

EPIC



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It Takes a Team!

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We welcome your comments or suggestions for future articles. Call or write at:

Georgia College of Emergency Physicians
6134 Poplar Bluff Circle, Suite 101
Norcross, GA 30092
(770) 613-0932 • Fax (305) 422-3327

From the President

It Takes A Team

Matt Lyon, MD, FACEP

I have been on the Board of Directors or part of the Executive Committee of GCEP for the last eight years. Over that time GCEP has worked on many issues related to our practice of Emergency Medicine. This year, however, has been the busiest of any I can remember and certainly the busiest of my eight years on the board. There have been many threats.....threats to how we bill, threats to how we contract with insurance companies, threats to our board certification as Emergency Physicians, threats to the financial health of GCEP and GEMPAC, and many more. Each of these threats has been addressed by GCEP, specifically the GCEP Board of Directors.

I have seen how each of these threats has to be confronted immediately, occasionally with only hours of notice. For example, Dr. “Chip” Pettigrew responded to a Georgia Senate Committee meeting to represent GCEP’s position on how emergency physicians bill for their services and how they negotiate with insurance companies. He only had a few hours notice. However, by all reports, he was the most influential speaker at the meeting and now GCEP is seen as a leader on this issue. Another example was a group trying to add an amendment to a bill that would establish a board certification pathway for Emergency Medicine that did NOT include the need for a residency-training program. GCEP along with ACEP, EMRA, and ABEM responded to this threat with only 24 hours notice. Being able to get national attention to an issue in Georgia is amazing!

These threats require a wide range of knowledge and expertise. Dr. John Rogers has provided exceptional leadership on many legislative issues this session. He has channeled the power of our national organization, ACEP, to help us with educational material, influence and strategy. Dr. Chip Pettigrew has provided expertise to GCEP regarding EM billing and contracting and has spear-pointed our effort to work with the legislature on a resolution to the balance billing issue. Dr. John Sy and Dr. Matt Keadey have been intimately involved in working behind the scenes with all these issues and many more providing the drive and manpower to accomplish our goals.

I have been very proud of how GCEP has worked as a team to protect our practice and patients. But the work is not done. There will be many legislative committee meetings over the summer. GCEP will be supporting Dr. Matt Watson for the ACEP Board of Directors and Dr. John Rogers for President of ACEP. At our membership meeting this summer the Coastal Emergency Medicine Conference at Kiawah Island we will be electing new board members to the GCEP Board of Directors. We need fantastic, motivated Emergency Physicians to carry on this work. Please consider coming to our board meetings, joining the board, contributing to GEMPAC, meeting your local legislator, and contributing in any way.

GCEP is your organization. Emergency Medicine is your profession. Get involved. Stay active. Thank you for your support.

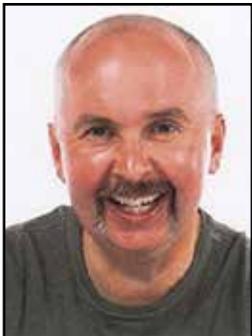


Matt Lyon, MD, FACEP
mattlyonmd@gmail.com

Dr. Lyon is a Professor of Emergency Medicine at Georgia Regents University. He serves a Vice Chairman for Academic Programs, the Director of the Section of Emergency and Clinical Ultrasound and Director of the Emergency Ultrasound Fellowship. He is currently President-Elect for GCEP and Chairman of the Georgia Emergency Medicine Political Action Committee.

Managing Felons in the Emergency Department

Larry B. Mellick, MD, MS, FAAP, FACEP



Larry B. Mellick, MD, MS,
FAAP, FACEP
lmellick@gru.edu

Dr. Larry B. Mellick is professor of Emergency Medicine and Pediatrics, Department of Emergency Medicine, Medical College of Georgia, Augusta, GA.

The management of felons is another myth that needs to be busted or at least seriously adjusted. Felons are pyogenic infections of the pulp space of the distal finger or thumb. These infections are essentially a compartment syndrome of the finger pad. However, this is not your typical compartment syndrome because the pulp of the fingertip is actually divided into multiple small compartments by 15 to 20 septa that extend from the periosteum to the skin (Figure 1). The inflammatory edema that results because of the infection causes significant pain and tissue necrosis may result. Because these septa attach directly to the periosteum, osteomyelitis may develop. On the other hand, a bonafide abscess may or may not develop and a sizeable fluid collection will usually not be present.

As demonstrated in the screenshot (Figure 2), treatment recommendations for felons are heavily weighted towards incision and drainage. In the past through and through, hockey stick or fish mouth incisions have been recommended. However, current recommendations seem to emphasize a less aggressive approach. For example, a unilateral longitudinal approach is recommended because it spares the sensate volar pad and is felt to achieve adequate drainage. If the

felon points toward the volar fat pad, a longitudinal volar approach is recommended. After the incision is made the septa are dissected using a blunt technique and a small wick is often recommended.

Here is where the common management recommendations and I part ways. First, these recommendations are based purely on consensus and have almost no supporting evidence based literature. The research is essentially non-existent and these treatment recommendations come from consensus opinions based on clinical experience.¹ Nevertheless, on the surface these recommendations would seem to make sense. If we are dealing with a compartment syndrome of the finger, why wouldn't a finger fasciotomy be the desired intervention? And, in addition to releasing pressure within the septa, one might simultaneously drain an associated abscess. But, I would argue that the fasciotomy typically done in compartment syndromes involves the release of a continuous fascia sheath surrounding a large, well defined and tightly enclosed extremity compartment with clearly identified neurovascular bundles. In the fingertip, we are dealing with 15 to 20 small compartments created by fibrous septa and a neurovascular bundle made up of very small branching nerves and blood vessels that are not easily avoided by the scalpel blade. The truth is that the highly sensory and vascular fingertip is dependent on the health of these small, branching nerves and blood vessels. Additionally, finger pad stability is reportedly dependent on these septa not being seriously violated. In fact, it is for this reason that the more extensive fish mouth or hockey stick ("J") incisions are no longer recommended. The truth is that I, personally, think that most felons can be treated with antibiotics alone. And, with the easier accessibility of ultrasound machines in the emergency department we can easily determine which felons contain sufficient abscess collections needing to be drained. Using techniques to avoid near field acoustic



Figure 1: Multiple finger septa

distortion such as a water bath or large amounts of ultrasound gel we can easily determine the presence or absence of a fluid collection (Figure 3). Once purulent fluid collections are noted a decision can be made as to whether or not they are large enough to deserve incision and drainage. Very small fluid collections should be left alone or aspiration with an 18 gauge needle can be attempted. Even if purulent material is not successfully aspirated, that large needle can be redirected several times in order to decompress tissue spaces within the finger pad (Figure 4). Following the needle decompression maneuvers the fingertip is massaged vigorously to further decompress the finger pad. Often serosanguinous fluids will be expressed with this technique and afterwards a less indurated fingertip may be noted. If a sizable abscess is noted, a simple stab incision with the sharp tip of a number 11 blade into the abscess localized by ultrasound is recommended. Blunt dissection afterwards may be necessary, but should not be extensive or prolonged. Finally, radiographs to search for evidence of an osteomyelitis or a foreign body, digital blocks with a long acting anesthetic to control pain and appropriate antibiotics to cover MRSA infections are other important management recommendations.

In summary, a kinder, gentler and less aggressive incision and drainage approach is being recommended. Well known potential complications of a felon and felon drainage include an anesthetic fingertip, a neuroma, and an unstable finger pad. My personal opinion is that these complications can be best avoided by a more surgically restrained approach that is based on appropriately performed ultrasound examinations

You can see a demonstration of needle aspiration and visualize the ultrasound appearance of a felon by visiting my youtube channel at: <https://www.youtube.com/watch?v=BuP4UGfutWk>

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Figure 2: Screenshot from Access Medicine demonstrating the surgical management of felons.



Figure 3: Ultrasounding the fingertip in a water bath to overcome near field acoustic distortion



Figure 4: An 18 gauge needle is used to aspirate small abscesses and is redirected several times to decompress the small septal compartments in the fingertip.

Is the Use of Decision Tools Necessary for the Management of Chest Pain in the Emergency Room?

Daniel McCollum, MD, and Mario Soto, MD, Emergency Medicine Resident, Georgia Regents University



Mario Soto, MD
msoto@gru.edu

Mario Soto, MD, is a second year Emergency Medicine resident at Augusta University.



Daniel McCollum, MD
DMCCOLLUM@gru.edu

Daniel McCollum, MD, is the Assistant Residency Director, Department of Emergency Medicine, Augusta University (aka Georgia Regents University, aka Georgia Health Sciences University, aka Medical College of Georgia).

An otherwise healthy 35-year-old female presents to your Emergency Department with chest pain three hours before shift change. Her initial workup – EKG, basic metabolic panel, coagulation panel, and troponin x 1 – is unremarkable. Can you discharge this patient or does she require a prolonged Emergency Department stay, placement to your observation unit, or admission to Cardiology?

Introduction

One of the most debated issues in Emergency Medicine is the appropriate disposition of patients presenting with chest pain. Believe it or not, most patients presenting to an emergency department with chest pain are not experiencing a myocardial infarction (MI) or acute coronary syndrome (ACS). What is the best way to sort out those that are acceptable to discharge?

