Original Article

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Correlation of Endoscopic and Histopathological Diagnosis of Upper Gastrointestinal Lesions: A Study in a Tertiary Care Centre in Coastal Karnataka

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Abstract

Background and objective: Endoscopy and histopathological examination plays an important role in the treatment of gastrointestinal lesions. The present study was done to evaluate and correlate the endoscopic and histopathological diagnosis of the neoplastic and non-neoplastic upper gastrointestinal lesions.

Materials and methods: One hundred endoscopic biopsies were studied both retrospectively and prospectively. Biopsies were retrieved using flexible fibre-optic endoscope and also video endoscope. They were transferred to a bottle containing 10% neutral formalin, processed and stained routinely with haematoxylin and eosin. Special stains such as Mucicarmine and Giemsa were done as and when required.

Results: Out of 100 endoscopic biopsies, 34% were from esophagus, 48% from gastric, 15% from gastro-esophageal junction and 3% from duodenum. The correlation of endoscopic and histopathological diagnosis of upper gastrointestinal lesions was 73.12%. The sensitivity of these upper gastrointestinal lesions was 76.67%, specificity 94.28%, positive predictive value 85.19% and negative predictive value was 90.41%.

Conclusion: Endoscopic examination and biopsy is a convenient procedure for accurate objective assessment of patients with upper gastrointestinal symptoms. Endoscopy is incomplete without biopsy and histopathology is the gold standard for the diagnosis of endoscopically detected lesions.

Keywords: Endoscopic biopsy; Histopathology; Upper gastrointestinal lesions; Esophageal biopsy; Gastric biopsy; Duodenal biopsy.

Introduction

Human gastrointestinal tract is long and tortuous. To facilitate diagnosis of upper gastrointestinal lesions, endoscopy and histology are complementary. Over the years, it has been realized that the endoscopic appearances are highly suggestive but are not pathognomic and they need histological confirmation. In endoscopic biopsy reporting of gastrointestinal tract, the diagnosis of malignancy is easy and well accepted by the clinicians especially when the growth is obvious on endoscopy. Then the job of the pathologist becomes easy enough to give other details related to malignancy. But the real skillful task is in cases of non-neoplastic lesions. Here is the role of specialty reporting pathologist having experience and knowledge about the clinical and endoscopic spectrum of the disease. Many a times, severity of the lesion is more on endoscopy but the biopsy from that site shows only mild inflammation e.g., gastritis or duodenitis.[1-4]

Gastroenterologists rely on the results of the biopsy for correct diagnosis. Therefore, histopathology is an essential complement to endoscopic examination.[5] It has been aptly described that we may now be merely scratching the surface of what lies ahead in

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Table 1: Age and sex wise distribution of upper gastrointestinal endoscopic biopsy cases

Age in Years	Sex		Total No. of Cases	Percentage
	Male	Female		
21-30	02	01	3	3%
31-40	10	04	14	14%
41-50	11	3	14	14%
51-60	16	08	24	24%
61-70	18	9	27	27%
71-80	13	02	15	15%
81-90	03	00	03	03%
Total	73	27	100	100%

the marriage of microscopy and endoscopy.[6] There are only few studies on endoscopy-histology correlation. This study highlights the correlation of endoscopic and histopathological diagnosis of neoplastic and non-neoplastic upper gastrointestinal lesions.

