

# DPM NEWS

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## Case Review

Mike Meyer provides an in-depth review of what seemed to be a typical call. See *page 13*.

## Prehospital Use of Fluids

Dr. Galton provides two articles on the use of fluids in the prehospital setting. See *page 5* for practical tips for improving your use of fluid administration. See *page 17* to learn why we use crystalloids and some of the drawbacks of their use.

## Mental Hygiene Arrests

Dr. Cushman and Heather Lenhardt discuss the findings of their analysis of charts involving MHA patients on *page 6* then provide some tips to consider when writing these charts. Eric Rathfelder discusses Mental Health Law as related to mental hygiene arrests on *page 9*.

## From the Editor

Throughout the last few months I've heard from several different EMS providers who requested that we create an email distribution list to distribute this newsletter and other important information directly to their email. We will be working to create such a distribution list. If you are an EMT or paramedic who would like your email address added, please send an email to [mlrems@mlrems.org](mailto:mlrems@mlrems.org) from the address you wish to have added. The subject should be "*provider distribution list*" and include your name and agency affiliation in the body of the email.

In this edition you'll find a new column which I hope will be a regular feature called "Dear Dr. Rueckmann", written in the style of a Dear Abby column. In order for the column to succeed, we are reliant on reader input, so send me any questions for the column that you want Dr. Rueckmann to address in, what I'm sure, will always be an entertaining and lively response. Check out the first installment on *page 2*.

You will also find our first contribution from someone not affiliated with the Division of Prehospital Medicine. Sharon Chiumento generously agreed to write a column on the new CIC/CLI credentialing process and testing on *page 11*. If you would like to write an article or know someone who would write a great article on a pertinent topic, please let me know!

*If you have any questions, comments or suggestions about this newsletter, please contact Eric Rathfelder at [e.rathfelder@gmail.com](mailto:e.rathfelder@gmail.com)*

## Visual Diagnosis - Cigarette Burns Imposter

*Elizabeth Murray, DO*

This is the hand of a baby initially thought to have been burned with a cigarette or injured in another fashion.



However, it is actually Acute Hemorrhagic Edema of Infancy (AHEI), a benign condition which is generally more upsetting to parents than the baby!

## Effective Patient Handoffs

*Benjamin Sensenbach, EMT-P*

The Monroe-Livingston Region is pleased to release our educational program on “Effective Patient Handoffs”. This new initiative and change in culture engages the region’s EMS providers and our emergency department physician and nursing colleagues. With support from the region’s emergency department directors, it provides a common structure to communicate patient care information from EMS to hospital providers. The initiative outlines a simple nine item report that should be utilized for medical control phone calls, cellular prehospital notification and in-hospital patient handoffs.

We have developed a short training video that should be viewed by all EMS providers within your agency. The training video as well as wall signs for your ambulance are available on the MLREMS website at <https://www.mlrems.org/patient-handoff/training-videos/>. Also available is an ID badge hanger that can serve as a reference when providing medical control reports and patient handoffs at the hospital.

Our regional Emergency Department staff are being trained in Effective Patient Handoffs in a parallel fashion but keep in mind that this training will take time to shift the current culture and improve patient handoffs.



## Dear Dr. Rueckmann...

*I recently treated a patient who was having an allergic reaction. I gave her IV Benadryl. She was also nauseous and I gave her promethazine. Should I be concerned about these medications interacting since they are both antihistamines?*

Dear Itchy and Nauseated,

Thank you reader for this great question. This new section in the DPM News is to answer burning questions related to prehospital care that you didn’t want to ask in person due to threat of side eye or internet shaming.

So, on to the first question...is it safe to use Benadryl (diphenhydramine) and Phenergan (promethazine)? My first response to this question is, "Wait did I miss this in a super secret MLREMS protocol buried within the MLREMS website?" After a long and thorough search I found no "super secret protocol". It looks like one of those weird cases where you had a patient with an allergy who was nauseated. In order to answer this question, let's break it down a bit.

Using Benadryl and Phenergan in therapeutic dosages with the majority of patients will cause mild side effects that won't cause the daytime class action lawsuit lawyers love, however, certain patient populations will be vulnerable to additive effects of these medications. Separately these medications have different indications and slightly different mechanisms of action.

Benadryl is primarily used as a histamine blocker that prevents allergies from making you the allergy monster (runny nose, nasal voice, blotchy skin...very scary). The problem with Benadryl is that it can cross the blood brain barrier causing it to interact with various CNS (Central Nervous System) receptors. This unwanted property of Benadryl could cause a wide range of side effects. These effects are due the anticholinergic effects and sedative effects. That is why some patients are "wired" after taking Benadryl, while others are ready for bedtime. In our region, Benadryl is a helpful tool to prevent histamine from causing havoc during allergic reactions but does not substitute for the fast action of epinephrine when battling the ravages of anaphylaxis.

Up next is Phenergan. Phenergan was initially developed as an antipsychotic, by targeting dopamine receptors in the brain. It didn't work out as an antipsychotic but did find its way as an antiemetic/sedative due its CNS effects. Phenergan shares many of the qualities of Benadryl and therefore triggers many of the side effects. Phenergan can cause sedation, extrapyramidal symptoms, and anticholinergic effects. Phenergan fell out of favor with the advent of Zofran but that's an article for another day.

So if you take both medications at the same time, you run the risk of doubling the effects. The most pronounced effects would likely be anticholinergic. What is anticholinergic? Well in layman's terms it blocks the effects of the parasympathetic nervous system. Without going into a lengthy neuro anatomy lecture, blocking the parasympathetic nervous system would look like this...

