



Agriculture Rescue Training

If you're not there, who will be?


October 22-23, 2021

Preventing Farm Injuries

Fire and EMS are Trusted Community Advisors

Casper Bendixsen, PhD and the RF-DASH team

*Director, National Farm Medicine Center
Deputy Director, Upper Midwest Agricultural Safety and Health Center
Deputy Director, National Children's Center for Rural and Agricultural Health and Safety*



RURAL FIREFIGHTERS DELIVERING AGRICULTURE SAFETY & HEALTH





Project Team

					
<small>Casper Bendixsen, PhD Principal Investigator</small>	<small>Kate Barnes, MS, MPH Project Manager</small>	<small>Kyle Koshak Research Coordinator</small>	<small>Andria Swenson, PhD Program Evaluator</small>	<small>Matt Pilz Programmer/ Analyst</small>	<small>Megan Tichenor Research Coordinator</small>
					
<small>Matt Kiefer, MD, MPH University of Washington - Emeritus</small>	<small>Dennis Murphy, PhD Penn State University - Emeritus</small>	<small>Dore Hill Penn State University - Emeritus</small>	<small>Jerry Minner Pittsfield Fire Fire Chief</small>	<small>Stephen Brown Penn State University</small>	<small>Jim Campbell, MS Farm Safety Specialist NVCAMH</small>



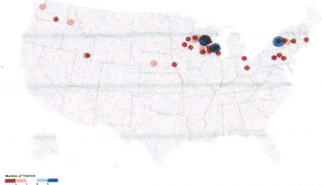
Collaborators

- Funded by Upper Midwest Agricultural Safety and Health (UMASH) Center
- Wisconsin State Fire Chiefs Association
- Wisconsin State Firefighters Association
- South Area Fire Emergency Response District (WI)
- South Central College (MN)
- Northcentral Technical College (WI)
- Penn State Extension
- McMillan Warner Mutual Insurance
- Professional Dairy Producers of Wisconsin (PDPW)
- Agricultural Safety and Health Council of America
- New York Center for Agricultural Medicine and Health
- Central States Center for Agricultural Safety and Health (CS-CASH)
- Utah State Extension
- Pacific Northwest Agricultural Safety and Health (PNASH) Center







RF-DASH

- Farmers expressed willingness to make changes if given advice from their local fire department
- Program designed to equip rural firefighters and EMS with agriculture health and safety knowledge
- 5 train-the-trainer events
- Trained over 70 fire and EMS trainers
- Trained over 30 trainers in other regions





Trained RF-DASH Personnel Locations





RF-DASH

- Five modules
 - 1) Intro to Ag Emergencies
 - 2) Pre-Planning and Mapping farms
 - Farm MAPPER
 - 3) Farm Hazard Analysis
 - Safer Farm
 - 4) Farm First Aid
 - 5) Reaching out to the Farm Community
- Eight hour training (4 hours in the classroom and 4 hours at a local farm)
- https://players.brightcove.net/1964492288001/default_default/index.html?videoId=5850970308001

Intro to Ag Emergencies

- Fire and EMS demographics
- Accumulation of incidents
- Mechanisms of injury
- Costs to communities

Pre-Planning and Mapping Farms

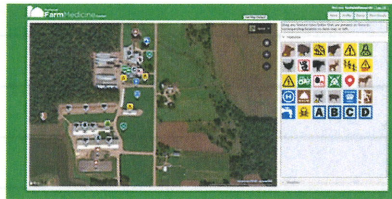
- Compared w/ other right-of-way scenarios
- An altruistic ask, "This is to protect Fire/EMS personnel."
- Improve and expedite response
- OSHA regulations may or may not be relevant
- Other versions of maps and preplans
- This is more than maps and layouts
- Building the relationship



Farm MAPPER

Interactive web tool that provides emergency responders onsite information about hazards and physical layouts of agricultural operations aimed to make responding to emergencies on farms safer.

