Patterns of Histomorphology of Upper GI Lesions Diagnosed on Endoscopic Biopsies; A Retrospective Analysis

Umme Kulsum Munmun (munmundmc61@gmail.com)
Dhaka Medical College and Hospital https://orcid.org/0000-0001-7231-0559
Mohammed Kamal
Bangabandhu Sheikh Mujib Medical University
Saqi Md. Abdul Baqi
Dhaka Medical College and Hospital
Musab Khalil
Sheikh Russel Gastroliver Institute & Hospital
Monika Mehjabin
Shaheed Suhrawardy Medical College and Hospital
Mohammed Imran Hassan
National Institute of Diseases of the Chest & Hospital
Nurejannat Ferdousi
M Abdur Rahim Medical College
Fatama Akter Chowdhury
Dhaka Medical College and Hospital
Mizanur Rahman
Dhaka Medical College and Hospital
Sarmin Sultana
Dhaka Medical College and Hospital

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Abstract

Background: Disorders of upper gastrointestinal tract are one of the most commonly encountered problems in Bangladesh. A variety of benign and malignant disorders of the upper gastrointestinal tract may give rise to overlapping clinical features. No definite data is available in this country regarding Upper GIT lesions.

Objectives: To determine the spectrum of histomorphological features of the lesions of upper gastrointestinal tract in Bangladesh.

Methods: This retrospective observational study was conducted in one of the busiest histopathology lab in Bangladesh named 'The Laboratory' during November to December 20. One year's data from January'2018 to December'2018 were used.

Results: A total 1390 endoscopic biopsies were evaluated. Out of which, 790 cases were gastric, 302 were from esophagus and 298 were from duodenum. 279 (35.32%) malignant cases were found in case of gastric biopsies. The most common malignancy was adenocarcinoma. Out of 302 oesophageal biopsies, 170 (56.29%) cases were malignant. The most common of these malignancies are invasive squamous cell carcinoma (40.06%) followed by adenocarcinoma. Duodenal biopsies include 12 (4.02%) adenocarcinoma and 8 (2.65%) non-Hodgkin lymphoma cases.

Conclusion: Endoscopy is incomplete without histopathological examination of biopsy and so, the combinations of these two methods play an important role in diagnosis and management of upper gastrointestinal tract disorders. Protocol based tissue sampling and appropriate reporting systems will help in this regard.

Introduction

Diseases of upper gastrointestinal tract are responsible for a great deal of morbidity and mortality and are one of the most commonly encountered problems in clinical practice. Upper GIT endoscopy is now the investigation of choice now-a-days for the disorders which often present with dyspepsia [1]. Endoscopy generates biopsy from sites that were previously inaccessible without a major resection procedure. Endoscopic biopsy followed by histopathological examination is the gold standard for the diagnosis of endoscopically detected lesions [2]. GI symptomatology tends to be nonspecific and poorly correlates with organic etiology seen on endoscopy. Abnormal endoscopic appearance may indicate a disease state, biopsy should be taken in that case. In cases where the GI mucosa appears apparently normal with endoscopy, the use of biopsy may still be beneficial in determining GI pathology. [3–5]. Implementation of recent protocols for taking biopsies and usage of appropriate classifications for reporting biopsies has revolutionised our understanding of the basic pathology [6]. The oesophagus and stomach can be sampled for a wide variety of infections, inflammatory disorders, mechanical conditions, toxic and physical reactions including radiation injury, vascular disorders, and neoplastic conditions [7]. Gastric biopsy also permits to explore H. pylori, early detection of malignant lesions, and also detect

gastric mucosal lesions like; intestinal metaplasia and dysplasia which may progress to invasive cancer [8]. The prevalence of Helicobacter pylori (H. pylori) infection is very common in Asian countries like; Bangladesh, India, Thailand and Vietnam reported at 92%, 81%, 74%and 75% respectively [9–12]. Helicobacter pylori (H. pylori) causes gastritis, dyspepsia, gastric adenocarcinoma and gastric lymphoma of mucosa associated lymphoid tissue (MALT) [13]. Histological diagnosis is entirely dependent on the clinical information provided and the questions that are being asked. So it is essential for each endoscopy unit to develop, in conjunction with the pathology departments, simple guidance on what information to provide on requisitions [14].

