

A REVISIT TO BARIUM SWALLOW ESOPHAGUS

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Abstract- After the evolution of Upper Gastrointestinal endoscopy in the modern era, the role of barium swallow as a primary modality of approaching towards dysphagia has been seeing a declining trend. However, the role of Barium swallow as a diagnostic tool is still pivotal in going towards finding out the causes of Dysphagia, particularly in motility disorders of the esophagus, extrinsic compressions of the esophagus etc. Barium swallow as a diagnostic tool isn't a substitute to Upper GI endoscopy but is complimentary instead.

Key words - Barium swallow, Upper GI endoscopy, dysphagia

INTRODUCTION

The first use of Barium swallow dates back to the early twentieth century¹ where it found its job role as a primitive investigation to assess the act of swallowing¹. Across years, it has however evolved to reveal the intricate anatomy and assessing the functional status of oral cavity, pharynx and oesophagus¹. Unfortunately, despite its tremendous use, inexpensive and non-invasive nature, its role in current day clinical practice has been superseded by Upper Gastrointestinal endoscopy (UGIE) as an investigative tool. UGIE is a frequently

performed endoscopic procedure that is particularly suited for the diagnosis of upper Gastrointestinal (GI) diseases with a luminal or mucosal location.² UGIE is performed by passing a flexible endoscope through the mouth into the esophagus, stomach and duodenum and thus enabling the clinician to visualize the picture of the gastric mucosa. This direct visualization of gastric mucosa and gastric lumen has set a perception that the UGIE as a diagnostic tool is superior to the conventional age-old Barium swallow investigation. This as a matter of fact, is however not true as there are clinical scenarios where Barium swallow is more valuable over UGIE and often guides the

endoscope with the help of its inferences. Moreover, even those with in-depth knowledge of the pathological lesions may end up doing an incomplete examination through UGIE³. The problems include but are not limited to – facing difficulty to insert the scope correctly into the oral cavity of the patient, difficulty to advance it properly along each portion of the GI tract, possibilities of blind spots that can be missed and require through observation, near impossibility to perform a successful UGIE without procedural skills³. A barium swallow study on the other hand may be used in the diagnosis of wide range of pathologies including motility disorders, strictures, perforations. Barium studies can also be used to characterize more distal pathologies such as hiatal hernia, gastro-oesophageal reflux or a gastric volvulus⁴. Modified barium swallow studies or videofluorographic studies maintain key-role in the area of dysphagia of neurological origin as it aids to achieve complete and dynamic evaluation of all phases of deglutition⁵. On the other hand, Timed-barium swallow (TBS) aids in assessing gastric emptying⁶. This article is a case-series of three cases with which it demonstrates the potential use of barium swallow as an investigative tool in the modern endoscopic era.

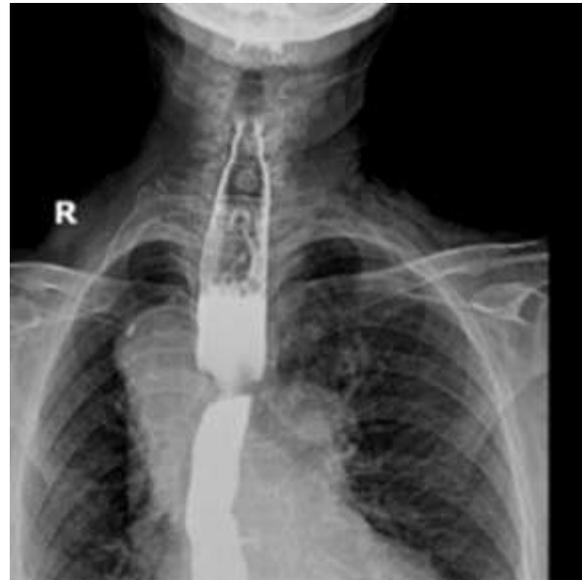


Fig. 1: A Barium swallow study showing shouldering appearance of the oesophagus suggestive of Ca. Oesophagus.

Sources: Radiology case files, NRI medical College, Chinakakani.

CASE SERIES

CASE – 1

A 62-year-old female presented to the ENT OPD, NRI general hospital, Chinakakani with complaints of dysphagia to liquids for 1 year. The patient underwent multiple Upper GI endoscopies at multiple centers priorly which did not reveal any pathology. Routine clinical examination was within normal limits. Video-laryngoscopy was within normal limits. As a routine investigative protocol at our center, we advised the patient to get a Barium swallow oesophagus done. Barium swallow oesophagus revealed smooth indentation with proximal dilatation in the right posterolateral region at upper thoracic vertebrae level suggesting a posterior mediastinal lesion. (Ref. figure 2)



Fig. 2: A Barium swallow study showing a smooth indentation with proximal dilatation of oesophagus. Suggestive of a posterior mediastinal lesion.

Sources: Radiology case files, NRI medical College, Chinakakani.

The patient was then referred to UGIE along with the barium swallow reporting. UGIE revealed an extrinsic compression with normal mucosal surface and pulsations were noted in the area corresponding to the smooth indentation on the barium swallow suspecting Dysphagia Lusoria.

