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Original Research Article

Endoscopic evaluation of dysphagia incorporating eating assessment tool-10 and dysphagia outcome and severity scales-a cross-sectional study

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ABSTRACT

Background: Dysphagia is associated with significant morbidity and mortality. A careful history may determine the cause of dysphagia in over 80% of patients. The intention of my study is to assess the patients of dysphagia using fiberoptic nasopharyngolaryngoscope and to study their clinicopathological profile and assess the severity using dysphagia outcome and severity scale (DOSS) scale and eating assessment tool (EAT)-10 score.
Methods: A descriptive cross-sectional study of patients with symptoms of dysphagia who presented to the ENT department were included. The study was conducted from January 2018 to June 2019. A total of 120 patients were taken for the study.
Results: Dysphagia was more common among males than females and more prevalent in the age group of 61-70 years. Patients with tracheostomy had an EAT-10 score above 6 and DOSS level 5 and below. EAT-10 score was helpful to assess dysphagia with the majority of patients having a score of 6 to 10 and the scores correlated with DOSS levels. Indirect laryngoscopy (IDL) was helpful to diagnose in 68.5% of cases and fibre optic laryngoscopy (FOL) was helpful in diagnosis in 75.8% of cases. Malignancy was the most common cause of dysphagia (25%) followed by laryngopharyngeal reflux (24.2%). Mortality rate in the present study was 15 %
Conclusions: Dysphagia is a complex symptom, the description of which varies from person to person and is common among the elderly population and in those with co-morbidities and needs to be evaluated early to diagnose and treat the underlying cause.

Keywords: Dysphagia, Laryngo-pharyngeal reflux, EAT-10, DOSS, IDL, Nasopharyngolaryngoscope

INTRODUCTION

Dysphagia is a medical term for the symptom of difficulty in swallowing.[1] The word is derived from Greek-'dys' meaning 'disordered' and the root 'phagein' meaning 'eat'. It suggests difficulty in the passage of solids or liquids from the mouth to the stomach, a lack of pharyngeal sensation or various other inadequacies of the swallowing mechanism.[2] Severe dysphagia can eliminate the pleasure of eating and drinking and thereby has a devastating impact on the quality of life. This can lead to isolation as the patient withdraws from activities involving food such as teatime, group dinners and family mealtimes.[3]

The term dysphagia refers to a swallowing disorder that involves any one of three stages of swallowing-oral, pharyngeal, or oesophageal.[4] Chronic oropharyngeal dysphagia may result in malnutrition and dehydration. [5] The major symptoms indicative of oropharyngeal or oesophageal disease includes dysphagia, odynophagia, regurgitation, pyrosis, and chest pain. Prominent pulmonary symptoms like chronic cough, wheezing and

recurrent pneumonia may also indicate a swallowing disorder. [6]

The true prevalence of dysphagia is unknown, but epidemiologic studies estimate the prevalence in individuals over the age of 50 to be in the range of 16 to 22%. A survey study of all ages in the mid-western population estimated the prevalence of dysphagia to be around 6% to 9%.[7] A comprehensive history for patients with dysphagia includes patient symptoms, current and past medical history, previous swallow assessments, and sociocultural status. Recently properly standardized tests have been developed to systematically capture patient-reported symptoms, namely the Sydney swallow questionnaire, which targets symptoms related to pain or discomfort during swallowing and EAT-10 which is a self-administered survey targeting patient burden from dysphagia.[8]

Instrumental evaluation is necessary for the comprehensive assessment of swallowing of both known and undiagnosed etiologies. Imaging is often critical for diagnosing the cause, selecting optimal treatments and assessing the effects of treatment by accurate measurement of the oropharyngeal swallowing response.[3] The overall management of dysphagia is influenced by whether the patient has an oropharyngeal or oesophageal cause and whether the dysfunction is secondary to a mechanical process or a motor disorder.[7]

Aims and objectives

The aim and objectives of the study were to study the clinicopathological profile of patients diagnosed with dysphagia across different age groups, to study the co-morbidities associated with dysphagia, to study the distribution of various causes of dysphagia in patients presenting to a tertiary care hospital and to evaluate the efficiency of indirect laryngoscopy and flexible nasopharyngolaryngoscopy for diagnosing dysphagia.

