

Evaluation of Patients with Swallowing Difficulties by Modified Barium Swallow

Muthukumar B¹, Radhakrishnan KR¹, Heber Anandan²

ABSTRACT

Introduction: Swallowing disorders can occur at any age but it is more common in the elderly patients. Neurological causes and malignancy account for the main reason in most of the cases. The modified barium swallow provides information about the complex split second events underlying the swallowing process. We can evaluate the effectiveness of swallowing manouveres by which we can prevent aspiration in patients with pharyngeal retention. Current research was done to study the various phases of swallowing in patients with dysphagia by modified barium swallow with risk of aspiration during swallowing and to study the effectiveness of swallowing manouveres by the modified barium swallow technique

Material and Methods: 200 patients who attended ear, nose, and throat out patient department with history of swallowing difficulties for more than 3 months were included in the study. Modified barium swallow was done in all these patients. Patients with risk of aspiration were detected by the amount of pharyngeal retention in the pyriform sinuses and vallecula after swallowing. The patients with grade 3 severe form of pharyngeal coating were given training for postural technique and swallowing manoeuvres to prevent aspiration.

Results: Out of the 200 patients, 92 patients were found to have abnormal findings during the study. Other 108 patients had normal findings on videofluoroscopy. Out of the 92 patients with the abnormal video fluoroscopic findings, 28 patients have pharyngeal retention alone with no other structural abnormalities. We focused mainly on the patients with pharyngeal retention. 16 of them were found to have grade 3 severe pharyngeal retention. These patients had history of stroke in the past. They were given training on swallowing manouveres to prevent aspiration. We found that these manouveres are effective in doing so. Another 12 patients had pharyngeal retention with no aspiration risk and they were in between the 61-80 yrs.

Conclusion: Modified Barium Swallow plays a critical role in the evaluation of swallowing and it provides extensive information about the swallowing events. Mild and moderate pharyngeal retention should be considered as normal in older individuals provided other causes are ruled out.

Keywords: Swallowing Difficulty, Modified Barium Swallow, Pharyngeal Retention, Aspiration, Swallowing Manouveres

INTRODUCTION

Aspiration is learned as the inhalation of oropharyngeal or gastric contents into the larynx and lower respiratory tract. Various pulmonary syndromes may occur as a series of aspiration, depending on the quantity and condition of the aspirated substance, the incidence of aspiration, and the host's response to the aspirated matter.¹ Among such

syndromes, aspiration pneumonia may occur from the inhalation of infectious oropharyngeal secretions conquered by pathogenic bacteria; this syndrome has been shown to be an important event of dangerous illness and mortality in hospitalized patients.¹⁻³

The videofluoroscopic swallowing study (VFSS) has considered as "gold standard" for diagnosis of swallowing complications since it enables the visualization of the whole swallowing process, identifying anatomical and operative disorders from the mouth to the esophagus and it might as well achieve treatment process.^{4,5} Throughout this exam, it is reasonable to offer various food proportions with barium sulfate contrast, test maneuvers and facilitator postures that provide to the evaluation of the degree of dysphagia, thus enabling better planning of rehabilitation. The apparatus used for the procedure is radiological equipment with image display connected to a DVD that allows recording for subsequent analysis, including the use of slow motion for detailed investigation.⁶

Largest studies on VFSS have generally reported its use for identification of alterations in the oropharynx and pharyngoesophageal transition. The method is used in various centers, but its advantage to also identify changes in the esophageal phase is not determined.⁶

Most studies on VFSS have generally reported its use for identification of alterations in the oropharynx and pharyngoesophageal transition. The exam is used in many centers, but its value to also detect alterations on the esophageal phase is not clearly defined.⁶

Current research was aimed to study the various phases of swallowing in patients with dysphagia by modified barium swallow with risk of aspiration during swallowing and to study the effectiveness of swallowing manouveres by the modified barium swallow technique

¹Assistant Professor, Department of Otorhinolaryngology, Government Rajaji Hospital and Madurai Medical College, Tamilnadu, ²Senior Clinical Scientist, Department of Clinical Research, Dr. Agarwal's Healthcare Limited, Tamilnadu, India

