

REVIEW

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Esophageal motility abnormalities in Egyptian patients using high resolution esophageal manometry: a descriptive study

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Abstract

Background and aim: For many years, esophageal manometry has been used for assessment of upper gastro-intestinal (GI) symptoms. Chicago classification is the key for diagnosis and managing motility disorders as it is considered as a standardized approach for categorization of esophageal abnormalities. The aim of this study is to analyze types of esophageal motility findings in Egyptian cases who were suffering from upper GI complaints. Methods: This descriptive study included 378 subjects who were suffering from upper GI complaints as dysphagia, vomiting, chest pain and regurgitation in the period between 10/2015–7/2020. Esophageal HRM study was performed for all patients (MMS Laborie device). The catheter was positioned and confirmed passing across the EGJ (esophago-gastric junction) using landmarks. Swallows and resting status were recorded. Anatomical landmarks were placed.

Results: Most of the patients were complaining of upper GI symptoms. Males were 49.2% of cases. Mean age was 41.3. Dysphagia was the prominent symptom while chest pain was the least symptom. Many manometry findings were observed including ineffective motility, achalasia, absent contractility, EGJ outflow obstruction, jackhammer esophagus and normal findings. Type II achalasia was the dominant type in achalasia patients while Type III was the least. LES was normotensive in most of the cases. Hiatus hernia (HH) was detected in 40.2% of the cases.

Conclusion: This is considered the first Egyptian descriptive study to determine the prevalence of esophageal motility abnormalities in Egyptian patients complaining of upper GI symptoms. HRM is very important for patients complaining of upper GI symptoms.

Keywords: Manometry, Motility, Esophageal topography, Achalasia

Background

Esophageal manometry is an evaluation of the pressure pattern which resulted from contractions of the esophageal muscles [1]. Chest pain and dysphagia are common esophageal dysmotility manifestations [2]. Esophageal manometry is the cornerstone for assessment of esophageal motor functions as it helps in evaluation of esophageal peristalsis by measuring the pattern, force, and time taken by each swallow [3].

For clinical purposes, it can be used to define the characteristics of the esophageal contractions in order to identify pathological conditions [4]. For many years, esophageal manometry has been used for assessment of cases with upper GI complaints as dysphagia [5].

The combination of pressure topography plotting and high-resolution manometry resulted in the appearance of esophageal pressure topography (EPT) which is widely used for esophageal motility clinical evaluation due to its high resolution form [6].

HRM has more advantages than conventional manometry such as close spacing of the sensors (reaching 1 cm intervals), higher spatial resolution, more details of esophageal motility and easy interpretation of

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the findings owing to the colored spatiotemporal plot instead of traditional lines [7].

Objective analysis can be provided by Chicago classification for HRM metrics and topography [8]. It is the cornerstone for diagnosis and hence managing motility disorders as it is considered as a standardized approach for esophageal abnormalities [9].

By using Chicago classification, HRM has superior inter-rater agreement with high accuracy in reaching the diagnosis even for non-experts [10, 11] and is easier to learn [12].

The aim of this study is to analyze types of esophageal motility findings in Egyptian patients who were suffering from upper GI complaints.

Methods

This descriptive study included data from patients' records who cannot be re-contacted. It included 378 cases who were suffering from upper GI complaints as dysphagia, vomiting, chest pain and regurgitation from many areas in Egypt in the period between 10/2015–7/2020.

The study was approved by the Ethical Review Board of Ain Shams university (Reference number: FMASU R 176/2021). The study protocol conforms to the ethical guidelines of 1975 Declaration of Helsinki as reflected in a prior approval by the institution's human research committee.

Esophageal HRM study was performed for all patients (MMS Laborie device) after a 6–8 h fasting period. Patients were also informed to stop for a minimum of 72 h before the procedure any anticholinergic drugs, nitrates, calcium channel blockers and prokinetic drugs. A water state HRM catheter was used with 24 pressure channels.

Before insertion of the catheter, the catheter was adjusted to zero to the atmospheric pressure then it was placed trans-nasally while the patient was sitting down, and the catheter was positioned to record from the UES to the stomach.

Then patients were advised to lie flat and the position of the catheter was confirmed passing across the EGJ using landmarks and instructed the patient to take a deep breath to ensure that the catheter has reached the stomach.

First, participants were asked to stop swallowing for 30–60 s (baseline recordings of LES pressure) and then participants were asked to repeat swallowing 5 ml water, at a minimum of 20 s intervals between each swallow.

Anatomical landmarks were placed as UES, transition zone, LES, PIP and gastric marks.

Statistical analysis

After completion of the procedure, automatic landmarks were revised and adjusted manually if an error was seen then analysis of the data recorded was done according to the Chicago classification v2.0 because it was the available software during that period.

LES was assessed by using IRP 4 s (integrated relaxation pressure) which was calculated by measuring the mean of the lowest LES pressure over 4 s which was measured in the 10 s interval after UES relaxation window. IRP 4 s was considered high if it was ≥ 15 mmHg. Evidence of HH was observed in cases of double humped LES.

