

DPM NEWS



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Naloxone Quality Improvement

On page 2, Dr. Cushman breaks down how we are doing when it comes to responding to opioid overdoses.

Mentorship (Part 2 of 2)

Dr. Galton writes the second part of his piece on the importance of mentorship on page 3.

IO vs IV

Dr. Kelly studies the efficacy of IV vs IO access in cardiac arrest cases. See his findings on page 4.

Recently, three of our DPM physician faculty, **Maia Dorsett**, **Aaron Farney**, and **Erik Rueckmann**, achieved Board Certification in Emergency Medical Services (EMS). Board Certification in EMS is a difficult process that requires completion of an Accreditation Council for Graduate Medical Education (ACGME)-approved EMS fellowship or extensive experience as an active medical director - a minimum of 400 hours/year over five years. Additionally, candidates must successfully complete a 6 to 8 hour written examination, for which the most recent pass rate was only 63%. According to the American Board of Emergency Medicine, EMS subspecialty certification serves to “standardize physician training and qualifications for EMS practice... and facilitate integration of prehospital patient treatment into the continuum of patient care.” According to the National Association of EMS Physicians, there are currently only 655 Board Certified EMS physicians in the country.

Dr.’s Dorsett, Farney, and Rueckmann join Dr. Cushman as part of the largest group of Board Certified EMS physicians serving EMS in the greater Rochester Region. Please feel free to congratulate these providers when you see them!

Eric Rathfelder
Editor-In-Chief



Dr. Dorsett



Dr. Farney



Dr. Rueckmann

Upcoming Events

Melinda Johnston

For more information about any event listed below, please visit the training calendar at MLREMS.org

April

- 7 - CIU Class
- 10 - BLS Core Content (#1)
- 14 - GEMS
- 14 - ACLS Refresher
- 17 - BLS Core Content (#2)
- 28 - PHTLS (1 of 2)
- 29 - PHTLS (2 of 2)

May

- 16 - EPC (1 of 2)
- 17 - EPC (2 of 2)

June

- 2 - ACLS Refresher
- 4 - GEMS
- 9 - PALS Refresher

Quality Improvement - Naloxone Administration

Jeremy T Cushman MD, EMT-P, FACEP, FAEMS



It's been about four years since we began widespread distribution of naloxone to Basic Life Support First Response (BLSFR) agencies. I have no doubt that moving naloxone to the BLSFR standard of care has saved lives. Recently we performed a quality improvement review of naloxone administrations and I wanted to take a few minutes to sum up the findings, as well as the opportunities.

Our average time from dispatch to the patient's side is 4.6 minutes, and we are giving the first dose on average 1.7 minutes after being at the patient's side. Don't get me wrong, those are GREAT times, but don't forget that ABC's come before N. That is, make sure that we are supporting their ventilation with a BVM prior to administering naloxone. In those initial minutes, ventilation and oxygenation is first priority, followed by the administration of naloxone.

To emphasize that point, we looked at the cases where providers documented "Slow or ineffective breathing" and they received BVM assistance only 72% of the time. Worse, when the provider documented "agonal or no respirations" they received BVM assistance 62% of the time. Your documentation should reflect what you did, so I hope all would agree that someone not effectively breathing, or not breathing at all, would receive BVM assistance 100% of the time.

We also found that an airway adjunct (NPA or OPA) was being used about half the time. Keep in mind that the BVM should always be paired with an airway adjunct – in fact I have had a few agencies start to put the OPA/NPA with the BVM to remind providers of their importance and to facilitate use. If I think it's an opiate overdose, I am a big fan of the NPA, as it is less likely to induce the gag, and therefore as they wake, them vomiting. OPA/NPA's also help minimize the amount of gastric insufflation (air getting pushed down the esophagus into the stomach during ventilation) which is an added bonus to help keep my boots clean.

