

# ADVANCES IN GERD

Current Developments in the Management of Acid-Related GI Disorders

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## Management of Dysphagia in Stroke Patients

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### G&H What presenting symptoms are associated with dysphagia?

**RS** Dysphagia, or difficulty in swallowing, is a common clinical problem in our society. The symptoms of this condition are diverse and include repetitive swallowing, throat clearing, garbled and/or hoarse voice, recurrent pneumonia, deglutitive cough, weight loss, choking, avoidance of social dining, and food sticking. Some of these symptoms are well recognized as dysphagic symptoms, whereas others are not. For example, when food becomes stuck in an individual's esophagus, it is clear that this individual has dysphagia. However, when an individual coughs after swallowing, or develops changes in his or her voice, it may be more difficult to connect this symptom with abnormalities of the swallowing mechanism. More education is needed for patients as well as trainees who may not equate respiratory symptoms with difficulty in swallowing.

### G&H How common is dysphagia?

**RS** In a Mayo Clinic study, almost 7% of the general population reported symptoms attributed to difficulty in swallowing. In long-term care settings such as assisted living residences or nursing homes, more than 60% of patients have dysphagia. In acute care settings, 20–30% of patients may have concomitant dysphagic symptoms. Approximately 30% of patients who had a unilateral

stroke have dysphagic symptoms; a similar percentage has been reported for patients who had a brain injury in an accident.

### G&H What are the main causes of dysphagia? How common is stroke as the cause of this condition?

**RS** Dysphagia has a number of causes, including central nervous system deficits, local structural lesions, muscular/neuromuscular disorders, pharmacologic agents, and emerging causes such as chronic obstructive pulmonary disease. Out of 100 patients who had a cerebrovascular accident, approximately 50–60% have dysphagic symptoms, approximately half of these patients have evidence of aspiration, and approximately 20% of these patients develop aspiration pneumonia. Dysphagia and aspiration occur more often during the early stage of a stroke due to abnormal cognition. Thus, it is important to evaluate patients for the presence of aspiration in the early stage of a stroke and devise a treatment plan accordingly.

### G&H Could you explain in more detail how a stroke causes dysphagia?

**RS** There are 3 types of swallowing: subconscious swallowing (which occurs approximately once every minute); reflexive swallowing (which is an airway-protective mechanism triggered by a sudden stimuli, such as the arrival of refluxate from the stomach or an inadvertent drop of food into the pharynx); and nutritional, or volitional, swallowing (which occurs when eating). When volition is involved, there is a swallowing network in the cerebral cortex that includes the insula, cingulate gyrus, prefrontal gyrus, somatosensory cortex, and precuneus regions. All of these areas are activated when a person takes a volitional, or nutritional, swallow. (In contrast, a reflexive swallow activates only the sensorimotor area.) When a person has a stroke, 1 or more of these areas is usually damaged, which disrupts the swallowing network and

debilitates the command center. Therefore, swallowing becomes impaired.

Dysphagic symptoms can also occur if a stroke affects the brain stem, such as with lacunar infarcts of the brain stem or a hemorrhage in this region. Any neurologic or muscular damage along the deglutitive axes can cause dysphagia. Thus, central causes of dysphagia in stroke patients include damage to the cortex or brain stem, and peripheral causes include damage to the nerves or muscles involved in swallowing. Swallowing abnormalities can develop when these damages result in malfunction, dis-coordinated function, or lack of function of the neuromuscular apparatus.

### G&H What complications can develop if dysphagia is left untreated in stroke patients?

**RS** Dysphagia can develop into aspiration pneumonia, an infection that increases the catabolic condition of the patient and requires more energy and an increase in nutritional demand. However, due to the inability to swallow normally, the patient is unable to meet this elevated nutritional demand, resulting in a vicious cycle. Therefore, malnutrition, dehydration, and infection are common consequences of dysphagia. Another consequence is a significant decrease in quality of life, due to the inability to eat at a normal speed and without coughing or choking.

### G&H How is dysphagia usually diagnosed in stroke patients?

**RS** There are a number of diagnostic modalities available for investigating dysphagia. After obtaining a thorough history and performing a physical examination and basic laboratory tests (as needed), the most commonly used diagnostic test is a video fluoroscopic examination. Videofluoroscopy is used to observe, record, and analyze the swallowing process as patients swallow contrast materials of different sizes and consistencies. Physicians can evaluate the passage—whether normal or abnormal—of each contrast material through the deglutitive axes, as well as the presence of aspiration. Physicians can also monitor and measure the normalcy or degree of abnormality of the function of different muscles.

