ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 68 . 16
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 4, Issue – 5, October - 2019, Page No. : 92 - 100

Histopathological Study of Upper Gastrointestinal Endoscopic Biopsies

[1]Suparna V. Suvernakar, Department of Pathology, Dr SCGMC Nanded, Maharashtra, India.
[2]Rajharsh D. Hanmante, Department of Pathology, GMC Latur, Maharashtra, India
Corresponding Author: Rajharsh D. Hanmante, Department of Pathology, GMC Latur, Maharashtra, India

Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction: Lesions of upper gastrointestinal tract are one of the most commonly encountered problems in clinical practise. Upper gastrointestinal lesions include those arising from the esophagus, stomach, and first and second part of duodenum. The upper gastrointestinal flexible fiber optic endoscope is a simple safe and well tolerated procedure with direct visualization of the pathologic site and biopsy leading to early detection of pathologic changes and therefore helps to start appropriate treatment. Endoscopic biopsy examination followed by histopathologic assessment is a convenient procedure and current gold standard for accurate objective assessment of patients with symptoms of upper GIT.

Aims and Objectives: 1. To study the morphological pattern and frequencies of lesions reported in upper gastrointestinal tract endoscopic biopsy specimens. 2. To correlate the endoscopic findings with histological findings.

Methodology: This study was carried over a period of 1.5 year in the department of pathology at government medical college Nanded, Maharashtra. The patients with age above 18 years with upper gastrointestinal tract lesion were included in the study. Endoscopic biopsies were processed through various stages of tissue processing. 3 – 5 micron sections, stained with Haematoxylene and eosin were obtained and microscopy findings were noted.

Observations: A total of 103 biopsies were studied. 68 were male and 35 were female with sex ratio of 1.9:1. Esophagus was the most common site of lesion contributing for 73 (70.9%) cases followed by stomach 23 (22.4%) cases. 4 (3.8%) cases had lesion in the duodenum and 3 (2.9%) cases from gastro-esophageal junction. Endoscopic biopsies were categorized as non neoplastic which includes 30 (29.2%) cases and neoplastic which includes 73 (70.8%) cases. Among the non neoplastic lesions, non specific lesions which were reported as Negative for malignancy accounts for 11 cases followed by Dysplastic lesions in 10 cases and 7 cases were of Gastritis and 1 case each polyp and Barrett's esophagus was found.

Among the neoplastic lesions, Squamous cell carcinoma was the predominant lesion contributing for 54 (73.9%) cases followed by Adenocarcinoma in 15 (20.5%) cases. Dysphagia was the predominant clinical presentation followed by pain in abdomen.

Conclusion: Endoscopy along with the biopsy is the gold standard approach for the diagnosis of upper gastrointestinal lesions.

Endoscopic biopsy provides an opportunity to detect the early lesions like metaplasia, dysplasia so as to prevent their progress to invasive cancer.

Keywords: Upper GIT, Endoscopy, Biopsy, Neoplastic, Non-neoplastic, Esophagus, Gastritis, Dysphagia.

Introduction

Lesions of upper gastrointestinal tract are one of the most commonly encountered problems in clinical practise. Upper gastrointestinal lesions include those arising from the esophagus, stomach, and first and second part of duodenum.[1] There is a wide range of pathologic lesions which may affect upper GIT like: infectious diseases, inflammatory disorder, mechanical, toxic and physical reactions including radiation injury and neoplasm. [2]

The upper gastrointestinal flexible fiber optic endoscope was first used in 1968 and proved to be a major breakthrough in the diagnosis of gastrointestinal tract (GIT) lesions.[3] It also offers the opportunity for biopsy of neoplastic and non-neoplastic lesions. It is a simple safe and well tolerated procedure with direct visualization of the pathologic site and biopsy leading to early detection of pathologic changes and therefore helps to start appropriate treatment. [4] Endoscopic biopsy examination followed by histopathologic assessment is a convenient procedure and current gold standard for accurate objective assessment of patients with symptoms of upper GIT. It is not only used to diagnose malignant and inflammatory lesions but also for monitoring the course, extent of the disease, response of the therapy and early detection of complications. This is reflected by a rising trend in obtaining mucosal biopsies from the upper GIT.[5]

The present study was done to find out the morphological pattern and frequencies of lesions reported in upper gastrointestinal tract endoscopic biopsy specimens.

