Orman asked him how he was doing and he responded, “You know, my throat hurts.” Phonation was clear but he was stridorous. He was on a face mask with humidified air. His saturation was in the upper 90s. He was very apprehensive and retracting. He looked like he was suffocating but he could talk. They had a little time. He seemed anxious. Orman gave the patient 1 mg of midazolam to help him calm down and a racemic epinephrine nebulizer. He improved dramatically and went to the CT scanner. The CT neck was normal. An hour later, he was completely fine. What did he do for disposition? After four hours, the patient remained asymptomatic so Orman discussed it with his fellow attending and discharged him home with very explicit instructions for return and recheck in the morning.

Think of what stresses you out and own it. Become a genius in it so your weakness becomes your strength.

**Airway Corner: Hypoxemia**

*Darren Braude MD and Jerry Bodily MD*

**TAKE HOME POINTS**

- One third of intubations performed in the ER are complicated by hypoxia.
- Predictors of hypoxia include pre-intubation saturation less than 93%, more than one intubation attempt and prolonged intubation time (greater than 3 minutes).
- Positive pressure ventilation has a role in improving oxygen saturation prior to an intubation attempt despite the theoretic risk of regurgitation and aspiration.

- You are trying to secure an airway but your patient is becoming progressively more hypoxic. Can you predict hypoxia or avoid it?


**PMID: 26164643.**
There isn’t much literature describing the baseline desaturation rate in the emergency department. This study used a software package that allowed the authors to obtain continuous data during airway management.

Is hypoxia a problem in emergency department intubation? One third of intubations experienced desaturation defined as SpO2 less than 90%. The median duration of desaturation was 80 seconds. This study was not focused on outcomes but serves as a proxy measure.

What predicts desaturation? Pre-intubation saturation less than 93%, more than one intubation attempt and prolonged intubation time greater than 3 minutes.

During the study period, the vast majority of pre-intubation oxygenation utilized non-rebreather masks or bag-valve-mask ventilation. Most of these patients did not have apneic oxygenation in place.

Patients with a pre-intubation saturation less than 93% are a critical group. If you are using all of the techniques we have and are unable to increase the saturation past 93%, the patient is on a steep part of the oxygen-dissociation curve. When you give them medications for RSI and the patient becomes apneic, they will desaturate further. We need to consider other strategies to improve the oxygen saturation before proceeding with intubation, especially in patients we know are high risk for complications from hypoxia.

How can this study change your practice? For every airway, place a nasal cannula and use apneic oxygenation. Have the video laryngoscope and bougie ready. Try for success on the first pass as multiple attempts are a predictor of desaturation.

We have done a disservice in the movement of rapid sequence intubation from the operating room to the emergency department by emphasizing no positive pressure ventilation. Positive pressure ventilation increases the risk of gastric insufflation and the risk of regurgitation and aspiration. However, this is a theoretical risk. Hypoxia is a real problem.

We need to have a plan for positive pressure ventilation in these patients. If you place the patient on a non-rebreather with a nasal cannula underneath and still can’t increase their saturation, you need positive pressure ventilation.

This may be done in a variety of ways. You may proceed to RSI with a plan for bag-valve-mask intubation with PEEP. Delayed sequence intubation (this is procedural sedation where the procedure is oxygenation).

Try to get the intubation on the first attempt. Make sure the positioning is right. Do you have the best device? Are you going to use jaw-thrust or external laryngeal manipulation? Do you have a bougie? What is your plan? Who is intubating this patient? Who is most likely to get the intubation on the first attempt?

Pediatric Pearls:
Pediatric Plastic Surgery
Ilene Claudius MD, Maria LoTempio MD, Sol Behar MD, Anand Swaminathan MD

Take Home Points

- Ear lacerations with the potential for accumulation of blood can be bolstered with pressure dressings made from dental rolls.
- Closure of lacerations involving the nasal ala needs to treat the mucosa, cartilage and skin independently.
- Healing via secondary intention with referral for scar revision in 6-12 months may be preferable in lacerations older than 24-36 hours.
- Advise patients that the scar will look the worst at 6 months and then improve between 6-12 months.
- How are lacerations in children different from adults? Children tend to heal faster than adults. Depending on location, they also have a decreased incidence of infection. Scarring is a concern but there are things we can do to minimize scarring.
- What locations should prompt you to consult plastic surgery? It depends on your comfort level but possibly around the eye and nose. Ears, especially if it is through the cartilage or jagged.
- Can you sew the ear? Do you need to put stitches in the cartilage? What should you worry about? If it is a simple laceration and you can get good approximation, you can probably avoid suturing the cartilage. If you have to align the cartilage with a keystone stitch to make sure the laceration is even, go ahead. We worry about the perichondrium lifting due to a hematoma and causing distortion or necrosis of the cartilage.
- If you have a larger laceration with evidence of blood in that area, the ear should be bolstered by making sure all of the layers are secured between two pressure points. Keep this in place for 7-10 days to ensure that the blood is not accumulating and allow the layers to come together.
- Pressure dressings are used for an auricular hematoma even if it isn’t associated with a laceration.
- How can you make a bolster? You can use several dental rolls. Place one on the pinna and the other on the opposite side of the ear around the area of concern. Offset the rolls so there isn’t direct pressure on the area but they are still compressing. Secure them in place by stitching through the rolls and the cartilage. Make sure the dental rolls are coated with xeroform or bacitracin to make sure they are lubricated. Use any form of nylon such as 3-0 or 4-0. You will need a needle large enough to penetrate all the layers and secure the bolster. Pass the suture through the dental roll, back through the ear to the
You can send the patients home with a triple antibiotic ointment. This keeps the wound moist which will allow for a better healing process. This can be discontinued after 3 days.

- You can consider interventions to try to decrease scarring after about two weeks. You can use silicone strips available over the counter. However, these are expensive, costing about $50 a week, and are used for 6-8 weeks.
- Counsel patients or parents that the scars will look the worst at 6 months. They will start improving between 6-12 months.

**Strayerisms: Roc vs Sux**

**Reuben Strayer MD**

**Take Home Points**

- Patients with predisposing conditions may experience a large spike in potassium with administration of succinylcholine that may be life threatening.
- Unlike preoperative patients in the OR, emergency department patients may not be able to tell us of contraindications prior to intubation.
- There is no difference between succinylcholine and rocuronium in creating optimal intubation conditions when rocuronium is dosed correctly.
- Succinylcholine may cause complications such as masseter spasm, bradycardia and malignant hyperthermia.

- “...trends suggest that the use of rocuronium is on track to surpass succinylcholine for the routine paralytic choice. This alarming change is happening despite the 2015 Cochrane review still favoring succinylcholine to optimize intubating conditions and critical care literature emphasizing appropriate sedation in the immediate period postintubation as a factor in morbidity and mortality outcomes.”

- Over the last decade, there has been a move toward rocuronium for a variety of reasons. It is time for a refresher on roc versus sux...
- Succinylcholine is the original paralytic that took emergency medicine decades to win. It allowed us to intubate as effectively as anesthesiologists in the OR. Succinylcholine is an important drug that has been used to excellent effect over many decades and millions of patients.
- There are some problems. Most notoriously, succinylcholine causes a small rise in serum potassium in most patients. In a few other dental roll and back again. If you don’t have dental rolls available, you can roll the xeroform into multiple layers like a dental roll.

