



Impact of Opioids on Children: an overview of neonatal withdrawal

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Objectives

- Define neonatal abstinence syndrome (NAS)
- Describe symptoms and signs in infants affected by NAS
- Describe treatment options
- Discuss issues in the care and management of affected infants
- Questions



NAS

- Constellation of signs and symptoms exhibited by infants exposed to certain drugs for an undefined period of time
- Leading cause of preventable behavioral and mental disease in children



What drugs are we talking about?

- | | |
|-------------------------|----------------------------|
| • Codeine | • Meperidine (Demerol) |
| • Methadone | • Morphine |
| • Heroin | • Hydromorphone (Dilaudid) |
| • Buprenorphine | • Propoxyphene (Darvon) |
| • Oxycodone (OxyContin) | |



Epidemiology

- Increasing rate of opioid and narcotic use in pregnant women
 - 3-5% of women in childbearing age groups
 - Up to 10% use in 15-25 year olds
 - This totals over 4,000 women per year
- 30-88% of infants at risk develop NAS
- Incidence of 1-3/1000 babies born per year (or 120,000 babies per year)



Demographics

- Caucasian and Latina women have less non-prescribed drug use reported compared to black women
- However, rates of prescribed drug abuse is highest in Caucasian women
- Urban centers and inner cities report higher non-prescription abuse
- Utah is the highest in prescription abuse



Risks for NAS



- Signs and symptoms occur 2 to 5 days after birth
- Most infants are affected by more than one substance
- Symptoms depend on what, how much, and how long
- Many infants are small for their gestational age, premature, low birth weight, have small head circumference, have higher rates of other birth defect, are at increased rate of SIDS and still birth



Signs and Symptoms



- Neurologic:
 - Insomnia, irritability, excessive crying, excessive sucking, increased tone and reflex response, and seizures
- Gastrointestinal:
 - Vomiting, diarrhea, feeding disturbances, poor weight gain
- Nervous system:
 - Sweating, fever, sneezing, high respiratory rate, blotchy skin, trembling



Pathophysiology



Maternal use of prescribed or unprescribed opioids during pregnancy →

Transfer across placenta to the fetus →

Fetus becomes dependent on opioid →

After birth, there is an abrupt decrease in opioid concentration →

This may precipitate withdrawal



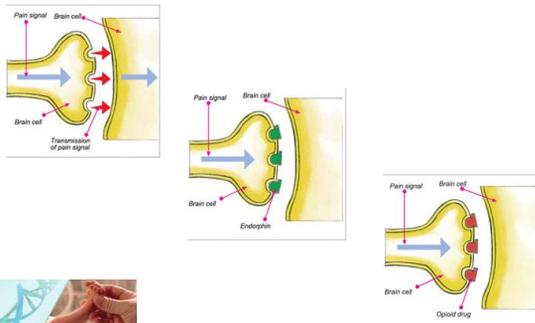
Opioid Receptors



- Found primarily in the brain and gastrointestinal systems
- Several types of receptors
- μ :
 - Morphine receptor
 - Involved in most symptoms of NAS
- δ :
 - Also involved in analgesia and dependency



How do opioids work?



When do babies withdraw?



- Depends on the drug and its half life
- Heroin: usually 24 hours to 72 hours
- Methadone: 24 hours to up to 7 seven days
 - This may extend out to 6 months



Why do we use methadone?



- Improved obstetric care
- Decreased illicit drug use
- Better follow up
- Less withdrawal in mothers



How do we diagnose NAS?



- Maternal history
 - Confirmed
 - Suspected
- Urine toxicology testing
 - Not reliable
 - Most infants will void before urine can be obtained
- Meconium toxicology testing
 - More reliable
 - Longer turn around time
- Umbilical stump testing
 - Similar to meconium screening for drug exposure
 - Not available in all hospitals
- “Scoring” the baby on various tests
 - Lipsitz Scoring system
 - Neonatal Abstinence Scoring System (Finnegan)
 - Neonatal Withdrawal Inventory



Scoring Sheet



SYSTEM	SIGNS AND SYMPTOMS	Score	DAY														
			1	2	3	4	5	6	7	8	9	10	11	12			
CENTRAL NERVOUS SYSTEM EXCITABILITY/DYSFUNCTION	High Pitched Cry	2															
	Comatose High Pitched Cry	1															
	Sleeps < 1 hour after feeding	2															
	Sleeps < 2 hours after feeding	1															
	Exaggerated Moro Reflex	2															
	Exaggerated Startle Reflex	2															
	Abd. Tension Disturbed	2															
	Exaggerated Suck Reflex Disturbed	2															
	Abd. Tension Undisturbed	1															
	Modest Suck Reflex Undisturbed	1															
METABOLIC/RESPIRATORY ADAPTATION/DYSFUNCTION	Exaggerated Head/Neck	2															
	Exaggerated Head/Neck Disturbed	2															
	Exaggerated Head/Neck	1															
	Exaggerated Head/Neck Disturbed	1															
	Respiratory Rate > 60/min	1															
	Respiratory Rate < 30/min	1															
	Apnea	1															
	Flaring	1															
	Respiratory Rate > 3-4 (breaths/min)	1															
	Respiratory Rate < 30/min	1															
GASTROINTESTINAL ADAPTATION/DYSFUNCTION	Excessive Vomiting	1															
	Poor Feeding	2															
	Regurgitation	2															
	Projectile Vomiting	1															
	Loose Stools	2															
Watery Stools	1																
TOTAL SCORE																	
SCORER'S INITIALS																	
STATUS OF THERAPY																	



How do we treat NAS?



- Comfort Measures
 - Swaddling
 - Low environmental stimulation
- Medications
 - Morphine, diluted tincture of opium, methadone
 - Phenobarbital
 - Clonidine
- Referrals
 - Pediatricians and family practitioner
 - Social work
 - DCFS
- Counseling



Long Term Outcomes



- Closer and more intense follow up needed
- More likely to need assistance in school
- More likely to be removed from their homes
- ? More likely to use substances of abuse
- ? More likely to be known to the court system



Long Term Impact



- Lower IQ scores
- Neurodevelopmental delay and impairments
- Sensory integration issues
- Depression
- ADD/ADHD



What are the issues?



- Interferes with maternal bonding
- Decreased rates of breastfeeding (?)
- Higher incidence of non accidental trauma
- Increased rates of court involvement
- Increased rates of re-hospitalization
- Increased length of stay
- Increased negative stigma for the child and siblings



Impact on Healthcare Cost



- Higher length of stay
- Higher rates of prematurity
- Higher rates of transport to larger medical centers
- Higher rates of need for feeding tubes, IV fluids, medications
- Higher rates of need for follow up care



Hospital Costs



- Length of stay varies, with an average of 30 days
- In one study, the care of 48 infants with NAS exceeded 1.7 million dollars
- Care must be undertaken by the neonatal intensive care unit in many situations, with an average bed cost of \$1300/day



Medical Issues in NAS



- Although NAS is clearly rampant throughout the country, there is little information known about specifics
 - What scoring system to use
 - What medications to use for withdrawal
 - What doses to use
 - Who is at highest risk for withdrawal



Misconceptions



- Middle, upper middle, and upper class populations are less likely to abuse narcotics
- NAS is apparent at birth or shortly after birth
- Infants grow out of NAS



Summary



- NAS affects an estimated 120,000 to 300,000 babies per year
- These babies are affected from before birth to young adult hood
- The cost of NAS to society is not insignificant
- There is still much to learn to optimize the care of these children





QUESTIONS?

