Hot Topics in Newborn Care: Neonatal Abstinence Syndrome & Breastfeeding Special Populations
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NEONATAL ABSTINENCE SYNDROME

OBJECTIVES

• Understand the current status of maternal opioid use and neonatal abstinence syndrome (NAS) and its impact on cost and length of stay
• Describe NAS and its clinical manifestations
• Describe monitoring, evaluation of, and treatment of NAS
• Describe the primary care provider role in follow-up of patients who have experienced NAS

What is Neonatal Abstinence Syndrome

The clinical findings in the neonate associated with opioid exposure and withdrawal

Prescription Pain Medication Use on the Rise

Opioid Prescriptions Dispensed by Retail Pharmacies—United States, 1991–2011

One Study with a national sample found that Antepartum maternal opiate use increased from 1.19 per 1,000 hospital births in 2000 to 5.63 in 2009

References:
U.S. Heroin Epidemic

- Heroin use more than doubled among young adults ages 18–25 in the past decade.
- More than 9 in 10 people who used heroin also used at least one other drug.
- 45% of people who used heroin were also addicted to prescription opioid painkillers.

Commonly Used Opioids

- Methadone – Commonly used in treatment program
- Buprenorphine – Commonly used in treatment program
- Morphine
- Oxycodone
- Hydrocodone
- Hydrocodone
- Fentanyl
- Heroin

Increased Risk of Readmission

A study in NYS from 2006 to 2009 showed when compared with uncomplicated term infants, infants diagnosed with NAS were more than 2x as likely to be readmitted to the hospital 30 days of birth hospitalizations.
**HIGH RATES IN WESTERN NY**

Newborn drug-related diagnosis rate per 10,000 newborn discharges

<table>
<thead>
<tr>
<th>Region</th>
<th>2007</th>
<th>2011-2013</th>
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<tbody>
<tr>
<td>New York City</td>
<td>45.5</td>
<td>66.6</td>
</tr>
<tr>
<td>Ontario County</td>
<td>86.5</td>
<td>160.3</td>
</tr>
<tr>
<td>Monroe County (Rochester)</td>
<td>85.6</td>
<td>180.2</td>
</tr>
<tr>
<td>Erie County (Buffalo)</td>
<td>139.7</td>
<td>228.7</td>
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<tr>
<td>Onondaga County</td>
<td>221</td>
<td>248.8</td>
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<tr>
<td>New York state</td>
<td>58.4</td>
<td>95</td>
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**REGIONS WITH THE HIGHEST RATES:**

- WESTERN NY REGION TOTAL: 219.4
- FINGER LAKES REGION TOTAL: 159.4

**MONROE COUNTY**

Newborn drug-related diagnosis rate per 10,000 newborn discharges

**State Medicaid Programs Paying the Majority of the Cost**

Cost is 15 to 16 times higher than healthy infants

Cost is rising – Mean hospital charges for discharges with NAS increased from $39,400 in 2000 to $53,400 in 2009

**Hospital in Florida studies cost and length of stay related to NAS from 2008-2011**

<table>
<thead>
<tr>
<th>Length of Stay</th>
<th>NAS not requiring pharmacologic intervention</th>
<th>Treated with Morphine</th>
<th>Normal Newborns</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>23</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>Hospital Charges</td>
<td>4215</td>
<td>41000</td>
<td>873-1746</td>
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**Screening**

- Maternal History
- Maternal Urine Drug Screen
- Infant Drug Screen - can have false negatives as it requires current exposure to be accurate
- Meconium testing - often not available at hospitals and not practical as it delays diagnosis

**SIGNS OF WITHDRAWAL IN NEWBORNS**

Onset, severity, presentation and signs of withdrawal vary greatly among each infant

- Increased Temperature
- Skin Mottling
- Yawning/Sneezing
- Nasal Stuffy
- Tachypnea

Increased Metabolic Rate with High Calorie Requirements
SIGNS OF WITHDRAWAL IN NEWBORNS