Properties of the contraction in the esophagus were assessed using the DCI (distal contractile integral) which was calculated by multiplication of the swallow duration by esophageal smooth muscles length by pressure amplitude which was more than 20 mmHg for assessing the occurrence of failed and weak contractions.

Data management and analysis

Data were collected and analyzed on computer using SPSS package version number 20. Quantitative data were tested for normality with Shapiro-Wilk test and described as mean, standard deviation (SD). Qualitative data were analyzed in the form of frequencies (n) and percentage (%). Chi-square describe the association between qualitative variables. P -value ≤ 0.05 was considered significant.

Results

This descriptive study included 378 patients who were complaining of upper GI symptoms. Males were 49.2% of cases. Age was widely ranging from 11 to 81 years old with mean age 41.3.

Upper GI symptoms were noticed in 98% of the patients. Dysphagia was the prominent symptom (41.3%) while chest pain was the least symptom (3.7%). Minority of patients (1.8%) were asymptomatic but manometry was done either preoperatively before or after an intervention (Table 1).

Many manometry findings were observed including ineffective motility (28%), achalasia (20.9%), absent contractility (12.7%), EGJ outflow obstruction (6.3%), jackhammer esophagus (0.8%) while normal findings (31.2%) were also noticed (Fig. 1).

Our study revealed that the dominant type of achalasia in our patients was Type II while the least one was Type III (63.3% versus 6.3% of the patients).

LES was normotensive in most of the cases. Hiatus hernia was detected in 40.2% of the cases (Table 2).

Table 1 Descriptive analysis of personal characteristics of study cases

		Mean	±SD	Minimum	Maximum
Age		41.38	13.66	11.00	81.00
Sex	Male	186	49.2%		
	Female	192	50.8%		
Indication	Dysphagia	156	41.3%		
	Heart burn	95	25.1%		
	Regurge	65	17.2%		
	Vomiting	41	10.8%		
	Chest pain	14	3.7%		
	postoperative	5	1.4%		
	Preoperative	2	0.5%		

SD standard deviation

Discussion

This is the first study to discuss manometry findings in Egyptian population using high resolution topography. A total of 378 patients underwent high resolution esophageal manometry with wide range of age.

Most of the patients were complaining of upper GI symptoms. Dysphagia was the prominent symptom while chest pain was the least symptom. Seven patients were asymptomatic but manometry was done either preoperatively before or after an intervention (Table 1). Hiatus hernia (HH) was detected in 40.2% of the cases.

Many manometry findings were observed including ineffective motility, achalasia, absent contractility, EGJ outflow obstruction, jackhammer esophagus and normal findings. The most common was ineffective motility followed by achalasia. While the least was jackhammer esophagus. Type II achalasia was the dominant type in achalasia patients while Type III was the least.

Achalasia was described as a common symptom by Rehman et al. [13] (35.6% of 202 patients) and Cisternas et al. [14] (31.2% of 426 patients).

In agreement with Serrano et al. who observed that 45% of the patients in the study were females and 55% were males, with a mean age of 61.5 ± 16.2 yrs. (range 20–87 years old). Many cases presented mainly by dysphagia (85% of cases) with some patients complained of reflux (45% of cases) (n = 31), chest pain (23% of cases)