METHODS

The present study titled "endoscopic evaluation of dysphagia incorporating EAT-10 and DOSS scales-a cross-sectional study" was conducted in the ENT department at the Southern Railway headquarters hospital, Chennai, Tamil Nadu. The study was conducted from January 2018 to June 2019. It was done after obtaining approval from the scientific committee and the institutional ethics committee. 120 patients were taken up for the study after obtaining a valid consent.

Sample size

Assuming a prevalence of 11% and absolute precision of 5% and 95% confidence interval, the sample size was found to be 128. And 120 patients data were collected during the study period.

Study population

Patients with symptoms of dysphagia who presented to the OPD of the ENT department, as well as in-patients in ENT, and patients referred from other departments for dysphagia, were included in the study.

Inclusion criteria

Patients presenting with dysphagia to OPD in the ENT department, patients above the age of 10 years were included in the study.

Exclusion criteria

Children with congenital anomalies and craniofacial deformities, children below 10 years of age and patients not willing to participate in the study were excluded from the study.

Methodology

Patients who presented to the ENT department with symptoms of dysphagia to solids and liquids were selected based on the inclusion and exclusion criteria. Patients were informed about the study and their role in the study. A written informed consent was obtained from the patient prior to data collection and data was collected using the study proforma. Demographic data was collected, history of dysphagia onset and duration, associated medical comorbidities, past surgical history and personal history were collected. Dysphagia severity was assessed using the EAT-10 questionnaire and grading was done using dysphagia outcome and severity scale, which includes 7 levels.

General examination findings and neck nodal status findings were noted and instrumental assessment using indirect laryngoscopy and fiberoptic nasopharyngolaryngoscopy was done. If the diagnosis was in doubt, upper GI endoscopy was done by the surgical department and the findings were noted. Imaging was done whenever required and biopsy and histopathology findings were recorded as applicable and blood investigations were done for select OPD patients when needed but were done for all inpatients.

Statistical analysis

Statistical analysis of the variables was carried out using frequency and percentages for qualitative variables, mean, and SD for quantitative variables. Microsoft excel was used for data tabulation and statistical analysis was done using SPSS software.

Sampling method

No sampling was done as all patients who presented with dysphagia and who satisfied inclusion and exclusion criteria were taken for study after obtaining their consent.

RESULTS

During the study period, 120 patients presented with dysphagia, which included patients who presented to the ENT OPD and patients who were referred from other departments. Among 120 patients, 80 patients were male and 40 patients were female, which constituted 66.7 % and 33.3 % respectively showing a male sex predominance among the dysphagia population.

Among the study population, most were in the age group of 61-70 years (48 patients-40%), followed by 71-80 years age group (21 patients-17.5%), followed by 41-50 year age group (19 patients-15.8%). The mean age of the study population was 60 years and while the minimum age was 14 years, the maximum age recorded was 89 years. Among the 61-70 years age group, 39 patients were male and 9 patients were female and in the 71-80 years age group, 15 patients were male and 6 patients were female. Female patients were predominantly in the 41–50-year age group where there were 11 female and 8 male patients.

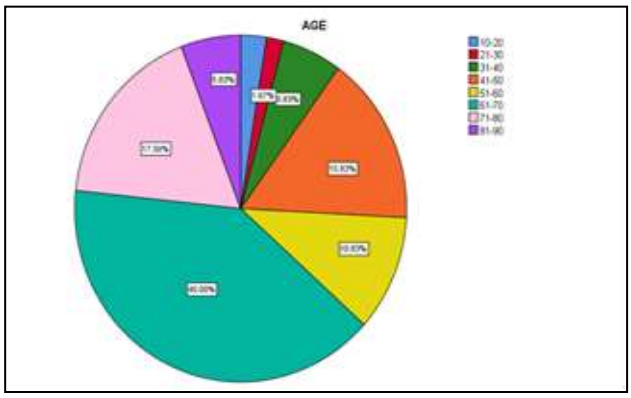

Figure 1: Age distribution.

