



SAVING LIVES - REDUCING RISK

From The Editor

Greetings. This quarter we are looking for your feedback on an important issue. I have asked our Pediatric EM expert, Dr. Todd Zimmerman, to author this month's newsletter. Todd is the Medical Director of Pediatric Emergency Medicine for the Alexian Brothers Health System in the Chicago Metro area and has an extensive background in

medical malpractice issues. We are interested in hearing whether you would like to see a separate Pediatric EM newsletter on a regular basis or if we should utilize our regular newsletter to include a broader range of information. Please click the link to take a 15-second survey: [TSG Newsletter Survey](#). As you will see, this newsletter is full of outstanding information, and we would like to get your thoughts on the issue.

Thanks!
Dr. Dan Sullivan ■

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Pediatric Submersion



This section is a brief synopsis of a July 2011 *WebMD* article entitled "Near Drowning" written by Michael Verive, MD.

Whereas drowning is defined as death that occurs within 24 hours of the submersion, near drowning is defined as survival beyond 24 hours after the submersion, even if death eventually occurs. Near drowning is the second leading cause of death and disability in children.

Submersion injuries can be warm-water ($\geq 20^{\circ}\text{C}$) or cold-water ($< 20^{\circ}\text{C}$) drownings.

Up to 15% of drownings are considered to be dry submersion injuries, in which little or no water is found in the lungs. Essentially, all damage ensues from hypoxemia.

Coxsackie Viral Infections: Coming To An ED Near You!

By Dr. Todd Zimmerman

Coxsackie viral infections will likely be increasing soon; we see them more commonly in the late summer/fall. They are a part of the enterovirus family that resides in the human digestive tract. The spread of this virus is usually person-to-person; it has often been found on unwashed hands and surfaces. A Coxsackie infection will frequently present with mild flu-like symptoms, but this virus can certainly cause more moderate-to-severe disease. Let's take a quick look at how these more serious infections can play out: the signs/symptoms; the red flags for the practitioner; and finally some important documentation points and tips for the practitioner.

Hand, Foot & Mouth Disease

Signs/Symptoms: Painful blister-type lesions in the mouth, throat, lips, tongue, and palate, and on the palms, soles, and sometimes the buttocks. Fever.

 **Red Flags for the Practitioner:** Dry mucous membranes, poor PO intake, decreased urination. The patient can become severely dehydrated due to painful swallowing.



Tips/Documentation Points: Patients may not want to swallow saliva due to pain, so even though they may be dehydrated, they might be keeping what saliva they do have in their mouth for a while.

Pay close attention to the other signs of dehydration and document them; think of the patient's heart rate, mentation, skin turgor, and urine output. Be concerned about tachycardia that is out of proportion to the fever.

CNS hypoxemia can result in cerebral edema, which can be a late finding.

Pulmonary effects can result from alveoli damage, impaired gas exchange, or late pneumonia.

Cardiovascular injury can occur from hypoxemia and from hypovolemia/hypotension due to increased capillary permeability.

Clinical course may be complicated due to multisystem organ failure, ATN and Rhabdomyolysis.

"Bimodal" age distribution has the highest risk: <4 years of age in pools/baths, and 15-19 years of age in natural bodies of water.

Think of secondary causes of drowning: trauma, seizures, drugs, syncope.

Remember warming, fluids, O2 sat monitoring.

Even if history is trivial, consider a minimum of 6-hour observation prior to discharge.



Herpangina

Signs/Symptoms: Blisters and ulcers in the throat. Throat pain, fever.

Red Flags: Same as Hand, Foot and Mouth Disease.

Tips/Documentation

Points: Same as Hand, Foot and Mouth Disease.

Hemorrhagic Conjunctivitis

Signs/Symptoms: Eye pain, eye redness, watery eyes, eyelid swelling, blurred vision and photophobia.

Red Flags: This may be confused with Bacterial Conjunctivitis. Evaluate each patient individually to decide whether antibiotics are indicated, as bacterial vs. viral conjunctivitis can be tricky in the ED.

Tips/Documentation

Points: Have a low threshold to Fl-stained red eyes; patients can rub their eyes excessively and scratch their corneas, especially the younger kids. Document visual acuities if possible. Consult with ophthalmology if you are unsure of the diagnosis.

Corticosteroids have little or no benefit.

Antibiotics are required only if submersion was in sewer or contaminated water.

Prognosis is directly related to duration and degree of hypoxia. Degree of hypoxemia is often under-recognized.

Give 100% O2; if you cannot maintain adequate oxygenation, intubate with use of PEEP.

Remember the potential for cervical spine injuries.

Consider child abuse, neglect, assault and Munchausen's Syndrome by Proxy.

IMPORTANT:

Remember that after a near drowning, the child may look well in the ED and have no signs or symptoms that there is any problem. Keep in mind that cerebral edema and pulmonary edema can develop up to 24 hours after the event. Admit these children into the PICU for observation overnight.

