NAS Scoring - Using the Finnegan Tool

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Objectives

- Describe the Finnegan Neonatal Abstinence Scoring Tool
- Define the items that make up the Finnegan tool
- Describe the appropriate way to assess infants for signs of NAS
- Discuss the presentation, signs and symptoms of infants affected by NAS
Finnegan Scoring Tool

...is a clinical drug withdrawal assessment tool used by healthcare providers to determine the severity of withdrawal signs exhibited by infants exposed to opioids in utero

- Most comprehensive tool available to assess signs & symptoms of withdrawal in the neonate
- Contains 21 signs and symptoms
- Dynamic tool assessing a period of time
- Identified from review of the literature and 200 clinical observations
Challenges

- Inconsistency in scoring among raters
- Infant pharmacologic treatment may be delayed
- Discharge may be delayed
- Increased healthcare costs
**Finnegan Scoring System**

- The most frequently used tool
- Three main body systems
- Each sign is weighted

<table>
<thead>
<tr>
<th>Neurologic</th>
<th>Autonomic</th>
<th>Gastrointestinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased wakefulness</td>
<td>Diaphoresis</td>
<td>Vomiting</td>
</tr>
<tr>
<td>Excessive high pitch cry</td>
<td>Nasal stuffiness</td>
<td>Diarrhea</td>
</tr>
<tr>
<td>Tremors</td>
<td>Temperature instability</td>
<td>Loose stools</td>
</tr>
<tr>
<td>Hyperactive moro reflex</td>
<td>Mottling</td>
<td>Watery stools</td>
</tr>
<tr>
<td>Myoclonic jerks</td>
<td>Elevation in respiratory rate</td>
<td>Poor weight gain</td>
</tr>
<tr>
<td>Increased muscle tone</td>
<td>Frequent yawning</td>
<td>Poor feeding</td>
</tr>
<tr>
<td>Hyperactive reflexes</td>
<td></td>
<td>Uncoordinated and excessive sucking</td>
</tr>
<tr>
<td>Seizures</td>
<td></td>
<td></td>
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<tr>
<td>Repetitive sneezing</td>
<td></td>
<td></td>
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<tr>
<td>Irritability</td>
<td></td>
<td></td>
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<tr>
<td>Skin excoriation</td>
<td></td>
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</tr>
</tbody>
</table>

- Diaphoresis
- Nasal stuffiness
- Temperature instability
- Mottling
- Elevation in respiratory rate
- Frequent yawning
# Neonatal abstinence score*

<table>
<thead>
<tr>
<th>System</th>
<th>Signs and symptoms</th>
<th>Score</th>
<th>Time of assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Metabolic/vasomotor/respiratory disturbances</td>
<td>High-pitched cry</td>
<td>2</td>
<td>2</td>
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<tr>
<td></td>
<td>Continuous high-pitched cry</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Sleeps &lt;1hr after feeding</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sleeps &lt;2hrs after feeding</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Sleeps &lt;3hrs after feeding</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Hyperactive Moro reflex</td>
<td>1</td>
<td>12</td>
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<tr>
<td></td>
<td>Markedly hyperactive Moro reflex</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Mild tremors disturbed</td>
<td>1</td>
<td>16</td>
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<tr>
<td></td>
<td>Moderate-severe tremors disturbed</td>
<td>2</td>
<td>18</td>
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<tr>
<td></td>
<td>Increased muscle tone</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Excoriation (specific area)</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Myoclonic jerks</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Generalized convulsions</td>
<td>3</td>
<td></td>
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<tr>
<td>Central nervous system disturbances</td>
<td>Sweating</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>Fever &lt;37.2-38.2°C</td>
<td>1</td>
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<tr>
<td></td>
<td>Fever &gt;38.4°C</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequent yawning (&gt;3-4 Times)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mottling</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nasal stuffiness</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sneezing (&gt;3-4 Times)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nasal flaring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respiratory rate &gt;60/min</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respiratory rate &gt;60/min with retractions</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal disturbances</td>
<td>Excessive sucking</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor feeding</td>
<td>2</td>
<td></td>
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<td></td>
<td>Regurgitation</td>
<td>2</td>
<td></td>
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<tr>
<td></td>
<td>Projectile vomiting</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>Loose stools</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watery stools</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>Total score</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Scorer’s initials</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Initiation of therapy (+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase in therapy (†)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decrease in therapy (↓)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discontinue therapy (↓↓)</td>
<td></td>
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</tbody>
</table>

A score greater than 8 on three consecutive scorings indicates a need for pharmacologic intervention.

* Based on Finnegan scoring system.

Finnegan Scoring Explained

- The total score reflects the behaviors over the entire scoring interval (2-4 hours)
  
  **It is not a snapshot**

- The scoring interval is usually 3 hours and done with the morphine dosing

- If the baby is scoring 8 or greater, pharmacologic intervention is recommended (AAP)
Crying

...key factor for scoring this item is focused on how long the infant is crying and whether he/she can be comforted or not

- Suggested that infants have a higher pitched cry when experiencing intense pain

- Normally consolation in about 15 seconds. NAS babies are difficult to console

- If the baby cries for more than 15 seconds up to 5 minutes **despite caregiver interventions** - score 2

- If the baby cries for more than 5 minutes **despite caregiver intervention** - score 3
Sleep

...scoring for this item is based on the *longest sleep period* the infant has within the 3-4 hour scoring interval

- Scored on the basis of the time the infant awakens without being disturbed **AFTER FEEDS**
  - Score 3 if less than 1 hour
  - Score 2 if less than 2 hours
  - Score 1 if less than 3 hours
  - No score for continuous sleep of 3 hours or more

