

# PEDIATRICS EMERGENCY MEDICINE-QUESTIONS REVIEW

ELLIE RAKOVCHIK M.D., PGY 1

10/7/2011

# QUESTION #1

- A 6 days old neonate presents to the ED with a temperature of 39.6. Mom reports that he felt very cold last night and she measured a temperature of 36.3, only after she tucked her baby in with 3 blankets. Also reported that overnight, she observed an episode where the baby stopped breathing for few seconds and she thought he was turning blue; she picked him up and felt he was febrile. She brought him in to the ED immediately.

- The baby was born at 40 weeks gestation for a GBS negative single mom. On exam the baby is crying and inconsolable. His vitals are: T:39.6, HR: 165, RR:55, BP58/35, O<sub>2</sub> sat: 98%. His weight is in the 75<sup>th</sup> percentile. The rest of his exam is unremarkable with the exception of mild papular rash around his eye. A routine full sepsis work-up was performed, and the infant was started on appropriate doses of cefotaxime, ampicillin, and vancomycin. Which of the following changes or additions to management might be indicated?
  - A. Add Cefepime or Ceftazidime
  - B. Change treatment to Vancomycin and meropenem only
  - C. Add aminoglycoside and/or Clindamycin or Metronidazole
  - D. Add acyclovir
  - E. Continue with current antibiotics management

- The baby was born at 40 weeks gestation for a GBS negative single mom. On exam the baby is crying and inconsolable. His vitals are: T:39.6, HR: 165, RR:55, BP58/35, O<sub>2</sub> sat: 98%. His weight is in the 75% percentile. The rest of His exam is unremarkable with the exception of mild popular rash around his eye. A routine full sepsis work-up was performed, and the infant was started on appropriate doses of Cefotaxime, ampicillin, and vancomycin. Which of the following changes or additions to management might be indicated?

- A. Add Cefepime or Ceftazidime
- B. Change treatment to Vancomycin and meropenem only
- C. Add aminoglycoside and/or Clindamycin or Metronidazole
- D. Add acyclovir**
- E. Continue with current antibiotics management

For children >28 days of age who are normal hosts:

- Vancomycin (15 mg/kg, maximum 1 to 2 g, for the initial dose)
- PLUS cefotaxime (100 mg/kg, maximum 2 g, for the initial dose) OR ceftriaxone (75 mg/kg, maximum 2 g, for the initial dose)
- Consider adding an aminoglycoside for possible GU source and/or clindamycin or metronidazole for possible GI source

For children >28 days who are immuno-suppressed or at risk for infection with *Pseudomonas* species:

- Vancomycin (15 mg/kg, maximum 1 to 2 g, for the initial dose)
- PLUS cefepime (50 mg/kg, maximum 2 g, for the initial dose) OR ceftazidime (50 mg/kg, maximum 2 g, for the initial dose)
- PLUS an aminoglycoside

## For children who cannot receive penicillin:

- For children who cannot receive penicillin:
- Vancomycin (age appropriate dose)
- PLUS meropenem (<3 months: 20 mg/kg for the initial dose,  $\geq$ 3 months: 20 mg/kg, maximum 2 g, for the initial dose)

# For infants 0 to 28 days of age:

- For infants 0 to 28 days of age:
- Vancomycin (15 mg/kg for the initial dose)  
PLUS cefotaxime (50 mg/kg for the initial dose)
- PLUS ampicillin (50 mg/kg for the initial dose)
- PLUS gentamicin (2.5 mg/kg for the initial dose)
- Add acyclovir (20 mg/kg per dose) for suspicion of HSV infection.

# Disseminated HSV disease:

- Approximately one-fourth of neonatal HSV disease is the disseminated form.
- Usually presents in the first week of life with non-specific signs and symptoms of neonatal sepsis (e.g. temperature dysregulation, apnea, irritability, lethargy, and respiratory distress).
- As the disease progresses infant may present with hepatitis, ascites, NEC, neutropenia, thrombocytopenia, DIC, hemorrhagic pneumonitis, and meningoencephalitis.

- In advanced disseminated neonatal HSV disease, fever is often absent, and hypothermia, often accompanied by respiratory failure and shock, is more prominent

**Eye vesicles in neonate with herpes simplex virus (HSV) infection**



**Neck vesicles in neonate with herpes simplex virus (HSV) infection**




# QUESTION #2

- The use of corticosteroid in the management of septic shock is indicated in which of the following scenarios?
  - A. An 18 years old unimmunized college freshman who presents with wide pulse pressures, decreased mentation, diffuse purpura, and anuria and a random cortisol level of 10 mcg/dl
  - B. An 8 years old girl with E coli bacteremia and meningitis.
  - C. A 3 years old girl with short bowel syndrome secondary to NEC on chronic TPN with indwelling catheter, who presents with a temperature of 40c unresponsive and bp of 60/30
  - D. A 4 days old neonate with herpetic periorbital lesions and a temp of 39.1