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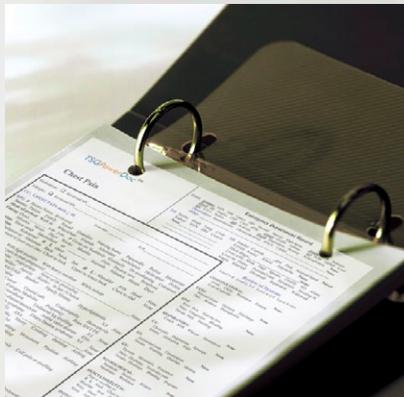


Viral Encephalitis/Meningitis

Signs/Symptoms: Headache, nausea, vomiting, photophobia, nuchal rigidity (+/- in smaller children, babies), decreased activity.

 **Red Flags:** Lethargy (bordering on the level of unconsciousness; not just less active); irritability (where the patient cannot be consoled; not simply fussy); unexplained tachycardia; signs of sepsis.

Tips/Documentation Points: If you suspect your patient has meningitis or encephalitis, then of course your documentation must reflect this. But because this is a potential serious possibility that can occur with Coxsackie virus, the documentation must reflect that the patient is, in fact, not meningitic (if this is clinically the case). This can be accomplished by painting a picture that reflects the wellness of the patient: e.g., in the appearance section, document that the patient appears



well; does not appear ill or toxic or septic; is not lethargic or irritable; is appropriate for age, etc. In the physical exam, document that there is no nuchal rigidity, the patient has warm extremities and normal pulses and normal capillary refill. These are the basics, of course, but the basics are often what we forget to document.

Viral Myocarditis

Signs/Symptoms: This can be quite difficult to diagnose in the Pediatric population. The patient may not be able to express that they have vague chest pain or mild shortness of

breath or positional chest pain. Therefore, we still need to inquire about this, but look for tachycardia out of proportion to the fever, unexplained fever, unexplained tachypnea, unexplained fussiness, or increased work of breathing. Sometimes, just remembering that a simple Coxsackie viral infection can lead into

myocarditis may remind you to order an ECG and CXR to get you started down that pathway.

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- ➔ Appendicitis in Children (coming soon)
- ➔ Case 02: A 15-year-old male with Abdominal Pain
- ➔ Case 04: A 14-month-old Febrile Child
- ➔ Case 06: A 23-month-old child with a Fever
- ➔ Case 13: Pediatric Missed Meningitis
- ➔ Cognitive Errors in Medicine Part 1
- ➔ Cognitive Errors in Medicine Part 2
- ➔ Community-Acquired Methicillin-Resistant Staph Infections (CA-MRSA)
- ➔ Head Injury
- ➔ Neonatal Emergencies
- ➔ Optimizing Communication in the Emergency Department
- ➔ Orthopedic Injuries Part 1
- ➔ Pediatric Abdominal Emergencies
- ➔ Pediatric Infections
- ➔ Pediatric Meningitis
- ➔ Pediatric Respiratory Emergencies
- ➔ Torsion Testicle

[click on course name to see course description](#)

Tips/Documentation Points: Addressing the vital signs is absolutely critical. For example, if there is unexplained tachycardia, then you have an obligation to explain it. Failure to do so would certainly increase your risk exposure, regardless of whether the pulse rate remained abnormal, was normalizing, or wasn't even rechecked.

Viremia/Viral Sepsis

Signs/Symptoms: Sepsis in children can be very difficult to diagnose, especially from the ED. In the Pediatric population, sepsis is often diagnosed once the child is already admitted; it is common for the child to exhibit little if any signs of sepsis while in the ED. The child may appear normal with some mild tachycardia, or may be lethargic, irritable, or somnolent, have increased work of breathing, unexplained tachycardia, and rarely may present in florid shock. Again, if we are clinically suspecting Coxsackie virus, knowing that there is a possibility it could turn into viral sepsis will hopefully put us on alert.

Tips/Documentation

Points: Do not accept that a high heart rate is due to the fact that you are dealing with a child; prove it with what you see and how you document.





However, if that is the case, have your documentation paint the picture of wellness. It is sound documentation to notate that the 5-year-old child's HR is 150 while he's running around the room, playing, trying to kick his sister, or screaming and trying to bite you; it's another thing to think to yourself that the HR is 150 because this is a child, and then fail to provide any supporting documentation. When reviewing the chart prior to discharge, is there one BP that sticks out? Maybe there is one BP that is low? Do not blow that off because the other BPs are normal. Carefully investigate it and explain it reasonably and soundly. This could be your only sign that a patient is becoming or has become septic.

You should be able to see a common theme here: pay attention to the vital signs in the Pediatric population. Do not ignore them; do not brush them off. They will help identify potentially ill children and will help decrease your risk exposure ■

A Synopsis On Dry Drowning

By Dr. Todd Zimmerman

This is a brief review of a July 2008 article from WebMD entitled "S.C. 'Dry Drowning'"



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Death Draws Attention" by Denise Mann. As the name entails, dry drowning is drowning without water. In dry drowning, you are not succumbing to an immediate submersion in water; rather it is a delayed effect of getting smaller amounts of water into the lungs. This can ultimately lead to laryngospasm, which is a reflex to limit the amount of water that enters the lungs; this can lead to respiratory arrest, ARDS, electrolyte imbalances from the water (even small amounts that enter into the lungs), and finally, arrhythmias.