There are limited data in Bangladesh about the GI disease spectrum. For this reason this study was carried out to determine the spectrum of morphological lesions of upper GIT in this country by histopathological examination and to rationalize the sampling of GI biopsy.

Methods

This retrospective study was conducted at one of the busiest histopathology laboratory of Bangladesh named ‘The Laboratory’. The study was carried out from November to December 2020. A total of 1390 endoscopic biopsies were evaluated in these study. All these cases were diagnosed previously from January 2018 to December 2018 (1 year). Haematoxylin & Eosin stained sections of all the biopsy samples were taken. Additional sections had also been stained with Giemsa to observe H. Pylori. Periodic Acid Schiff (PAS) stain was performed wherever necessary. Grading for duodenal biopsies was done according to Modified Marsh Classification. All tumors were classified according to the WHO classification.

Data analysis

Statistical analyses were performed using SPSS version 23. Gender was expressed in male female ratio. Categorial variables were expressed in percentage.

Results

In this study, out of 1390 cases, 784 (56.4%) were males and 606 (43.6%) were females with male to female ratio of 1.3:1. .Among all cases the majority (790) were gastric biopsies which comprised 56.83%. The youngest patient was 11 years female with chronic active gastritis and the oldest patient was 90 years male with epithelioid gastrointestinal stromal tumour. 302 (21.73%) were oesophageal biopsies. The youngest patient was 21 years female with reflux oesophagitis and the oldest patient was 95 years male with moderately differentiated invasive squamous cell carcinoma. The rest of the cases (298; 21.44%) were duodenal biopsies. The youngest patient was 16 years male with giardiasis and the oldest patient was 85 years male with moderately differentiated adenocarcinoma. The results of site distribution of upper GI biopsies shown in **(Fig. 1**).

Distribution of different histomorphological findings of oesophageal biopsies are given in Table 1. Out of 302 oesophageal biopsies, 170 (56.29%) cases were malignant. The most common of these malignancies are invasive squamous cell carcinoma (40.06%) followed by adenocarcinoma (15.56%) (Table 1).

Table 1
Histopathological findings in esophageal biopsies (302 cases)

Lesions	No. of cases	Percentage	Lesions	No. of cases	Percentage
Invasive squamous cell carcinoma	121	40.06%	Squamous papilloma	6	1.99%
Adenocarcinoma	47	15.56%	Dysplasia	2	0.66%
Hyperplastic mucosa	25	8.28%	Ulcer	8	2.65%
Barrett's oesophagus	12	3.97%	Candidiasis	2	0.66%
Reflux Oesophagitis	5	1.66%	Hyperplastic polyp	6	1.99%
Small cell carcinoma	2	0.66%	Fibroepithelial polyp	2	0.66%
Gastric hetertopia	1	0.33%	Inconclusive diagnosis	62	20.53%
Leiomyoma	1	0.33%			

Distribution of different histomorphological findings of gastric biopsies are given in Table 2.

Table 2
Histopathological findings in gastric biopsies (790 cases)

