# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-3933.ijam20175185

# Clinical and manometric profile of patients with GERD in a tertiary care hospital

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Received: 08 September 2017 Accepted: 31 October 2017

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# ABSTRACT

**Background:** Abnormal esophageal motility and low Lower Esophageal Pressure (LES) play an integral role among various etiologies implicated in pathogenesis and severity of Gastro Esophageal Reflux Disease (GERD). Delayed clearance of refluxate leads to prolonged mucosal exposure to gastro duodenal contents which promotes esophagitis and its complications. To find out the association of ineffective esophageal motility (IEM) and low Lower Esophageal Sphincter (LES) pressure with endoscopic esophagitis in patients presenting with symptoms of GERD. Settings and designs: Prospective cross sectional study done in a tertiary medical care center in south India from October 2016 to March 2017.

**Methods:** This cross sectional study was carried out among patients presenting with symptoms of GERD (heart burn and regurgitation,) at least twice per week for past three months. Based on their endoscopy findings patients with GERD are grouped into two having erosive and nonerosive reflux disease. After general and systemic clinical examination, High resolution Manometry was performed, and data was analyzed using Trace 1.2.3a V software. Statistical methods: Data was analysed using SPSS version 19. Chi square test was used to analyze categorical variables and independent 't' test was used for continuous variables.

**Results:** A total of 66 patients with GERD symptoms were subjected to esophageal manometry. Out of these 66 patients 42 were males and 22 were females with their mean age  $40.82\pm12.86$  years. Among 66 patients presented with GERD symptoms 26.7% were found to have ineffective esophageal motility and only 11.7% had low LES pressure. Ineffective esophageal motility was also found to be more common among older age group individuals with their mean age being 44.64 ±14.154. Among the patients with erosive reflux disease (70.21%), 66.7% had low LES pressure and 75 % had IEM; the association was not statistically significant.

**Conclusions:** The incidence of Ineffective esophageal motility in patients with GERD is found to be higher than that of low LES pressure. There was no significant association observed between IEM and low LES pressure with endoscopic esophagitis in patients with GERD.

Keywords: Chicago classification, Hypotensive sphincter, High Resolution Manometry, Ineffective peristalsis

#### **INTRODUCTION**

Globally Gastro Esophageal Reflux Disease (GERD) remains a highly prevalent disease with considerable

geographic variation; estimated prevalence rate was found to be 18.1-27.8% in US and 8.8-25.9% in Europe, and less than 10% in Asian countries.<sup>1</sup> GERD causes significant pain and discomfort which compromise patients' quality of living. It is considered as major risk factor for the occurrence of Barrett's oesophagus and oesophageal adenocarcinoma.<sup>2,3</sup>

Among multiple causes which constitute the pathogenesis of GERD abnormal esophageal motility plays a crucial role and also associated with disease progression and severity.<sup>4</sup> Delayed clearance of the refluxate leads to prolonged mucosal exposure to refluxed gastro duodenal contents which in turn promotes esophagitis and its complications. Prevalence of ineffective esophageal peristalsis was found to be 40-50% among GERD patients.<sup>5</sup>

Moreover, pattern of esophageal motility was found to be different in various sub classes of GERD patients. Abnormal motility pattern and low LES pressure observed in GERD patients are more likely to be related to endoscopic esophagitis. Esophageal High-Resolution Manometry (HRM) an advanced technique which gives a picture of change in intraluminal pressure from upper esophageal sphincter to lower one as well as motor activity of the esophagus while swallowing.<sup>6</sup>

Further studies are warranted to elucidate the role of dysmotility in patients with reflux disease. Hence, we proposed this study to find out the association of ineffective esophageal motility and low basal Lower Esophageal Sphincter (LES) pressure with their endoscopic findings in patients with GERD using High Resolution Manometry, which is the gold standard investigation to diagnose and evaluate esophageal motility disorders using new Chicago classification.

### **METHODS**

This prospective cross sectional study was conducted among 66 patients of both sexes after obtaining ethical clearance from institutional human ethical committee. Study was conducted during the October 2016-March 2017 for duration of six months. Study participants belonged to the age group ranging from 20-65 years. Patients presented with symptoms of GERD (heart burn or acid regurgitation) at least twice a week for more than 3 months were included in the study after obtaining their informed consent. Patients with achalasia, esophageal or fundic varices, previous gastric or esophageal surgery, esophageal cancer, collagen diseases or previous ingestion of corrosive agents, acute cardiovascular, respiratory, digestive tract or metabolic diseases were excluded from the study.

Patients were asked to discontinue drugs such as nitrates and calcium-channel blockers which affect esophageal motor function 48hours before the manometry. Patients on proton pump inhibitors also were to ask with hold the drug for three weeks. Based on their endoscopic findings patients were categorized into two groups with erosive reflux disease and non-erosive reflux disease. After general and systemic clinical examination manometry was performed 2hours after endoscopy. Manometry was performed with a 16-channel water perfused catheter which has 8 channels placed 1 cm apart at the lower end and the remaining 8 channels were placed 3cm apart (Manufactured by RMH, Victoria, Australia. The data were analyzed using Trace 1.2.3a V software (Geoff Hebbard, Royal Melbourne Hospital, Victoria, Australia).

