

SPECTRUM OF FINDINGS IN PATIENTS PRESENTING FOR UPPER GASTROINTESTINAL ENDOSCOPY AT A TERTIARY CARE HOSPITAL AND THE INFLUENCE OF AGE AND GENDER

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ABSTRACT

Objective: To determine the spectrum of findings in patients presenting for upper gastrointestinal (UGI) endoscopy and investigate role of age and gender.

Study Design: Cross-sectional study.

Place and Duration of Study: Department of Gastroenterology & Internal Medicine, Combined Military Hospital Kharian, from Jul 2017 to Mar 2019.

Methodology: The data regarding 638 consecutive patients who underwent upper gastrointestinal endoscopy in the department were collected from the computer-based database and patients were stratified into two groups according to their age: ≤ 50 and >50 years.

Results: The mean age was 50.2 ± 17.4 (range: 7-100) years. There were 431 males and 207 females. The commonest presenting complaint was decompensated chronic liver disease (CLD) 162 (25.4%). The upper gastrointestinal endoscopy was normal in 306 (48%) and abnormal in 332 (52%) patients. The commonest abnormality seen on upper gastrointestinal endoscopy was esophageal varices seen in 167 (26.2%) followed by non-specific gastropathy, and hiatal hernia seen in 28 (4.4%) and 21 (3.3%) patients respectively. No significant differences were observed among males and females for a positive upper gastrointestinal endoscopy. Significantly large number of patients of age >50 years had an abnormal upper gastrointestinal endoscopy ($p < 0.001$). The commonest upper gastrointestinal endoscopic abnormalities were similar in both genders and age-groups.

Conclusion: The commonest finding on upper gastrointestinal endoscopy were esophageal varices and non-specific gastropathies. Females and patients ≤ 50 years had a higher prevalence of a normal upper gastrointestinal endoscopy. The commonly observed upper gastrointestinal endoscopy findings were generally similar among the genders and the age-groups.

Keywords: Decompensated chronic liver disease, Gastropathy, Hiatal hernia, Upper gastrointestinal endoscopy, Varices.

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INTRODUCTION

Upper gastrointestinal (UGI) problems are reasonably prevalent in the general population at large. Dyspepsia is a general term used to describe a constellation of symptoms related to the UGI tract. It includes epigastric burning or pain, upper abdominal fullness after taking meals, and early satiation as elaborated by the joint statement given by an international committee of clinical investigations¹. Worldwide, 15-20% people in many developed countries complain of dyspepsia at regular or intermittent basis^{2,3}.

Dyspepsia is mostly considered a benign disease (functional belching, post prandial discomfort, etc.) but sometimes, it is an earlier manifestation of a graver disease e.g. peptic ulceration, cholelithiasis, gastric carcinoma, etc., where it is termed as organic dyspepsia. The initial cost-effective approach towards a person with dyspepsia is to test for antibodies against *Helicobacter pylori* and treat the infection if the test is

positive⁴. If the antibodies are absent, an empiric therapy with a proton pump inhibitor or an H₂ receptor antagonist with or without a prokinetic agent is recommended⁴. If symptoms persist or recur after six to eight weeks of empiric therapy, UGI endoscopy should be performed⁴. UGI endoscopy is also the initial investigation of choice if a person has alarming features such as dysphagia, hematemesis, and/or melena⁴.

UGI endoscopy has evolved considerably since its inception in 1960⁵. Its use is getting more common for the treatment of gastro luminal pathologies. UGI endoscopy is aimed at recognition of the particular etiology so that the precise therapy can be started. Early endoscopy for every patient with UGI symptoms may come up with normal results and may not be cost-effective but it reassures the patient and his/her physician to gether^{4,6,7}. The aim of this study was to identify the spectrum of diseases found on UGI endoscopy in patients presenting with different gastrointestinal symptoms at Kharian city and compare the male and female genders and the age groups to explore any association with any of the disease.