Corresponding author: Radhakrishnan KR, Assistant Professor, Department of Otorhinolaryngology, Government Rajaji Hospital and Madurai Medical College, Tamilnadu, India

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MATERIAL AND METHODS

200 patients who attended ear, nose, and throat out patient department of our hospital with history of difficulty in swallowing, feeling of lump in the throat, foreign body sensation of throat and patients with history of cough during swallowing for more than 3 months were included in the study. Critically ill and un co-operative patients were excluded from the study. Out of these 200 patients, 109 were males and 91 were females. The age range of 'patients were 20 to 80 yrs. The Chief complaints of patients for difficulty in swallowing for solids only in 128 patients, solids and liquids in 68 patients and liquids only in 4 patients. Co-existing illnesses which are known to cause allowing difficulties like stroke were noticed in 16 individuals of our study population.

Inclusion criteria: Patients in the age between 20-80 yrs with the chief complaints of difficulty in swallowing, feeling of lump in the throat, foreign body sensation in throat and patients with history of cough during swallowing

Exclusion criteria: Critically ill patients and un co-operative patients

Prior to modified barium swallow examination, a detailed medical history obtained. History on limitations of certain type of diet, manner with which the food is swallowed, and history of any choking or coughing during swallowing was enquired. Detailed clinical examination of oral cavity and

throat was carried out. Bed side evaluation of swallowing was done with various consistencies of foods.

- Modified Barium Swallow Technique
- Radiological Findings During Oral Phase and their Inference
- Biological Findings During the Pharyngeal Phase their Inference
- Videofluoroscopic Swallowing Study Report

RESULTS

Modified barium swallow examination was done for 200 patients with complaints of difficulty in swallowing of which 109 were males (54.5%) and 91 were females (45.4%). About 92 patients found to have abnormal findings during the study. Other 108 patients had normal findings on videofluoroscopy. Abnormal pharyngeal mucosal coating was found in 28 patients and 16 of them had past history of stroke for which neurological causes may be attributed. Another 12 patients however have no significant illnesses. Out of 92 patients with the abnormal videofluoroscopy findings, 28 patients had pharyngeal retention alone with no other structural abnormalities. 10 patients were found to have growth in the hypopharynx. 8 patients were found to have growth in the larynx. 4 patients were found to have oesophageal growth. Postcricoid web was found in 30 patients. 2 patients had achalasia cardia, 4 patients had unilateral vocal cord palsy (figure-1). This pharyngeal mucosal coating after swallowing is graded as mild, moderate and severe according to the height of residue in the pyriform sinuses or valleculae seen in the videofluoroscopy images. Postcricoid web was found in 30 female patients of which 22 patients fall in the age group between 20 – 40 yrs. 8 were in between 40 – 60 yrs of age. Post cricoid web was found in 30 females and anaemia and no males were found to have this finding. 108 patients who are radiologically and clinically normal were treated appropriately. There was a good response in the patients who were treated with proton pump inhibitors and domperidone.

Disease	Males	Females
Pharyngeal retention	23	5
Growth hypopharynx	7	3
Growth larynx	8	0
Growth orophaynx	3	1
Growth oesophagus	3	1
Postcricoid web	0	30
Achalasia	1	1
Unilateral vocal cord palsy	3	1

