Correlation of Radiological and Endoscopic Findings in Patients Presenting with Dysphagia

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Abstract Dysphagia is a common symptom with diverse etiology in otolaryngology. In the present study clinico-pathological, radiological and endoscopic evaluation of patients was done in a tertiary care hospital in patients presenting with dysphagia. A *prospective nonrandomized observational study* was carried out on total of 80 cases having dysphagia during March 2015 to August 2016. In the present study, out of 80 patients, youngest case was a three years old child while oldest case was an 85 years old female. The mean age was 48.3 ± 20.3 years. The majority of cases were in age group 41–59 years (35%). Male to female ratio was 2.33:1. The mean duration of illness was 15.44 weeks. 15% of patients had absolute dysphagia. For detecting the lesion, Barium swallow study (BSS) showed a total sensitivity of 49.05% ($n = 53$), Computerised Tomography (CT) showed a total sensitivity of 85.70% ($n = 49$), plain skiagram neck & chest showed a total sensitivity of 88.88% ($n = 9$) and endoscopy was the most sensitive test overall as it showed a total sensitivity of 98.75% ($n = 80$). No complications were reported with either rigid or flexible endoscopy. Dysphagia is a common presenting complaint in otolaryngology with cases coming directly or being referred from other specialities. Males are more commonly affected than females and incidence of malignancy increases with age. Endoscopy can become the first screening test in dysphagia due to its high sensitivity and low risk of complications, with radiological tests being done in an adjunct manner.

Keywords Dysphagia · Barium swallow study · CT scan · Endoscopic evaluation

Introduction

Dysphagia is the “perception that there is an impediment to the normal passage of swallowed material” [1]. Normal swallowing is dependent upon rapid neuromuscular co-ordination of structures in the oral cavity, pharynx and oesophagus during a brief cessation of respiration. With the advent of flexible fibre-optic endoscopy, screening of patients with dysphagia has become safe, rapid, highly accurate in its findings and comfortable to the patient. A *prospective nonrandomized observational study* with complete clinical and pathological assessment, radiological investigations and endoscopic evaluation was carried out during and their correlation was studied.

Methods

A *prospective nonrandomized observational study* was carried out and total of 80 cases having dysphagia were studied during March 2015 to August 2016. Institute ethics committee approval was taken and informed consent was obtained from each patient. The patients having symptom of dysphagia with lesion from oropharynx to cardiac end of oesophagus having intraluminal, extraluminal or luminal cause were included in this study. A detailed *clinical history* regarding dysphagia was taken. Endoscopic examination was done using Rigid or Fibreoptic laryngoscopy and/or esophagoscopy under General or Local anaesthesia. Biopsy and relevant histopathological investigations were done wherever indicated. Barium swallow study were

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performed as multiphasic examinations under videofluoroscopic control using both thick and thin barium paste. Computed tomography (CT) was carried out in select cases acquiring axial, sagittal and coronal cuts both with and without contrast. All acquired images were post-processed with either two dimensional software tools. The reporting of radiological investigations was done by experienced consultants. Statistical analysis was performed with the help of Microsoft Excel 2007 and mean, percentage and proportions were used.

Results

Out of 80 cases of dysphagia included in the present study, maximum number of cases were in the age group 41–59 years (35%). The male to female ratio was 2.33:1. Majority of the cases had dysphagia longer than 8 weeks duration (46.2%). Out of 48 cases of carcinoma for which data was available, addiction to one or more substances was seen in 68.75%. Only 2 patients (2.5%) reported with history of caustic injury leading to sudden onset of dysphagia. These patients were followed up at 4–8 weeks after presentation and both developed esophageal stenosis as a late sequelae. All patients underwent endoscopic evaluation and radiological investigation with either barium swallow or CT scan was undertaken.

Findings of Barium Swallow Study

In the present study total of 53 Barium swallow studies were done (Table 1), 28 (52.8%) came out to be positive while 25 (47.2%) reported normal finding. Most common finding was filling defect in lower 1/3rd of esophagus. Positive Barium Swallow studies comprised primarily of

esophageal lesions with 25 cases (47.2%) and laryngopharyngeal lesions comprising of 3 cases (7.54%). Negative Barium swallow study consisted mostly of GERD patients, with only 1 such case reporting a positive study. Curling's phenomenon was seen in a 65 years old male with dysphagia since 8 weeks in lower third of esophagus. Bird beak appearance was seen in two cases, a 6 years old female child of stricture cardiac end esophagus and an 85 years old male with Achalasia cardia. Classically bird-beak sign on BSS is associated with Achalasia cardia, but it actually signifies distal narrowing with proximal dilatation of esophagus that can be seen in any case with such finding. Esophagocutaneous fistula was seen in one case with history of penetrating neck trauma. The patient was suspected to have developed stenosis for which BSS was advised, but incidental finding of esophagocutaneous fistula was reported.