# QUESTION #2


- The use of corticosteroid in the management of septic shock is indicated in which of the following scenarios?
  - A. An 18 years old unimmunized college freshman who presents with wide pulse pressures, decreased mentation, diffuse purpura, and anuria and a random cortisol level of 10 mcg/dl
  - B. An 8 years old girl with E coli bacteremia and meningitis.
  - C. A 3 years old girl with short bowel syndrome secondary to NEC on chronic TPN with indwelling catheter, who presents with a temperature of 40c unresponsive and bp of 60/30
  - D. A 4 days old neonate with herpetic periorbital lesions and a temp of 39.1

- The best indication for corticosteroid use is in children with catecholamine resistant shock. Equivalent 'low-dose' regimen in pediatrics would be hydrocortisone 3–6 mg/kg/day in three or four divided doses, or as a continuous infusion, with the use of adult doses after 50 kg.


- 
- Patients at risk include children with severe septic shock and purpura, children who have previously received steroid therapies for chronic illness, and children with pituitary or adrenal abnormalities. There are no strict definitions, but adrenal insufficiency in the case of catecholamine resistant septic shock is assumed at a random total cortisol level of  $<18$  g/dL


# Sepsis

- Systematic response to infection with bacteria, viruses, fungi, protozoa, rickettsiae.
- Sepsis = SIRS (systemic inflammatory response syndrome) + infection.

- 
- Sepsis can progress to severe sepsis (sepsis with organ dysfunction, hypoperfusion, or hypotension)
  - Severe sepsis can progress to septic shock (severe sepsis with persistent hypotension) → can progress to multiple organ dysfunction syndrome and death.

- The systemic response includes:
- Activation of complement system,
- Hageman factor (activates coagulation cascade, adrenocorticotrophic hormone and Beta endorphin release,
- stimulations of PMNs, stimulation of kallikrein-kinin system.
- TNF and other inflammatory mediators increase vascular permeability producing diffuse capillary leakage, reduced vascular tone and imbalance between perfusion and metabolic demands.

- 
- Clinical presentation:
  - Pt is warm with bounding pulses and brisk cap refill.
  - High output physiology, with decreased systemic vascular resistance; an elevated cardiac output; widened pulse pressure; and warm, dry extremities.
  - Later stages: Patients might have cool extremities with poor peripheral BP and perfusion.

- 
- Management:
  - Resuscitation, supportive care, and broad spectrum initial antibiotics.
  - Airway and breathing:
  - O<sub>2</sub>, O<sub>2</sub> monitoring, Intubation

- Restoration of tissue perfusion:
- Blood pressure (systolic pressure at least fifth percentile for age: 60 mmHg <1 month of age, 70 mmHg + [2 x age in years] in children 1 month to 10 years of age, 90 mmHg in children 10 years of age or older)
- Quality of central and peripheral pulses (strong, distal pulses equal to central pulses)
- Skin perfusion (warm, with capillary refill <2 seconds)
- Mental status (normal mental status)
- Urine output ( $\geq 1$  mL/kg per hour, once effective circulating volume is restored)

- IVF: Crystalloids, up to 60 mL/Kg before consideration of vasopressors.
- Low dose dopamine (2 to 5 mcg/kg/min) for children who are normotensive
- Beta adrenergic dose of dopamine (5 to 10 mcg/kg/min) or norepinephrine for those who are hypotensive and vasodilated
- Epinephrine for children who are hypotensive and vasoconstricted despite maximum beta adrenergic doses of dopamine and/or norepinephrine

# SOURCES:

\* Pediatric considerations.

Parker MM, Hazelzet JA, Carcillo JA  
Crit Care Med. 2004;32(11 Suppl):S591.


\* Advances in the emergency management of pediatric sepsis.

Melendez E, Bachur R  
Curr Opin Pediatr. 2006;18(3):245.

\* Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock: 2008.

Dellinger RP, Levy MM, Carlet JM, Bion J, Parker MM, Jaeschke R, Reinhart K, Angus DC, Brun-Buisson C, Beale R, Calandra T, Dhainaut JF, Gerlach H, Harvey M, Marini JJ, Marshall J, Ranieri M, Ramsay G, Sevransky J, Thompson BT, Townsend S, Vender JS, Zimmerman JL, Vincent JL, Intensive and Critical Care Medicine

Crit Care Med. 2008;36(1):296

- 
- \* Sepsis and Shock; Stormrken Anne, Powel Keith. Nelson Textbook of Pediatrics; Nineteenth Edition,
  - \* Septic shock: Initial evaluation and management in children; [Wendy J Pomerantz, MD, MS](#); UPTODATE ONLINE