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METHODOLOGY

This retrospective study was carried out at the department of Gastroenterology & Internal Medicine, Combined Military Hospital (CMH) Kharian while considering data of patients from July 2017 to March 2019. The approval from the hospital ethics committee was obtained before starting the study. Other ethical issues were settled according to the directions of the declaration of Helsinki. A sample size of 133 was estimated via Epi Tools Epidemiological calculator 8 while keeping level of significance 5%, confidence level 95%, estimated true proportion 35%, 9 and 5% of absolute precision. All individuals who underwent UGI endoscopy in the department were sampled through consecutive sampling. CMH Kharian is a tertiary care hospital in Gujrat district of the Punjab province. The hospital provides medial services to an area of nearly ten million people. The UGI endoscopy unit started functioning in 2002. It receives patients from the in-door and out door departments of the same hospital and other outpatient clinics and hospitals in the vicinity. Patients generally are from variable socioeconomic backgrounds.

The criteria for inclusion in the study were patients who reported for UGI endoscopy for different UGI symptoms. The data were collected from the computer-based database of the department. The recorded data included information regarding age, gender, the primary symptoms for which the UGI endoscopy was requested, and the endoscopic findings.

All UGI endoscopies were performed by one consultant gastroenterologist. The standard procedure followed at the department was that the patients were informed in detail about the procedure and the risks involved therein. Willing patients were then premedicated with injection midazolam 2mg and throat spray 4% lignocaine. During the study period, Pentax Eg 2990 I (Pentax Life Care Division, Hoya Corp., Tokyo, Japan) video endoscope was used to visualize the UGI tract. The endoscope was disinfected with 2% glutaraldehyde before the procedure. Esophageal, gastric, and duodenal mucosa were carefully inspected for the signs of any noteworthy irregularity. Endoscopic biopsy was carried out where indicated.

The presence of any of the following lesions was considered as a notable finding in the UGI, endoscopy: peptic ulcer (gastric or duodenal ulcer, or both), esophagitis, growths in esophagus, stomach, gastroesophageal junction or duodenum, erosive gastritis or duodenitis, hiatal hernia, Barrett's esophagus, esophageal

or duodenal stricture, Mallory Weiss tear, foreign body in the esophagus, stomach or duodenum, hookworm infestation, UGI varices (esophageal varices, isolated gastric varices, duodenal varices, others, etc.) achalasia cardia, portal hypertensive gastropathy, and other non-specific gastropathy or duodenopathy.

Patients were stratified into two groups according to their age: ≤ 50 years (group 1) and > 50 years (group 2). Data analysis was performed using Statistical Package for Social Sciences 20 (SPSS Inc., Chicago, IL, USA) for windows. The data were described as mean \pm SD and numbers with percentages. For statistical analysis Pearson's Chi square test was used. All the inferences were made at 95% confidence interval and p -values of ≤ 0.05 were considered significant.

RESULTS

A total of 638 patients underwent UGI endoscopy between July 2017 and March 2019. The mean age of the sample was 50.2 ± 17.4 years with a range of 7-100 years. There were 431 (67.6%) males (mean age 51.1 ± 17 years, range: 12-100 years) and 207 (32.4%) females (mean age: 48.3 ± 18.1 years, range: 7-86 years). There were 318 (49.8%) individuals of age ≤ 50 years and 320 (50.2%) individuals in the age group of > 50 years. The different complaints for which the patients were referred or the indications have been mentioned in table-I.

The commonest presenting complaint among the recruited patients were decompensated chronic liver disease (CLD) 162 (25.4%) followed by peptic ulcer disease 147 (23%). The UGI endoscopy was normal in 306 (48%) and abnormal in 332 (52%) patients. The commonest abnormality seen on UGI endoscopy was esophageal varices seen in 167 (26.2%) patients. This was followed by non-specific gastropathy and hiatal hernia seen in 28 (4.4%) and 21 (3.3%) patients respectively (table-I).

On comparison of male and female patients, more males had a positive UGI endoscopy and more females had a normal UGI endoscopy. However, this variation did not show statistical significance ($p=0.333$). The commonest UGI endoscopic abnormalities were similar in both genders i.e. esophageal varices, non-specific gastropathy, and hiatal hernia (table-II).