- Dilated pupils that can cause blurred vision
- Flushed and dry skin/mucous membranes (no sweat anywhere)
- Tachycardia
- Urinary retention
- Constipation
- Mental Status Changes-sometimes agitated but sometimes sedated
- Twitching-Myoclonus
- Seizures

While most patients won't have these dramatic findings, certain patient populations will! Which patient populations are at highest risk for developing these findings you ask? The elderly, patients with organic brain disease (think dementia), and patients on other medications/substances that have similar effects (think certain psych meds, ETOH, etc). There is also that whole concern over QTc widening but

generally there would have to be other medications on board to cause this. Giving these “high risk” patients a dose of Benadryl followed by Phenergan will likely lead to an interesting ride (think of an agitated, demented, no filter 80 year old Rueckmann) to a local hospital and an extra special “thank you” from the local ED team.

So bottom line...probably not the best idea to use these two medications in concert in the prehospital setting when there are better options out there, but now you know!! Thanks for the question and we’re looking forward to the next one! -ER

## EMS Week 2016 Kickoff Event

*Melinda Johnston*

The Monroe-Livingston Regional EMS 2016 Kickoff Event was Sunday, May 15, 2016. This year’s event took on a new design in the form of a mini conference in which there were several CME offerings throughout the afternoon,

culminating in the awards ceremony and light refreshments to wrap up the day. We also had the opportunity to offer a training session to almost forty boy and girl scouts that introduced them to a mass casualty simulation and first aid education. Our event couldn’t have happened without the help of all of our agencies and area hospitals. If you were able to attend our event and have any comments or suggestions, please feel free to email them to [mlrems@mlrems.org](mailto:mlrems@mlrems.org) so that we can take them into account for next year. Remember, this is your event! Help us continue to make it great!



### *Our 2016 MLREMS Award Winners*

- Basic Life Support Provider of the Year
  - **Amanda Martin**
- Advanced Life Support Provider of the Year
  - **Eric Rathfelder**
- EMS Communications Specialist of the Year
  - **Timothy Wood**
- EMS Educator of Excellence
  - **Melodie Kolmetz**
- Harriet C. Weber EMS Leadership Award
  - **Reg Allen**
- Registered Professional Nurse of Excellence
  - **Pauline Shaw**
- Physician of Excellence
  - **Dr. Timothy Lum**
- EMS Agency of the Year
  - **Henrietta Ambulance**

## Practical Tips to Improve your Care of the Acutely Ill Patient

*Chris Galton, MD, NRP*

First, I would like to congratulate you. We have started to notice a trend in the EDs that patients are more regularly coming in with properly sized IVs, as well as multiple access points when appropriate. Not to beat the dead horse, but for those who missed my earlier article, a 14 gauge, 1/4" peripheral catheter remains the goal for critically ill, hypotensive patients. These catheters will flow at ~330 mL/min. That's one liter of IV crystalloid every 3 minutes when the flow restricting devices are removed! When you are not able to successfully obtain correct access for acutely ill patients, 16 or 18 gauge peripheral IVs are OK, but offer sub-optimal access for critically ill, hypotensive patients.

For all patients that potentially need aggressive resuscitation, removing all flow restricting devices in your IV setups will make a big difference. In most cases, this involves removing the "clave" adaptors or stopcocks that are directly in line with the flow of your drip sets. I think these devices should be removed from our setups anytime that we initiate "wide open" high volume resuscitations or need to administer a specific amount of IVF in a rapid bolus fashion.

In the pictures below, I have circled the pieces that should be removed to promote maximum flow. For the EMS staff that order equipment, there is no reason EMS should use anything other than "high flow" or "large bore" extension sets with removable clave adaptors or stopcocks in their setups. Slowing fluid infusion rates down is very easy to do, but speeding them up is not.



With the addition of interosseous catheters to the EMS armamentarium, our ability to institute therapies on difficult access patients has dramatically improved. Now that we have gained some experience, I think it's time to refine our practices. For those that are not aware, all three sizes of the needles have a 15 gauge diameter. The difference between needles is only length and they come in 15 mm, 25 mm, and 45 mm lengths. The flow rates for these devices depends more on location than needle length, although shorter needles run faster.

We know that the humeral head site flows 5-10 liters/hour, the proximal tibia flows 3-5 liters/hour, and the distal tibia flows 1-3 liters/hour. If you assume the average flow rate through each site, the humeral head will flow 125 mL/min (equivalent to an 18 g 1¼" peripheral IV), the proximal tibia will flow 67 mL/min (20 g 1" PIV), and the distal tibia will flow 33 mL/min (22-24 g PIV). Based on this information, we should be placing humeral head IOs unless there is an absolute contraindication to accessing those sites. The lower extremity sites are clearly inferior for volume and the transit time to the heart for acute resuscitation medications is too slow if better options exist.

It also means that we should still be looking for large bore IV access even if one or two humeral head IOs have been placed. When a humeral head IO is used as the first point of access, as soon as is practically possible we should be placing one or two large bore IVs. The external jugular site continues to be an underutilized and easily accessed site for large bore IVs and I would encourage you to use it for acutely ill patients.

I'm excited that you are starting to raise the bar in this region when it comes to venous access and acute resuscitation. Keep up the good work and encourage your colleagues to do the same. Let's keep the momentum and continue to improve the care we provide for acutely ill patients.

As always, if you have any questions about this column, I can be reached at:  
[christopher\\_galton@urmc.rochester.edu](mailto:christopher_galton@urmc.rochester.edu).