Discussion

Traditionally, patients presenting with chest pain are assumed to have a life threatening condition – ACS, ST-segment elevation myocardial infarction (STEMI), or non-STEMI – until proven otherwise. In an effort to expedite the evaluation of those with chest pain, many decision tools have been under investigation to risk stratify patients. The few patients that are considered very low risk are discharged, while everybody else requires a fairly long observation or hospital admission. The American Heart Association recommends serial troponins over 6 hours, serial EKG tracings, and provocative testing within 72 hours. While this approach is reasonable in those at higher risk for ACS, this is likely overkill in those at fairly low risk for ACS.

An article published by Edward W Carlton, MBChB, Ahmed Khattab, PhD, and Kim Greaves, MD in the 29 July 2015 *Annals of Emergency Medicine*, “Identifying Patients Suitable for Discharge After a Single-Presentation High-Sensitivity Troponin Result: A Comparison of Five Established Risk Scores and Two High-Sensitivity Assays”, detailed the performance of several decision tools for assessing chest pain risk and combined them with a high sensitivity troponin assay. Their goal was to have a negative predictive value of 99.5 percent for MI in the next 30 days and be able to discharge 30 percent of their patients after a single high sensitivity troponin.

- Patients with evidence of ischemia on EKG were not included in the study. Note that these aren't just STEMI patients but also those patients with dynamic EKG changes, T wave inversion, ST depression, etc.
- There were multiple cut off points for several of the decision tools to assess for different levels of sensitivity and specificity.
- Unstable angina was completely ignored in this study.

Omission of unstable angina is reasonable because it is a very tricky diagnosis to define. Before troponins were common, much of what was called unstable angina was actually a NSTEMI. We believe most cases of what is now called unstable angina will likely cause small bumps in the new high sensitivity troponin assay, but please note this is purely conjecture. The poor inter-rater reliability of what is and what is not unstable angina is apparent

to anyone that has ever admitted a patient to the cardiology service. It is easy to debate whether a patient with chest pain has unstable angina or some other cause of chest pain. While STEMI and NSTEMI are well defined in medical literature, unstable angina is a very vague creature.

The different “decision tools” are often discussed and asked about in the Emergency Department. While some physicians rely heavily on these tools when making a disposition on a patient with chest pain, we feel these decision tools have numerous weaknesses. Let’s explain why as we evaluate them one by one.

1. Modified Goldman: The problem with the Modified Goldman is that it has a very poor positive likelihood ratio. Its positive LR is only 1.7 with a score of 1 or less, and a positive LR of only 1.12 with a score of 0. Remember a +LR of 1 is an absolutely useless test. It also cheats by including a high sensitivity troponin as part of its rule. All the extra circumlocution included in this eight-part rule barely improves the sensitivity of just ordering a high sensitivity troponin. While we still feel the Modified Goldman is one of the better of the five decision tools, its poor positive likelihood ratio makes it difficult to rely on in actual practice.

2. TIMI: The TIMI (Thrombolysis in Myocardial Infarction) score, developed in the late 90s, is likely the best-known decision tool. However, its utility as an undifferentiated chest pain decision tool is questionable since it was designed to prognosticate patients with confirmed ACS and ultimately determine a basis for therapeutic intervention. Furthermore, a TIMI score of 0 has a 5 percent risk of bad outcome within 14 days. Even if this tool was intended to risk stratify undifferentiated chest pain patients, having a 5 percent bad outcome within 14 days is unacceptable in an emergency medicine setting. Lastly, let’s consider some of the strengths and weakness of the individual criteria of the TIMI score.

- Age > 65 – A criteria that is fairly intuitive.
- Three or more risk factors – The literature is full of papers showing that older patients presenting with chest pain do not have their pre-test probability affected by risk factors. Traditional risk factors are intended for primary care providers to determine whether a patient should start taking a statin; It has been shown they add little for the ED physician evaluating an elderly patient with chest pain.
- Use of aspirin in the last week – It is rather intuitive that patients taking daily aspirin have a higher risk for cardiac disease, because these patients are already recognized as individuals who either have, or are highly likely to have, atherothrombotic dis-

ease. An analogy would be the notion that car keys are a risk factor for dying in a car crash. There may be an association, but association does not equal causation.

- Coronary stenosis >50% – While you certainly shouldn’t argue that having stenosis >50% is protective of having a heart attack, the plaques most likely to rupture and cause MI are unstable plaques, often <50% occlusive.

- Recent severe angina (>2 events in last 24 hours) – This line is a decent description of unstable angina. Most would agree that a patient with stuttering typical chest pain should have inpatient care. This decision can be and should be made without the aid of a decision tool

3. GRACE: This was developed by regression analysis and largely excludes clinical reasoning. A computer churned through thousands of charts and generated this list of risk factors while ignoring things it couldn’t measure. Furthermore, similar to the TIMI score, GRACE was designed to prognosticate patients with known STEMI or NSTEMI. Ignoring the clinical picture and utilizing a tool developed for patients with known ACS, to rule out ACS, seems less than ideal. If utilizing GRACE, a 30 year-old patient without any risk factors and a low-risk story for ACS who has normal vital signs and no medical problems could be considered too high risk to discharge. Normal blood pressure is also considered a risk factor.

4. HEART: The HEART score was derived, and validated, specifically for assessment of undifferentiated chest pain patients. The tool assesses the risk for major cardiac event within 6 weeks. Compared to previous decision tools, the HEART score allows the physician to utilize gestalt plus diagnostic testing. Of note, the HEART score performance is contingent upon the provider having “significant experience” evaluating chest pain patients. It may not be the best decision tool for providers with limited experience.

5. Vancouver Chest Pain Rule: This rule includes a high sensitivity troponin, but like most of the other decision tools leaves out physician gestalt. Radiation is a valid risk factor, but the rest of the tool leaves much to be desired. The “risk factors” of prior ACS or recent nitroglycerin use is problematic for the same reason that aspirin use in TIMI is problematic. The negative likelihood ratio of palpation of chest pain is only 0.3, which is not sufficient to rule out ACS. Additionally, this tool cannot be used for subjects 50 years of age and older or subjects with pre-existing ECG findings such as left bundle branch block, paced rhythm, or LVH.

The problem with all these rules is that they have not adequately been compared to practitioner gestalt.

An article published in the *Emergency Medicine Journal* in July 2014 by Body, et al., “Can Emergency Physicians ‘Rule In’ and ‘Rule Out’ Acute Myocardial Infarction with Clinical Judgement?” comes to a similar conclusion.

Clinician gestalt was 100 percent sensitive for ACS if you only sent home people that were “probably not” or “definitely not” having ACS. This is with a single negative regular troponin and EKG. Combine this with a high sensitivity troponin and you could send home >40% of people presenting with chest pain with 0 misses in over 400 cases. Of note the study population was quite sick with >17% of the subjects ultimately diagnosed with ACS.

Conclusion

In the end, it appears it’s better to focus on the patient and less on clinical decision rules. The best decision tool may just be the brain and the experience of the Emergency provider. Keep this in mind the next time a consultant suggests a management plan

based solely on a risk score. Clinical gestalt is still important in the evaluation of chest pain. If you think the patient is sick, they likely are.



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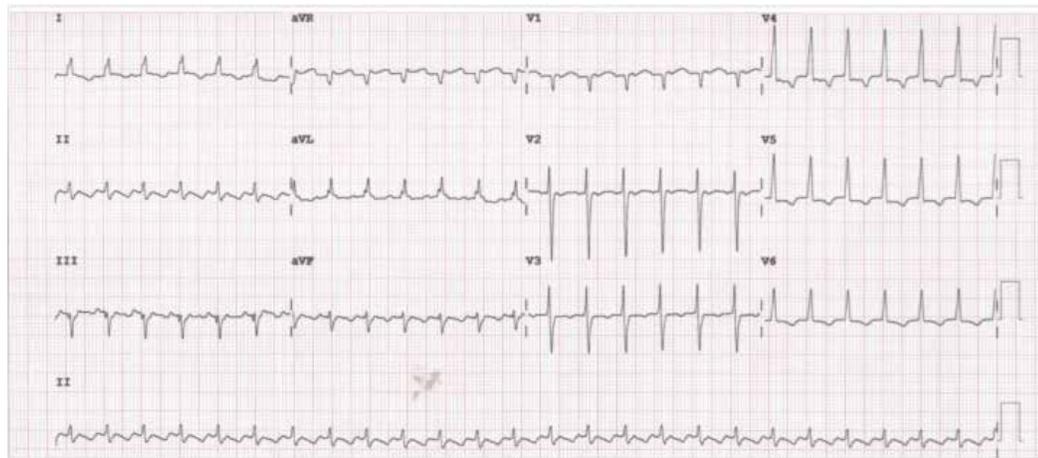
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Atrial Flutter

Marita M. Harris-Naddell, MD

Patient presentation

A 65-year-old male presents to the Emergency Department with 45 minutes of palpitations, shortness of breath, and diaphoresis. Vitals were significant for tachycardia HR 150 and normal blood pressure. Patient had the electrocardiogram below:



Marita M. Harris-Naddell, MD
marita.harris-naddell@emory.edu

Marita completed her medical degree at Morehouse School of Medicine in Atlanta, GA. She is currently a second year Emergency Medicine resident at Emory University in Atlanta, GA.

