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Clinical assessment of the patients suffering from gastro esophageal reflux disease (GERD) diagnosed with endoscopy from Bihar

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Abstract
Endoscopy done to evaluate the mucosa in patients with symptoms of GERD usually reveals erosions or ulcerations at the squamocolumnar junction, or Barrett's oesophagus which is diagnostic of GERD. Endoscopy is the most sensitive diagnostic test for peptic ulcers. The main role of endoscopy in patients with uncomplicated Peptic Ulcer disease is to confirm the diagnosis, identify lesions too small to be detected by radiographic examination and to rule out malignancy by performing endoscopic biopsy. Hence based on above literature findings the present study was planned to Clinical Assessment of the Patients Suffered from Gastro Esophageal Reflux Disease (GERD) Diagnosed with Endoscopy from Bihar.
The present study was planned in Department of Gastroenterology, Ruban Memorial Hospital, Patna, Bihar, India. In the present study 50 patients diagnosed of Gastro-esophageal reflux disease (GERD) based on upper gastrointestinal endoscopy (UGI scopey) were enrolled. Patients who had been diagnosed as gastro-esophageal reflux disease (GERD) based on upper gastrointestinal endoscopy were included in this study. UGI scopy had been considered the gold standard diagnostic test for the diagnosis of gastro-esophageal reflux disease.
The data generated from the present study concludes that higher age of the patient infers higher risk of complications. Daily episodes of heartburn, regurgitation and retrosternal chest pain implies higher risk of complications. Some other studies also showed similar results with higher complications seen in increasing age and increased frequency of symptoms.

Keywords: endoscopy, esophagitis, gastroesophageal reflux disease, gerd, Bihar, etc

Introduction
GERD, also known as acid reflux, is a condition where stomach contents flow back up into the food pipe (esophagus) after eating, resulting in either symptoms or complications. Symptoms include the taste of acid or bile in the back of the mouth, heartburn, bad breath, chest pain, vomiting, breathing problems, and wearing away of the teeth. Complications consist of esophagitis, esophageal strictures, and Barrett's esophagus (a precancerous condition). Treatment is typically via lifestyle changes and medications. Lifestyle changes include not lying down for three hours after eating, weight loss, eliminating certain foods, and stopping smoking. Medications include antacid, H2 receptor blockers, proton pump inhibitors, and prokinetics. Some patients will be subjected to surgical management with Laparoscopic Fundoplication, which involves making incisions in the torso and wrapping part of the stomach around the base of the esophagus, which is the gold standard for efficacy. Though surgery posts its own risks and post-operative issues, there was no other option around until recently, when Stretta therapy was introduced.
Gastroesophageal reflux disease (GERD), also known as acid reflux, is a long-term condition in which stomach contents rise up into the esophagus, resulting in either symptoms or complications [5, 6]. Symptoms include the taste of acid in the back of the mouth, heartburn, bad breath, chest pain, vomiting, breathing problems, and wearing away of the teeth. Complications include esophagitis, esophageal stricture, and Barrett's esophagus. Risk factors include obesity, pregnancy, smoking, hiatal hernia, and taking certain medicines. Medications involved may include antihistamines, calcium channel blockers, antidepressants and sleeping pills. Acid reflux is due to poor closure of the lower esophageal sphincter, which is at the junction between the stomach and the esophagus. Diagnosis among those who do not improve with simpler measures may involve gastroscopy, upper GI series, esophageal pH monitoring, or esophageal manometry [1].
Treatment options include lifestyle changes; medications; and sometimes surgery for those who do not improve with the first two measures. Lifestyle changes include not lying down for three hours after eating, raising the head of the bed, losing weight, avoiding foods which result in symptoms, and stopping smoking. Medications include antacids, H2 receptor blockers, proton pump inhibitors, and prokinetics [2]. In the Western world, between 10 and 20% of the population is affected by GERD. Occasional gastroesophageal reflux without troublesome symptoms or complications is even more common. The classic symptoms of GERD were first described in 1925, when Friedenwald and Feldman commented on heartburn and its possible relationship to a hiatal hernia. In 1934 gastroenterologist Asher Winkelstein described reflux and attributed the symptoms to stomach acid [3].
The diagnosis of GERD is usually made when typical symptoms are present. Reflux can be present in people without symptoms and the diagnosis requires both symptoms or complications and reflux of stomach content. Other investigations may include esophagogastroduodenoscopy (EGD). Barium swallow X-rays should not be used for diagnosis. Esophageal manometry is not recommended for use in diagnosis, being