- **Have the patient follow-up in 18-24 hours to evaluate if the hematoma has accumulated.** If so, it will need to be drained.
- Update the patient's tetanus and send them home with antibiotics, typically amoxicillin-clavulanic acid.

- **What are some tips for lacerations through the nasal ala?** The nose has three anatomic structures that need to be addressed independently: the mucosa, the cartilage and skin. The nose is not as forgiving as the ear; any notching in the ala will be apparent when done wrong and difficult to correct. If there is a step-off, you need to have a plastic surgeon. If it is clean, simple and you feel comfortable sewing up the different levels, go ahead.

- You need an absorbable suture for the mucosa such as fast absorbing gut or chromic.
- You can use a 5-0 or 6-0 nylon or monocryl for the cartilage. Permanent sutures are often used in rhinoplasty.
- Plain nylon or prolene for the skin. This will be removed in five days.
- **Repair the mucosa first.** To repair the cartilage, use a key-stone stitch. Make sure it is truly approximated. If you are off, it will be very noticeable. Undermine the skin to make sure there is a tension-free closure.
- **What is the keystone stitch?** This is the first stitch that you place to make sure it is aligned, like the first stitch when re-pairing the vermillion border.

- **Facial lacerations may still be sutured within what period of time?** Lo Tiempo is comfortable suturing within 24 hours. The blood supply of the face is better than elsewhere in the body. The rate of infection is low if it is irrigated and debrided of non-viable tissue. If the laceration is older than 24-36 hours, it may be better to let them heal and refer for a scar revision in 6-12 months.

- **Tips for using dermabond.** Steri-strips may be a better option as they may make it easier to reapproximate the wound. Dermabond only works effectively when the two edges are reapproximated. Use sparingly at first and then add multiple layers.

- **How long should sutures stay in?** In general, nonabsorbable sutures should remain in for at least 5 days. Any areas subject to movement may require longer. Sutures in place for longer than 7 days can result in the appearance of a train track. It is ok to use absorbable sutures in kids who will have a hard time tolerating removal. You can use sterile saline to keep the absorbable suture moist and pliable while you are suturing.

- **What should you emphasize in your discharge instructions?** You can send the patients home with a triple antibiotic oint-
patients with predisposing conditions, it causes a huge potassium spike that causes malignant arrhythmias. These conditions are an absolute contraindication to succinylcholine. This is ok if you are doing RSI for a tummy tuck and the patient is well, calm, cooperative and can talk to you and tell you that they have multiple sclerosis, muscular dystrophy, myopathy, subacute stroke, burn, crush injury, spinal cord injury, etc.

- The patients we intubate in the emergency department can't tell us about these absolute contraindications because they are often dying and can't breathe. The literature is full of bad outcomes from these unrecognized conditions. No doubt, some patients who arrest and are pronounced dead during or after intubation died from succinylcholine-induced hyperkalemia and their deaths were attributed to whatever condition prompted intubation.

- The authors of this paper suggest that this contraindication regarding conditions that upregulate acetylcholine receptors has crept into a more general caution against using succinylcholine in patients who have or might have hyperkalemia. They offer evidence that succinylcholine may be used safely in hyperkalemic and dialysis patients. This would be valuable if there weren't an alternative to succinylcholine that doesn't affect the potassium.

- The article describes several studies illustrating a delay of post-intubation sedation in patients receiving rocuronium compared to succinylcholine. They proposed that this is a reason to favor succinylcholine. These studies demonstrate that you are more likely to do a poor job of post-intubation care if you use rocuronium. This is not a problem with rocuronium; it is a problem with post-intubation care. We all need to focus on optimal post-intubation care regardless of the paralytic you use.

- Use an intubation order set that ties post-intubation sedation to the procedure. When you use rocuronium for RSI, know that paralysis will outlast sedation and do proper post-intubation care. Use rocuronium properly. This includes proper dosing.

- The paper describes that succinylcholine provides optimal intubating conditions faster than rocuronium. This is only true if you use the wrong dose of rocuronium. For many years, the recommended dose was 0.6mg/kg. Rocuronium should be used at 1.2mg/kg. The Cochrane review reports, "We found no statistical difference in intubation conditions when succinylcholine was compared to 1.2 mg/kg rocuronium." 


- Many intubation medicine kits have a 50mg vial of rocuronium which is 0.6 mg/kg in an 80kg patient. You need the 100 mg or 250 mg vial.

- The shorter duration of action of succinylcholine is perceived as an advantage. This is a disadvantage. Succinylcholine enthusiasts claim an advantage in the “can’t intubate, can’t ventilate” scenario. Succinylcholine will wear off. This may be true for an elective surgery but emergency medicine doctors do not intubate patients for elective surgeries. If you think sux wearing off will rescue you from “can’t intubate, can’t ventilate”, you are making a bad decision.

  ○ We are more inclined to attempt RSI on patients who might be better managed more cautiously with alternate techniques because we think succinylcholine is safer. We fail to place or delay placement of a rescue device. We fail to initiate a surgical airway until it is too late.

  ○ Even if it was true that succinylcholine wears off fast enough that patients will start breathing before hypoxia, how does this help you? Patients who require intubation in the emergency department require intubation.

- Consider this in the much more common "can't intubate, can ventilate scenario". In this situation, succinylcholine is dangerous. You re-establish oxygenation, make a change to your airway strategy and try again. The worst thing that can happen is return of muscle tone during your attempt to intubate again. This will make the patient more difficult to bag and can sometimes lead to vomiting, turning a stable airway into a disaster. The long duration of rocuronium is its most important advantage. When you push 100mg of rocuronium, you know your patient will be paralyzed until you get a tube into the trachea.

- There are a variety of rare problems with succinylcholine that are more common with administration of a second dose. For example, masseter spasm, when the jaw clamps shut and can’t be opened. Succinylcholine may induce bradycardia, especially in kids. Malignant hyperthermia is rare, but it is out there and you are not screening for it.

  ○ Rocuronium does not cause fasciculations, which shorten desaturation time and lead to worsened outcomes in brain injury.

  ○ You should consider succinylcholine over rocuronium in patients with status epilepticus, when you want to know as quickly as possible after intubation whether seizures are ongoing.

- The FDA just approved sugammadex, a rocuronium reversal agent, which restores muscle activity within a few minutes. This is being sold as a solution for can’t intubate, can’t ventilate but that is not what emergency medicine doctors need. We can use it after the patient is intubated to closely follow the neurologic exam.

- Succinylcholine is a good drug. It has been used safely and effectively for a long time. However, for emergency department intubation, rocuronium is a better drug. It is safer and more effective.
Marijuana Comes of Age
Jessica Mason MD

Take Home Points

- Edible marijuana has a slower onset with lower serum concentrations and longer duration of action compared to smoking. The delayed onset may encourage patients to ingest more than desired.
- Legal limits based on blood levels have no significance as metabolism and tolerance may vary widely.
- Packaging of edibles may be appealing to children. Intoxicated children may experience more CNS and respiratory depression than adults.

