

# Analysis of Oesophagogastroduodenoscopy Findings in Patients of Dyspepsia - A Retrospective Study in Coastal Region of Karnataka

Anand Hanumaiah<sup>1</sup>, Savita K. Sridhar<sup>2</sup>

<sup>1, 2</sup> Department of General Surgery, Karwar Institute of Medical Sciences, Karwar, Karnataka, India.

## ABSTRACT

### BACKGROUND

Dyspepsia is a term used to describe a number of symptoms thought to originate from the upper gastrointestinal tract. It may be caused by a variety of conditions such as peptic ulcer disease, gastro-oesophageal reflux, or even malignancy. Sometimes, dyspepsia is deemed to be functional. Endoscopy helps in differentiating these upper gastro-intestinal (GI) conditions. The objectives of this study were to determine the gastrointestinal findings in patients presenting with dyspepsia in our centre and compare them with those of other studies.

### METHODS

This is a retrospective study of 100 consecutive patients who had undergone upper GI endoscopy for symptoms of dyspepsia from endoscopy data base at Karwar Institute of Medical Sciences, Department of Surgery, from January 2018 to March 2020.

### RESULTS

Out of the total 100 patients who underwent upper GI endoscopy in our institution, 60 were males and 40 were females; youngest was aged 18 years and the oldest was 80 years old. 87 patients had abnormal findings and among these, 29 patients had finding in oesophagus, 54 in the stomach and 04 in the duodenum. A total of 13 patients were reported to be normal.

### CONCLUSIONS

Dyspepsia is much common in males than females. Gastritis is the most common finding on endoscopy followed by oesophagitis and duodenitis other than reflux disorders. Along with proper history and physical examination, endoscopy helps in identifying serious pathologies like malignancy at earlier stage thus reducing morbidity and mortality. Endoscopy is the 'gold standard test' for patients with upper gastrointestinal symptoms.

### KEYWORDS

Dyspepsia, Upper GI Endoscopy, Gastritis

*Corresponding Author:*

*Dr. Anand Hanumaiah,  
# 1760, 6th Main, D - Block,  
2nd Stage, Rajajinagar,  
Bengaluru - 560010, Karnataka, India.  
E-mail: docanandh@yahoo.com*

*DOI: 10.18410/jebmh/2021/317*

*How to Cite This Article:*

*Hanumaiah A, Sridhar SK. Analysis of oesophagogastroduodenoscopy findings in patients of dyspepsia - a retrospective study in coastal region of Karnataka. J Evid Based Med Healthc 2021;8(21):1679-1684. DOI: 10.18410/jebmh/2021/317*

*Submission 05-02-2021,  
Peer Review 13-02-2021,  
Acceptance 05-04-2021,  
Published 24-05-2021.*

*Copyright © 2021 Anand Hanumaiah et al. This is an open access article distributed under Creative Commons Attribution License [Attribution 4.0 International (CC BY 4.0)]*

## BACKGROUND

Dyspepsia is derived from the Greek words 'dys' and 'pepse' and literally means "difficult digestion". The disease burden leads to impairment in quality of life and considerable healthcare costs. It encompasses a variety of symptoms that may cause intermittent or persistent abdominal discomfort or pain attributable to upper gastrointestinal tract.<sup>1</sup> Hence a vast number of patients are referred frequently to general surgeons for these complaints. The symptoms include epigastric discomfort, early satiety, bloating, anorexia, nausea, belching / regurgitation and heart burn.<sup>2</sup>

As per Rome III criteria, patient is said to have dyspepsia when patient has one or more of the following three symptoms (1) Post prandial fullness (2) Early satiety (3) Epigastric pain/burning three months within the initial six months of symptoms onset.<sup>3</sup> Gastroesophageal reflux disease (GERD), biliary tract diseases, malignancies, pancreatitis, peptic ulcer disease and others also have similar symptoms.<sup>2</sup> Hence, symptomatology tends to be non-specific poorly correlating with organic pathology.<sup>4</sup>