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## Quality Improvement - Mental Hygiene Arrests (MHA)

*Jeremy T Cushman, MD, MS, EMT-P*

*Heather Lenhardt, MBA, EMT-P*

Our most recent quality improvement assessment surrounded our response, management, and documentation of Mental Hygiene Arrests. Our range of patient age was 7 to 95 years, the average 34. The use of chemical restraints, although not frequent, was appropriate and followed a reasonable documented escalation in the use of verbal techniques and physical redirection. Documentation of these interactions is extremely important given the circumstances surrounding these calls: psychiatric illness with often drugs or alcohol and law enforcement presence. These are high risk calls from a provider safety and medicolegal perspective. Overall, in 88% of cases the chart provided a clear story and timeline of events. I was also happy to see that in 83% of cases the provider documented their thought process on the call and made it easy to understand why they treated the patient the way they did (for example, achieved effective verbal de-escalation, or didn't and had to move to chemical restraint). You are also documenting (74% of the time) if the patient is in immediate risk of harming themselves or others. There is always room for improvement, but I was pleased to see this critical information documented – so if you are not making those items a routine part of your MHA/psychiatric patient chart, you just got a few pointers. There were some areas of documentation, however, that I do think we can improve on as we found them documented in less than 50% of charts. Specifically, here are some key items that should be considered in your narrative whenever caring for a patient with a psychological complaint or is under MHA: Is there

any evidence of mental illness? Is the patient under MHA? Was there any violence prior to arrival? Is the patient verbally aggressive? And are they being physically aggressive? These details are important in supporting your decisions to restrain – either physically, chemically, or both. If you do restrain, remember to document what physical restraints were used and where were they placed. Lastly, if physical restraints were used, did the patient continue to resist and what was done to mitigate it.

I recognize that law enforcement often dictates whether the patient goes in cuffs in the ambulance, and this is a relatively frequent occurrence, with 87 of 104 charts indicating the presence of handcuffs. I will relate my preference, and encourage you to discuss this with the officer. I prefer that patients not be transported in handcuffs in the absence of an officer/deputy in the back (only 4 of 311 cases did an officer ride in the back, in three cases the patient was restrained with handcuffs, the other lacked the documentation to understand the circumstances). The reason is simple: handcuffs are not medical restraints, and should anything untoward occur, we need immediate and unfettered access to the patient to render care should their condition deteriorate. Although cuffs were behind the back only 31% of the time, we know this can impede respiratory mechanics, is certainly uncomfortable on a gurney, and precludes us from some critical interventions. Now certainly, there are cases in which the patient should be handcuffed, and I prefer it to be to a backboard rather than the gurney (at least those backboards are good for something) so that we can quickly render care, and if the person is that potentially violent to be cuffed in the back of my ambulance, then I would prefer an officer/deputy ride along. Again, I recognize that some officers will not do this, but we are responsible for the medical care of the patient, and I encourage you, as you feel comfortable, to offer other means of restraint (the backboard restraint method I have taught in the past) or the presence of an officer in the back. In the end it is your decision, but I want that to be an informed one for both your, and the patient's safety.

More than any other chart you may write, documentation for these patients should be objective and articulate in outlining what you saw, what your thought process was, and what you did. Hopefully this provides a few pointers for you to enhance your documentation while you continue to provide compassionate and responsible care to this often challenging group of patients.

On the next page, you will find some questions that you should address when you write a chart for an MHA. Please feel free to use this as a reference or check when writing your mental hygiene charts.

### All Charts

Was the patient being violent prior to EMS arrival?

Is there a history of mental illness?

Is the patient being verbally aggressive?

Is the patient being physically violent?

Is the patient trying to harm others?

Is the patient trying to harm themselves?

All Charts
Is the patient under MHA?
Were physical restraints used?
What was used to restrain the patient?
Was the patient transported with handcuffs on?
Handcuff position? Behind the patient’s back, to the gurney, in front of the patient
Did the patient continue to resist?
Were the restraints used only because it was an MHA?
Good endpoint documentation.
Was law enforcement present on scene?
Did law enforcement ride in the ambulance or behind it?
Were drugs or ETOH involved?

ALS Charts	BLS Charts
Were chemical restraints used?	Was ALS called for the use of chemical restraints?
How was the midazolam administered?	Did ALS use chemical restraints?
What was the total dose of midazolam given in mg?	Did ALS ride to the hospital with BLS if chemical restraints were not used?
Did the ALS provider explain why they felt chemical restraints were necessary?	

## NYS Mental Hygiene Law - A Brief Overview

*Eric Rathfelder, MS, EMT-P, Police Officer*

Patients experiencing mental health or substance abuse issues make up a large percentage of the calls to which EMS and law enforcement respond. The way these calls are handled depends on many factors including: the perceived level of threat the patient is exhibiting towards themselves and others, the presence of and level of intoxication, the jurisdiction where the patient is located, the presence or appearance of mental illness and the environment where the patient is found. The disposition of these calls will fall into one of four categories:

1. The patient is evaluated and refuses transport with EMS.
2. The patient is voluntarily transported to a hospital by EMS.
3. The patient is placed under mental hygiene arrest by law enforcement and transported by EMS to a hospital.



4. The patient is placed under mental hygiene arrest by law enforcement and transported by law enforcement to the hospital.

Regardless of the outcome, these calls will frequently require collaboration between law enforcement and EMS personnel so it is important for EMS providers to be aware of two sections of NYS Mental Hygiene Law that most frequently apply in mental health related calls.

MHL 9.41 authorizes a law enforcement officer to, “take into custody any person who appears to be mentally ill and is conducting himself or herself in a manner which is likely to result in serious harm to the person or others.” The section of law I pulled this sentence from is much longer and contains additional definitions and information so please feel free to type “New York MHL 9.41” into your preferred search engine to learn more. The takeaway message, though, is that a person must fit two criteria to be taken into custody under this section of the law: appear mentally ill AND act in a manner likely to cause *serious* harm.