Among the 120 patients, 45 patients (37.5%) had a duration of dysphagia for 1 month followed by 25 patients (20.8%) for whom the duration of dysphagia was 2 months and 14 patients (11.7%) had dysphagia for 3 months. Patients who underwent radiotherapy or surgery for malignancy had a longer duration of dysphagia, usually for more than 6 months. Patients who were diagnosed with inflammatory and infective causes for dysphagia had a shorter duration. Those who presented with foreign bodies had acute onset of dysphagia.

The majority, around 65 patients (54.2%), belonged to upper lower class-class IV according to the modified Kuppuswamy socio-economic scale. Next most common was lower middle class-class III (35 people-29.2%) followed by upper middle class-class II (19 people-15.8%). One person belonged to lower class-class V.

Among the 120 patients, 14 patients were on tracheostomy due to major surgery or for airway concerns (11.7%) and the rest 106 patients were normal (88.3 %).

The 37 patients (30.8%) had prior surgery and 83 patients (69.2%) had no prior history of surgeries.

Out of 120 patients, 55 patients tolerated pureed diet (45.8%), 41 patients tolerated normal diet (34.2%), 12 patients were on Ryle's Tube feeding (10%), 5 patients tolerated only liquid diet (4.2%), 3 patients were on feeding jejunostomy (2.5%) and 4 patients had absolute dysphagia due to obstruction by the foreign body or acute laryngeal edema.

In the present study, 73 patients (60.8%) had no history of smoking, alcohol, or tobacco consumption. The 26 patients (21.7%) had both smoking and alcohol history and there were 7 people who consumed only alcohol (5.8%), 9 people had a history of only smoking (7.5%), 1 patient had a history of both tobacco and alcohol intake, and 1 patient had a history of smoking with tobacco consumption, and 3 patients (2.5%) had history of tobacco chewing. Smoking, alcohol and tobacco chewing were the most prevalent in males. Out of 120 patients, only 1 female patient had a tobacco-chewing history.

Out of 120 patients, 46 had no medical comorbidities. 55 patients had hypertension (45.8%), followed by diabetes mellitus in 35 patients (29.1%), followed by coronary artery disease in 22 patients (18.3%) and dyslipidemia in 15 patients (12.5%). Hypothyroidism was noted in 10 patients (8.3%) and 6 patients had chronic kidney disease (5%). Most of the patients had more than 1 medical comorbidity.

The functional severity of dysphagia was graded using dysphagia outcome and severity score. The 42 people (35%) had DOSS Level 7 which meant they had no restrictions in their diet in all situations. 21 patients (17.5%) had DOSS Level 6 which meant they had diet within functional limits or restricted independence. 21 patients (17.5%) were graded DOSS level 1 which meant they had severe dysphagia and were unable to tolerate per oral safely. The 16 patients (13.3%) had mild dysphagia and belonged to DOSS level 5. The 14 patients (11.7%) had restriction of two diet consistencies and graded DOSS level 4. Five patients (4.2 %) had moderate dysphagia graded DOSS level 3 and 1 patient had DOSS Level 2 which meant the patient had moderately severe dysphagia and use of strategies to tolerate per oral safely.

Dysphagia was screened using EAT-10 scoring. Among 120 patients, the majority had EAT score between 6 to 10 (35 patients-29.2%) followed by a score of 11 to 15 (29 patients-24.2%) followed by a score of 16 to 20 (20 patients-16.7%), next followed by a score of 4 to 5 (17 patients-14.2%) and then a score of 3 (14 patients-11.7%). Four patients (3.3%) had an EAT score of between 21 to 25 and 1 patient had an EAT score of 27. It was found that higher EAT 10 scores were found in patients above the age group of 40 years.

Table 1: Comparison of EAT-10 score with age group of patients.

Age (Years)	EAT-10 score						
	3	4-5	6-10	11-15	16-20	21-25	26-30
10-20	2	0	0	0	1	0	0
21-30	0	1	1	0	0	0	0
31-40	2	1	0	3	0	0	1
41-50	4	5	4	3	1	2	0
51-60	1	4	3	4	1	0	0
61-70	5	3	18	11	9	2	0
71-80	0	3	8	5	5	0	0
81-90	0	0	1	3	3	0	0

It was also found that the higher the EAT 10 score, the severity of dysphagia increases as shown in the histogram Figure, which shows lower DOSS levels as EAT-10 score increases.

Figure 2: Histogram showing correlation between EAT-10 and DOSS levels.