Discussion

The patient presented with atrial flutter. Atrial flutter is a macro-reentrant atrial arrhythmia with regular atrial rate and constant P-wave morphology on electrocardiogram. Atrial rates usually range between 250 bpm - 350 bpm. A 2:1 conduction through the AV node is most common resulting in a regular ventricular rate of 150.

Atrial flutter is classified as typical cavotricuspid isthmus (CTI) and atypical non-CTI dependent. The classic “sawtooth” finding on electrocardiogram is seen in typical atrial flutter. The most common pathway in typical atrial flutter occurs in a counterclockwise pattern. On electrocardiogram, the flutter waves are usually negative in the inferior leads (II, III, aVF) and positive in V1. In the clockwise pathway, the flutter waves are usually positive in the inferior leads and negative in V1 due to the opposite direction of atrial activation. Occasionally, inverting the electrocardiogram tracing in suspected atrial flutter may help to identify the rhythm. Vagal maneuvers can also assist with diagnosis as they may reveal flutter waves in diagnostic uncertainty.

In hemodynamically stable patients, treatment includes rate control with oral or intravenous beta blockers or calcium channel blockers (diltiazem or verapamil) (Class I). Rate control may also be achieved with IV amiodarone (Class IIa). Treatment with oral dofetilide or intravenous ibutilide may be used for rhythm control in the stable patient. In the unstable patient, treatment includes rhythm control with synchronized cardioversion (Class I), or rate control with IV amiodarone (Class IIa).

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<http://www.uptodate.com/contents/overview-of-atrial-flutter>

http://www.uptodate.com/contents/electrocardiographic-and-electrophysiologic-features-of-atrial-flutter?source=see_link

My Life as a YouTube Rock Star

Larry B. Mellick, MD, MS, FAAP, FACEP



**Larry B. Mellick, MD, MS,
FAAP, FACEP**
lmellick@gru.edu

Dr. Larry B. Mellick is professor of Emergency Medicine and Pediatrics, Department of Emergency Medicine, Medical College of Georgia, Augusta, GA.

I didn't plan for it to work out this way. In fact, it all started simply enough back in February 2010 when I posted my first YouTube video demonstrating the Finkelstein test on a newly created channel. Other teaching and procedure videos followed and it wasn't long before interest in my YouTube channel began to grow. With this growth I sensed the need to vet my activities within our academic organization. The department, hospital and university were made aware of the channel and the organizations rapidly became involved in the oversight of the video production process. Because these were medical center patients, ownership of the channel was claimed by the university. Subsequently, the YouTube channel has grown in size and popularity beyond what we would have ever imagined. The channel currently has 500 plus videos, over 70,000 subscribers and receives more than 2 million video views per month. Some individual videos have topped over two or three million views. Additionally, our YouTube followers span the entire world. The viewership is international with video comments being made from various countries such as Israel, Iran, Iraq, Kuwait, Germany, Austria, England, Russia, China, Australia and scores more.

This exposure has brought a degree of name recognition to the university (yes, all of our names, old and new), and a mini-celebrity status for the creator of the channel. And, consequently, the label, YouTube rock star, has bubbled to the surface in both social media and other settings. In fact, the label, YouTube rock star, was used during my introduction before a recent pediatrics department grand rounds presentation. Interestingly, offers for speaking engagements on the national scene have been expanding recently because of the name recognition gleaned from the YouTube channel. And, at these meetings the impact of the YouTube channel has been obvious. Comments of appreciation for the videos are heard frequently. In fact, during a recent lecture at Christ Hospital in Cincinnati, Ohio two of the attendees asked for selfies with me and one asked for an autograph. Similar scenarios have repeated themselves in other settings. Our residents joke about the fact that their friends identify their training program as the residency where "that guy makes the YouTube videos." A reality TV star contacted me recently and wanted me to know that he was huge fan of the YouTube channel. Requests to use the videos for TV shows have come from all over the world. *The Doctors*, *Tosh. O* and other TV programs have used our videos. Writers for nationally syndicated news organizations have asked for interviews relative to social media and our YouTube channel. And, finally, it is not uncommon to be sitting in a lecture at one of our national meetings and have one of our videos suddenly appear on the screen.

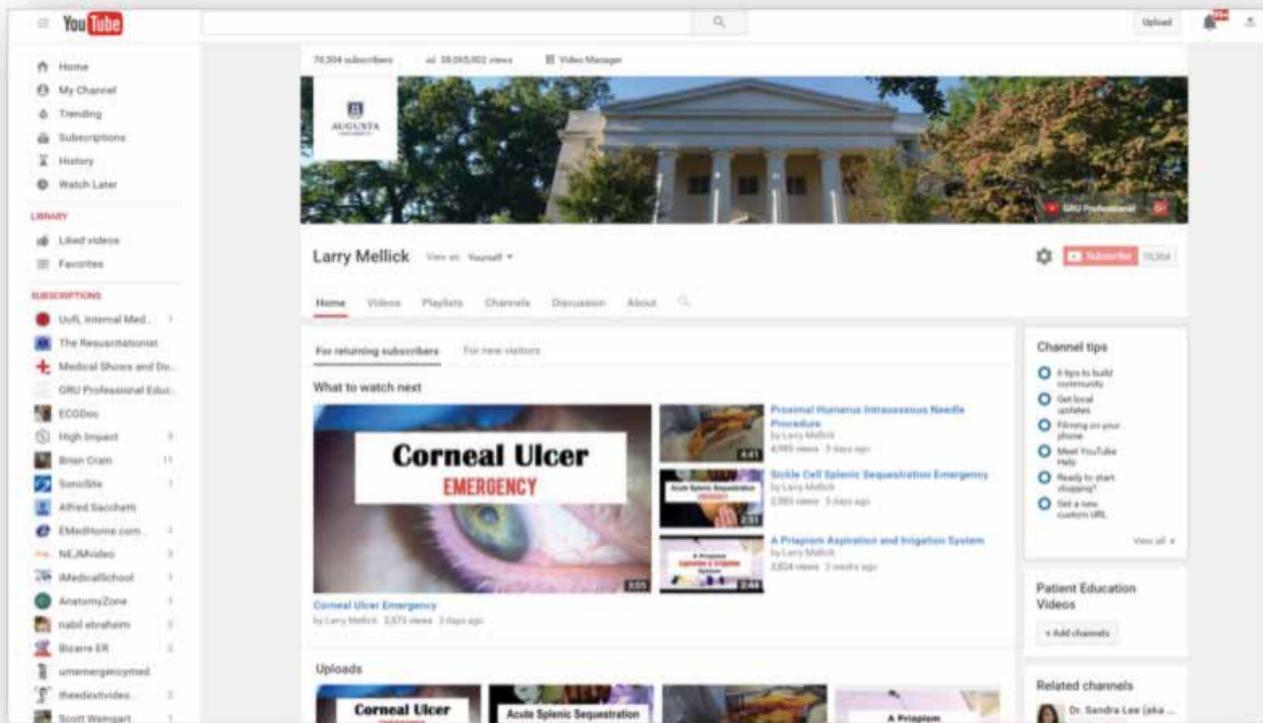
Okay, so what? This article really isn't intended to be an opportunity to brag about my 15 minutes of fame as a YouTube rock star. Instead, I want to make the case for the strongly positive impact of good medical videos widely accessible on social media. My videos are, in reality, a collaboration between our patients and their healthcare providers with the intent being to help and teach others. Generally, medical centers and hospitals avoid the creation of videos that involve real life patients. In fact, in many clinical settings it's entirely possible to get fired for taking any pictures or videos involving patients. However, our experience



has been dramatically different. Stories of how the videos have helped others come to us from all over the world. They comments range from testimonials of having been inspired to go into medicine to simply having gotten a question right on an examination because of a video. The entire spectrum of learners and practitioners (coding and billing, paramedic, nursing, and medical students, practicing physicians and physician assistants) have given testimony to the helpfulness of these videos in training and clinical practice. Additionally, there have been a few reports of lives that have been saved because of information gleaned from the videos.

The truth is this channel has never been about becoming a YouTube rock star. Instead, this YouTube channel, quite simply, is a labor of love. The labor is the three to five hours of work required for a simple five minute video and the

countless hours spent learning complicated video programs and video cameras. It is also about investing thousands of dollars on video cameras, video software and computer equipment for video production. Furthermore, the labor component involves the careful vetting and peer review process that every video goes through. Love, on the other hand, is the personal gratification that comes from artistic creativity and the personal sense of fulfillment that comes from teaching, helping others and positively touching lives. It is also about the opportunity to share personal blessing with others. It truly is “more blessed to give than to receive.” In the end all YouTube rock stardoms eventually fade away. On the other hand, it is my hope that these educational videos will remain as an ongoing gift to students of the world for many years to come.



An Emergency Physician Practices Abroad

C. Barrett Jones, MD



C. Barrett Jones, MD
chrjones@augusta.edu

Barrett completed his residency in 2013 at the Medical College of Georgia and joined the department as an assistant professor. He plans to continue teaching international medicine and enjoys time with his wife and 3 children.



A typical triage line for our clinics in the Gambia. Photo by Barrett Jones

As emergency medicine physicians, all of us will have the unique opportunity to be involved in global healthcare. Even if you choose to never leave the comfort of your community emergency department, chances are that you will eventually have a patient present with fever after returning from international travel. You may find yourself wondering what else should be added to the differential for a refugee or immigrant from a tropical region. Every day, the world is becoming smaller with increased access to transportation, and the world's patients will increasingly be found on our doorsteps.