The alarm features for dyspeptic patients include age more than or equal to 50 years, history of having a first – degree relative with upper gastrointestinal malignancy, complaints of GI bleeding and history of unintended weight loss. Onset of symptoms of dysphagia, odynophagia, persistent vomiting or blood investigation suggestive of iron deficiency anemia, abnormal imaging suggesting organic disease.<sup>2</sup>

Patients who are below 50 years of age and without alarm features have a low risk of malignancy hence such patients can be evaluated by any of the following three methods: First method is the "test and treat" approach – this involves checking for *H. pylori* using a non-invasive test and then treating the patient if the test comes positive. Second method is to start the patient on a trial of acid suppressants. Third method involves straight away evaluating the patients by upper GI endoscopy. However, its worthy to note that a large, randomized study has been done comparing "test and treat" with initial endoscopy and its been found that there was no significant difference in the two groups at one year.<sup>2</sup>

In many patients wherein investigations and clinical assessment fails to establish any abnormality to which the symptoms can be reasonably attributed these patients are labeled as having 'functional dyspepsia', which is generally accepted as the converse of 'organic dyspepsia' denoting dyspepsia for which a disease process has not been identified.<sup>1</sup> Patients who are suspected of having functional dyspepsia are difficult to treat but various treatment options are available for such patients which include immediate stopping of non-steroidal anti-inflammatory drugs, counseling on life-style changes, advise on consuming a healthy diet, starting a trial of anti-spasmodic drugs, prokinetic agents. If symptoms are still not responding, patient may need to be started on tricyclic antidepressants, selective serotonin reuptake inhibitors, and cognitive behavior therapy<sup>2</sup> with the help of a psychiatrist.

Upper GI scopy is a very, quick, and well-tolerated procedure which provides both an in-depth visual

assessment of G.I mucosa as well as allowing for sampling of tissues, which can be further assessed by a pathologist.<sup>5</sup>

The first gastroscopy in 1868 is credited to Kussmaul.<sup>6</sup> This later was followed in 1920's by the conceptualization of image transmission using flexible quartz fibers a concept used by Hopkins in 1954 to build a model of a flexible fibre imaging device,<sup>7</sup> the precursor of fibre optic endoscope. Since then endoscopes and endoscopy have undergone technical developments to the current new dimension in imaging of endoscopic ultrasonography (EUS) by combining ultrasonography and endoscopy.<sup>8</sup>

Surgeons/physicians performing an upper gastrointestinal series (UGI) scopy procedure require adequate knowledge and training to develop the skills. During endoscopy, patient is usually placed in left lateral decubitus position (some cases patient may be supine) and usually is done by a single person (operator) either standing / sitting (standing / sitting method) in front of the patient. Basic skills involves maneuvers like deflecting the tip of the scope to different angles, pushing in and pulling back, insufflating air and suctioning it. Among advanced maneuver, one has to acquire skills such as making paradoxical movements, making a J-turn and the U-turn. Finally the intubation technique where in one has to safely push the scope through oral cavity, pharynx (larynx and vocal cords can be noted simultaneously during entry and exit of the scope), and then travel through all three levels of oesophagus – upper, middle, and the lower to reach the oesophagogastric junction. Once it enters stomach, the body, antrum and fundus should be visualized before making final maneuver to reach in to 1st and 2<sup>nd</sup> part of duodenum.<sup>9</sup>

Propofol usage during endoscopy for sedation helps in preventing vomiting and also it relaxes the upper oesophageal sphincter. Propofol whether used singly or in combination helps in successful penetration of distal tip of the scope in to esophagus.<sup>10</sup> When endoscope is in second part of duodenum it is desirable to look for ampulla of Vater and captures its images. However, because the endoscope used is a forward viewing endoscope and not a side-viewing endoscope this is not always possible.<sup>11</sup> There are few adverse events that are reported with diagnostic UGI scopy. Some are minor while few are major incidents. Minor incidents includes fluctuating oxygen saturation and heart rate, major incidents are aspiration pneumonia, respiratory arrest, shock and myocardial infarction.