recommended only prior to surgery. Ambulatory esophageal pH monitoring may be useful in those who do not improve after PPIs and is not needed in those in whom Barrett's esophagus is seen. Investigation for H. pylori is not usually needed [4].

The current gold standard for diagnosis of GERD is esophageal pH monitoring. It is the most objective test to diagnose the reflux disease and allows monitoring GERD patients in their response to medical or surgical treatment. One practice for diagnosis of GERD is a short-term treatment with proton-pump inhibitors, with improvement in symptoms suggesting a positive diagnosis. Short-term treatment with proton-pump inhibitors may help predict abnormal 24-hr pH monitoring results among patients with symptoms suggestive of GERD [5].

Endoscopy, the looking down into the stomach with a fibre-optic scope, is not routinely needed if the case is typical and responds to treatment. It is recommended when people either do not respond well to treatment or have alarm symptoms, including dysphagia, anemia, blood in the stool (detected chemically), wheezing, weight loss, or voice changes. Some physicians advocate either once-in-a-lifetime or 5- to 10-yearly endoscopy for people with longstanding GERD, to evaluate the possible presence of dysplasia or Barrett's esophagus [6].

The treatments for GERD may include food choices, lifestyle changes, medications, and possibly surgery. Initial treatment is frequently with a proton-pump inhibitor such as omeprazole. In some cases, a person with GERD symptoms can manage them by taking over-the-counter drugs. This is often safer and less expensive than taking prescription drugs. Some guidelines recommend trying to treat symptoms with an H2 antagonist before using a proton-pump inhibitor because of cost and safety concerns [7]. Certain foods may promote GERD, but most dietary interventions have little effect. Some evidence suggests that reduced sugar intake and increased fiber intake can help [34]. Avoidance of specific foods and eating before lying down are recommended for those having GERD symptoms. Foods that may precipitate GERD include coffee, alcohol, chocolate, fatty foods, acidic foods, and spicy foods [8].

Weight loss may be effective in reducing the severity and frequency of symptoms. Elevating the head of the entire bed with blocks, or using a wedge pillow that elevates the individual's shoulders and head, may inhibit GERD when lying down. Although moderate exercise may improve symptoms in people with GERD, vigorous exercise may worsen them. Abstinence from smoking or alcohol does not appear to significantly relieve symptoms. The primary medications used for GERD are proton-pump inhibitors, H2 receptor blockers and antacids with or without alginic acid. The use of acid suppression therapy is a common response to GERD symptoms and many people get more of this kind of treatment than their case merits. The overuse of acid suppression is a problem because of the side effects and costs [9].

Proton-pump inhibitors (PPIs), such as omeprazole, are the most effective, followed by H2 receptor blockers, such as ranitidine. If a once daily PPI is only partially effective they may be used twice a day. They should be taken one half to one hour before a meal. There is no significant difference between PPIs. When these medications are used long term, the lowest effective dose should be taken. They may also be taken only when symptoms occur in those with frequent problems. H2 receptor blockers lead to roughly a 40% improvement [10].

The evidence for antacids is weaker with a benefit of about 10% (NNT=13) while a combination of an antacid and alginic acid (such as Gaviscon) may improve symptoms 60% (NNT=4) [38]. Metoclopramide (a prokinetic) is not recommended either alone or in combination with other treatments due to concerns around adverse effects. The benefit of the prokinetic mosapride is modest. Sucralfate has a similar effectiveness to H2 receptor blockers; however, sucralfate needs to be taken multiple times a day, thus limiting its use [8]. Baclofen, an agonist of the GABAB receptor, while effective, has similar issues of needing frequent dosing in addition to greater adverse effects compared to other medications [11].