While considering comparison of different age groups, significantly large number of individuals of age ≤ 50 years had a normal UGI endoscopy and significantly large number of patients of age > 50 years had an abnormal UGI endoscopy ($p < 0.001$). The commonest UGI endoscopic abnormalities were similar in both

age-groups i.e. esophageal varices, non-specific gastro-
pathy, and hiatal hernia (table-III).

and various disorders like UGI bleeding, Mallory
Weiss tear; gastric erosions, and foreign bodies can

Table-I: Frequencies and percentages of different presenting complaints and findings on upper gastrointestinal endoscopy.

Presenting Complaints	n	%	Upper Gastrointestinal Endoscopy Findings	n	%
Chronic liver disease	35	(5.5)	Normal	306	(48)
Decompensated chronic liver disease	163	(25.6)	Achalasia Cardia	5	(0.8)
Chronic kidney disease	5	(0.8)	Growth esophagus	7	(1.1)
Carcinoma esophagus	1	(0.2)	Growth gastroesophageal junction	3	(0.5)
Dysphagia	30	(4.7)	Growth stomach	6	(0.9)
Hoarseness of voice	1	(0.2)	Growth duodenum	10	(1.6)
Chronic diarrhea	8	(1.3)	Esophageal varices	167	(26.2)
Hepatitis B Virus infection	5	(0.8)	Isolated Gastric varices	8	(1.3)
Hepatitis C virus infection	8	(1.3)	Gastroesophageal varices	1	(0.2)
Weight loss	6	(0.9)	Gastric outlet obstruction	1	(0.2)
Ascites	3	(0.5)	Barret esophagus	2	(0.3)
Gastroesophageal reflux disease	9	(1.4)	Portal hypertensive gastropathy	12	(1.9)
Gastric outlet obstruction	2	(0.3)	Portal hypertensive duodenopathy	8	(1.3)
Peptic ulcer disease	147	(23)	Gastric ulcer	11	(1.7)
Anemia	58	(9.1)	Duodenal ulcer	12	(1.9)
Persistent vomiting	22	(3.4)	Mallory Weiss tear	4	(0.6)
Generalized Pain abdomen	3	(0.5)	Esophagitis	13	(2)
Hematemesis	26	(4.1)	Foreign body esophagus	1	(0.2)
Persistent vegetative state	8	(1.3)	Hiatal hernia	21	(3.3)
Obstructive jaundice	2	(0.3)	Hookworm infestation	1	(0.2)
Melena	21	(3.3)	Stricture esophagus	9	(1.4)
Upper gastrointestinal bleeding	22	(3.4)	Stricture duodenum	2	(0.3)
Liver tumor	2	(0.3)	Non-specific gastropathy	28	(4.4)
Dyspepsia	50	(7.8)			
Missing values	1				

Table-II: Comparison of male and female genders for different findings on upper gastrointestinal endoscopy ($p=0.333^*$).

Findings on Upper Gastrointestinal Endoscopy	Male	Female	Findings on Upper Gastrointestinal Endoscopy	Male	Female
Barret esophagus	1 (50%)	1 (50%)	Duodenal stricture	1 (50%)	1 (50%)
Hookworm infestation	1 (100%)	-	Isolated Gastric varices	5 (62.5%)	3 (37.5%)
Non-specific gastropathy	19 (67.9%)	9 (32.1%)	Portal hypertensive gastropathy	9 (75%)	3 (25%)
Esophageal stricture	3 (33.3%)	6 (66.7%)	Gastric ulcer	9 (81.8%)	2 (18.2%)
Growth duodenum	6 (60%)	4 (40%)	Growth esophagus	4 (51.7%)	3 (42.9%)
Hiatal hernia	16 (76.2%)	5 (23.8%)	Mallory Weiss tear	3 (75%)	1 (25%)
Achalasia Cardia	4 (80%)	2 (20%)	Duodenopathy	5 (62.5%)	3 (37.5%)
Growth stomach	4 (66.7%)	2 (33.3%)	Duodenal ulcer	10 (83.3%)	2 (16.7%)
Growth gastroesophageal junction	3 (100%)	-	Esophagitis	11 (84.6%)	2 (15.4%)
Esophageal varices	114 (68.3%)	53 (31.7%)	Foreign body esophagus	1 (100%)	-
Gastric outlet obstruction	-	1 (100%)	Gastroesophageal varices	1 (100%)	-

*Pearson's Chi square/ Fisher Exact test

DISCUSSION

UGI endoscopy is a standout amongst the most precise, speedy, and economical investigative instruments for a broad range of gastrointestinal disorders, particularly under situations when other investigations are unconvincing. Not with standing its diagnostic use, UGI endoscopy also has a time-honored curativerole

successfully betreated at endoscopy. Therefore, even withchanging indications over a period, the disorders requiring UGI endoscopy for diagnostic or therapeutic purposes have demonstrated an increasing tendency.