- Excessive sucking/uncoordinated suck
- Poor feeding
- Weight loss/Poor Gain
- Reflux
- Loose watery stools —> diaper rash

SIGNS OF WITHDRAWAL IN NEWBORNS

- High pitched Cry/Excessive Crying
- Irritability
- Excoriation
- Poor Sleep
- Hypertonia
- Tremors disturbed or undisturbed
- Seizures

Onset of Withdrawal

<table>
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<tr>
<th>Methodone</th>
<th>Heroin</th>
<th>Buprenorphine</th>
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<tbody>
<tr>
<td>24-72 hours</td>
<td>Within 24 hours from birth</td>
<td>~ 40 hours</td>
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- Infants are typically monitored for a minimum of 72-96 hours for signs of withdrawal
- Withdrawal onset can be delayed for up to 5-7 days

FINNEGAN SCORING SYSTEM

- Most widely used tool in the US
- Scores are used to help quantify the severity of the withdrawal and they are used as a guide to start, wean and discontinue treatment
- A normal newborn can have scores as high as 8
- At SMH treatment is typically initiated with consistent scores > 8
- Training of staff completing scoring very important
- Examination of infant just as important as evaluation of scores as scores can be somewhat subjective
- Scores are a reflection of a period of time and not one moment in time
- Trending scores over time is important in determining management

Goal of Therapy

To alleviate the symptoms of NAS and to prevent complications including fevers, seizures, discomfort, weight loss etc.

- Attain sufficient sleep and nutrition
- Establish pattern of weight gain

The goal is NOT to eliminate every single symptom

NON-PHARMACOLOGIC MANAGEMENT

Decrease Environmental Stimuli
- Dim lighting
- Quiet environment
- Swaddling
- Decreased Handling
- Pacifier

Firm prolonged touch vs frequent stroking etc.

CAN THESE INFANTS BREASTFEED?

- **YES!** As long as the mother is in a supervised treatment program
- There may be other medications or diseases that may be contraindicated, however most of the infant’s treated at SMH can breastfeed if desired!
- If mother is unable to breastfeed or desires to use formula then often
- There may be other medications or diseases that may be contraindicated,
- **YES!** As long as the mother is in a supervised treatment program

PHARMACOLOGIC MANAGEMENT - MORPHINE

Short half life allows for weaning, shorter half life than Methadone
- Dosed every 4 hours
- Infant needs to be monitored during initial therapy for signs of respiratory depression Due to decreased responsiveness to carbon dioxide tension
- Opioids decrease pain perception and cause euphoria and sedation. They also decrease GI motility resulting in constipation and anorexia.
- **At** SMH: Once infant “captured” on dose with stable scores for ~ 48 hours then the dose is weaned 10-20% every 1-3 days until discontinued
- **At** SMH: Once discontinued infant is monitored in the hospital for an additional 24-48 hours to ensure there is no rebound withdrawal

PHARMACOLOGIC MANAGEMENT – PHENOBARBITAL 2nd line agent

- Most commonly used when there is history of poly-substance use
- May be used with severe NAS or when morphine is very difficult to wean
- Suppresses hyperactivity, decreases CNS activity, helps to control insomnia and irritability. Does not have any effect on opioid specific withdrawal symptoms such as diarrhea and poor feeding
- Long half life - drug may not need to be given every day
- Infant may be discharged on Phenobarbital with pre-planned taper and close follow up by PCP

PHARMACOLOGIC MANAGEMENT - Other Therapies That Have Been Used

- Tincture of opium
- Methadone
- Clonidine - for poly-substance
- Diazepam - for poly-substance
- Buprenorphine has recently been under investigation as an option to consider in the management of NAS

Multidisciplinary Approach

- Medical Providers
- Nurses
- Parents
- Social work
Dysfunctional
More
A Mother
At CPS
Exposed
environmental
data
will
mother
days
indicated
Developmental
visiting
SMH
outcomes
involvement
after
Close
on
research
be
in
all
may
be
often
Clinic
given

term
difficult
often
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Close
on
infants.

term
Difficult
infants.