Lesions	No. of cases	Percentage (%)	Lesions	No. of cases	Percentage (%)
Adenocarcinoma	261	33.04%	Fundic gland poyp	18	2.28%
Chronic nonspecific gastritis	92	11.65%	Small cell neuroendocrine carcinoma	2	0.25%
Gastrointestinal stromal tumour	4	0.50%	Tubulovillous adenoma with low-grade dysplasia	3	0.38%
Early gastric cancer	2	0.25%	Tubular adenoma with low-grade dysplasia	1	0.13%
Chronic active gastritis without H. pylori	52	6.58%	Tubular adenoma with high-grade dysplasia	1	0.13%
Chronic active gastritis with H. pylori	7	0.88%	Granulomatous inflammation, suggestinve of TB	1	0.13%
Chronic gastritis with intestinal metaplasia	84	10.63%	Ulcer	27	3.42%
Non-Hodgkin lymphoma	6	0.76%	Erosive gastritis	11	1.39%
Hyperplastic polyp	103	13.04%	Eosinophilic gastritis	2	0.25%
Parietal cell hyperplasia	32	4.05%	Chronic atrophic gastritis	2	0.25%
Chronic gastritis with xanthomatous change	3	0.38%	Adenocarcinoma, D/D: Small cell neuroendocrine carcinoma; IHC advised	2	0.25%
Lipoma	2	0.25%	Adenocarcinoma, D/D: Large cell neuroendocrine carcinoma; IHC advised	1	0.13%
Poorly differentiated adenocarcinoma, D/D:NHL; IHC advised	3	0.38%	Poorly differentiated adenocarcinoma, D/D:GIST; IHC advised	2	0.25%
			Inconclusive diagnosis	67	8.48%

Table 3. Distribution of different histomorphological findings of duodenal biopsies are given.

Lesions	No. of cases	Percentage	Lesions	No. of cases	Percentage
Chronic duodenitis	161	54.02%	Tubulovillous adenoma with low-grade dysplasia	4	1.343%
Adenocarcinoma	12	4.02%	Tubular adenoma with low-grade dysplasia	2	0.67%
Non-Hodgkin lymphoma	8	2.65%	Tubular adenoma with high-grade dysplasia	1	0.33%
Carcinoid	5	1.67%	Brunner gland hyperplasia	8	2.65%
Duodenal ulcer	8	2.65%	Brunner gland adenoma	1	0.33%
Lymphoid hyperplasia/follicular duodenitis	15	5.02%	Peutz Jegher polyp	2	0.67%
Active duodenitis	8	2.65%	Hyperplastic polyp	11	3.68%
Erosion	3	1.01%	Chronic duodenitis with partial villous atrophy (MARSH type 3a)	9	3.01%
Strongyloides stercoralis/ Nematode infestation	8	2.65%	Total villous atrophy (MARSH type 3c)	1	0.33%
Gastrointestinal stromal tumour	2	0.67%	Giardiasis	4	1.33%
Lipomatous polyp	2	0.67%	Gastric metaplasia	1	0.33%
Lymphangiectasia	3	1.01%	Inconclusive diagnosis	19	6.37%

In case of gastric biopsies, 279 (35.32%) malignant cases were found. Of these, adenocarcinoma was the most frequent (33.04%). These include 22 (2.78%) signet ring cell carcinoma and 3 (0.38%) mucinous carcinoma cases. Among the non-neoplastic cases, chronic gastritis was the most common (30%). Of these, 92 cases (11.65%) were non-specific, 84 cases (10.63%) were chronic gastritis with intestinal metaplasia, 2 cases (0.25%) were chronic atrophic gastritis, 59 cases (7.46%) were chronic active gastritis which includes 7 cases of active gastritis with H. pylori infection (0.88%) (Table 2).

Distribution of different histomorphological findings of duodenal biopsies are given in Table 3.

Malignancies were least common in case of duodenal biopsies. These include 12 (4.02%) adenocarcinoma and 8 (2.65%) non-Hodgkin lymphoma cases. Chronic duodenitis was the most frequent (54.02%) among the non-neoplastic cases (Table 3). Out of the 298 duodenal biopsies, 17 were from the

second part and 33 were from the distal duodenum. Ten cases of distal duodenal biopsies showed features of celiac disease.