On examination, 91 patients (75.8 %) had normal neck findings and 28 patients (23.3%) had positive nodes on neck examination. 1 patient had multinodular goitre. It was found that neck nodes were present in patients above the age group of 50 years and more in the age group of 61-70 years suggesting malignancy in this age group to be the cause of dysphagia.

Oral and local examination done on 120 patients showed 88 patients (73.3 %) had normal or fair oral hygiene, 20 patients (16.7%) had poor oral hygiene, 5 patients (4.2%) had missing tooth/edentulous, 2 patients (1.7%) had pale oral mucosa, 1 patient had glossitis, 1 patient had undergone dental restoration/filling, 1 patient was on the ventilator, 1 patient had hoarseness of voice and 1 patient had trismus.

For assessment of dysphagia, indirect laryngoscopy, FOL and UGI scopy were used.

Among 120 patients, IDL was done for 105 patients (87.5%) and IDL could not be done for 15 patients (12.5%) due to the patient's poor general condition and those in emergency situations and people who failed to co-operate. All patients underwent FOL. Upper GI Endoscopies were used in select cases where diagnosis could not be done with FOL alone. UGI scopy was performed on 41 patients (34.2%).

Among 105 patients for whom IDL was performed, positive findings were noted in 67 patients (63.8%), normal findings in 5 patients (4.7 %) and findings could not be picked up in 33 patients (27.5%). Thus, diagnostic accuracy of IDL in the present study was 68.5 %.

Out of the 120 patients for whom FOL was performed, a diagnosis was reached in 86 patients (71.7%) and 5 patients (4.2%) had normal findings but diagnosis could not be confirmed in 29 patients (24.2%). Thus, diagnostic accuracy of FOL in the present study was 75.8%.

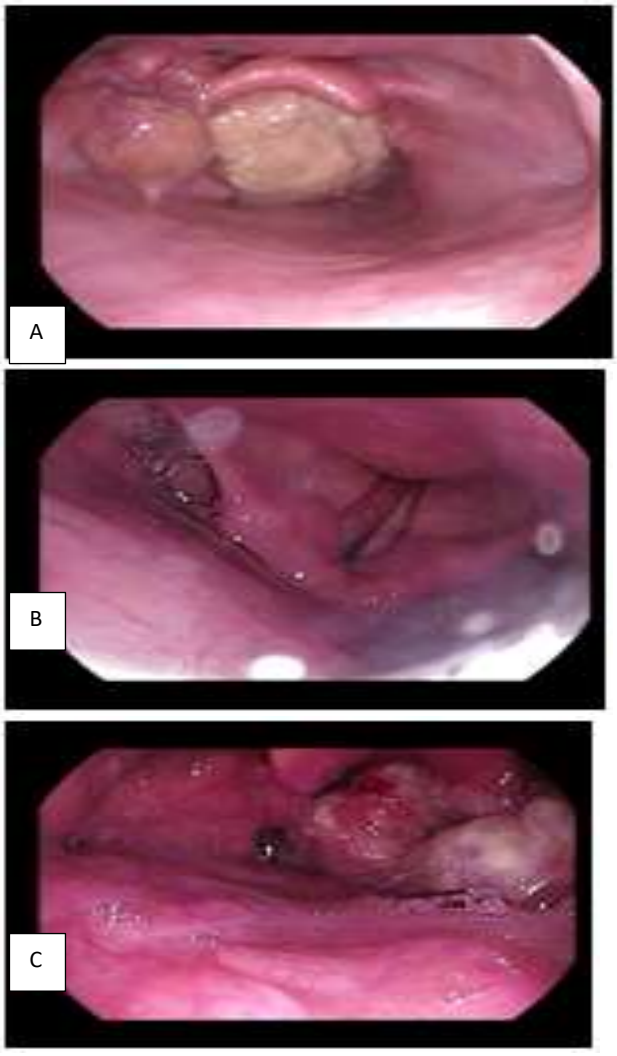

Figure 3 (A-C): 38/M with FOL for dysphagia of carcinoma supraglottis; 71/M with FOL for dysphagia showing carcinoma left vocal cord; 58/M with FOL for dysphagia showing carcinoma right PFS.

