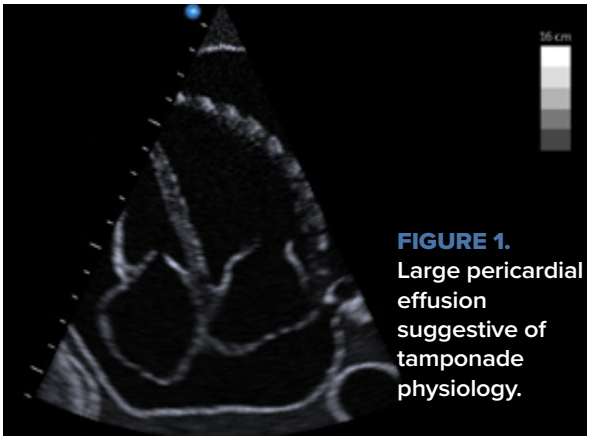


FIGURE 1. Large pericardial effusion suggestive of tamponade physiology.

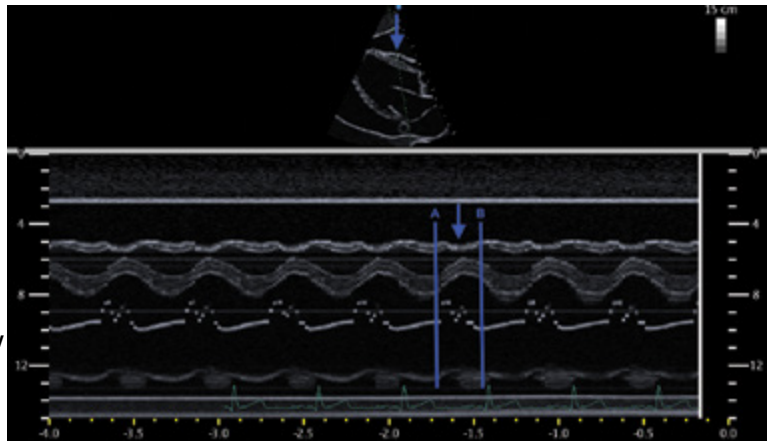


FIGURE 2. Diastolic collapse of the RV free wall (blue arrows). Points A and B demarcate diastole (ie, time during which mitral valve is open). The blue arrow indicates the collapse of the RV free wall during diastole.

CASE 2. A different patient with the same clinical presentation has an echo that reveals a hyperdynamic LV with abnormal movement of the mitral valve. What tools can be used to assess for valvular pathology?

The same clinical presentation with very a different ultrasound finding can significantly alter management. In this patient, instead of tamponade, we are concerned for valvular catastrophe causing cardiogenic shock. With the finer details of Doppler beyond the scope of this review, the basics of color Doppler for valvular pathology can assist in identification of valvular dysfunction and inform the physician of its emergent diagnosis.

Moving away from the physiologic musings of tamponade, the color Doppler evaluation of valvular pathology requires a basic understanding of the sonographic

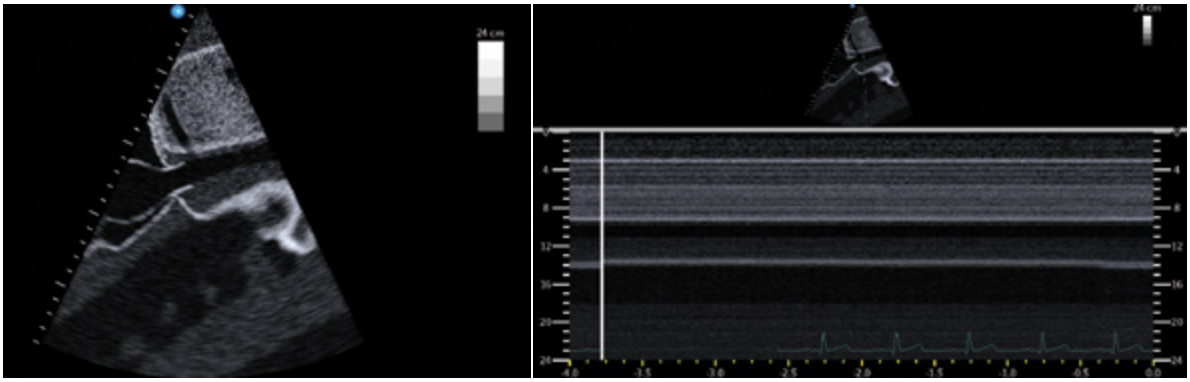


FIGURE 3. Inferior vena cava showing lack of variation with respiratory efforts.
Left: B mode showing static IVC.
Right: M mode showing lack in respiratory variation of IVC.

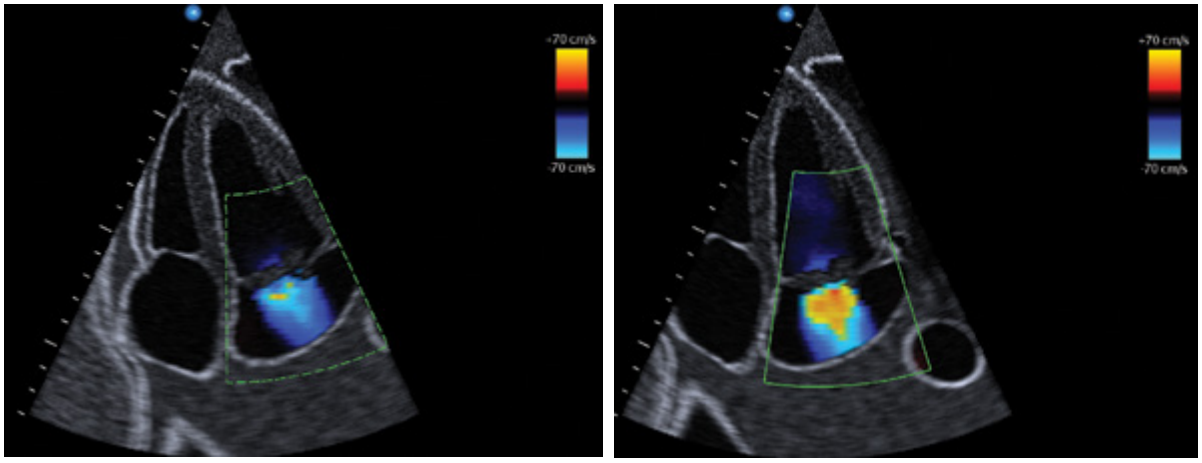


FIGURE 4. (left) Color Doppler with Nyquist limit on right of the figure.

FIGURE 5. (right) Centrally located mitral regurgitation jet.

mechanics. The color Doppler setting represents flow using a color spectrum to denote the direction of blood flow in relation to the ultrasound probe. Flow away from the transducer registers as blue; flow toward the transducer registers as red.[6] Similar to pulsed-wave Doppler, color Doppler emits intermittent ultrasound signals to sample a specific area of blood flow. Because the machine can only send signals at a finite rate, both color Doppler and pulsed-wave Doppler have an upper limit of flow velocity at which the machine can accurately detect direction and velocity. This limit is known as the Nyquist limit. When the velocity of the blood flow in the sampled area exceeds the Nyquist limit, the machine reports the direction inaccurately, often in the opposite direction of the flow. The multi-colored artifact created is known as aliasing (Figure 4).

Turbulent flow velocity caused by regurgitation is much faster than normal laminar flow through a valve. Therefore, the aliasing artifact is used to identify regurgitant jets as the velocity of turbulent flow from regurgitation exceeds the Nyquist limit. Despite knowledge of aliasing in the regurgitant jet, we want to minimize overestimation of regurgitation due to an inappropriately low Nyquist limit. An inappropriately low Nyquist limit will overestimate the regurgitant jet by misinterpreting flow from the nearby pulmonary vein, incorporating it as part of the regurgitant jet.[7] To avoid overestimating the regurgitant flow, color Doppler requires setting an appropriate Nyquist limit or sampling frequency of greater than 55 cm/second.

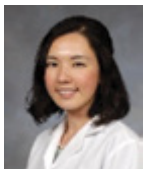
The apical 4-chamber and the parasternal long views are the best views to evaluate for mitral valve regurgitation in this patient with a likely flail leaflet. The color Doppler setting will provide a boxed in area for sampling. Adjust the box such that it encompasses the mitral valve as well as the left atrium. A smaller sampling box, will allow you to maximize the Nyquist limit. While there are many methods to quantify the severity of regurgitation, qualitative analysis is often more useful in the unstable patient. There are 2 qualitative clues that are consistent with acute severe regurgitation: jet shape and jet size. Regurgitant jets can form centrally or eccentrically. Eccentric jets are more often associated with flail leaflets and acute regurgitation.[8] Typically, one jet will appear in the center of the atrium and the other will appear to hug the sidewall of the atrium. Resembling a flame-like structure across the mitral valve, the representation in Figure 5 is an example of a central regurgitant jet. Visual estimation of jet size is useful in determining severity of mitral valve regurgitation. Generally accepted jet size in severe regurgitation include a jet covering more than 40% of the left atrium (rough visual estimate) or a jet that reaches the back wall of the atrium.[8]

Integration of echocardiography into the hemodynamic assessment of the crashing patient provides an intervention-based, physiologic approach to resuscitation. While standard emergency medicine echocardiography can provide some answers to hemodynamic collapse, M-mode and Doppler techniques create a deeper understanding of the physiologic compromise of the patient in the resuscitation bay. ✶

Special thanks to the NYU/Bellevue Department of Emergency Medicine for the echocardiographic images in this piece.