With the change to the 4 mg/0.1 ml formulation (the nasal spray) we are seeing a slight decrease in the number of doses required. However when we look at the dosing interval, the vast majority of second doses are being given within two minutes of the first dose – that is way too early. The second dose should be between 3-5 minutes after the first – if ventilations are being assisted, there is time, and importantly it takes a few minutes for the medication to take effect. There are downsides of too much naloxone after an overdose: the physiologic strain that it puts on the body, not to mention withdrawal symptoms can be severe. Keep in mind the treatment goal of naloxone is to restore adequate ventilation – NOT for the

patient to be awake. We have the tools (BVM, NPA, and naloxone) to refine our management of overdoses to both safely reverse their overdose as well as not throw them into profound withdrawal.

I was extremely pleased that *every* administration of naloxone appeared clinically indicated based on the documentation provided, so our next focus should be on the finer things of managing that overdose through ventilation assistance and the administration of naloxone to promote adequate spontaneous respirations and limit the amount of acute withdrawal we are causing them. Keep in mind how important it is that we are properly documenting our interventions (eg BVM assistance, placement of an NPA, AND the administration of naloxone) so that we know you are hitting the mark. Keep up the great work!

Mentorship - Part 2 of 2

Christopher Galton MD, NRP, FP-C



My mentors are a large part of why I have been able to achieve professional success and reach goals that I would have thought were out of reach. Most high level leaders at Fortune 500 companies insist that their employees have mentors and embrace those relationships while accepting the lost time required to build them. These companies know they will get more out of their employees in the long run when mentees have goals, purpose, and guidance.

I'm sure you have all heard the phrase "it's not what you know, it's who you know." Your mentor is the "who" in that expression that is capable of opening doors and making connections on your behalf. My mentors have frequently made phone calls, sent emails, and made personal introductions to connect me with the right people. That is how business is done and you should not be embarrassed to take advantage of those connections.

Hopefully I sold you on the value of having a mentor in your professional life. The first hurdle is finding the right mentor for you. I think you need to start by identifying the personality traits that you want to emulate. In EMS, those traits might include unconditional empathy, a calming demeanor, a driving desire to learn, or an altruistic belief in serving the community. Your mentor should be someone who has established a benchmark for you to work towards.

The second step is identifying people that you already have a connection to, that are 2-3 steps above you in the pile. For instance, I am one of the Deputy Medical Directors of Monroe County. If my professional goal was to become a Chief Medical Director of a county or region, then I would start by identifying people in those positions who would serve as good benchmarks for me. In our region I would have hit the jackpot because that would be either Dr. Cushman or Dr. Farney, who would both be great mentors and could help me achieve my professional goals. They are doing the job that I want to have, and are consistently demonstrating their success in that position.

Step three is approaching the potential mentor. Your anxiety level should be pretty low. This is not asking someone out of your league on a date or walking into your boss's office to ask for a raise. I'll let you in on a little secret, any good mentor will be flattered that you have asked them to help you grow in your career. By asking them, you are saying that you think they are doing something right and that they have the ability to guide you to success. That is a pretty impressive compliment and if they don't see that, then they are probably not a good mentor for you anyway.

The final step is developing that relationship. A potential mentor needs to know that you will value their input and put their advice to good use. You are asking them to give up their valuable time to guide you forward in your career with little direct benefit for them. Kathy Caprino, a columnist for Forbes, recently tackled the issue of finding a mentor and she takes it to the next level by saying that a potential mentor has “to like, trust and believe in you already.” She goes on to ask the question, “are you somebody you yourself would like to mentor?” If you cannot answer yes to that question, then you need to work to become that person before you consider engaging a mentor.

Mentorship should not be forced. The relationship needs to develop organically without being coerced. This usually occurs during the initial few meetings where your mentor will start to help you set some goals and work on the things that need to occur for you to meet your goals. A great mentor is someone who can inspire you when you need to be inspired and can put you in your place when you need to get leveled out. If the relationship is not that strong, then that is not mentorship. Your mother can be your cheerleader. Your mentor fills the role of coach, cheerleader, friend, leader, and follower based on what you need, when you need it. It is a special relationship that should be cherished.

I have benefited greatly from having positive mentors in my life. I continue to have multiple mentors today who both directly and indirectly inspire me to be the greatest paramedic, physician, medical director, anesthesiologist, intensivist, coach, and friend that I can possibly be. If only they could help me find some time to sleep...

If you have any questions about this column, please feel free to contact me at christopher_galton@urmc.rochester.edu.

