Are Patients With Silent Aspiration More Frequently Admitted or Readmitted to the Hospital With Pneumonia Than Those With Audible Signs of Aspiration?

Megan A. Krull
Darci Becker

Abstract
This retrospective study examined the medical records of 50 patients of Genesis Medical Center who completed a modified barium swallow study (MBSS) for possible oropharyngeal dysphagia within the past three years. The medical records of these patients were reviewed to determine if the patients were subsequently admitted to the hospital within one year of the MBSS, with a diagnosis of pneumonia. Of those who were admitted to the hospital with pneumonia, records were further examined to determine if patients who silently aspirated during their MBSS were more frequently admitted, than patients who presented with audible signs of aspiration at the time of their MBSS.

Introduction
After a stroke, 30% to 60% of individuals experience a permanent or temporary swallowing difficulty known as oropharyngeal dysphagia (Sura, 2012). Oropharyngeal dysphagia is an impairment of emotional, cognitive, sensory, and/or motor acts involved with transferring a substance from the mouth to the stomach (Groher & Crary, 2010). Oropharyngeal dysphagia can cause aspiration and pneumonia. Aspiration is when food or liquid enters the larynx and goes past the true vocal folds into the airway. It can occur silently or audibly. Silent aspiration occurs when the individual aspirates but does not show any overt signs, such as coughing. Audible aspiration is when an individual shows overt signs to indicate that aspiration is occurring, such as coughing or throat clearing (Eisenstadt, 2010).

Aspiration pneumonia results from a lung infection caused by aspirated material that stays in the lungs and causes a lung infection (Sura, 2012). It is believed that oropharyngeal dysphagia largely accounts for stroke-related pneumonia (Sura, 2012). Individuals who have pneumonia post-stroke have a three times greater risk of death than individuals who do not have pneumonia post stroke (Masiero, 2008). While oropharyngeal dysphagia contributes to and can cause pneumonia, the prevalence of this connection is not widely explored.

Purpose
The purpose of this study was to explore variables associated with readmissions (or admissions if patients were evaluated initially as outpatients) to the hospital for aspiration pneumonia, in patients with oropharyngeal dysphagia. Specifically, this retrospective study examined whether patients with silent aspiration versus audible signs of aspiration were more frequently readmitted (or admitted) to the hospital with pneumonia.

Hypothesis: It is hypothesized that a higher number of individuals who presented with silent aspiration, during their MBSS, will be readmitted (or admitted) to the hospital with pneumonia than individuals with audible signs of aspiration.
Method

**Participants:** 50 inpatients and outpatients at Genesis Medical Center, who were evaluated via a modified barium swallow study (MBSS) for possible oropharyngeal dysphagia within the past three years.

**Procedure:** A record review of each file included first accessing the written MBSS report written by a speech-language pathologist. The researcher then determined if the patient demonstrated aspiration during their MBSS study and if the patient aspirated, whether they silently aspirated or produced audible/overt signs of dysphagia. It was then determined if any of these patients were subsequently admitted to Genesis Medical Center within one year of the MBSS. If not, no further information was collected for this patient. If so, the physician’s discharge summary from that encounter was reviewed to determine if the discharge diagnoses in that report included a diagnosis of “pneumonia.” The decision tree for this process of data collection is shown below in Figure 1.

*Figure 1. Data collection decision tree*
Results
Among the 50 patients who completed a MBSS, the attending speech-language pathologist indicated in their report that 60% (30/50) of the patients did not aspirate during their swallow study, while 40% (20/50) of patients did aspirate.

Aspirators
• Of the 20 patients who aspirated during the swallow study, 17 (85%) were silent aspirators and 2 (15%) were audible aspirators.
• Of those 20 patients, 10 (50%) were admitted to the hospital within one year of the swallow study. Only 3 (30%) of those admitted were diagnosed with aspiration pneumonia or pneumonia.
• All 3 individuals admitted with aspiration pneumonia or pneumonia silently aspirated during their original swallow study.

Non-Aspirators
• Of the 30 patients who did not aspirate during their swallow study, 17 (56%) were admitted into the hospital within one year of the swallow study.
• Of those 17 patients, two patients (12%) were diagnosed with “possible pneumonia” and three patients (18%) were diagnosed with aspiration pneumonia or pneumonia.

<table>
<thead>
<tr>
<th>MBSS Results</th>
<th>Admitted Within a Year</th>
<th>Diagnosis</th>
</tr>
</thead>
</table>
| 20 (40%) aspirating | 10 out of 20 (50%) Admitted/Readmitted | • 3 out of 10 (30%) were admitted with aspiration pneumonia  
• All 3 (100%) were "silent aspirators" |
| 30 (60%) not aspirating | 17 out of 30 (56%) Admitted/Readmitted | • 3 out of 17 (18%) were admitted with aspiration pneumonia  
• 2 out of 17 (12%) were admitted with "possible pneumonia"  
5/17 (30%) admitted with "pneumonia" |

Figure 2. Data collection results

Conclusions
The results of this study supported the author's hypothesis that a higher number of individuals with silent aspiration would be readmitted (or admitted) to the hospital with pneumonia than individuals with audible signs of aspiration. Interestingly, 5 of the 30 individuals who were diagnosed as 'non-aspirators' during their MBSS were admitted and diagnosed with aspiration pneumonia or possible pneumonia. Thus, comparable admission rates for pneumonia were seen between these two groups (30% in those with aspiration and 29% in those who did not demonstrate aspiration). It is suggested that some of these patients may have had oropharyngeal dysphagia and been at risk for aspiration, but it was not observed or did not occur during their original MBSS. It is also possible that some of the admitted patients had non-dysphagia related pneumonia, such as from aspiration of gastric contents.

The authors have no relevant financial or nonfinancial relationships to disclose.