A Severe Case of “the Blues”

Kirsten Rupp, MD
Laura Nell Hodo, MD
University of Utah, Department of Pediatrics
Primary Children’s Hospital

Disclosure of Financial Relationships

Dr. Rupp has no financial relationships to disclose.

Dr. Hodo has received compensation from the American Academy of Family Physicians as a CME speaker.
History of Present Illness

- 13 year old female presents after ingestion
- Found lethargic, with open pill bottles, thought were aspirin and phenazopyridine (Pyridium)
- Abdominal pain, nausea, and tinnitus
- Initially stable, then developed hypoxia and cyanosis

Additional Questions

- Toxidromes - aspirin or Pyridium?
- Expected exam findings?
- Expected lab abnormalities?
Physical Exam

T: 37.3 HR: 98 RR: 18 BP: 102/84 O2: 85% on RA

General: Drowsy but arouses. Answers questions appropriately

HEENT: Pupils are 3mm, equal, round, and reactive. Mucous membranes slightly dry. Slight perioral cyanosis is noted.

Cardiac: Regular rate and rhythm. No murmurs noted.

Respiratory: CTA bilaterally. No wheezes or crackles heard. No increased work of breathing.

Abdominal: Slightly tender throughout, but soft and non-distended. Normal bowel sounds.

Extremities: Slight cyanosis noted of fingers. No clubbing. No lower extremity edema.

Skin: Besides cyanosis, no other rashes or lesions.

Neurological: Fatigued, but intact strength and reflexes noted.

Differential Diagnosis: Ingestion and Hypoxia

- Pulmonary edema
- Aspiration pneumonitis/pneumonia
- Hypoventilation
- Asthma
- Foreign Body
- Pulmonary Embolism
- Congenital heart disease
- Pneumothorax
- Derangement in oxygen delivery
Additional Exam Findings

- No improvement in SpO2 when placed on supplemental O2
- Progressively increasing perioral cyanosis

Differential Diagnosis: Hypoxia Unresponsive to O2

- R→L shunting
  - Intracardiac shunt
  - Intrapulmonic shunt
  - AVM
  - Congenital heart disease
Differential Diagnosis: Hypoxia Unresponsive to O2

- Ineffective binding
- Ineffective delivery
- Carboxyhemoglobin
- Methemoglobin

Work up
- Urine drug screen + THC
- Urinalysis grossly orange otherwise WNL
- Pregnancy test negative
- Salicylate level WNL
- CXR normal
Further Work-up

- ABG: 7.53/20/128/18

SpO₂ 85%, carboxyhemoglobin 0.8%, **methemoglobin 48%**

Methemoglobinemia

- Altered state of hemoglobin
- Fe²⁺ oxidized to Fe³⁺
  - Fe³⁺ can’t bind oxygen
Methemoglobinemia

- Symptoms: hypoxia, cyanosis
- Suspect with cyanosis and normal PaO2

Blue People of Kentucky

Methemoglobinemia

Methemoglobinemia

- Congenital
- Acquired
  - Antibiotics
  - Local anesthetics
  - Nitroglycerin, metoclopramide, rasburicase
- **Phenazopyridine (Pyridium)**
Treatment: Methylene Blue

A Cure for the Blues

- Two doses of 1mg/kg IV methylene blue
- Methemoglobin level trended
- Monitored for complications
- Discharged to inpatient psychiatric facility
Lessons Learned

• Thought process-hypoxia that does not improve with supplemental oxygen

• Common presentation of uncommon condition

• Rule out worse case scenario (ROWS)

References


Acknowledgements

Thank you to Primary Children’s Hospital for allowing me to participate in this conference and supporting my education.

Thank you to Dr. Nell Hodo for providing mentorship throughout this process.