Analyzing Swallow Studies in Pediatrics

About the Speaker

Robert Beecher, M.S., CCC-SLP was formerly senior speech-language pahologist at the Children's Hospital of Wisconsin in Milwaukee. He is specialized in the field of pediatric feeding and swallowing with emphasis on the development of protocol and procedures for the use and analysis of pediatric video fluoroscopic studies of the swallowing process. He is co-developer of the Multiple Application Multiple Articulation Seating System (MAMA) for infants and children. Mr. Beecher continues to consult and lecture throughout the United States on the issues involved in pediatric feeding and swallowing.

Topic Index

Part 8
Evaluation Examples cont. ……..60 min.

Part 9
Evaluation Examples cont. ……..62 min.

Part 10
Evaluation Examples cont. ……..54 min.

Part 11
Evaluation Examples cont. ……..49 min.

Total Viewing Time (10 hours 2 min.)
Total Hours Granted: 10 Contact Hours/1.0 CEUs

INSTRUMENTAL TECHNIQUES

Cervical Auscultation

Uses a stethoscope to listen to sounds in the pharyngeal and laryngeal portions of the airway.

Flexible Endoscopic Evaluation of Swallowing (FEES)

Uses a fiberoptic scope inserted through the nasal cavity to the junction of the nasopharynx and the hypopharynx to observe the structures and functions of the mid to lower portion of the pharynx, larynx, and subglottic trachea before and after the swallow.

Oral-Pharyngeal Motility Study (OPMS)

Uses a fluoroscope to assess the structures and functions of the oral and pharyngeal mechanisms, the larynx, proximal trachea, and proximal esophagus during a typical feeding.

References

Takahashi, K., Groher, M.E., & Michi, K. Methodology for detecting swallowing sounds. Dysphagia, 1994, 9: 54-62.

Willging, J.P., Miller, C.K., Link, D.T., & Rudolph, C.D. Use of FEES to assess and manage pediatric patients, in S.E. Langmore, Endoscopic evaluation and treatment of swallowing disorders. New York: Thieme, 2001,213-234.

Arvedson, J., & Lefton-Greif, M. Pediatric videofluoroscopic studies: A professional manual with caregiver guidelines. San Antonio: Communication Skill Builders, 1998.

CRITERIA FOR ORAL-PHARYNGEAL MOTILITY STUDIES

A videofluoroscopic oral-pharyngeal motility (OPM) study may be considered if an infant or child exhibits any of the characteristics listed below. If a patient has 2 or more symptoms, an OPM study is strongly suggested in the interest of patient safety.

1. Frequent coughing, choking, and/or gagging especially during eating or drinking activities.

2. Failure to gain weight or poor weight gain.

3. Refuses to eat new food textures.

4. Exhibits rigid feeding behaviors.

5. Cannot control oral secretions.

6. Respiration-phonation is wet/gurgly before, during, and/or after eating or drinking activities.

7. Frequent irritability.

8. Poor sleep habits (e.g., difficulty going to sleep, frequent waking, restless sleeper).

9. Frequent upper respiratory infections; chronic respiratory problems.

10. Neuromotor involvement, which affects respiratory coordination, sensory-motor activity, muscle tone, oral-motor function, and/or postural control against gravity.

11. Structural and/or functional problems of the oral and/or pharyngeal mechanisms which might result in aspiration.

CRITERIA FOR REPEAT OPM STUDIES

Repeat oral-pharyngeal motility studies are indicated prior to implementing a significant change in an infant or child's oral-motor/feeding treatment plan, feeding equipment, or dietary textures if:

1. there is a recurrence of symptoms previously thought to have been resolved,

2. aspiration occurred without immediate, effective clearing of aspirated materials during the previous study,

3. the initial study was terminated prior to completion,

4. the initial study could not be analyzed, or

5. there is a significant medical change (e.g., surgery, medication change) which may affect oral-motor function.