Risk factors for cardiopulmonary complications which are patient related include previous history of cardiopulmonary diseases, advanced age, American society of Anesthesiologists (ASA) Class III or higher and an increased modified Goldman score.<sup>12,13</sup> One of the major complications of UGI scopy is perforation which is most likely to occur in presence of an anterior cervical osteophyte and Zenker's diverticulum. Other patients at high risk for perforation during endoscopy include, patients with oesophageal strictures and duodenal diverticula.<sup>14,15</sup> Bleeding can occur during UGI scopy but rarely it is significant.<sup>16</sup> Even Mallory-weiss tear which occurs in less than 0.5% of cases do not cause a significant bleed.<sup>17</sup> However, tendency to bleed during diagnostic UGI scopy is seen in patients with thrombocytopenia and / or coagulopathy.<sup>18</sup> Minimal

threshold platelet count for performance of diagnostic UGI endoscopy has not been established.

*H. pylori* infection which is common human bacterial pathogen is easily transmissible and mainly manifests in stomach and duodenum. In the stomach, it ranges from simple gastritis, gastric ulcer and gastric atrophy to primary gastric B-cell lymphoma and gastric adenocarcinoma. In the duodenum, it causes ulcers. Patients may also present with iron deficiency anaemia and vitamin B12 deficiency.<sup>19-22</sup> The risk of *H. pylori* infection is inversely related to the overall sanitary conditions. In rural India, contamination of water is the primary mode of transmission of *H. pylori* and mostly infection occurs during childhood.<sup>23,24</sup> Patients can get infected for the first time or get re-infected post eradication of *H. pylori* after a UGI scopy procedure if high-level disinfection is not done to all of the endoscopic equipments and its accessories. Accessories which can spread the infection include biopsy forceps, water bottles, connecting tubes and rubber ports. Oral brush culture is a minimally invasive technique which would be ideal for obtaining culture specimens for susceptibility testing in India.<sup>25</sup>

In most cases, gastroscopes of a standard size of 10 mm diameter having an instrument channel of 2.8 mm can be utilized. But for children with weight below 10 kg endoscopes smaller than 6 mm should be used routinely. For cases with severe acute upper GI bleeding gastroscopes with operating channel measuring 3.8 - 4.2 mm is ideal. To screen for pre-malignant gastric or duodenal lesions, high-definition gastroscopes with optical zoom should be available. Certain accessories are required during endoscopy for tissue sampling and for retrieving of foreign bodies. For sampling, biopsy forceps standard and jumbo should be available. While for retrieving foreign body, we may need rat tooth forceps, alligator forceps or retrieval nets. Other accessories such as polypectomy snares, overtubes of esophageal and gastric lengths, a foreign body protector hood should also be available. If additional therapeutic procedure are planned as per plan more equipments should be kept ready.<sup>26</sup>

Most patients will be on one or multiple drugs for various co-morbidities, these drugs can be given to patients with sip of water while fasting for endoscopy, but however patient with diabetes need their drugs to be adjusted accordingly. For patients on antithrombotic agents who are planned for endoscopy American society for gastrointestinal endoscopy (ASGE) guidelines need to be followed for decision making,<sup>27</sup> even for at risk patients undergoing endoscopy antibiotic prophylaxis agents ASGE guidelines would help.<sup>28</sup> All patients undergoing elective UGI scopy need to be kept fasting. As per American Society for Anesthesiologists guidelines, a patient who has had clear liquids should fast for at least couple of hours (2hrs) before endoscopy and patients who has had light meals should be kept fasting for minimum six hours. In emergencies and in patients whose gastric emptying is delayed, there is a risk of aspiration of gastric contents while doing endoscopy. Such complications can be avoided by adjusting level of sedation, planning intubation to protect the airway or where suitable delaying the procedure.<sup>26</sup>