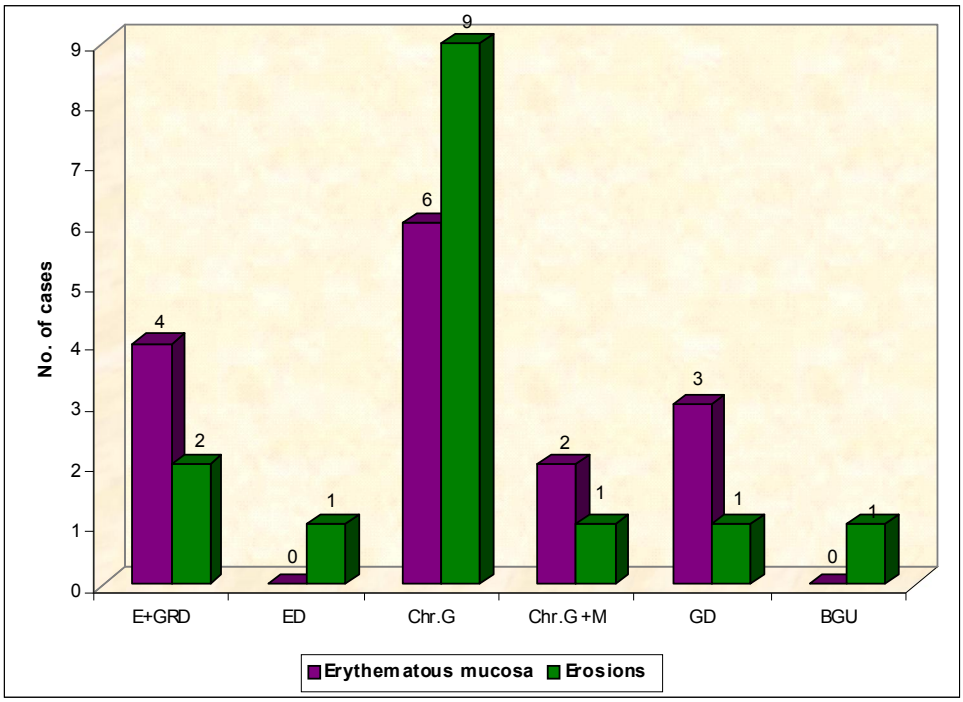
Materials and methods

A total number of 100 upper gastrointestinal biopsy specimens from oesophagus, stomach and first part of duodenum were studied retrospectively over a period of two years. Patients who were clinically diagnosed with upper gastro-intestinal lesions were taken up for endoscopy. Details of the patient were recorded such as the age, sex, symptoms, clinical diagnosis, investigations, and endoscopic findings with diagnosis. The lesions were diagnosed on gross visualization during endoscopy. Patients of both gender, all ages, inpatients and outpatients and those with diagnostic upper gastrointestinal lesions were included in the study. The cases in which biopsies could not

Table 2: Incidence of different upper gastrointestinal lesions

Lesions	No. of Cases	Percentage
Esophagus		
1. Chronic Nonspecific Esophagitis	04	4%
2. Gastro Esophageal Reflux Disease	02	2%
3. Barrett's Esophagitis	04	4%
4. Dysplasia	01	1%
5. Squamous Cell Carcinoma	26	26%
6. Adenocarcinoma	01	1%
Stomach		
1. Chronic gastritis	15	15%
2. Chronic gastritis + metaplasia	03	3%
3. Benign Gastric Ulcer	01	3%
4. Dysplasia	04	4%
5. Adenocarcinoma	29	29%
6. Squamous cell carcinoma	0	0
Duodenum		
1. Duodenitis	03	3%
2. Non specific duodenal ulcer	01	1%
3. Tumors	0	0%
GE Junction		
1. Squamous cell carcinoma	0	0
2. Adenocarcinoma	06	6%
Total	**100**	**100%**

Figure 1: Endoscopic appearance and histopathological diagnosis of non-neoplastic upper GI lesions.



E+GRD: Esophagitis & Gastroesophageal Reflux Disease, ED: Esophageal Dysplasia, Chr.G: Chronic Gastritis, Chr.G+M: Chronic Gastritis & Metaplasia, GD: Gastric Dysplasia, BGU: Benign Gastric Ulcer

Figure 2: Chronic gastritis with intestinal metaplasia, Haematoxylin & Eosin x 100