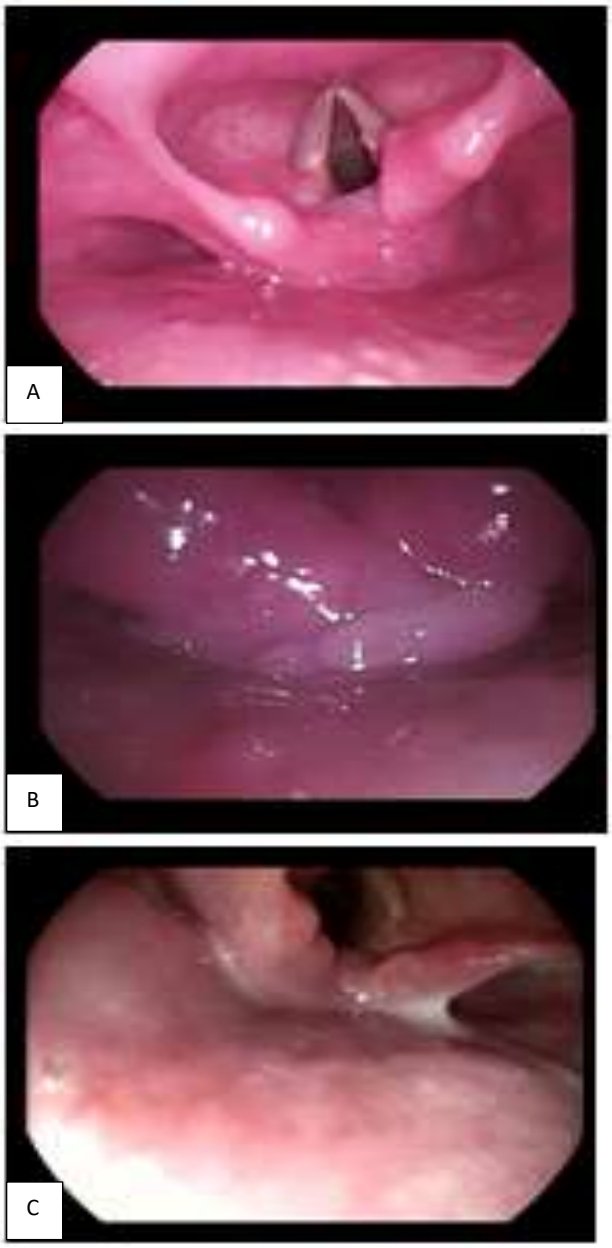

Figure 4 (A-C): 50/F with FOL for dysphagia showing right vocal cord palsy post-carotid body tumour excision; 45/F with FOL for dysphagia showing carcinoma post cricoid region; 49/M with FOL for dysphagia showing oropharyngeal candidiasis.

Among 41 patients for whom UGI scopy was performed, positive findings were noted in 36 patients (87.8%) and 5 patients had normal examination findings (12.2%).

52 patients (43.3%) underwent some form of imaging for diagnosis. CT neck was performed on 21 patients, CECT Neck was performed on 17 patients, PET CT was done for 5 patients, CT chest was done for 3 patients, CT brain was done for 2 patients, MRI brain was done for 2 patients, X-ray chest and X-ray neck was done for 1 patient each.

Blood investigations were done for 80 patients of which 47 patients had normal blood reports (58.75%), 26 patients had coexisting anemia (32.5%) and elevated renal function tests were noted in 5 patients (6.25%) and 2 patients had hyponatremia (2.5%).

