

TITLE: Dysphagia

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Physiology of Swallowing

Dysphagia is defined as difficulty swallowing. The act of swallowing can be divided into three phases: oral, pharyngeal, and esophageal. The amount of time elapsed from initiation of the swallow to the end ranges from 8 to 11 seconds. A step that precedes swallowing is oral preparation. It involves conversion of food from the solid to the semisolid state. This phase requires intact dentition and is negatively affected by poor salivary gland function (lubrication), surgical defects, and neurologic disorders. In the oral phase, a formed bolus is positioned in the middle of the tongue. The bolus is then pressed firmly against the tonsillar pillars, triggering the pharyngeal phase. The oral phase is affected by surgical defects resulting in weakness of the tongue or neurologic disability. These deficits can lead to leakage of oral contents before or after the swallow, resulting in leakage into the airway.

The pharyngeal phase of swallowing is the shortest but is the most complex. In this phase the soft palate elevates closing off the nasopharynx and preventing nasopharyngeal regurgitation. The superior constrictor muscle contracts, beginning pharyngeal peristalsis while the tongue base drives the bolus posteriorly. Respiration ceases during expiration-the larynx elevates and the epiglottis retroflexes, driving the bolus around the opening of the larynx. The arytenoids adduct and are approximated to the base of the epiglottis. Bolus propulsion is enhanced by passive and active dilatation of the upper esophageal sphincter (of which the cricopharyngeus is a part). The cricopharyngeal and inferior constrictor muscles then relax, allowing food to pass into the upper esophagus. The pharyngeal phase is followed by the esophageal phase in which the bolus is propelled about 25 cm from the cricopharyngeus through the thoracic esophagus via peristaltic contractions. The lower esophageal sphincter relaxes and the bolus moves into the gastric cardia.

The swallow reflex is a complex neurologic event involving participation of high cortical centers, brain stem centers such as the tract of the nucleus solitarius and nucleus ambiguus, and

cranial nerves V, VII, IX, X, and XII. Neurologic deficits in any of these areas can result in dysphagia.

Evaluation of Dysphagia

History:

In taking the history it is important to note the duration of the dysphagia. Also important is whether the problem is difficulty swallowing or pain on swallowing (odynophagia). Odynophagia suggests inflammatory or malignant neoplastic processes. The level of sensation of the difficulty in swallowing (“the catch”) should be sought. Suprasternal pain suggests a hypopharyngeal location of disease. A substernal or subxyphoid location of symptoms suggests an esophageal source. These locators can be misleading, though, as distal esophageal problems can occasionally present with suprasternal discomfort. Dysphagia to solids suggest esophageal or other structural obstruction. Dysphagia to liquids suggests pharyngeal disorders, including neuromuscular disease. Weight loss in a patient with dysphagia is an indicator of the significance and duration of the disease. Dietary changes in response to the dysphagia give insight into the nature and severity of disease. History of voice changes, hemoptysis, regurgitation of food, nasal leakage of liquids, and otalgia are all important to elicit. Previous surgery or trauma of the pharynx, chest, or abdomen should be sought. Patients should be probed about ingestion of caustic substances.

Review of Systems:

Review of systems often reveals systemic diseases that cause dysphagia. These include spinal osteoarthritis, tuberculosis, and thyroid enlargement. Systemic neuromuscular or autoimmune disorders may cause problems with esophageal motility. Otolgia may indicate upper digestive tract malignancy. Use of alcohol or tobacco raises suspicion of malignancy. A family history of digestive disease should be sought, such as history of oculopharyngeal dysphagia and muscular dystrophy. Use of certain medications such as antihistamines, anticholinergics, antidepressants, and antihypertensives can affect salivary gland function or the neurology of swallowing.