- Marijuana is now legal for recreational use in adults over age 21 in Colorado, Oregon, Washington and Alaska. How does this affect us in the emergency department?
- Edibles are increasingly common.
  - Smoking marijuana has a more rapid onset and higher bioavailability than edibles. The bioavailability of smoking marijuana is between 20-50% and depends on the strength of the marijuana plant and skill in smoking. The onset is rapid and it lasts for about 4 hours.
  - Edibles have slower onset, lower serum concentrations and longer duration of action. It can take 1-2 hours for onset and the serum concentration may not peak until 2-6 hours after consuming the product. The serum concentration is lower overall than if it is smoked. The bioavailability of edibles is about 4-12%. The duration of action can last up to 12 hours.
  - There is a legal limit in Colorado of 5ng/mL. What does this mean? Nobody knows. People metabolize marijuana differently. Women and men metabolize marijuana at different rates and habitual users may have higher tolerance. It also depends on the source plant.
  - A small study compared two regular marijuana users after smoking a marijuana cigarette. Marijuana levels were measured 2 hours later. Both had plasma levels that fell below 5ng/mL.
  - How many milligrams is the maximum per serving? Oregon is attempting to pass a law limiting the maximum per serving to 5mg and the maximum per product of 50mg. A cookie may contain five servings and patients are unlikely to divide the cookie into fifths. The delay until onset of the effect may encourage the patient to eat more. This can cause patients to accidentally overdose and end up in the emergency department.
- How has marijuana legalization impacted the emergency department?
  - The number of ED visits for cyclic vomiting syndrome has doubled since legalization. Accidental ingestions in pediatric patients under age 12 rose significantly. Calls to the poison control center increased by 30%.
  - Edibles such as cookies, brownies and candy bars may be appealing to children. Edibles in candy bar form have packaging that is designed to mimic the packaging of real candy bars.
  - Intoxicated children may present differently than intoxicated adults. They may experience more CNS depression. They may experience airway compromise in severe overdoses. Pediatric patients with overdose should be observed until their symptoms resolve.
- Orally ingested THC may be converted to an active metabolite which may be more potent and better at crossing the blood brain barrier.

LIN Sessions: Rapid Team Building
Michelle Lin MD and Christopher Peabody MD

Take Home Points

- Safety strategies employed by other injuries may be difficult in the ER due the challenges of our particular environment such as inconsistent teams.
- Pre-shift preparation can help prepare your team for the shift. Learn team member names and assign roles early.
- How do we deal with patient safety in the emergency department? We are in an environment where we are unable to stop our input (like at a car plant) but we are judged on our ability to produce.
- We have interesting constraints in the emergency department, especially regarding teams. We are unable to choose our team. We show up for our shifts and we may not have met the entire team. We work in ad hoc teams to take care of the most critical moments in a patient’s life. Most of the teamwork literature talks about the importance of training together and removing ineffective team members. We don’t have the ability to do this.
- Teams need leadership as well as a shared mission and vision.
- What teams are high functioning?
If the emergency department is to become a high-functioning organization, patients with the same complaint should receive the same care and have the same outcomes. In reality, it is highly variable. It depends on who is on that team during that shifts. If you get a team that is high functioning, you will get better care. How can we do this?

- Examples of high functioning teams include cockpit crew management, SWAT teams, NASCAR crew members and firefighters. None of these fit the emergency department.

- As Bob Wachter says, the safety culture in medicine is something that everyone talks about but no one does anything about. We got a lot of information about changing safety culture but it doesn’t result in meaningful change. How do we set the safety tone for someone coming into a new environment with team members that they haven’t met previously?

- Peabody focuses on the pre-shift preparation.
  - While working at three sites, he didn’t know everyone’s name so he asked the charge nurse to go over names and roles prior to the shift. Peabody gets everyone together in a circle prior to the start of his shift and asks them to introduce themselves and their role. He asks if there are any operational issues that will present a barrier to care. For example, the x-ray tech is unavailable or there isn’t any patient transport. You won’t know unless you ask.

- Peabody ends with the three mantras of emergency medicine; “We keep our patients safe, we get each other’s backs and you have the shift of your life.”

- The number one priority is to take care of patients and we need to do it in a safe manner. It takes discipline and consistency.

- “We get each other’s backs.” To create a team and atmosphere focused on patient safety, we need to encourage others to speak up when they see unsafe conditions. This includes everyone; nurse, clerk, resident, and medical student. If the nurses bring an issue to you, go and address it. Be courteous. “Thank you so much for coming to get me. I think it is actually this, but I really am glad that you brought it up.”

- If you call a consultant, introduce yourself. “I’m Christopher Peabody, one of the attendings. Welcome to the emergency department. Thanks so much for seeing our patients. Let us know what you think before you leave.”

- “Have the shift of your life.” Up to 80% of residents are burned out by the time they finish residency. This persists after graduation from residency. Our field has one of the highest burnout rates in medicine. About 60% of emergency department doctors describe themselves as burned out.

- There is a great TED talk by Shawn Achor on the happy secret to better work. He is a psychologist. We need to remind ourselves that we have made it. Be happy with what you are doing right now. Success will follow. If your brain is happy, you will release dopamine which enhances learning, reliability and decreases burnout. You have a 19% better chance of getting the correct diagnosis.

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**Can You Pick Your Friend’s Nose?**

Patrick Bafuma PA

### Take Home Points

- Midazolam can improve pain associated with NG tube insertion in addition to lidocaine.
- 2mg appears to be a more effective dose than 1mg.
- Elderly patients and those with chronic lung disease may be at increased risk of complications so you may consider starting at a lower dose and titrating up for effect.

  - This study was small; there were only 13 patients in the control arm and 10 in the experimental arm.
  - What did they do? All patients were premedicated with 1 mL of intranasal lidocaine 5% and 0.5% phenylephrine in each nostril followed by either placebo or 2mg of IV midazolam. The NG tube was placed within the next five minutes.
  - What did they find? Patients who received the midazolam reported pain scores of only 21 on a 100mm visual analog scale compared to 52 in the control group. For discomfort, midazolam was favored with scores of 28 compared to 54. 92% of patients who did not receive midazolam experienced significant discomfort versus 40%. 77% in the placebo group expressed significant pain versus 30% in the midazolam group. Placement was much easier in the group that had received midazolam. This study polled the research associate to determine if they felt the patient was uncomfortable. Those in the midazolam group seemed to be less frequently uncomfortable (46% versus 30%).
  - This trial was suspended after 51 cases of which only 23 qualified for the study. Why? Several ED clinicians felt that the use of midazolam prior to insertion was superior to topical anesthetic alone and they didn’t want the patients randomized to placebo.
The authors attempted to evaluate the use of 1mg of midazolam in patients over the age of 60, those with known pulmonary disease and saw no effect. This dose did not reduce pain or discomfort.

The study concluded that premedication with 2mg intravenous midazolam reduced the pain of NG tube insertion in ED patients without the need for full procedural sedation. If you have to place an NG tube, hopefully your hospital policy allows the administration of IV midazolam without considering it procedural sedation. If you have to place an NG tube in a patient over 60, consider a dose of 1mg followed by 0.5mg doses up to 2 mg.

Understanding the Frequent Flyer
Paul Jhun MD, Christopher Peabody MD and Maria Raven MD

Take Home Points
- Patients with alcohol abuse frequently have severe medical problems associated with their use. They are at risk of liver disease and intracranial hemorrhage.
- Frequent ED users are just as likely to access primary care as other patients.
- The complex medical conditions presented by these patients may not be appropriate for a primary care setting.

