

NAS and Eat, Sleep, Console

A New Approach to an Old Problem

Disclosures

- **Under Accreditation Council for Continuing Medical Education (ACCME) guidelines, disclosure must be made regarding financial relationships with commercial interests within the last 12 months**
- **I have no relevant financial relationships or affiliations with commercial interests to disclose.**

Objectives

- Learn physiology, diagnosis, and treatment of NAS
- Review Finnegan Scoring System
- Learn principals and execution for ESC
- Review ongoing challenges and concerns of NAS with ESC

Neonatal Abstinence Syndrome

What is it?

- Set of symptoms that develop in infants secondary to exposure (usually prolonged) to medications or illicit substances
- Association with maternal morphine use noticed in 1875
 - Congenital Morphinism
 - Frequently fatal
- Recognized as opioid withdrawal in 1901
- Clinically recognizable signs of withdrawal occur in 60-80% of infants
- Severity dependent upon length of exposure, drug, drug metabolism, placental transfer, genetics?

NAS

What is it?

- 2 types
 - Prenatal
 - In utero exposure via placental transfer
 - Post-natal
 - Long term opiate use in critically ill infants

NAS

Pathophysiology-Prenatal

- Occurs following the abrupt cessation of in utero exposure to maternally administered drugs
- Most commonly associated with opiates
 - Generally more severe and for longer duration
 - Occurs in 55-94%
 - Prescribed or not prescribed
 - Heroin, fentanyl, methadone, lortab, norco, oxycodone, subutex
- May occur with exposure to other substances
 - Benzodiazepines, barbiturates, tobacco, SSRIs, alcohol
 - Possibly cocaine, methamphetamines, amphetamines, THC?

NAS

Pathophysiology-Post Natal

- Long-term exposure to opiates in critically ill infants
 - Fentanyl, morphine

NAS Screening

- Identify at-risk infants
 - Inadequate prenatal care
 - <5 prenatal visits
 - Maternal clinical concerns
 - Disorientation, slurred speech, somnolence, smell of EtOH/chemicals, physical signs (needle marks, etc)
 - Known history within the past 3 years
 - Positive maternal toxicology
 - At or greater than 20 weeks gestation

NAS

Diagnosis

- Maternal Toxicology
 - UDS
 - Multiple can be helpful
 - Exclude any labor medications
- Neonatal Toxicology
 - UDS
 - Fast but least accurate
 - First catch
 - Negative does not rule out exposure
 - MDS
 - Somewhat more accurate
 - Harder to obtain
 - Long processing time

NAS

Diagnosis

- Neonatal Toxicology (cont)
 - Cord stat
 - Umbilical cord
 - Multiple tests available
 - Most accurate*
 - Processing time 5-7 days
 - Not always available
- Observe for at least 5 days (AAP recommends 4-7)
- Symptoms most commonly occur at 2-5 days of life

NAS

Diagnosis-Classic Symptoms

Neurologic	Gastrointestinal	Autonomic
Irritability Increased wakefulness High-pitched cry Tremors Increased muscle tone Hyperactive reflexes Frequent sneezing Seizures	Vomiting Diarrhea Dehydration Poor weight gain Poor feeding Hypersucking	Diaphoresis Nasal stuffiness Fever Mottling Temp instability Tachypnea

NAS

Long Term Outcomes

- Studies are difficult
 - Difficult to isolate substance exposure as causal
- Thought to be associated with neurodevelopmental and learning deficits, behavioral disorders
 - ADHD, learning disabilities, oppositional defiant
- Developmental Pediatric follow-up is essential
- More studies needed