Physical Examination:

General factors such as body habitus, drooling, and mental status should be noted. Voice quality (e.g. a wet sounding voice suggesting pooling of secretions), Wheezing or labored breathing, and any cranial nerve weakness should be noted. Gurgling noise in the neck or crepitus in the neck may indicate the presence of Zenker’s diverticulum. Inspection or palpation of the tongue and tongue strength may unmask fibrillation or fasciculation of one or both sides. The oropharynx should be inspected for palatal elevation and posterior pharyngeal motion on phonation. Lateral movement of the mucosa of the posterior pharynx indicates weakness on the opposite side. Nasopharyngoscopy and hypopharyngoscopy can check for symmetry of the pharyngeal constrictors. Laryngeal examination is important but can be made difficult by the presence of pooled secretions. However, the nature of secretions gives clues to the nature of the disorder. Thick mucoid secretions are from standing accumulation such as paralysis or adynamic motor dysfunction. Foamy secretions in the piriform sinus or laryngeal vestibule indicate turbulence secondary to anatomic obstruction such as a nonrelaxing cricopharyngeal muscle or stricture. Vocal fold movement during variable pitch phonation, whispering, loud voicing, and

during inspiration should be observed. Arytenoids should be inspected for immobility. The interarytenoid mucosa is erythematous and edematous in gastroesophageal reflux disease.

Imaging Studies for Evaluation of Dysphagia

Imaging studies for dysphagia should be chosen based on the history associated with the dysphagia.

Plain Films:

Plain films are indicated in diagnosing specific causes of dysphagia, such as inflammatory (epiglottitis, retropharyngeal abscess) or radio-opaque foreign bodies. The advantages of this modality are that it is cheap and quick. The disadvantages are its inability to detect mechanics of the swallow and inability to resolve mucosal surfaces.

Barium Esophagram

The barium esophagram involves the use of a cup of liquid barium that is swallowed, then followed fluoroscopically to the stomach. Because the study is documented only on plain film, it is not considered a dynamic swallow study. The air contrast esophagram uses effervescent granules followed by administration of barium to provide better anatomic detail. The advantages of the study are that it is widely available, and with air contrast it provides better anatomic detail. The disadvantages are that the study involves radiation exposure, the logistics are difficult in bedridden patients, and the study is not a dynamic one so it cannot adequately detect dynamic dysfunction. The study is indicated in patients in whom structural disorders are suspected (e.g. dysphagia to solid foods and not to liquids) because of its relatively good level of anatomic detail.

Manometry:

Manometry uses a catheter that measures pressures at various intervals along the length of the esophagus. With each swallow, data on strength, timing, and sequencing of pressure events are obtained. The advantage of the study is that it is an actual test of pressure wave physiology. The disadvantages of the study are that it is not widely available, cannot diagnose visible lesions, is unpleasant, and is a technically demanding study to perform. For these reasons this study is rarely used except in cases where elevated intraluminal pressures must be followed (e.g. achalasia). The study may be indicated for patients who need recurrent intraluminal pressure assessment for achalasia or diffuse esophageal spasm.

Bolus Scintigraphy:

Bolus Scintigraphy is a study in which a short-lived radioactive isotope is mixed with a single swallowed bolus. A gamma camera images the radiation field and counts the number of radiation particles present. The advantages of this study are that it uses less radiation than standard radiography and it allows quantitative measurement of the fraction of the bolus aspirated. Disadvantages are that the study provides no anatomic detail. It uses only a single bolus-different consistencies of boluses are not tested. Also, the test is not widely available. Scintigraphy may be indicated to follow improvement in a patient with a history of aspiration or to follow esophageal emptying in achalasia.

Ultrasound:

Ultrasound can image the upper digestive tract, assess mobility and bolus transit, and identify vallecular stasis. The advantages of the study are that it uses no radiation, is portable, and normal food can be used. The disadvantages are that it is not widely available and the study is segmental in nature so that anatomic detail is poor.