There are some cases where it is very obvious a person fulfills both criteria, such as the individual who has threatened suicide and followed up with an attempt such as cut their wrists, overdosed on medications, or drove their car into a bridge abutment. Some cases are not so clear, such as the 95 y/o hoarder with dementia who has a UTI that should be treated. Or, the 17 y/o without any history of mental health problems who texts her boyfriend and says, “I can’t take it anymore – I don’t want to see tomorrow”. After gathering additional information, some police officers will complete the mental hygiene arrest and some will not, based on their interpretation of the situation and the law. As EMS providers, it is important for us to realize that we might be able to provide law enforcement officers with information to assist them in understanding if a patient does appear to be mentally ill or is at risk of serious harm. So, if you recognize that some of the patient’s medications are psych meds, your evaluation reveals the patient has a serious medical condition that will likely cause them harm if left untreated, or you have prior knowledge of the patient attempting to harm themselves, discuss these things with the law enforcement officers at the scene.

MHL 22.09 authorizes a law enforcement officer to compel “A person who appears to be incapacitated by alcohol/or substances to the degree that there is a likelihood to result in harm to the person or to others...” to be transported to the hospital. Again, the actual language of the law defines and expounds upon this statement significantly, but that should give you a basic understanding of the intent of the law. This section of Mental Hygiene Law might be used in a situation where a severely intoxicated individual is walking in heavy traffic at risk of being hit by a car. Or, when someone has used heroin and is passed out in a snowbank wearing nothing but a t-shirt and shorts. I’m sure you can think of many, many examples. One situation where it would probably not be used is when an intoxicated individual is in their home since they are not likely to be harmed.

In order to make mental health related calls go as smoothly as possible, keep the following tips in mind:

1. Have clear communication with law enforcement at the scene and take a team approach to the call.

2. Recognize that your agency policies, your protocols, and the local law enforcement general orders can vary heavily between jurisdictions. For example, some law enforcement agencies will transport their own MHAs to the hospital while others are not allowed to. Some law enforcement agencies require each and every MHA patient to be handcuffed which could conflict with your EMS agency's protocol.
3. Things will always go smoothest if law enforcement, EMS, and the patient are all on the same page.
4. Mental hygiene "arrests" do not create a criminal record for the patient.

With a better understanding of NYS Mental Hygiene Law and good communication with your local law enforcement agencies, you should be able to maximize your effectiveness dealing with mental health calls.

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## Full Circle - Sharing Research Results with our Region's EMS Providers

*Courtney Jones, PhD, MPH*

*Heather Lenhardt, MBA, EMT-P*

*Timmy Li, EMT-B*

Nationally, pediatric pain management has been getting a lot of attention. Previous research has shown there is room for improvement with pediatric pain management in EMS. In the summer of 2013, the URMC EMS Research Group conducted a survey study to try and shed light on the reasons that influence EMS administration of analgesics to pediatric patients. The findings from this study were recently published in the journal *Pediatric Emergency Medicine*. In the study, a medical student contacted 17 ALS agency leaders in the Monroe and Livingston counties to arrange a time to come to the agency and conduct a brief survey with paramedics. We visited seven agencies and completed 127 surveys. Of these 127 paramedics, 42 (33%) had 5 years of ALS experience or less, and 85 (67%) had more than 5 years of ALS experience. We identified some concerns among the paramedics which may influence the decision to provide analgesia. For example, paramedics frequently noted the following barriers to administration of pediatric analgesia: 1) causing more pain from IV insertion; 2) parental influences; 3) difficulty assessing pain; and 4) concerns about allergic reactions. Now for the good news! Paramedics that we surveyed did believe that analgesic administration is important, but wanted more education about administering analgesics to pediatric patients with the support of the agency leadership. These results highlight some key areas for future educational efforts in region and elsewhere. A link to the complete article can be found here: <http://www.ncbi.nlm.nih.gov/pubmed/26414634>

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## Changes in NYS CIC and CLI Certification

*Sharon Chiumento, BS, EMT-P*

The NYS Bureau of EMS & Trauma, in conjunction with the Training & Education Committee of the State Emergency Medical Services Advisory Council (SEMSCO), has revamped the testing procedures for

Certified Lab Instructor (CLI) and Certified Instructor Coordinator (CIC) for those taking an original course as well as for those requiring an update.

As the Bureau of EMS is moving to the new process for certifying and recertifying EMS instructors, they are developing information to assist instructors to prepare for the new exam, which is based on educational principles rather than on EMS certification-level content.

- Original certification and recert of CLI/CIC will be through a 50 question (& 5 pilot questions) instructor level-specific exam (CIC vs CLI). The passing grade is 70, and instructors can retake the exam if needed. The testing is done at the usual NYS regional course exam sites, and the usual exam application needs to be completed just as in the old process with the provider-level exams.
- Recertifying instructors will take test once at their next renewal date, unless issues are identified at a later date. This negates the previous requirement to take a NYS recert exam every 3 yrs. There are no separate course requirements for ALS instructors vs BLS instructors – ALS level providers can teach BLS or ALS courses; BLS level providers teach just at the BLS level. CIU requirements remain in place. (Note: this policy has not yet been updated on the BEMS website as 2016 policies have not yet been posted there.)
- Materials to be tested include Foundations of Education (NAEMSE textbook), NYS Program Administration Manual & various education-related policies/advisories including:
  - Course Sponsor Administration Manual
  - Policy 10-02 (Distributive Learning)
  - 13-03 (Course Funding)
  - 13-06 (Instructor Certification)
  - 15-01 (Field/Clinical Rotation)
  - 15-04 (Criminal Convictions)
  - 15-05 (ADA)
  - Article 30/Part 800
  - CLI/CIC curricula
  - Practical Skills Manual

NYS DOH Bureau of EMS has provided a 20-minute video to update instructors on the new CLI and CIC exams. The video is located in a moodle site at: [training.vitalsignsconference.com](http://training.vitalsignsconference.com). The video can be found under "Courses", "Instructors", and then "New Instructor Exams".