The standard surgical treatment for severe GERD is the Nissen fundoplication. In this procedure, the upper part of the stomach is wrapped around the lower esophageal sphincter to strengthen the sphincter and prevent acid reflux and to repair a hiatal hernia. It is recommended only for those who do not improve with PPIs. Quality of life is improved in the short term compared to medical therapy, but there is uncertainty in the benefits over surgery versus long-term medical management with proton pump inhibitors. When comparing different fundoplication techniques, partial posterior fundoplication surgery is more effective than partial anterior fundoplication surgery, and partial fundoplication has better outcomes than total fundoplication [12].

Esophagogastric dissociation is an alternative procedure that is sometimes used to treat neurologically impaired children with GERD. Preliminary studies have shown it may have a lower failure rate and a lower incidence of recurrent reflux.

In 2012 the FDA approved a device called the LINX, which consists of a series of metal beads with magnetic cores that are placed surgically around the lower esophageal sphincter, for those with severe symptoms that do not respond to other treatments. Improvement of GERD symptoms is similar to those of the Nissen fundoplication, although there is no data regarding long-term effects. Compared to Nissen fundoplication procedures, the procedure has shown a reduction in complications such as gas bloat syndrome that commonly occur [13]. Adverse responses include difficulty swallowing, chest pain, vomiting, and nausea. Contraindications that would advise against use of the device are patients who are or may be allergic to titanium, stainless steel, nickel, or ferrous iron materials. A warning advises that the device should not be used by patients who could be exposed to, or undergo, magnetic resonance imaging (MRI) because of serious injury to the patient and damage to the device [14]. In those with symptoms that do not improve with PPIs surgery known as transoral incisionless fundoplication may help [15]. Benefits may last for up to six years [16].

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planned to Clinical Assessment of the Patients Suffered from Gastro Esophageal Reflux Disease (GERD) Diagnosed with Endoscopy from Bihar.

Methodology

The present study was planned in Department of Gastroenterology, Ruban Memorial Hospital, Patna, Bihar, India. In the present study 50 patients diagnosed of Gastro-esophageal reflux disease (GERD) based on upper gastrointestinal endoscopy (UGI scopey) were enrolled. Patients who had been diagnosed as gastro-esophageal reflux disease (GERD) based on upper gastrointestinal endoscopy were included in this study. UGI scopy had been considered the gold standard diagnostic test for the diagnosis of gastro-esophageal reflux disease.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

The study was conducted in accordance with the protocol, ethical principles having their origin in the Declaration of Helsinki, International Conference on Harmonization Good Clinical Practice (ICH-GCP) guidelines, all applicable government regulations and Institutional research policies and procedures. All the information collected during study was kept confidential.

Following was the inclusion and exclusion criteria for the present study.

Inclusion criteria

Age >18 years, Gastro-esophageal reflux disease patients proven based on UGI scopy.

Exclusion criteria

Age <18 years, Presence of mass lesion in esophagus or stomach, Presence of esophageal varices, History of corrosive ingestion, Pregnant women, terminally ill patients, mentally challenged. Patients on acid suppression therapy for 4 weeks before endoscopy, had history of upper gastrointestinal surgeries like gastrectomy, distal esophagectomy, gastro-jejunostomy, fundoplication, severe gastroparesis were excluded. In addition, pregnant patients, patients with contraindication to biopsy due to esophageal varices, bleeding disorders etc., patients with history of pill use and impaction, were also excluded.

Results & Discussion

A diagnosis of GERD can be made based on symptoms3 and confirmed by a favorable response to antisecretory medical therapy [18]. It is important to note that epigastric pain can be the major symptom of GERD.3 If the patient's history is consistent with typical or uncomplicated GERD, an initial trial of empiric medical therapy is appropriate before consideration of endoscopy in most patients. [19] Endoscopy at presentation should be considered in patients who have symptoms suggestive of complicated disease (eg, dysphagia, unintentional weight loss, hematemesis) or those with multiple risk factors for Barrett's esophagus (BE) [20, 24]. Risk factors for BE include older than 50 years of age, male sex, white race, a family history of BE or esophageal adenocarcinoma, prolonged reflux symptoms, smoking, and obesity [24]. In addition, failure to respond to appropriate antisecretory medical therapy should prompt evaluation with EGD and consideration of other diagnostic modalities, including ambulatory pH monitoring, esophageal manometry, and/ or multichannel impedance testing [25].