Our involvement in global health as emergency medicine physicians, however, does not need to stop there. Our flexible schedules and broad scope of practice allow us to go to the patients. It is relatively easy for us to block off a couple of weeks on our schedule and go overseas while still fulfilling our clinical duties at home. When we arrive, our emergency medicine background allows us to treat the majority of patients we encounter. It is a situation uncommon to healthcare professionals since many will have packed clinical schedules and a more focused area of expertise. We can deliver healthcare to many patients who cannot access the care that they need, we can educate patients and physicians, and we can learn invaluable lessons in return.

For those who travel once per year to developed areas, doing some reading or taking a short course on tropical diseases will add to your comfort level. For those who wish to take frequent trips to more remote areas, such as Sub-Saharan Africa or Southeast Asia, more extensive training will add to the safety of your trip and successful patient care. The following case tells of a patient I saw in the Gambia during early December 2015.

Case:

A 5-year-old male from the Gambia presents with fever, headache, nausea, vomiting, and malaise for three days. The fever is constant and has no cyclic pattern. There has been no cough, difficulty breathing, abdominal pain, diarrhea, rash, or weight loss. The patient has one sibling with similar symptoms and two other siblings who are well.

The patient has no past medical history. He lives in a rural area near the Gambia River with his family who farm and raise cattle. His mother states that they have mosquito nets and she brings a vaccination record showing that her son has received all government recommended vaccinations. She denies feeding the patient any unpasteurized dairy products or raw meat or seafood.

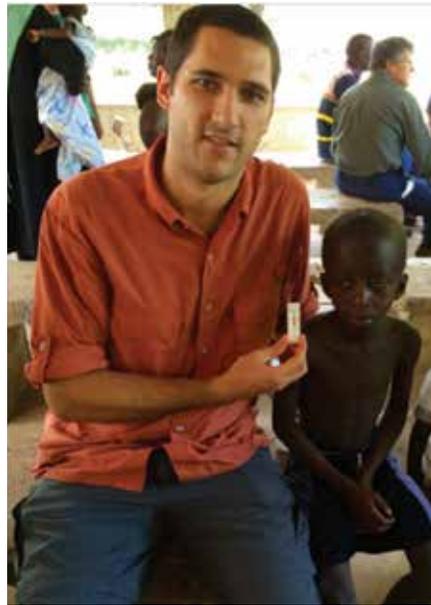
On exam, the patient appears moderately ill but is able to sit up unassisted and follow commands. He does not appear malnourished. He is febrile, tachycardic and has mildly decreased skin turgor. Mucous membranes are slightly dry but his eye, ear, nose, and throat exams are otherwise normal. You find no meningeal signs. His chest exam includes clear lungs and tachycardia with a regular rhythm and no murmurs. His abdomen is nontender, nondistended and without masses. You notice mild pallor but no rash or jaundice. No lymphadenopathy is present.

Differential Diagnosis and Evaluation

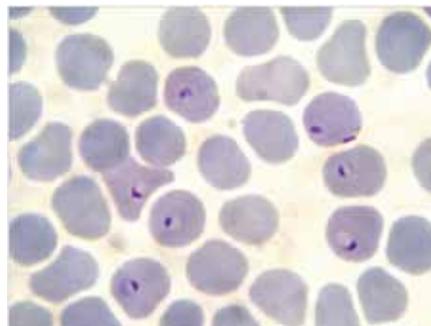
The differential diagnosis for this patient includes viruses and bacterial illnesses such as influenza, otitis media, pneumonia, and meningitis, which occur nearly everywhere in the world. Other considerations should be based on the patient's location, history and exam. In Sub Saharan Africa, diseases such as hemorrhagic fevers, schistosomiasis, filariasis, typhoid fever and brucellosis are important considerations in febrile patients. Arthropod borne diseases will add several possibilities including malaria, yellow fever, dengue, leishmaniasis, and rickettsioses. Tuberculosis is always a possible cause of fever in the developing world .

The patient's history and exam help to narrow the differential diagnosis. He specifically lacks cough, abnormal bleeding, distinct rashes, hepatomegaly, jaundice, meningeal signs, lymphadenopathy, and recent weight loss, decreasing suspicion for many of the above diagnoses.

Laboratory evaluation for fever should always start with malaria testing in any endemic area. Thick and thin peripheral blood smear microscopy is the classic method



Our patient's rapid diagnostic test was positive for falciparum malaria. Photo courtesy of Hartmut Gross.



A thin blood smear from another patient with hyperparasitemic falciparum malaria. Photo courtesy of Hartmut Gross.

of diagnosing malaria, but rapid diagnostic tests (RDTs) are being used more commonly. Additional routine studies may include a CBC with differential, chemistry, urinalysis, hepatic function tests and blood cultures. More specific testing should be considered on an individual basis, including imaging, stool studies, serologies, skin snips or scrapings, and CSF studies.¹

Results

Our patient's malaria RDT was positive for *Plasmodium falciparum*. We had recently seen many patients in the area with similar presentations who had falciparum malaria confirmed by peripheral blood smears. A capillary blood glucose level was also found to be normal in the patient. No further diagnostics were performed since the patient showed no signs of severe malaria and his clinical picture was adequately explained by the diagnosis of malaria. The non-cyclical fever mentioned by the mother is common in early malaria infections, especially with *P. falciparum* and may become cyclical later in the course.²

Treatment and Disposition

The patient was given an anti-emetic, oral hydration and treated with oral artemether-lumefantrine combination therapy (ACT).³ The mother was instructed to seek

medical attention for any worsening symptoms, which could indicate progression to severe malaria. The recommended treatment for severe malaria is IV artesunate, a life-saving treatment owing to its ability to rapidly decrease the parasite burden of the patient within hours.⁴

The patient's symptomatic brother was also positive for falciparum malaria and was treated with ACT. The family was counseled to consistently use mosquito nets at night. The mother then admitted that their nets were never used because the family members became too warm to sleep comfortably under them, a problem common in the tropics.

[International Medicine continued on page 16](#)

Therapeutic Hypothermia Following Out of Hospital Pediatric Cardiac Arrest

Is there any Benefit?

Drs. George Hsu and Alex Farish, August University, Children's Hospital of Georgia



George Hsu, MD, MS
ghsu@gru.edu

Dr. Hsu is a pediatric emergency medicine fellow at Augusta University, Children's Hospital of Georgia

Case 1

It's a slow night in the emergency department when you receive a call from an incoming EMS unit about a 9-year-old male in full cardiopulmonary arrest, CPR in progress. Upon arrival, you note the patient is intubated with two large bore IV's in place. After verification of the endotracheal tube and initiation of resuscitation you note return of spontaneous circulation and improvement of vital signs after two rounds of epinephrine and three 20cc/kg boluses of crystalloids. You quickly place the patient on a ventilator and setup an epinephrine drip while obtaining further studies on the patient. Upon questioning the family, it's noted that the patient has no significant medical history, but had been sick for the past week with fever, cough, and over the past 12 hours they notice the patient acute worsening until he suddenly collapsed prior to EMS arrival. You decide to contact your local pediatric intensive care unit for assistance. They accept the patient, but due to the inclement weather state that transport will be at least three hours out by ground. You alert your staff of the situation when the nurse notes the patient is febrile to 39 degrees Celsius. You order for the initiation of antipyretics but wonder if therapeutic hypothermia will be of any long term benefit for this patient?

Case 2

You are on the last hour of your shift when you're called emergently to the ambulance bay. Upon arrival there are two EMS personnel bagging a newborn infant delivered just prior to arrival. Upon first assessment you note no spontaneous crying or movement and are unable to palpate any pulses. While intubating the child, you note thick meconium in the oropharynx and in the trachea. After securement of the airway your nurse palpates a femoral pulse and you note some spontaneous movement. You instruct your team to continue the resuscitation while you get more history. The EMS crew tells you that infant was a full term infant who delivered precipitously to a 23-year-old mother with a history of cocaine abuse and previous placental abruptions. Mom was also noted to have heavy bleeding for 10 minutes prior to delivery. The child was limp and listless for five minutes prior to arrival of EMS and had been down for at least more than 15 minutes. You check back on the patient and note that his vitals have improved and is having some spontaneous movements. You call the nearest neonatal intensive care unit and they accept the patient, but due to inclement weather state that transport will be at least three hours out by ground. In the meantime they ask that you begin cooling the patient to 34 degrees Celsius while waiting for transport arrival. You wonder what the long term benefits of hypothermia will provide for this patient?



Alex Farish, MD
afarish@gru.edu

Dr. Farish is a pediatric resident at Augusta University, Children's Hospital of Georgia

Introduction

Targeted temperature therapy or therapeutic hypothermia (TH) has been conceptualized to be a neuroprotective adjuvant of care following cardiac arrest for more than 50 years. Out of hospital cardiac arrest is associated with higher morbidity and mortality than in hospital events with long-term neurologic deficits common among survivors. This phenomenon is theorized to be a combination of poor perfusion, whole-body ischemia, reperfusion injury, altered neurologic metabolism, and extended times to return of circulation.