<https://www.youtube.com/watch?v=43HibmCnMDc>



<https://www.farmmapper.org>



Farm Hazard Analysis

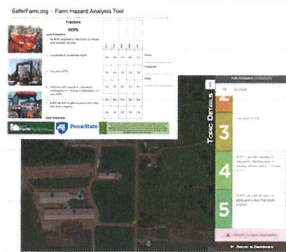
- "What is the greatest risk for human/property loss here?"
- How do we frame critique versus advise



Safer Farm

Simple method for evaluating and recommending corrections for hazards in agricultural environments (perform a safety consultation).

https://www.youtube.com/watch?v=LKtmHrqC_HI



<https://saferfarm.org/>



Farm First Aid

- Barriers to care: personnel, time, and distance
- Give farms good things to do
 - Improving injury outcomes
 - Mitigate feelings of uselessness, fault, etc.
- Making farm families and personnel see the potential danger
- Give them skills to handle an incident well
- Punctuate with injury prevention/mitigation strategies



Farm Community Outreach

- Friendly targets, local champions, high risk folks
- Insurance companies potential role
- Use farm events
- Recruit the farm community to Fire and EMS
- Frame the work as community risk analysis and mitigation (NFPA 1300) for local leadership



Expanding Outside the Midwest

- Collaborated with northeast colleagues and conducted training in New York state
- Strong interest and response from various regions around the country
- Piloted a national training to see if RF-DASH was generalizable enough for use in other regions of the country as well as increase partnerships between stakeholders.



National Training

- Invited 18 individuals to Minneapolis, MN
 - Washington, Idaho, Utah, Minnesota, Wisconsin, Nebraska, Ohio, Pennsylvania, and New York
- Fire and EMS partnered up with their local Ag Safety and Health Specialist in their state
- Two National Fire Protection Association (NFPA) representatives attended
 - Focus on eliminating hazards
 - Create codes and standards for fire/EMS departments to follow



National Training

- 8 hour training
 - Engaging in five modules and hands-on application of the program at a local farm
- Round table discussion
 - Program effectiveness for fire/EMS to implement in their regions
 - Ways to improve program
 - NFPA



International

- Working with Canadian Agricultural Safety Association (CASA) to implement version of program in their regions



CASA | ACSA
CANADIAN AGRICULTURAL SAFETY ASSOCIATION
ASSOCIATION CANADIENNE DE SÉCURITÉ AGRICOLE



Results

- Flexible program model
- Receptivity and enthusiasm by Fire/EMS on RF-DASH has been tremendous
- National Fire Protection Association (NFPA) Standards i.e. 1500
- Triple threats
 - Fire/EMS
 - Farmer
 - Educator/trainer
- Positive media attention and community response
- Fire/EMS around U.S. searching for programs to fulfill gap in pre-planning and hazard reduction on farms

"There's a huge lost opportunity with us not doing essentially pre-incidence plans at these agricultural sites because we do it all the time for our local industry and factories. However, for some reason, it just slips the mind that we don't visit our farms. We don't get that eye-on, we see what everything looks like, and get familiar with that. That was the whole eye-opening takeaway for me with the whole thing." - RF-DASH National Trainer

"I think that's the plus of the program, taking rural firefighters and engaging them with that population. It's a small enough community that everyone knows each other. There's already a relationship there so it's not a government agency or an insurance company or something threatening. It's someone who knows them and says, 'Dude, look about you. Let's work together to make it better.'" - RF-DASH Trainer

"When I see a victim of a farm accident, it's just like when it's someone from the fire service, even if I don't know them, it feels like I do because they are the brother-in-law. Anything I can do to help make the ag industry safer, I'm more than willing to do." - RF-DASH WEMMA Trainer



Outcome and Future Efforts

- Development of a training manual
- Development of a website
- Increased networking and communication
- Create flexible materials for trainers
 - Ability to conduct a virtual synchronous and asynchronous training
- Focusing on sustainability of the program beyond the grant
- Merge RF-DASH into NFPA standards
- Merge RF-DASH into FEMA Emergency Preparedness Systems
- Continue to improve Safer Farm and Farm MAPPER
- Establish Canada's version of RF-DASH program



Funding Acknowledgement

UMASH Pilot Award P005501204 (2014 - 2016)
CDC/NIOSH U54 OH010170 (UMASH) (2016-2021)

Project Website

<http://rfdash.org/>



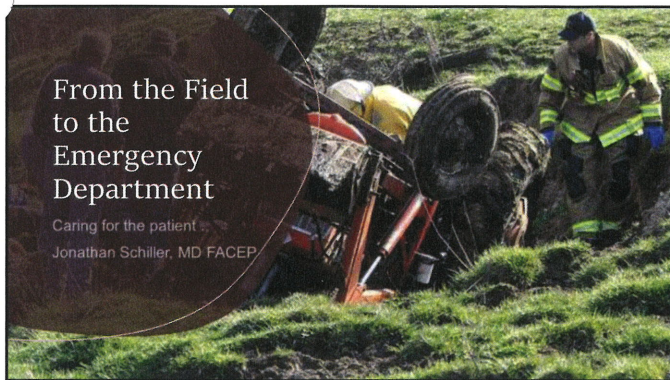
Questions?