Flexible Endoscopic Evaluation of Swallowing (FEES):

The flexible endoscopic evaluation of swallowing utilizes commonly available and portable equipment to evaluate swallowing. In this study, the flexible nasopharyngoscope is passed through the nose to the nasopharynx in order to view the upper aerodigestive tract. Anatomy and function of the upper aerodigestive tract are assessed (palate, pharynx, larynx function, salivary pooling, and sensation). Then swallowing is assessed with boluses of varying consistencies. A description of the study follows: First, the flexible scope is passed through the anesthetized nasal fossa with the tip in the posterior part of the nasal fossa. The palate is checked from the nasopharyngeal surface. Subtle palate weakness can be detected. Oral sounds, e.g. "k,k,k," "ss," and spontaneous speech are observed as part of palate function testing. Even mild unilateral weakness can be detected with this test. After checking the palate, the tip of the scope is moved beyond the edge of the palate and is turned downward. This allows a panoramic assessment of the laryngopharynx and observation of pooling of secretions in the piriform sinuses, vallecula, and laryngeal vestibule. Next, the tip of the fiberscope is positioned parallel to the posterior pharyngeal wall opposite to the epiglottis to obtain a larynx view. Vocal cord mobility and closure are assessed in this view. Sensory testing can be performed at this point by touching the tip of the fiberscope to various points on the hypopharynx and larynx to assess symmetry of reaction.

A more quantitative sensory testing modality involves the use of controlled pulses of air in set pressures to determine sensory threshold of laryngeal closure. After this structural assessment the tip of the endoscope is pulled back to the level of the soft palate and food of various consistencies is administered. This is often followed by administration of methylene blue dye. This allows visualization of leakage during the oral phase, visualization of overflow aspiration from the hypopharynx and visualization of tell-tale signs of aspiration with blue dye staining the laryngeal vestibule. Overall, the advantages of the FEES are that the equipment is simple, widely available, portable, does not expose the patient to radiation, can be used to train the patient in speech therapy via biofeedback. It allows a better assessment of neurologic status (including sensation) and gives a more detailed rendering of the anatomy than is available from other methodologies. The disadvantages of the FEES include the "blind spot" that occurs during the swallow, which prevents direct visualization of aspiration and penetration, and the fact that the cricopharyngeus and esophagus cannot be assessed. FEES is indicated in evaluation of oral and pharyngeal sources of dysphagia.

Modified Barium Swallow:

The modified barium swallow is a study in which puree, liquid, and/or solid consistency barium is administered in varying amounts while the fluoroscopic image (lateral and anterior-posterior) is recorded on videotape for later review and analysis. The study requires the presence of a speech and language pathologist and a radiologist. The patient is placed erect and varying consistencies of barium items are fed to the patient, depending on the patient's symptoms (e.g. solid bolus for the patient with complaints of obstruction, liquid bolus for the patient with

complaints of aspiration). For the oral/pharyngeal portion of the exam, a mouth full of liquid barium is given and held there for 10 seconds, and then swallowed. Any incidence of leakage is observed before the swallow, giving insight into the coordination of the oral and pharyngeal stages of swallowing. Volume of the swallow, leakage into the nasal cavity, and entry into the laryngeal vestibule can all be seen in this portion of the exam. The modified barium swallow is useful in testing the ability to protect the airway because of the ability to directly visualize contrast penetrating the laryngeal vestibule during swallowing.

If contrast enters the patient's vestibule and the patient coughs immediately, the entry may only have been incidental. However, any entry into the larynx without the patient's awareness is abnormal. "Penetration," (entry of contrast into the larynx during swallowing) is distinguished from "aspiration," (entry of contrast into the airways before or after swallowing). The pharyngoesophageal segment (made up mainly of the cricopharyngeus) is studied in the modified barium swallow, noting anatomic weakness as well as its ability to relax at the end of the pharyngeal stage. The esophageal segment is assessed next with the patient both erect and supine to test the adequacy of peristalsis. Advantages of the modified barium swallow are that it is a comprehensive test evaluating all phases of swallowing, gives good anatomic detail, and can be reviewed later in a multidisciplinary setting. The disadvantages include the radiation exposure to the patient, the difficulty in coordinating scheduling, logistics in bedridden patients, its inability to directly assess sensation, and its less than ideal rendering of the anatomy, as it relies on radiographic shadows.