Acid peptic disorders are caused by various pathogenic mechanisms involving either excessive acid secretion and/or diminished mucosal defense [26]. Since they are common conditions present in daily clinical practice, due to their chronicity, they represent a significant cost to healthcare. Acid reflux in GERD causes damage to the esophageal mucosa, potentially causing laryngeal tissue injury with subsequent development of pulmonary symptoms [27].

Patients with GERD and PUD often present with extra-intestinal symptoms like chronic laryngitis, asthma and pseudoangina. Also, many patients with GERD present with otorhinolaryngology symptoms and these patients land up being treated with medications based on the findings of nasal endoscopy and laryngoscopy, since they consult only an ENT surgeon [28]. Hence, it has been recommended that these patients are to be screened using esophageal manometry and pH monitoring to ensure correct line of management [29].

Table 1: Dietary and basic details

Parameters	No. of Cases
Age	**52 – 69 years**
Diets	
Vegetarian	15
Mixed: Veg + Non Veg	35
Spicy Food Consumption	
Yes	36
No	14
Fried Food Consumption	
Yes	40
No	10
Tea/Coffee	
Yes	45
No	5
Smoking	
Yes	38
No	12
Alcohol Intake	
Yes	33
No	17

Table 2: Complications Observed

Complication	No. of Cases
Esophageal Ulcers	8
Barrett's esophageous	4
Esophageal Stricture	2
Absent	34

Table 3: Clinical variables between GERD with complications and without complications

Complication	GERD with Complication	Without Complication
No. of Cases	14	34
Heart burns		
For Less than 2 weeks	1	3
For More the 2 weeks	2	20

Daily	10	6
Absent	1	5
Regurgitation		
For Less than 2 weeks	1	8
For More the 2 weeks	3	5
Daily	9	2
Absent	1	19
Retrosternal chest pain		
For Less than 2 weeks	1	12
For More the 2 weeks	4	4
Daily	8	3
Absent	1	15
Dysphagia		
For Less than 2 weeks	0	4
For More the 2 weeks	2	1
Daily	9	2
Absent	3	27

Although esophageal 24-Hr pH-metry remains the gold standard for diagnosing NERD and differentiating it from reflux hypersensitivity and functional heartburn, lack of widespread availability, inadequate training and uniform reporting in India remains some of its limitations. Madan *et al* showed that combination of omeprazole challenge, endoscopy and histology can identify all the patients of GERD [30]. They advocated that despite being the gold standard 24-hour pH-metry might not be a prerequisite for diagnosis of GERD in the Indian scenario. A validated GERD symptom based questionnaire as used in our study is a reasonable alternative to identify the burden of GERD as has been shown in previous studies from India [31]. Since the ZAP grades in GERD patients were significantly higher than controls it could be a simple way to diagnose GERD in day to day practice.

Endoscopic surveillance programs have been established in an effort to diagnose cancer at an early stage in patients with Barrett's esophagus (BE). The numbers of published case-control and cohort studies have shown that endoscopic surveillance is significantly associated with both an earlier stage of esophageal adenocarcinoma at diagnosis and improved survival. In a survey in UK by Mandal *et al*, only 76% of respondents considered that surveillance was worthwhile. In those who considered surveillance worthwhile, 83% used sub-selection based on age, length of Barrett's or presence of ulcer or stricture [32]. Although, no randomized, controlled trials have evaluated the efficacy of surveillance, and also it is not clear whether surveillance reduces the mortality from esophageal cancer, most of the major gastroenterological societies and published guidelines recommend surveillance of patients with BE. There are several factors, which expected benefits of current surveillance strategies such as the low overall incidence of cancer in BE patients, the absence of a previous diagnosis of BE in the majority of patients with esophageal adenocarcinoma and difficulties in the diagnosis of dysplasia, which is a high missing rate on evaluation of random biopsy specimens and high variation among pathologists in the interpretation of biopsy findings [33, 34].

