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An Overview of Pediatric Dysphagia

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Difficulty swallowing or dysphagia can be present in children and adults alike. Pediatric dysphagias have long been recognized in the literature. Certain groups of infants with specific developmental and/or medical conditions have been identified as being at high risk for developing dysphagia. Still others may present with a swallowing or feeding problem as their primary symptom. Left untreated, these problems in infants and children can lead to failure to thrive, aspiration pneumonias, gastroesophageal reflux, and/or the inability to establish and maintain proper nutrition and hydration.

Awareness of the prevalence of pediatric dysphagia in today's population and the signs and symptoms of this condition aids in its treatment. Early detection of dysphagia in infants and children is important to prevent or minimize complications. This article provides a review of symptoms, etiologies, and resources available regarding management of this condition to help the primary care physician and the families of young children and infants in its management.

Keywords: pediatrics; swallowing; dysphagia; disorders

Incidence/Epidemiology

Swallowing is a dynamic process that requires the recruitment and coordination of the muscles of the lips, tongue, palate, pharynx, larynx, and esophagus. Essentially, the act of swallowing occurs in 3 main stages: oral, pharyngeal, and esophageal. Therefore, swallowing disorders may present in any, some, or all of these stages.

Adult dysphagia, or difficulty swallowing, has long been reported in the literature and has been estimated to be present in up to 40% of individuals¹ to as high as 64% of individuals following a stroke.² The incidence of dysphagia in other adult populations is significant as well, being reported in as high as 20% of the population aged 50 and older.³ Infants and children also experience swallowing problems,

either because of behavioral, developmental, or neurological conditions, respiratory problems, and/or gastroesophageal reflux, or structural deficits such as a cleft lip or palate.

A significant correlation has been established between dysphagia and aspiration pneumonia in infants and children⁴ and in adults.⁵ Pneumonia has the highest mortality rate of any nosocomial infection⁶ and has one of the lowest reimbursement rates for patients hospitalized with this condition.

Etiologies

Causes of pediatric dysphagia can be multidimensional, existing alone or in addition to other underlying medical conditions (see Table 1). Developmental factors such as appropriate maturation, sensory development, and fine motor coordination are imperative to optimal deglutition. Prematurity, neurological conditions, reflux, and congenital malformations can all create dysphagia.

The preterm infant has a difficult time coordinating and tolerating the various activities required for oral feeding. With prematurity, an infant has to coordinate both feeding and breathing.⁷ Poor suckling occurs as a result of underdeveloped oral motor

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Table 1. Common Etiologies of Pediatric Dysphagia

Traumatic brain injury
Neurological disorder
Cerebral palsy
Prematurity
Tracheotomy or ventilator dependence
Craniofacial abnormalities
Failure to thrive

strength and coordination, immaturity, or lack of development altogether of the sucking pads in the cheeks. Underdeveloped lungs also create challenges for the coordination of respiration and swallowing.⁸ Prematurity can also lead to a variety of other medical conditions that can affect swallowing. Some common medical conditions associated with prematurity that may also adversely affect swallowing and feeding functions include respiratory distress syndrome, broncopulmonary dysplasia,⁹ cardiac problems resulting in apnea and bradycardia,¹⁰ and necrotizing enterocolitis.¹¹

Other medical conditions that can lead to pediatric swallowing problems include gastroesophageal reflux, which often creates behavioral challenges or aversions to eating, coughing, pneumonia, apnea, and failure to thrive.¹² Cerebral palsy is the most common condition to create congenital neurological dysphagia.¹³ Cerebral palsy may create hypertonicity or hypotonicity, hypersensitivity to touch and foods, and a prolongation of reflexes such as suckle and rooting reflexes.¹⁴ Fetal alcohol syndrome can lead to craniofacial abnormalities and/or mental retardation, both challenges to a safe swallow function.¹⁵ Craniofacial abnormalities and syndromes associated with these abnormalities (CHARGE syndrome, Pierre-Robin Syndrome, etc) can include cleft of the palate (resulting in little pressure for sucking and/or nasal regurgitation), cleft lip (which diminishes the functionality of the labial seal around the nipple), and/or a submucosal cleft (which can result in nasal regurgitation).¹⁶ Because craniofacial abnormalities can create discomfort and dysfunction when feeding, feeding aversion or refusals at mealtimes may occur with these conditions as well.

For infants and children with severe respiratory problems requiring tracheostomy, dysphagias may exist because of a decreased overall sensation in the larynx, decreased elevation of the larynx,¹⁷ and poor sucking resulting from limited practice doing so during development. Failure to thrive can also lead to or be the result of swallowing and eating disorders.¹⁸

Behavioral feeding disorders, such as aversion to textures, poor management of different textures of foods, and food avoidance have also been noted in children and infants. Behavioral feeding disorders have been evidenced both with and without organic swallowing conditions.

Signs and Symptoms

Adults with dysphagia often complain of food “sticking” in the pharynx and coughing or choking on solids or liquids. As mentioned earlier, children and infants rely on their parents or clinical physicians to be alert to the signs and symptoms of their swallowing problems.

Common signs and symptoms that a swallowing problem exists in an infant or child can range from obvious ones (projectile vomiting, coughing, and/or choking) to instances of silent aspiration where these symptoms can be very mild or absent altogether. Some significant signs of pediatric dysphagia include the child having little interest in eating or feeding, straining or extension of muscles during feedings, extensive time required to feed, spilling of food or liquid out of the mouth, emesis, coughing and gagging during feeding, challenges with breathing/stridor when feeding, and failure to thrive. The presence of tongue thrusting during swallowing has also been evidenced as a sign of dysphagia.¹⁹ Gastroesophageal reflux and nasal regurgitation are other signs that swallowing problems may exist, and a swallowing evaluation should be performed.