Causes of Dysphagia

Foreign Bodies:

In the pharynx, fish and chicken bones are the usual foreign body culprits. Foreign bodies of the pharynx usually lodge themselves in the pharyngeal or lingual tonsils or in the piriform sinuses. The patient has a globus sensation or sharp pain when attempting to swallow. Patients usually present within a few hours, but foreign bodies are actually identified on endoscopy in only 25% of patients who complain of their presence. Most of the time the foreign body passes, and mucosal trauma from the passage of the body produces symptoms for several days. In most cases, radiography is not necessary. Simple examination with a head mirror and/or a nasopharyngoscope should be performed. Usually, the pharyngeal foreign body can be identified and removed all at the same time. In rare cases, general anesthesia may be required. If complete examination reveals no foreign body but suspicion is high, then repeat exam should be performed in 24 hours. If symptoms persist, radiographs or endoscopy may be considered. Serious complications can result from persistent foreign bodies. They include retropharyngeal abscess (the most common cause of which is a fish bone in the retropharyngeal space), perforation, and cellulitis. In the face of these complications, the patient will present with the foreign body complaint in addition to fever, dysphagia, and odynophagia.

The most common esophageal foreign bodies in adults are meat impactions and bones. Coins and button batteries are not uncommon in children. Most adults have other esophageal pathology contributing to the impaction of the foreign body. Denture use is a common predisposing factor as dentures decrease sensation on the palate leading to misjudging of the size of the bolus. Impaction usually occurs at areas of physiologic narrowing. These include the cricopharyngeus, the point where the esophagus is compressed by the aortic arch, the left main-stem bronchus, and the lower esophageal sphincter. They may also lodge at areas of pathologic

narrowing such as a peptic stricture or a Schatzki's ring. Symptoms vary from none to complete obstruction with drooling. Other symptoms include dysphagia, odynophagia, foreign body sensation, excessive salivation, vomiting, chest pain and rarely wheezing (secondary to tracheal displacement). Physical exam is usually normal. Evidence of emphysema in the neck or chest may be a sign of perforation. Fever may be evidence of mediastinitis. All patients with esophageal foreign bodies should undergo radiography, usually a PA and lateral chest and neck film. Failure to detect a foreign body does not rule it out-esophagoscopy should be performed in such cases.

In management of esophageal foreign bodies, airway protection is critical as esophageal foreign bodies may become airway foreign bodies. Asymptomatic coins in the distal esophagus should be given 12 hours to pass, whereas coins in the mid to upper esophagus should be removed as soon as possible to avoid regurgitation of the coin into the airway. Rigid and flexible endoscopy are equally efficacious for most foreign bodies. Flexible endoscopy does not require general anesthesia, but it also does not protect the trachea. Sharp or pointed objects may cause significant trauma and should be removed via rigid endoscopy. After removal of a foreign body, a chest X-ray should be obtained and the patient should be observed for 24 hours for signs and symptoms of mediastinitis. Button batteries are particularly dangerous and should be removed immediately because their ability to cause direct corrosion, low voltage burns, and direct pressure necrosis, leading to complications such as perforation, and tracheal and aortic fistulas. They can be distinguished from coins because button batteries have a halo on PA films because of their bilaminar structure. Careful endoscopy should be performed at the time of removal, minding the fact that the battery may have corroded the esophageal wall. Barium esophagrams should be performed 24 hours after removal of a button battery and again 14 days later to check for fistulization. Alternative methods to address foreign bodies includes the use of Balloon catheters to remove foreign bodies, but they do not provide for control of the foreign body. Glucagon has been shown to relax the lower esophageal sphincter, but it is not successful in foreign body treatment when other pathology is present.