The most common cause for dysphagia was malignancy comprising 30 patients (25% of the patient population). Among malignancy, carcinoma hypopharynx was most common (11 patients, 9.2%), followed by carcinoma supraglottis (5 patients, 4.2%), carcinoma oropharynx (4 patients, 3.3%), carcinoma transglottis and carcinoma oesophagus (3 patients each, 2.5%), lymphoma (2 patients, 1.7%), carcinoma subglottis and adeno-carcinoma stomach (1 patient each). The next most common cause was laryngopharyngeal reflux/posterior laryngitis comprising 29 patients (24.2%), followed by radiotherapy (15 patients, 12.5%). Among radiotherapy patients, carcinoma oropharynx was the most common (10 patients, 8.3%), followed by carcinoma glottis (3 patients, 2.5%) and 1 patient each with carcinoma of unknown primary and non-small cell lung cancer. Infective causes constituted 11 patients comprising 9.1% of the patient population among which oesophageal candidiasis constituted 5 patients (4.2%). Inflammatory causes were the reason in 7 patients (5.8%). Synechiae and strictures caused dysphagia in 7 patients (5.8%). Other causes were post-surgical-2 patients (1.7%), cerebro-vascular accident-3 patients (2.5%), vocal cord palsy-3 patients (2.5%), Plummer Vinson syndrome-2 patients (1.7%), foreign body-3 patients (2.5%), aspiration pneumonia-2 patients (1.7%), presbyphagia-3 patients (2.5%) and 1 case each of motor neuron disease and multi nodular goitre and psychogenic cause (0.8%).

Histopathological examination was done in 46 patients as and when deemed necessary and not done for 74 patients as it was not indicated. Among 46 patients, the majority (35 patients) had squamous cell carcinoma (76.08%) in various grades, followed by 4 cases of adeno-carcinoma (8.6%).

During the study period, 19 patients died due to complications associated with dysphagia, suggesting a mortality rate of 15.8%. Mortality was more among males (14 patients) compared to females (5 patients).

DISCUSSION

Dysphagia is a commonly encountered clinical condition and limited data exists in South India on the incidence of various etiologies. An attempt had been made to classify the distribution of causes and demographic profiling and investigation methods to diagnose the cause of dysphagia in the Indian population. A total of 120 patients were included during the study period and the results were analyzed.

Datta et al in his study of dysphagia in the ENT department, found the mean age of the population was

52.5 years with 60% males and 40% females. [9] In a study on endoscopic findings of oesophageal dysphagia by Gouda et al the mean age of the population was 49.56±16.41 years.[10] Similarly, in a study on endoscopic evaluation of patients with dysphagia by Sahu et al the mean age of cases was 53.48 years with a standard deviation of 14.95 years.[11] In the current study, the mean age of the population was 61 years with a standard deviation of 15.05 years, with the minimum and maximum age of the patient being 14 and 89 years respectively.

A study on the clinicopathological profile of dysphagia by Swaminathan et al found males were more affected than females in a ratio of 1.9:1.[12] In the current study, the male to female ratio was 2:1.

Swaminathan et al in his study observed that 82.8% of the patients belonged to low socioeconomic status.[12] Similarly, in a study of head and neck cancer by Tuli et al 58.18% of the cases were from poor socio-economic status.[13] In the present study, 54.2% (65 patients) were from class-IV socio-economic status (Modified Kuppuswamy socio-economic scale).

Table 2: The duration of symptoms most people presented in various studies is listed.

Study	Duration of dysphagia majority presented with
Khan et al[14]	24 weeks (53.2%)
Sahu et al[11]	24 weeks (54%)
Gouda et al[10]	24 weeks (59.1%)
Present study	4 weeks (37.5%)

In a study on tracheostomy and aspiration in patients with head and neck cancer by Muz et al in head and neck patients who had a tracheostomy, the incidence of aspiration was about 58 %.[15] Here, of 47 head and neck cancer patients, 11 patients were on tracheostomy and among them, 4 patients died of complications due to aspiration pneumonia which gives an incidence of 36%.

Among 80 males, 34 patients had no history of smoking/alcohol/ tobacco consumption. Of the remaining 46 male patients, 9 were smokers, 26 had both smoking and alcohol history, 7 were alcoholic, 1 had alcohol and tobacco consumption, 1 had tobacco and smoking and 2 had only tobacco consumption. Among 40 female patients, 1 patient had a history of tobacco chewing. Among 47 patients exposed to smoking/alcohol/tobacco, 34 patients had head and neck cancer indicating that 72% of cancer cases were confined to people with these habits. The male preponderance in the study may be due to more exposure of this gender to alcohol intake, smoking, tobacco and pan chewing.