Table-1: Sex predilection for disease

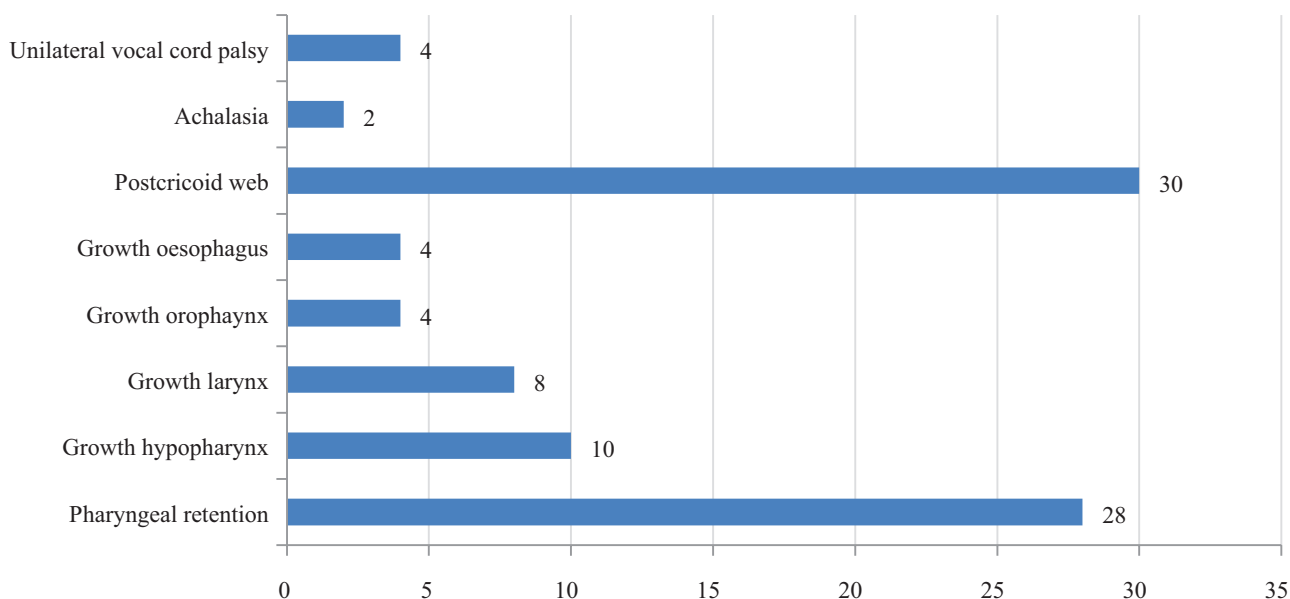


Figure-1: Disease distribution

They were diagnosed as GERD and managed conservatively. Some patients showed improvement with placebo treatment itself. In this study, we concentrated mainly on the patients who were likely to aspirate while swallowing. We identified 28 patients with pharyngeal retention and 16 of the patients were given training on swallowing manouveres as they had severe pharyngeal retention. We studied the effectiveness of these manouveres again by the videofluoroscopy and we found that these are very useful in preventing aspiration.

DISCUSSION

In our study, we learnt the various phases of swallowing by modified barium swallow. We found 28 patients with pharyngeal retention alone. Out of these 28 patients, 16 had past history of stroke and had grade 3 pharyngeal retention. Another 12 patients had grade 1 and 2 pharyngeal retention and they fall between 61-80 yrs of age. We had given training for swallowing manouveres for the patients with severe pharyngeal retention so as to prevent the aspiration. Another finding we got from our study was postcricoid web which was typically found in females. Out of the 30 patients, 22 were in the age group between 20-40 and 8 were in the 41-80 yrs of age. These patients were managed with deworming, iron supplementation, and rigid esophagoscopy. They showed significant improvement following this line of management.

When evaluating laryngeal penetration and tracheal aspiration, it is critical to assess the timing of the abnormality relative to the swallow reflex. For example, poor control of the oral bolus will lead to early vallecular spill. If the vallecula fills, contrast will spill into the type of aspiration occurs during the oral phase, before the initiation of the swallow reflex, it is termed as pre prandial aspiration. If the epiglottis fails to invert, or the larynx is otherwise unprotected, the contrast bolus may enter the laryngeal vestibule during the pharyngeal phase of the swallow. This type of aspiration is termed prandial aspiration.⁷

If there is a failure of pharyngeal contractility, or the cricopharyngeus muscle fails to relax, contrast may be retained in the pharynx after the completion of the entire swallow. This contrast may then drip into the larynx, causing postprandial aspiration. A diagnosis of post prandial aspiration is sometimes applied presumptively. When contrast is seen in the trachea late in the examination but the patient was not seen to aspirate during the videotaped portions of the swallow.

Dysphagia is the most frequent symptom to merit fluoroscopic evaluation of swallowing. A pharyngo-esophagogram is the examination of choice in this setting. The most common causes of dysphagia are gastroesophageal reflux disease (GERD) and its complications, so a pharyngo-esophagogram for dysphagia must include an evaluation of lower esophageal sphincter competency.⁸

Aspiration is the most serious life threatening complication as it may lead to aspiration pneumonia. We learnt that prior full bed side examination of the patients to predict aspiration must be carried out before going for videofluoroscopy studies.

