Fiberoptic Endoscopic Evaluation of Swallowing for Infants in the NICU: Past, Present & Future Directions

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Disclosures

• Jenny Reynolds
  • No financial or non-financial disclosures
• Chrysty Sturdivant
  • No financial or non-financial disclosures
Objectives

1. The participant will describe the past and current practice for evaluation of dysphagia in the NICU.

2. The participant will describe 5 components to creating and implementing a FEES program in the NICU.

3. The participant will describe at least three clinical indications for using the FEES in the NICU.
Baylor Health Care System is now a part of Baylor Scott & White Health

- 10 NICU’s in the system
- Baylor University Medical Center-Dallas
  - Birthing hospital
  - 82 beds
  - Level III
  - 6 Neonatal Therapists
Background Story

• Triplets

• Dedicated mother to BF

• One diagnosed with severe pharyngeal dysphagia and required thickened bottle feedings per VFSS results

• Mother… “But she looks great during BF”
Clinical Questions

- Is FEES appropriate and safe in the NICU?
- Can FEES be utilized as an evaluation for breastfeeding?
Determining the efficacy of using FEES compared to VFSS to diagnose laryngeal penetration & aspiration in infants in the NICU

2014 randomized controlled research study to answer two clinical questions:

① Determine specificity and sensitivity values for penetration and aspiration using VFSS and FEES

② Evaluate FEES while breastfeeding as a method to observe the presence or absence of penetration or aspiration during breastfeeding
The Past is your lesson. The present is your gift. The future is your motivation.
FEES and the “Gold Standard”

- VFSS
  - Logemann
    - 1983
  - Arvedson

- FEES
  - Langmore
    - 1988, 1991
  - Willging
    - 1995, 2000
FEES and the “Gold Standard”

- Several studies comparing VFSS and FEES in adult population
- Limited studies comparing FEES and VFSS in pediatric population
FEES and the “Gold Standard”: Pediatric Studies

- Leder et al, 2000
- N=30
- 11 days old to 20 years
- 100% agreement in
  - Bolus flow characteristics
  - Anatomical characteristics
  - Laryngeal penetration/aspiration
- 100% agreed on feeding recommendations

FEES and the “Gold Standard”: Pediatric Studies

- da Silva, et al 2010
- N=30
- Laryngeal penetration and aspiration 100% agreement
- Inter-observer agreement for FEES parameters >70% for all parameters

Is FEES Safe?

“When FEES is performed by expertly trained clinicians- it is an extremely safe swallowing evaluation method.”

(Aviv, et al 2000)

“FEES can be performed in children as young as premature infants safely- no laryngospasms or respiratory compromise have been seen.”

(Willging & Thompson 2005)
Why FEES in the NICU?

Advantages

✓ Simulates true feeding environment & experience
✓ Clear view of structures
✓ No barium or radiation
✓ Assess caregiver interventions
✓ Assess during breastfeeding
✓ No time constraints
✓ Promote family involvement
Why FEES in the NICU?

Disadvantages

- Possible discomfort to patient
- Specialized training required
- Limit view of esophageal phase
- Chain swallows in infants can be difficult to interpret
- White out during the swallow
- Equipment cost
Potential Complications

- Epistaxis
- Reaction to topical anesthesia
- Vasovagal response
- Laryngospasm


Special Considerations

- Topical Anesthesia
  - Viscous Lidocaine
  - Neo-Synephrine
  - Must have MD order

- Coloring Agent
  - Green dye
  - Barium

Anatomy
Abnormal Anatomy
The Present...
How do you develop a NICU FEES Program?
Underlying Assumptions

✔ SLP team has advanced FEES training
✔ Competent neonatal therapy team
✔ Decisions are made by NICU team
✔ Breastfeeding is always supported and encouraged
✔ Bedside feeding evaluations by NT before an instrumental study is ordered
Underlying Assumptions

- All feeding interventions and strategies are trialed before recommending an instrumental assessment
- Maturation has been achieved
- LOS is a “real” issue
- Rice cereal for thickening formula
- Gelmix for EBM (>42 weeks and 6 pounds)
- We have our own recipes for thin/half-nectar/nectar/honey
5 Program Components

① Competency
② Equipment
③ Protocol
④ Procedure
⑤ Education
Who’s On the NICU FEES Team?