In our study, we observed a male preponderance, which is in line with other studies done by Rajendran *et al*¹, Padma *et al*¹⁰ and Hadayat *et al*¹¹. The reason for

increased male subjects in the study is generally related to higher prevalence of smoking, tea intake, use of soda drinks, and betel nut chewing among male people. All these factors orchestrate a pivotal role in the development of UGI problems.

14 (26.4%) followed by Candidal esophagitis 12 (22.6%) as the common findings. Gado *et al*⁹, observed the commonest significant pathologies being peptic ulcer, esophagitis, and erosive gastroduodenitis, which were diagnosed in 18%, 14%, and 8% of the patients. The

Table-III: Comparison of age groups for different findings on upper gastrointestinal endoscopy ($p < 0.001^*$).

Findings on Upper Gastrointestinal Endoscopy	Age ≤50 years	Age >50 years	Findings on Upper Gastrointestinal Endoscopy	Age ≤50 years	Age >50 years
Barret esophagus	-	2 (100%)	Duodenal stricture	2 (100%)	-
Hookworm infestation	-	1 (100%)	Isolated Gastric varices	1 (12.5%)	7 (87.5%)
Non-specific gastropathy	11 (39.3%)	17 (60.7%)	Portal hypertensive gastropathy	7 (58.3%)	5 (41.7%)
Esophageal stricture	3 (33.3%)	6 (66.7%)	Gastric ulcer	4 (36.4%)	7 (63.6%)
Growth duodenum	3 (30%)	7 (70%)	Growth esophagus	2 (28.6%)	5 (71.4%)
Hiatal hernia	6 (28.6%)	15 (71.4%)	Mallory Weiss tear	3 (75%)	1 (25%)
Achalasia Cardia	4 (80%)	1 (20%)	Duodenopathy	5 (62.5%)	3 (37.5%)
Growth stomach	2 (33.3%)	4 (66.7%)	Duodenal ulcer	5 (41.7%)	7 (58.3%)
Growth gastroesophageal junction	1 (33.3%)	2 (66.7%)	Esophagitis	6 (46.2%)	7 (53.8%)
Esophageal varices	51 (30.5%)	116 (69.5%)	Foreign body esophagus	-	1 (100%)
Gastric outlet obstruction	1 (33.3%)	2 (66.7%)	Gastroesophageal varices	1	1 (100%)

*Pearson's Chi square/ Fisher Exact test

The commonest presenting features among the recruited patients were decompensated CLD 163 (25.6%) followed by peptic ulcers 147 (23%) and anemia 58 (9.1%). Other studies have reported diverse presenting complaints among the patients who reported for UGI endoscopy. The most common symptom encountered by Parashar and colleagues¹², was epigastric pain seen in 49 (92.5%) patients followed by anorexia and weight loss in 45 (84.9%), and 41 (77.4%) patients respectively in an Indian hospital. Gado *et al*⁹, observed dyspepsia 1400 (31%), UGI bleeding 1155 (26%), and banding or sclerotherapy of varices 897 (20%) as the most frequent indications for UGI endoscopy in an Egyptian institute. Khurram *et al*¹³, noted dyspepsia (42.6%), UGI bleed (32.8%), and evaluation of the CLD (10.2%) as the common indications for the procedure in a Pakistani teaching hospital. Rajendran and colleagues¹ reported nausea/vomiting accounting for 50%, followed by weight loss (20%), and gastrointestinal bleeding (20%) as the most common symptoms for patients reporting to an Indian gastroenterology unit.