Study on reliability of EAT-10 by Belafsky et al showed that the mean EAT-10 score was 0.40±1.01 and was 22.42±14.06 for head and neck cancer patients and 11.7±19.61 for those with reflux.[16] In the current study, the mean EAT-10 score was 10.19±5.48 and the mean EAT-10 score was 14 in head and neck cancer patients and 4.6 for those with laryngopharyngeal reflux patients. Normative data suggest that an EAT-10 score of 3 or greater is abnormal. Similarly in a study to assess the ability of EAT-10 to predict aspiration risk in persons with dysphagia by Cheney et al individuals with EAT-10>15 were 2.2 times more likely to aspirate.[17] Here, 19 patients expired and their mean EAT-10 score was 16 thus confirming aspiration risk.

In O'Neil et al study, their results indicated that the DOSS can be used by trained clinicians to better describe the severity level of dysphagia with excellent reliability and to make more consistent recommendations for nutrition, diet, and independence.[18] Similarly, in a study by Siegfried et al in patients with dysphagia, EAT-10 is superior to DOSS in predicting abnormal high-resolution manometry with esophageal pressure topography. Although both scales had a high PPV and moderate sensitivity, both had poor specificity and NPV.[19] In the current study, around 72% of people who had smoking/alcohol/tobacco history had cancer of the head and neck and EAT-10 score was helpful to assess dysphagia with the majority of patients having a score of 6 to10 and the scores correlated with DOSS levels thus making DOSS a valid screening tool.

Sarkar et al observed that hypopharyngeal carcinoma (25%) constituted the most common cause for dysphagia followed by supraglottic carcinoma 20%.[20] In the study by Gouda et al GERD/reflux esophagitis was the most common cause constituting 19.7% followed by oesophageal stricture 17.3% and oesophageal mass 16.5%.[10] Swaminathan et al, in his study found 75.3% of the cases of dysphagia was due to malignancy whereas in the current study, 39.16% of the patients (47 patients) of dysphagia was attributed to malignancy, followed by laryngopharyngeal reflux which constituted 24.2% (29 patients).[12]

Study by Swaminathan et al showed that among malignancies, carcinoma oesophagus was the most common malignancy whereas in the current study, among malignancies, carcinoma oropharynx was the most common malignancy noted constituting 29.78% (14 of 47 malignancies).[12]

In a review by Roden and Altman on the etiology of dysphagia in different age groups, gastroesophageal and immunologic etiologies are more common in the middle-aged population (30-60) while neurology and oncology causes are more likely to affect the elderly population (>60).[21] Similarly in this study, most of the oncology cases were found in patients above 60 years of age.

In a population-based study on epidemiology and risk factors of dysphagia by Eslick et al dysphagia is common in the general community and high blood pressure is a

novel risk factor while GERD, anxiety and depression were independently associated with dysphagia and have a significant impact on quality of life. In the present study, 45.8% of patients (55 patients) who had dysphagia had co-existent hypertension.[22]

Among 14 patients who underwent tracheostomy, 11 patients had significant dysphagia consistent with DOSS levels of 4 and below, indicating that 9.16% of patients who had dysphagia can be attributed to tracheostomy. This is comparable to a study by Sahu et al in which tracheostomy was found as a cause for dysphagia in more than 7% of cases.[11]

In our study, 76% of histopathological examinations showed squamous cell carcinoma followed by adenocarcinoma in 8.6% of cases. In the study on endoscopic evaluation of patients with dysphagia by Sahu et al 79% of carcinoma cases were found to be squamous cell carcinomas.[11] In the study by Swaminathan et al 95.3% of HPE with malignant causes of dysphagia was squamous cell carcinoma.[12]

In a study on endoscopic findings in patients presenting with oesophageal dysphagia by Khan et al it was concluded that evaluation of dysphagia remains incomplete without upper GI endoscopy.[14] It should be considered at the earliest, especially in elderly males having dysphagia of medium to long term duration to diagnose treatable conditions at earliest. Similarly, in our study, among 29 patients who could not be diagnosed with nasopharyngo-laryngoscopy, upper GI endoscopy proved to be useful in finding and confirming the diagnosis.

Thus, dysphagia needs in depth assessment with regard to quality of life and grading of severity. Effective therapy needs to be appropriated to alleviate dysphagia which involves multimodal management with medications or surgery and also compensatory strategies and swallowing exercises individualized for each patient. Dysphagia definitely needs to be diagnosed early with newer and faster modes of investigations which are now available for efficient management.

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