- It is a common perception that frequent emergency department users are presenting for issues related to substance abuse, mental health or minor medical conditions that would be better addressed in the primary care setting.
- They looked at data in Medicaid beneficiaries have higher rates of emergency department use. What did they find? Although there is a subset of patients with mental health issues or substance abuse, they aren't presenting for these issues as much as for real, chronic illness. They have high rates of hospital admission for these diseases. Many are trying to access primary care. When they present to the emergency department, they may need to be there.
- Patients who present to the emergency department for alcohol intoxication are likely to have other medical problems associated with their alcohol use. They may have severe vitamin deficiencies and liver disease. Falls may increase the risk of intracranial hemorrhage.
- These patients are viewed as unlikely to follow-up with primary care for a variety of reasons. However, the study found that frequent users are just as likely to access primary care as other patients. They also found that frequent users were more likely to have a primary care appointment within thirty days of their emergency department visit as non-frequent users.
- Why do they keep coming back? Primary care providers have 15 minutes on average for the patient encounter. They are dealing with patients with complex medical issues who may have behavioral issues as well. This is a lot to handle in 15 minutes. There may be some primary care referral to the emergency department for acute exacerbations of chronic issues. Also, these patients can be very sick and may need to visit the emergency department.
- Raven consults for the San Francisco Health Plan which is a Medicaid managed care plan. They have a program for frequent users based on case managers. Case managers have a high school degree and are supervised by social workers. They have a caseload of patients and they are out on the streets and in the community. If they find out one of their patients is in the emergency department, they will go see them in the emergency department and provide collateral information to the emergency staff. They can assist in safe discharge.
- Washington State is taking data from all the emergency departments in a given region and pooling it. When a patient presents to the emergency department, the physician can access the patient's data from the whole system. This may decrease duplication of work-up and save time. Your frequent ED users aren't just using your ED; they are using other EDs and parts of the health and social services system.
- Regionalization can decrease the burden on the individual emergency physician. When a patient in the program presents to the emergency department, you can access their information and contact their case manager for help.

Critical Care Mailbag: Phenylephrine in Sepsis
Rob Orman MD and Scott Weingart MD

Take Home Points
- Norepinephrine is preferred over phenylephrine in tachycardic patients with septic shock.
- Vasopress should be considered as a second line agent and may allow titration down of norepinephrine improving tachycardia.
- Epinephrine in low doses may serve as an inotrope.
Phenylephrine in septic shock? Some use phenylephrine when patients are tachycardic and they don’t want the beta stimulation of norepinephrine. This has been studied and norepinephrine seems to be better.

Why? Patients also get increased inotropy which phenylephrine lacks. The Surviving Sepsis campaign’s recommendations are to not use phenylephrine as the primary agent.

Tachycardia in a septic patient is interesting. Sometimes the tachycardia improves even if you give an agent with beta stimulation, such as norepinephrine or epinephrine. The patient has increased cardiac output and vasoconstriction.

Don’t avoid norepinephrine in tachycardic patients.

If you have a patient on norepinephrine that is profoundly tachycardic but the norepinephrine is working, should you switch them to another agent? This is a difficult decision. If the patient is 25 years old with sepsis from MRSA and a heart rate of 150, leave them. If you have a 90 year old with baseline heart failure and an ejection fraction of 10%, you might consider switching agents.

However, first consider if it is actually sinus tachycardia?

- If it is atrial flutter or fibrillation, you can consider cardioverting the patient or starting amiodarone. The antidysrhythmic and rate control may lower the heart rate allowing you to continue using the norepinephrine.

- You could consider doing an esmolol drip along with the norepinephrine, although Weingart doesn’t recommend it. There is some supporting literature but it is not robust.

Before switching to phenylephrine, add a fixed dose of vasoressin. This is pure vasoconstriction that does not increase the heart rate. It has a much better evidence base than phenylephrine. Use a dose of 0.03 units/min - this is not titrated further. This may allow you to decrease the norepinephrine.

If all this fails, you might consider switching to phenylephrine but this would be extremely rare.

Don’t hesitate to add vasoressin to norepinephrine. There is some emerging literature supporting this although Weingart does not do it routinely.

Is there any indication for starting dobutamine? Dobutamine provides inotropy and does not cause vasoconstriction. However, Weingart prefers to use epinephrine in doses targeted for inotropy. At low doses, epinephrine is an excellent inotrope. He uses 0.01-0.08 mcg/kg/min.

The Schedule Hack
Rob Orman MD, Mel Herbert MD and Dike Drummond MD

Take Home Points

- Life balance is a problem for emergency physicians.
- Maintain a calendar that has life events in addition to your schedule.
- Date nights are important. Maintain your relationships.

How do you make your schedule? If you are a physician and you don’t put some boundaries around your career, you don’t have much room. Your career is like a large gorilla. If you want life balance, you need to plan for life balance. Life balance is not a problem. Problems have solutions. Life balance is a dilemma and a balancing act. You address dilemmas with strategies.

You need a paper calendar with the month at a glance. Put your life in the week ahead on the schedule. What about your workouts, date night or a free hour for scheduled spontaneity? Everyone has a weekly bucket list item that changes your reality (for example, riding your bike). Place this in your schedule every week. Take a picture of this with your cellphone.

Now you have a life calendar. This makes it possible to say no. “Can you take a couple extra hours on Thursday”? If you don’t have your life calendar, you will say yes because you don’t want to seem like a slacker or weak.

There are computer programs you can use. However, the physical act of writing makes it real.

If you have your life calendar you can look at it. “I am sorry I can’t. I have plans.”

This isn’t magic. You might say yes. You may have a debt to pay or want someone in your debt. You might not be comfortable saying no. If you say yes for whatever reason, you can see who you need to reschedule with.

Practice saying no.

This will give you a more balanced week every single time you use it. It takes discipline and strategy.

Date nights are important. If you don’t have a strategy to keep focus on your primary relationship, it wanes over time. Things get stale. Don’t do it less than twice a month.

If it’s not on your calendar, it won’t happen.
Take Home Points

- Although necrotizing fasciitis may be categorized depending on the pathogen, the treatment is rapid surgical debridement and broad spectrum antibiotics.
- The only consistent risk factor for mortality is time to surgical debridement.
- Patients with hemorrhagic bullae are highly likely to have *Vibrio vulnificus*. Patients with suspicion of *Vibrio* should receive doxycycline.

**CASE**
A 61 year old Jamaican woman presented with two days of dyspnea and abdominal rash preceded by abdominal pain and vomiting for two weeks. She was hypoxic, hypotensive and required intubation and vasopressor support. CT revealed diffuse ground glass opacities with patchy infiltrates in the lung, distended stomach and duodenum and extensive abdominal wall and left thigh subcutaneous emphysema. An emergent fasciotomy confirmed necrotizing fasciitis. Blood and wound cultures grew *E. coli*. EGD revealed gastric mucosal swelling and denuded duodenal mucosa with subepithelial hemorrhages. **Diagnosis?** Disseminated strongyloidiasis.

- Necrotizing fasciitis or necrotizing soft tissue infection (NSTI) is a rapidly spreading, invasive soft tissue infection that dissect along fascial planes and carries a high rate of morbidity and mortality. The mortality rate is usually 25-35% although some studies have shown rates as high as 76%. With delay in diagnosis or definitive treatment, mortality rates approach 100%. This is a rare diagnosis. Most of the literature is based on case presentations or retrospective data.
- NSTIs can be broken down into three different types based on the infectious etiology.
  - **Type I** is the most common and characterized by polymicrobial pathogens. It usually involves the trunk and limbs. There are multiple associated risk factors including diabetes, obesity, immunocompromised status and trauma (including recent surgeries).
  - **Type II** is the second most common and characterized by infection with group A beta-hemolytic Streptococcus (GAS) alone or with *Staph aureus*. This usually affects the limbs.