- Give the baby enough time to sleep

  *You do not score the baby “not sleeping” if you wake the baby to feed*

- 2010 “Sleep Record”
Moro Reflex

...normal newborn reflex that evaluates the integrity of the infant’s CNS

- **Normal**
  - When startled the baby extends arms out from body then will relax and bring them back to midline smoothly

- **Hyperactive – score 2**
  - When startled the baby extends arms out from the body with pronounced jitteriness that is rhythmic, symmetrical and involuntary during or immediately after the reflex
  - Includes self startle

- **Marked Hyperactive – score 3**
  - Involuntary jitteriness of the hands with clonus (repetitive jerks)
  - When suspected, dorsiflex the wrist using a short brisk movement
Tremors

...involuntary movements or quivers that are rhythmical with equal amplitude or strength that occurs at a fixed point in time

- Not scored while sleeping
- Induced by sound, touch, or passive movement
- Undisturbed score higher than disturbed

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mild</th>
<th>Moderate to Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rhythmic involuntary movement of the hands and/or feet</td>
<td>Rhythmic involuntary movement of the arms and legs</td>
</tr>
<tr>
<td>Disturbed</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Undisturbed</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Muscle Tone

...is the ability of a muscle to resist movement

- Postural tone is tested using the pull-to-sit maneuver
  - Grasp the infant's hands and pull from supine to sit position
  - Head will lag behind the body
  - When the infant is sitting, head remains upright momentarily then falls forward
  - Pull to sit tone is increased if baby has no head lag and increased tone in extremities
- Neonates with abstinence have increased muscle tone
- Body and head are raised without lag
- Score 2
Excoriation

...redness of the skin or skin breakdown that is the result of an extremity continuously rubbing against a covered surface such as bed linen

- **Score 1**
  - abrasions on chin, nose, cheeks, knees, toes, heels
  - Score until the area is no longer red
  - **No score** for diaper area usually related to loose stools
Myoclonic Jerks

...involuntary spasms or twitching movements of a muscle

- Not common in the newborn period
- Jerking movements of the muscles of face or extremities
  - when more pronounced, resemble myoclonic seizures
  - rarely seen when withdrawal is adequately managed
- May be induced by stimulation such as loud noise, touch, passive movement of an extremity
- Score 3 if twitching is observed
Convulsions

...generalized convulsions are commonly referred to as tonic seizures

- Tonic seizures are generalized activity involving tonic extension of all limbs
- Associated with CNS irritability
- Seizures generally seen around 10 days
- Subtle signs of seizures are not common in neonatal abstinence
- Score 5 if seizures are noted
Sweating and Fever

- Sweating is not scored if due to overheating
- Keep infant dressed in a diaper and T-shirt, swaddled
- A second blanket can be used
- Etiology of increased temperature must be determined
- Score 1 for sweating
- Score 1 for temp < 101°F
- Score 2 for temp > 101°F
Frequent Yawning and Sneezing

- Both score 1
- Yawn - more than 3 times in the scoring interval
- Sneeze – more than 3 times in the scoring interval
- Signs do not need to be consecutive
- Sneeze record?
Mottling

...caused by instability or immaturity of the nerve supply to the superficial capillaries in the skin

- Occurs often among infants experiencing drug withdrawal
- Overstimulation of an immature peripheral circulatory system
- Typically one of the last signs of withdrawal to disappear
- Score 1 for mottling
Nasal Stuffiness
Nasal Flaring

- Keep the nares clear of exudate to facilitate breathing
- Generally present during inspiration to allow more air to enter the lungs
- Score 2 for nasal flaring
- Score 1 for nasal stuffiness
Respiratory Rate

Assess and count for one full minute

Respirations often irregular and fast

Increased norepinephrine $\rightarrow$ Tachypnea

Labored respirations = retractions

Must count when infant is quiet

Score 1 for respirations > 60/min

Score 2 for respirations > 60/min with retractions
Excessive Sucking

...sucking successfully on a pacifier can be soothing and comforting therefore a positive sign

- increased (more than 3 times) rooting while making rapid swiping movements of hand across the mouth in an attempt to suck on fist, hands, or pacifier prior to or after a feeding
- also score if the infant attempts to suck on a pacifier while moving head from side to side and is unable to adequately suck on pacifier
- Score 1 for excessive sucking
Poor Feeding

...normal feeding is the result of a well-coordinated sequence of sucking, swallowing, and breathing

- excessive sucking
- sucks infrequently during feeding taking a small amount
- uncoordinated sucking reflex
- difficulty sucking and swallowing
- continuous gulps while eating and stops frequently to breathe
- Score 2 for any
Regurgitation and Projectile Vomiting

- Regurgitation
  - effortless return of gastric or esophageal contents from the infant’s mouth
  - not unusual for newborns to regurgitate during burping
  - Two or more regurgitations not associated with burping
  - Score 2

- Projectile vomiting once or more during or after a feeding
  - Score 3
Loose Stools

- Mushy
  - normal breastfed baby poop
  - No score

- Loose
  - Slightly curdy, mushy seedy, and more liquid than a normal stool
  - No water ring
  - Score 2

- Watery
  - Any type of stool accompanied by a water ring
  - Score 3

- Baby may have red buttocks with loose stools
When to start scoring?

- Let the baby transition
- Begin scoring around 3-4 hours in a situation with known prenatal exposure
- Keep on the same schedule
- Score prior to feeds**
Inter-rater Reliability

...the degree to which 2 independent raters or observers watch the same event at the same time, document what they observe independently, then compare the ratings
Conclusion

- Finnegan Scoring Tool is the most frequently used tool to determine the severity of drug withdrawal in neonates
- Accuracy in assessment is improved by knowing the definitions of the items contained in the tool
- Establishment of an inter-rater reliability protocol
- Establishment of a standard protocol for the general care of neonates affected by narcotic exposure
Questions?
Resources