There has been recent interest in the use of high definition endoscopy with I scan, magnification endoscopy, chromoendoscopy and narrow band imaging in NERD patients to identify patients with minimal change esophagitis [35]. However, these are not yet standardized, easily available and are not yet validated. They are still at a premature stage for their use in GERD patients in day to day practice. It will be interesting to see any correlation between findings of these new techniques with ZAP grading among GERD patients.

Until now, GERD was considered to be the disease of affluent people without being a significant health problem in developing countries including India [36]. GERD has a significant impact on quality of life (QIL) [37, 38], quantitative estimation of its actual prevalence is difficult and whatever is our current understanding about the epidemiology of GERD, it is based on data obtained from population-based cross-sectional studies conducted across the affluent western regions like the United States and Europe [37, 38], while such studies are lacking from countries in Asia. As per the data available, the prevalence of GERD symptoms in the Western population ranges from 10% to 44%. The traditional belief is that GERD occurs less frequently in Asia than in Western countries [39], however, there is an emerging suggestion that the prevalence of GERD might be on the rise in Asia [40]. The exact reasons for these changes in the prevalence of GERD are difficult to determine but this reflects, in general, the lifestyle changes that are currently occurring in many Asian countries. Hence, although increasing attention is being given to the epidemiology of GERD in the Asia-Pacific region, yet community-based prevalence studies are lacking from most countries in this region. Studies from this region are required as ethnic and geographical differences in disease frequency may highlight environmental or genetic influences that contribute to our understanding of the etiology of this disease. Our study is one such study where we have focused both on the prevalence of the disease as well as have tried to look for its association with various risk factors.

A combination of different endoscopic treatments may provide the best outcomes. Given that relatively few patients need these treatments each year, offering them at specialized centers will concentrate clinical expertise and be the most cost-effective approach.

Conclusion

The data generated from the present study concludes that higher age of the patient infers higher risk of complications. Daily episodes of heartburn, regurgitation and retrosternal chest pain implies higher risk of complications. Some other studies also showed similar results with higher complications seen in increasing age and increased frequency of symptoms.