ORAL-PHARYNGEAL MOTILITY STUDY ANALYSIS

PRIMARY FACTORS

Aspiration

Laryngeal penetration

Residual

Elicitation of swallow

Preparation of bolus

Control of bolus

Propulsion of bolus

Velopharyngeal function

Tongue/palate contact

Timing of swallow

Premature entry

Coordination of breathing/swallowing

UES/esophagus (function)

ORAL-PHARYNGEAL MOTILITY STUDY

I. PURPOSE

The purpose of this fluoroscopic study is to provide definitive information relative to the structure and function of the oral and pharyngeal mechanisms during the feeding and swallowing processes. The information obtained from this fluoroscopic study is essential to the development of an effective management and/or treatment program for the child and the family. The questions to be answered by this study differ from those answered by other barium studies. Therefore, a specific protocol has been established for this study. There will be exceptions in individual cases due to motor development, cognitive development, medical conditions, feeding history and other variables relevant to each individual patient.

II. REFERRAL

A referral for this study must be made by a physician.

III. PROTOCOL

A) Personnel: The radiologist will operate the fluoroscopy unit. The speech pathologist will position the patient, select materials, and determine the order of presentation. If the parent/primary caretaker cannot be present during this study, the speech pathologist will present the materials to the patient.

B) Instruction/preparation of the patient: The parent(s) should be informed of the evaluation process several days prior to the study. The process should be explained in appropriate terms to the patient before entering the radiology suite if the patient is capable of understanding it. Parents should be made aware that the study will be more successful if the child is hungry at the time of testing.

Some time may be needed by the patient and parent(s) prior to the start of the study to acclimate to the room and the procedure. Specific instructions as to when and how to present materials will be given by the speech pathologist in conjunction with the radiologist.

C) Position: The patient will be positioned in as close to his/her usual feeding position as possible, using equipment provided by the parent/primary caretaker or equipment available at the facility that most closely approximates the equipment to which the patient is accustomed. The speech pathologist may find it necessary to change the patient's head and/or body position (flexion, extension, turn, tilt) during the study to assist in making management/treatment decisions.

D) Views: The lateral view will be completed first. The area to be viewed extends:

1. Horizontally from the outer edge of the lips posteriorly through the cervical spine.

2. Vertically from the mid-nasal cavity inferiorly to 6-8 cm. below the larynx and upper esophageal sphincter.

An anterior-posterior (AP) view will be completed if appropriate. Reasons for conducting an AP view include:

1. Suspicion of unilateral impairment.

2. Need to more accurately evaluate tongue function.

3. Need to more accurately determine the existence of asymmetrical functions and/or structures.

4. Scan esophagus.

The area to be viewed during the AP view extends:

1. Horizontally from ear to ear.

2. Vertically from the mid-nasal cavity to 6-8 cm. below the larynx and upper esophageal sphincter.

3. Scan esophagus.

E) Barium materials/textures: Barium materials available in the radiology department will be utilized as the basic materials presented to the patient. Actual textures used will be dependent on the level of motor development, level of cognitive development, medical condition, feeding history and other variables relevant to the individual patient. The textures presented during the study can include those listed below or any other texture(s) which approximate ones presently in the patient's diet.

1. Thin Liquid - A mixture of 3 parts water to 1 part liquid barium, a dash of Kool Aid, and 1 teaspoon of sugar; stir thoroughly.

2. Thick Liquid - A mixture of liquid barium, a dash of Kool Aid, and 1 teaspoon of sugar; stir thoroughly.

3. Pureed - A mixture of a consistency similar to pureed bananas; add a dash of water to 5-6 tablespoons of barium esophageal cream (Esophatrast), stir well, add another dash of water, and stir until the proper consistency is produced.

4. Soft Mechanical - A lumpy mixture made by adding 1 oz. of rice baby cereal to 2 oz. of liquid barium and stirring well allowing time for the cereal to absorb the moisture; more barium and/or cereal can be added in order to find the texture the child is acquainted with as described by the parent/caretaker.

5. Solid - A quick dissolving, easily chewed cracker (graham) or cookie (Lorna Doone) dipped in the pureed texture made from Esophatrast and water.

F) Amount: The amount of material provided will be determined by the primary caretaker. Modifications in the amount of material presented might be made by the speech pathologist to assist in making management/treatment decisions.

G) Sequence: The sequence of presentation of textures will generally begin with the texture easiest for the child to eat according to the primary caretaker. Additional textures will be presented in order of increasing difficulty. The actual sequence may be dependent on the level of motor development, level of cognitive development, medical condition, feeding history and other variables relevant to the individual patient.