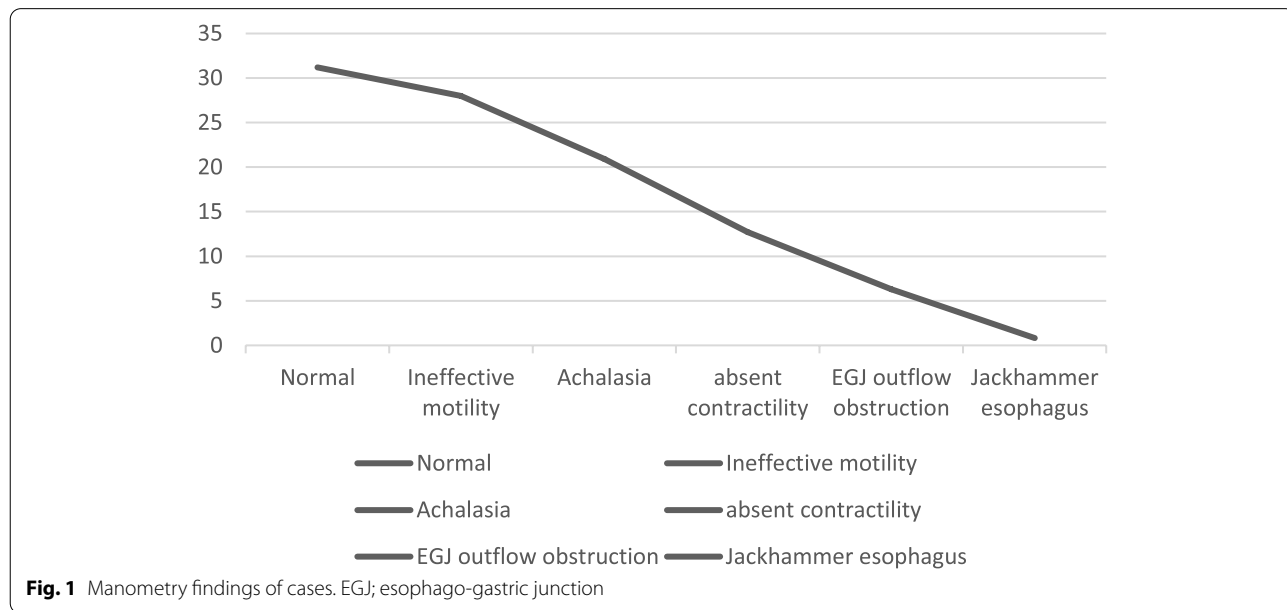


Fig. 1 Manometry findings of cases. EGJ; esophago-gastric junction

Table 2 Relation between sex and HH

		Sex				P*	Sig
		Male		Female			
		n	%	n	%		
Hiatus Hernia	No	115	61.8%	111	57.8%	0.426	NS
	Yes	71	38.2%	81	42.2%		

HH hiatus hernia, NS Non-significant

($n=13$), heartburn (13% of cases) ($n=9$), weight loss (6% of cases) ($n=4$) and cough (4% of cases) ($n=3$) [15].

Serrano et al. observed 51 achalasia cases (30 cases were type II, 9 were type I and 12 were type III). Six cases were jackhammer esophagus, eight cases were DES and five were esophago-gastric junction outflow obstruction [15].

In parallel to a study done at Barnes Hospital, St. Louis, Missouri, in the period between 1980 and 1982. Patients were referred for esophageal manometry. Patients, who were presented with chest pain, were evaluated (34% of the patients), dysphagia (43% of the patients), and heartburn (7% of the patients). Few patients (9%) were referred to confirm or to exclude diagnosis of achalasia, and few (7%) were referred for miscellaneous causes [16].

Maziak et al. studied preoperative esophageal motility in patients with paraesophageal hiatus hernia. Common symptoms were recorded as reflux symptoms (80% of cases), postprandial pain (56% of the cases) and heart burn (in 31% of cases). Indicators of severe reflux disease were observed as hypotensive LES (in 51% of cases), and ineffective distal esophageal peristalsis (in 59% of patients) [17].

Nottingham University Hospitals developed a study included patients with esophageal symptoms using a development study while a validation study was done at University Hospital Zürich (Switzerland). Many patients (48%) were complaining of dysphagia while others (52%) were complaining of reflux or other symptoms. The validation study included 221 patients, 44% of them had dysphagia and 56% had symptoms of reflux [18].

Kahrilas et al. described the result of a pressure topography patterns via systematic analysis in 475 cases. Many findings were observed including aperistalsis (29 cases), achalasia (73 cases) and distal esophageal spasm (6 cases) [19].

Sixty-eight patients with GERD completed a study cohort. They included normal peristalsis (38 cases) and minor peristaltic disorders (30), mainly IEM. Many symptoms were recorded including regurgitation, chest pain, heart burn, dysphagia and other non-specific as (cough and hoarseness of voice). Regurgitation was the commonest symptom (68.4% of cases in the normal motility group versus 87% of cases in the minor motility disorders) [20].

Conclusions

This is considered the first descriptive study to observe and describe different esophageal motility findings in Egyptian cases who were suffering from upper GI complaints. HRM is very important for cases suffering from upper GI symptoms.

Abbreviations

GI: Gastro-intestinal; HRM: High resolution manometry; EGJ: Esophago-gastric junction; EPT: Esophageal pressure topography; LES: Lower esophageal sphincter; UES: Upper esophageal sphincter; PIP: Pressure inversion point; IRP: Integrated relaxation pressure; DCI: Distal contractile integral; SD: Standard deviation; GERD: Gastro-esophageal reflux disease; IEM: Ineffective esophageal motility.

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None.

Authors' contributions

GGN: conceptualization/ performing the procedure/ data collection/ revision of the manuscript. MHF: Data analysis / writing the manuscript/ revision of the manuscript. AIE: Data analysis / writing the manuscript/ revision of the manuscript. MGN: Data analysis/ writing the manuscript/ revision of the manuscript. All authors shared in finalization of the manuscript till it reached its final stage.

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Availability of data and materials

The datasets used and analyzed during the current study are available from corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Ethical Review Board of Ain Shams university (Reference number: FMASU R 176/2021). The study protocol conforms to the ethical guidelines of 1975 Declaration of Helsinki as reflected in a prior approval by the institution's human research committee. This descriptive study is a retrospective study which included data from patients' records who cannot be re-contacted.

Consent for publication

Not Applicable.

Competing interests

All authors declare that they have no competing interests.

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