Methodology

The present study was done in the department of pathology at tertiary care hospital over a period of 1.5 years. The endoscopic biopsies obtained were fixed in 10% formalin for 24 hours and then processed for routine processing. Sections were stained using Haematoxylene and Eosin stains. Special stains performed wherever necessary. The patients with age above 18 years with upper gastrointestinal tract lesion were included in the study. The previously diagnosed cases, inadequate biopsies and cases with lesions in the oral cavity and oropharynx were excluded from the study.

Observations

A total of 103 biopsies were studied. 68 were male and 35 were female with sex ratio of 1.9:1. The youngest patient was of 26 years and oldest was of 86 years with mean age of presentation was 59.01 ±13.37. It was found that esophagus was the most common site of lesion contributing for 73 (70.9%) cases followed by stomach 23 (22.4%) cases. 4 (3.8%) cases had lesion in the duodenum and 3 (2.9%) cases from gastro-esophageal junction. After Histopathological examination, these endoscopic biopsies were categorized as non neoplastic which includes 30 (29.2%) cases and neoplastic which includes 73 (70.8%) cases. Among the non neoplastic lesions, non specific lesions which were reported as Negative for malignancy accounts for 11 cases followed by Dysplastic lesions in 10 cases and 7 cases were of Gastritis and 1 case each polyp and Barrett's esophagus was found.

Among the neoplastic lesions, Squamous cell carcinoma was the predominant lesion found during the present study. It contributes for 54 (73.9%) cases. It was followed by Adenocarcinoma in 15 (20.5%) cases. 1 (1.4%) case each of Adenosquamous carcinoma,

Signet ring carcinoma, Brunner gland adenoma and Non-Hodgkin's lymphoma. Considering the age of the patients, neoplastic lesions were more commonly found among the 5 th and 6 th decade of life. The clinical presentations of the patients were noted. It was found that dysphagia was the predominant clinical presentation followed by pain in abdomen in neoplastic as well as non-neoplastic lesions. Other clinical presentation includes dyspepsia, vomiting, anorexia, weight loss, haematemesis and obstruction. During the present study, the endoscopic findings were correlated with Histopathological findings. It is shown in Table No. 1. It was found that endoscopically ulcerative type of lesion was commonly seen among non neoplastic lesions while proliferative followed by ulcerative type of lesions was common among neoplastic lesions of upper gastrointestinal tract.

Considering the anatomic site of esophageal lesions, middle one third of oesophagus was the most commonly involved site followed by upper one third, lower one third and then gasto-esophageal junction. The site wise distribution of esophageal lesions is shown in Table No.2. Among the neoplastic lesions of the esophagus, squamous cell carcinoma was the most common histological entity comprising of 54 cases.

The bulk of gastric biopsies received were from pylorus comprising of 10 (43.4%) cases followed by antrum 9 (39.2%) cases. Gastritis was the most common histological findings found among the gastric biopsies. The distribution of cases among gastric biopsies is shown in Table No. 3.

4 endoscopic biopsies were studied from duodenum comprising of 1 from first part of duodenum and 3 were from periampullary region. Histopathologically, Brunner gland adenoma was found in first part of duodenum and two cases from periampullary region was found to be Adenocarcinoma and remaining one case was negative for malignancy.

Discussion

The upper gastrointestinal symptoms like dysphagia, dyspepsia, vomiting and abdominal pain etc are very common complaints for which patient needs surgeon's consultation. To know the exact pathology for diagnosis and further management endoscopic examination is needed. Upper gastrointestinal endoscopy is regarded as the investigation of choice in patients with upper gastrointestinal disorders. Endoscopy is incomplete without biopsy and histopathology is the gold standard for the diagnosis of endoscopically detected lesions.[6] Thus, we studied the upper gastrointestinal tract endoscopic biopsies histopathoogically to know the frequency of upper gastrointestinal tract lesions and to correlate the endoscopic findings with Histopathological findings.