Newer technology such as endosonography, endoscopic sewing, and the endoscopic videocapsule are now becoming available for future use widening the frontiers of endoscopy. The current retrospective study is intended to study the disease pattern. Thereby, helping to plan early OGD scopy for patients at high risk, while avoiding unnecessary intervention on patients with non-specific symptoms. All the 100 endoscopies were performed by both the authors. We intend to study the oesphagogastrroduodenal endoscopy findings in patients who had undergone OGD scopy for evaluation of dyspepsia.

### Objectives

1. To determine the upper gastrointestinal endoscopic findings in patients presenting with dyspepsia, and compare with previous studies.
2. To detect upper GI malignancy at an early stage.

## METHODS

After an approval from institutional ethics committee with IEC No. IEC / KRIMS / 27 / 2019 - 20, a retrospective study was conducted on 100 consecutive patients who had undergone upper GI endoscopy for symptoms of dyspepsia, the required details regarding the patients was collected from endoscopy database of Department of Surgery, Karwar Institute of Medical Sciences and the data considered was from January 2018 to March 2020. Both male and female patients aged more than 18 years were included in the study. Patients undergoing repeat endoscopy were excluded from the study.

### Statistical Analysis

All the available data was entered in MS Excel and descriptive statistics in terms of numbers and percentage was obtained.

## RESULTS

Of the 100 patients included in the study, 60 were male (60 %) and 40 were female (40 %). Male to female ratio was 3 : 2 (Table -1). The most common age group in the study was found to be between 31 - 40 years. The minimum age was 18 years and maximum age was 80 years (Table -2). The endoscopic findings were gastritis in 37 patients (37 %) followed by normal findings in 13 patients (13 %), 10 patients (10 %) were noted to have gastritis, 8 patients (8 %) had oesophagitis, GERD were noted in 6 patients (6 %), while gastric erosions had occurred in 04 patients (4 %). Duodenitis, hiatus hernia and candidiasis were noted in 03 patients each (3 %). Esophageal varices, esophageal ulcers, lax LES, gastric ulcers and carcinoma of esophagus were noted in two patients each (2 %). Other lesions noted in 1 % of patients included duodenal ulcer (01), Barrett's esophagus (01) and carcinoma of stomach (01) (Table -3).

Our observation shows a male preponderance similar to other studies, probably attributed to increasing consumption of alcohol, smoking and tobacco which plays a key role in pathogenesis of dyspepsia. Following findings were noted in 100 consecutive patients who underwent upper GI scopy in our institution are tabulated as under.

Dyspepsia Symptom	No. of Cases	Percentage
Males	60	60 %
Females	40	40 %
<b>Total</b>	<b>100</b>	

**Table 1. Distribution of Cases of Dyspepsia Among Males and Females**

Age (years)	No. of Cases (100)	Percentage %
18-30	17	17 %
31-40	21	21 %
41-50	16	16 %
51-60	18	18 %
61-70	19	19 %
71-80	09	09 %

**Table 2. Age Distribution**

Anatomical Location	Diagnosis	Number of Cases (N)	Percentage (%)
Oesophagus	Normal	13	13 %
	Oesophagitis	08	08 %
	GERD	06	06 %
	Candidiasis	03	03 %
	Hernia	03	03 %
	Varices	02	02 %
	Oesophageal ulcer	02	02 %
	Barett's esophagus	01	01 %
	Carcinoma esophagus	02	02 %
	Lax LES	02	02 %
Stomach	Gastritis (antral, body, fundal)	37	37 %
	Pan gastritis	10	10 %
	Gastric erosions	04	04 %
	Gastric ulcer	02	02 %
	Carcinoma stomach	01	01 %
Duodenum	Duodenitis	03	03 %
	Duodenal ulcer	01	01 %
<b>Total Cases</b>		<b>100</b>	<b>100</b>