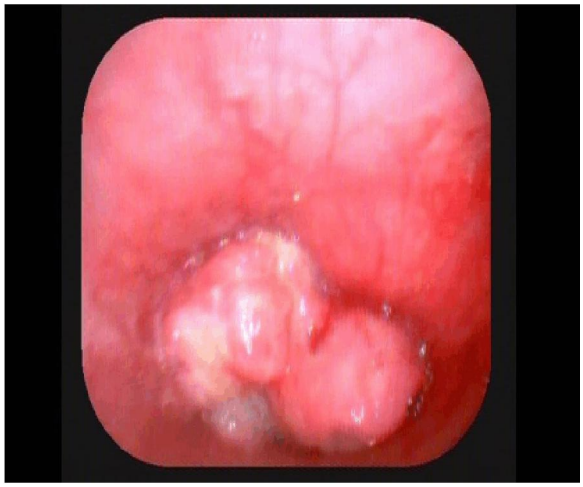
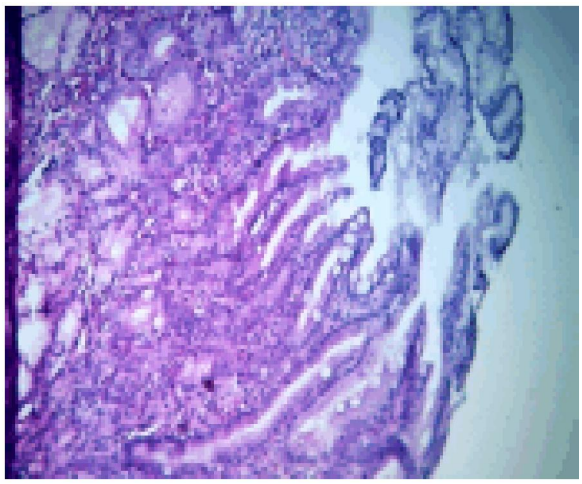


Figure 3: Helicobacter pylori, Giemsa x1000



be done and endoscopy done for therapeutic purposes were excluded from the study. Flexible fibre-optic endoscope, Pentax LH-150 PC and video-endoscope, Pentax EHK 1000 were used in this study.

The biopsy tissue obtained by using biopsy forceps was transferred to a bottle containing 10% neutral formalin. The tissue was processed and the sections were stained with Hematoxylin and Eosin. Special stains such as Mucicarminbe and Giemsa were done as and when required. A histopathological diagnosis was made. Later a correlation of endoscopic and histopathological diagnosis was carried out. Data was collected by purposive sampling method and analyzed for frequency, percentage, specificity and sensitivity. Kappa statistics was used to find

Figure 4: Endoscopic appearance of proliferative growth in mid-esophagus

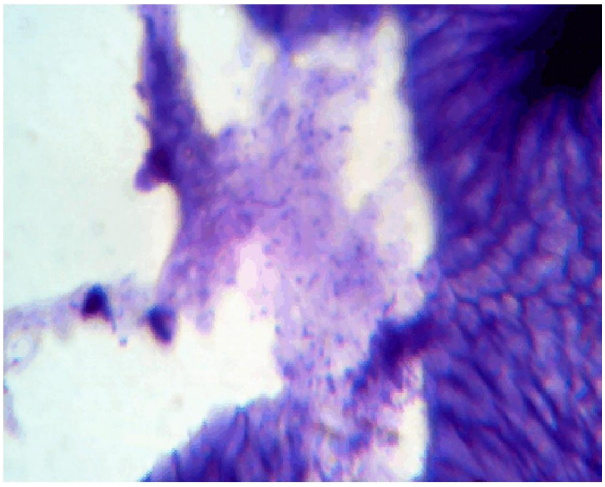
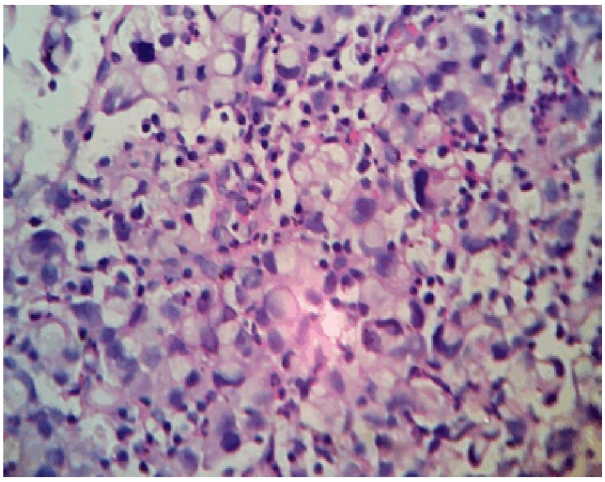


Figure 5: Signet ring cell carcinoma of stomach, Haematoxylin & Eosin x 400



an agreement with the diagnostic tests.