Dry drowning can occur any time from 1 to 24 hours after an incident.

Risk factors for dry drowning: inexperienced swimmer, asthmatic, underlying lung disease.



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Dr. Lloyd George Connelly
Sunnyside Medical Center (Pediatric Meningitis)

Utilize your hospital's pharmacist to check your doses.

Ask the nurse to perform the calculation of your medication dose as a recheck. Write out the medication and the dose, including units, in its entirety; write "milligrams" instead of "mg"; write "micrograms" instead of "mcg"; write "Morphine" instead of "MSO4."

Always double-check your own dose!!!

The CDC did not have any statistics on the number of dry drownings per year at the time this article was published.

Early warning signs for dry drowning:

- Excessive coughing
- Shortness of breath
- Chest pain
- Any mental status change

Tips To Help Avoid Medication Errors In the ED

by Dr. Todd Zimmerman

Check your medication doses with an accepted Pediatric Medication dosing resource such as the *Harriet Lane Handbook* or the PDR.

Fireworks-Related Injuries To Children

John M. Howard, DO. Review of "Fireworks-Related Injuries to Children" from *Pediatrics*; 108; 190.

From a study using data from 1999, approximately 8,500 individuals were treated in U.S. hospital EDs for fireworks-related injuries; 45% were children under 15 years of age. The U.S. Consumer Product Safety Commission reports that these numbers remain stable even through 2010 data.





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Heat Stroke In Children

The areas most typically involved include hands (40%), eyes (20%), and head and face (20%). It is important for physicians to remember that one-third of fireworks-related eye injuries result in permanent blindness.

From the 1999 data set, 16 people died as a result of injuries associated with fireworks. Every form of firework, including those considered "safe," has been associated with injury or death.

There were 20,100 fires caused by fireworks in 1997 alone, causing roughly \$22.7 million in property damage. Each July 4th, more fires are caused by fireworks than all other causes of fire combined.

Children and their families should be encouraged to enjoy fireworks at public fireworks displays conducted by professionals rather than purchase fireworks for home or private use ■



John M. Howard, DO. Review of "Heat Stroke in Children" (by Paul Ishimine) from *UpToDate*, last updated May 2011.

The definition of heat stroke includes an elevated core body temperature of 104°F (40°C). This must be accompanied by CNS dysfunction with environmental heat exposure. This represents a failure of the body's ability to maintain thermoregulatory homeostasis and is a true medical emergency.

There are two forms of heat stroke: 1) Classic heat stroke arises from environmental exposure and is more common in younger children who cannot escape from hot environments (i.e., cars, car seats) and those with an underlying medical condition that impairs thermoregulation. 2) Exertional heat stroke occurs in young athletes or military recruits who engage in heavy exercise during

periods of high ambient temperature and humidity. *continued on page 10*



ACEP Scientific Assembly Lectures

by Dan Sullivan, MD, JD, FACEP

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Sat., Oct. 15, 8:00 am - 8:50 am

2 Taking the Stand: Real Malpractice Cases, Bad Outcomes - You Decide

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3 Medical Liability: A Short Cut to Resolution

Sun., Oct. 16, 10:00 am - 10:50 am

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The diagnosis is based on clinical findings, and the distinction between heat exhaustion and heat stroke may be unclear. However, children with elevated temperature and CNS findings



should be treated as victims of heat stroke. Physicians must remember that pre-hospital cooling may have lowered a patient's core body temperature prior to arrival in the ED.

CNS symptoms may be subtle (impaired judgment or inappropriate behavior) or significant (seizures, delirium, hallucinations, ataxia, dysarthria, or coma). These children may also experience tachycardia, tachypnea, and hypotension. Skin may be

flushed and warm or diaphoretic. Vomiting and diarrhea are also common. If the patients develop coagulopathy, then purpura, hemoptysis, hematemesis, melena, or hematochezia may be encountered.

Treatment includes the following: airway support to maintain oxygenation/ventilation due to CNS effects; fluid resuscitation (be careful to avoid fluid overload). These patients may have poor response to fluids and may require central venous pressure monitoring. These children may have poor cardiac contractility and systemic vascular resistance and may require vasopressors.

Active cooling efforts are required to prevent end-organ damage; for example, application of ice packs to neck/axilla/groin and IVF at room temperature. These measures should complement evaporative cooling efforts; they should be discontinued when temperature reaches 100°F (38°C).

Midazolam should be added to prevent shivering during cooling. Physicians should anticipate further complications such as rhabdomyolysis, DIC, high-output cardiac insufficiency, renal failure, and hepatic failure ■

Thank You.

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