The commonest abnormalities seen by us on UGI endoscopy were esophageal varices (26.2%), non-specific gastropathy (4.4%), and hiatal hernia (3.3%). A review of the previous relevant studies also shows a variability in terms of commonly reported findings on UGI endoscopy. Mahmood *et al*¹⁴, reported gastritis 106 (13.85%), esophagitis 85 (11.1%), duodenal ulcer 62 (8.1%), and hiatal hernia 55 (7.2%) as the common findings. Parashar and colleagues¹², found antral gastritis

frequent abnormal findings noted by Padma and Murugan 10 on UGI endoscopy included gastritis in 987 cases (44.9%), esophageal varices in 195 cases (8.9%), lax lower esophageal junction with esophagitis in 178 cases (8.09%), and duodenal ulcers in 124 cases (5.6%). Thomson and colleagues¹⁵ identified erosive esophagitis 451 (43%), gastric erosions 102 (9.8%), and peptic ulcers 55 (5.3%) as the frequent findings. Inayatullah *et al*¹⁶, acknowledged gastroduodenitis (20% cases) followed by gastric ulcers (5.4% cases) as the most frequent findings. In a series by Hadayat *et al*¹¹, the most common endoscopic finding were esophageal varices 234 (92.9%) and portal hypertensive gastropathy 98 (38.9%). Malghani and colleagues¹⁷, in recent Pakistani study, discovered esophageal varices in 371 (50.8%) patients, followed by gastropathy 114 (15.6%), gastritis 68 (9.3%), and cardio-fundal varices 58 (7.9%) in a descending order of frequency.

In our study, normal endoscopy was reported more commonly in females (31.2%) as compared to males (28.6%) showing that more females suffered from functional dyspepsia in our setup. Similar findings were observed by Jamaludin and Chong¹⁸ and Mahmood *et al*¹⁴. We did not find any difference among the two genders for the incidence of common UGI endoscopy findings. In the same line, Hadayat *et al*¹¹, found equal distribution among males and females in the UGI endoscopy findings. However, some studies have found an association between a finding and gender. Padma and Murugan¹⁰ reported that duode-

nal ulcers and esophageal carcinomas were more common among males. Malghani and colleagues¹⁷, found a distinct predilection of different UGI endoscopy findings for the two genders. They found that esophageal varices, gastritis, gastric carcinomas, and duodenal ulcers and were more expected to be discovered in male patients as compared to female patients ($p=0.039$) while esophageal and gastric ulcers and portal hypertensive gastropathy were more expected to be found in female patients.

Comparing the two age groups, a normal study was significantly more observed in younger patients that, in turn, means that younger patients are more likely to present with functional UGI symptoms than older people. Jamaludin and Chong¹⁸, studied the effect of age on the presence of significant findings on UGI endoscopy and concluded that patients >50 years of age were more likely (p -value <0.05) to have positive findings on UGI endoscopy than younger patients (age ≤50 years). The findings of Gato *et al*⁹, also endorse above findings as the significant UGI lesions were more common in the older people. Esophagitis, erosive-gastritis and duodenitis, peptic ulcer, and UGI malignancies, all were associated with the age in terms of statistical significance. Abnormal UGI findings were more commonly observed in patients above 40 years of age as compared to younger patients (76.6% Vs 63.4%) by Mehmood *et al*⁴. Thomson and colleagues¹⁵, in their study, also disclosed that clinically significant findings on UGI endoscopy were more common in patients of older age group (>50 years of age) than in patients of younger age. Malghani and colleagues¹⁴, reported that esophageal varices and gastric varices were more likely to be found in patients from the middle age group ($p<0.001$), whereas gastritis, gastric erosions, duodenitis, and duodenal ulcer were more likely to be found in older (>60 years) patients ($p<0.001$). These observations defend the opinion that endoscopy should right away be done for patients above 45 with dyspepsia.