While much is still not understood, two landmark studies illustrated specific benefits in long term mortality and neurologic function in specific patient populations (adult patients,

out of hospital cardiac arrest secondary to ventricular fibrillation or ventricular tachycardia).^{1,2} This led to the formal endorsement of therapeutic hypothermia by the American Heart Association and European Society of Cardiology guidelines for comatose adult patients with ROSC after out of hospital ventricular fibrillation cardiac arrest (2010) and for all comatose adult patients with ROSC after cardiac arrest with a target temperature between 32 degrees Celsius and 36 degrees Celsius for at least 24 hours.³ Recently there has been interest in the utilization of therapeutic hypothermia in pediatric patients that suffer an out of hospital arrest. However, there is not much known of the utility of this therapy in pediatrics. The following article summarizes the current knowledge and recommendations regarding therapeutic hypothermia in pediatric patients.

Current Evidence and Practices

Prior to 2015, there has been a paucity of studies specifically looking at therapeutic hypothermia in pediatric patients and what trials were published were not specifically designed to look at therapeutic hypothermia in out of hospital arrests in pediatric patients. Additionally the majority of studies were retrospective and only one was multi-centered.^{4,9}

Recently, a study published in the *New England Journal of Medicine* looked into therapeutic hypothermia after out-of-hospital cardiac arrest in children >2 days and younger than 18 years.¹⁰ The study was conducted as a multicenter randomized clinical trial comparing therapeutic hypothermia and eutermic in pediatric patients after out of hospital cardiac arrest at 38 different children's hospital throughout both the United States and Canada.

The study included children requiring chest compressions for at least two minutes who required mechanical ventilation after return of cardiac circulation. Patients were then randomized and received therapeutic hypothermia within 6 hours of return of cardiac circulation. Temperature goals were 33 degrees Celsius for the cooling arm and 36.8 degrees Celsius for the control arm. Temperature management occurred for a total of 120 hours for both groups, with targeted hypothermia occurring for 48 hours in the cooling group. Primary and secondary outcomes for the study were neurobehavioral outcomes (at 12 months) and all-cause mortality. While the study was unable to detect statistically significant results between the two study arms, the authors did note that patients who received therapeutic cooling had a higher mean neurologic functioning (20%) compares with the eutermic arm (12%). Similarly both short and long term survival was found to be greater in the therapeutic hypothermia patients. Mean survival time was 149+/-14 vs 119 +/-14 days and 39% vs 29% survival>1

year for therapeutic hypothermia vs. eutermic groups respectively. It was noted that these observed effects were not found to be statistically significant, however this was possibly due to the initial design of their study (powered to detect a 20% clinical difference between the two arms of the study). The patient population and etiology of cardiac arrest was significantly different than in previous studies done in the adult population. Rather than cardiac arrest with associated dysrhythmia being the inciting event, the majority (>70%) of pediatric patients in the study had respiratory failure which eventually lead to cardiac arrest. Additionally, only 8% of recruited patients had a shockable rhythm at presentation.

Neonatal Hypothermia

Therapeutic hypothermia in infants with moderate to severe hypoxic-ischemic encephalopathy (HIE) is considered a standard of care in neonatology. Multiple studies have shown that hypothermia significantly improves survival and neurocognitive outcomes. In fact, a recent review published in 2015 noted that current treatment protocols were close to optimal and any further improvements to outcome in this setting would likely be in earlier patient identification and initiation of therapy.¹¹

Most protocols routinely involve starting induced hypothermia within the first six hours of life. Goal temps are 34.5(+/-) 0.5 degrees C for head cooling measures or 33.5 (+/-) 0.5 degrees C for whole body cooling measures and treatment time varies between 48 and 72 hours. A recent cohort study, however, demonstrated that even within this six hour goal time frame improvements in outcomes can be correlated with those who received treatment less than three hours after birth as opposed to those who received treatment between 3-6 hours. Unfortunately other studies have found that only approximately 12% of infants started on HIE hypothermia protocols were started in the first four hours of life. Identifying infants at risk who demonstrate the typical characteristics of HIE are critical to the prompt initiation of therapy in order to maximize long term neurologic outcomes. These characteristics include depressed level of consciousness, respiratory depression, abnormal muscle tone, abnormal cranial nerve function, and delayed seizures following a traumatic birth.

All too often, babies with birth asphyxia are born outside of centers with established hypothermic protocols and neonatal intensive care units. Quick recognition of the symptoms of hypoxic ischemic encephalopathy is often dependent on emergency medicine physicians and transport teams in order to quickly institute therapeutic cooling. This can be as simple as using ice packs or servo-controlled blankets. Other options are passive cooling, or deferment of active cooling of the affected neonate.

Conclusions

Therapeutic hypothermia following out of hospital cardiac arrest is an established adjuvant therapy in the post-resuscitation care of certain adult patient populations. The long term benefits in terms of preservation of neurologic function and decreasing mortality have been shown in adults, however the data in pediatric patients is not as clear. While further studies need to be done, preliminary data shows that similar benefits could be obtained in pediatric patients suffering an out of hospital arrest. While there is not enough data to support instituting therapeutic hypothermia in all pediatric patients suffering out of hospital cardiopulmonary arrest there are specific situations where cooling is definitively indicated. Evidence has clearly shown that neonates suffering birth asphyxia or hypoxic ischemic encephalopathy directly benefit from therapeutic hypothermia with timely interventions being key to preserve long term neurologic function.

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International Medicine continued

I have chosen the option of the international medicine fellowship at Augusta University during the 2015-2016 academic year. The fellowship provides training in the areas of travel medicine, global health, and a heavy emphasis on tropical diseases. Reading includes multiple texts on these subjects and weekly conferences with discussion of tropical disease cases. As a fellow, I have spent an average of four or five months outside the United States including a tropical medicine diploma course approved by the American Society of Tropical Medicine and Hygiene (ASTMH). Completion of a diploma course grants eligibility to sit for the Certificate of Knowledge in Clinical Tropical Medicine and Traveler's Health Exam (CTropMed). Other travel includes coursework and fieldwork in locations tailored to individual fellows and has allowed me to work in Asia, Africa, Central America and South America throughout the fellowship.

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Pediatric Emergency Medicine Fellowship Update: Augusta University

Natalie E. Lane, MD, Pediatric Emergency Medicine Fellowship Director, Augusta University

It is hard to believe that we are at the end of the 2015-16 academic year. The first of the year passes by in a blur as time is spent acclimating the new fellows to the program and their respective roles, channeling their energies into meaningful projects, meeting the requirements of the ACGME reporting periods, remaining afloat in one's own initiatives, enjoying the interview season with its Match culmination in December, only to realize, around the corner, the process begins all over again—tiring but rejuvenating at the same time. The department experienced a successful Match filling two slots with pediatric trained residents from Emory University and the Medical College of Georgia. Drs. Aimee Baer Ellington and Julie Jacobs will both bring great depth to the program.

Our fellows have become a valuable asset to the department as they reach out to enhance relationships and share in mutual academic growth. Fellows and the department participated in the Annual National Pediatric Emergency Medicine Fellow's conference at the University of Michigan in Ann Arbor supported partially by Emergency Medical Services for Children and the American Academy of Pediatrics. I understand the MCG fellows made a great "first impression." They were afforded the opportunity to network with other young PEM professionals and vet their preliminary research projects with some of the greats in the profession. They obtained great feedback and both fellows are on track for IRB approval within the next couple of months and this is just their first year of fellowship. Successful submission is a result of their enthusiasm and excellent support from our research administration within the department of emergency medicine.

The fellows continue to be closely involved with the training of pediatric interns and medical students. They assist with procedural workshops and provide mini didactic sessions for the interns who benefit from

this one-on-one instruction as they navigate through their emergency medicine month. The fellow curriculum provides structure, but also allows for flexibility and exposure to wilderness medicine, ultrasound, international medicine and emergency medical services. Our fellows use the state-of-the-art ultrasound machines housed in our ED on a daily basis. One of the newest venues for fellow training is through the state-of-the-art simulation center at the \$65-million-dollar Education Commons (the new medical student instructional home for the Medical College of Georgia.) The fellows additionally have access and receive training in all manner of video laryngoscopy.

The section continues to grow in its mission as changes in healthcare and the cost of doing business forces institutions to become more creative and reach out to communities who otherwise may not have access to pediatric emergency or subspecialty care. As part of the states telehealth program, Augusta University using the REACH telestroke platform, has joined with Emmanuel County Medical Center Emergency Department to provide telemedicine consultation for pediatric patients in their emergency department. The hope is to provide consultative care, ease of transport and access to subspecialty care. There is a large learning curve in its application, but we feel confident this will be a win-win for all involved.

The pediatric emergency medicine fellowship is alive and well. Graduates have achieved 100% board passage rate in the last five years and they are collectively successful in their positions. All were emergency medicine graduates, but most practice pediatric emergency medicine greater than 80% of the time choosing to care for pediatric patients over adults. Our graduates can be found in large thriving community emergency departments and academic institutions from Georgia, South Carolina to Utah, to Oklahoma and in several cities in the big state of Texas. I am proud of them all.