In the present study, among the 103 biopsies of upper GIT, male predominance was found with M:F ratio was 1.9:1. Male predominance was also observed in other studies done by Sandhya PG et al.[4] Krishnappa R et al.[7] and Shennak MM et al.[8] Males were predominantly affected probably because of more exposure of male to risk factors. Thus, malignancies were more common in male as compared to female.

Majority of the biopsies in our study were from 4 th to 6 th decade of life. Neoplastic lesions were more common in 6 th decade of life followed by 5 th decade. Similar findings were noted in other studies by Shennak MM et al.[8], Sheikh BA[9] and Khar HB et al. [10] In the present study, youngest patient was 26 years old and oldest was 86 years old. In a study by Hirachand S. et al.[11] the youngest patient 16 years old and oldest was 84 years. The wide range of age group of patients might

be due to varied exposure to risk factors at different age group mainly dietary habits and life style.

In the present study, the lesions of the upper GIT were classified in to two broad categories viz Non-neoplastic and Neoplastic lesions. 70% biopsies were neoplastic and 30% were non-neoplastic. In a study by Bhat N. et al.[12] non-neoplastic lesions were predominate contributing for 54% of cases while neoplastic contribute for 46% cases. Non-neoplastic lesions were predominantly seen among the lesions of the upper GIT in the studies by Krishnappa R. et al.[7] , Sheikh BA et al.[9] , Hirachand S. et al.[12] and Abilash SC et al. [13] Thus, the findings of the present study is contradictory to other studies. This could be due to low sample size in our study and geographical variation in risk factors.

Comparison of site wise distribution of endoscopic biopsies among different studies is shown in Table No. 4. Esophagus was the commonest site of lesion found in the present study. But, stomach was the commonly affected site of lesion among the above mentioned studies.

Esophageal biopsies

among the 73 biopsies from esophagus, neoplastic lesions were predominate over non-neoplastic lesions. Among the neoplastic lesions, squamous cell carcinoma was the predominant lesion constituting of 53 cases followed by 02 cases of Adenocarcinoma and 01 case of adeno-squamous cell carcinoma. The findings of the present study are similar with findings of Bhat N. et al.[12] and Sheikh BA et al.[9] in which neoplastic lesions of the esophagus was commonest among which squamous cell carcinoma was predominate. Sheikh BA et al.[9] found that 82% of the esophageal lesions were malignant.

But, Shennak MM et al.[8], Hirachand S et al.[11] and Abilash SC et al.[13] found that non-neoplastic lesions were predominating among the esophageal lesions. This difference might be due to difference in geographical distribution of risk factors. Among the esophageal carcinomas, middle 1/3 of esophagus was commonest site of malignancy in our study comprising of 30 (51%) cases followed by 13 (22%) cases each of upper 1/3 and lower 1/3 of esophagus. Esophageal carcinoma was most commonly seen in lower end 25 (71.42%) in a study by Bhat N et al. [12] followed by middle oesophagus 7 (20%) and upper oesophagus 3 (8.57%). Rumana et al. [15] also found the changing pattern of esophagogastric cancer in Kashmir and found that there was a trend towards an increase in frequency of cancer at lower end of esophagus and gastroesophageal junction. Squamous cell carcinoma was the commonest histological diagnosis among neoplastic lesion of esophagus during the present study. It is similar to studies done by Krishnappa R et al. [7] , Sheikh BA et al. [9] Abilash SC et al. [13], and Hirachand S et al. [11]

Gastro-esophageal Junction biopsies

During the present study, 03 endoscopic biopsies were studied from gastro-esophageal junction. All were malignant lesions comprising of 1 case of squamous cell carcinoma and 2 cases of Adenocarcinoma. These findings are fairly correlated with findings of Sheikh BA et al.[9] and Rumana et al. [15]

Gastric biopsies

Total 23 gastric biopsies were studied during the present study.