• Neonatal Therapist (feeder)
• Speech Pathologist (endoscopist)
• Bedside Nurse
• Physician and Nurse Practitioner
• Dietician
• Respiratory Therapist
Competency

- Neonatal Therapist
- Nursing
- Speech Language Pathologist

- ASHA Position Statement
- ASHA Training Guidelines
- ASHA Knowledge and Skills for Speech-Language Pathologists Performing Endoscopic Assessment of Swallowing Functions

Equipment

• Manufacturer
• Cost
• Creativity
• Tenacity
Equipment

Procedural Cost Comparison

VFSS
$853.97 without radiologist fee
$2,000.00 with radiologist fee

FEES
$500.00
FEES Protocol

- **Clinical Indications**
  - Clinical signs/symptoms of aspiration during the bedside feeding evaluation
  - Poor or questionable secretion management
  - Stertor or stridor
  - Suspected laryngeal abnormality
  - Abnormal VFSS and additional information of swallow function needed
FEES Protocol

• Clinical Contraindications
  ✓ Autonomic instability
  ✓ Unable to pass/tolerate naso-gastric tube
  ✓ Anatomic conditions that would limit visualization
    ✓ Choanal atresia
    ✓ Nasal stenosis
    ✓ Pharyngeal stenosis
FEES Procedure for Bottle Feeding

- Staff Roles clearly defined
- Education
  - Staff
  - Parents
- Preparing the Environment
  - Sound
  - Lights
  - Equipment-stool, chair
FEES Procedure for Bottle Feeding

- Preparing the infant
  - Remove feeding tube
  - Suction if needed
  - Neurobehavioral Assessment
    - Autonomic
    - State
    - Motor
  - Swaddle and positioning
  - Sucrose and non-nutritive sucking
FEES Procedure for Bottle Feeding

• Prepare Breast milk/formula
  ✓ Bottles/nipples
  ✓ Consistencies: thin, half-nectar, nectar, honey
  ✓ Add 2 drops of McCormick's green dye for every 30 mL.

• Scope prepared
  ✓ Check image
  ✓ Apply lubricating jelly
FEES Procedure for Bottle Feeding

- Assessment and Interpretation
  - Insert scope
- Team
  - Collaboration
  - Recommendations
  - Plan
  - Communication
FEES Procedure for Breastfeeding

- Staff roles clearly defined
- Education
- Preparing the Environment
- Preparing the Infant
  - Positioning
FEES Procedure for Breastfeeding

• Preparing the Mother
  ✓ Add 1 drop of McCormick’s green dye with 5 mL. EBM and/or sucrose behind Nipple shield/SNS
  ✓ Deliver with 1 mL. syringe
  ✓ Position for feeding and scoping
  ✓ Latch
FEES Procedure for Breastfeeding

- Scope prepared
- Assessment and Interpretation
  - Insert scope
  - Re-position mother and infant
- Team
Interpretation & Results

• Determine appropriate feeding plan
• Collaborate for follow-up
• Determine need for additional consults (GI, ENT, Cardiac, Pulmonologist)
• Provides additional information for clinical decision making
Education

- Administration
- Grand rounds
- NICU and therapy staff
- Bulletin board
- Newsletter/email
- Research department
Case Study #1

- Infant male born at 39 weeks repeat c-section
- Admitted to NICU for failed transition
- Facial abnormalities, wide-set toes
- Heart murmur and VSD
- Micro-deletion of chromosome 13
- Head US and MRI
  - DOL #3 with partial agenesis of corpus collosum
- Respiratory distress syndrome
  - N/C @ .5 liters, 21%
Case Study #1

• Feeding history
  ✓ Started gavage feeds on admission
  ✓ NPO on DOL #2 for large residuals
  ✓ Increased stridor with feeding
  ✓ Increased oxygen requirements
  ✓ Audible swallows
  ✓ Increased work of breathing
  ✓ Breastfeeding and some bottle feeding attempts
  ✓ Bedside feeding evaluation DOL #6
## Instrumental Studies

### VFSS

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Penetration</th>
<th>Aspiration</th>
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<tbody>
<tr>
<td>Thin</td>
<td>Negative</td>
<td>Negative</td>
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### FEES

<table>
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<th>Aspiration</th>
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<td>Positive</td>
</tr>
<tr>
<td>Honey</td>
<td>Positive</td>
<td>Negative</td>
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FEES Video
Recommendations & Follow-Up

• Gavage feedings as primary route
• Breastfeeding when mother available
• Oral motor therapy
• Gastrostomy tube placement scheduled
• Discharge from hospital at 2 months
• Diagnosed with developmental delay, g-tube dependency and failure to thrive at 4 months
• Outpatient therapy, GI and cardiology follow-up
Lessons Learned

• State of the infant matters
• Screens for privacy
• Practice and prepare for the worse
• Mother is dedicated to breastfeeding
Future Direction

- Additional research
- Case studies
- Breastfeeding
- Share information
- FEES the new “Gold Standard”???
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References


References


References

• Guidelines for Speech-Language Pathologists Performing Videofluoroscopic Swallowing Studies ASHA Special Interest Division 13, Swallowing and Swallowing Disorders (Dysphagia) http://www.asha.org/policy/GL2004-00050/#sec1.1


References


- Role of the Speech-Language Pathologist in the Performance and Interpretation of Endoscopic Evaluation of Swallowing: GuidelinesASHA Special Interest Division 13, Swallowing and Swallowing Disorders (Dysphagia) Committee on Endoscopic Evaluation of Swallowing Guidelines. (asha.org)