Natalie E. Lane, MD, FAAP
nlane@gru.edu

Dr. Lane is professor of Emergency Medicine and Associate Professor of Pediatrics, Department of Emergency Medicine, Augusta University and Region VI EMS-Children Committee Chair, Augusta, Georgia



Emergency Medical Services for Children (EMS-Children) Nationally and in Georgia

Natalie E. Lane, Pediatric Emergency Medicine Fellowship Director, Augusta University



Natalie E. Lane, MD, FAAP
nlane@gru.edu

Dr. Lane is professor of Emergency Medicine and Associate Professor of Pediatrics, Department of Emergency Medicine, Augusta University and Region VI EMS-Children Committee Chair, Augusta, Georgia

Since 1994, Emergency Medical Services for Children (EMS-Children) has been a federally-funded grant program through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. Today, each state and U.S. territory receives funding to further the initial intent of the program that sought to “expand access and improve the quality of emergency medical services for children through existing EMS systems.” A second portion of grant monies goes to the State Partnership Regionalization of Care (SPROC) which enhances the sharing of resources among state and accredited schools of medicine to assist certain patient populations. The program also sponsors targeted issues grants awarded to schools of medicine for work that focuses on pre-hospital research. The EMS-Children grant program also funds the Pediatric Emergency Care Applied Research Network (PECARN), a multi-institutional network for research in pediatric emergency medicine. Every four years, EMS-Children is at risk for losing funding but through its notable value and support base, it was able to celebrate its 30th year in 2014. From very early in its inception it has been closely aligned with the initiatives of other national organizations to include the American College of Emergency Physicians (ACEP), the American Academy of Pediatrics (AAP), National Association of Emergency Medical Technicians (NAEMT), American Thoracic Society (ATS), Emergency Nurses Association (ENA) and the American Psychological Association (APA). These organizations together were loosely known as the Partnerships for Children Coalition or PFC and were established back in 1995. The relationships remain strong, although each on their own is a powerhouse.

As emergency medicine physicians caring for children, whether in a tertiary care hospital or community setting, we often benefit from the initiatives supported by EMS-Children. The following list are but a few familiar initiatives. Many of these may be familiar and may be in their more recent iterations. Research stemming from PECARN affect our daily practices.

- (1998) The Emergency Information Form
- (2009) Guidelines for pediatric equipment on basic and advanced life support ambulances
- (2009) Guidelines for care of children in the emergency department
- Various educational initiatives that impacted pre-hospital approaches regarding children
 - Assessment focused rather than disease focused evaluations
 - Progression to well defined objectives and lesson plans for pre-hospital personnel regarding children
 - Clinical changes in care (a couple of examples)
 - Role of hyperventilation in patients with increased ICP (dangers rather than benefit)
 - Out of hospital airway management of children (downplaying intubation)
 - Vascular access in the out-of hospital setting (choose wisely)
 - The E-C clamp for improved bag valve mask ventilation
 - The Pediatric Assessment Triangle

Research highlights from initiatives through PECARN can be found at

- <http://www.emscnrc.org/emsc-resources/publications/community-and-public-resource/research-highlights>
 - pre-hospital care concerning children with special health care needs, pain management, seizure management
 - emergency department care concerning children with traumatic brain injury, cardiac arrest, markers for severe infection, CT use in appendicitis evaluation
 - (2013) Inter facility transfer Tool kit for the Pediatric patient <http://www.emscnrc.org/emsc-resources/publications/hospital-care/inter-facility-transfer-tool-kit>
 - EMS-Children is guided by established performance measures. New performance measures open for public comment are found at (<http://www.emscnrc.org/about-us/emsc-news/2016/emsc-performance-measures-opens-second-public-comment-period>)

The ACEP in its 2001 policy statement encouraged its members to support EMS-Children through leadership in areas of injury and illness prevention; through participation in local, regional and state EMS- and EMS-C systems by providing medical direction, education of providers, quality improvement and legislative advocacy. Members are encouraged to enhance the concept of the medical home for children through referral to primary, specialized and rehabilitation services. They should contribute to the design and function within the EMS system and provide expertise for and collaborate with the National EMS-Children program.

Acknowledging the national recommendation for members to participate, GCEP members should be encouraged to join with the Georgia EMS-C system initiatives. A quarter of the population of Georgia is made up of children. There are five leading children's hospitals in Georgia with the Children's Hospitals of Atlanta being the state's pediatric coordinating hospital. The majority of children however are seen in community/non-pediatric centers. There are over 180,000 pediatric 911 calls and transports a year which on average represent less than 10% of ambulance transports. Children are scary for all providers if they don't see them often. EMS-Children focuses on preparedness in the care of children no matter where they might be seen. The state EMS-Children program whose grantee administrator is Mr. Earnest Doss, Deputy Director of Trauma and EMS at the Department of Public Health, Office of Trauma

and Emergency Preparedness is instrumental in reaching out to improve the care of children across the state. The Georgia EMS-Children has an executive board that meets quarterly. Reports on its actions and initiatives are made at state EMS meetings. Regional EMS Councils should have active EMS-Children committees that can leverage pediatric initiatives. Membership on these committees by interested emergency physicians can help support and direct these initiatives.

Many of the most recent initiatives in Georgia follow on the heels of the national pediatric readiness project (<http://www.pediatricreadiness.org/>). In 2014, a national survey was distributed to assess readiness of emergency departments to see and care for children. A joint policy statement by the AAP, ACEP, ENA and supported by EMS-C regarding preparedness guidelines for children in emergency departments was disseminated in 2009. The survey in 2014 was meant to assess this readiness based on the guidelines. The national average on a 100-point scale was 69. In Georgia, the average readiness score was 71. Children's hospitals out performed smaller emergency departments but other than disaster preparedness, in which all institutions were lacking; the primary area in which both nationally and regionally emergency departments fell short was in the presence of a pediatric "champion," both a nursing and physician champion. EMS-Children in Georgia encourages and wants to be a resource to those interested in picking up this banner. Any emergency department that answered the initial survey received a report and additional tools linked to toolkits on how to improve in various areas. Ask your administrators to review these reports. State and national report scores can be found at <http://www.pediatricreadiness.org/results-and-findings>.

Other state initiatives include the focus on disaster preparedness for children. EMS-Children is providing funding to a new non-profit organization that was convened in 2013 known as the Pediatric Health Improvement Coalition (PHIC) of Georgia whose mission is: *To preserve and advance pediatric care in our state by unifying the pediatric provider community and engaging the state and Medicaid CMOs in productive, quality-driven initiatives to raise the standard of care for Georgia's children.* A disaster subcommittee within this coalition with representatives from all children's hospitals in Georgia and hospital systems that see a large population of children sit on this committee and are focused on improving Georgia's readiness as it applies to children in a disaster. EMS-Children has representation on the committee.

Georgia EMS-Children along with the Department of Public Health's Office of Hospital Preparedness has entered into a collaboration with the University of Georgia College of Public Health Policy and Management,

Institute for Disaster Management to develop a disaster preparedness course specific to children. Significant financial resources are being provided to bring this unique, dynamic and interactive course to the communities that could potentially be greatly impacted by a disaster and need this valuable education. Progress on this initiative will be posted on the state EMS-Children website at <https://dph.georgia.gov/emergency-medical-services-children-emsc>

Georgia EMS-Children additionally supports injury prevention programs regarding car seat safety. It is revising emergency guidelines for schools with the help of physicians at Children’s Hospital of Atlanta. Georgia EMS-Children additionally subcontracts with the Medical College of Georgia Department of Emergency Medicine on a grant that hopes to enhance some regionalization of care regarding sickle cell disease and asthma in children. There is much work to be done in Georgia. It could benefit from interested emergency medicine physicians. Please use the resources the national website for EMS-Children provides at <http://www.emscnrc.org/>. Contact the state regional EMS offices to become involved with your local EMS-C committees. Lastly, enjoy EMS-Children’s Day May 18, 2016.

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What Toxidrome is This?

Michael J. Bono, MD, FACEP

The Case

A 15-year-old male was brought to the emergency department by his counselor for strange behavior from a drug treatment/rehabilitation center. The counselor said they were on a field trip with other patients, when three of them wandered off. When he finally found them, they were smoking something in a pipe in the middle of the field. The counselor had no idea what they were smoking. He had no idea where they got the pipe.

The patient was mumbling and seemed to be talking to people who were not there. He would not talk directly to me. His words were understandable but they made no sense. He had no previous psychiatric history. He had no other medical problems and took no medications. The patient was in the drug treatment/rehabilitation center for marijuana and cocaine abuse. There were no medical problems that ran in his family. All of the history was obtained from the counselor.

Physical Exam

The patient had the following vital signs: blood pressure 233/130, heart rate 120, respiratory rate 20, oral temperature 99.0°F, oxygen saturation 99% on room air.

HEENT: PERRL, EOMI, essentially normal exam, but I could not see the optic disks because he was noncompliant. Neck: no bruits, trachea midline. Lungs: expansion full, lungs clear to auscultation. Heart: regular rapid rate with no murmur, gallop, click, or rub. Abdomen: soft, nontender, no masses or nodules, bowel sounds present. GU: normal male both testes descended. No lesions noted. Extremities: full range of motion without tenderness or swelling. Skin: no track marks, skin was flushed and dry, no diaphoresis. CNS: would respond to verbal stimuli, but talks in rambling sentences, will not answer questions. Motor function and muscle strength is intact equal bilaterally. Cranial nerves II through XII are grossly intact. He walked without assistance.

What's going on here? What is the Toxidrome?

Tricks of the Trade

History Tricks. Getting a history is usually difficult. Patients are usually unable to tell us what they took or they will lie about what they took. We have learned to rely on family, friends, and paramedics. Drug screens rarely help us in this instance. Poisoning or overdose should be suspected in a patient who presents with multisystem involvement until proven otherwise. The primary goal is to take care the patient, and the secondary goal is identification of the toxic agent.