Cricopharyngeal Achalasia:

A prominent cricopharyngeus can cause dysphagia by failure of adequate opening of the pharyngoesophageal segment. This failure to open occurs secondary to failure of pharyngeal and laryngeal elevation during swallowing, abnormal cricopharyngeal contraction, or inflammatory (e.g. gastroesophageal reflux disease, GERD) or neoplastic process. Symptoms range from a "globus" sensation to significant dysphagia with pooling of secretions and aspiration. Medical therapy includes treatment of GERD and Botox injection into the cricopharyngeus for temporary relief. If Botox works to correct dysphagia, cricopharyngeal myotomy may provide more permanent relief. In this somewhat controversial procedure, a careful releasing scalpel incision is made in the cricopharyngeal muscle avoiding mucosal damage. In properly chosen patients, this procedure has a high success rate. Patients with clear signs of cricopharyngeal spasm/hypertrophy on radiology and manometry are most likely to benefit.

Zenker's Diverticulum:

The Zenker's diverticulum is an acquired mucosal herniation through a posterior portion of the cricopharyngeus in an area of congenital weakness in the muscle known as Killian's dehiscence. Symptoms caused by the diverticulum include coughing up undigested food, aspiration, and chronic mucus production. Small diverticula can be treated by cricopharyngeal myotomy alone. Larger diverticula require dissection off of the rest of the esophagus and

transection with the defect sutured in layers. Diverticulopexy, or suspension of the diverticulum vertically in pre-vertebral fascia is used to shorten the procedure and reduce risk in high risk elderly patients. Endoscopic techniques use a variation of the Van Overbeek's diverticuloscope and the CO₂ laser to perform the diverticulotomy. The GIA stapler can also be used to divide and secure the pouch endoscopically.

Lateral Pharyngeal Pouches and Diverticula:

Lateral pharyngeal pouches are transient or persistent protrusions of the upper lateral pharyngeal wall in an area of weakness of the unsupported thyrohyoid membrane. They usually do not require surgical treatment, but can be treated in a similar fashion to Zenker's diverticula.

Cervical Spine Disease:

Large osteoarthritic spurs may develop on the cervical spines of patients with long-standing osteoarthritis. These spurs are a common finding in patients with diffuse idiopathic hyperostosis. The spurs are usually asymptomatic, but they may affect swallowing. Surgical resection of the spurs has been shown to help in some patients.

Anterior surgical approaches to the spine that require dissection and retraction of the larynx and pharynx can cause temporary or prolonged dysphagia secondary to interruption of the motor or sensory innervation.

Esophageal Webs:

Esophageal webs are squamous mucosal membranes that grow across the lumen of the esophagus and may be congenital or acquired. Most commonly these occur secondary to GERD, but occasionally they occur in association with Plummer-Vinson Syndrome. This syndrome occurs most commonly in individuals of Scandinavian descent and is characterized by esophageal webs, iron deficiency anemia, dysphagia, achlorhydria, atrophic gastritis, hiatal hernia, and increased risk of cancer. Dysphagia improves in the Plummer-Vinson syndrome with iron therapy, though the webs remain.

Esophageal Ring (Schatzki's Ring):

The esophageal ring is located at the gastro-esophageal junction and contains squamous and columnar epithelium with a core of connective tissue. A common symptom is that of intermittent dysphagia associated with large boluses. Treatment, when necessary, is usually by dilatation.

Tracheostomy:

Tracheostomy affects swallowing in several ways. First, by tethering the trachea to the anterior neck skin (especially with use of the Bjork flap), the tracheostomy prevents proper laryngeal elevation during the pharyngeal phase of swallowing. Direct pressure from the trachea with or without the cuff increases extrinsic esophageal pressure and leads to regurgitation and even aspiration. Tracheostomy may decrease sensitivity of the glottic closure reflex, resulting in increased risk of aspiration. To minimize these complications the smallest sized tracheostomy possible should be used and the airway should be closely monitored and frequently suctioned.