A minimum of three swallows per texture are necessary for an adequate evaluation. The evaluation of bottle feeding should include a minimum of three sucking sequences.

H) Delivery system(s): The parents will be asked to bring the utensils the child uses at home. Utensils that most closely approximate these utensils will be provided by the facility if the patient's utensils are not available. Variations in the type of bottle, nipple, spoon or other feeding device may be necessary to assist in making management/treatment decisions.

I) Placement of materials: The primary caretaker will present the materials to the child without specific instruction. Variations in the placement of material may be necessary in order to make management/treatment decisions. These variations will

be dependent on motor development, cognitive development, medical conditions, feeding history and other variables relevant to the individual patient.

J) Temperature: Material is presented at room temperature. Temperature variations may be used to assess the affect on the feeding process in accordance with information from the feeding history.

K) Phonation: A brief speech sample comparing nasal versus non-nasal sentences may provide valuable information on tongue and velopharyngeal functioning if the child is able to speak. The need to perform this portion of the evaluation will be determined by the speech pathologist in conjunction with the radiologist.

L) Safety: Suctioning equipment and trained hospital personnel will be readily available. Female caretakers should be cautioned not to enter the radiology room if there is a possibility that they are pregnant. All persons in the room will be shielded appropriately. The radiologist will terminate the study if continuing it might jeopardize patient safety.

M) Recording: All studies will be videotaped (with audio) for analysis and stored as a permanent record.

N) Reporting: Written reports will be provided by the radiologist and the speech pathologist.

ORAL-PHARYNGEAL MOTILITY STUDY

EVALUATION PROCESS

1. View Tape - twice
    a. Time the study
    b. Count swallows and number of presentations of each texture
2. Assess for General Function - look for problem areas
3. Assess Inferior Portion of the Pharynx
    a. Aspiration
        1) texture
        2) frequency
        3) amount
        4) response
    b. Laryngeal penetration
        1) texture
        2) frequency
        3) amount
        4) response
    c. Residual
    d. Supraglottic space - structure/function
    e. Compression of piritbrm sinuses
    f. Contact point*
    g. Cervical spine
    h. Timing/effectiveness of the UES
    i. Observe proximal esophagus

4. Assess Medial Portion of the Pharynx
    a. Tongue - posture, function
        1) airway size
        2) coordination
        3) contact point*
    b. Epiglottis - posture, structure, function
    c. Contact point*
    d. Aryepiglottic folds
    e. Hyoid position and movement
    f. Pharyngeal wall motion
    g. Residual
    h. Cervical spine
    i. Tonsils

5. Assess Superior Portion of the Pharynx
    a. Nasopharyngeal airway
        1) tonsils/adenoids
        2) cranial base
        3) soft palate
        4) residual
    b. Soft palate - structure/function
    c. Nasal reflux
        1) frequency
        2) source
        3) effect on ventilation

4) response

5) residual

d. Posterior tongue

1) position

2) function

3) contact point*

4) residual

e. Cervical spine

6. Assess Oral Mechanism

a. Tongue size

b. Tongue movement

1) flexibility

2) pattern

3) coordination

c. Palatal vault

d. Jaw relationship

e. Dental relationships - anterior, molar

f. Jaw motion

g. Lips

h. Bolus preparation

i. Bolus control

j. Bolus propulsion

k. Residual

7. Assess Coordination/Relationship/Function/Timing

    a. Inferior/medial pharynx

    b. Medial/nasal pharynx

    c. Oral/nasal pharynx

    d. Entire pharynx

    e. Oral/nasal/medial pharynx

    f. Airway protection

8. Anterior View

    a. Inferior/medial pharynx

        1) symmetry of valleculae and piriform sinuses at rest/during function

        2) residual

        3) epiglottis

        4) aspiration

        5) proximal esophagus

        6) residual

    b. Oral

        1) symmetry of tongue and jaw at rest/during function

        2) palatal vault

        3) tongue

        4) jaw

        5) bolus preparation

        6) bolus control

        7) bolus propulsion

        8) residual

9. Review Entire Study - twice

* *Contact point = The first point of contact between the posterior tongue and palate or pharynx which provides a base of stability allowing the muscular action required to provide sufficient movement to the cricopharyngeus muscle that elicits the swallow response.*