Close
on


Follow up

A visiting nurse often sent to infant’s home in the first few
days after discharge to assess with hyperalimentation and vital
signs. Close follow up in the first few days after discharge is
indicated to evaluate for continued withdrawal.

At SMH all infants are seen in the KIRCH Pediatric
Developmental Clinic at 3 months of age

CPS involvement often ongoing after discharge. Note: If
mother in a treatment program at time of delivery then CPS
will not be notified

Mother may be given referral for outpatient social worker

Outcomes

More research needs to be done! Very limited
data on long term outcomes of in utero
exposed infants.

Dysfunctional caregivers and other
environmental variables make interpretation of outcomes difficult

Decreased Risk Of Withdrawal After Opioid Exposure
In Preterm Infants

• Immature central nervous system
• Decreased fat deposition of drug
• Decreased length of drug exposure in utero
• Inability to express motor dysfunction as
  compared to term infants i.e. tremors

The Primary Care Providers Role

• Monitor weight gain closely given high metabolic demands
• Determine if infant requires increased caloric density or if infant has stable or excessive
  weight gain they can be transitioned off higher caloric formula on SMH
• Advocate for child if parental substance use is suspected to be continuing by reporting to
  CPS
• Work with in patient clinician on weaning phenobarbital if infant is to go home on
  medications
• Understand the clinical manifestations of NAS and determine if infant experiencing clinically
  significant withdrawal that would require initial admission or readmission
• Understand that withdrawal can occur after hospital discharge and still may require
  hospitalization
• Many times mothers also have a diagnosis of hepatitis C at time of delivery. Be sure to
  screen at risk infant’s for disease according to Red Book guidelines
• Continue to follow infant’s development and refer for evaluation as indicated

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Objectives

- State AAP recommendations for breastfeeding newborns
- Identify Healthy People 2020 goals for breastfeeding
- Identify important interview points for the breastfeeding mother
- Identify special considerations necessary when caring for late preterm infant
- Create a feeding plan to optimize growth in the late preterm infant, infant with significant weight loss, and infant with tongue tie
- Recognize newborn with tongue tie and make necessary referral and feeding plan to optimize growth
- Identify resources for mothers to obtain breast pumps and lactation support

Breast Feeding Recommendations

- AAP recommends exclusive breast feeding for the first 6 months of life, then continued breast feeding with the introduction of complimentary foods
- According to the CDC 2014 Breast Feeding Report Card:
  “In 2011, 79% of newborn infants started to breastfeed. Yet breastfeeding did not continue for as long as recommended. Of infants born in 2011, 49% were breastfeeding at 6 months and 27% at 12 months.”

What makes breast milk optimal nutrition?

- Breast milk is a “complex and dynamic fluid that supports ideal infant growth and immune function development. The composition of human milk changes over time, and contains live cells along with macronutrients and micronutrients and bioactive factors” (Denne 2015)
- Colostrum is the first milk, it begins to produced during the second trimester of pregnancy and is available in relatively low volumes during the first days following delivery. It is rich in secretory IgA, lactoferrin, leukocytes, and epidermal growth factor
- Breast milk transitions to mature milk during over the next 2-4 weeks. It is rich in lactose, fat, immunoglobulins and total proteins

Important questions for breast feeding mothers

- Complete history:
  - Medical and obstetric history
  - Daily medications and supplements
  - Did she experience breast changes during the first trimester of pregnancy
- Maternal breast feeding goals:
  - How long does mother plan to breast feed for?
  - Does she wish to feed at the breast or pump breast milk for bottle feeding
  - What is her previous breast feeding experience and does she have support at home
- Maternal access to breast pumps:
  - Thanks to the Affordable Care Act, most new mothers will be able to obtain an electric breast pump through insurance, these are generally available through a durable medical equipment supply
  - Mothers with WIC may be able to obtain a breast pump through the WIC peer counselor