These patients may present with toxic shock syndrome. Although less common than Type I, this subtype usually affects younger, healthier, immunocompetent patients. IV drug use and “skin popping” is a risk factor.

- **Type III.** This is not universally regarded as a distinct subtype but some sources classify NSTIs due to *Vibrio vulnificus*. Infection is usually due to penetrating trauma with contaminated salt water. Also consider in cirrhotics with a history of oyster consumption.
- **Don’t worry about the subtype, the management is the same.**
- **Have a high index of suspicion.** The only consistent risk factor for NSTI mortality is time to operative debridement. Survival plummets in patients who don’t go to the operating room within 24 hours (and some at 12 hours) from emergency department presentation. Insisting that the patient goes to the OR rapidly can mean the difference between life and death.
- **Risk factors include** surgery or trauma at the site of infection in the last 90 days, diabetes, cardiovascular and peripheral vascular disease, IV drug use, obesity, cancer and cirrhosis.
- **The diagnosis of necrotizing fasciitis is clinical.** The gold standard is the appearance in the operating room. Signs specific to NSTI are pain out of proportion to the exam, tenderness beyond the borders of erythema, crepitus, hemorrhagic bullae, hypotension (SBP <90mmHg) and altered mental status. **Hemorrhagic bullae almost guarantees necrotizing fasciitis and the majority were due to *Vibrio vulnificus***.

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema</td>
<td>70.7</td>
</tr>
<tr>
<td>Warmth</td>
<td>44.0</td>
</tr>
<tr>
<td>Pain or tenderness</td>
<td>79.0</td>
</tr>
<tr>
<td>Swelling</td>
<td>80.8</td>
</tr>
<tr>
<td>Bullae</td>
<td>25.6</td>
</tr>
<tr>
<td>Crepitus</td>
<td>20.3</td>
</tr>
<tr>
<td>Skin necrosis</td>
<td>24.1</td>
</tr>
<tr>
<td>Fever &gt; 37.5°C</td>
<td>40.0</td>
</tr>
<tr>
<td>Hypotension</td>
<td>21.2</td>
</tr>
</tbody>
</table>

- **Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC)** has been used to risk stratify for necrotizing fasciitis based on a combination of laboratory results including WBC, CRP, hemoglobin, sodium, creatinine and glucose. This is used to classify patients as low, moderate, high or very high risk of necrotizing fasciitis. The weighted scoring system was retrospectively derived and validated in the same study with two patient cohorts and performed relatively well. **Unfortunately, multiple attempts to replicate these results have failed.** At best, the sensitivity is 80% and there are cases of necrotizing fasciitis with LRINEC scores of zero. You can’t use a low LRINEC score to rule out the diagnosis.
• How good is radiographic imaging at detecting subcutaneous gas?
  ○ We use x-ray frequently but it is not great at finding subcutaneous gas. Only about 25% will have findings on x-ray. If you see gas (Ed note: gas along the fascial planes), you have made the diagnosis but you are unable to rule it out if it is not present.
  ○ CT scan is better but not great. MRI is better than CT but is not realistic for most.
  ○ Do not delay starting antibiotics or consulting a surgeon for imaging.
• Perineal necrotizing fasciitis is the second most common location. Diabetics and alcoholics are at particular risk for this type of infection. Consult urology as well as general surgery so they can do surgical management jointly.
• Necrotizing fasciitis is much less common in pediatric patients.
  ○ There is some association with complications from varicella.
  ○ Neonates with umbilical cord stump inflammation (omphalitis) may be deceptively well appearing. Don’t be deceived by a well-appearing child. Omphalitis can rapidly turn into necrotizing fasciitis and result in death within 24-72 hours. These children require aggressive resuscitation, antibiotics and a stat surgical consult. These children should be admitted for observation. If you aren’t sure if the redness is caused by the pressure of the diaper, observe the child. Redness due to pressure from the diaper should improve with time, omphalitis won’t.
• Antibiotics.
  ○ The Infectious Diseases Society of America advises broad spectrum antibiotic coverage. They recommend treating based on the subtype of the NSTI. This isn’t practical or obvious early on in the disease course. It is reasonable to start treating with clindamycin, vancomycin and piperacillin-tazobactam until coverage can be narrowed.
  ○ Clindamycin is particularly important as it inhibits ribosomal formation of toxins which allow spread of the bacteria along the fascial planes.
  ○ If you see hemorrhagic bullae or a history concerning for Vibrio vulnificus remember to add doxycycline.

CASE CONCLUSION
The patient responded well to seven weeks of ivermectin and three weeks of albendazole. She recovered and is worm free.

Paper Chase 1: Intubating in Analog and Digital
Sanjay Arora MD and Michael Menchine MD

Take Home Points
• A randomized controlled trial of direct versus video laryngoscopy in the emergency department showed no statistically significant difference in first pass rates.
• There does appear to be a small improvement in first past success but this is not statistically significant.
• We should be trained in video laryngoscopy but direct laryngoscopy remains a reasonable option.

• The bottom line: there was no statistically significant different in first pass success between direct and video laryngoscopy.
• The majority of us trained with direct laryngoscopy. The rise of video laryngoscopy has been swift and currently about 30% of intubations are performed with video laryngoscopy compared to 1% 10 years ago. Some experts argue that direct laryngoscopy should no longer be considered first line for intubation. This is driven by observational studies in the emergency department showing better first pass and success rates. None of the emergency department studies have been via randomized controlled trial.
• The authors conducted a non-blinded, non-randomized controlled trial at Hennepin County Medical Center. They had an exception from informed consent and proceeded with community consent. Subjects were enrolled only if direct laryngoscopy was planned as a first attempt. They were then randomized to direct laryngoscopy versus video. All patients were intubated using the C-MAC but they covered the video screen in patients randomized to direct laryngoscopy.
• The primary outcome was success of intubation on the first pass. What did they find? 198 patients were randomized. The first pass success rates was 86% in direct laryngoscopy group. It was slightly higher in the video laryngoscopy group at 92% but this was not statistically significant. This difference was maintained even in difficult airways (82% versus 87%).
• The authors reported this as a negative trial. However, the results do appear consistent with prior literature. There appears to be a small improvement in first pass success rate (about 6%) with video laryngoscopy although this is not statistically significant. This is a little more evidence that emergency physicians should get trained in video laryngoscopy techniques. Direct laryngoscopy is very effective and a completely reasonable choice.
**Paper Chase 2: Fluid Volume in Pediatric DKA**
Sanjay Arora MD and Michael Menchine MD

**Take Home Points**
- A randomized controlled trial on pediatric patients with DKA found a 20cc/kg bolus compared to 10cc/kg had faster time to metabolic recovery and no increase in adverse events.
- This was a small study and unlikely to detect a difference in rates of cerebral edema.
- The majority of guidelines still recommend 10cc/kg, however, 20cc/kg appears to be safe and effective.


- The bottom line: 10cc/kg and 20cc/kg were compared as the initial fluid bolus in pediatric diabetic ketoacidosis. Children receiving a 20cc/kg bolus had a faster time to metabolic recovery with no increase in adverse events.

- This is controversial topic. Some believe that more rapid rehydration in DKA can restore hormonal imbalances and resolve ketosis more quickly. Others believe that faster rehydration leads to adverse events, in particular cerebral edema. Most pediatric organizations recommend limiting rehydration to 10cc/kg.