CT Scan Findings

49 Computerized Tomography (CT) scans were included which showed 27 cases of lesion in laryngopharynx and 16 cases of esophageal lesion, and a negative CT scan was reported in 6 cases (Table 2). Positive scans were reported mostly in cases of mass lesions in laryngopharynx and esophagus. Two cases of paraesophageal mediastinal mass were also reported, with both the cases being females (Fig. 1). Negative CT scan was reported in 4 cases of GERD, 1 case of benign esophageal ulcer and 1 case of carcinoma esophagus which had a small malignant ulcer on endoscopy. Positive lymph node metastasis were reported in 9 patients. Distant metastasis was seen in 5 patients which showed liver metastasis in 4 patients and brain metastasis in 1 patient, thus demonstrating the sensitivity of CT scan for assessment of distant metastasis.

Table 1 Findings of barium swallow study in 53 cases of dysphagia

S. no.	Finding	No. of patients	Percentage (%)
1	Mucosal irregularity in laryngopharynx	2	3.77
2	Hold up of barium at laryngopharynx	1	1.88
3	Bronchogram	1	1.88
4	Filling defect in esophagus		
	Upper 1/3	4	7.54
	Middle 1/3	8	15
	Lower 1/3	7	13.2
5	Bird beak appearance	2	3.77
6	Diffuse esophagitis	1	1.88
7	Esophago-cutaneous fistula	1	1.88
8	Curling's phenomenon	1	1.88
9	No finding seen	25	47.2
Total		53	100

Table 2 CT scan findings in 49 cases of dysphagia

S. no.	Finding	No. of cases	Percentage (%)
1	Lesion in laryngopharynx	27	55.1
2	Lesion in esophagus		
	Intrinsic	13	26.53
	Extrinsic	3	6.12
3	No finding	6	12.24
4	Metastasis		
	Lymph nodes	9	18.36
	Liver	4	8.16
	Brain	1	2
Total		49	100

Fig. 1 CT scan with oral contrast showing paraesophageal mediastinal mass pushing mediastinal structures to the left and causing left lung collapse

Table 3 Endoscopy findings in 80 cases of dysphagia

S. no.	Type of lesion	No. of cases
1	Ulceroproliferative growth	32 (40%)
2	Ulcerative growth	8 (10%)
3	Endophytic growth	6 (7.5%)
4	Ulceronodular/Polypoidal growth	3 (3.75%)
5	Inflammatory lesion	1 (1.25%)
6	Foreign body	9 (11.25%)
7	Stenosis/Stricture	5 (6.25%)
8	Spasm at lower end (Achalasia cardia)	1 (1.25%)
9	Esophagitis	9 (11.25%)
10	Extrinsic compression	1 (1.25%)
11	Normal	1 (1.25%)
Total		80 (100%)

Endoscopy Findings

In the present study, in carcinoma of upper gastrointestinal tract, ulceroproliferative growth was the most common lesion with 32 cases (40%) being reported (Table 3). It was also the most common lesion overall on endoscopy, followed by foreign body and esophagitis both reported having 9 cases (11.25%). The least common lesions seen were benign inflammation, lower and esophageal spasm (Achalasia cardia) and extrinsic compression of esophagus, each having 1 case (1.25%) respectively. Normal esophagoscopy was reported in only 1 case (1.25%) which was a suspected foreign body (coin) at lower end of esophagus.

No complications during rigid or flexible fibre-optic endoscopes endoscopic evaluation.

Correlation Between Radiological and Endoscopic Findings

The present study of 80 cases included 53 barium swallow studies, 49 CT scan assessment cases and 80 endoscopic evaluations for dysphagia (Table 4).

Barium swallow study showed a total sensitivity of 49.05%, CT showed a total sensitivity of 85.70%, Plain Skiagram Neck and Chest showed a total sensitivity of 88.88% and endoscopy was the most sensitive test overall as it showed a total sensitivity of 98.75% (Table 5).

Discussion

In the present study maximum number of patients were seen in 41–59 years age group. This was related to high rate of addictions amongst this group. Foreign bodies were seen most commonly in 0–20 years age group. Tongper et al. [2] reported maximum number of cases in 60 years and above age group. 70% cases were males with male to female ratio of 2.33:1, Kishve et al. [3] observed 60.6% patients were males and Tongper et al. [2] observed 63.6% patients were males.

Barium swallow study was carried out in 53 cases and 52.8% came out to be positive while 47.2% of these reported with no significant finding. Matilde et al. [4] noted true positive barium swallow studies in 86.5% cases. Curling's phenomenon was seen in one case of Presby-dysphagia. This phenomenon is believed to be due to tertiary esophageal contractions, that occur to propel food towards stomach. Endoscopic evaluation revealed mild reflux esophagitis, however patient did not improve on proton pump inhibitor drug therapy. Swallowing therapy, lifestyle and dietary modifications were initiated, and patient showed significant improvement of symptoms.

