

Pediatric Quiz

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Summertime is a busy time for both Pediatricians and Parents alike. In days of old, children were often outside from daylight till dark; playing with friends and enjoying their summer break from school. It is a time when Pediatric injuries are potentially at their highest levels. Skateboards, bicycles, hover boards, swimming pools, jet skis, boats, go carts, and recreational sports such as basketball, golf, summer league softball and more. It is literally a smorgasbord of fun filled days. Oh, but the worries it brings for parents and grandparents who try to keep up with these youngsters! Things like sunscreen, insect repellent, meals t.i.d, water, and first aid for those lumps, bumps and scrapes. Calgon take me away! So we often escape to the beach for some needed rest and recuperation. Yet, our work is never far behind!

You are vacationing at a private beach when you notice a crowd of people gathered around a young child with the life guard present. Fearing a shark attack, you instinctively rush over rendering aid. It has, thus far, been a beautiful, hot, day at the beach with a temperature rising to 95 degrees resulting in a heat index over 100 degrees. Lying on the beach is a 6 year old male who had been exuberantly building a sand castle for some time. His sunscreen had clearly washed off as his skin was red and dry. Parents convey to the lifeguard he had been fine until an hour ago when he began to complain of a headache. He was offered a drink of water at that time, but refused and continued playing. He later complained of feeling sick to his stomach (nauseated) and vomited on his mother's beach towel. His parents thought it was just some bad seafood consumed last night at the local crab shack. His father stated, "I told him not to get in the water for at least one hour after eating breakfast this morning". Therefore, the child would not get into the ocean, at all, today. "I looked over, and he just fell out in the sand", stated his father. You intervene, checking for a pulse while the lifeguard sets up the AED. The child regains consciousness, but remains confused. He has a rapid, bounding pulse. He has no allergies and is not a known diabetic. You immediately direct the lifeguard to radio for 911 and emergency transport.

1. This 6 year old male is experiencing:

A: Heat cramps

B: Heat food poisoning

C: Heat exhaustion

D: Heat stroke

E: Heat induced MI

2. You quickly check his temperature with your non-contact COVID thermometer yielding:

A: 96^{oF}

B: 98^{oF}

C: 100^{oF}

D: 106^{oF}

3. EMS performs a fingerstick blood glucose. Based on your assessment and diagnosis, you would expect the child to be:

A: Euglycemic

B: Hyperglycemic

C: Not measurable

D: Hypoglycemic

4. A frequent neurologic finding in someone with this diagnosis is:

A: Exercise Associated Muscle Cramp (EAMC)

B: choreoathetosis

C: hemiballismus

D: Seizure

5. Treatment should involve hydration with:

A: water

B: IV D5 ½ NS

C: sport drink

D: IV NS

Heat related injury is a common occurrence among the elderly and children. Among those suffering heat related injury, children compose almost half (47.6%) of this population.¹ According to the CDC Picture of America Report on Heat Related Illness, from 1999-2010, 8081 heat related deaths occurred in the United States. Most occur between May and September (94%) and highest in July (39%) with a male to female ratio of 2:1.² Mortality for heat stroke ranges from 17% to 80%, depending on severity and age of the patient. Children are more susceptible to heat based illness for reasons such as greater surface area to body mass ratio, lower rate of sweating, and slower rates of acclimatization.³ Clinical presentation may range from heat edema, prickly heat, heat syncope, heat tetany, heat exhaustion, to most significantly, heat stroke.

Heat edema occurs within a few days of exposure to a hot environment and is a vasodilatory response in extremities, hands, and feet. Usually mild in nature and resolves spontaneously upwards of six weeks. Diuretics are not effective.

Prickly Heat is a common benign, maculopapular, erythematous, pruritic rash of infants. It is postulated to result from blockage of sweat pores with inflammation of sweat ducts. It can be prevented by loose clothing and avoiding over-bundling.

Heat syncope results from vasodilation, decreased volume, and decreased vascular tone. It is usually associated with poor acclimatization and heat edema. All other sources of syncope, especially cardiac, must be ruled out. Treatment is removal from heat, rehydration, and rest.⁴

Heat tetany, aka heat cramps, results from respiratory alkalosis secondary to hyperventilation or panting. This is typically seen in the thigh, calf, or stomach of children and often resolves with fluids and cool down period.⁵

Heat exhaustion results from strenuous exercise or work in high ambient temperature settings. Once cardiac output is exceeded, pre-syncope symptoms appear. Fatigue, malaise, gastrointestinal symptoms, cold, clammy skin, and increase in core body temperature just below 104°F commonly occur. A defining feature is retention of mental status. If left untreated, it will progress to heat stroke with increased morbidity and mortality. Treatment consists of cooling, oral or intravenous rehydration, and Trendelenburg positioning. Complications such as hyponatremia, hypokalemia, rhabdomyolysis, mild hepatocellular injury, and acute renal failure may occur.⁶

Heat stroke is characterized by a core body temperature above 105°F and altered mental status. Common neurologic manifestations may include loss of consciousness, delirium, headache, confusion, agitation, seizures, or coma. Skin is dry, flushed, without sweating, and hot to palpation. Rapid strong pulse is frequent. Gastrointestinal symptoms such as nausea and vomiting are often displayed. Compounding complications may include rhabdomyolysis, acute respiratory distress, hepatic and renal dysfunction, electrolyte abnormalities, cardiac events, and disseminated intravascular coagulopathy. Treatment should commence with A, B, C's of emergency care followed by rapid cooling. Mortality rates may approach 80%. Cold water or ice water immersion are frequently utilized to a goal of 101°F to avoid cardiac complications. Seven day rest before return to athletic events is recommended by American College of Sports Medicine.⁶

References:

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