References

1. "Gastroesophageal Reflux (GER) and Gastroesophageal Reflux Disease (GERD) in Adults". NIDDK, 2014, Archived from the original on 5 October 2016. Retrieved, 2016.
2. Hershcovici T, Fass R. "Pharmacological management of GERD: where does it stand now?. Trends in Pharmacological Sciences. 2011; 32(4):258-64. doi:10. 1016/j.tips.2011.02.007. PMID 21429600.
3. Arcangelo, Virginia Poole; Peterson, Andrew M. Pharmacotherapeutics for Advanced Practice: A Practical Approach. Lippincott Williams & Wilkins, 2006, p. 372. ISBN 9780781757843.
4. Katz PO, Gerson LB, Vela MF. "Guidelines for the diagnosis and management of gastroesophageal reflux disease" (PDF). The American Journal of Gastroenterology. 2013; 108 (3):308-28. doi:10.1038/ajg.2012.444.
5. Numans ME, Lau J, de Wit NJ, Bonis PA. "Short-term treatment with proton-pump inhibitors as a test for gastroesophageal reflux disease: a meta-analysis of diagnostic test characteristics". Annals of Internal Medicine. 2004; 140(7):518-27. doi:10.7326/0003-4819-140-7-200404060-00011. PMID 15068979.
6. Patient information: Barrett's esophagus, archived from the original on, 2017.
7. Consumer Reports; Drug Effectiveness Review Project, "Drugs to Treat Heartburn and Stomach Acid Reflux: The Proton Pump Inhibitors - Comparing Effectiveness, Safety, and Price" (PDF), Best Buy Drugs, Consumer Reports, p. 6, archived (PDF) from the original on, 2010. retrieved 27 March 2013
8. Kahrilas PJ, Shaheen NJ, Vaezi MF, Hiltz SW, Black E, Modlin IM. *et al*. "American Gastroenterological Association Medical Position Statement on the management of gastroesophageal reflux disease". Gastroenterology. 2008; 135(4):1383-1391, 1391.e1–5. doi:10.1053/j.gastro.2008.08.045. PMID 18789939.
9. Gupta R, Marshall J, Munoz JC, Kottoor R, Jamal MM, Vega KJ. *et al*. "Decreased acid suppression therapy overuse after education and medication reconciliation". International Journal of Clinical Practice. 2013; 67(1):60-65. doi:10.1111/ijcp.12046. PMID 23241049.
10. Tran T, Lowry AM, El-Serag HB. "Meta-analysis: the efficacy of over-the-counter gastro-oesophageal reflux disease drugs". Aliment Pharmacol Ther. 2007; 25(2):143-53. doi:10.1111/j.1365-2036.2006.03135.x. PMID 17229239.
11. Hershcovici T, Fass R "Pharmacological management of GERD: where does it stand now?". Trends in Pharmacological Sciences. 2011; 32(4):258-64. doi:10.1016/j.tips.2011.02.007. PMID 21429600.
12. Ramos RF, Lustosa SA, Almeida CA, Silva CP, Matos D. "Surgical treatment of gastroesophageal reflux disease: total or partial fundoplication? Systematic review and meta-analysis". Arquivos de Gastroenterologia. 2011; 48(4):252-60. doi:10.1590/s0004-28032011000400007. PMID 22147130.
13. Badillo Raul. "Diagnosis and treatment of gastroesophageal reflux disease". World Journal of Gastrointestinal Pharmacology and Therapeutics. 2014; 5(3):105-12. doi:10.4292/wjgpt.v5.i3.105. PMC 4133436. PMID 25133039.
14. Medical Device Approvals: LINX™ Reflux Management System - P100049 Archived 10 November 2013 at the Wayback Machine, U.S. Food and Drug Administration, U.S. Department of Health and Human Services, Update of, 2014.
15. Jain D, Singhal S. Transoral Incisionless Fundoplication for Refractory Gastroesophageal Reflux Disease: Where Do We Stand?. Clinical Endoscopy. 2016; 49(2):147-56. doi:10.5946/ce.2015.044. PMC 4821522. PMID 26878326.
16. Hopkins J, Switzer NJ, Karmali S. Update on novel endoscopic therapies to treat gastroesophageal reflux disease: A review". World Journal of Gastrointestinal Endoscopy. 2015; 7(11):1039-44. doi:10.4253/wjge.v7.i11.1039. PMC 4549661. PMID 26322157.
17. Gibinski K, Rybicka J, Nowak A, Czarnecka K. Seasonal occurrence of abdominal pain and endoscopic findings in patients with gastric and duodenal ulcer disease. Scand J Gastroenterol. 1982; 17(4):481-5. PMid: 7134875. https:// doi.org/10.3109/00365528209182235
18. Numans ME, Lau J, de Wit NJ. Short-term treatment with proton-pump inhibitors as a test for gastroesophageal reflux disease: a meta-analysis of diagnostic test characteristics. Ann Intern Med. 2004; 140:518-27.
19. Venables TL, Newland RD, Patel AC. Omeprazole 10 milligrams once daily, omeprazole 20 milligrams once daily, or ranitidine 150 milligrams twice daily, evaluated as initial therapy for the relief of symptoms of gastro-oesophageal reflux disease in general practice. Scand J Gastroenterol. 1997; 32:965-73.
20. Lundell LR, Dent J, Bennett JR. Endoscopic assessment of oesophagitis: clinical and functional correlates and further validation of the Los Angeles classification. Gut. 1999; 45:172-80.
21. Wo JM, Mendez C, Harrell S. Clinical impact of upper endoscopy in the management of patients with gastroesophageal reflux disease. Am J Gastroenterol. 2004; 99:2311-6.
22. Lieberman DA, Oehlke M, Helfand M. Risk factors for Barrett's esophagus in community-based practice. GORGE consortium. Gastroenterology Outcomes Research Group in Endoscopy. Am J Gastroenterol. 1997; 92:1293-7.
23. Shaheen NJ, Weinberg DS, Denberg TD. Upper endoscopy for gastroesophageal reflux disease: best practice advice from the clinical guidelines committee of the American College of Physicians. Ann Intern Med. 2012; 157:808-16.
24. Evans JA, Early DS, Fukami N. The role of endoscopy in Barrett's esophagus and other premalignanct conditions of the esophagus. Gastrointest Endosc. 2012; 76:1087-94.
25. Fock KM, Talley N, Hunt R. Report of the Asia-Pacific consensus on the management of gastro.
26. Moayyedi P, Hunt R, Armstrong D, Lei Y, Bukoski M, White R. *et al*. The impact of intensifying acid suppression on sleep disturbance related to gastrooesophageal reflux disease in primary care. Aliment Pharmacol Ther. 2013; 37(7):730-7.
27. Mejia A, Kraft WK. Acid peptic diseases:

pharmacological approach to treatment. Expert Rev Clin Pharmacol. 2009; 2(3):295-314.
28. Roman S, Holloway R, Keller J. Validation of criteria for the definition of transient lower esophageal sphincter relaxations using high-resolution manometry. Neurogastroenterol Motil, 2016.
29. Herbella F, Andolfi C, Vigneswaran Y, Patti M, Pinna B. Importance of esophageal manometry and pH monitoring for the evaluation of otorhinolaryngologic (ENT) manifestations of GERD. A multicenter study. J Gastrointest Surg, 2016.
30. Madan K, Ahuja V, Gupta SD. Impact of 24-h esophageal pH monitoring on the diagnosis of gastroesophageal reflux disease: defining the gold standard. J GasteroenterolHepatol. 2005; 20:30-7.
31. Sharma PK, Ahuja V, Madan K, Gupta S, Raizada A, Sharma MP. *et al*. Prevalence, severity, and risk factors of symptomatic gastroesophageal reflux disease among employees of a large hospital in Northern India. Indian J Gastroenterol. 2011; 30(3):128-134.
32. Mandal A, Playford RJ, Wicks AC. Current practice in surveillance strategy for patients with Barrett's oesophagus in the UK. Aliment Pharmacol Ther. 2003; 17(10):1319-24.
33. Society for Surgery of the Alimentary Tract. SSAT patient care guidelines. Management of Barrett's esophagus. J Gastrointest Surg. 2007; 11(9):1213-5.
34. Montgomery E, Bronner MP, Goldblum JR, Greenson JK, Haber MM, Hart J. *et al*. Reproducibility of the diagnosis of dysplasia in Barrett esophagus: a reaffirmation. Hum Pathol. 2001; 32(4):368-78.
35. Pungrasamee A, Pisespongsa P, Praisontarangkul O, Thongsawat S, Leerapun A, Chitapanarux T. *et al*. Reliable Endoscopic Findings of Minimal Change Esophagitis for Diagnosis of Non-erosive Reflux Disease (NERD) Using High Definition Endoscopy with I-scan. Thai J Gastroenterol. 2012; 13(2):87-92.
36. Locke 3rd GR, Talley NJ, Fett SL, Zinsmeister AR, Melton 3rd LJ. Prevalence and clinical spectrum of gastroesophageal reflux: a population-based study in Olmsted County, Minnesota. Gastroenterology. 1997; 112:1448-56.
37. Dean BB, Crawley JA, Schmitt CM, Wong J, Ofman JJ. The burden of illness of gastro-oesophageal reflux disease: impact on work productivity. Alimen Pharma Ther. 2003; 17:1309-17.
38. Klauser AG, Schindlbeck NE, Müller Lissner SA. Symptoms in gastro-oesophageal reflux disease. Lancet. 1990; 335:205-8.
39. Stanghellini V. Three-month prevalence rates of gastrointestinal symptoms and the influence of demographic factors: results from the Domestic/International gastroenterology surveillance study (DIGEST). Scandinavian J Gastroenterol. 1999; 34:20-8.
40. Ho KY, Lim LS, Goh WT, Lee JM. The prevalence of gastrooesophageal reflux has increased in Asia: a longitudinal study in the community. J Gastroenterol Hepatol. 2001; 16:132.