Chronic lung infections and lung disease may suggest aspiration either during feedings or on refluxed material. For pediatric patients with compromised strength and endurance resulting from developmental, neurological, or other medical conditions, fatigue during feedings can also increase the risk of aspiration.²⁰ Although coughing is a protective mechanism that is designed to prevent penetration and/or aspiration of material, many infants who aspirate do not cough,²¹ and therefore, the incidence and frequency of lung infections may be the only indication that aspiration occurs.

Assessment

In addition to a medical history and details on developmental milestones, a feeding history obtained

from the parents or caregivers is important to identify infants and children with dysphagia or those at risk. According to Arvedson,²² asking parents the following 4 questions can provide significant insight into whether the condition exists or if referral to a swallowing therapist should be considered:

- How long do mealtimes typically take? If more than about 30 minutes on any regular basis, there is a problem. Prolonged feeding times are major red flags pointing to the need for further investigation.
- Are mealtimes stressful? Regardless of descriptions of factors that underlie the stress, further investigation is needed. It is very common for parents to state that they “just dread mealtimes.”
- Does the child show any signs of respiratory stress? Signs may include rapid breathing, gurgly voice quality, nasal congestion that increases as the meal progresses, and panting by an infant with nipple feeding. Recent upper respiratory illness may be a sign of aspiration with oral feeds, although there may be other causes.
- Has the child *not* gained weight in the past 2 to 3 months? Steady appropriate weight gain is particularly important in the first 2 years of life for brain development as well as overall growth. A lack of weight gain in a young child is like a weight loss in an older child or adult.²²

A careful physical examination to assess the nutritional status, growth, and development or identify structural abnormalities is important. Special attention should be given to the head and neck area. It is ideal if the physician is able to independently observe the infant and child while they feed. Objective swallowing assessments used may include a videofluoroscopic swallow study (often called a *cookie swallow*), which is performed with radiology and determines how well the infant or child can tolerate amounts and types of liquids and soft foods. In studies, this method has been shown to be more accurate in determining aspiration of solids in children than bedside or clinical swallowing assessments²³ and has been shown to be crucial in the determination of silent aspiration.²¹ For infants, various nipple sizes and types can be tried out during this assessment to determine safety as well. Other objective assessments available to assess swallow function include flexible fiberoptic endoscopic evaluation of swallowing (FEES) and FEES with sensory

testing (FEEST).²⁴ For infants and children with suspected esophageal dysphagia, a barium esophogram²⁵ can be used to assess esophageal motility and rule out gastroesophageal reflux. Manometry and/or videomanometry to determine the strength of pharyngeal contractility and upper esophageal sphincter relaxation during swallowing can also be used.²⁶

Overview of Treatment Options

Swallowing therapy for adults with dysphagia often involves swallowing exercises for the patient to perform, which are designed to increase tongue base strength, increase laryngeal elevation, or use compensatory techniques such as tucking of the chin or turning the head to increase intake safety. Swallowing therapy for infants and children often involves modifying diet or liquid texture, or repositioning to achieve optimal safety during meals. Changing of body and head position allows better airway protection; alteration of temperature, volume, and consistency of foods and liquids; oral stimulation to increase oral motor strength and coordination; slowing the rate of food or liquid presentation; and the use of adaptive feeding equipment such as varied spoon size and shape or nipple size, shape, and flow rate.²⁷

Depending on the results of assessments, strategies, diet modifications, and techniques to aid in improving diet tolerance and swallowing ability are provided to parents and caregivers. Therapy techniques can include exercises to strengthen weak muscles of the face, tongue, lips, and palate. By adjusting the size and flow rate of the nipple on the bottle for infants, liquid tolerance can be increased. And, like the techniques used for adults, diet modifications such as the thickening of liquids or altering the textures of foods (eg, all smooth or all crunchy) can ensure that optimal textures of foods are used. For infants and children with tracheotomies, a valve or cap over the tracheotomy can be used to increase pressure and restore a more normal oropharynx, aiding in development and function. In cases of extreme dysphagia, recommendation of alternative means of nutrition and hydration (either via temporary or longer-term feeding tube) may be made.

For infants and children with congenital abnormalities or physical or structural conditions preventing optimal swallow function (stricture, severe reflux, cleft palate, etc), surgery or medication can

be used to treat dysphagia. Infants and children with severe developmental delay or cerebral palsy may require alternate route of feeding.

Often, for children with feeding challenges, a multidisciplinary team of professionals is best suited to treat the condition. This team often includes a dietitian, behavioral psychologist, speech-language pathologist, and occupational therapist. For children with behavioral feeding issues, behavioral modification focuses on parent or caregiver education as well as behavioral changes or modification to relearn poor feeding skills.

Conclusion

Swallowing problems can affect infants and children. Early detection and identification of risk factors or etiologies will minimize complications. As primary care physicians, the importance of early diagnosis and treatment of pediatric dysphagia will not only address the underlying medical condition in young children and infants but will help ensure optimal growth and maturation in the crucial developmental years.

Take-Home Points

1. Signs that pediatric dysphagia exists include the child having little interest in eating or feeding, straining or extension of muscles during feedings, extensive time required to feed, spilling of food or liquid out of the mouth, emesis, coughing and gagging during feeding, challenges with breathing/stridor when feeding, and failure to thrive.
2. Swallowing therapy for infants and children often involves modifying diet or liquid texture, or repositioning to achieve optimal safety during meals. Changing of body and head position allows better airway protection; alteration of temperature, volume, and consistency of foods and liquids; oral stimulation to increase oral motor strength and coordination; slowing the rate of food or liquid presentation; and the use of adaptive feeding equipment such as varied spoon size and shape or nipple size, shape, and flow rate.

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