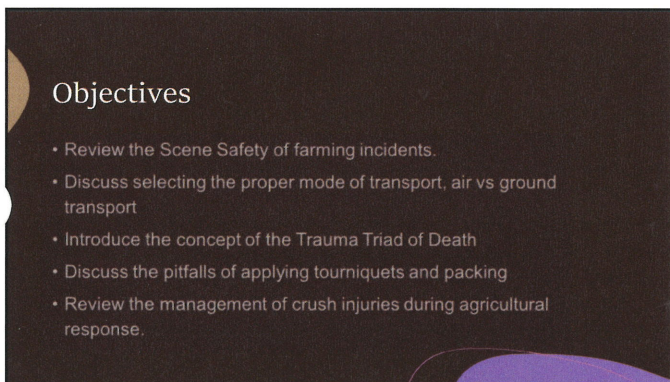
- Connect with us!
- rfdash@marshfieldresearch.org
- 715-389-7947

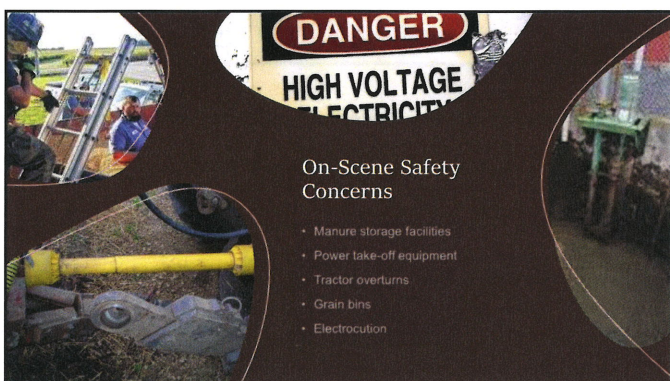


@FarmMedicine
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@umash_umn










What's the Best Transport Mode?

- Air
 - Transport can be faster
 - Critical Care Equipment
- Ground
 - Inclement weather



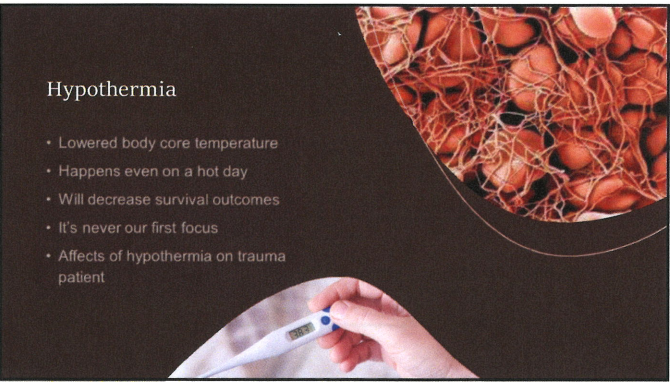
Trauma Triad of Death



- If you focus on stopping the Triad, you can save your patient
 - Hypothermia
 - Acidosis
 - Coagulopathy

Hypothermia


- Lowered body core temperature
- Happens even on a hot day
- Will decrease survival outcomes
- It's never our first focus
- Affects of hypothermia on trauma patient



Blood pH Levels

Death	Acidosis	Normal pH	Alkalosis	Death
6	7	7.34	7.38	7.8
9				

It is vitally important to maintain the body acid alkaline balance at the correct pH level to enjoy good health and avoid degenerative disease.




Acidosis

- Acidosis: Lower than normal pH due to increased hydrogen ion concentration.
- Effects of Acidosis
- 7.35-7.45

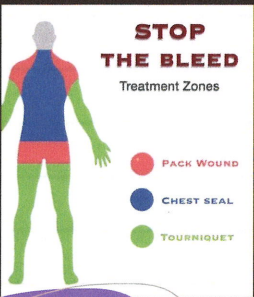
Coagulopathy

- **Coagulation system:** A temperature- and pH-dependent series of complex enzymatic reactions that result in the formation of blood clots to stop both internal and external hemorrhage.
- **Coagulopathy:** Any disorder of the blood that makes it difficult for blood to coagulate