Results

Totally 100 upper gastrointestinal tract biopsies were examined. Of these biopsies, 34% were from esophagus, 48% from gastric, 15% from gastro-esophageal junction and 3% from duodenum.

There were 73 male and 27 female patients with male to female ratio 3:1. The highest incidence was seen between 61-70 years (27%) and the lowest incidence was seen in 21-30 yeas (3%) and 81-90 years (3%) [Table 1]. The most commonly encountered lesion was gastric carcinoma (29%) and esophageal carcinoma (27%) [Table 2].

The ratio of neoplastic to non-neoplastic conditions amongst the esophageal lesions was 2.5:1. Four cases (36.36%) were diagnosed histologically as Barrett's which on endoscopy was diagnosed as gastroesophageal reflux disease. The peak incidence of gastritis was seen in the sixth decade. Male preponderance was seen in all the non-neoplastic upper gastrointestinal lesions (3:1 for gastritis, esophagitis and Barrett's and 3:0 for duodenitis). Amongst the non-neoplastic upper gastrointestinal lesions, the highest number of cases belonged to gastritis histologically, 9 of which presented endoscopically as erosions and 6 as an erythematous mucosa [Figure 1]. Histologically, one case of chronic gastritis showed intestinal metaplasia [Figure 2] and another showed the presence of Helicobacter pylori [Figure 3].

The maximum number of malignant cases was from stomach (46.77%) and esophagus (43.55%). The peak incidence of both the malignancies was in the seventh decade (41.38% and 29.63% in gastric and esophageal carcinomas respectively). The youngest age at presentation was 27 years and oldest age was 84 years with a mean age of 55.5 years. The

Table 3: Comparative incidence of upper gastrointestinal malignancies by endoscopy

Authors	Site			
	Esophagus	Stomach	Duodenum	Others
Lal *et al*[10]	84%	12%	4%	-
Paymaster JC *et al*[13]	66.5%	16.1%	-	17.4%
Devi KR *et al*[14]	54.3%	22.5%	-	23.2%
Prabhakar *et al*[15]	44.9%	6.17%	-	48.93%
Sauerbruch *et al*[16]	46.4%	50.7%	2.9%	-
Present study	43.55%	46.77%	-	9.68%

Table 4: Statistical analysis of upper gastrointestinal lesions

Kappa Statistics (Correlation)	73.12%
Sensitivity	76.67%
Specificity	94.28%
Positive Predictive Value	85.19%
Negative Predictive Value	90.41%

male to female ratio of esophageal carcinoma was 1.5:1 and that of gastric carcinoma was 2:1. Squamous cell carcinoma of esophagus on endoscopy presented commonly as proliferative growth (53.85%) [Figure 4]. Only one case of adenocarcinoma esophagus was seen which presented as an ulcero-proliferative growth. Esophageal carcinoma was commonly seen in the middle one-third (51.85%) followed by lower one-third (44.45%) and upper one-third (3.7%) of the esophagus.

On endoscopy, majority (55.17%) of adenocarcinoma of stomach presented as an ulcerative growth and only one case as an erythematous mucosa. Twenty nine cases were from stomach and six cases from gastro-esophageal junction. Most of the cases of adenocarcinoma stomach were of tubular type (80%). All six cases (17.14%) from gastro-esophageal junction were of signet ring cell type [Figure 5] and only one case of gastric adenocarcinoma was of mucinous type.

Eight cases (57.12%) were diagnosed as benign gastric ulcer on endoscopy was found to be adenocarcinoma histologically. Two cases (9.7%) were noticed as gastric carcinoma on endoscopy was diagnosed to be chronic gastritis histologically.