References available online.

EMRA CRITICAL CARE ALERT



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Apneic Oxygenation in RSI

A 57-year-old male presents to the emergency department for shortness of breath. He became more hypoxic despite applying NIPPV. You decided to proceed with rapid sequence intubation. Do you routinely use apneic oxygenation?

Article

Caputo N, Azan B, Domingues R, et al. Emergency Department Use of Apneic Oxygenation Versus Usual Care During Rapid Sequence Intubation: A Randomized Controlled Trial (The ENDAO Trial). *Acad Emerg Med.* 2017;24(11):1387-1394.

Objective

Apneic oxygenation (AO) was developed to prevent oxygen desaturation during the apnea period during rapid sequence intubation. The purpose of the study was to determine if the application of AO increases the average lowest oxygen saturation during RSI when compared to the usual care (UC) in the emergency setting.

Background

Using the concept of "aventilatory mass flow," apneic oxygenation has been theorized to be effective in preventing the occurrence of desaturation during the apneic period. Apneic oxygenation is performed by delivering various rates of oxygen flow through the nasopharynx during the apneic period of laryngoscopy. Though methods using specialized high flow cannula (eg, THRIVE or high flow systems capable of up to 70 liters per minute of flow) have been studied, recent work has explored the utility of standard nasal cannula for AO at "flush flow" rates, which achieve ≥ 15 LPM. Though variation exists, many emergency department oxygen valves are capable of delivering flow rates exceeding the 15 LPM labeled on the outlet by turning the valve to maximal capacity past the 15 LPM gradation.

The primary outcome of this investigation was to determine if the use of AO via flush flow rates increases the average lowest oxygen saturation during RSI when compared to usual care. Caputo and colleagues also sought to determine if the use of AO increased first pass success rates and decreased the rates of desaturation, time to desaturation, and mortality.

Design

Randomized controlled trial, single-center urban, academic, Level I trauma center in New York City.

Inclusion criteria: Any adult patient (age >18 years old) requiring intubation

Exclusion criteria: Non-preoxygenated patient to the standard RSI protocol of a goal of 3 minutes with 100% FiO2 by means of BVM, BPAP, and/or NRB, a cardiac/traumatic arrest, or intubated without an apneic period.

Study Protocol

All adult patients undergoing endotracheal intubation the ED were randomized to receive supplemental O2 via NC and NC EtCO2 both at flush flow rates ≥15 LPM during laryngoscopy (AO group) or no supplemental oxygen (UC group).

Data collection during intubation was performed by independent observers who were not directly involved in the performance of the procedure.

Apnea time was defined as time from first look (defined as insertion of the laryngoscope blade into the patient's mouth) to confirmation of endotracheal tube placement by waveform capnography (EtCO2). Intubation attempts were counted for each patient.

Measured Outcomes

Primary: The average lowest oxygen saturation during apneic period or the following 2 minutes after intubation

Secondary: First pass success, desaturation below SpO2 90%, and desaturation below SpO2 80%.

Key Results

Enrollment of 200 patients (100 in each category) provided an 80% statistical power to detect a moderate difference between groups for the primary outcome.

Enrolled n=209; Included n=200

More than 70% of patients were successfully intubated by 60 seconds, 80% by 80 seconds, 90% by 100 seconds, and 100% by 195 seconds.

Patients with prolonged apnea times (>130 secs) did not desaturate to an average SpO2 <90% (n=22). There was no difference in O2 saturation between the groups at any of the time intervals during the periprocedural period; also, there was no difference in rates of desaturation below 90% or 80% between groups.

Conclusion

This study demonstrated that in patients who are properly preoxygenated during RSI in the ED, the application of apneic oxygenation via flush flow rates on standard nasal cannula did not show any differences in lowest mean SpO2 nor in rates of moderate or severe desaturation. It is important to consider the study was performed at a single-center, academic ED with a residency training program. Furthermore, the intubations were performed promptly and the results may not be generalizable across all populations. ✶

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THE Do's AND Dont's OF Docere

How to Be an Effective Teacher

Physicians take on many roles and responsibilities — including that of a teacher. In fact, the word "doctor" itself derives from the Latin "*docere,*" meaning to teach.[1]

Residents may be asked to deliver teaching sessions to various groups of learners in the hospital. We should jump at these character-building opportunities, which can be both rewarding and enjoyable. To many, however, it can be a daunting prospect. Following clear principles and careful planning can increase the effectiveness of your session and even improve satisfaction for you as the teacher. In this article, we will explain the essential components of an effective teaching session. Try these tips for success in the classroom, at the bedside, or while working informally with peers.

Planning Your Teaching Session

Identify Your Learners

Knowing your audience is vital, because it allows you to plan your content accordingly and present it at the appropriate level.[2] Some key points are:

- Why you are teaching the session?
- What do learners already know about the topic?
- What do they need to know about the topic?

One of the easiest ways to find this information is to look at your audience's curriculum, if available. This can provide formal and detailed guidance on what learners will need to know and what they may already know.

It is always useful to list your expected audience at the top of the lesson plan so that you can plan the session with them in mind. A session that is centered on your learners and their specific needs is bound to be successful.

Pick a Topic

The topic may be predetermined, or you may have free reign. Either way, it is important to ensure that the subject matter is clear from the beginning. If given the opportunity to choose a topic, pick something that will be important and relevant to your target audience.

Set Aims and Objectives

Aims and objectives are at the heart of lesson preparation. Without them, the session could easily lose its direction and vision. You will commonly encounter the use of aims and objectives in education, but they are not always used correctly. By establishing them early on in the planning process, you are able to clearly outline the content and learning outcomes that will be achieved during the session.

The aim is an overarching statement of intent; it provides learners with a flavor of what they can expect from the session. Generally, a short session will have one aim while a longer session may have two or more. When writing aims, use broad, general words such as *introduce, encourage, improve, develop*, and *allow*. For example, if you are teaching intravenous catheter (IV) insertion to 3rd year medical students, your aim might read, "*to introduce the procedure of IV insertion.*"

Objectives provide more specific guidance than the aim. They are statements of what the learner should be able to do by the end of the session. This is reflected in the terminology used when writing them, which might include action words such as *list, name, describe,* and *recognize*. With reference to the previous example of IV insertion, one of the objectives may read, "*learners should be able to list the essential equipment needed.*" Sessions will generally have about three objectives. Depending on the length of the session, this can vary. The important thing is to make sure that they are SMART (Figure 2).

Make a Lesson Plan

The key to teaching is preparation. A prepared teacher is someone who will be able to provide direction and focus for their students while remaining flexible to deal with unexpected changes in direction. The secret to being prepared is a lesson plan. It is simple to construct and well worth the extra preparation time. Using a template is an easy way to begin (Figure 1).

Choose the Right Teaching Methods

Once you have a clear outline of what you would like to accomplish, it is time to think about how you are going to achieve this task. It is important to incorporate a range of teaching methods that stimulate different learning styles. For example, when teaching a practical procedure such as IV insertion, you could explain it with clear written steps, show a video, and demonstrate the technique in person. It is important to plan this in advance. Contrary to current practice in many medical schools, traditional didactic lectures may not always be the best method.

Identify Resources

It is useful to have a column in your lesson plan that specifies what you need for each specific task. Be as detailed as possible, even down to number of pens that might be necessary for an activity. By breaking your teaching session down into its specific parts, you can form a list of the resources required.

Create a Schedule

You will often have an allocated amount of time to accomplish your objectives, and it is important that you keep this in mind when developing your lesson plan. Be detailed with time markers in the lesson plan; you can use these during the session to ensure that you stay on track. Remember to incorporate short breaks and to have a fixed time for the learners to ask questions at the end. Building in a modest amount of buffer time can also be extremely useful, as this builds flexibility into the session — one of the major keys for success.

Assessment

Assessment is a flexible element that can be incorporated many ways. Traditionally, assessment is most formal when presented in the way of a scored, individual examination. Alternatively, assessment can be left as an informal element evoked through active questioning. To meet in the middle, it could be useful to include a small quiz or group task to help reinforce and embed understanding. If you are conducting a series of lectures, it may be helpful to conduct a small test of the previous material to help learners recall and consolidate their knowledge then build upon it.