The patient was further sent for Contrast enhanced CT of the chest to further evaluate the cause for extrinsic compression. CECT chest study revealed a Right sided aortic arch with aberrant left subclavian artery showing retro-oesophageal course and causing oesophageal compression and mild dilatation of the proximal thoracic oesophagus thus confirming the diagnosis of Dysphagia Lusoria and finally explaining the reason for the long-standing Dysphagia (Ref. figure 3 and 4)



Fig. 3: Axial section of CECT Chest showing a right sided aortic arch with aberrant left subclavian artery.

Sources: Radiology case files, NRI



Fig. 4: Coronal section of CECT Chest showing right sided aortic arch with descending thoracic aorta on right.

Sources: Radiology case files, NRI medical College, Chinakakani.

CASE-2

A 25-year-old female came to the ENT OPD with complaints of progressive dysphagia for 5 years. Dysphagia was initially to liquids followed by solids. Routine clinical examination was within normal limits. Hemoglobin count was 13g/dl. Video-laryngoscopy was within normal limits. Prior UGIE from a different tertiary center showed no significant abnormality. Abiding to the investigative protocol at our institution, we sent the patient for Barium swallow oesophagus investigation. The study revealed dilatation of the oesophagus with a smooth tapering of contrast giving a characteristic bird beak appearance of the oesophagus suggestive of Achalasia Cardia (Ref. figure 5). The patient was referred to Surgical gastroenterology department for further management.



Fig. 5: Barium swallow oesophagus study showing smooth tapering of contrast giving the characteristic bird beak appearance as seen in Achalasia Cardia

CASE-3

A 50-year-old male patient with scoliotic spine presented with shortness of breath for 4 months and bilateral pedal oedema for 5 days to the pulmonology OPD and with complaints of Dysphagia to solids more than liquids for 4 months to the ENT OPD. Video-laryngoscopy study was within normal limits. We sent the patient for Barium swallow oesophagus examination. The study revealed dilated oesophagus with a narrowing proximal to Gastro-oesophageal junction with compressions noted at various levels due to scoliotic spine (Ref. fig. 6)



Fig. 6: Barium swallow oesophagus study showing a narrowing proximal to GEJ (Yellow arrow) and multiple compressions due to scoliotic spine (White arrow)

Sources: Radiology case files, NRI medical College, Chinakakani.

We further followed up the CT chest study as advised by the Pulmonologist. It revealed the similar findings as suggested by the Barium Swallow Oesophagus study (Ref. figure 7)

DISCUSSION

In the Case number 1, the patient underwent multiple UGIE's priorly at multiple centers but none of the studies revealed any pathology. But once the barium swallow oesophagus at our center revealed a smooth indentation with proximal dilatation of Oesophagus, a repeat UGIE could successfully suggest of an extrinsic compression with pulsations in the same area corresponding to the indentation noted in Barium swallow study.

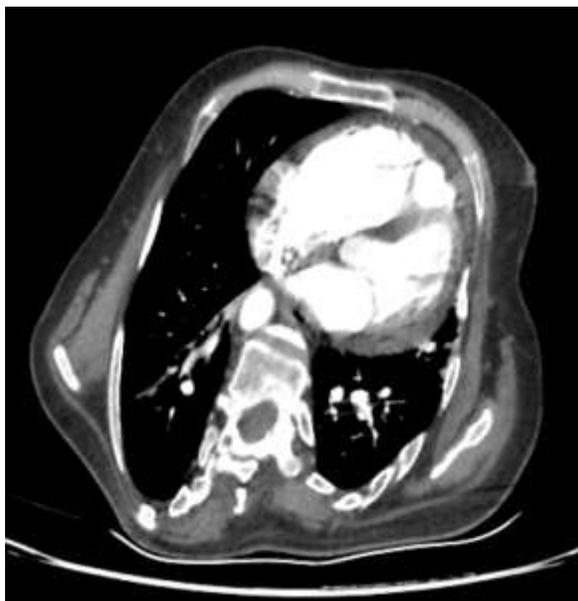


Fig. 7: CT Chest showing the scoliotic spine to cause compression over the oesophagus.

Sources: Radiology case files, NRI medical College, Chinakakani.

This is because the Barium swallow investigation gives a bird eye view of the Oesophagus. The eyes see what the mind knows! Following the Barium swallow study, the physician now knew where to exactly focus and where could the pathology lie. Hence a focused approach towards the same area could help reveal the pulsations.

In case number 2, the patient had multiple upper GI endoscopies priorly but none of them revealed an obvious pathology. On performing a Barium swallow oesophagus on the same patient, smooth tapering of the oesophagus in the lower 1/3rd was revealed showing a characteristic bird beak appearance of the oesophagus suggestive of Achalasia Cardia. This shows the efficacy of Barium swallow Oesophagus study in diagnosing motility disorders of the Oesophagus.

In case number 3, multiple compressions due to the scoliotic spine were revealed on the Barium swallow study which were later also seen on CT chest study. Barium swallow is considered as a primitive investigation by many practicing physicians but in this case, it could exactly reveal the findings that were seen on a modern-day giant – Computed tomography.