**Table 3. Gastrointestinal Endoscopic Findings among the Study Subjects**

**DISCUSSION**

Although dyspepsia may be due to mostly benign causes, risk of malignancy exists and risk increases as patient ages. Hence, all patients with dyspepsia were selected carefully for evaluation by endoscopy. 87 % of patients had an abnormal finding. The findings noted in our study were compared with other similar studies and following results were noted. Padma S, et al. has reported a male and female incidence of dyspepsia to be 61.78 % & 38.21 % while in Javali et al.<sup>29</sup> study it is 61.6 % & 28.4 %. In our study it is 60 % & 40 % respectively, which is similar to other studies.

The prevalence of dyspepsia in our study was highest in the age group of (31- 40 years) which is similar to study by Antony B et al.<sup>30</sup> (30 - 40 yrs). The prevalence of gastritis was highest 47 % in our study which is at par with other studies, Javali et al. study showed 39.3 % gastritis, Antony B et al. 51.1 % and Padma S et al. 44.1 %

The incidence of oesophagitis in our study was found to be 08 % which as compared to other studies were very similar Javali et al. 6.8 %, Antony B et al. 16.1 % and Padma S et al. 8.1 %.

The prevalence of incidence of gastric ulcer and duodenal ulcer in study by Javali et al. was 0.8 % & 2.5 %, Antony B et al. study showed it to be 4.3 % & 2.6 %, Padma S et al 3.5 % & 5.6 %, while in our study it was 02 % & 01 %.

The incidence of oesophageal cancer in our study was 2 % which is similar to study by Padma S et al. 2.1 % but higher compared to study by Antony B et al. which was 0.7 %.

The incidence of stomach cancer was 01 % in our study while its similar to study by Padma S et al. its lower compared to study by Jawali et al. (4.6 %) and Antony B et al. (2.3 %).

Some patients experience severe discomfort during transoral UGE because of the gag reflex and pain that occur when the scope is passed through pharynx to reduce this transoral UGE-induced gag reflex and pain, topical pharyngeal anesthesia is administered, either alone or in combination with intravenous sedation. Lidocaine is the topical anesthetic of choice, which is given either as a viscous solution or as a spray.<sup>31</sup>

In our institute, all the patients were applied anesthesia by spraying lidocaine, lidocaine viscous was not used in any patients.

UGE without using sedatives has some advantages including lower incidence of cardiopulmonary complications, shorter duration of procedure, fewer costs and patient's ability of controlling self-care after endoscopy. On the other hand, sedation can cause better tolerance and less irritation for patients.<sup>32</sup>

In our institute, sedation was given in one single case due to patient being apprehensive rest 99 cases were not sedated. According to documents, most tolerated procedure well with out sedation.

Upper gastrointestinal endoscopy is a widely used procedure that is generally considered safe, but deaths after endoscopy may be unavoidable, hence clinicians undertaking upper GI scopy should provide oxygen therapy and cardiovascular monitoring and keep accurate records. The involvement of an anaesthetist in airway management and the administration of intravenous sedation should be actively considered.<sup>33</sup>

In our institute, endoscopy room is attached to the operation theatre complex. According to data for selective high-risk cases, endoscopy have been done providing oxygen therapy and cardiovascular monitoring and under the supervision of the anesthetist. Among 100 cases, no serious complications were recorded, and there were no deaths post or during the procedure or due to the procedure.