Keys for Presentation Day

DO: Get there early.

There is nothing worse than arriving at the teaching venue to find out that there is a problem and you have little time to resolve it. Arriving early will take the pressure off, allow you to relax before you teach, and allow troubleshooting of any unexpected issues with time to spare. Learners are more likely to respond to a teacher that appears calm, in control, and rehearsed.

DO: Execute a trial run.

Arriving early also allows you to execute a trial run. It is always useful to practice a small section of your material in a safe environment. Depending on the setting and content of the session, this may involve timing yourself as you present slides or practicing with the equipment you may use if teaching practical skills.

DO: Make introductions and use icebreakers.

The first few moments will set the tone for the entire presentation. While a perfect start is rarely necessary to achieve an effective teaching session, a bad start can be disastrous and effectively ruin the rest of the presentation. In any session, it is always important to introduce yourself and your relationship with the topic.

Despite running the risk of feeling contrived, asking for a short introduction (e.g. name and one line of interest) from each learner is often a great way to start small group work. It literally 'breaks the ice' and is often the first step toward encouraging more meaningful group interaction and teamwork.

For larger groups or full lecture halls, you may need to be somewhat more creative in generating group interaction.

DON'T: Be too hard on yourself.

No matter how well you prepare, there will be parts of your session that you feel could have gone better. This is the same for both novice and experienced teachers alike. Similar to clinical medicine, honest and constructive self-reflection is an essential part of the process of lifelong learning and development as a teacher. Return to your aims and objectives to assess if the presentation was successful. If it fell short, what could be done differently? Feedback from an external observer may be useful to assist in identifying areas of improvement while also highlighting strengths.

FIGURE 1. Lesson Plan Template

Title			
Aims			
Objectives			
Audience: Number of students and level			
Timing	Section	Content	Resources

FIGURE 2. SMART Objectives

SPECIFIC. Well defined, ensures the session is focused

MEASURABLE. Allows assessment of whether the objectives are met

ACHIEVABLE. Within the allocated time frame and given available resources

RELEVANT. With the AIM and wider curriculum of the learner in mind

TIME-ORIENTATED. Every objective needs a time frame

DON'T: Have only a 'Plan A.'

Some sessions take off flawlessly and with no hiccups. However, sometimes no matter how well you prepare, it may not be possible to deliver a session as you intended. Technology failure, illness, and traffic are sometimes to blame for a sub-par performance. Part of your lesson planning should be ensuring that you have a 'plan B', such as handouts if your computer presentation does not work. Make sure to save your presentation in multiple formats, such as on a portable drive as well as on a cloud based system accessible via internet.

DON'T: Be intimidated by questions you cannot answer.

We have all been stumped by a question in front of an audience. Even the most experienced lecturers have difficulty answering questions on the fly from time to time. It can be helpful to ask the group to assist in providing a complete answer. Alternatively, look up the question as a group and initiate a discussion that can help facilitate a learning objective. The most important thing is to be honest and provide support in finding the right answer. Never lie or give a vague answer — this will detract from your credibility and do significant harm. Offering to look up an answer and notify the learners at a later date will be beneficial to your learning and maintain a mutual level of respect.

Summary

Teaching is a key responsibility. Residency is a great place to develop these skills, as they will carry you through your entire career. The key to a successful presentation is preparation in the form of a structured lesson plan that contains aims and objectives, a mixture of teaching methods, a list of resources, and a 'Plan B'. ✶

The Best of Humanity

IN THE WORST OF TIMES

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To a medical student, perspective is everything. The way we view our time spent studying in the classroom, the way we process our clinical experiences, and the way we develop our identities as physicians all prepare us for the day when someone will call us their "doctor." Medical school presents students with a deluge of perspectives, yet time can seem to flow by in a cyclical and monotonous manner. **What happens when we are forced to slow time and change our perspectives?** What happens when life produces an event that changes everything?

Hurricane Harvey was that inciting event for many people.

When Harvey struck, millions of Texans were affected. Entire communities were devastated, families were displaced, and at least 75 people lost their lives. The cost of the damage is estimated to be $150-$180 billion — making it among the most destructive hurricanes ever in recorded in the United States.

Yet in the midst of this chaos, the true nature of humanity emerged.

Carl Jung believed in a theory called "humanism," which assumes humans are inherently good beings who sometimes make mistakes. In a world that is currently plagued by disasters, hateful speech, and many other negativities, I am proud that the state of Texas — and its neighbors who swiftly provided aid — showed a true humanistic nature.

Dallas and Houston are known to be rivals in almost every aspect. From sports to schools to styles of driving, these sister cities showcase their "sibling rivalry" with every passing day. But like true siblings, **when one is in trouble, the other will stand up in support.** Immediately following the evacuations of the communities most affected by Harvey, the City of Dallas created multiple shelters to house, feed, clothe, and care for those who now had nothing. The Dallas "Megashelter" at the Kay Bailey Hutchison Convention Center housed around 2,650 participants at its peak, with thousands more finding refuge in the surrounding areas. Hundreds of volunteers arrived to help care for these evacuees. I was fortunate enough to be a part of this great endeavor.

In conjunction with the medical students at UT Southwestern, Texas A&M College of Medicine students

participated in a variety of clinical duties at the Dallas Megashelter. We staffed the medical clinic from 6 am to midnight every day for 19 consecutive days. During this time, students ranging from first-year to fourth-year participated in almost every aspect of the medical clinic, from triaging patients to serving on the command staff. Thousands of patients were successfully treated through the combined efforts of UT Southwestern, Texas A&M, Dallas Fire Department, the Dallas County Medical Society, and many other organizations. **When called upon, medical students spanning two large institutions bonded together to work through long hours and stressful conditions with no expectation of return.**

Working alongside our mentors, we students experienced the true meaning of being a "healer," while participating in pre-clinical and clinical duties. Even though there was no expectation of personal benefit, I believe every volunteer took something valuable away from this experience.

Disasters have a way of uniting individuals and bringing out the best in humanity — humanism truly shows its face when it is needed most. It is what inspires individuals to go abroad and perform mission work in communities with which they have no association. It is what inspires our soldiers to provide toys to children in areas where they are deployed and currently fighting an enemy. And humanism is what inspired the people of Dallas to step up when our sister city was struck by tragedy. Regardless of the amount of time logged at the shelter, I hope this event shaped the perspectives of every medical student who participated and allowed each and every one of us to discover our identity as physicians. ✶

Entire communities were devastated, families were displaced, and at least 75 people lost their lives.

PHOTO BY MICHAEL NIGRO, SIPA VIA AP IMAGES

REFLECTION ON THE CHARLOTTESVILLE RALLY

Amid growing controversy surrounding the existence of confederate statues in present-day America, a rally in protest of the removal of two such statues thrust Charlottesville, Virginia, into the national spotlight on August 12, 2017. The "Unite the Right" rally pitted hundreds of members of right-wing groups, including White Supremacist organizations, against thousands of counter-protesters. As tensions built, the UVA Health System prepared for a potential mass casualty incident (MCI). Then violence erupted as a car plowed into the crowds, killing one individual and injuring 19. Six residents staffed the emergency department in downtown Charlottesville that day, most of whom applied their recent training to the first MCI of their medical careers.

Residents Leap into Action

"Let's do some teaching!" **Kayvon Izadpanah**, MD, recalls his attending on the pediatric side of the ED enthusiastically announce. Before she could begin, news broke of a car ramming into a crowd — with 20-30 incoming blunt trauma patients, ETA unknown.

"My mind briefly felt paralyzed by the magnitude of the unknown," he recalls. "We had no idea what was about to come through the ED doors."

As the hospital's MCI protocol was initiated, the ED prepared for the worst by setting up airway kits and locating tourniquets. "There was a lot of raw emotion you had to leave at your desk as we prepared the resuscitation bay."

Then the first trauma patient was wheeled into the department.

"When the first patient arrived, a switch flipped and I just fell back onto my training," Dr. Izadpanah said. This trauma, like any other, required a calm and systematic approach. As the team treated a steady flow of patients, imaging was prioritized for the most critical patients, and admission processes were expedited so ancillary staff could clear rooms for additional waves of the injured.

The situation tested the residents' ability to adapt quickly to a difficult situation. This task was highlighted for **Saher Iftikhar**, MD, the most senior resident in the ED at the time. "Not only did we need to triage resources, but we needed to triage

ourselves," she remembers. Fortunately, the recent MCI preparation devised a system to handle this: the team used the GroupMe app to quickly summon help from additional upper-level residents.