Non-neoplastic (52%) lesions were common than neoplastic lesions (48%). It is in line with the findings of Rupendra et al. [16] and Rashmi et al. [17]

Chronic active gastritis was the commonest lesion among non neoplastic lesion and Adenocarcinoma was the commonest neoplastic lesion among gastric

biopsies. There was one case of Non-Hodgkin's lymphoma from antrum region. Chronic active gastritis was the commonest finding in studies by Hirachand S. et al. [11], Sheikh BA et al. [9] Shultz M et al. [18] and Thapa R et al. [19]

H. Pylori was associated with 20% cases of dysplasia & 14.28% cases of chronic gastritis in the present study. Bhat N. et al.[12] found that 54% cases of chronic gastritis was associated with H. pylori infection. H. pylori was found among the 30% and 68% cases of chronic gastritis in a study by Hirachand S. et al. [11] and Sheikh BA et al. [9] respectively. Adenocarcinoma was the commonest histopathological diagnosis among gastric biopsies in our study which is similar with findings of Memon F et al. [2], Sandhya PG et al.[4] , Hirachand S. et al. [11] , Abilash SC et al. [13] , Jaynul Islam SM et al. [14] , Jeshtadi A et al. [20]

Pylorus was the commonest site of lesion among gastric biopsies and it comprises of 10 (43%) cases followed by antrum 9 (40%) cases and 4 (17%) cases from body of the stomach. pyloric antrum was also the common site of involvement of gastric carcinoma among the studies by Sheikh BA et al [9], Rumana M et al[15] and Naseema et al. [21]

Antrum was the common site of involvement found during the studies by Hirachand S. et al.[11], Nafees A. et al.[22], Preiser F et al. [23] and Cherian JV et al. [24]

Duodenal biopsies

4 endoscopic biopsies were studied from duodenum. 3 were neoplastic, of which 1 case was of Brunner gland adenoma and 2 were Adenocarcinoma. Remaining one case was non specific duodenitis. Whereas Hirachand S.et al. [11], Abilash SC et al. [13], Hussain et al.[25] and Neil A Shepherd et al.[26] found that non neoplastic lesions were more common among duodenal biopsies.

Among the biopsies of upper GIT, majority of the neoplastic lesions were presented as ulcero-proliferative lesions endoscopically. It is similar with other studies. [12,17]

Conclusion

Endoscopy along with the biopsy is the gold standard approach for the diagnosis of upper gastrointestinal lesions. Limitations may occur in the diagnostic interpretation. It might be due to tiny tissue biopsy, handling and processing artifact. Thus, it is recommended that we have to study multiple bits of endoscopic biopsies from abnormal looking mucosa to establish a definitive diagnosis. Thus, endoscopic biopsy provides an opportunity to detect the early lesions like metaplasia, dysplasia so as to prevent their progress to invasive cancer. Thus, it is concluded that endoscopy along biopsy and histopathological examination is an ideal diagnostic tool for better patient care.

Table 1. Correlation of Endoscopic findings with Histopathological findings of Upper GI lesions. (n=103)

Endoscopic findings	Histopathological Diagnosis										
	Non-neoplastic lesion					Neoplastic lesion					
	Gastritis	BE	Dysplasia	NFM	Polyp	SCC	ADC	ADSC	SRC	BGA	NHL
Ulcerative	7	1	8	6	0	18	11	0	0	0	0
Proliferative	0	0	2	3	0	32	4	1	1	0	0
Polypoidal	0	0	0	1	1	2	0	0	0	1	1
Stricture	0	0	0	1	0	2	0	0	0	0	0
Total	7	1	10	11	1	54	15	1	1	1	1

BE: Barrettes esophagus, NFM: Negative for Malignancy, SCC: Squamous Cell Carcinoma, ADC: Adenocarcinoma, ADSC: Adenosquamous cell

Carcinoma, SRC: Signet Ring Cell Carcinoma, BCA: Bronchioalveolar Carcinoma, NHL: Non-Hodgkin's Lymphoma.

Table 2. Distribution of Esophageal lesions according to anatomic site. (n=76)

Site	Histopathological diagnosis										Total
	BE	Dysplasia	NFM	SCC			ADC			ADSC	
				WD	MD	PD	WD	MD	PD		
U 1/3	0	1	4	3	9	1	0	0	0	0	18
M1/3	1	5	2	7	18	4	0	0	0	1	38
L 1/3	0	2	2	2	8	1	1	1	0	0	17
GEJ	0	0	0	0	1	0	1	1	0	0	3
Total	1	8	8	12	36	6	2	2	0	1	76

WD: Well Differentiated, MD: Moderately Differentiated, PD: Poorly Differentiated.

