Case Study of Dysphagia and Aspiration Following a Brain Stem Stroke

Dysphagia and aspiration are fairly common sequelae of stroke, particularly of the brain stem variety. The authors present an actual case study of a patient who developed dysphagia, aspiration, and feeding problems subsequent to experiencing a lateral medullary stroke. This article follows the patient along as his post-stroke swallowing status changed and various feeding decisions were made. The speech and language pathologist was fundamental in the making of these decisions while the rehabilitation team was instrumental in their implementation. Dysphagia in the brain stem stroke patient can take many months to years to resolve. Key words: aspiration, brainstem stroke, case study, dysphagia

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INTRODUCTION

The management of dysphagia and aspiration, as described in previous articles in this journal, is subject to significant clinical variability. In this article will be presented the case of a patient who had significant problems with dysphagia and aspiration following a stroke. This patient was initially managed in a tertiary care university-based hospital in Canada.

Initial Presentation

A 56-year-old right-handed hypertensive, type II diabetic was admitted to his local hospital with complaints of occipital headache, right hand tingling, right limb ataxia, hoarse voice, dysphagia, nausea, vomiting, and vertigo. The retired English teacher’s blood pressure was elevated but no focal weakness was noted on examination. The
following day he was transferred to a tertiary care university-based hospital. A magnetic resonance imaging scan performed on the day of admission revealed a right lateral medullary infarct with a right vertebral artery occlusion. The following day this man was noted to have: (1) increased blood pressure that required treatment with an angiotensin converting enzyme (ACE) inhibitor and diuretic; (2) poor hypoglycemic control that required the use of insulin; (3) severe dysphagia (his primary complaint); and (4) bilateral aspiration pneumonia, confirmed on chest x-ray. Antibiotic treatment was initiated to treat the pneumonia.

**Initial Swallowing Assessment**

This gentleman was referred to a speech and language pathologist on the day of admission for a bedside swallowing assessment. His vocal quality was “wet” with his own saliva. He could not elevate the hyoid bone, indicating a probable swallow reflex problem. Oral motor evaluation revealed tongue elevation that was significantly reduced, with a low resting soft palate on the left and reduced movement on that side during phonation. No gag reflex could be elicited. Mild hypernasality during conversation was noted. Maximum phonation duration of 6 seconds indicated reduced breath support, likely resulting from vocal cord paralysis. During phonation and conversation vocal quality was moderately breathy. He was noted to have a weak cough and diminished throat-clearing ability. A swallow reflex could not be elicited. The bedside swallow assessment therefore deemed he was unsafe for oral feeds and at risk for the development of further aspiration. A videofluoroscopic modified barium swallow (VMBS) was not performed at this time because it was not perceived that the test would change clinical management, in view of the severity of the results of the bedside assessment.

**Initial Management of Swallowing Difficulties**

Initially, the patient was kept NPO (nothing by mouth) and a nasogastric tube was inserted to provide nonoral feeds. The patient was carefully followed by nursing and other rehabilitation staff and 1 week after stroke onset the speech and language pathologist noted evidence of initiation of a swallow reflux. At that point, both thin and thick fluids were attempted as a clinical trial. He continued to demonstrate clinical signs of possible aspiration, such as coughing and a wet voice with both fluid consistencies. There was a delay in initiation of the swallow reflex and the patient reported marked difficulty in clearing food through the pharynx. Vocal quality was wet and gurgly and there was post-swallowing coughing and throat clearing. A head turn compensatory strategy toward the left side was attempted to direct the bolus down the stronger side of the pharynx. The patient reported that this seemed to only minimally help the pharyngeal clearing. Given the severity of his swallowing problems, the apparent high risk of aspiration, and the anatomical location of his stroke, a gastrojejunostomy (GJ) tube was recommended and a radiologist inserted this percutaneously.

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During the first month following his stroke the patient demonstrated improvement in his pharyngeal swallow including better clearing of oral secretions and mild improvement in clearing of thickened fluids. He continued to use lateral head rotation to the left side during his swallow assessment; however, there were continued clinical signs of laryngeal penetration of oral contents.

**Rehabilitation Phase**

The patient was admitted to the rehabilitation service 1 month following the onset of his stroke. Further bedside swallowing assessments indicated that he was unable to tolerate more than half a teaspoon of thin fluids at any time. The speech and language pathologist noted that the patient likely had experienced a delay in the initiation of his pharyngeal swallow, and he was experiencing weakness of pharyngeal peristalsis. This likely resulted in residue in both valleculae and pyriform sinuses. The patient was given oral and pharyngeal exercises to be used when clearing his oral secretions to improve the strength of pharyngeal constriction, i.e., hard glottal swallows with the head turned to the left.

A VMBS study was subsequently performed and indicated good oral transport of all consistencies presented. A half teaspoon of pudding revealed moderate delay in the swallow reflex with minimal residue in the valleculae but a large residue was present in the pyriform sinus that was then grossly aspirated. Presentation of a half teaspoon of thick liquids with the chin tucked again revealed gross aspiration occurring from a large residue in the pyriform sinus. A second half teaspoon of thick liquids with head turned to the left continued to show large residuals in the pyriform sinus along with gross aspiration. It was recommended that the patient continue with the GJ tube feedings exclusively. He was receiving tube feedings from 1900 hours to 0800 hours and at 1200 hours to 1330 hours. This schedule was designed to minimize disruption to rehabilitation therapies.