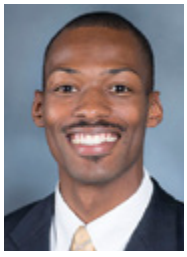
Dr. Izadpanah and his co-resident, Joshua Ginsburg, MD, stationed themselves in the main trauma bays, while Dr. Iftikhar floated between bays to delegate responsibilities and direct incoming providers. Given how quickly the situation was changing and how fast all the physicians were moving, Dr. Iftikhar's role proved vital to reducing chaos as she remained mobile and served as the go-to airway specialist.

Aaron Blackshaw, MD, had been placed on call after a torch-wielding crowd marched the previous night, demonstrating the scale of what was to come. "I thought there was a very small chance I would actually get called in," Dr. Blackshaw recalls. As the news showed footage of openly brandished weapons, racist iconography, and growing violence, Dr. Blackshaw stayed closer to his pager and phone.

At 1:53 pm, he got the call and bid goodbye to his worried wife.

"After the short drive to the hospital, while walking into the ED, I looked down at my phone and saw over 10 texts referencing the breaking video of a car plowing through pedestrians," Dr. Blackshaw said. "I readied myself for a hectic flurry of activity."

He was amazed at the response he encountered, with "simply outstanding" support staff and colleagues working together flawlessly. As he took the lead in a trauma bay, Dr. Blackshaw recalls the surreal feeling of going through ABC's while factoring in the risk of firearms or other weapons during the "exposure" portion of the assessment.



Jonathan Greer, MD, had long thought about how he would respond in such a situation. "Due to the sheer number of trauma patients, there were a number of involved individuals who fell directly under my care," he said. "My first patient was a young African-American female who had been struck by the car." Dr. Greer vividly remembers the expression of inconsolable terror and shock as she was brought in by EMS. "At the head of the bed, while I completed my trauma survey, I [tried] to console and reassure my patient. In the heat of the moment, my principle objective was to treat her as my patient." However, he recalls the following days having the greatest emotional impact.

No Break in Business

Despite the chaos, the EM interns, along with 2 other off-service interns, continued to care for non-rally as well as less seriously injured rally participants. "I look with some amazement at the 6 other residents who kept on working despite the chaos," Dr. Iftikhar said. "They know that no matter what is happening outside, it is business as usual in the ED."

Hospital Preparation Prior to August 12

The events of Aug. 12 came after a smaller but similarly motivated rally in July. Amid rising tensions, the hospital's MCI plan was reviewed and reinforced.

For **Joshua Ginsburg**, MD the MCI activation turned a conceptual protocol into reality. Just a month prior to the incident, he had given a lecture on mass casualty incidents during didactic conference. Now, he found himself as one of the upper-level residents helping to manage many critically ill patients. Seamless cooperation was going to be crucial.

When Dr. Ginsburg went to check one of his trauma patients, he found orthopedic surgery residents had already completed a needed splint. "The teamwork was impeccable, and that made for swift and really high-quality patient care," he said. "Even the most senior attendings provided care wherever they were asked, whether in triage, express care, the main ED, or the trauma bays.

"Inpatient teams accepted patients whose workups were far from complete in order to decompress the ED. Medical students updated patients and followed up on results. Medical scribes asked us what supplies were running low and helped to re-stock where needed. Housekeeping quickly made sure rooms turned over and ready for the next critical patient."

The sense of cohesive purpose was a reminder that despite extreme circumstances, emergency medicine is a field in which every member of the team is surrounded by people whose main goal is to help others and support each other.

"There were no egos that day," Dr. Ginsburg said. "No one was there to be the hero but rather to simply do what we do with each shift: our jobs."

The Aftermath and Support

Austin Lee, MD, gleaned many lessons from this MCI.

He recalls being able to identify one of his patients while watching news footage after the long shift ended. "I could see that this patient got hit directly, and at a high rate of speed; he was thrown into the air," Dr. Lee said. "It is not often you get to rewind and watch a patient's collision or injury occur, but [it] taught me to be extra vigilant in any trauma case. Though we rightly put an enormous weight on a patient's history, in times of trauma or emotional distress distracting injuries could easily be lurking."

Dr. Lee is most proud of the teamwork and leadership displayed that day. "The ED, as well as an entire health system, is an incredibly powerful force that can be mobilized to great effect," he said. "Throughout the day's events there was a very strong sense of teamwork and camaraderie not just among the EM residents and faculty, but also with the trauma team, the nursing staff, and other providers from throughout the entire hospital. The response of so many truly showed the depth and efficiency of that day's mobilization plan and subsequent response."

Yet while the MCI highlighted the strength of the health care team, it also

As tensions built, the UVA Health System prepared for a potential mass casualty incident (MCI).

emphasized the fragility of life, Dr. Blackshaw said. As a medical student, he was completing an EM rotation in Charleston, South Carolina, when a mass shooting occurred at Emanuel AME Church.

"Now that I have also lived and worked through what happened in Charlottesville, I'm reminded that my day-to-day experiences as a white man in America are not reflective of what most of my friends, neighbors, and colleagues go through," he said. "However, I am most impressed by the first responders, techs, nurses, and physicians who work to help whoever needs it, whenever it happens. As Mr. Rogers said, when you see frightening events on the news or disasters, 'Look for the helpers. You will always find people who are helping.'"

Dr. Greer notes the emotions that were part of the day, while important to recognize, are best separated from immediate patient care. "Following this act of terror, my emotions ranged from disbelief to anger to the realization that I had just witnessed firsthand the results of hatred," he said. "For members of the White Supremacist, Neo-Nazis, and Ku Klux Klan to travel hundreds of miles to wreak havoc in my city was discouraging and unsettling. Nonetheless, as emergency physicians, our responsibility is to meet individuals at their worst moments. This is much more than just a job, it's a calling — a calling that we will continue to fulfill regardless of whom we are treating."

Moving Forward

The aftermath of the incident was emotionally taxing — yet, true to form in EM, it was tempting to simply absorb those hardships and move on to the next task. The team intentionally counteracted that habit.

"One of the most important things we did for each other as a department was dedicate time, over several days, to collectively debrief, discuss, and share our emotions," Dr. Izadpanah recalls. "The strength of our department was palpable through the level of support we had for each other."

The UVA Emergency Department mirrors the Charlottesville community in its pride for diversity of all forms, which ultimately helps strengthen the ability to serve patients. The "Unite the Right" rally aimed to divide a community, and Americans as a whole, but in the end it demonstrated the resolve of our community, first responders, and Americans across the United States who stood in solidarity with the Charlottesville community. ✶

Get ready for some progress with the 2017–2018 EMRA Board of Directors! Front row: Past President Alicia Kurtz, MD; President Zach Jarou, MD; (second row, left-right): Director of Health Policy Rachel Solnick, MD; Director of Membership Shehni Nadeem, MD; Secretary/*EM Resident* Editor Tommy Eales, DO; Medical Student Council Chair Erin Karl; EMRA Representative to ACEP Nida Degesys, MD; ACGME RC-EM Representative Eric McDonald, MD; Speaker Scott Pasichow, MD, MPH; Vice-Speaker Nathan Vafaie, MD; President-elect Omar Maniya, MD, MBA; Director of Technology Nick Salerno, MD; and Director of Education Sara Paradise, MD

Scenes from ACEP17

Below: ACEP17 offered plenty of reasons to smile

SCENES FROM ACEP17

The 20 IN 6 RESIDENT LECTURE COMPETITION was fierce, but in the end 3 speakers prevailed *(below)*.

1st Place Allen Chang, MD, Stanford University/Kaiser Permanente Medical Center: "GOOD: Re-examining Wellness and Resiliency"

2nd Place, Catie Reynolds, MD, University of Texas – Houston: "Fast, Wide, and Regular: Is My Stable Patient Really in VTach?"

People's Choice Tanya Belle, MD, University of Connecticut: "Is There a Doctor on Board?"

EMRA published 4 new clinical resources in October, thanks to the leadership and expertise of editors John Greenwood, MD *(above; PressorDex®)*, Eric Steinberg, DO, FACEP, and Joseph Habboushe, MD, MBA *(above left; Basics of Emergency Medicine* and *Basics of EM: Pediatrics)*; and Brian Levine, MD, FACEP, Jeremy Berberian, MD, and *(not pictured)* William Brady, MD, FACEP *(at left; EMRA EKG Guide)*.

The CORD CPC Final Competition winners are *(left)* Jonathan Andereck, MD, Resident Presenter; and Nick Aloisio, MD, Faculty Discussant. Runners-up *(not pictured)* are Andrew Goldsmith, MD (Resident Presenter) and David Diller, MD (Faculty Discussant).

Adam Kellogg, MD, FACEP, *(photo at right)* received the 2018 Joseph F. Waeckerle Alumni Award, along with his wife, Jennifer, and daughters.