Table 3. Distribution of Gastric lesions according to anatomic site. (n=23)

Site	Histopathological diagnosis									Total
	Gastritis	NFM	Dysplasia	Polyp	ADC			SRADC	NHL	
					WD	MD	PD			
Cardia	0	0	0	0	0	0	0	0	0	0
Fundus	0	0	0	0	0	0	0	0	0	0
Body	1	2	0	1	0	0	0	0	0	4
Antrum	2	0	0	0	2	2	1	1	1	9
Pylorus	4	0	2	0	1	0	3	0	0	10
Total	7	2	2	1	3	2	4	1	1	23

SRADC: Signet ring cell adenocarcinoma.

Table 4. Comparison of site wise distribution of endoscopic biopsies among various studies.

Site	Jaynul SM et al. [14]	Sandhya PG et al. [4]	Memon F et al. [2]	Krishnappa R et al. [7]	Hirachand S et al. [11]	Present Study
Esophagus	20.00 %	06.25 %	39.0 %	25%	05.76 %	73.8%
Stomach	66.36 %	84.85 %	51.3 %	68%	90.12 %	22.4%
Duodenum	13.64 %	05.62 %	09.7 %	07%	04.12 %	03.8%

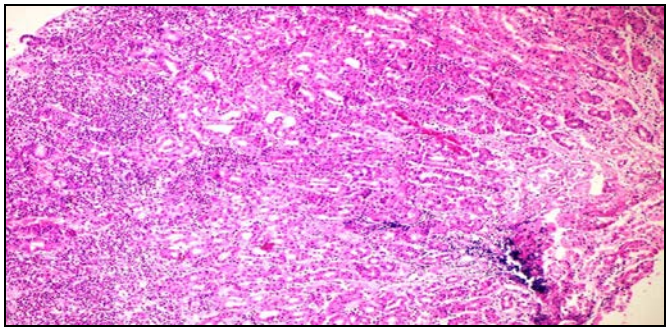

Fig. 1. Chronic gastritis showing gastric gland with dense lymphoplasmacytic infiltrate. (H&E, 10 x).

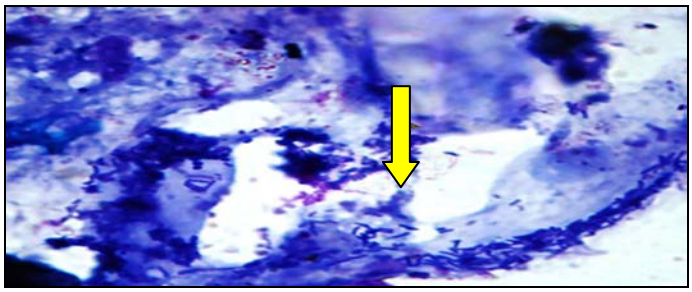

Fig. 2. Spiral shaped Helicobacter pylori in the gastric pit. (Giemsa stain, 100x).

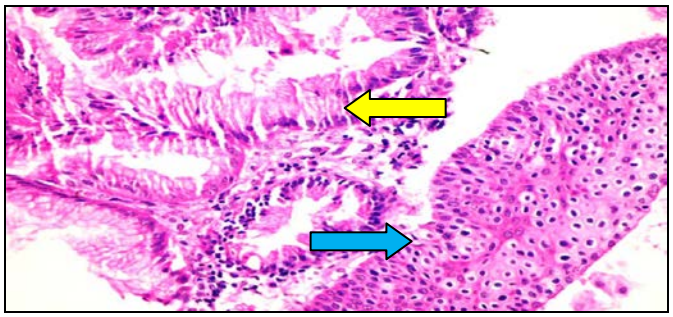

Fig. 3 Barrett's esophagus showing esophageal squamous epithelium (blue arrow) is replaced by

columnar epithelium of intestinal type with goblet cells (yellow arrow). (H&E, 40x).