It includes clinical observation of swallowing, assessment of intra oral sensibility and functional examination of the musculature involved in swallowing. One report stated that thorough clinical examination before study can reach a sensitivity for aspiration up to 80%, specificity to near 70%.⁹ Major advantage of videofluoroscopic study is that the effectiveness of the therapeutic strategies which could be either rehabilitative or compensatory can be assessed. The aim of compensatory strategies is to correct the disorder of swallowing by altering the flow of bolus. Head position changes can alter the axis of oral, pharyngeal and laryngeal subsites and it can reduce the angle of opening of laryngeal inlet. Hyolaryngeal excursion and propulsive forces of the muscles of the pharynx can be increased by chin down (chin tuck) position. Anyhow, the risk of aspiration is increased when the pyriform sinuses are filled with barium before the onset of pharyngeal swallow. Because, the emptying of pyriform sinuses and elevation of larynx coincides. Testing with various consistencies of boluses permits one to formulate a treatment plan. The effectiveness of these trials were tested by modified barium technique in 12 patients of our study. During the study, we trained the patients on how to accurately perform the manouveres and postural techniques. We found as disadvantages of this manouveres are it requires full co operation of the patient who must have the mental and cognitive ability to understand the importance and method of procedures.¹⁰

CONCLUSION

To conclude, normal and abnormal biomechanical events of the swallowing that drive the bolus from the oral cavity to the pharynx and into the esophagus is necessary for the accurate diagnosis of oropharyngeal swallowing disorders. Modified Barium Swallow plays a critical role in the evaluation of swallowing and it provides extensive information about the swallowing events. Mild and moderate pharyngeal retention should be considered as normal in older individuals provided other causes are ruled out. Swallowing manouveres are effective in preventing aspiration in patients with severe pharyngeal retention. Help of expertise of the Radiologist and Speech language pathologist permit the better evaluation of therapeutic strategies aimed at improving the chance that the patient with dysphagia can eat safely and effectively.

REFERENCES

1. Marik PE. Aspiration pneumonitis and aspiration pneumonia. *N Engl J Med.* 2001;344:665–671.
2. Beck-Sague C, Villarino E, Giuliano D, Welbel S, Latts L, Manangan LM, Sinkowitz RL, Jarvis WR. Infectious diseases and death among nursing home residents: results of surveillance in 13 nursing homes. *Infect Control Hosp Epidemiol.* 1994;15:494–496.
3. Marrie TJ, Durant H, Kwan C. Nursing home-acquired pneumonia. A case-control study. *J Am Geriatr Soc.* 1986;34:697–702.
4. Costa MMB, Nova JLL, Carlos MT, Pereira AA, Koch HA. Videofluoroscopy -a new method. *Radiol Bras.* 1992;25:11-8.

5. Costa MMB. Videofluoroscopy: the gold standard exam for studying swallowing and its dysfunction. *Arq Gastroenterol.* 2010;47:327-8.
6. Martin-Harris B, Jones B. The Videofluorographic Swallowing Study. *Phys Med Rehabil Clin N Am.* 2008;19:769-85.
7. Beck-Sague C, Villarino E, Giuliano D, Welbel S, Latts L, Manangan LM, Sinkowitz RL, Jarvis WR. Infectious diseases and death among nursing home residents: results of surveillance in 13 nursing homes. *Infect Control Hosp Epidemiol.* 1994;15:494-496.
8. Marrie TJ, Durant H, Kwan C. Nursing home-acquired pneumonia. A case-control study. *J Am Geriatr Soc.* 1986;34:697-702.
9. Costa MMB, Nova JLL, Carlos MT, Pereira AA, Koch HA. Videofluoroscopy -a new method. *Radiol Bras.* 1992;25:11-8.
10. Martin-Harris B, Jones B. The Videofluorographic Swallowing Study. *Phys Med Rehabil Clin N Am.* 2008;19:769-85.
11. Smith DF, Ott DJ, Gelfand DW, Chen, MYM. Lower esophageal mucosal ring: correlation of referred symptoms with radiographic findings using a marshmallow bolus. *AJR.* 1998;171:1361-5.

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