Many instructors have also found it useful to go through the BEMS CIC Addendum Course also found in the "Instructors" section of the site. The course is split up into several modules and is used for all new CICs as well. Each module contains a resource document, a short video and a quiz, and the course overviews most of the materials above. In addition to the moodle site, reviews can be done during upcoming CIUs to assist instructors in preparing for their exams.

## Kids Corner - EMS Awareness of Human Trafficking

*Elizabeth Murray, DO*

You may have heard news stories about teen women from Africa and parts of Asia being sold into human slavery. However, did you know that Rochester has an extremely high rate of human trafficking? Upstate New York State offers an extensive roadway system, dense population areas, proximity to an international border, and multiple large sporting arenas making it a prime location for traffickers. In fact, more than 1000 teens are trafficked in NY every year. As EMS providers, you likely have interacted with a trafficked teen at some point in your career, but because of common stereotypes related to trafficking, you might not have realized it. A wake up call to end the stereotypes came to many in Monroe County when a large trafficking chain in Henrietta and Brighton was discovered and broken up last year. The girls were not migrants or without families. They were high school students, enrolled in school, who grew up in Rochester but had become trapped for one reason or another. Through my work at the Bivona Child Advocacy Center, I have cared for many of these girls and have heard common stories from them. So, in their own words, I present, what they would like you, the First Responder, to know about them and how you might be able to help.

*"I have a family in Rochester, but things were worse at home"*

Parental drug use, exposure to violence either in the home or the neighborhood, and sexual abuse are just some of the reasons that children may not feel safe at home. The traffickers know this and use this against the teens.

*"He/she was my friend, at first"*

It starts with "I'm sorry you have to deal with that at home, you can hang out with me if you want to be safe." It progresses to "you deserve to have nice things, here I bought you that special bag you wanted." Finally, "Don't you want to help me out, I've kept you safe all this time." Many see the trafficker as the only stable adult in their life. Once, primarily a job of men, we have started to see a number of women working to traffic teens. Teens are often surprised by this too and may let their guard down when approached by more of a "mother figure."

*"He's not my dad or my brother"*

Local hotels/motels are often used for trafficking. Keep this in mind when you respond to the local motel for an automatic fire alarm or fuel spill in the parking lot. A call to 911 may be her only way out. If you encounter a teen asking for medical care but an adult is trying to refuse transport, get help from the police if you need it and speak with the teen alone. It's ok to ask "will he really take you to the doctor if we leave?" "Are you safe?" "How can I help you?"

*"These tattoos were not my choice"*

Take a moment to read and ask about your patient's tattoos. Traffickers will often tattoo their name on the teen. You might see more than one name. The name may be female. The teen will often say "he was my boyfriend or he is my boyfriend." While this may be true, the very large, well done name tattoos should raise an alarm, especially if there are more than one.

*“He said I was a prostitute now so I’ll go to jail if I tell.”*

In 2008, New York State passed the Safe Harbour for Exploited Children Act. This provision prevents trafficked teens from being charged with prostitution and instead sees them as victims in need of support. In 2012, Monroe County was selected as one of 5 Counties in NY to receive funding for a Safe Harbour Program. This organization is run locally by the Center For Youth and provides housing, counseling, and educational support for victims of trafficking.

Every teen is not a victim of trafficking, but some are so you need to keep it in your differential. More information is available on the Center For Youth website ([centerforyouth.net](http://centerforyouth.net)). In addition, the Bivona Child Advocacy Center offers Darkness to Light training. This is a program designed to help adults recognize and prevent child abuse.

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## Case Review - Poison Peppers or Bad Fall?

*Michael Meyer, EMT-P*

08:52 – Call dispatch: Female passed out (31A1 – Priority 3)

09:02 – You discover a 66 year-old female patient lying on the floor of a second floor bathroom. Her husband reports she may have passed out while sitting on the toilet, hearing ‘a thud’ and finding her lying on the floor when he arrived a few moments later. He reports she was conscious and alert when he arrived at her side. The patient tells you as you enter the bathroom that she believes she is suffering from neurotoxins which resulted from eating peppers last night, and has a headache “all over” her head.

She states every time she eats peppers, she wakes with a headache, needs to drink large amounts of water to help flush the toxins from her body, uses the restroom and recovers fine. She did eat peppers last night, and awoke about 07:30 with the headache she is experiencing now. Patient has used the restroom three times, having a bowel movement each time, and believes she passed out during this most recent use. It appears as though she fell forward, striking the wall about three feet in front of her, as she has a small laceration to the bridge of her nose.