Study	Gastritis	Duodenitis	Esophagitis	Gastric Ulcer	Duodenal Ulcer	Oesophageal Carcinoma	Stomach Cancer
Javali et al.	39.3 %	6.16 %	6.8 %	0.8 %	2.5 %	4.5 %	4.6 %
Antony B et al.	51.1 %	22 %	16.1 %	4.3 %	2.6 %	0.7 %	2.3 %
Padma S et al.	44.1 %	2.1 %	8.1 %	3.5 %	5.6 %	2.1 %	01 %
Present study	47 %	03 %	08 %	02 %	01 %	2 %	01 %

**Table 4. Comparison of Upper GI Findings of Different Studies**

## CONCLUSIONS

The commonest symptom of upper gastrointestinal symptom is dyspepsia. The gold standard test available now to evaluate the cause of the symptoms is endoscopy which helps in differentiating benign from more serious malignant conditions in the initial stages. Dyspepsia is more common in males than females. Gastritis is a more common finding on endoscopy followed by oesophagitis and duodenitis other than reflux disorders. Although the percentage of patients with malignancy of esophagus and stomach was low, it was the most significant finding, which helped in further treatment of patients. Knowledge of potential endoscopic adverse events, their expected frequency, and the risk factors for their occurrence may help to minimize / prevent the incidence of adverse events.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

## REFERENCES

- [1] Heading RC. Definitions of dyspepsia. *Scandinavian Journal of Gastroenterology* 1991;26(182):1-6.
- [2] Shaukat A, Wang A, Acosta RD, et al. The role of endoscopy in dyspepsia. *Gastrointest Endosc* 2015;82(2):227-232.
- [3] Tack J, Talley NJ. Functional dyspepsia-symptoms, definitions and validity of the Rome III criteria. *Nat Rev Gastroenterol Hepatol* 2013;10(3):134-141.
- [4] Thomson ABR, Barkun AN, Armstrong D, et al. The prevalence of clinically significant endoscopic findings in primary care patients with uninvestigated dyspepsia: the Canadian Adult Dyspepsia Emperic Treatment-Prompt Endoscopy (CADET-PE) study. *Aliment Pharmacol Ther* 2003;17(12):1481-1491.
- [5] Teriaky A, AlNasser A, McLean C, et al. The utility of endoscopic biopsies in patients with normal upper endoscopy. *Can J Gastroenterol Hepatol* 2016;2016:30265603.
- [6] Kluge F, Seidler E. Zur erstanwendung der ösophagound gastrokopie: briefe von adolf kussmaul und seinen mitarbeitern. *Medizinhist J* 1986;21(3-4):288-307.
- [7] Hopkins HH, Kapany NS. A flexible fiberscope, using static scanning. *Nature* 1954;76:864-869.
- [8] Sivak MV. Gastrointestinal endoscopy: past and future. *Gut* 2006;55(8):1061-1064.
- [9] Lee SH, Park YK, Cho SM, et al. Technical skills and training of upper gastrointestinal endoscopy for new beginners. *World J Gastroenterol* 2015;21(3):759-785.
- [10] Koo JS, Choi JH. Conscious sedation during gastrointestinal endoscopy: midazolam vs propofol. *Korean J Gastrointest Endosc* 2011;42(2):67-73.
- [11] Chini P, Draganov PV. Diagnosis and management of ampullary adenoma: the expanding role of endoscopy. *World J Gastrointest Endosc* 2011;3(12):241-247.
- [12] Gangi S, Saidi F, Patel K, et al. Cardiovascular complications after GI endoscopy: occurrence and risks in a large hospital system. *Gastrointest Endosc* 2004;60(5):679-685.
- [13] Clarke GA, Jacobson BC, Hammett RJ, et al. The indications, utilization and safety of gastrointestinal endoscopy in an extremely elderly patient cohort. *Endoscopy* 2001;33(7):580-584.
- [14] Quine MA, Bell GD, McCloy RF, et al. Prospective audit of perforation rates following upper gastrointestinal endoscopy in two regions of England. *Br J Surg* 1995;82(4):530-533.
- [15] Schulze S, Pedersen VM, Hóier-Madsen K. Iatrogenic perforation of the esophagus. Causes and management. *Acta Chir Scand* 1982;148(8):679-682.
- [16] Anderson MA, Ben-Menachem T, Gan SI, et al. Management of antithrombotic agents for endoscopic procedures. *Gastrointest Endosc* 2009;70(6):1060-1070.
- [17] Montalvo RD, Lee M. Retrospective analysis of iatrogenic Mallory-Weiss tears occurring during upper gastrointestinal endoscopy. *Hepatogastroenterology* 1996;43(7):174-177.
- [18] Silvis SE, Nebel O, Rogers G, et al. Endoscopic complications. Results of the 1974 American Society for Gastrointestinal Endoscopy Survey. *JAMA* 1976;235(9):928-930.
- [19] Rimbara E, Fischbach LA, Graham DY. Optimal therapy for *Helicobacter pylori* infections. *Nat Rev Gastroenterol Hepatol* 2011;8(2):79-88.
- [20] Cardenas VM, Ortiz M, Graham DY. *Helicobacter pylori* eradication and its effect on iron stores: a reappraisal. *J Infect Dis* 2006;194(5):714.
- [21] Devarbhavi H, Nanivadekar S, Sawant P, et al. Sensitivity of *Helicobacter pylori* isolates from Indian patients to different antibacterial agents. *Indian J Gastroenterol* 1998;17(Suppl 1):S53.
- [22] Graham DY. *Helicobacter pylori* infection in the pathogenesis of duodenal ulcer and gastric cancer: a model. *Gastroenterology* 1997;113(6):1983-1991.
- [23] Ahmed KS, Khan AA, Ahmed I, et al. Impact of household hygiene and water source on the prevalence and transmission of *Helicobacter pylori*: a South Indian perspective. *Singapore Med J* 2007;48(6):543-549.
- [24] Nurgaliev Z, Malaty HM, Graham DY, et al. *Helicobacter pylori* infection in Kazakhstan: effect of water source and household hygiene. *Am J Trop Med Hyg* 2002;67(2):201-206.
- [25] Graham DY, Kudo M, Reddy R, et al. Practical rapid, minimally invasive, reliable nonendoscopic method to obtain *Helicobacter pylori* for culture. *Helicobacter* 2005;10(1):1-3.
- [26] Ahlawat R, Hoilat GJ, Ross AB. Esophagogastroduodenoscopy. In: *StatPearls. Treasure Island (FL): StatPearls Publishing 2020.* <https://www.ncbi.nlm.nih.gov/books/NBK532268/>
- [27] Acosta RD, Abraham NS, Chandrasekhara V, et al. The management of antithrombotic agents for patients