NAS

Common Misconceptions

Misconception	Truth
NAS refers to all substances	Mainly Opiates
All withdrawal can be treated	Mainly opiates
When my baby goes home, he/she is no longer in withdrawal	No longer withdrawing enough for medical treatment May exhibit signs for up to 18months
Can't use breast milk	Very few contraindications for BM use May aid in decreasing withdrawal symptoms
NAS only applies to illegal drug use	Most are prescription use
My baby will only need to be in the hospital for 2 weeks	May be 5 days to 2 months or more Can be some of the longest NICU stays
I took "x" with my last baby is he/she is fine	Every baby is different Long-term outcomes not well understood

NAS

The Old Way- The Finnegan Neonatal Abstinence Scoring System

- Finnegan scoring
 - Developed in 1975
 - Taking the subjective and making it objective
 - 21 different scoring items
 - Assigns numeric value to individual symptoms
 - Start 3 hours after birth
 - Scoring occurs every 3hrs, 30 min after feeding
 - Scores of 8 or higher consistently is indication for treatment
 - Medication adjusted per scores
 - Continues for full observation and/or treatment period

NAS

The Old Way- FNASS

- Limitations
 - Complicated, sometimes redundant scoring system
 - Different interpretations
 - Rationale for using 8 as indication for treatment has never been scientifically validated
 - Infants with no opioid exposure have been shown to have scores 2-5 and as high as 8, with normal day-night cycles
 - New research suggests treatment should be based on function-based assessments

NAS

Why Change?

- Reduce pharmacologic treatment
 - Morphine not benign
 - Long-term effects not known
- Reduce LOS
- Reduce cost
- Simplify and decrease variability in scoring
- Encourage collaboration between nurses, providers, and parents
- Family-centered care

NAS

A New Approach- Eat, Sleep, Console (ESC)

- Developed by a collaborative effort between Yale, Children's Hospital at Dartmouth-Hitchcock, and Boston Medical Center
- Sole principal is that treatment of infant should be based on FUNCTION and COMFORT rather than reducing all signs and symptoms of withdrawal
- Focuses on non-pharmacological treatments first

NAS

ESC: A Change in Mindset

- Focus on FUNCTION not SYMPTOMS
- Focus on COMFORT not ALLEVIATION
- Focus on the WHOLE baby, not individual PARTS
- Focus on MANAGEABILITY not RESOLUTION

NAS

ESC- How is it different?

- Only 3 items to score vs 21
- No numeric values assigned
- Yes or No answers only
- Less stringent in many ways
 - Allows for “normal baby” behavior
 - Scores done every 2-4 hrs and only when baby is awake
- More collaboration between nurses, physician, care partners
- Looks at infant as a whole instead of as a compilation of symptoms

NAS ESC Care Tool

Component	Yes/No
Eating	
Poor eating due to NAS?	
Sleeping	
Sleep <1hr due to NAS?	
Consoling	
Able to console within 10 min?	
Parental Presence	
Is a care partner present?	
Management Decision	
Recommend a team huddle?	

NAS ESC Care Tool

Component	Yes/No
Action Taken Optimize NPI Initiate medication treatment Increase/decrease dosage Other	

NAS

ESC- Eat Component

Yes	No
Breast/Bottle feeds well Breast: latches comfortably with effective suck Bottle: effectively coordinates suck/swallow/breathe	Unable to coordinate feeding within 10min of showing hunger cues
Eats at least 10ml each feed	Unable to sustain suck/latch within 10min of initiating feeding
Feeding issues not related to NAS (prematurity, sleepiness, anatomic difficulties)	Excessive gagging/spitting up/emesis
	Poor feeding due to NAS (fussiness, tremors)