Strictures/Caustic Ingestion:

Strictures most often result from reflux of gastric acid into the esophagus, but also can result from ingestion of caustic substances. Rarely, strictures are caused by medications such as doxycycline, oral potassium chloride, and quinidine. Alkali ingestion occurs most frequently in children and causes rapid liquefaction necrosis and penetrates deeper than acid. Acid causes coagulation necrosis and creates an eschar that prevents deep burns. The acute reaction in the ingestion of caustic substances includes odynophagia, dysphagia, and inflammatory edema. Supraglottic edema can cause stridor and airway distress. Deep burns, especially with alkali, can cause perforation. Initial endoscopic evaluation is necessary within 24-48 hours of ingestion. If the injury is deep enough, stricture formation is noted 3-6 weeks later. Radiographic studies should be performed after three weeks to assess for the formation of strictures. The treatment for strictures, should they occur is dilatation or even excision.

Achalasia:

Achalasia is characterized by distal esophageal flaccidity associated with failure of the distal esophageal sphincter to relax. Patients present with dysphagia for solids greater than liquids. Radiology reveals a bird's beak deformity. Manometric studies confirm increased intraluminal pressure. Therapies include nitrates and calcium channel blockers, injection of botulinum toxin into the lower esophagus, endoscopic balloon dilation or, usually as a last resort, myotomy.

Diffuse Esophageal Spasm:

Patients with diffuse esophageal spasm suffer substernal cramp-like pain that may mimic myocardial infarction. Contrast and manometric studies demonstrate diffuse spastic activity. Treatment includes medical and surgical options similar to achalasia with referral to GI medicine.

Gastro-esophageal Reflux Disease (GERD):

GERD is recognized in about 10-15% of the population. The disease does not typically cause dysphagia, so other causes should be explored. The cause of GERD is related to incompetence of the lower esophageal sphincter. Regurgitation of stomach contents may cause sensation of subxyphoid pressure. Severe disease may lead to stricture formation, Barrett's esophagus, and increased risk of esophageal cancer. Radiography shows evidence of lower esophageal sphincter incompetence or sliding hiatal hernia in 1/3 of patients. Indirect laryngoscopy may show interarytenoid erythema or edema. Manometry shows decreased lower esophageal sphincter tone. The gold standard for diagnosis is the 24 hour pH probe. Treatment is with anti-reflux medications such as H₂ blockers and proton pump inhibitors along with life-style modifications.

Cancer of the Larynx or Pharynx:

Cancer of the upper aerodigestive tract is often associated with odynophagia. Patients usually have a history of heavy smoking and/or drinking and unilateral throat pain on swallowing radiating to the ipsilateral ear or to the angle of the mandible. Careful physical exam usually identifies the lesion.

Cancer of the Esophagus:

Cancer of the esophagus carries a very vague symptom complex and is usually diagnosed late in its course, accounting for the poor survival rate. A chief symptom is dysphagia to solids more than liquids.

Systemic Disorders that Cause Dysphagia

A common factor in all systemic causes of dysphagia is that swallowing therapy given intensively by a speech therapist can help the patient compensate for weakness in the swallowing apparatus. Patients with deficits of the oral or pharyngeal phases of swallowing may benefit from swallowing therapy. This may include strengthening and coordination exercises or compensatory maneuvers to aid in swallowing. The supraglottic swallow, Mendelsohn maneuver, and neck turning with swallowing are examples of compensatory maneuvers. The supraglottic swallow involves voluntarily holding the breath at the height of inspiration before and during swallowing, thereby closing the vocal folds before and during the swallow. The patient coughs after the swallow to clear any residual food from the larynx. The Mendelsohn maneuver is performed by voluntarily elevating the larynx during the swallow, which tucks the laryngeal inlet anteriorly and opens the PE segments, thereby facilitating the swallow. Patients with unilateral pharyngeal paralysis can turn their head towards the paralyzed side, which diverts the bolus down the functioning side of the pharynx.