Prior medical or psychiatric history is critically important, and paramedics play an essential role. We should ask about type of material, amount of material ingested, and if any materials were splattered over body? Ask particularly about pill or liquor bottles at the scene. What medications were in the house? What's the situation surrounding the incident? What was he doing that day? Does the patient live alone? Did the patient lose his job or end a meaningful relationship? Is the patient on a special diet? Did he possibly take too much medication by accident?

Afebrile children with these symptoms might be poisoned: unexplained lethargy, neurologic symptoms, bizarre behavior, puzzling presentation.

Physical Exam Tricks. The general physical exam may reveal the presence of a toxidrome, or detect complications of the poisoning. The exam may also uncover underlying systemic disease. So watch these things carefully: vital signs, cardiac status, pulmonary status, and neurologic status.



**Michael J. Bono, MD,
FACEP**
m.bono@charter.net

Dr. Michael Bono is professor of emergency medicine and associate residency director for the Department of Emergency Medicine at Eastern Virginia Medical School in Norfolk.



Elevated temperature. Fever may be a sign of infection, or could be a sign of ingestion of salicylates, dinitrophenols, anticholinergics, PCP, LSD, or cocaine.

Low Temperature. Hypothermia usually makes us think of exposure to cold, but hypoglycemia is a common cause of hypothermia. Hypothermia can be caused by ingestion of sedatives, barbiturates, ethanol, carbamazepine, narcotics, or phenothiazines.

Bradycardia. Bradycardia is most commonly caused by beta-blockers. Digoxin is rarely used today, but overdose can be a cause of bradycardia. Calcium channel blocker overdose can also cause bradycardia, as well as cholinergic medications, hypothermia, and spinal cord trauma.

Hypertension. The following medications should be considered in a severely hypertensive patient: cocaine, PCP, amphetamines, sympathomimetics, and anticholinergics.

Diaphoresis. Profound diaphoresis can be caused by hypoglycemia, myocardial infarction, salicylate poisoning, hyperthyroidism, organophosphate poisoning, drug withdrawal, alcohol withdrawal, or shock. Many of my patients come to the emergency department for second-gain, but it is hard to fake diaphoresis.

Smell the patient's breath. A fruity odor is likely DKA. The smell of silver polish or almonds is a cyanide overdose. The smell of an insecticide is a carbamate or organophosphate ingestion. A smell of cleaning fluid is likely carbon tetrachloride. A garlic smell on the breath is arsenic. Gasoline, turpentine, and mineral spirits on the breath all have distinctive smells.

Ear, nose, and throat exam. Patients will inject themselves in crazy places. A large nasal septal defect is the consequence of prolonged cocaine abuse. An elongated, edematous uvula can be caused by chronic marijuana abusers.

Lung exam. Pulmonary edema is caused by tricyclic antidepressant overdose, methaqualone (Quaaludes), or very commonly by narcotic overdose. Inhalation of toxic gases will cause wheezing. Mediastinal emphysema from marijuana or crack cocaine smoking may be heard on exam. Mediastinal emphysema sounds like someone walking on snow covered with ice, and matches the patient's heartbeat. The eponym is Hamman's crunch, which is usually caused from a ruptured bleb on the surface of the lung.

Heart exam. Any arrhythmia may be caused by any overdose or electrolyte disturbance. A new murmur in IV drug abusers is bacterial endocarditis until proven otherwise. A young patient with ventricular arrhythmias should cause concern for cocaine. "Holiday Heart" is atrial fibrillation caused by patients who binge on alcohol, and we hear the classic irregularly irregular rhythm.

Abdominal exam. The patient who presents with severe abdominal pain and a board-like abdomen is either a ruptured viscus, or a black widow spider bite. Adynamic ileus is typical for any overdose, and causes markedly decreased bowel sounds.

Skin exam. Make sure you roll up their sleeves and look for tracks, burns, or lacerations. Heroin addicts will wear long sleeve shirts even in the summertime. My experience with heroin addicts is that they are very pleasant until they need the next fix, and don't mention the large forearm abscess under the sleeve.

Skin flushing. Think of allergic reaction, fever, anticholinergics, or niacin overdose. Also think of Scombroid fish poisoning, toxic shock syndrome, or the alcohol disulfiram reaction.

Jaundice. Painless jaundice is usually caused by cancer, either at the ampulla of Vater or at the head of the pancreas. The jaundiced patient who took an overdose of acetaminophen 2 to 5 days earlier has a very poor prognosis. Aspirin ingestion can also cause jaundice. Other things to consider: iron poisoning, carbon tetrachloride sniffing, mushroom, copper, or phosphorus ingestion.

Petechiae and ecchymosis. Patients with petechiae or ecchymosis make us think about coagulopathy, primarily Coumadin or aspirin overdose. If the patient is febrile with mental status changes, certainly think of meningococemia.

Bullae. The patient with bullae may have had prolonged pressure on that area, likely from a sedative hypnotic overdose. Carbon monoxide can cause this as well. Also think about thermal burns and snake envenomation.

Back to our case

This patient had smoked Jimson Weed with the other people in his group. He was admitted into the ICU for hypertensive emergency and mental status changes. Labs were surprisingly normal. His hypertension persisted. The usual first line agents did nothing to bring down his blood pressure. We finally treated him with physostigmine and his blood pressure stabilized. The next day he left the hospital against medical advice. This is an anticholinergic toxidrome.

Brief pharmacology review

Acetylcholine is a neurotransmitter found in nerve junctions and synaptic sites, and works only in nerve endings. Acetylcholine binds, and activates, or inhibits, cellular function. Acetylcholine is inactivated when metabolized by acetylcholinesterase.

How anticholinergic drugs work? These drugs block acetylcholine by competitively binding the receptor. When the receptor is blocked, acetylcholine builds up in the synapse of the nerves, which causes the effects.



Receptor sites in different organs are not equally sensitive to anticholinergics.

Many anticholinergic drugs are useful. At low dose they decrease secretions of sweat, bronchial secretions, and salivary glands, which is useful for preoperative patients. At medium dose anticholinergic drugs provide mydriasis, (dilated pupil), and cycloplegia, (paralysis of the ciliary body), and stimulation of the vagal nerve, which slows the heart rate. At high-dose they cause bladder atony, and decrease gastrointestinal motility. Very high doses cause the toxidrome.

Anticholinergic Toxidrome

The following symptoms are characteristic of the anticholinergic toxidrome: dilated pupils, tachycardia, decreased bowel sounds, urinary retention, warm dry flushed skin, and hallucinations. These are hard to remember, so the following is a better way:

- hot as hell
- blind as a bat
- dry as a bone
- red as a beet
- mad as a hatter

Our patient was dry as a bone and mad as a hatter. The most disturbing symptoms are the CNS effects. These patients are often described as having confusion and disorientation. They can have ataxia, psychomotor agitation, and seizures. Visual and auditory hallucinations are common. It is initially hard to distinguish the anticholinergic toxidrome from psychosis.

So where do anticholinergic drugs come from? Anticholinergic drugs come from plants and mushrooms.

Jimson Weed has the scientific name *Datura stramonium*, and is a belladonna alkaloid, along with other herbal plants Henbane and Mandrake. This patient and the others in the field identified Jimson Weed seeds, and were smoking the seeds in the marijuana pipe. One hundred Jimson Weed seeds contain six milligrams of atropine, and ingestion of the seeds can be fatal. These plants are sought for their hallucinogenic effects, particularly in late summer. Duration of the toxidrome is hours to week, but is cut short by the use of physostigmine.

Belladonna alkaloids are atropine, scopolamine, and glycopyrrolate (Robinul). The antispasmodics are Benadryl, ditropan, and urispas. The anti-parkinsonism drugs Cogentin and Artane. We commonly use scopolamine, ditropan, and Cogentin. Other anticholinergic drugs include mydriatics: cyclogel, homatropine, and mydriacyl. Antihistamines are used commonly: Dimetane, Chlor-Trimeton, Dramamine, Benadryl, Caladryl, Atarax, and Antivert. Over-the-counter sleep aids, which we all have used during our emergency medicine careers, are Benadryl and doxylamine (Unisom). Other drugs with anticholinergic effects are Elavil, Imipramine, Atrovent, and Periactin.

Anticholinergic Toxidrome treatment

Usually supportive care is sufficient. Agitation can be controlled with benzodiazepines. If we are certain the diagnosis is anticholinergic poisoning and the patient has dangerous vital signs, such as this patient, physostigmine is the drug of choice. Physostigmine is carbamate that reversibly inhibits cholinesterase in both the peripheral nervous system and the CNS. If the patient has seizures, the usual medications are used.

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To Create a Successful Investment Plan, Coordinate Your Assets



**Setu Mazumdar, MD, CFP, President and Wealth Manager
Financial Planner For Doctors**

Does this sound familiar?

You graduated from your EM residency more than 10 years ago. You switched jobs a few times. Sometimes you were an employee and other times an independent contractor. You got married and your spouse also had a few different jobs along the way. Now you have kids and don't have much time to manage your finances.