Left: Olu Akindutire, MD, of Kings County Hospital/SUNY Downstate earned the EMDOCS Resident LAC Trave Scholarship as well as the EDDA Scholarship; *Right:* 2018 LAC Travel Scholar Arwa Mesiwala, MD, of The Ohio State University Wexner Medical Center

2018 Mentorship Award honoree Gillian Schmitz, MD, FACEP, of UT San Antonio

Resident Health Policy Elective recipient Kayvon Izadpanah, MD, and EMRA EKG Guide author William J. Brady, MD, FACEP

The University of Pennsylvania represented at the EMRA FALL AWARDS, with *(from left)* Erik J. Blutinger, MD (Global Health Initiative and ACEP17 Travel Scholar); John Greenwood, MD (PressorDex® editor-in-chief); Rohit Sangal, MD (CORD Travel Scholar); Jennifer Love, MD (FOAM(ER) of the Year); Joshua Glick, MD (Clinical Excellence Award); and Paul Ginart (Be the Change Grant); *Right:* Student Health Policy Elective recipient Tiffany Sin; *Far right:* Capt. Joshua Krieger, MD, earned the 2018 Steve Tantama, MD, Award for Military Excellence

ACEP17 Travel Award recipients *(left to right)* Ryan Joseph, DO; Brian McQuaide; Lawrence Lau, MD; Christina Liu

Recipients of the CORD ACADEMIC ASSEMBLY TRAVEL SCHOLARSHIP for 2018 include *(left to right)* Rohit Sangal, MD; Brooke Moungey, MD; Linda Katirji, MD; Garrett Blumberg, MD; and Ryan Joseph, DO

SCENES FROM ACEP17

Left: **Former EMRA President Jim D'Orta, MD, FACEP(E), and Jed Ross (not pictured), along with their children Maryrose, AJ, and Cubby, welcomed EMRA leaders to their Georgetown home.** ***Middle:*** **EMRA President Zach Jarou, MD presents an EMRA Proclamation to White House physician Ronny Jackson, MD, honoring his contributions to emergency medicine.** ***Right:*** **U.S. Secretary of Veterans Affairs David Shulkin, MD, snaps a selfie with EMRA leaders.**

JOB FAIR—With hundreds of employers seeking to fill emergency physician jobs and fellowship spots throughout the nation (and some globally), the EMRA Job & Fellowship Fair filled a cavernous exhibit hall and provided key face time for recruiters and job candidates alike.

MEDWARS—*Above:* The team from Stanford University works together to build a fire before advancing in the race to complete a trail challenge filled with medical roadblocks.

Left: **Volunteers Carrie Jurkiewicz, MD, and Landon Pratt, MD, get their marching orders from MedWAR organizer and Wilderness Medicine Division Chair Geoff Comp, DO, FAWM.**

Right: **Defending EMRA MedWAR champions from the Medical College of Georgia race uphill from the final challenge, clocking another first-place finish in record time.**

There's no telling who you'll run into at EMRA events (BatDoc to the rescue!). For medical students hoping to match into emergency medicine the EMRA Residency Program Fair, EMRA Medical Student Forum, and networking events offer unparalleled ways to make connections.

SIMWARS—*Left:* **After a brief absence from the EMRA Resident SIMWars competition, the team from Emory returned to capture the top billing at ACEP17.**
Right: **Orlando Health leaps into action during a "series of unfortunate events" at SIMWars, performing a perimortem delivery.**

THANK YOU FOR HANGING WITH US AT ACEP17!

You are the superheroes that make EMRA's events so spectacular. We are grateful for your friendship and your unwavering support of medical students and residents.

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Hope to see you at ACEP18!

Diagnose this Condition

The Case. A 31-year-old male presents to the emergency department with a chief complaint of "rash to both legs." Three weeks ago, the patient's vehicle was stuck in the sand at a South Texas farm. The farm is home to several types of animals. The patient reports kneeling in the sand and digging for approximately 5 hours. Within a few days, the patient noticed a rash to both lower extremities. Approximately one week later, there were additional eruptions to the right upper extremity and right flank. The patient describes the rash as small, red, "itchy" spots that migrate. He admits to scratching the affected areas, leading to scabbing. The patient denies any recent domestic or international travel. He is unaware of any other exposures.

The patient was previously evaluated at two different EDs. On the first visit, he was advised to use oral antihistamines and topical steroids. On the second visit, he was prescribed oral cephalexin. He experienced no relief of symptoms.

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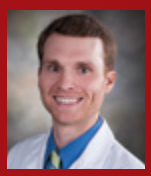

Browning S. Wayman, MD, DTM&H
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What is the diagnosis?

See page 40

The Diagnosis

Cutaneous larva migrans

This is a case of cutaneous larva migrans (CLM). The disease is caused by the larvae of dog and cat hookworms, most commonly *Ancylostoma braziliense* and *Ancylostoma caninum*. Parasite eggs are shed through canine or feline feces onto soil or sand. Humans who walk barefoot or lie on the ground can become infected by larval invasion through healthy, intact skin. CLM symptoms typically present within a few days of infection. Larva migrate laterally within the skin, leading to an intensely pruritic, erythematous, serpiginous track that can advance by 2 cm per day.

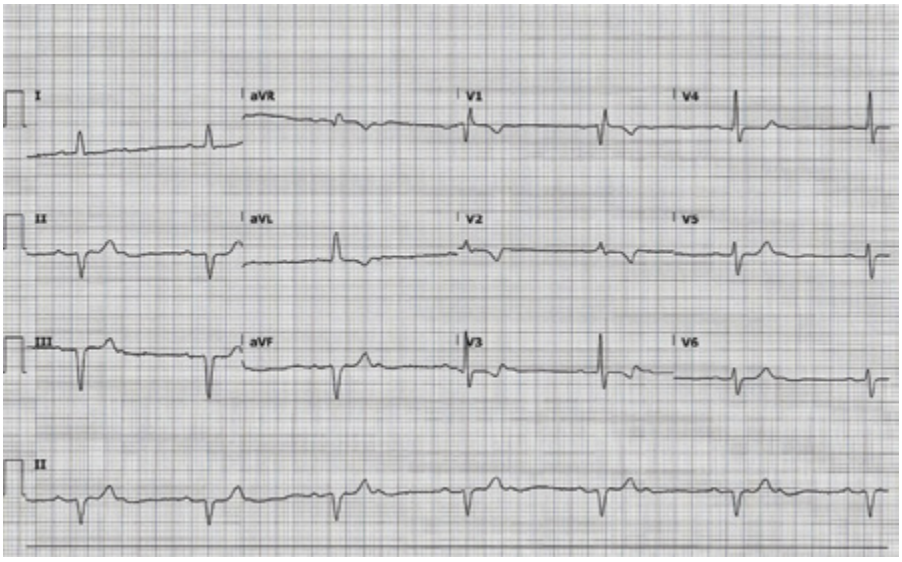
CLM is the most common dermatologic infection in the returning traveler, and history is usually significant for exposure to sandy beaches. CLM classically occurs in tropical and subtropical regions of the Caribbean, Gulf Coast, Latin America, Coastal Sub-Saharan Africa, and Southeast Asia, with a predisposition for individuals living in low socioeconomic settings or visiting tourists. CLM is a clinical diagnosis, and providers should also have a high index of suspicion for rashes that present as a "creeping eruption" in non-travelers, as in the case of this patient. Complications include secondary cellulitis because of excoriation and pustular folliculitis. Treatment should consist of either albendazole or ivermectin.

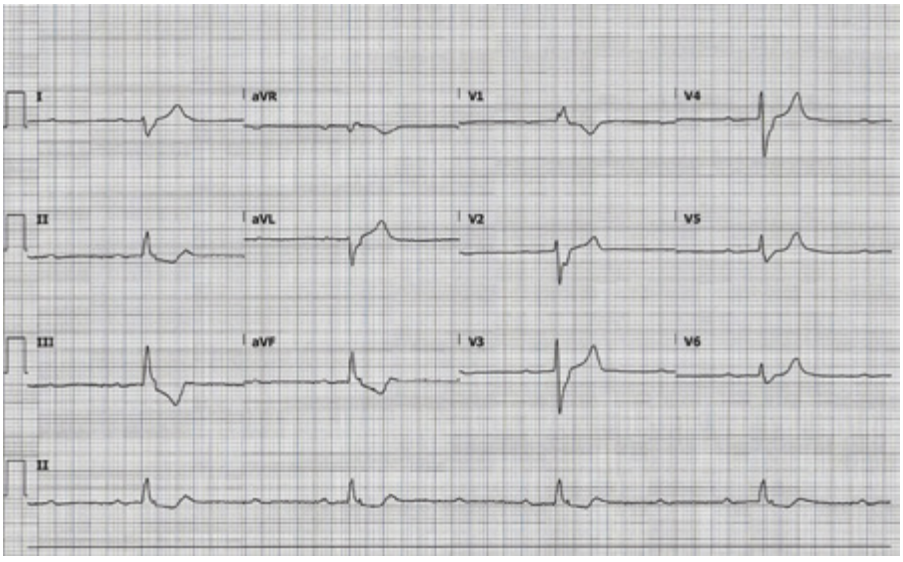
ECG Challenge

CASE.