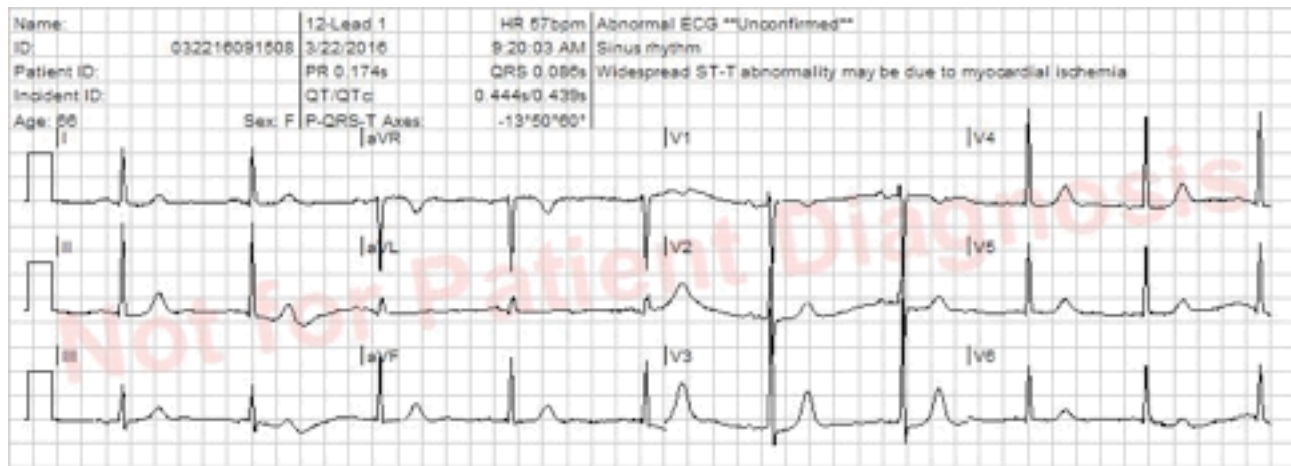
She is shifting back and forth on the floor, trying to get comfortable, and appears to be doing so without difficulty or distress. She denies any additional pain upon initial exam and assessment. Her skin is warm, pink and dry with a HR=80 and RR=16. She is CAOx3 with clear speech, no deficit, and only apparent injury being the small laceration to nose. As the patient is nearly naked, it is easily noted that patient has no rash, erythema, or urticaria present.

She goes on to relate she felt well last night at bed time, denying any chest pain/discomfort or palpitations this morning. She is experiencing no SOB and has no increased work of breathing. She denies recent cough or fever. At bedtime last night, patient had no headache and no N/V/D. Husband offers that patient is a daily runner and takes good care of herself – patient’s appearance suggests the same. Patient is

well followed by her PCP with no significant medical history, no daily medications and an allergy to codeine. Both patient and husband deny drug/alcohol use and no psychiatric disorders.

09:07 – She is assisted to a sitting position on the floor which she then maintains on her own, and is assisted into a t-shirt by her husband, lifting her arms to accommodate dressing. BP is obtained at 180/90 and room air SpO<sub>2</sub> of 96%. She is further assisted to a standing position, pivots and sits in stair-chair. She crosses her arms and positions her feet for EMS to secure patient in chair and then is moved to ground floor where she is again able to stand and pivot from chair to stretcher. She is moved to ambulance without incident, remaining CAO<sub>3</sub> throughout and without complaint.

09:17 – Now secured in the ambulance, any remaining exam and/or interview is completed as transport to ED of patient's choice is begun. The assessment revealed she has no perceivable neurological deficits, a symmetrical face, and no additional pain beyond her headache which she relates at 9/10. She is placed on EKG – regular sinus rhythm and a 12-Lead EKG is obtained (attached).



A 16 ga saline lock is placed in her left anterior forearm for which patient does not grimace or respond (BG=183 mg/dL). Patient remains hypertensive at 190/100.

09:25 – Patient rather suddenly becomes noticeably anxious and reports that she can no longer feel her extremities, however, spontaneous movement continues to be present in all four extremities. She goes on to say she is 'not aware' of movements, and wouldn't know she was moving if she was unable to see her arms and legs. When asked to follow commands, patient initially says she is unable to follow commands such as squeezing hands and lifting limbs off stretcher. Moments later, she is able to comply with commands directing gross movements, but then asks EMS if she completed the request. Patient reports she has no awareness of movement. Reassessment and palpation of cervical spine and extremities reveal no perceptible changes – patient continues to deny pain with palpation of spine, no deformities appreciated. BP 178/100, other vital signs without significant change.

09:32 – Continued assessment finds she makes no attempt to withdraw from painful stimuli to nail beds, no facial grimace noted with pain. Despite reported lack of sensation, patient continues to have free and spontaneous movement in all four extremities.

09:38 – Head of stretcher is lowered from about 40 degrees elevated to 20 degrees elevated with patient reporting some decrease in headache in new position. Upon arrival at ED, BP 149/88, other vital signs unchanged. 12-Lead EKG repeated and unchanged from initial tracing.