# Manometry procedure

The manometry catheter was introduced by transnasal route. Basal LES pressure was recorded for 1 minute, which is followed by ten 5 ml wet swallows at an interval of 30seconds. 10 wet swallow frames show upper and lower esophageal sphincter relaxation and contraction of esophageal body is represented as isobaric color contour plot. Spatial and temporal analysis of esophageal motor events was made. Tests swallows are characterized based on HRM data using recently evolved Chicago classification.<sup>7</sup> According to Chicago classification it is considered as ineffective esophageal motility, when >50% of swallows are ineffective, that is either failed (DCI\* <100 mmHg.cm.sec) or weak (DCI 100-450 mmHg.cm.sec).<sup>8</sup>

\*DCI- Distal Contractile Integral- measure of how robust peristalsis is in the smooth muscle of esophagus

### Analysis

Data was entered in excel sheet and analyzed using SPSS software version 19. Data was expressed as mean (SD) values for quantitative variables and percentages for continuous variables. Chi square test was used to analyze categorical variables and independent 't' test was used for continuous variables.

### RESULTS

A total of 66 patients with GERD symptoms were subjected to endoscopy and esophageal manometry. Out of these 66 patients 42 were males and 22 were females with their mean age  $40.82\pm12.86$ . Four of the patients had hiatus hernia. Their clinical presentations were heart burn (48.8%), acid regurgitation (30.2%) chest pain (16.3%) and vomiting and nausea (4.7%). Among 66 patients presented with GERD symptoms 26.7% were found to have ineffective esophageal motility and only 11.7% had low LES pressure. 6% of patients with GERD had both low LES pressure and ineffective esophageal motility. Among 18 patients with ineffective esophageal peristalsis 38.8% had failed peristalsis and 61.1% had weak peristalsis. Ineffective esophageal motility was also found to be more common among older age group individuals with their mean age being 44.64±14.154. On upper GI endoscopy 48 patients had erosive reflux disease and 18 patients had non-erosive reflux disease. In the sub group of patients with erosive reflux disease, 66.7% had low LES pressure and 75 % had IEM and the association was not statistically significant (Table 1).

Manometric profile	Endoscopic findings		n Voluo
	Non-erosive reflux disease	Erosive reflux disease	p-value
Normal lower esophageal sphincter pressure (%)	16 (26.7)	44(73.3)	0.727
Low Lower esophageal sphincter pressure (%)	2(33.3)	4(66.7)	
Normal esophageal motility (%)	13(28.3)	33(71.7)	0.785
Ineffective esophageal motility (%)	5 (25)	15(75)	

Table 1: Association between manometric profile and endoscopic findings.

#### DISCUSSION

Low basal pressure of LES along with low amplitude and ineffective peristaltic waves in the distal esophagus was found to be a more common finding in patients with GERD.<sup>9</sup> In our present study ineffective esophageal motility was found to be higher when compared to low basal LES pressure. Kruse-Anderson et al also had observed increased fewer and low amplitude propagative peristalsis among patients with esophagitis when compared to controls.<sup>10</sup>

Abnormal Esophago Gastric Junction (EGJ), Transient Lower Esophageal Sphincter Relaxations (TLESRs), hypotensive Lower Esophageal Sphincter (LES), anatomic distortion of EGJ and ineffective esophageal peristalsis are found to be the major contributing factors for reflux of gastric contents into the esophagus. We found that ineffective esophageal motility was found to be the more significant abnormality found among GERD patients than low LES pressure as esophageal peristalsis is an important anti reflux mechanism which governs the clearance of refluxed gastric contents. Savarino et al also stated that abnormally low LES pressure, IEM, and hiatus hernia were found to be more prevalent in GERD patients than patients with functional heart burn and healthy controls.<sup>11</sup> Several studies had reported that GERD and its complications are more commonly observed in scleroderma patients, with failed or absent peristalsis which proved the role of esophageal clearance in the development of GERD.12,13

It was reported in recent studies that there occurs impairment of esophageal function such as reflux or dysphagia was found to be more prevalent among older individuals which starts from 40 years onwards.<sup>14</sup> In our study we observed increased incidence of ineffective esophageal motility in older patients with GERD. Gutschow et al in his study conducted among patients with reflux symptoms with and without GERD reported that there was significant decrease in peristaltic function in older patients.<sup>15</sup>

In our study low, LES pressure was found to be reported higher among patients with erosive reflux disease than in patients with Non-erosive reflux disease. Frazzoni et al in a comparative study conducted among GERD patients had observed lower mean LES pressure in patients with erosive and non-erosive reflux disease compared to controls.<sup>16</sup> Both LES pressure and peristaltic abnormality was found to be affected in reflux esophagitis. Somani et al also in this study described that severity of endoscopic esophagitis is inversely related with amplitudes of contraction in the distal esophagus.<sup>17</sup> In our present study ineffective esophageal motility was found to be reported more among patients with erosive reflux disease when compared to non-erosive reflux disease. Daum et al found peristaltic dysfunction in 56% of Non-Erosive Reflux Disease (NERD) and 76% of Erosive Reflux Disease (ERD), they also had observed that esophageal motility disorder was reported higher in GERD patients using HRM than with conventional manometry.<sup>18</sup> In contrast Lemme et al reported that there was no difference observed in the prevalence of IEM among non-erosive (38%) and erosive (38%) GERD patients.<sup>19</sup> Simren et al, also suggested that IEM had little influence on esophageal clearance during upright acid reflux and only severe esophageal motility disturbances, were associated with prolonged esophageal clearance in those with supine reflux.<sup>20</sup>

#### CONCLUSION

Ineffective esophageal motility was found to be higher than low basal LES pressure in patients with GERD. There was no significant association observed between IEM and low LES pressure in patients with endoscopic esophagitis. Hypotensive sphincter and Ineffective esophageal motility may be the cause for GERD and may not always associated with esophagitis.

Funding: No funding sources Conflict of interest: None declared Ethical approval: The study was approved by the institutional ethics committee

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**Cite this article as:** Deepalakshmi K, Vasanthi R, Venkatakrishnan L, Karthikeyan S. Clinical and manometric profile of patients with GERD in a tertiary care hospital. Int J Adv Med 2017;4:1658-61.