Achalasia cardia or esophageal spasm was seen in an 85 years old male in our study. It is caused due to degeneration or absence of ganglion cells of Auerbach's myenteric plexus. The etiology may be autoimmune, viral or neurodegenerative. It is indistinguishable from Chagas disease, seen in patients from South America due to infection with *Trypanosoma cruzi* which destroys the ganglion cells. Treatment consists of medical therapy with calcium channel blockers or botulinum toxin injection into the lower esophageal sphincter.

In the present study CT Scan showed positive findings in 87.7% cases. Mazzeo et al. [5] studied CT findings in esophageal pathologic conditions in thirty-three cases and reported sensitivity of 84% and specificity of 87%.

Table 4 Correlation between radiological and endoscopic findings

S. no.	Lesion	Radiological investigations						Endoscopic findings	
		Barium swallow		CT		Plain skiagram neck and chest		True +ve	False –ve
		True +ve	False –ve	True +ve	False –ve	True +ve	False –ve		
1	Carcinoma	17	14	38	1	–	–	48	0
2	GERD	1	9	1	5	–	–	10	0
3	Benign lesion	0	1	1	1	–	–	2	0
4	Foreign body	–	–	–	–	8	1	8	1
5	Achalasia cardia	1	0	–	–	–	–	1	0
6	Presbydysphagia	1	0	–	–	–	–	1	0
7	Stricture/Stenosis	6	2	2	0	–	–	8	0
8	Plummer-Vinson syndrome	0	1	–	–	–	–	1	0
Total		26	27	42	7	8	1	79	1

Table 5 Sensitivity of various tests in diagnosis of cases of dysphagia

Lesion	Barium swallow	CT (%)	Plain skiagram neck and chest (%)	Endoscopy (%)
Carcinoma	54.8%	97.4	–	100
GERD	10%	16.67	–	100
Benign lesion	0	50	–	100
Foreign body	–	–	88.88	88.88
Achalasia cardia	100%	–	–	100
Presbydysphagia	100%	–	–	100
Stricture/Stenosis	75%	100	–	100
Plummer-Vinson syndrome	0	–	–	100
Total	49.05%	85.70	88.88	98.75

Using data from Table 4

In the present study maximum cases of carcinoma were seen in males over 40 years of age. This is due to the high incidence of addictions like smoking and tobacco/betelnut chewing predominantly in males in our country. These habits are seen less in the Indian females. Gopalakrishnan and Praveenkumar [6] reported carcinoma in over 87% of head & neck malignancies occurs in males and peak incidence in occurs in 40–60 years.

In our study in cases of stricture/stenosis we observed maximum incidence of 37.5% in males of 41–59 years age group. Male to female ratio was 1.66:1 in these cases. Stenosis in these cases had developed as a late sequelae to caustic injury or radiation therapy for carcinoma of esophagus. In a study by Dabadghao and Kakrani [7], the mean age of cases was 41.33 ± 18.3 years and male to female ratio was 0.58:1. Nanda and Kochhar [8] reported a mean age of 35 years and sex ratio of 1.6:1. Desai et al. [9] reported the mean age in their study as 55 years with a male to female ratio of 2.2:1.

In our study GERD was reported in 12.5% of total cases. 40% of cases were noted in age 21–40 years and 70% cases

were noted to be males. Males in 21–40 age group comprised 40% of the cases. This can be because of higher incidence of stress, obesity and practice of eating spicy meals by the men in our country. Kishve et al. [3] reported 11% incidence of GERD and Tongper et al. [2] reported it to be 2.27%. Endoscopic assessment was the most sensitive test compared to Barium swallow and CT scan and equally sensitive to skiagraphy in foreign body cases. Overall sensitivity of 98.75% was the highest with a sensitivity rate of 100% in almost all cases except foreign body ingestion where it showed equal sensitivity. Thus in the present study it highlights as the best screening test for cases of dysphagia. In cases of foreign body ingestion it additionally affords the benefit of removal.

In the present study a no complications were seen with both rigid and flexible fibre-optic endoscopic assessment. These were done by experienced consultants working in our institute. Wennervaldt et al. [10] reported a complication rate of 0.8% in 483 cases. Thus rigid endoscopic evaluation of dysphagia is equally safe as compared to fibre-optic evaluation.

Conclusion

Dysphagia is a common presenting complaint in otorhinolaryngology OPD with various patients being reported from in-patient setting. Endoscopic assessment of dysphagia should thus be the initial screening modality in cases of dysphagia due to its high sensitivity, high diagnostic yield, low complication rate and absence of any risk of radiation exposure to the patient. Other radiological tests like Barium swallow study and CT scan should be used concomitantly with endoscopy as dysphagia encompasses various lesions requiring a battery of tests to arrive at the correct diagnosis. Dysphagia is a clinical entity which can occur due to various lesions. A battery of clinical tests is usually required when there is difficulty in arriving at a diagnosis.

Compliance with Ethical Standards

Conflict of interest No conflict of interest is declared.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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