A 71-year-old male presents with exertional syncope.

What do you see in the following ECGs (taken 4 minutes apart)?





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See the ANSWER on page 42

ECG Challenge

For more, see p. 33-36 of the EMRA EKG Guide

ANSWER

Image 1. This ECG shows an atrial rate of ~78 bpm, a ventricular rate of ~39 bpm, and left axis deviation. There is a conduction block of every other beat, creating a repeating pattern of P-QRS-P with a constant PR interval for the conducted beats. This is a 2:1 AV block, which is an example of a fixed ratio AV block. Since every other beat is dropped in this ECG, it is impossible to determine if the PR interval is lengthening or not. This makes it difficult to tell if the underlying rhythm is a Mobitz Type I or Mobitz Type II. A wide QRS suggests a Mobitz Type II, but a narrow QRS, like the one seen in this ECG, can be seen with both Type I and Type II.

Image 2. This ECG shows a 3rd degree AV block, also called a complete heart block. The atrial rate is still ~78 bpm (note that every 3rd P-wave is buried in a T-wave) but the ventricular rate is now ~25 bpm. This ECG could easily be mistaken for a high-grade 3:1 AV block given how close the ventricular rate is to being 1/3rd of the atrial rate. But the PR intervals (for the conducted beats) are not constant- they are getting longer because the ventricular rate is little slower than 1/3rd of the atrial rate. Another difference to note is that the QRS is completely different in the 2nd ECG. It is now wide with rightward axis and there is a right bundle branch block. This suggests that ventricular is being paced infranodally, most likely from an idioventricular focus as there was no RBBB in the initial ECG. There are also T-wave inversions and ST depressions in the inferior leads of unknown etiology. The patient had no anginal symptoms and a negative troponin, which suggests these changes are repolarization abnormalities unrelated to ischemia.

LEARNING POINTS

2nd Degree AV Block: Mobitz Type I (Wenckebach)

General Features
- Intermittent failure of conduction, typically at AV node

EKG Features
- Relatively constant PP interval
- Progressively ↑PR interval and ↓RR interval until a dropped QRS
- PR interval immediately after dropped beat is shorter than PR interval preceding dropped beat
- RR interval that includes blocked P-wave ≤ twice the PP interval

Clinical Significance
- Can be normal variant
- Does not produce hemodynamic compromise
- Can lead to a more advanced AV block if associated with a pathologic etiology
- Can be seen with inferior MI

2nd Degree AV Block: Mobitz Type II

General Features
- Intermittent failure of conduction, typically infranodal (ie, in His-Purkinje system)

EKG Features
- Relatively constant PP interval
- Constant PR interval in conducted beats
- Described as ratio of P-waves to QRS complexes
- QRS duration depends on location of block
  - Narrow QRS ⇒ block in AV node or bundle of His
  - Wide QRS ⇒ block distal to bundle of His
- RR interval that includes blocked P-wave = twice the PP interval

Clinical Significance
- Always pathologic, never normal variant
- Frequently produces hemodynamic compromise
- Atropine is unlikely to lead to clinical improvement
- High risk of progression to 3rd degree AV block
- High-grade (or advanced) AV block
  - Variant of Mobitz Type II where ≥ 2 sequential P-waves are not conducted
  - Seen with anterior MI and has significant risk of progression to 3rd degree AV block

2:1 AV Block

General Features
- Conduction block of every other beat

EKG Features
- Every other QRS is dropped
- Wide QRS suggests underlying Mobitz Type II

Clinical Significance
- Not always possible to tell if the underlying block is Mobitz Type I or Type II so assume the higher risk Type II physiology

3rd Degree AV Block

General Features
- Absence of conduction through the AV node leading to complete AV dissociation

EKG Features:
- P-waves "march out" (constant PP interval) and do not conduct to produce a QRS
- Regular PP interval that is shorter and independent of regular RR interval
- Atrial rate > ventricular rate
- Ventricular rhythm can be junctional (narrow QRS) or idioventricular (wide QRS)

Clinical Significance
- All patients require admission and evaluation for pacemaker placement
- Can be seen with inferior and/or anterior MI

3 Topics of Interest to *Annals of Emergency Medicine*

The *Annals of Emergency Medicine*'s Residents' Perspective section is now accepting abstract submissions from EM residents and fellows, according Joshua Mirkin, MD, editorial board resident fellow for 2017-2018.

Authors of promising abstracts will be invited to submit a full manuscript for peer review. This year, *Annals* is interested in 3 particular themes:

1. **Ethics of Utilizing Placebos in Clinical Practice**
2. **Economics of Health Insurance**
3. **Technology in Emergency Medicine**

Abstracts are limited to 300 words and should be double-spaced. Submit your abstract via *Annals*' online submission system, Editorial Manager, at www.editorialmanager.com/annemergmed (select the "Residents' Perspective" article type). Invited manuscripts will undergo the same peer review process as all other submissions to *Annals*. More information for authors can be found at www.annemergmed.com/content/categories#residentsperspective, or by emailing annalsfellow@acep.org. ✶

New EMRA Website Coming Soon

EMRA has made a significant investment in overhauling our online presence, and the results are coming soon. Within the next several weeks you'll see a brand-new look, feel, and functionality on emra.org — complete with personalization that grows along with each individual member. It will be easier than ever to find the resources you need, when you need them, in the format you want (desktop, tablet, or phone). But we need one thing from you! To make the most of the new website, **be sure to log in and tell us your interests**! The ultimate success of this interactive site depends on you — please make the most of your EMRA membership. ✶

EM Residents' Appreciation Day

Don't forget
EM Residents' Appreciation Day
March 7, 2018.
How will you celebrate?

It doesn't take a massive investment of time or resources to make sure the residents who help provide 24/7/365 coverage in the ED know they're vital members of the team. Thank them with a public note, a pizza party, or anything else that might make their day brighter! ✶

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 33-year-old woman presents with a tight, band-like pain around her head. Although she is uncertain when it started, she says it "came on slowly maybe a week ago." She denies fever, photophobia, phonophobia, nausea, and vomiting. What is the most likely diagnosis?
   A. Cluster headache
   B. Migraine headache
   C. Tension headache
   D. Trigeminal neuralgia

2. A 56-year-old man presents with a severe headache and nausea with vomiting; his wife says he "started to act really confused." Vital signs include BP 201/135, P 102, T 37°C (98.6°F); Spo2 is 99% on room air. Computed tomography of the brain reveals bilateral white matter hypodensities in the occipital and parietal regions consistent with vasogenic edema. What is the most appropriate treatment?
   A. Hydralazine titrated to a target BP of 140/80
   B. Metoprolol titrated to a target P of 60
   C. Nicardipine titrated to a MAP of 126
   D. Nitroprusside titrated to a diastolic BP less than 100

3. What is the most common presenting symptom in PE?
   A. Chest pain
   B. Dyspnea
   C. Hypotension
   D. Hypoxia

4. A 37-year-old man presents with ataxia, headache, and nausea. He says he was using a gas-powered generator indoors "and passed out cold." Vital signs are normal. Carboxyhemoglobin level is 26%. What is the best first step in management?
   A. Arrange for exchange blood transfusion
   B. Perform serial carboxyhemoglobin measurements
   C. Provide supplemental oxygen
   D. Transport to the nearest hyperbaric oxygen facility

5. At which of the following levels is a unilateral facet dislocation most likely to occur?
   A. C1-C2
   B. C3-C7
   C. L1-L5
   D. T1-T12 ✶

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

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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 https://www.governmentjobs.com/careers/usouthal/jobs/1326363/emergency-medicine-faculty.

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

THE UNIVERSITY OF CHICAGO MEDICINE

Academic Emergency Medicine Physicians

The University of Chicago's Department of Medicine, Section of Emergency Medicine, is seeking full-time faculty members to serve as Emergency Physicians as we prepare to open a new adult emergency department and establish an adult Level 1 Trauma Center. Academic rank is dependent on qualifications. Applicants are required to be board certified or board eligible in emergency medicine and to be eligible for Illinois licensure by the start of appointment. Responsibilities will include teaching in the educational programs sponsored by the Section and participation in scholarly activity. We seek candidates looking to develop an academic niche that builds upon our faculty expertise in basic and translational research, health equity and bioethics research, geriatric emergency care, global emergency medicine, medical education, prehospital medicine, aero-medical transport, and ultrasound. We host one of the oldest Emergency Medicine Residency programs in the country and serve as a STEMI receiving hospital, a Comprehensive Stroke Center, a Burn Center, and a Chicago South EMS regional resource hospital. The Adult ED has an annual volume of 65,000 and our Pediatric ED cares for 30,000 patients per year, including 1,000 level 1 trauma patients.