STOP THE BLEED

Treatment Zones



The pitfalls of Tourniquets and Wound Packing

- Not using a TQ or waiting too long
- Not making a TQ tight enough to stop distal pulse
- Not using a second TQ
- Periodically loosening a TQ
- Using an improvised TQ
- Packing a wound with a hemostatic gauze product and assuming you are done
- Letting the pain stop you from tightening
- Doing nothing when a tourniquet or wound packing supplies are not available

Management Guidelines for the Treatment of Agricultural Injuries

- Control bleeding
- Rapid transport
- Temperature control
- Maintain pH levels through proper ventilation and fluids



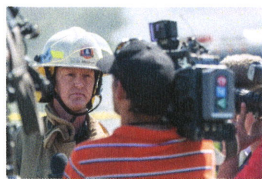
Management of Crush Injury

- Initial Management
 - IV fluids
 - Tourniquet
- Hypotension
 - Continue fluid administration
- Metabolic Abnormalities
 - Sodium Bicarbonate
 - Calcium gluconate/chloride
- Secondary Complications
 - Treat open wounds



Review

- Scene Safety during farming incidents.
- Air vs ground transport
- Trauma Triad of Death
- Tourniquets and packing
- Crush injuries during agricultural response.



Partnering with Media to Prevent Injuries in Agriculture

Scott Heiberger
Communications Manager - National Farm Medicine Center



How We Receive News

- Think local
- Social media amplifies "word-of-mouth"
- Traditional media layers and reinforces your messages



The Media Landscape

- Newspapers
 - Check out local community weekly papers
 - Agriculture weekly newspapers
 - Country Today
 - Wisconsin State Farmer
 - Agri-View
- Television
 - More likely to encounter TV reporter at a scene
- Radio
 - Farm broadcasters
 - Highly respected in rural communities
 - Listeners see them as trusted friends



Spokesperson and Media Relations Plan

- Communication goals
 - Building trust with community and local media
 - Motivating and influencing safety behavior in community
 - Setting stage for future safety messaging
 - Promoting fundraisers for new equipment
- Spokesperson
 - Embodies a department's identity
 - Personifies response efforts
 - Human connection to the public
- Successful spokesperson = fewer incidents of illness, injury, and death in community



Spokesperson and Media Relations Plan

- Spokesperson responsibilities
 - Establish relationships with local media agencies before an incident
 - Keeping reporters out of harm's way on scene, yet facilitating their coverage
 - Provide reasonable timeframe for updates
 - Understand journalism deadlines
- Remember three B's!
 - Be credible
 - Be available
 - Be helpful



Preparing for Interviews

- Scheduled
 - Ask reporter if they have an angle in mind
 - Do your homework
 - Questions in advance?
 - What do you want to accomplish?
 - Recorded or live?
 - Don't be afraid to say you don't know and you will get back to them
 - RELAX!
- On-Scene
 - Always assume you are being recorded
 - Don't speculate!
 - Include prevention message
 - Don't say "no comment"
 - Avoid saying terms like "it was a freak accident"



Additional Media Interview Tips

- Don't use firefighter jargon
- Don't argue with a reporter
- Don't play favorites
- Treat reporters with respect
- Know a reporters deadlines
- Don't be intimidated
- Monitor news coverage following interview to ensure accuracy
- Special TV tips: a) dress the part, look professional; b) no sunglasses; d) no smoking or chewing.



Power of Stories

- Stories are powerful and can influence behavior
- Incidents provide "teachable moments"
- Consider issuing a press release/incident report
 - Incident location
 - Time called
 - What responders found
 - Actions taken
 - Final results
 - Safety tip/prevention message and action step



Photo courtesy of Marshfield Clinic Health System



Putting it All Together - "Tractor vs. milk truck crash ..."

- Nov. 14, 2019 at Wisconsin EMS Association meetings, training given on agricultural risks and how to be safety advocates. Stratford Chief Tim Carey attends.
- November 18, 2019, Stratford Fire (with mutual aid from Mosinee and Marshfield Ambulance) responded to fatal tractor/milk truck crash.
- Chief Carey puts training to use, communicating with local media about actions that farmers and the community can take to prevent such incidents.



Fire Chief, Tim Carey, talking with News Channel 7 about the incident and his message on how it can be prevented courtesy of WSAW.com.