NAS ESC- Sleep Component

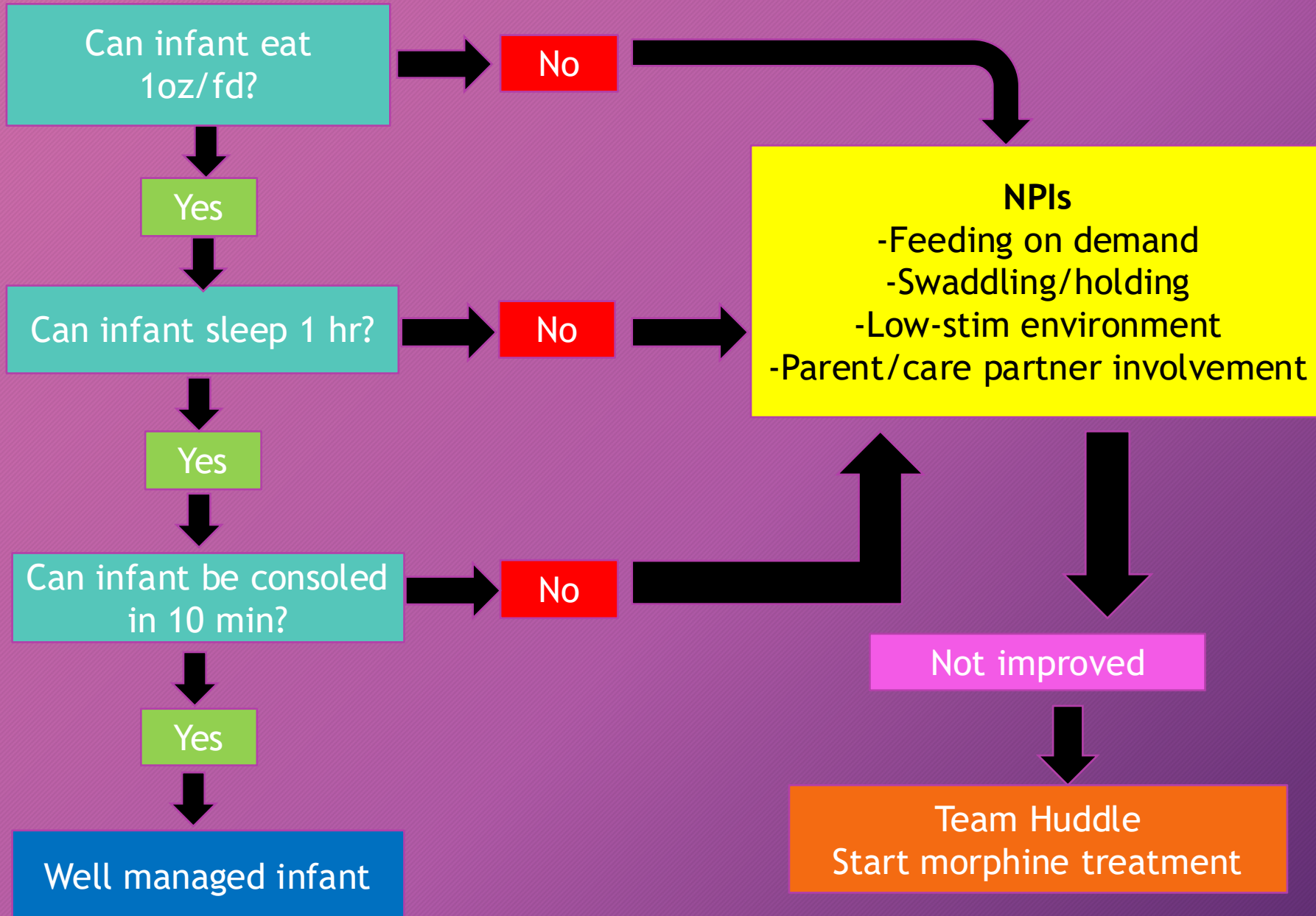
Yes	No
Able to sleep for 1 hour or longer after a feed	Sleeps <1hr due to NAS symptoms
If sleeps <1 hr but due to non-NAS factors (cluster feedings, other interruptions)	