Vascular Access in Out of Hospital Cardiac Arrest

Intravenous or Intraosseous?

Gregory Kelly Pharm.D.

Intraosseous access (IO), which was originally limited to pediatric resuscitations, has been gaining popularity as more evidence amounts to validate its safety and efficacy in the resuscitation of adults.¹⁻⁶ Reasons for increasing popularity of IO access include higher success rates and faster time to vascular access.⁷ Previously conducted randomized controlled trials in out of hospital cardiac arrest have demonstrated higher success rates with tibial IO access (95%) compared to peripheral intravenous (PIV) access (49%). As a result of more successful access, mean time to drug administration was faster with tibial IO (mean 6.5, range 4.8 to 8.6 minutes) than PIV administration (mean 7.6, range 5.1 to 9.7 minutes).⁸ Despite higher success rates and faster time to drug administration, there is limited evidence to suggest IO offers a clinical benefit over IV access. A large retrospective chart review of 1,310 out of hospital cardiac arrest cases found similar rates of return of spontaneous circulation (ROSC) with IO (19.9%) compared to IV (19.7%) access.⁹ Results from the aforementioned trials are summarized in Table 1.

Table 1: Literature Review

Study	Design	Methods of Access	Outcome			
			Tibial IO	Humeral IO	IV	p-value
Reades et al. 2011 ⁸	Randomized controlled trial	Tibial IO: 35% Humeral IO: 28% IV: 37%	First attempt success rates			
			95%	71%	49%	<0.001
			Time to drug administration (minutes)			
			6.5	7.7	7.6	<0.001
Clemency et al. 2017 ⁹	Retrospective chart review	IO: 39.6% IV: 60.2%	First attempt success rates: 60.2% (IV) vs. 94.8% (IO), p <0.01 Achievement of ROSC: 19.7% (IV) vs. 19.9% (IO), not significant			

We reviewed 25 out of hospital cardiac arrest cases, and observed that IV access was initially attempted in 10 cases with a 60% success rate, and IO access initially attempted in 15 cases with a 93% success rate (Figures 1 and 2). The mean time to epinephrine administration was 5.4 ± 1.7 minutes with IV access initially attempted compared to 7.1 ± 4.3 minutes with IO access, although success of placement was higher with IO access. This is contradictory to the study previously discussed.⁸ In cases where IV access was attempted and then failed, an average delay to vascular access of 2.5 ± 1 minutes was noted, although this delay is reflected in the time to epinephrine administration. To further assess the choice of vascular access, the percentage of patients achieving ROSC out of the hospital was compared between IV and IO access. Despite a longer time to medication administration, rates of ROSC were higher with IO (40%) compared to IV (30%) access although not statistically significant, p = 0.617.

Figure 1: Paramedic first choice of access

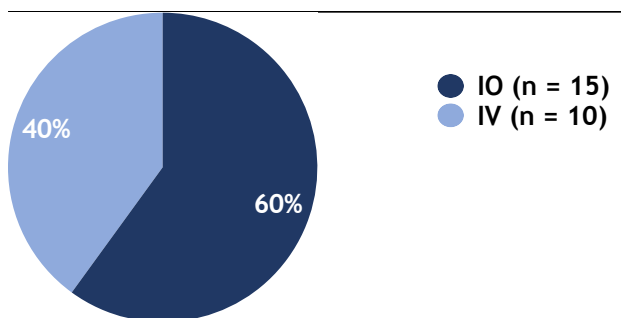
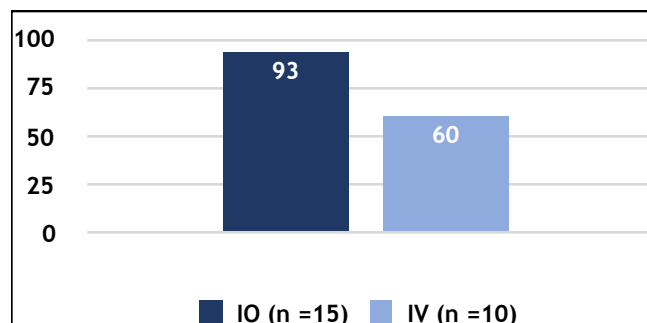