Discussion

The present study consisted of one hundred esophagogastro duodenal biopsies, out of which 34%, 48%, 15% and 3% were from esophagus, stomach, GE junction and duodenum respectively. This was almost similar to a study done by Kazi *et al*[7] except for the number of duodenal biopsies which were 60.3% in his study.

In the present study, the peak incidence of the esophagogastroduodenal lesions was in the seventh decade. The mean age was of 55.5 years which almost simulates a study conducted by Behar *et al*[8] and Bogomeltz *et al*[9] The youngest patient was 27 years old and the oldest patient was 84 years old. It was almost similar to a study by Bogomeltz *et al*[9] and Lal *et al*[10]. Male to female ratio of esophagogastroduodenal lesions in our study was 3:1. Kumar *et al*[11], Misra *et al*[12]. and Paymaster *et al*[13] had a similar observation in their studies. Whereas, contrast findings were observed by Devi *et al*.[14]

The percentage of esophageal carcinoma in the present study was 43.55% which was lower than that of other studies [Table 3].[10,13-16] The percentage of gastric malignancy was 46.77% which was higher than other studies[10,13-15] except that of Sauerbruch *et al*[16] [Table 3]. In our study, gastroesophageal junctional malignancies constituted 9.68%.

The sensitivity and specificity, positive predictive value and negative predictive value of upper gastrointestinal lesions were 76.67%, 94.28%, 85.19% and 90.41% respectively in the present study [Table 4]. The correlation of endoscopic and histopathological diagnosis of upper gastrointestinal lesions in the present study was 73.12% which was in contrast to a study by Misra *et al*.[12] According to a study done by Gad[17], only 42% correlation was noticed.

Out of six cases diagnosed as esophagitis on endoscopy, four cases were confirmed histopathologically. Four cases presented as erythematous mucosa and two cases of Gastroesophageal reflux disease as erosions on endoscopy. The sensitivity, specificity, positive predictive value and negative predictive value for esophageal lesions in the present study were 96.88%, 95.59%, 91.18% and 98.48% respectively. The correlation of endoscopic and histopathological diagnosis of esophageal lesions was 90.98%. This is similar to the observation done by Behar *et al*[8] but in contrast to the findings of Gruber *et al*[18] who in conventional esophagoscopy found a sensitivity of 40.6%, specificity of 78.9%,

positive predictive value of 52% and negative predictive value of 70.3%.

Out of the 14 cases diagnosed as benign gastric ulcer on endoscopy, eight were found to be malignant and two were chronic gastritis on histopathology. In the present study, the correlation of endoscopic and histopathological diagnosis gastric lesions was 57.28%. The sensitivity, specificity, positive predictive value and negative predictive value were 65.96%, 90.57%, 86.11% and 75% respectively. Kazi *et al*[7] also found correlation between endoscopic and histopathological diagnosis in 240 patients undergoing upper gastrointestinal endoscopy for dyspeptic symptoms. One out of six benign looking ulcers in esophagus and 1 out of 9 benign looking gastric ulcers on endoscopy turned out to be malignant on subsequent histology.

The analysis of all the cases which did not show endoscopy – histology correlation was done. They were found to be due to stricturous or necrotic growth, superficial biopsy and absence of goblet cells in Barrett's esophagus. Careful evaluation of the clinical data, expertisation on the part of endoscopist in choosing the appropriate site are therefore needed, apart from the proper processing of biopsy tissue and meticulous reporting by the histopathologist for interpretation of endoscopic biopsies.[19,20]

Conclusion

Endoscopic examination and biopsy is a convenient procedure for accurate objective assessment of patients with upper gastrointestinal symptoms. It is recommended as the first investigation in the work up of a patient with dyspeptic symptoms. Neoplastic lesions were found to be more common than the non-neoplastic lesions in both, esophagus and stomach. The correlation of endoscopic and histopathological diagnosis of upper gastrointestinal lesions was 73.12%. Endoscopy is incomplete without biopsy and histopathology is the gold standard for the diagnosis of endoscopically detected lesions. Endoscopic biopsy correlation reflects important advances in understanding the biology and pathophysiology of the disease. It provides new diagnostic information, knowledge about the recent advances and thereby assists in improving patient management.