NAS ESC- Console Component

Yes	No
<p data-bbox="157 564 932 611">Consoles within 10 min of using CSIs</p> <p data-bbox="157 639 1014 686">Consoling Support Interventions (CSIs)</p> <ul data-bbox="157 696 1123 1200" style="list-style-type: none"><li data-bbox="157 696 817 743">-softly, slowly talking to infant<li data-bbox="157 753 1116 801">-gently facilitate hand-to-mouth movements<li data-bbox="157 811 1047 915">-calm talking while placing a firm, gentle hand on baby's abdomen<li data-bbox="157 925 1123 1029">-calm talking while bringing arms and legs to center of body<li data-bbox="157 1039 1110 1143">-holds, swaddles or skin-to-skin while gently swaying/rocking<li data-bbox="157 1153 715 1200">-offers pacifier or feeding	<p data-bbox="1164 564 2117 611">Does not console within 10 min of using CSIs</p> <p data-bbox="1164 639 2117 743">Excessive crying and restlessness for over 10 min despite interventions</p>

NAS ESC

- Non-Pharmacologic Interventions (NPI)
 - Rooming-in
 - Parental/care partner presence
 - Skin-to-skin contact
 - Holding by caregiver/cuddler
 - Swaddling
 - Optimal feeding quality
 - Quiet, low light environment
 - Non-nutritive sucking
 - Limit visitors
 - Cluster care
 - Noise machines
 - Swings



NAS ESC- Treatment

- Role of Breast Milk
 - Usually not contraindicated (unless for other medical reasons or polysubstance use)
 - Small amount of opiates excreted in BM
 - May reduce symptoms
 - Recommend against abruptly stopping

NAS ESC- Treatment

- Pharmacological Treatment
 - Morphine is the first-line and main treatment
 - Administered with feeds
 - Collaborative decision made between nurse and physician
 - Consider if answers “NO” for at least 2/3 components
 - Dosing
 - Starting dose will be 0.04mg/kg/dose
 - No longer scheduled q 3hrs
 - Will be prn dosing, usually determined by team huddle

NAS ESC- Treatment

- Adjunctive Therapy
 - If max dose of morphine reached and infant continues to be uncontrolled
 - Phenobarbital
 - Not recommended as single therapy
 - More commonly needed in poly substance abuse
 - Dosed every 12hrs-24hrs
 - Morphine weaned first
 - May be discharged home on phenobarb
 - Usually baby outgrows dose (natural wean)
 - Requires PCP be comfortable managing
 - Reliable family
 - Clonidine
 - Methadone

NAS ESC- Promising Data

- Decreased morphine usage
 - 50-80% treatment rate when using a numerical, score based approach
 - 10-40% treatment rate with ESC, some centers report even higher reduction
 - Decrease in overall morphine dosage
- Decreased LOS
 - Early data showing from 3 weeks to <1 week on average (22.5 days to 5.9 days)
- Decreased cost

NAS ESC- Promising Data

	Outcomes Using the ESC Approach	Predicted Outcomes using FNASS	P-value
Infants with NAS receiving morphine	6(12%)	31 (62%)	<0.001
Hospital Days			
-No morphine	258 (87.2%)	156 (52.7%)	<0.001
-Increased morphine dose	8 (2.7%)	76 (25.7%)	<0.001
-Decreased morphine dose	21 (7.1%)	35 (11.8%)	<0.001
-Same morphine dose	9 (3.0%)	29 (9.8%)	<0.001

NAS

ESC- Adapting to NICUs

- Parental/care partners are key to success
 - High-risk population
 - Collaborative effort between nurses, parents, and guardians
 - Requiring parents to stay?
 - Cuddlers
- Rooming-In
- Morning and evening huddles
- Location/bed awareness
- Baby-wearing
- Prenatal Consults

NAS

ESC- Challenges/Concerns

- Will babies be missed?
- Will babies be undertreated?
- What about GI symptoms?
- Highest rates of success are when parents are heavily involved
- **ESC is a shift in thinking: We are not denying a baby is withdrawing, we are just changing how we approach and treat it.**

NAS

A Work in Progress

- Evolving process of learning and adjusting
- Any questions?