Figure 2: First attempt success rates by access route



Throughout chart review, a time effect was noted in regards to choice of IO access. In 2016 (n = 17), 59% of paramedics selected IV access initially compared to 41% choosing IO access. In 2017 (n = 8), 100% of

paramedic selected IO access initially, $p = 0.008$. An effect with regards to time to epinephrine administration was also noted. In 2016 the average time to epinephrine administration was 8.8 ± 4.7 minutes with IO access, which decreased to 5.5 ± 3.5 minutes in 2017. This is similar to the time to IV drug administration of the entire set of patients as previously discussed (5.4 minutes). Achievement of ROSC also improved from 2016 to 2017 among patients receiving initial IO access compared to initial IV access, 28.6% and 50% respectively, $p = 0.1667$ (Table 2).

At this time it appears that IO is the preferable method of vascular access when compared to IV as a result of higher initial success rates with placement. This has been suggested in the literature to improve rates of ROSC.⁹ The time effect noted in this case review suggests that with continued experience with IO access paramedics will soon be able to obtain IO access faster than IV access which may correspond to decreases in time to drug administration. The true clinical significance of decreased time to drug administration remains to be elucidated as previously conducted trials have not detected a difference in ROSC between IV and IO access.⁹ The small number of cases reviewed as well as lack of access to inpatient medical records limits the applicability of these results particularly as it applies to differences in survival to hospital discharge with a good neurologic outcome which would be the most patient-centered outcome.

Table 2: Patient Centered Outcomes

Outcome	2016		2017	
	IV (n = 10)	IO (n = 7)	IV (n = 0)	IO (n = 8)
Time to epinephrine administration (minutes) Mean \pm SD	5.4 \pm 1.7	8.8 \pm 4.7 [†]	N/A	5.5 \pm 3.5
Rate of ROSC	30%	28.6%*	N/A	50%

* $p = 0.1667$; [†] $p = 0.051$

Lastly, to continue to progress clinical practice, consideration should be given to encouraging humeral IO access. In our case review all IO access was obtained through the tibia. Data from healthy volunteers suggests that higher rates of infusion may be used,¹⁰ and preliminary animal data suggests that resuscitative medications may reach systemic circulation more effectively with humeral IO access when compared to tibial access.^{11,12} Prior to encouraging humeral IO access, significant education should be performed as decreased levels of paramedic comfort, longer time to obtain access, as well as higher rates of access dislodgement have been demonstrated with humeral compared to tibial IO access.⁸

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UR Division of Prehospital Medicine Represented at NAEMSP

Aaron Farney MD



The National Association of EMS Physicians (NAEMSP) recently held their annual meeting, January 8th-13th in San Diego. This is the primary yearly gathering of EMS physicians and medical directors from throughout the country, with well over 1,000 in attendance this year. Cutting edge prehospital research and education on timely topics are presented over the course of the week. Rochester was well represented at this year's conference, as numerous UR faculty and staff attended, with several presenting.

Dr. Cushman gave a lecture entitled "Can Mission Lifeline Help Your Performance Improvement Program?" Dr. Cushman presented an overview of elements of the Mission Lifeline program as it relates to the care of STEMI and stroke patients, and how certain best practices around performance benchmarks and provider feedback can be derived from Mission Lifeline to improve care at agency and system levels.

Additionally, numerous posters and research abstracts were presented. Dr. Cushman and Dr. Galton presented a poster they collaborated on with Ben Sensenbach and Mindy Johnston entitled "Critical Care Interfacility Transport Education for Emergency Residents." Dr. Courtney Jones presented an

abstract entitled “Resource Utilization and Clinical Outcomes of Older Adult EMS Patients with Traumatic Brain Injury Who Were Transferred to a Level I Trauma Center,” to which Heather Lenhardt and Dr. Cushman contributed. Dr. Jones also presented “Does Pre-hospital Mode of Arrival Influence Women’s Decision to Participate in Research?” And finally, Dr. Dorsett served as an instructor for the Out-of-Hospital Critical Procedure Cadaver Lab.

Congratulations to all who presented their work at NAEMSP this year!