One day you decide to take an inventory of your investment portfolio, which might look like this:

Your Accounts	Spouse's Accounts
401k from job #1	401k from current job
403b from job #2	Rollover IRA from previous job
SEP IRA from current job	IRA
IRA	Roth IRA
Roth IRA	Individual brokerage account
Individual brokerage account	

Setu Mazumdar, MD, CFP
setu@financialplannerfordoctors.com

Setu Mazumdar, MD, CFP® is a financial planner and President of Physician Wealth Solutions where he helps make work optional for doctors. He is also a board certified emergency medicine physician.

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Now you realize that instead of having an investment plan you have investment chaos. Here's how you turn the chaos into harmony:

Step #1: Determine your asset allocation

Asset allocation is the process of constructing an investment portfolio through various investment classes to meet your financial goals and risk and return objectives. A big mistake I've seen many physicians and financial advisors make is that they don't create a unified asset allocation across all of their accounts. Instead each account has a separate allocation. In the end only the overall asset allocation of the portfolio matters not what each account is doing.

Step #2: List all accounts you own by type of account

This is shown above, but you should add the custodian and balances of each account. Common types of accounts include: IRA, SEP IRA, Roth IRA, 401k, 403b, 457, defined benefit, and taxable.

Step #3: Break down each account by tax category

Make this simple by grouping accounts into three tax categories: tax deferred, tax free, and taxable. This is important because you may want to consider placing tax inefficient investment classes in tax deferred accounts.

Step #4: List all investment choices for each account

If you have an employer sponsored retirement plan, you may be restricted to certain mutual funds, but in other accounts you might be able to access almost any funds. For the latter wide open accounts, you'll have to determine which specific funds to use. If you've



got multiple funds within the same investment class, look at the internal expenses of each fund and rank them from low to high. Generally the lower cost funds tend to perform better.

Step #5: Match all investment choices with specific investment classes

Remember you've already created your asset allocation which should include the proportion of your portfolio you want in specific investment classes. Now you need to match each fund with its respective asset class.

Step #6: Fill it in

You're now ready to allocate each specific fund you've chosen to specific accounts categorized by tax status and taking into account the fund choices within each account.

Step #7: Maintenance, maintenance, maintenance

You'll probably realize from the previous step that much of what I told you conflicts with each other. For example let's say you want 30% of your asset allocation to be in international stocks, but the accounts you want them to be in happen to offer very high cost funds. Or perhaps you just run out of room to place certain investment classes in certain tax categories. In those cases you'll have to make a decision and may have to adjust your asset allocation altogether and go through this exercise again. On top of that you'll have to consider future contributions into each account and factor in all of this again. Then, what if the investment choices change?

The bottom line is that you'll have to do this on an ongoing basis to make sure you've got a real investment plan.

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T20—Are We Listening or Labeling?

Nicole Wischmeyer, 4th year medical student and Richard L. Elliott, MD, PhD, FAPA, Mercer University School of Medicine



Richard L. Elliott, MD, PhD
elliott_rl@mercer.edu

Dr. Elliott is professor and director of Medical Ethics at Mercer University School of Medicine in Macon, GA.

Nicole Wischmeyer

Nicole Wischmeyer is a fourth year medical student at Mercer University School of Medicine in Macon, GA.

A 21-year-old female was seen one evening in the EC of a large teaching hospital and found to be in diabetic ketoacidosis. Her past medical history included Type 1 diabetes mellitus, diagnosed at age four, non-alcoholic steatohepatitis, iron deficiency anemia, seizure disorder, major depressive disorder, HPV and HSV2 infection, methamphetamine use, and a history of addiction to prescription opiates. She was admitted and treatment was initiated for DKA.

During staffing with the attending the following morning, her DKA appeared to be responding, and it was noted that the patient had an additional history of being a “frequent flier.” Prominently displayed at the top of her medical record was the label “***T20***” indicating that she was among the top 20% of patients in terms of number of EC visits. Also prominent at the top of the record was a note that the patient was a “known drug seeker” and that she was noncompliant with her medical care. The team agreed they would need to be cautious when prescribing opiates.

The patient’s DKA resolved during the day, but during the night the on-call resident, who had not met the patient, was notified that the patient was complaining of abdominal pain. The nurse reporting the patient’s complaint reminded the resident of the patient’s “T20,” drug seeking, and treatment noncompliant status, and suggested the patient’s pain complaints were very similar to past complaints thought to be related to drug seeking. The resident agreed with the nurse, decided not to visit the patient, order labs or imaging, or order pain medications, as these actions would only reinforce the spurious nature of the complaints.

The following morning, the team reviewed the night’s events. Although the team was aware of the T20-drug seeking–noncompliant entries in the record, they decided to proceed with an evaluation, which revealed acute pancreatitis. She responded to a course of morphine, Zofran, and being kept NPO.

There is little doubt that this patient’s care was adversely affected by the labels inserted into her record. Thus the question—should such labels be used at all? Can they benefit care? Or do the pejorative effects outweigh the benefits?

Are labels useful? In order to communicate with other healthcare providers, physicians and nurses often use verbal shorthand, attempting to convey as much information as possible in a brief encounter. Sometimes this verbal shorthand uses a kind of labeling, with labels that can be positive or negative, describing a patient’s behaviors or attributes which are positive or negative from a healthcare perspective. Some labels enhance care, such as when a mother is described as “caring.” It is always nice to open a record to discover a “pleasant” patient is about to be seen. But is there a place in our communication for negative labels, e.g., demanding, hostile, manipulative, or drug-seeking? What does labeling a patient as a “T20” do to improve care, beyond that which a physician would quickly learn by perusing the record or examining the patient? Do such labels attempt to influence physicians’ opinions negatively, in a manner that is likely not to benefit the patient? Thus an ethical issue arises when such shorthand adversely affects a patient’s care, when a label makes it hard for us to listen to and evaluate a patient objectively.

In our case, some of the healthcare providers had cared for this patient in the past and had labeled her as being a drug seeking, T20, and noncompliant patient, whereas other providers caring for this patient had not yet met the patient but learned these labels from the electronic health records and their colleagues. It is difficult to ignore such labels before meeting the patient for the first time, and such negative labels can influence the physician’s emotions and potentially affect medical decisions.

No doubt the on-call resident was aware of the effects of labeling, and knew an objective evaluation was needed. Perhaps he or she was vulnerable, fatigued, angry at being burdened with what was presented as a manipulative, demanding patient. For whatever reason, the overnight team allowed the patient's drug seeking and other labels to influence medical decision making, allowing them to dismiss the complaint as illegitimate and manipulative. As a result, a serious medical condition was missed and treatment was delayed.

Physicians are called upon to uphold justice in the care being delivered. From Rawls to Beauchamp and Childress, it has been argued that physicians must practice with justice, which has been described as acting fairly, in an impartial, non-judgmental manner.^{1,2} Though the thoughts and attitudes of physicians may not be impartial and non-judgmental, their actions should be. The personality, behaviors, or decisions of patients range widely, from the very pleasant, model patient to the hateful, unpleasant, and protesting patient. However, it is our duty to treat these patients equally. No matter one's feelings about a patient, each patient should be given equal and adequate care for similar health issues, not judging the patient or deciding if the patient deserves attention and care. By allowing these negative labels assigned to the patients to alter the evaluation and treatment of patients, physicians ignore their commitment to practicing with justice.

Unfortunately, pain is subjective; not even the best physicians can reliably determine if a patient is experiencing true pain or if the patient is pain-free and manipulative. Since the percentage of people complaining of pain that is fabricated or exaggerated is unknown, one must avoid assuming that a patient complaining of pain is a manipulative drug seeker and should not receive opiate medication. Aswegan argues "the principle of justice guides us to evaluate and alleviate pain in a non prejudicial and non judgmental manner."³ Unfortunately, the manner in which the on-call physician dealt with the patient was anything but non prejudicial and non judgmental, denying the patient a right to be treated impartially, with justice.

The Declaration of Geneva states that, "the health of my patient will be my first consideration."⁴ The physician on-call failed to uphold this oath, making his or her first consideration the patient's motives for complaining of pain. The resident allowed mistrust of the patient, based on labels received from the nurse, to permeate medical decision making. Thus the resident did not see the need for giving pain medications or evaluating the cause of the pain.

Such patients are sometimes referred to with another label, that of being "difficult." Physicians perceive patients as difficult for many reasons, including patients who make irrational choices that are harmful to their health,

patients whose ailments cannot be cured, and patients whose beliefs, values, or personalities differ from those of the physician.⁵ One study revealed an association between labeling a patient as difficult and worse short term outcomes for the patient. This study found those labeled as difficult patients were found to have lower satisfaction rates with their medical care, have less trust in their health care providers, have a higher amount of unmet expectation, and are more likely to report a worsening of their presenting symptom in the weeks following their visit.⁶ These findings suggest that the labeling of a patient as difficult may not be as innocuous as some providers consider it; thus, there is a need for something to be done to improve these encounters with patients considered difficult to ensure that they are given equal care and fairness. Some have proposed that physicians should stop focusing on categorizing patients based on whether they feel the patients are difficult; when the urge to classify a patient as a difficult patient comes up, healthcare providers are encouraged to strive to be more empathic with the patient and keeps their minds open when hearing the patient's requests.⁷

Although labeling may be commonplace in healthcare, physicians must act to ensure the care they give is not adversely influenced by the labels. When labels are used, care should be taken to label behaviors, and to avoid labeling a patient. Physicians must remember the first rule: We are doctors; in being doctors, our job is to treat patients with justice and put their health first, regardless of the labels or other negative characteristics attributed to the patient.

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