Safe Depictions

- What we write, say, and images shown can promote unsafe farm practices
- [Media Guidelines for Agricultural Safety](#) -List of do's and don'ts for keeping folks safe and showing dangerous farm practices



National FarmMedicine Center

Media Relations Resources

- [PIO 101: The basics of media relations for the fire service \(Firehouse\)](#)
- [PIO 101: Tips for media interviews \(Firehouse\)](#)
- [The Media's Role in a Crisis, Disaster, or Emergency \(Centers for Disease Control and Prevention\)](#)
- [Emergency preparedness planning: media relations \(The Hartford\)](#)
- [Media guidelines for agricultural safety \(Childhood Agricultural Safety Network\)](#)

National FarmMedicine Center

Questions?

Connect with us!
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MYTH CRUSHING

3 THINGS WE WERE TAUGHT WRONG ABOUT
CRUSH INJURY MANAGEMENT

THINGS YOU HAVE HEARD..

1. "WAIT!!



WE HAVE TO PUSH BICARB BEFORE
WE FREE UP THEIR LEGS!"

2. "IF YOU SEE PEAKED T WAVES



=



PUSH CALCIUM CHLORIDE"

3. IF YOU SUSPECT HYPERKALEMIA

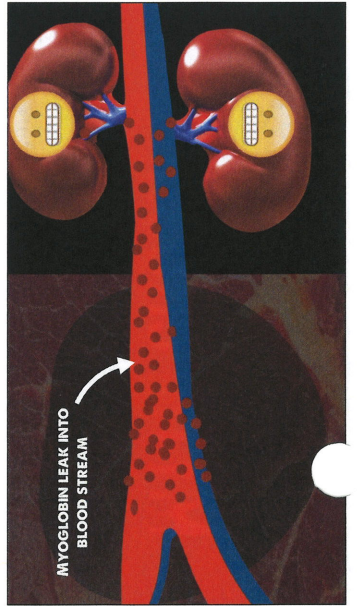
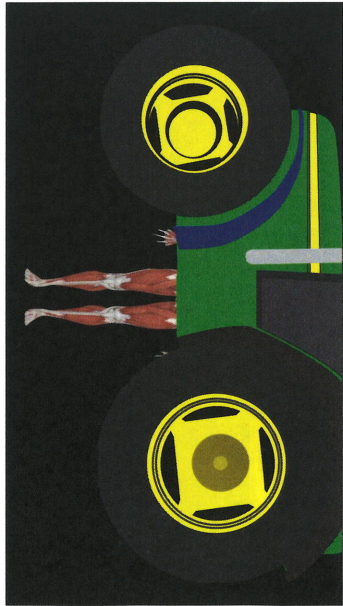
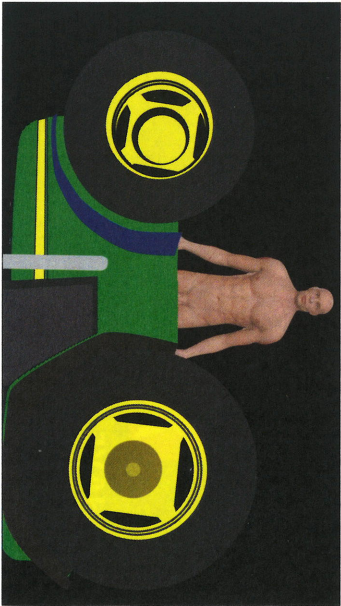


DO NOT USE LACTATED RINGERS!!

"WAIT!!



WE HAVE TO PUSH BICARB BEFORE
WE FREE UP THEIR LEGS!"





> J Trauma. 2004 Jun;56(6):1161-6. doi: 10.1097/01.ta.0000132761.79627.10.

Preventing renal failure in patients with rhabdomyolysis: do bicarbonate and mannitol make a difference?

Carlos V R Brown¹, Peter Rhee, Lissa Chan, Kelly Evans, Demetrios Demetriades, George C Velmagos

Affiliations + expand

PMID: 15271124 DOI: 10.1097/01.ta.0000132761.79627.10

Abstract

Background: The combination of bicarbonate and mannitol (BICMAN) is commonly used to prevent renal failure (RF) in trauma patients with rhabdomyolysis despite the absence of adequate evidence. The purpose of this study was to evaluate the effectiveness of BICMAN in preventing RF in patients with rhabdomyolysis caused by trauma.