This position provides competitive compensation and an excellent benefits package. Those interested must apply by uploading a cover letter and current CV online at academiccareers.uchicago.edu/applicants/Central?quickFind=55160. Review of applications will continue until all available positions are filled.

The University of Chicago is an Affirmative Action/Equal Opportunity/Disabled/Veterans Employer and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender identity, national or ethnic origin, age, status as an individual with a disability, protected veteran status, genetic information, or other protected classes under the law. For additional information please see the University's Notice of Nondiscrimination at http://www.uchicago.edu/about/non_discrimination_statement/. Job seekers in need of a reasonable accommodation to complete the application process should call 773-702-0287 or email ACOppAdministrator@uchicago.edu with their request.

Williamsburg Emergency Physicians, Inc.

Beautiful Historic Williamsburg Location

illiamsburg Emergency Physicians, Inc. – a well tablished, highly regarded democratic ED group s looking for BC/BP ED physician to join their actice. Sentara Williamsburg Regional Medical enter is a state of the art hospital located in historic rk County, VA recently named one of the nation's 0 top hospitals by Truven Health Analytics. ED sees ,000 visits per year with a 6 bed Fast Track. Staffing supported by ED trained full time/part time PA's ong with a strong Scribe program affiliated with the ollege of William and Mary.

ompetitive salary and compensation package, hich includes health insurance, malpractice and a tirement plan.

illiamsburg is one of the fastest growing areas in rginia with excellent quality of life.

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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 fall of 2017 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**.

FLORIDA

Jacksonville: St. Luke's Emergency Care Group, LLC — Jacksonville, Florida. Independent Physician group at St. Vincent's Medical Center-Southside in beautiful Northeast Florida. Great area/community with river and ocean access. Good schools, sports, and entertainment. Emergency Medicine residency trained BC/BE physicians. FT/PT available. Low physician turnover. Flexible scheduling with overlapping shifts. Holiday pay, shift differentials, competitive base salary, quarterly RVU bonus pool. Sign-on bonus and moving stipend. Cerner EMR. In house hospitalists and ICU coverage, L&D/Neonatal ICU. Supportive Medical Staff back-up and consultation coverage. 37,000 ED visits/year. Please contact us and send CV to: Katherine Considine, MD, Katherine.considine@ascension.org or (904) 296-3885.

GEORGIA

Atlanta: EmergiNet, a progressive, well-established physician owned emergency group, has positions available for BC/BP, EM residency trained physicians at multiple facilities in the Atlanta area. We work as a team emphasizing quality emergency care, dedicated customer service, professional and personal growth. Fee-for-service based compensation, plus benefits, in the $350K range. Malpractice and tail coverage are provided. Flexible scheduling, no non-compete, and much more. Email CV to Neil Trabel, **ntrabel@emerginet.com**; fax 770-994-4747; or call 770-994-9326, ext. 319.

INDIANA

Fort Wayne: Emergency Medicine of Indiana (EMI) is seeking BC/BE emergency physicians for our Fort Wayne locations. Volumes range from 14k-45k with varying acuities and demographics. Our compensation package includes sign-on up to 100k, loan repayment up to 100k, relocation, paid health/dental, paid malpractice, short/long term disability and 401k plan. Some

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
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.

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

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positions **qualify** for ownership after one year! EMI is a 100% physician owned democratic group staffing nine contracts in NE Indiana. Fort Wayne is the #1 City in Indiana to raise a family with a very low cost of living. It is an easy drive to metro areas such as Chicago, Indianapolis, Detroit, Cleveland and Cincinnati! Visit us at www.emipg.com. E-mail CV to **mschenkel@emipg.com** or call 260-203-9607.

South Bend: Memorial Hospital. Very stable, Democratic, single hospital, 23 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

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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

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The newly ACGME accredited Emergency Medicine residency program, part of the Sunrise Health Graduate Medical Education Consortium along with TeamHealth presents the first annual Southwest Regional Emergency Medicine Conference. This conference is intended for emergency medicine educators, practicing emergency physicians, residents and allied emergency medicine providers. Evidence-based topics will be presented in a workshop format to increase the knowledge and competency of the attendees.

Mass Casualty Principles and Protocols
- Frank Lee, DO
  MountainView Hospital

The Las Vegas Mass Casualty Incident
- Clarance Dunagan, MD/Scott Scherr, MD
  MountainView and Sunrise hospitals

Physician and Resident Wellness
- Greg Guldner, MD/Suzanne Roozendaal, DO
  UC Riverside and MountainView hospitals

International Research Development
- Shane Sargent, DO
  Kingman Regional Medical Center

Asymmetric Terrorism
- Michael Allswede, DO
  MountainView Hospital

Transfusion Strategies
- Sophia Johnson, DO
  Kingman Regional Medical Center

Snakebites: Evaluation, Management and Antivenom Principles
- Kristina Domanski, MBBS, BSc
  MountainView Hospital

In Partnership With:

TEAMHealth

Location: MountainView Hospital

Graduate Education Building Auditorium, 2880 N. Tenaya Way, Las Vegas, NV, 89128

Conference Director, Andrew Behl, DO

Participating Institutions:
- Sunrise Health GME Consortium Emergency Medicine Residency, MountainView Hospital* *The University of Nevada, Reno School of Medicine.*
- University of California, Riverside Community Hospital*, *University of California Riverside School of Medicine*
- Emergency Medicine Residency Program, Kingman Regional Medical Center, *Arizona College of Osteopathic Medicine of Midwestern University*

Course Tuition:
Affiliated EM providers: no charge
Residents and students: no charge
Non-affiliated providers: $50

RSVP
Contact Pamela Livingston at 702-962-9551 or Pamela.Livingston@hcahealthcare.com

Accomodations: Suncoast Hotel and Casino, 9090 Alta Drive, Las Vegas, NV 89145 702-636-7050

Hotel Reservation: 866-816-7111 (Toll Free Direct Central reservations) or http:www.suncoastcasino.com/groups Group Code AMTVIEW prior to December 9, 2017

SunriseHealthGME.com

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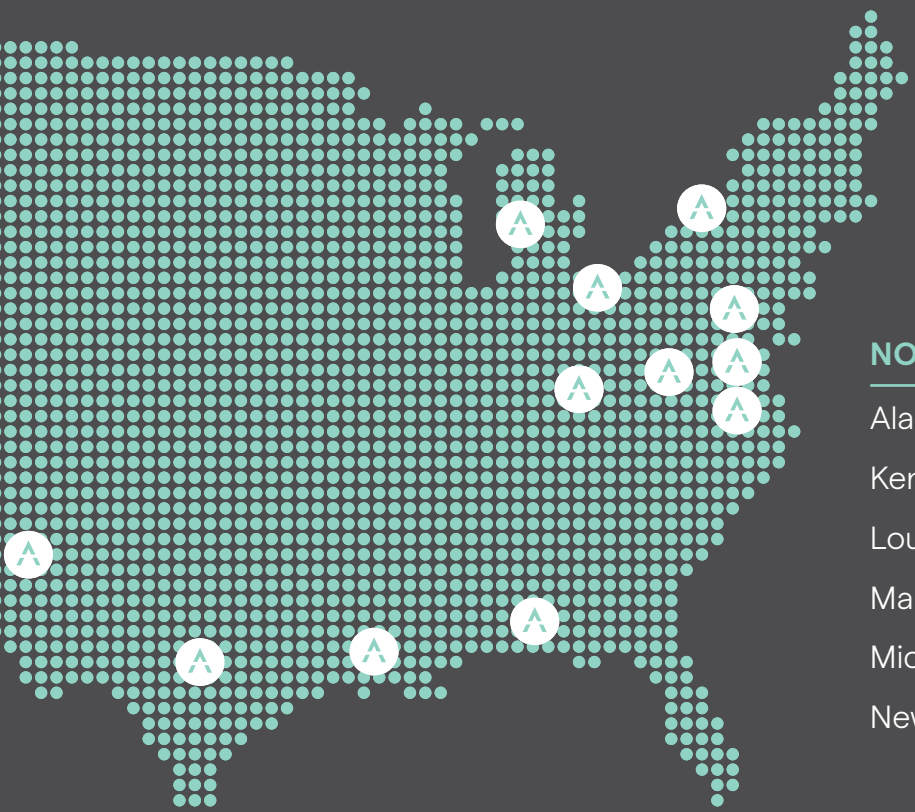

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{ Job Opportunities }

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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**

Emergency Medicine Opportunities with Signing Stipend, Loan Forgiveness!!