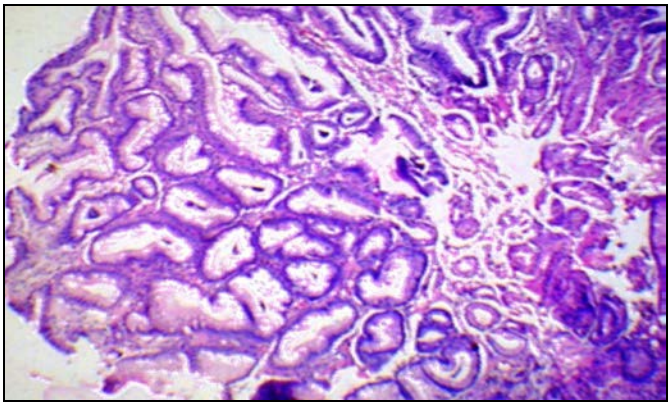

Fig. 4. Gastric Polyp showing cystically dilated glands lined by chief cells, parietal cells and mucinous foveolar cells. (H&E, 40x).

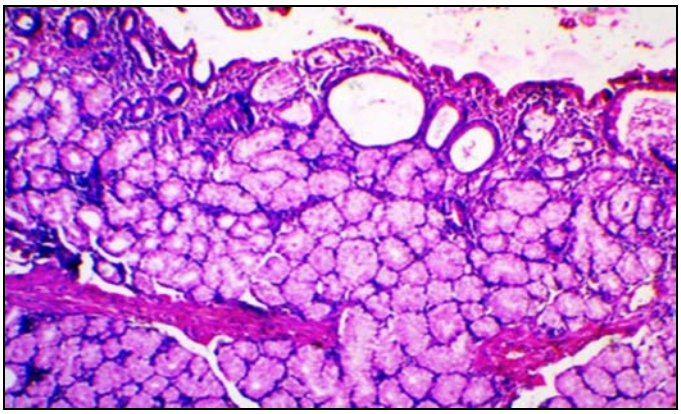

Fig. 5. Brunner gland adenoma showing branched acinotubular glands in submucosa. Glands are lined by cells which stain strongly for mucin. (H&E,40x).

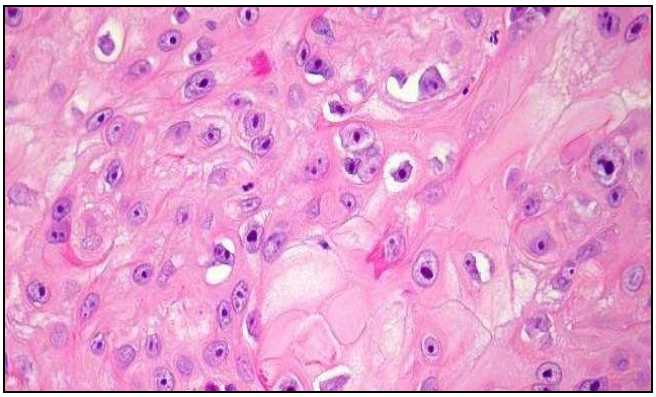

Fig. 6. Well differentiated squamous cell carcinoma of esophagus. (H&E, 40x).

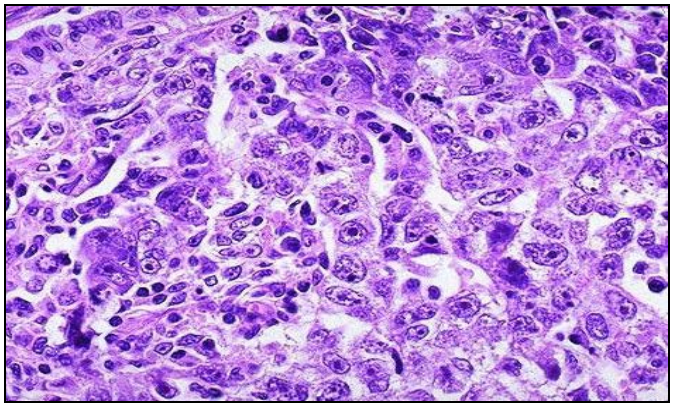

Fig. 7. Poorly differentiated squamous cell carcinoma of esophagus (H&E, 40x).