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References

1. Hopkins HH. Optical principles of endoscope. In: Berci G Ed. Endoscopy. 2nd ed. New York: Appleton Century Grafts; 1976, 3-26.
2. Tytgat GNJ. Role of endoscopy and biopsy in the work up of dyspepsia. *Gut.* 2002; 50(suppl IV): 13-16.
3. Kang JY, LaBrooy SJ, Wee A. Gastritis and duodenitis – a clinical, endoscopic and histological study and review of the literature. *Ann Acad Med Singapore* 1983; 12: 539-544.
4. Levy N, Stermer E, Boss JM. Accuracy of endoscopy in the diagnosis of inflamed gastric and duodenal mucosa. *Isr J Med Sci.* 1985; 21: 564-8.
5. McBroom HM, Ramsay AD. The clinicopathological meeting : A means of auditing diagnostic performance. *Am J Surg Pathol.* 1993; 17: 75-80.
6. Nathanson MH. Confocal colonoscopy: More than skin deep. *Gastroenterol.* 2004; 127: 987-1000.
7. Kazi JI, Alam SM, Kazi AM, Anwar A, Shamsi Z. Correlation of endoscopic and histological diagnosis in upper gastrointestinal lesions. *J Pak Med Assoc.* 1990; 40(12): 281-3.
8. Behar J, Sheahan DC. Histologic abnormalities in Reflux Esophagitis. *Arch Pathol.* 1975; 99: 387-92.
9. Bogomoletz WV, Molas G, Gayet B, Potet F. Superficial squamous cell carcinoma of the

esophagus. *Am J Surg Pathol.* 1989; 13(7): 535-546.

10. Lal N, Bhasin DK, Malik AK, Gupta NM, Singh K, Mehta SK. Optimum number of biopsy specimens in the diagnosis of carcinoma of the oesophagus. *Gut* 1992; 33: 724-726.
11. Kumar A, Bansal R, Pathak VP, Kishore S, Arya PK. Histopathological changes in gastric mucosa colonized by H. pylori. *Indian J Pathol Microbiol.* 2006; 49(3): 352-356.
12. Misra V, Misra SP, Shukla SK, Jaiswal PK, Agarwal R, Tondon S. Endoscopic and histological changes in upper gastrointestinal tract of patients with chronic renal failure. *Indian J Pathol Microbiol*. 2004; 47(2).
13. Paymaster JC, Sanghvi LD, Gangadharan P. Cancer in the gastrointestinal tract in Western India. *Cancer.* 1968; 21(2): 279-288.
14. Devi KR, Suvarna N. Pattern of gastrointestinal tumors in North Kerala. *Indian J Cancer.* 1980; 17: 159-163.
15. Prabhakar BR, Maingi K, Sahni A. Incidence of gastrointestinal malignancies in Punjab. *Indian J Pathol Microbiol.* 1988; 31(4): 262-265.
16. Sauerbruch T, Schreiber MA, Schussler P, Permanetter W. Endoscopy in the diagnosis of gastritis. Diagnostic value of endoscopic criteria in relation to histological diagnosis. *Endoscopy*. 1984; 16(3): 101-4.
17. Gad A. Erosion: a correlative endoscopic histopathologic multicenter study. *Endoscopy.* 1986; 18(3): 76-9.
18. Gruber AC, de Barros SG, Piitten AC *et al*. Esophageal dysplasia and chronic esophagitis; detection at upper gastrointestinal endoscopy. *Arq Gastroenterol.* 1998; 35(4): 258-63.
19. Odze RD, Maley CC. Neoplasia without dysplasia, Lessons from Barrett's esophagus and other tubal gut neoplasms. *Arch Pathol Lab Med.* 2010; 134: 896-906.
20. Voltaggio L, Montgomery EA, Lam-Himlin D. A clinical and histopathologic focus on Barrett esophagus and Barrett-related dysplasia. *Arch Pathol Lab Med.* 2011; 135: 1249-1260.