At the time of discharge from the multidisciplinary rehabilitation program almost 2 months after his initial presentation with the stroke, the patient was close to being independent with a walker, requiring only minimal assist with tub transfers (he was discharged home on GJ tube feedings).

**Outpatient Management**

A second VMBS study was done 4 months poststroke onset. This showed that pudding and thick fluids still resulted in large residue being present in the pyriform sinus with moderate to large aspiration from both. No cough was heard when he aspirated. With thin liquids large residue was present in the pyriform sinus resulting in laryngeal penetration and aspiration. This VMBS study thus indicated that he was still unsafe with swallowing and required tube feedings. Upon laryngeal penetration of thick liquids he was asked to cough and this cleared the penetration. A third modified barium swallow was conducted 2 months later (6 months post-stroke onset). Poor epiglottic motion and weak pharyngeal peristalsis were present. It was noted that there was marked pyriform sinus residue and mild vallecular residue with thin and thick liquid barium and pudding consistencies. Aspiration was demonstrated with these consistencies but they did not elicit a cough. It was recommended he continue to be fed through his GJ tube.

Six months later (1 year subsequent to his lateral medullary stroke) this gentleman had his fourth VMBS study. The speech and
language pathologist noted a large improvement in his swallowing. He continued to show large residue in the valleculae and pyriform sinuses, more so in the latter. Double swallowing with consistencies of thick liquid and pudding allowed him to clear the residue. It was decided that he could manage thin liquids (with double swallowing) and a diet of all pureed consistencies. Bread and cookies were felt to be able to block the upper airway and thus were not allowed. He was still kept on GJ tube feedings primarily at night, but this was reduced to compensate for his oral feedings.

A fifth and final VMBS was done 6 months later, more than 1–1/2 years subsequent to his stroke. Most of the thick liquid barium was transferred into the esophagus; however, there was impaired pharyngeal peristalsis so that after swallowing a minimum residue remained in the valleculae and a minimum to moderate residue remained in the pyriform sinus. No laryngeal penetration was noted. With pudding, bread, and cookie consistencies the results were the same. With thin liquids there was occasional episodes of trace laryngeal penetration and trace aspiration. After the swallows minimal residue was in the valleculae and minimum to moderate residue was in the pyriform sinus. Results with thin liquids from a cup were similar. It was noted that despite abnormalities in the pharyngeal phase of swallowing there was no laryngeal penetration or aspiration with thick fluids, pudding, or bread or cookie consistencies. The speech and language pathologist noted that the patient was able to eat all consistencies in a generally safe manner. It was suggested he continue to use supraglottic swallowing as well as throat clearing to remove any material that may have penetrated. It was recommended that he be placed on a diet of thin liquids and regular solids and no further interventions were felt to be necessary. The GJ tube was subsequently removed. At one time during his poststroke period, cloxacillin was ordered for a subcutaneous skin infection around the GJ tube site. No further such difficulties ensued.

**DISCUSSION**

This case indicates several issues with regards to dysphagia and aspiration. The gentleman in this case suffered a brainstem stroke, in this case a lateral medullary infarct. Little literature exists about this type of stroke and dysphagia outcome. Horner, Buoyear, Alberts, & Helms (1991) studied 23 “brainstem stroke” patients. Six of the patients had some cerebellar involvement and only two were classified as “pons-medulla.” It was concluded that “more than 80% resumed oral feeding without morbidity.” However, the four patients who did not resume full oral nutrition had infarctions in the pontine area. At the London Health Sciences Centre, strokes involving the brain stem are often associated with severe and persistent swallowing problems. Factors such as the volume of the stroke area and actual stroke location can play a significant role in determining dysphagia morbidity.

Significant oral feedings on modified diets could not be initiated until 12 months poststroke and the GJ tube was removed 18 months poststroke. The VMBS study served as the “gold standard” for swallowing evaluation but in the early phases problems were so grossly abnormal that clinical assessment was sufficient to determine the use of a GJ tube. Although the patient was in the hospital for 2 months, nonoral tube feedings were continued for 18 months poststroke. Com-
puterized pumps allow patients and their families to manage nonoral feedings outside of a hospital setting. Factors such as cost, ability of patient and family to assimilate information concerning tube feeding and its application, physical dexterity, and family or community support are all important issues to consider when a discharge home on tube feedings is being contemplated.

The development of pneumonia close to the time of admission is a phenomenon that the authors observed as occurring fairly commonly in lateral medullary infarcts. The problem of aspiration is inevitably worse immediately after the stroke. Progressive improvement is therefore expected although the rate and degree of improvement varies. In this case, recovery was delayed and continued for more than 1 year post-stroke onset. With careful attention to swallowing and dietary issues, poststroke dysphagia and aspiration can be efficiently managed. Discharge home on tube feedings is safe and feasible in patients of all ages.

**REFERENCES**