United Health Services Hospitals is a progressive multi-specialty group with a large primary care base, consisting of 200+ physicians providing care in over 20 medical and surgical specialties in multiple locations. The group is affiliated with United Health Services Hospitals, the regional leader in healthcare. There is a strong market presence in the region and an excellent referral base.

We are seeking BE/BC E.M. trained or ABEM physicians to join our two Emergency Medicine Departments in Binghamton and Johnson City, NY. These are level 2 ED's. They see a combined 60,000 patients a year and have single to quadruple coverage during the busiest times. Excellent staffing ratios, 35 hour work week, 220/hr after loan forgiveness. Johnson City is a Level II Trauma Center, with comprehensive stroke and cardiac care centers. There are opportunities for teaching residents, and medical students with Upstate Medical University in Syracuse, and the ability to participate in clinical research.

The area boasts numerous cultural and recreational activities and is noted for its excellent quality of life. Competitive starting salary, signing stipend, educational loan repayment, excellent benefits and malpractice insurance.

If you would like to speak with me about this opportunity I can be reached at Stephen_Gomez@uhs.org or 607-423-5838.

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

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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
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- Additional incentive compensation
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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.

CAPE FEAR VALLEY HEALTH

Please contact Ashley Dowless, Interim Director, Physician Recruitment at 910-615-1888 or adowl@capefearvalley.com for additional information.

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for Emergency Department Coverage

- **115 bed Emergency Department**
- **3 ERs (Community, Trauma and Pediatric)**
- **150,000 patient visits annually**
- **Level I Trauma/ Regional Referral Center**
- **40+ Physicians in current employed group**

The position offers an excellent compensation package including above MGMA average salary with RVU-based incentives, paid vacation, CME allowance, health and life insurance, malpractice insurance, and a 401k plan with employer contribution. The hospital has 24/7 in-house Hospitalist, Radiology, Cardiology, Trauma, Orthopaedic and Neurosurgical Coverage as well as EMR and Mid-Level support. Four different units make up our Emergency Department: Level I Trauma Center downtown with 75 beds and fast track, Medical Observation Unit with 16 beds, Pediatric ER at Children's hospital with 16 beds, and a 21 bed community hospital ER in Madison. 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, Med/Peds, Pediatric Emergency and Family Medicine Physicians.

Huntsville, is situated in the fastest growing major metropolitan area in 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 traditions while progressing with new ideas, exciting technologies and creative talents. With a population of 386,661 in the metro area, we are a high-tech, family oriented, multi cultural community with excellent schools, dining and entertainment.

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

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Academic Faculty & Clinical Faculty Opening

We are currently hiring faculty of all ranks commensurate with prior experience and seeking applicants who have demonstrated a strong interest and background in medical education, simulation, ultrasound, or research. Clinical opportunities are also available at our affiliated hospitals.

Those interested in a position or further information may contact Dr. Dick Kuo at **dckuo@bcm.edu** or 713-873-7044. Please send a CV and cover letter with your past experience and interests.

Assistant/Associate Program Director Opening

The Department of Emergency Medicine at Baylor College of Medicine in Houston is seeking outstanding candidates for the **position of Assistant/ Associate Program Director**.

Applicants should have a strong background in medical education with a career path directed toward GME. Duties of this position will include a focus on developing and implementing innovative educational strategies in the CLER pathways (Patient Safety, Health Care Quality, etc.) that meet and exceed the ACGME accreditation standards. The successful candidate will contribute to our missions of promoting academic excellence, diversity, and teamwork in service to our patients.

Submit a CV, letter of intent, and 1 letter of recommendation to Program Director Dr. Tyson Pillow (**pillow@bcm.edu**).

University Hospitals Cleveland Medical Center

Case Western Reserve University EST. 1826

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

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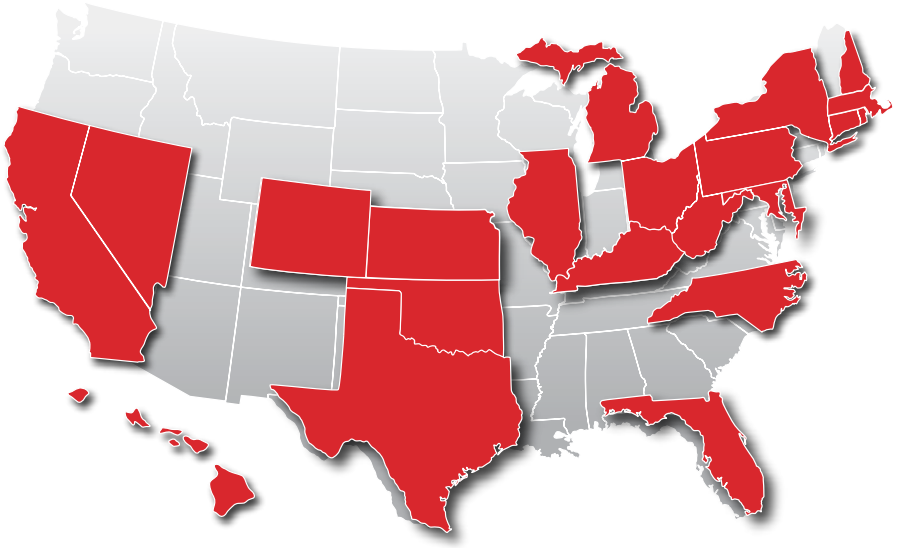

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Darrin P. Grella | VP of Recruiting
dgrella@usacs.com or 800-828-0898.

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Chicagoland
*Chicago, IL | 30-60,000 pts./yr.

Albany Memorial Hospital
Albany, NY | 43,000 pts./yr.

Allegheny Health Network
*Western PA | 12-61,000 pts./yr.

Saint Francis Hospital
*Tulsa, OK | 10-99,000 pts./yr.

Providence Health Center
Waco, TX | 73,000 pts./yr.

Valley Baptist Medical Center
Harlingen, TX | 30,000 pts./yr.

Peterson Regional Medical Center
Kerrville, TX | 29,000 pts./yr.

CHI St. Joseph Health Regional Hospital
Bryan, TX | 51,000 pts./yr.

Meritus Medical Center
Hagerstown, MD | 78,000 pts./yr.

LifeBridge Health
*Baltimore, MD | 64-72,000 pts./yr.

Lake Health System
*Cleveland, OH | 12-35,000 pts./yr.

Summa Health System
*Akron, OH | 10-100,000 pts./yr.

Mercy Health
*Cincinnatti, OH | 14-60,000 pts./yr.

Florida Hospital
*Tampa/Heartlands, FL | 13-45,000 pts./yr.

University Medical Center
*Las Vegas, NV | 17-81,000 pts./yr.

Carolinas HealthCare System
*Charlotte, NC | 17-69,000 pts./yr.

CarlolinaEast Medical Center
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* Denotes multiple locations available

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Visit ***ketteringdocs.org*** for more information.

KETTERING Health Network

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The University of Chicago's Department of Medicine, Section of Emergency Medicine, is pleased to offer the opportunity for qualified candidates to receive training in medical education, medical operations and leadership, or global health as an Emergency Medicine Scholar. These positions offer protected time for professional development while working clinically as an attending in our emergency department at a reduced effort. Applicants must have a medical degree, be board certified or board eligible in Emergency Medicine by the time of appointment and be eligible for medical licensure in Illinois.

Those interested must submit a cover letter and CV online at academiccareers.uchicago.edu/applicants/Central?quickFind=55205. Compensation is dependent upon qualifications. A generous package of fringe benefits is provided. Review of applications will continue until all available positions are filled.

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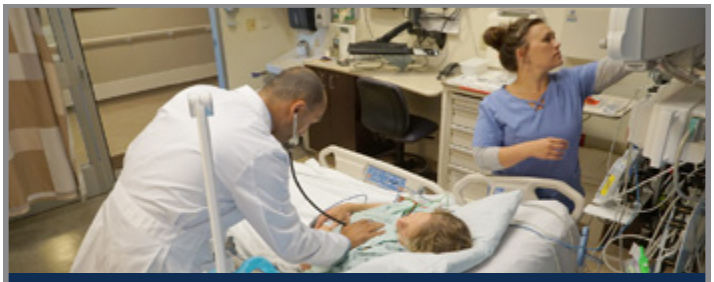

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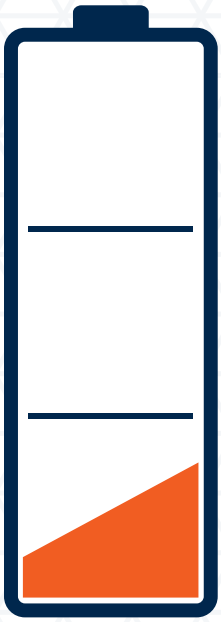

80% of physicians today are professionally overextended or at capacity, leaving them with no time to see additional patients

Physician burnout rates top **50%** in latest Mayo study and work life balance continues to worsen

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