- There is not much prospective supporting data until now. This is a randomized controlled trial of two different fluid regimens in pediatric diabetic ketoacidosis. The high volume group received 20mL/kg of normal saline over the first hour and then 1.5x main-tenance. In the low volume group, patients received 10mL/kg of normal saline over the first hour followed by 1.25x maintenance. Both groups received similar insulin regimens. The only difference was the initial bolus. They obtained labs including potassium, bicarbonate and beta-hydroxybutyrate levels every hour.

- The primary outcome was time to bicarbonate of 15 and pH to 7.3.
  - 50 children were randomized. The average age was 10 years old. Patients in the high volume group were sicker on average. They adjusted for this in the analysis.
  - Patients in the high volume group were two times more likely to have both pH and bicarbonate levels normalize. They were 2.5x more likely to have just the pH normalize and 1.2x more likely to have just the bicarbonate normalize.
  - Adjusted length of treatment and time to discharge were both shorted in the high volume group.

- There were no adverse events such as cerebral or pulmonary edema.
- This is pilot data but hopefully will allow for future studies with larger differences in amount of fluids. Larger trials are currently ongoing. 20cc/kg appears safe and effective.

**Paper Chase 3: Hypertonic Saline in Brain Injury**
Sanjay Arora MD and Michael Menchine MD

**Take Home Points**
- A randomized controlled trial found hypertonic saline had no benefit in mortality or improvement in intracranial hypertension in patients with severe brain injury.
- There appears to be little risk of harm if your consultants want to use it.


- The bottom line: hypertonic saline was found to have no benefit in mortality or improvement in intracranial hypertension in patients with severe brain injury.

- Head trauma is a leading cause of death and severe and permanent disability.
  - Hyperosmolar fluids are commonly used to reduce intracranial pressure. These pull fluid into the vascular space from the cerebral space.
  - Mannitol is most commonly used. However, there is concern that mannitol will lead to hypotension, volume depletion and secondary brain injury because it is an osmotic diuretic. This may be especially true in patients bleeding into other areas as well.
  - Hypertonic saline should address some of these issues in theory. It is able to draw fluids into the vascular space but is not a diuretic so there is less risk of developing later onset of hypotension.

- This study was a standard systematic review of the literature and subsequent meta-analysis of the data using relatively state of the art techniques. They only included randomized controlled trials of patients with severe brain injury with GCS of 8 or less. The outcomes of interest were death, intracranial pressure control and disability.

- What did they find?
  - They found 11 studies including 1820 patients. Hypertonic
saline was always used but the comparators included Lactated Ringers, bicarbonate, mannitol and normal saline.

- Four studies looked at mortality and found no benefit. The odds ratio of death was 1.
- There was no difference in intracranial pressure (about 1 mmHg) between hypertonic saline.
- There was no difference in functional outcome.

• What does this mean? Our initial enthusiasm for hypertonic saline in the management of patients with severe brain injury is not supported by randomized controlled trials. In general, there is no improvement in mortality, functional outcome or other surrogate outcomes. There did not seem to be a difference in adverse outcomes however, so if your neurosurgeon or trauma surgeon wants it, it probably won’t harm.

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**Paper Chase 4:**
**Is Longer Better in PTX Decompression?**
Sanjay Arora MD and Michael Menchine MD

**Take Home Points**

- Longer angiocatheter needles may be more successful in emergency needle thoracostomy.
- About 80% of patients have a chest wall thicker than 5cm.


- The bottom line: longer needles were found to have higher rates of clinical improvement without increased rates of complications in trauma patients with suspected pneumothorax and tension physiology.

- Definitive management of pneumothorax with pending tension is opening the pleural space. If you need to do it quickly, you may reach for a needle. Success may be mixed. ATLS recommends using a 5cm angiocatheter. However, larger patient body habitus may limit the utility of a shorter angiocatheter.

- This was a retrospective review of all adult trauma patients presenting to a Level 1 trauma center via the trauma registry. All patients receiving needle thoracostomy either in the field or emergency department during resuscitation were included. In 2011, they made a protocol change to stock field crash carts with 8cm angiocatheters. Successful needle thoracostomy was defined broadly and basically was any evidence of improvement (improved breath sounds, improved respiratory effort, etc) which may be subject to bias.

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**Paper Chase 5:**
**A Case of Steroids Not Helping**
Sanjay Arora MD and Michael Menchine MD

**Take Home Points**

- Long term dexamethasone in patients with HIV-associated cryptococcal meningitis is associated with dramatically increased mortality.

- Patients with suspected cryptococcus meningitis should not be given steroids.


- The bottom line: adjunctive dexamethasone caused worse clinical outcomes compared with placebo in patients with HIV associated cryptococcal meningitis.

- Adjunctive glucocorticoids have been shown useful in the treatment of meningitis in limited clinical settings such as the treatment of acute bacterial meningitis caused by *Streptococcus pneumoniae* when given immediately prior to antibiotics. Glucocorticoids have been shown to reduce mortality in this
setting as well as hearing related sequelae in *Hemophilus influenzae* type B meningitis.

- The benefits are less clear in other situations. A large study in Vietnam found no effect of an intention to treat with steroids in patients with presumed bacterial meningitis. However, when they looked at the subset of patients with confirmed bacterial meningitis, they found a benefit.

- **Why is this important?** If it shows benefit in patients with bacterial meningitis but no effect in all comers, it must be harming someone. Who?

- This was randomized controlled trial of patients with cryptococcal meningitis and HIV proven on lumbar puncture. They received dexamethasone or placebo in addition to the usual antifungal treatment. The dexamethasone treatment was continued for 6 weeks but some points may be applicable to emergency medicine.

- The primary outcome was mortality at 10 weeks. Secondary outcomes included the level of disability at 10 weeks and 6 months.

- **What did they find?** They planned to enroll 880 patients. The trial was stopped after 451 patients due to increased mortality associated with dexamethasone. At the trial termination, 47% of the dexamethasone group had died within 10 weeks versus 41% in the placebo group. This yielded a number needed to harm of 16.

- The jury is still out on which patients with suspected meningitis should get empiric glucocorticoids. These data suggest it should not be given to patients with suspected cryptococcus.

A Sensible Approach to TIA – Part 1
Rob Orman MD, Anand Swaminathan MD and Cam Berg MD

**Take Home Points**

- Most patients with TIA do not benefit from hospitalization and may have an outpatient workup.

- MRI can assist in determining disposition if available from the ED and may help avoid admission.

- The most common predisposing condition is a new cardiac arrhythmia. Look for atrial fibrillation.

- A patient presents with weakness that has now resolved. How should we manage patients with TIA?

- What is a TIA? The definition has changed over time. This is a transient neurologic deficit that results in spontaneous resolution. A diagnosis of TIA does not require a negative workup or negative neuroimaging. This is a clinical definition. This is a patient presenting with symptoms consistent with a vascular territory stroke that improved.

- A small proportion of patients may inappropriately receive thrombolytics for stroke mimics such as TIA. The randomized controlled trials only showed improvement at 30 days and rapid resolution after thrombolytics may because it was a TIA.

- What should you do for the patient who does not qualify for thrombolytics and has improved by the time of your assessment?

- Can we reliably predict stroke after TIA? No. Is the ABCD² score useful for us? Not really.

- There has been recent interest in the use of clinical decision scores in TIA. ABCD² is one of the most commonly described scores (age, blood pressure, clinical features and diabetes). However, external validation at different sites found variable results. Interrater reliability is inconsistent. This gives an estimate of risk at 2 days, 7 days and 90 days.