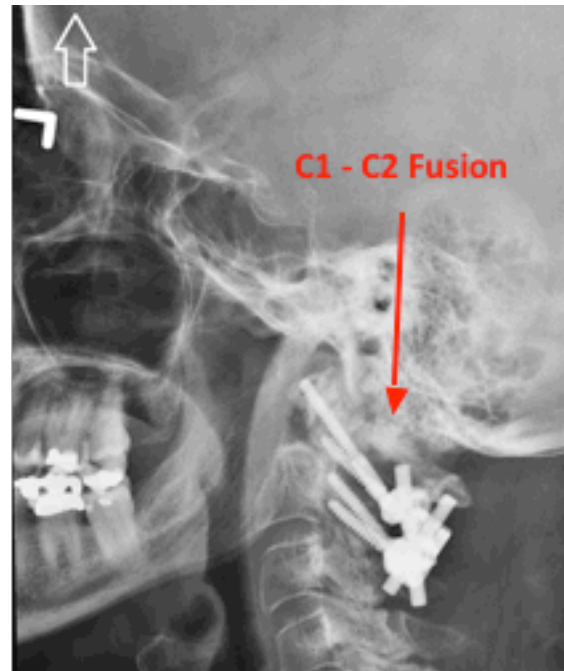
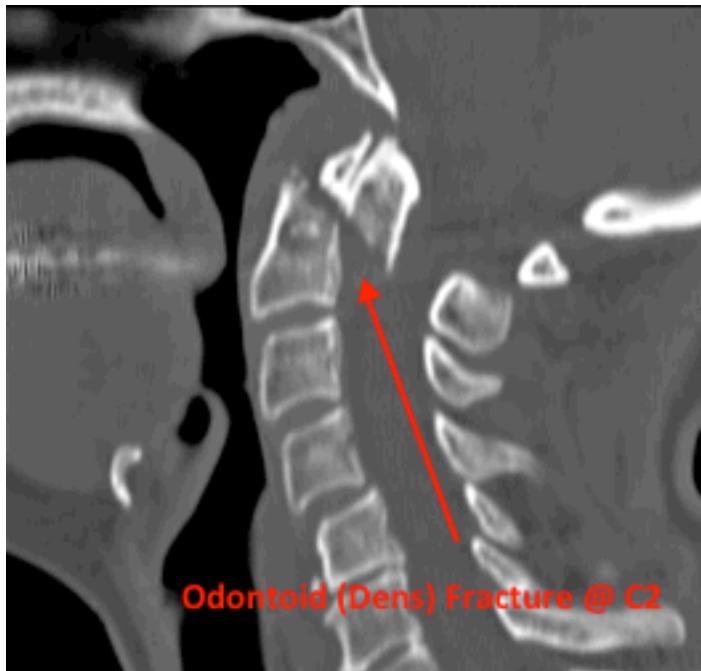
09:42 – She is moved to ED on stretcher, vomiting once during movement of stretcher from ambulance to ED. She is able to turn head and protect her own airway, but no other movements such as wiping her mouth noted. A brief report is given to triage and an additional attempt to illicit a response from painful stimuli to nailbeds is attempted by nursing staff. Patient again offers no response. Patient is directed into a treatment room where a MIST report is provided to the physicians and nurses present.

Now that you have my accounts of the events, and our patient is safely tucked away, I want you to think about a few items. I am sure that many of you have questions, and I will be the first to admit there are a few areas that could be improved upon, so let's take a minute and reflect on the following:

- Is she a psych patient complaining of neuro-toxins from peppers?
  - o I will admit that her story about peppers did likely affect my treatment plan. It was clear from her syncope that she would be transported for evaluation. However, during transport when she reported a loss of sensation while maintaining the ability to freely move all of her extremities, I was likely more suspicious because of her earlier report on neuro-toxins.
  
- Should she have been placed in a cervical collar in our present selective spinal motion restriction world?
  - o I didn't place one and there are probably valid arguments on either side. It's not always the major trauma, but the simple falls we need to be concerned about. How many of us heard something like that in EMT or Paramedic class? How many of us routinely transport simple falls and other similar patients without a collar, especially in the elderly? Am I suggesting that all the advances in spinal motion restriction (SMR) are wrong? No. In fact, I would argue that by simply minimizing the motion of this patient, she did no worse than if a collar had been applied.
  
- Should she have received analgesics for her headache?
  - o I think she could have. Why didn't I administer them? Well, with her change in presentation, I got caught-up in the reassessment, attempting to understand how she could move her extremities but not feel them. That and the pepper neuro-toxins from earlier likely distracted me from the larger picture and the administration of analgesics. Keep in mind that narcotics are rarely used in the ED management of cephalgia (headaches), and deferring prehospital analgesics is more than appropriate.

Hospital care to discharge:

In the ED she was found to have 4/5 strength in her bilateral upper extremities and had decreased proprioceptive sense. Her nasal laceration was repaired in the ED. She had CT's from head to tail which showed a transverse fracture through the base of the dens pressing back into the spinal canal causing approximately 50% narrowing. An MRI was then performed which showed a fragment of the transverse fracture of C2 pressing back and resulting in severe central canal stenosis with spinal cord compression. Orthopedics performed a C1-C2 vertebral fusion and decompression of the C2 vertebrae. She was then moved to the Burn Trauma ICU intubated and vented, moving all extremities.



She was later moved to an in-patient rehabilitation unit to continue her recovery with the eventual goal being discharge back to home. In addition to follow-up care for her orthopedic injuries, she received physical therapy to address concerns of mobility, transfer, and gait training with assistive devices, while occupational therapy assisted her ADL performance training including upper and lower body dressing, bathing, grooming, and toileting with assistive devices. Through coordination with social work, she was discharged home ahead of schedule.

This patient suffered a life changing injury which could have been fatal. There are several aspects of care that can be discussed surrounding this case, and I offer it to you for just that purpose. Please take a minute to reflect on how you would have cared for this patient. What would you have done differently?

One thing I learned was that Dens fractures are the most common cervical spine fractures in persons above the age of 65 and account for approximately 5% to 15% of all cervical spine fractures [1-3]. Additionally, depending on which portion of the spinal cord is compressed, you may have loss of proprioception (space and movement awareness) and sensation while motor function remains grossly



intact. Given the patient's previous experience with peppers causing neurologic symptoms, one can easily lose sight of the potential of injury given what most providers would consider an atypical neurologic exam. Although this patient met no criteria for spinal motion restriction, one must always maintain an index of suspicion not just based solely on mechanism, but also hard neurologic findings (in this case complete absence of pain response) regardless of how bizarre they may be, and take steps to minimize spinal motion while reporting these findings to the hospital!