259 Barium swallow studies have been performed at our institution over a period of 4 years (2019 to current date). Of these 259, 193 revealed normal studies. 19 revealed anterior oesophageal webs and 2 revealed posterior oesophageal webs. 13 revealed Achalasia Cardia. 3 studies revealed extrinsic compressions including the one

discussed in the case series above. 4 revealed irregular filling defects and 2 of these 4 showed shouldering appearance of the oesophagus pointing out towards malignancy. 4 studies showed post-corrosive strictures. 11 revealed benign strictures and 4 revealed malignant strictures. 2 studies revealed post-chemotherapy strictures. 2 studies revealed esophageal diverticulum. 1 study was performed on post-operative case of Heller's cardio-myotomy. These results show the plethora of diagnoses that the Barium swallow investigation is capable of reporting. Other findings that have find their mention in existing papers include: A non-peristaltic esophagus as in the older subset of population suggesting a presbyesophagus, elongated and tortuous esophagus resembling a sigmoid colon as in the cases of sigmoid esophagus and compression of the cervical esophagus by anterior osteophytes of cervical vertebrae¹⁵.

The sensitivity of UGIE in subtle benign strictures is imperfect. At places where the clinical suspicion for a structural component of dysphagia persists despite a normal endoscopic study, barium swallow has higher sensitivity to detect subtle rings, webs and strictures⁷⁻¹⁰.

High-resolution Esophageal manometry (HRM), though remains the gold standard for diagnosing achalasia cardia, the use of more objective protocol of TBS in evaluating emptying, the specificity in comparison to HRM reaches upto 90%. However, the sensitivity remains between 65 to 80% using the conventional cut-off of 5cm at 5 mins post ingestion¹¹⁻¹⁴. Though, a normal or negative barium swallow study

does not rule out the diagnosis of achalasia cardia, in scenarios where the studies of HRM are inconclusive but the clinical suspicion of Achalasia cardia prevails, barium swallow continues to hold an important role vide a characteristic esophageal wall motion abnormalities or marked retention of barium on TBS studies¹⁵.

TBS have found immense value in assessing the therapeutic response to Achalasia Cardia¹⁶⁻¹⁸ and for evaluating long term symptom relapse following therapy to Achalasia^{19,20}

Barium swallow studies find themselves to be of significant use in cases of dysphagia in post-operative UGIE cases. In cases presenting with dysphagia following a bariatric surgery, where a secondary achalasia like pattern has been studied and where endoscopy hasn't contributed to yield significant findings, barium swallow is likely to give valuable insights by throwing a light over the post-surgery functional as well as structural entities¹⁵. In cases where fundoplication has been performed, dysphagia during the early phase of the post-operative phase is often common attributing to surgical oedema and paralytic ileus²¹, the incidence of late post-fundoplication dysphagia may be noted in around 15-20% of cases^{22,23}. Barium swallow and endoscopic studies are recommended in these cases primarily to evaluate for anatomical defects such as slipped/mal-positioned fundoplication with recurrent hernia, overly tight crural closure etc.

CONCLUSION

Barium swallow is considered obsolete in the present-day endoscopic era of medicine. There is an ongoing perception that UGIE is superior to the conventional barium swallow oesophagus. The fact that UGIE helps us visualize the mucosa of the oesophagus all through its length supports this perception. However, Barium swallow gives a first-hand information of the whole length of the oesophagus, guiding the endoscope. Areal view of the subject in study will always add to the close view of the same subject.

Uses of Barium Swallow Oesophagus that are still relevant in the modern-day endoscopic era include but not limited to:

1. It gives the bird-eye view of the whole length of the oesophagus and thus acts as a guide to the endoscope. This helps the physician to focus on specific areas which are otherwise missed on endoscopies without barium swallow guidance.
2. Barium swallow Oesophagus study is invaluable in diagnosing motility disorders of the oesophagus like Achalasia cardia, diffuse oesophageal spasm (DES) etc. Its role becomes more valuable when it is modified to attain dynamic assessment through video-flourography⁵.
3. The role of Barium swallow is superior in lesions causing dysphagia with no obvious mucosal irregularities in the Oesophagus.
4. Barium swallow oesophagus gives a first-hand information about the proximal and distal extent of oesophageal stricture thus helping us

to be extra careful while navigating the endoscope in the corresponding area and thus preventing potentially fatal complication of iatrogenic oesophageal perforation.

5. Barium swallow oesophagus gives an idea about the next best investigation to be performed to inch closer towards the diagnosis. This can significantly cut down the variables like financial expenses and inadvertent radiation exposure to the patient.
6. It finds potential value in diagnosing the cause in post-surgical dysphagia¹⁵.

Thus, we would like to conclude by emphasizing on our point that Barium Swallow is not an obsolete investigation and is still phenomenal in the modern-day endoscopic era. In fact, we would like to emphasize that neither the Barium swallow nor the UGIE is superior to the other but these investigations compliment the findings of each other to hasten in arriving at a diagnosis more accurately.

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