- What is the risk of stroke after TIA? The annual rate ranges from 2-4% to as high as 20% a year depending on patient population.

- What is the benefit of admitting the patients? Some feel that admitting the patient may result in expedited thrombolytic therapy if the patient has a subsequent acute stroke in the next 48 hours. Outside of this, there is not much benefit of hospitalization compared to a clinic. We need to consider reversible conditions, treatable pathology and address these variables as they pertain to the patient.

- What can we do for these patients? Few patients benefit from hospitalization. We need to act like neurologists and evaluate TIA symptoms, vascular distribution and pattern to help determine if the patient has modifiable risk factors that may lead to benefit.

- The most common predisposing condition is a new cardiac arrhythmia. This is usually atrial fibrillation. We are experts at diagnosing, treatment and risk stratifying atrial fibrillation. We often forget that one of the highest yield tests in TIA is an EKG. Telemetry may rarely identify conditions not identified in EKG.

- **Consider the anatomy.** TIs occur due to transient cerebral ischemia. This may result from a thrombotic event or critical vascular stenosis. Classically, we consider carotid stenosis as a risk factor but patients may have stenosis of other vessels including intracerebral vessels. We have studied different interventions in thrombosis, stenosis and occlusions. Intervention is only beneficial when used in the extracranial, anterior circulation (i.e. the carotid). Interventions in the posterior circulation do not benefit patients and may result in harm.

- Does the deficit reported in the patient map to the anterior or posterior circulation? If it is anterior, you should obtain im-
aging of the carotid arteries and this may be done either in the
emergency department or as an outpatient.

- There are multiple predisposing medical conditions but only
one has short term benefit from treatment. Hyperthrombotic
states should be treated with antiplatelet agents. Treatment of
hypertension, hyperlipidemia, hyperglycemia and lifestyle mod-
ifications such as smoking and alcohol cessation, physical ac-
tivity and weight loss have proven benefit but are not on the
timeframe of an ED visit. These can happen as an outpatient.

- What is the ideal work-up of a patient with a TIA?

  - Recent data suggests that urgent or emergent MRI is helpful
    in risk stratification. You need the basic non-contrast, diffu-
sion weighted brain series. This may be done in 10 minutes.
    If the MRI shows ischemia, the patient is at very high risk
    of short term of stroke. Some data shows a risk of stroke
    of around 10% in the next 72 hours. This is better than the
    ABCD² score and allows you to rule out other causes such
    hemorrhage, trauma, mass lesions, etc.

  - Generally speaking, patients with TIA should have a normal
    MRI. About 10% of cases with clinical improvement have an
    abnormality noted on MRI. This is a TIA with diffuse weighted
    imaging abnormality. These patients should be admitted to
    the hospital.

  - The carotid arteries may be imaged on MRI. This is a better
    test than the ultrasound. If you have the ability, it is reason-
    able to obtain an MR angiogram at the same time as MRI.

  - However, most do not have the option to obtain an MRI at all
    hours for this level of neuroimaging and the use of MRI is con-
    troversial. What if you do if you do not have MRI available?

  - MRI does not change your management although it may guide
    your disposition. If you do not have an MRI available, you need
    some form of brain imaging. You need to obtain an electrocar-
diogram and consider other predisposing conditions and the use
    of a clinical decision rule such as ABCD².

  - The guidelines provide a lot of leeway as to the timing of
    these tests. Both the American Heart Association and Amer-
    ican Stroke Association say it is reasonable to perform this
    entire work-up as an outpatient within the next week. If you
    are unable to get follow-up, the patient may be kept in house.

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**A Sensible Approach to TIA – Part 2**

**Rob Orman MD, Anand Swaminathan MD**

and **Cam Berg MD**

**Take Home Points**

- It is reasonable to refer patients for outpatient imaging of
  their vessels.

- Echocardiogram has limited yield and may be done as an
  outpatient.

- High risk conditions include recent MI or cardiomyopathy,
  valvular heart disease, crescendo symptoms and positive
  MRI with ischemia. These patients should be admitted.

- Patients should be started on aspirin. The data is less clear
  about the best treatment if they are already on aspirin.

- Should you get a CT brain first and then proceed to MRI? It
  depends on the particular patient. Berg feels if you have ready
  access to MRI, you don’t need to get a CT first.

- Should you always do an angiogram? You don’t always have to
  unless you think it may change the patient’s management such
  as a patient who would be a surgical candidate, has not had pri-
  or imaging of their carotid arteries, and has a lesion that maps
  to the anterior circulation of the brain.

- Referring for outpatient vessel imaging is reasonable. Not ev-
  eryone needs imaging of their carotid vessels.

- Many patients are admitted for the sole purpose of getting an
  echocardiogram but this may be done as an outpatient. The
  utility of echo is limited. Its benefit has been primarily in elderly
  populations where you are concerned for a cardiac source and
  considering PFO. Not every patient with a TIA needs an echo
  and it may certainly be done as an outpatient.

- Who gets admitted and who goes home?

  - High risk conditions with specific therapies should be ad-
    mitted. A recent MI or cardiomyopathy; mural thrombus can
    cause a TIA. Clinical valvular heart disease or a new murmur
    concerning for vegetations and emboli. Crescendo TIA with
    stuttering and escalating symptoms. Positive MRI with isch-
    emia. Berg would discharge most other patients provided that
    close outpatient follow-up is feasible.

  - Why admit the patient with an abnormality on diffusion
    weighted MRI? These patients have a much higher rate of short
    term stroke due to either progression or subsequent event.

  - Is new diagnosis of atrial fibrillation a mandatory admission? It
    depends on the location and local practice pattern. However, it
    does mandate immediate systemic anticoagulation.

  - What should you give to the aspirin naïve patient? The evi-
Evidence supports 81mg baby aspirin taken daily. Studies have shown benefit at about 70mg. Increased doses of aspirin don’t provide benefit but could cause more GI bleeding.

- **What if the patient is already on aspirin?** The evidence is less clear. If you did obtain an MR angiogram that shows high grade stenosis (more than 70%) located in the intracranial vessels, there is a proven benefit to the addition of clopidogrel to aspirin. For other patients, you can increase the aspirin dose to 325mg. However, there is little supporting evidence. Patients who do not have intracranial stenosis will have the increased risk of bleeding without the desired decrease in risk of stroke.

- **What about dipyramidole?** Aspirin plus dipyramidole appears similar in efficacy to aspirin alone and has a slight increased risk of bleeding.
  - “For patients with stroke or TIA attributable to 50% to 99% stenosis of a major intracranial artery, the data are insufficient to make a recommendation regarding the usefulness of clopidogrel alone, the combination of aspirin and dipyridamole or cilostazol alone.”

- **How much do these drugs reduce the risk of subsequent stroke?** Overall, the relative risk reduction for stroke prevention from antiplatelet therapy after TIA is 15%. Baby aspirin is fairly safe.

- **What is the follow-up?** This can happen with either primary care or neurology within the next week depending on your system. Patients should have their cholesterol checked. Some may benefit from extended cardiac monitoring. Blood pressure should be re-assessed and treated if appropriate. Lifestyle modifications should be addressed.

- **What is the single most beneficial intervention in TIA?** Smoking cessation.

