MCG PEDIATRIC PODCAST

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NEONATAL OPIOID WITHDRAWAL SYNDROME (NOWS)

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Learning Objectives

- Define neonatal opioid withdrawal syndrome
- Apply knowledge of signs and symptoms of NOWS to recognize these infants early
- Demonstrate general understanding of non-pharmacologic vs. pharmacologic management indications
- Recall the long term effects of NOWS and utilize this information to care for these infants long-term
- Educate families on clinical symptoms, management, and potential complications of NOWS

Neonatal Opioid Withdrawal Syndrome (NOWS) Key Points:

1. Incidence and relevance of NOWS
    a. Coinciding with the Opioid epidemic starting in the early 2000s, we have seen a concomitant 5x increase in the incidence of NOWS
    b. Approximately 7.3 out of 1000 infants are affected by NOWS
    c. Maternal opioid use and NOWS disproportionately affect low-income women and those less likely to seek prenatal care
2. Etiology of NOWS
    a. Opioids are natural and synthetic substances that activate mu-opioid receptors in the central nervous system and gastrointestinal tract. Substances include morphine, codeine, heroin, methadone, fentanyl, hydromorphone, and buprenorphine.
    b. Neonatal opioid withdrawal syndrome refers to antenatal exposure of infants to opioid and the subsequent withdrawal they experience after delivery.
    c. Most infants born with NOWS have been exposed to opioids within at least one week of delivery.
3. Clinical Signs & Symptoms of NOWS
    a. Symptoms of NOWS affects multiple organ systems
    b. NOWS is a result of the dysregulation of one or more of four domains
    c. The domains can be remembered using the acronym, SOMA:
        i. Sleep – fragmented sleep, shorter sleep cycles, difficulty maintaining an alert state between sleep cycles
        ii. Overstimulation – irritability, tachypnea, excessive crying, difficulty feeding, poor weight gain, adverse GI issues (vomiting, diarrhea, excessive gassiness)
        iii. Movement – jitters, tremors, hypertonicity, seizure activity
        iv. Autonomic dysfunction – excessive yawning, sweating, fever, sneezing, mottling, nasal congestion

4. Differential diagnosis
    a. The differential is very broad and largely dependent on the domains affected in each individual patient
    b. Common differential diagnoses:
        i. Hypoglycemia, hypocalcemia, other metabolic abnormalities
        ii. Hypoxic-ischemic encephalopathy
        iii. Transient tachypnea of newborn, respiratory distress syndrome, pulmonary hypertension, congenital heart disease, congenital pneumonia
        iv. Infectious process, including TORCH infections and STDs
5. NOWS work-up and diagnosis
    a. Ideally, mothers will be followed by OBGYNs and their opioid status will be known prior to delivery
    b. Diagnosis is primarily clinical, utilizing history, maternal or infant toxicology testing, and infant signs & symptoms
    c. Finnegan scoring system can be used to evaluate the clinical likelihood an infant is presenting with NOWS
    d. Gold standard: meconium sample
        i. Pros: longer window of exposure for identifying toxins
        ii. Cons: more invasive and time-intensive; can take days for result to return
    e. Urine toxicology
        i. Pros: easy to obtain, quick result
        ii. Cons: shorter window for identifying toxins
    f. Umbilical cord testing
        i. Pros: easy to obtain at time of delivery
        ii. Cons: efficacy of test reliability is variable
6. Finnegan Scoring System
    a. Lists 21 symptoms frequently observed in opioid-exposed infants
    b. Each symptom and its degree of severity are scored, and scores are totaled as the final Finnegan score
    c. Used to guide treatment plans and track progression/regression throughout clinical course
    d. Provides a framework for when pharmacological management may be necessary
    e. Additional scoring systems include the Mother Opioid Treatment: Human Experimental Research (MOTHER) and Eat, Sleep, Console (ESC) amongst others
    f. Use of scoring system improves clinical outcomes and reduces length of hospital stay (scoring system used is institution preference)
7. Non-pharmacologic management of infants with NOWS
    a. Individualized to infant's specific clinical signs and symptoms
    b. Interventions are targeted at reducing stimuli that may aggravate patient symptoms:
        i. Dim lighting
        ii. Quiet environment
        iii. Keeping infant with mother
        iv. Skin-to-skin contact
        v. Swaddling
        vi. Breastfeeding with lactation consultation if needed
        vii. Infant positioning
8. Pharmacologic management of infants with NOWS
    a. First-line options: morphine, methadone, buprenorphine
        i. Choice is largely physician and institution dependent

   ii. Combination of morphine (short-acting) and methadone (long-acting) may be beneficial to gain rapid control and maintenance of symptoms
- b. Adjunctive therapies: phenobarbital, clonidine
   i. Phenobarbital is used for its sedative and anticonvulsant properties and is also useful for polysubstance exposure of opioids with barbiturates or benzodiazepines.
   ii. Clonidine can lessen symptoms of withdrawal, including tachycardia, fever, sweating, sneezing, and yawning.
- c. Infants are monitored for a minimum of 72 hours and weaned off medication prior to discharge.

9. Potential long-term effects and longitudinal care for infants with NOWS
   a. Infants are at an increased risk for:
      i. Vision problems
      ii. Motor abnormalities
      iii. Behavioral delays
      iv. Cognitive delays
      v. Poor weight gain and failure to thrive
      vi. Otitis media
      vii. Child abuse/neglect
      viii. Sudden unexpected infant death (SUID)
      ix. Future substance abuse
   b. Follow-up with pediatrician or primary care provider should be scheduled within 48 hours of hospital discharge
   c. Additional provider follow up:
      i. Pediatric ophthalmology

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