Special populations

- Late Preterm or Small Infants
- Tongue Tie
- Significant Weight Loss

Breastfeeding the late preterm infant

- Infants born between 34 0/7 weeks and 36 6/7 weeks gestation are:
  75% of preterm births and they:
  “lag behind in terms of their cardiorespiratory, metabolic, immunologic, neurologic, and motor development”
  “4 times more likely than term infants to be diagnosed with jaundice, respiratory distress, poor feeding, temperature instability, or hypoglycemia during the birth hospitalization”
- Breast fed late preterm infants are more likely to be readmitted to hospital than formula fed counterparts due to failure to thrive, jaundice and dehydration
Breastfeeding
the late preterm infant

Role of the Primary Care Provider

• Before hospital discharge:
  - Ensure effective at breast feeding with daily evaluation of feeding quality by hospital lactation services.
  - Clowly monitor weight and bilirubin.
  - Create in-hospital breastfeeding plan based on weight/height loss and bilirubin, as well as maternal factors and desires.

• In PCP office
  - First visit 24-48hrs following hospital discharge.
  - Continued close monitoring of weight, bilirubin and hydration.
  - Identification of lactation support (private Lactation support company, La Leche League, WAC).
  - Modification of home breast feeding plan.

Breastfeeding
& tongue tie

- Congenital condition causing a short, thick lingual frenulum
- Effects 1.7-4.7% of newborns, causes feeding difficulties in 44% of these infants.
- There are potential for both short and long term sequelae of ankyloglossia, including speech difficulties, orthodontic and mandibular abnormalities and psychological problems.

Breastfeeding
& tongue tie

- What to do??
  - Frenotomy is the procedure during which the tongue is released by clipping the restrictive lingual frenulum.

  - Though some evidence reports decreased maternal nipple pain and improvements in the infants ability to latch and transfer milk – there are very few randomized controlled trials that report this procedure to be effective treatment although there is a tendency toward performing this procedure to protect breastfeeding.

  - If concern for tongue tie exists and is thought to be affecting feeding and weight gain, referral to ENT can be made or tongue can be clipped AND a feeding plan can be created to optimize milk transfer and weight gain, this will generally include supplementation and maternal pumping.
Breastfeeding & significant weight loss

What defines significant weight loss in newborns?
- In late preterm infant, weight loss of > 3% in first 24 hours or >7% by day 3 of life

Factors to consider:
- Gestational age at birth as well as birth weight
- Immediate postpartum course – has infant been nourishing in and exclusively breast fed?
- Was first feeding delayed for any reason?
- Maternal breast feeding history as well as past medical history that could affect breastfeeding (breast surgery, poly cystic ovary syndrome, etc.)
- Maternal medications (many medications can affect or hinder breast milk production)
- Experienced mother vs first time breast feeding mother
- Delivery modality: vaginal vs c-section

Breastfeeding & significant weight loss

How to manage significant weight loss...
- Establish clear feeding plan, generally this means giving the mother a period of time during the day (4, 6, 8 or 12 hour) during which the infant may exclusively breast feed
- During the remaining hours of the day the infant may breast feed but must be supplemented with formula or expressed breast milk
- Identify available lactation support
- Mothers are encouraged to pump if the infant is receiving supplemented feeds or has significant weight loss to stimulate the increased supply
- Follow up with this group of infants should be done frequently, at least weekly until appropriate weight gain is established. Once infant is gaining weight adequately the feeding plan can be altered to include more hours of exclusive at breast feeding

Future breastfeeding objectives

Healthy People 2020

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<tr>
<th>Objective</th>
<th>Baseline</th>
<th>Target</th>
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<td>Increase the proportion of infants who are breast fed</td>
<td>N/A</td>
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<td>Increase the proportion of infants who are breast fed</td>
<td>N/A</td>
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<td>MCHC-24</td>
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http://www.drugabuse.gov/relatedtopics/opioid-abuse

Future breastfeeding objectives

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