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**EM:RAP Mailbag**

**Take Home Points**

- Unstable patients with acute MI and new bundle branch block need reperfusion more urgently than transvenous prophylactic pacer placement.
- Third degree AV blocks may divided into supranodal and infranodal. Patients with a narrow QRS have a block above the node with instability unlikely. Patients with a wide QRS have an infranodal block and should have a pacemaker placed.

- Amal Mattu had a few points of contention regarding the segment on transvenous pacers by Joe Bellezzo in the April 2016 edition.
- Belleazzo says if the patient is having an MI with a new left bundle branch block, right bundle branch block, Type II second degree or third degree block, they have a 43% chance of entering a fatal bradycardia and you may consider placing a prophylactic transvenous pacer.
- **Mattu’s response.** Acute MI with a new bundle branch block needs reperfusion first and foremost. If the patient is hemodynamically stable, don’t waste any time putting in a pacer. The risk of complications outweighs the small potential benefit of a prophylactic pacer. If the patient has an MI that causes a new left bundle branch block, the patient won’t be stable. If the patient has a left bundle branch block and MI but is hemodynamically stable, the left bundle branch block is likely not new. Otherwise, it would mean that every stable patient with a left bundle branch block and a positive troponin needs a transvenous pacer.
- Bellezzo said that in the situation of vessel occlusion, the chance of going from a first degree AV block to a second degree AV block is 33%.
- **Mattu’s response.** A first degree AV block, even in the setting of acute MI, is completely irrelevant. Decisions regarding treatment are based on ventricular rate and not AV block. Mobitz I without any bradycardia is often a normal variant, especially in patients who exercise a lot. Mobitz I with bradycardia is almost always a vagal issue and responds to atropine, even in the setting of acute MI. Pacers are overemphasized here. A pacer would only be indicated if several doses of atropine are ineffective.
- **Mobitz II is concerning and the pacer is appropriate.** Mobitz I is different from Mobitz II and they should not be grouped together.
- **Bellezzo said if the patient has a stable third degree AV block without MI, he would place a 6 French sheath in the right in-**
ternal jugular but not float the pacemaker unless the patient became unstable.

- **Mattu’s response.** Third degree AV block was oversimplified in this discussion. There are actually two varieties. The first is a third degree AV block with a narrow QRS that is usually vagal or above the AV node. Some patients live with this and it is usually not a problem. It may be transient and rarely causes instability, even in acute myocardial infarction because the escape rhythm is junctional at a rate of 40-60 beats per minute. Catheterization should be prioritized.

- **Bellezzo felt that any patient with an unstable bradycardia should receive a transvenous pacer.**

- **Mattu’s response.** This is an overstatement. The vagally mediated bradycardias may be treated with atropine. Also, bradycardias caused by toxicity or hyperkalemia have different treatments.

- **Pacers aren’t simple.** Not all are comfortable placing them rapidly. They may have higher complication rates and bleeding issues, especially as acute MI patients may receive antiplatelet agents. There is a reason the guidelines discuss emergent placement rather than prophylactic placement in the ED.

- **Bellezzo responds.** Mattu’s points are valid. We don’t all have immediate cath lab availability. The goal of the pacemaker episode was to give permission and inspiration to go ahead and place the pacemaker in an unstable patient. Beware of the simple first degree AV block as it may be your first indication that things are going bad. If you are going to send patient to another hospital in an ambulance, you may want to consider placing a pacer even if you don’t turn it on.

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**Intussusception**

Karen Heilig, Ann Dietrich MD, Ilene Claudius MD, and Mizuho Spangler DO.

**Take Home Points:**

- **Intussusception is a diagnosis that can be easy to miss as it can present in a variety of ways and children can look well between episodes.**

- **Parental report of "something is not quite right" is a red flag.** Families usually they don’t become persistent unless there’s a problem. We have to listen to parents to be able to not miss a diagnosis like intussusception.

- **New evidence suggests a subset of patients who have intussusception reduced in the ED can be safely discharged home.**

- **This piece begins with the story of Cayden a nine-month-old boy who had the diagnosis of intussusception missed by a number of different providers in different setting despite a high level of parental concern.**

- **Intussusception is a common abdominal emergency** in early childhood and refers to telescoping of part of the intestine into itself. It most commonly occurs at the ileocecal junction but can occur anywhere along that ileum, jejunum and colon. **This telescoping leads to venous and lymphatic congestion that can lead to ischemia, perforation and peritonitis.**

- **75-90% of cases are idiopathic.** More common etiologies for the other 10-25% are caused by lead points such as Meckel’s diverticulum, polyps, small bowel lymphoma, hemolytic uremic syndrome and cystic fibrosis. Intussusception can also be seen post operatively in those with abdominal surgeries related to scar tissue working as a lead point.

- **What are the common ages of presentation for idiopathic intussusception?** Most cases occur between four months and
two years of age with the peak around 10 months. One common theory of the cause in idiopathic cases is related to swollen Peyer’s patches following a viral infection acting as a lead point for the telescoping.

- **How do children present with intussusception?** It is classically described as sudden onset of intermittent crampy abdominal pain usually with inconsolable crying and a drawing up of the legs towards the abdomen. Between episodes children may not look sick. Intussusception can be associated with emesis which typically starts out as yellow in color and can turn bilious. A late finding can be bloody or "currant jelly" stools but this is found in only 15% of patients at presentation.

- Presentations can vary and it is an easy to miss diagnosis. Some children will simply present with lethargy and others will present with a couple days of typical viral gastroenteritis symptoms. Getting a history for episodic pain can be an important way to not miss this diagnosis.

- Classically a "Sausage shaped" abdominal mass can be palpated.

- **How do you approach the diagnosis of intussusception?** While plain films are not adequately sensitive alone Deitrich will often get them. They do not tell you anything if negative but can show you what looks like a soft tissue mass or signs of a bowel obstruction. Additionally with anyone with peritoneal signs they can detect free air. Ultrasound is often the test that is used but it is important to remember that it is operator dependent.

- **Once the diagnosis is confirmed what is the management?** In those without peritonitis management is typically with fluoroscopic guided air or contrast enema though ultrasound guided enemas may be equally efficacious without radiation. Surgical reduction can be needed in some cases.


- **What is your perspective on it listening to mothers who particularly seem concerned about their child more than you think they should be?** Usually they don’t become persistent unless there’s a problem. We have to listen to parents to be able to not miss a diagnosis like intussusception. It is easy to miss diagnosis when astute families come in early in the course.

- **Can patients be discharged from the ED safely after radiologic reduction of ileocolic intussusception?** The risk of recurrence after reduction of intussusception is between 5.8 and 11.5%. A recent study discharged a subset of patients who had radiologic reduction of ileocolic intussusception after a 3 hour observation period in the ED.

- In order to qualify for discharge patients needed to be asymptomatic for 3 hours post reduction, tolerating oral liquids, able to return to the ED if needed, and the procedure must have been successful in 3 or less attempts. Radiology, ED and Surgical staff could also request admission at their discretion or for relative criteria such as fever, bloody stools, or prolonged prodrome prior to reduction.

- Using this criteria 30 patients(65%) were discharged with 7 returning to the ED and only 1 who returned requiring repeat enema.

- This protocol lead to significant cost savings with average with an average charge of $6,066 for admitted patients and $2,937 for those discharged from the ED.


- **How long should patients be observed?** This study had shorter observation period at 3 hours. Another study used a six to eight hour observation period. Recurrence in one study occurred on average 18 hours after reduction. Claudius suggest a six to eight hour observation.