CONCLUSION

Our study showed that the commonest finding on UGI endoscopy were esophageal varices and non-specific gastropathies. Female patients and patients ≤50 years had a higher prevalence of a normal UGI endoscopy without a specific finding. The commonly observed UGI endoscopy findings, were generally similar among the genders and the age-groups.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

- Rajendran K, Chidambaranathan S, Sathyanesan J, Palaniappan R. Spectrum of upper gastrointestinal endoscopy findings in patients with dyspepsia and its relation to alarm symptoms. *Int J Med Health Res* 2018; 4(10): 175-77.
- Ahmad M, Ahmad M, Munir T. Prevention of functional dyspepsia with carica papaya extract. *Ann King Edward Med Uni* 2018 24(1): 60-68.
- Addula M, Wilson VED, Reddymasu S, Agrawal DK. Immunopathological and molecular basis of functional dyspepsia and current therapeutic approaches. *Expert Rev Clin Immunol* 2018; 14(10): 831-40.
- Mehmood K, Saeedi MI, Muhammad R, ud Din Z. Upper gastrointestinal endoscopic findings in patients with dyspepsia. *J Postgrad Med Inst* 2011; 20(1): 70-73.
- Subramaniam S. Competency in polypectomy: when desirable becomes essential. *Gastrointest Endosc* 2018; 87(3): 645-47.
- Teriaky A, Al-Nasser A, McLean C, Gregor J, Yan B. The Utility of Endoscopic Biopsies in Patients with Normal Upper Endoscopy. *Can J Gastroenterol Hepatol* 2016; 2016(1): 3026563-65.
- de Jong JJ, Lantinga MA, Drenth JP. Prevention of overuse: A view on upper gastrointestinal endoscopy. *World J Gastroenterol* 2019; 25(2): 178-89.
- EpiTools Epidemiological Calculators. Aus Vet. Accessed 29 December 2018. [Internet] Available from: <http://epitools.ausvet.com.au/content.php?page=1Proportion>.
- Gado A, Ebeid B, Abdelmohsen A, Axon A. Endoscopic evaluation of patients with dyspepsia in a secondary referral hospital in Egypt. *Alexandria J Med* 2015; 51(3): 179-84.
- Padma S, Murugan R. Disease pattern by upper gastrointestinal endoscopy in rural areas of Tiruchirappalli district carried out at CMCH and RC Irungalur, retrospective study and comparative analysis with other contemporary studies in India. *Int Surg J* 2018; 5(3): 965-70.
- Hadayat R, Jehangiri AU, Gul R, Khan AN, Said K, Gandapur A. Endoscopic findings of upper gastrointestinal bleeding in patients with liver cirrhosis. *J Ayub Med Coll Abbottabad* 2015; 27(2): 391-94.
- Parashar R, Kaushik D, Malik PK. The study of clinical and endoscopic spectrum of upper gastrointestinal manifestations in HIV patients. *Int J Res Med Sci* 2018; 6(5): 1588-93.
- Khurram M, Khaar HT, Hasan Z, Umar M, Javed S, Asghar T, et al. A 12 years audit of upper gastrointestinal endoscopic procedures. *J Coll Physicians Surg Pak* 2003; 13(6): 321-24.
- Mahmood K, Saeedi MI, Muhammad R. Upper gastrointestinal endoscopic findings in patients with dyspepsia. *J Postgrad Med Inst* 2011; 20(1): 70-73.
- Thomson AB, Barkun AN, Armstrong D, Chiba N, White RJ, Daniels S, et al. The prevalence of clinically significant endoscopic findings in primary care patients with uninvestigated dyspepsia: the Canadian Adult Dyspepsia Empiric Treatment - Prompt Endoscopy (CADET-PE) study. *Aliment Pharmacol Ther* 2003; 17(12): 1481-91.
- Inayatullah M, Nazish Z, Akhtar MS, Anjum AH, Naqvi AB. Dyspepsia and upper gastrointestinal endoscopy; Multan experience. *Prof Med J* 2008; 15(1): 143-47.
- Malghani WS, Malik R, Chaudhary FM, Tameez Ud Din A, Shahid M, Ahmad S, et al. Spectrum of endoscopic findings in patients of upper gastrointestinal bleeding at a tertiary care hospital. *Cureus* 2019; 11(4): e4562-65.
- Jamaludin AZF, Chong VH. Spectrum of endoscopic findings in patients referred for suspected upper gastrointestinal bleeding. *Brunei Darussalam J Health* 2007; 2(1): 39-43.