Methods: This study was a review of all adult trauma intensive care unit (ICU) admissions over 5 years (January 1997–September 2002). Creatinine kinase (CK) levels were checked daily (abnormal >520 U/L). RF was defined as a creatinine greater than 2.0 mg/dL. Patients received BICMAN on the basis of the surgeon's discretion.

Results: Among 2,083 trauma ICU admissions, 85% had abnormal CK levels. Overall, RF occurred

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Preventing renal failure in patients with rhabdomyolysis: do bicarbonate and mannitol make a difference?

Results: Among 2,083 trauma ICU admissions, 85% had abnormal CK levels. Overall, RF occurred in 10% of trauma ICU patients. A CK level of 5,000 U/L was the lowest abnormal level associated with RF: 74 of 982 (19%) patients with CK greater than 5,000 U/L developed RF as compared with 143 of 1,701 (8%) patients with CK less than 5,000 U/L ($p < 0.0001$). Among patients with CK greater than 5,000 U/L, there was no difference in the rates of RF, dialysis, or mortality between those who received BICMAN and those who did not. Subanalysis of groups with various levels of CK still failed to show any benefit of BICMAN.


Ca only
CALCIUM CHLORIDE
 INJ USP 10%
 1.36 mEqg/mL
 (100 mg/mL)
 13.6 mEqg
 (1 g)
 10 mL
 LIVER-IT™ LIVER-LOCK PRE-FILLED SYRINGE
 Single use. Do not reuse for another patient.
 For LOW ANEMIA/ANEMIA USE

A 3x3 grid of white squares, each containing a black plus sign and a cracked egg-like shape, set against a dark, textured background.

THE HEART

CALCIUM CHLORIDE

THE HEART

CALCIUM CHLORIDE

www.afuronline.org

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¹Rice University, Houston, TX
²Section of Emergency Medicine, Baylor College of Medicine, Houston, TX

Student: papapoulus@gmail.com¹, papapoulus@rice.edu
 Mentor: zehedi.rafique@bcm.tmc.com², rafique@bcm.edu

Rosa D. Pando¹, Ilse M. F. et al., Zeynep R. et al.

Rice University, Houston, TX

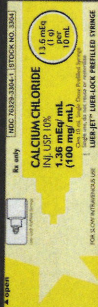
Student: pappal.ryan@gmail.com*, pappal.ryan@rice.edu
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ABSTRACT T-wave bias traditionally has been associated with hyperlipidemia cases; previous studies have called their reliability for hyperlipidemia diagnosis into question. This study examined 99 ESD patients undergoing 756 patient visits. Linear regression and receiver operating characteristic (ROC) analyses were utilized to evaluate the reliability of peak T-wave. A diagnostic criterion for hyperlipidemia, based on V4-V6 leads V2-V6 and serum potassium levels was found, $\text{AUC} = 0.23$, $\text{AOR} = 0.17$, and $p < 0.001$. Poor correlations between T/R ratio (leads front and serum potassium) were found, $r = 0.2$, $p = 0.17$, and $p < 0.001$. R values ranged from 0.03 to 0.05. ROC analysis found poor sensitivity and specificity of T/R ratio as a predictor of hyperlipidemia (area under the curve: 0.41 ± 0.06), and $\text{AOR} = 0.5$, $p = 0.17$. We concluded a sensitivity of 0.83 with a specificity of 0.71 for the T/R ratio. The T/R ratio was not a useful tool for the early identification of hyperlipidemia in ESD patients presenting to the emergency department.

HOW RELIABLE ARE PEAKED T WAVES?

SENSITIVITY SPECIFICITY
59.5% 48.0%

WHEN IN DOUBT..



WHIP IT OUT..

IF YOU SUSPECT HYPERKALEMIA



DO NOT USE LACTATED RINGERS!!

Solution	Na ⁺	Cl ⁻	K ⁺	Ca ²⁺	Lactate ⁻	Acetate ⁻	Osmolality*	pH
Sodium Chloride 0.9% (normal saline)	154	154	—	—	—	—	308	5.5
Lactated Ringer's	130	109	4	2.7	28	—	273	6.5
Plasma-Lyte A	140	98	5	—	27	294	294	7.4
Blood	135-145	96-106	3.5-5.0	8.5-10.5	0-1	NA	275-295	7.35-7.45

Bottom Line

Balanced fluids (Lactated Ringer's and Plasma-Lyte A) containing potassium can safely be used in patients with hyperkalemia. Given their more neutral pH, they may be preferred over normal saline in some patients.