A more recent diagnostic method involves the use of a tiny, very narrow videoendoscope that can traverse through the nostril into the pharynx, so that physicians can investigate whether the swallowed material enters the airway. Thus, the presence of aspiration and residue can be evaluated at a patient's bedside using an endoscope. More sophisticated tests such as manometry or electromyography may occasionally be used to define muscular activity in ambulatory patients.

### G&H How is dysphagia managed in stroke patients?

**RS** There are a large number of therapeutic approaches for dysphagia, depending on the type of deficit in the patient. Swallow studies usually determine when aspiration occurs in relation to the transit of the swallowed material through the oropharynx. There are 3 types of aspiration: predeglutitive aspiration, which occurs when a patient is chewing in preparation to swallow food; intrade-glutitive aspiration, which occurs when food traverses the pharynx; and postdeglutitive aspiration, which occurs after a swallow is finished. In the last type of aspiration, a large amount of food is left behind in the pharynx, so when patients breathe (ie, open their airway), the retained food spills into the airway. Each type of aspiration is associated with its own remedial approaches. Predeglutitive aspiration occurs mainly in poststroke patients; intrade-glutitive aspiration occurs in both poststroke and post-surgical patients; and postdeglutitive aspiration occurs in stroke and nonstroke patients due to abnormalities of the opening muscles of the upper esophageal sphincter, old age, long-standing reflux, or muscular disorders.

Over 2 decades ago, investigations confirmed that an early video fluoroscopic examination or another modality such as an endoscopic examination of the swallowing mechanism should be performed as soon as the stroke patient is able to undergo the test, in order to determine the presence of aspiration. It is particularly important to determine the risk of aspiration in stroke patients because some of these patients may aspirate without being aware of doing so, due to the loss of sensation and the inability to cough after a stroke. The fact that a patient may be able to swallow contrast material or food without coughing does not mean that the patient does not aspirate. Therefore, it is important to objectively document that there is no aspiration. Since this approach has been adopted, many lives have been saved.

As soon as we obtain the results of the fluoroscopic swallow study or endoscopic evaluation, patients are separated into 2 groups: aspirators and nonaspirators. Each group is treated differently. Aspirators should not be allowed to eat unless they are given appropriate instructions and undergo swallow therapy to prevent aspiration. Nonaspirators can follow a more liberal diet depending on their other medical conditions. Aspirators are treated intensively by swallow therapists, depending on their deficits. Patients may need maneuvers to direct food away from the weak side, a change in posture to reduce the likelihood of aspiration, a change in the consistency and volume of food in order to improve bolus transit and reduce the likelihood of aspiration, or rehabilitative exercises—such as the Shaker exercise, Mendelsohn

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maneuvers, or other oropharyngeal exercises—to improve the strength of the swallowing muscles. Prompt evaluation of the swallow mechanism after stroke is the accepted standard of care.

### **G&H** Are there any emerging treatment options currently being investigated?

**RS** A recent study evaluated the feasibility and effects of transcranial magnetic stimulation on poststroke dysphagia. The treatment was applied for 20 minutes daily for 5 days. After the end of this treatment, the researchers noted improved swallow reaction time, decreased aspiration scores for liquids, decreased residue for pastes, and no effect on oropharyngeal transit time or glottal closure. There is also ongoing research on the creation of an electrical device that can help synchronize and organize the swallowing muscles. This approach, which uses electrical stimulation to train the peripheral muscles, requires further investigation. In addition, there are currently attempts to stimulate the brain to recover from a stroke as well as to stimulate the unaffected side of the brain to take over more function from the damaged side. Preliminary experimental results are encouraging, but these techniques are still investigational and need clinical confirmation before being used in practice.

### **G&H** Is treatment always necessary in these patients, or can dysphagia spontaneously resolve?

**RS** Some dysphagic conditions improve spontaneously over time. However, when a system, particularly one

that involves striated muscles, is not used, the apparatus becomes weak and begins to atrophy. Although the ability to swallow may return without therapy, the swallowing muscle becomes weaker and weaker during this waiting period. Therefore, physicians should not postpone treatment in the hopes of a spontaneous recovery. Swallow therapy is particularly important in this patient population, as the swallowing muscle must be kept strong.

### **G&H** What other studies are currently being conducted in this area?

**RS** There are important studies currently ongoing in our laboratory at the Medical College of Wisconsin and at other institutions to devise approaches to improve recovery from dysphagia using neuroplasticity of the central nervous system as well as targeted rehabilitative techniques and sensory motor function improvement.

### **Suggested Reading**

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