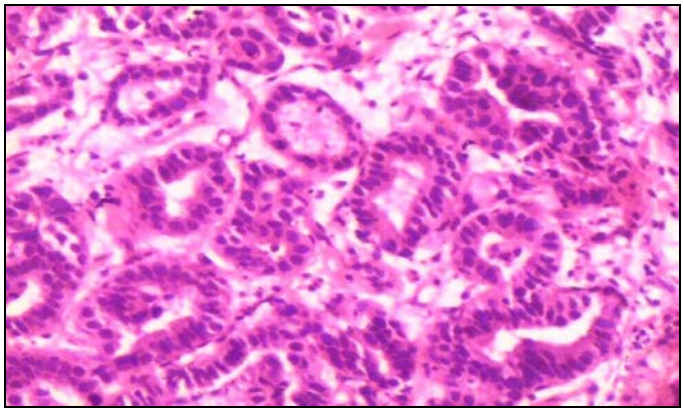

Fig. 8. Well differentiated intestinal type of gastric adenocarcinoma (H&E,40x).

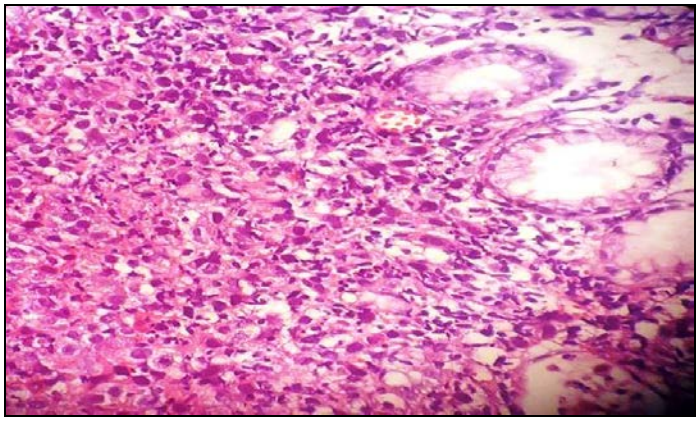

Fig. 9. Poorly differentiated gastric adenocarcinoma (H&E,40x).

References

1. Shah JM, Atit NB, Shah FR, Kakadiya SR (2015) Interpretation of upper gastrointestinal tract endoscopic biopsies-A retrospective study. Int J Sci Res 4: 9.