#### References:

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## Abnormal Saline

*Chris Galton, MD, NRP*

Intravenous infusion of a saline solution has been used by physicians since the mid nineteenth century, when it was first used to treat the dehydration associated with cholera in the West Indies. In the late 1800s, a Dutch physiologist, Hartog Hamburger, determined that the appropriate concentration of salt in human blood was approximately 0.9% (unfortunately wrong). By the end of the century, Sydney Ringer, a professor and physician at the University College in London, had determined the optimal concentration of a salt solution to promote maximum contractility of a frog's cardiac muscle. The work of these two scientists provided the framework to develop normal saline, a 0.9% isotonic saline solution.

Normal saline is comprised of 154 mEq/L of sodium ions and 154 mEq/L of chloride ions. The typical plasma sodium level is 140 mEq/L and a typical chloride level is 102 mEq/L. A 0.9% liter of saline has a greater amount of sodium and a significantly greater amount of chloride than human plasma. This is the primary reason that normal saline is fondly known as "abnormal saline" within healthcare circles.

Abnormal saline can become a big problem in the hospital if multiple liters over days are administered. This leads to undesirable shifts in sodium and chloride. Hypernatremia (high sodium) can lead to increased thirst, fatigue, seizures, and coma, while rapid rises in serum sodium can cause a profoundly debilitating condition called central pontine myelinolysis. Hyperchloremia is a cause of non-anion gap metabolic acidosis and the leading cause of iatrogenic metabolic acidosis. For these reasons and many more, 0.9% saline solutions are generally reserved for acute resuscitations only if other resuscitation solutions would not be appropriate. If normal saline is used initially, physicians typically try to switch off to another balanced solution as soon as is practical.

Fortunately, the small amount of hypernatremia and hyperchloremia that could be caused in the prehospital environment is very manageable. A better question might be how much is too much? The simple answer is more than you should probably be administering in one ambulance run. The not so simple answer requires a more thorough understanding of their baseline renal status, electrolytes, and comorbidities. We should be happy to defer this decision to the emergency medicine physicians after they have a better understanding of the patient's unique pathophysiology.

Hopefully some of you are asking yourselves why we still use 0.9% saline if there are other options available. The chart below lists the contents of human plasma, along with the three primary resuscitation fluids used by hospitals. Each one of them has benefits and drawbacks that are worth discussing. Briefly, normal saline is a very clean solution with only two components, but it is very acidic and slightly hypertonic. Lactated Ringer's is slightly hypotonic and contains lactate, which is converted to bicarb by a healthy liver. Plasma-Lyte is perfectly pH balanced and is the closest chemically to plasma, but contains more potassium than most. It is typically the most expensive of the fluids, and not by a little bit.

Fluid	Na <sup>+</sup> (mEq/L)	K <sup>+</sup> (mEq/L)	Ca <sup>2+</sup> (mEq/L)	Mg <sup>2+</sup> (mEq/L)	Cl <sup>-</sup> (mEq/L)	Extras <sup>(-)</sup> (mEq/L)	pH	Osmolality(mOsm/L)
Plasma	140	4	5	2	103	Bicarb(25)	7.4	290
0.9% Saline	154	0	0	0	154		5.7	308
Lactated Ringer's	130	4	3	0	109	Lactate(28)	6.4	273
Plasma-Lyte	140	5	0	3	98	Acetate(27) Gluconate(23)	7.4	295

Until we come up with a synthetic version of human plasma we are stuck with these resuscitative fluids that all have benefits and drawbacks. Saline at 0.9% is a good choice for EMS given the limited information we have available in the prehospital environment. It has been around for over one hundred years because it's simple and safe in the short term. In an environment where knowing an individual patient's plasma chemistry is at best an inferred pipedream, less is probably better.

Keep up the great work. If you have any questions about this column, I can be reached at: [christopher.galton@urmc.rochester.edu](mailto:christopher.galton@urmc.rochester.edu)

## Introducing . . . Dr. John Schueckler

*What is your current job and how does it relate to EMS?*

I am an Attending Physician at Strong and Strong West in the ED. Right now, I am leading the Specialty Care Transport (SCT) Committee which is responsible for the new changes in protocols and policy. I am also Medical Director for Monroe Ambulance. Also, at this time I am working along with Dr. Farney and Dr. Cushman revamping the resident, pharmacy, and Physician Assistant/Nurse Practitioner EMS rotation experience. I am also part of the committee looking at cardiac arrests in the region, and improving all aspects of cardiac arrest care and outcomes in the prehospital setting.



John Schueckler

*How did you originally become interested in EMS?*

I was actually late to the game. I was never part of EMS until I did a ride along as a 4th year medical student and then I was hooked. During residency as part of my EMS experience I went to Firefighter 1 Bootcamp and was a member of the Barnard Fire Department. I did everything that I could to get involved with EMS during residency. My residency research project was in the prehospital arena looking at knowledge retention of toxidromes in prehospital providers. My first year out of residency I went to Rochester General Hospital, but still wanted to be part of EMS, and it was during this time that I went and got my EMT certification. I then came back to the Division of Prehospital Medicine after almost two years and decided to get my Paramedic certification as well. As of now I am just waiting to take the state exam. I wanted to do all of this so that not only could I be a better EMS Physician, but also to understand what all of you providers out there on the road know. Currently, I am a member of the Penfield Fire Department and one of the Monroe County EMS Physicians.

*Can you give a quick update on the status of the SCT program?*

SCT updates are up and running. As a committee, we are tackling new protocols such as the addition of blood during transport. We are also trying to establish better communication between the hospitals and providers allowing for safe transports for our patients. Also, we are in the process of setting up the first SCT educational conference that will have lectures, hands-on demonstrations, and a Morbidity and Mortality session.

*Is there anything else you would like us to know about you?*

I am looking forward to really getting involved in the education of the area's providers. I also want to let everyone know that if there you have questions on a case, or if you just want to chat, I am always available to providers on the road. Just stop and grab me when you see me.