Stroke:

Swallowing difficulty after stroke may occur in up to 47% of cases. Most patients recover within one week. However, there is a high rate of aspiration pneumonia in these patients. Causes for dysphagia after stroke include delayed triggering of the swallow reflex, cricopharyngeal dysfunction, reduced lingual and pharyngeal control, and weak cough. With brain stem strokes, direct cranial nerve deficits can lead to further impairment of glottis closure and coordination of phases of swallowing. Treatment consists of rehabilitative speech therapy and placement of a nasoduodenal feeding tube or gastric feeding tube to avoid aspiration. Also frequent pulmonary toilet is required. If laryngeal impairment is permanent, vocal cord medialization procedures, narrow field laryngectomy, or other procedures may be useful.

Laryngeal Nerve Injury:

Isolated recurrent laryngeal nerve injuries result in dysphagia and aspiration secondary to decreased glottic closure pressures and neurogenic dysfunction of the inferior constrictor and cricopharyngeus muscles. Treatment is often by true vocal fold gelfoam injection for temporary medialization of the paralyzed vocal fold, followed later by medialization thyroplasty.

Amyotrophic Lateral Sclerosis:

This is a rapidly progressive degenerative disease of unknown etiology that involves the brain and spinal cord motor neurons. It has a prevalence of 5/100,000 and an average age of onset of 55 years. Speech and swallowing difficulties parallel each other and require intensive speech therapy and eventual feeding tube placement. Aspiration is a problem late in the disease.

Parkinson's Disease:

Affecting 1% of people over age 50, Parkinson's disease is a progressive disorder of the CNS marked by the classic triad of resting tremor, bradykinesia and rigidity. Dysphagia in Parkinson's disease is addressed by dietary modification and gastric feeding tube placement for end-stage disease.

Multiple Sclerosis:

Multiple sclerosis is a disease in which degenerative plaques are found in the CNS. It has an extremely variable presentation, with the origin of dysphagia being found in the pharyngeal phase of swallowing.

Muscular Dystrophy:

Muscular dystrophy can result in spasm of the SCM, masticator, or cricopharyngeus muscles. An oculopharyngeal form of muscular dystrophy also exists.

Myasthenia Gravis:

Dysphagia may be the presenting symptom in this disorder of acetylcholine receptors and aspiration pneumonia may be the terminal event. Dysphagia and fatigue are typically worse later in the day.

Autoimmune Disorders:

Autoimmune disorders that carry a high incidence of dysphagia include systemic sclerosis, system lupus erythematosus, dermatomyositis, mixed connective tissue disease, mucosal pemphigoid, epidermolysis bullosa, Sjogren's syndrome (xerostomia) and Rheumatoid arthritis (cricoarytenoid joint fixation).

Aging:

Dysphagia affects 2% of the population over the age of 65. Oral preparatory phase problems result from poor dentition, and oral phase problems result from loss of tongue connective tissue. Pharyngeal phase changes include increased pharyngeal transit time and prolonged upper esophageal sphincter relaxation time. With these physiologic changes, any superimposed pathology is easily noticed in the otherwise healthy elderly individual.

Children:

In children and infants, nasal obstruction may present with feeding difficulties. Nasal masses, choanal atresia, and choanal stenosis fall in this category. Oral lesions such as cleft lip or palate, mucocoeles, ranulas, and Warthin's duct stenosis may cause dysphagia. Upper aerodigestive tract anomalies such as laryngomalacia, vocal cord paralysis, laryngeal clefts, tracheo-esophageal fistula, foregut malformations, or vascular rings of the aorta or pulmonary arteries that compress the esophagus or trachea may all contribute to feeding problems and dysphagia. Tumors of the aerodigestive tract which can certainly cause dysphagia include hemangiomas, lymphangiomas, papillomas, leiomyomas, and neurofibromas.

Globus Hystericus:

This is a form of "imagined" dysphagia which may be caused by behavioral deficits such as poor swallowing habits. Also it may be a manifestation of a conversion disorder, in which psychic conflict is converted to physical symptoms (somatization). This disorder is a diagnosis of exclusion, and psychotherapy may be helpful in treating it.

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