2. Memon F, Baloch K, Memon AA. Upper gastrointestinal endoscopic biopsy; morphological spectrum of lesions. Professional Med J 2015; 22(12): 1574-79.
3. Black stone MO. Endoscopic interpretation normal and pathologic appearance of the gastrointestinal tract. Raven Press New York 1984;1:13-15.
4. Sandhya PG, Madhusudan C, Naseem N, Balkrishnan CD, Balagurunathan K. Interpretation of upper gastrointestinal tract endoscopic mucosal biopsies- A study conducted in teaching hospital in Punducherry, India. International Journal of Medical and Health Sciences 2012; 1(3): 17-24.
5. Karish nappa rashmi. Horakerappa MS, Ali Karar Ghouri Mangala. A study on histopathologic spectrum of upper gastro intestinal tract endoscopic biopsies Int J Medical Res Health Sciences 2013;2 (3):418-424.
6. Islam SkMJ, Ahmed ASMM, Ahamad MSU, Hafiz SAMMA (2014) Endoscopic and histologic diagnosis of upper gastrointestinal lesions, experience in a port city of Bangladesh. CMOHSMC 13: 11-14.
7. Krishnappa R, Horakerappa MS, Mangala Ali Karar, GouriMangala. A study on histopathologic spectrum of upper gastrointestinal tract endoscopic biopsies. Int J Medical Res Health Sciences 2013; 2(3): 418-24.
8. Shennak MM, Tarawneh MS, Al Sheik. Upper gastrointestinal diseases in symptomatic Jordanians: A prospective study. Ann Saudi Med 1997; 17(4): 471-74.
9. Sheikh BA, Hamdani SM, Malik R. Histopathological spectrum of lesions of upper gastrointestinal tract –A study of endoscopic biopsies. Global Journal of Medicine and Public Health. Vol. 4,No.42015.
10. Khar HB, Umar M, Khurram M, Khan M, Mohammad Z, Goraya F et al. Endoscopic and Histopathological evaluation of 306 dyspeptic patients. Pak j Gastroenterol 2003;17:4--7.
11. Hirachand S. et al. Histopathological spectrum of upper gastrointestinal endoscopic biopsies JBPKIHS 2018;1(1) 68-67.
12. Bhat N. et al. Histopathological Study of Upper Gastrointestinal Endoscopic Biopsies-1 Year Prospective Study. Vol. 6 No. 2:315;2018,1-6.
13. Abilash SC, Hasaf K, Gitanjali MM, Shreelaxmidevi S, Balamuruganvelu S. Histopathologic spectrum of upper gastrointestinal tract mucosal biopsies: A retrospective study. Sch. J. App. Med. Sci. 2016; 4(5): 1807-13.
14. Jaynul Islam SM, Mostaque Ahmed ASM, Uddin Ahamad MS, Hafiz SAMMA. Endoscopic and histologic diagnosis of upper gastrointestinal lesions, experience in a Port City of Bangladesh. ChattagramMaa-o-Shishu Hospital Medical College Journal 2014; 13(3):11-4.
15. Rumana M, Khan AR, Khurshid N, Seema A, Besina S, et al. (2005) The changing pattern of esophagogastric cancer in Kashmir. JK Practitioner Int 12: 189-192.
16. Rupendra T, Mamta L, Pradeep KY, Prakash K, Choodamani A, Kamana S. Histopathological study of endoscopic biopsies. J Nepal Med Assoc 2013;52(190):354--6.
17. Rashmi K, Horakerappa MS, Karar A, Mangala G (2013) A study on Histopathological spectrum of upper gastrointestinal tract endoscopic biopsies. Int J Med Res Health Sci 2: 418-424.

18. Schultz M, Duarte I, Chianale J. Frequancy and histopathological features of chronic gastritis in 300 patients without endoscopic lesions. Rev Med Chill. 1996; 124: 545-52.
19. Thapa R, Lakhey M, Yadav PK, Kandel P, Aryal C, Subba K. Histopathological study of endoscopic biopsies. J Nepal Med Assoc 2013; 52(190): 354-56.
20. Jeshtadi A, Mohammad AM, Kadaru MR, Nagamuthu EA, Kalangi H, Boddu A, Lakkarasu SK, Boila A. Study of gastric biopsies with clinicopathological correlation- A tertiary care centre experience. J. Evid. Based Med. Health 2016; 3(57): 2937-40.
21. Naseema C, Khan AR, Romana M, Saud L. Histopathology of gastric cancer in Kashmir- A five year retrospective analysis. JK Science2007;9(1):21--4.
22. Nafees A Qureshi, Michael T Hallissey, John W Fielding. Outcome of index upper gastrointestinal endoscopy in patients presenting with dysphagia in a tertiary care hospital- A 10 years review. BMC Gastroentrology 2007; 7: 43.
23. Preiser F, Carneiro F, Correa P, Guilfold P, Lambert P, Megraud F. Gastric carcinoma. In: Hamilton SR, Altonen LA, editors. Pathology and genetics of tumors of the digestive system- WHO Classification of tumors. Lyon, France: IARC Press; 2000: 38-52.
24. Cherian JV, Sivaraman R, Muthusamy AK, Jayanthi V. Carcinoma of esophagus in Tamil Nadu (South India): 16 year trends from a tertiary centre. J Gastrointestinal Liver Dis 2007; 16(3): 245-49.
25. Hussian SI, Reshi R, Akther G, Beigh A. A clinicohistopathological study of upper gastrointestinal tract endoscopic biopsies. Int J Cur Res Rev. 2015; 7(16): 78-85.
26. Neil A Shepherd, Roland M Valori. Guidance for endoscopic biopsy in the gastrointestinal tract frontline. Gastroenterology. 2014; 5(2): 84-7.