- undergoing GI endoscopy. *Gastrointest Endosc* 2016;83(1):3-16.
- [28] Khashab MA, Chithadi KV, Acosta RD, et al. Antibiotic prophylaxis for GI endoscopy. *Gastrointest Endosc* 2015;81(1):81-89.
- [29] Javali S, Madan M, Harendrakumar ML, et al. Role of endoscopy in evaluating upper gastrointestinal tract lesions in rural population. *J Dig Endosc* 2015;6(2):59-65.
- [30] Antony B, Vijayasarithi S. Trends and patterns of diagnosis by upper GI endoscopy in dyspeptic patients: a retrospective study. *IAIM* 2016;3(8):132-139.
- [31] Hayashi T, Asahina Y, Waseda Y, et al. Lidocaine spray alone is similar to spray plus viscous solution for pharyngeal observation during transoral endoscopy: a clinical randomized trial. *Endoscopy International Open* 2017;5(1):E47-E53.
- [32] Khodadoostan M, Sadeghian S, Safaei A, et al. Viscous lidocaine solution versus lidocaine spray for pharyngeal local anesthesia in upper gastroesophageal endoscopy. *J Res Med Sci* 2018;23:102.
- [33] Thompson AM, Wright DJ, Murray W, et al. Analysis of 153 deaths after upper gastrointestinal endoscopy: room for improvement? *Surg Endosc* 2004;18(1):22-25.