Discussion

Gastric and esophageal cancers are the most common cancers found in men, while esophageal cancer ranks third among women after breast and cervical cancers [15]. So it is essential to detect these malignant lesions at an early stage and also to differentiate them from other benign and inflammatory conditions that may give rise to an overlapping symptomatology. Adequate clinical and endoscopic information is a fundamental prerequisite for diagnostic accuracy [16]. Limitations in diagnostic interpretation are sometimes encountered due to tiny biopsy material, handling and processing artefacts and due to lack of co-operation with the clinician. In this study, a noteworthy proportion of cases including 20.53% oesophageal biopsies, 8.48% gastric biopsies and 6.37% duodenal biopsies could not be reported out with a conclusive diagnosis. To overcome these pitfalls, multiple bits of endoscopic biopsies from abnormal looking mucosa are recommended. Proper co-opearation of the endoscopy units with the pathology department is also essential for precise diagnosis. A systematic approach is a must while reporting because it can be life-saving in many cases [6].

In this study, the most common site for upper endoscopic biopsy was from stomach, followed by esophagus and duodenum. A male to female ratio of 1.3:1 was observed in our study. These results were almost similar to the studies carried out by Sarker et al and Shennak et al [17, 18]. This male predominance could be due to their exposure to risk factors more often than females. Of the total 302 cases of esophageal biopsies, 56.29% constituted malignant lesions. The most common malignancy was squamous cell carcinoma (40.06%). In stomach biopsies, 35.32% cases were malignant. The most common malignancy was adenocarcinoma. These findings correlate with the study of Rashmi et al [19].

Among the non-neoplastic gastric biopsies, chronic gastritis was the most common (30%). Of these, 92 cases (11.65%) were non-specific, 84 cases (10.63%) were chronic gastritis with intestinal metaplasia, 59 cases (7.46%) were chronic active gastritis which is defined histologically by presence of neutrophils and lymphocytes in the lamina propria. Of the 59 (7.46%) cases of chronic active gastritis, 7 cases were chronic active gastritis with H. pylori infection (0.88%) (Table 2). H. pylori negative chronic active gastritis cases could be due to intake of proton pump inhibitors prior to endoscopic biopsy or failure to see H. pylori in the tissue specimens. Similar findings were observed in studies done by Hirachand et al, Shultz M et al. and Thapa R et al [20–22].

Most of the duodenal biopsies showed non-neoplastic lesions. The commonest lesions being chronic non-specific duodenitis (54.02%), Total 10 cases of distal duodenal biopsies revealed histologic features of celiac disease. The findings are similar to studies done by Hirachad et al, Abilash SC et al, Hussain et al and Neil A Shepherd et al [20, 23–25].

Conclusion

Endoscopy with assisted biopsy is the gold standard in the diagnosis of upper gastrointestinal tract lesions. Endoscopic biopsies can detect changing patterns in the spectrum of lesions besides detecting upper GI mucosal lesions at an early stage especially atrophy intestinal metaplasia and dysplasia so as to prevent progress of these lesions to invasive cancer. Protocol based tissue sampling along with usage of appropriate reporting systems will help in providing an accurate diagnosis. We recommend further study considering both the endoscopic findings and microscopic diagnoses. It will encourage the cooperation among the clinicians and pathologists. Moreover, this can guide the clinicians where to avoid unnecessary biopsy keeping in mind the cost effectiveness of the procedure.

Declarations

Funding

This study did not get any grants.

Availability of Data and Material

These are available upon reasonable request.

Code Availability

Not applicable

Authors' Contributions

UKM, SMAB, MM and MIH generated the idea and developed the design of this study. MK participated in taking endoscopic biopsy samples from the patients. UKM, MM, MR and SS were involved in gross examination of the tissue samples. Professor MK made the microscopic diagnoses and provided the pictures of the cases. UKM collected the data. MR, SS and FAC helped in manuscript writing and data analysis. All the authors read and approved the final manuscript.

Ethical Approval

Ethical approval was obtained from the ethical review committee of Dhaka Medical College. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

As because this was a retrospective study and our study materials were previously diagnosed cases, so informed consent was taken verbally over telephone from each participants.

Conflict of Interest

The authors declare that they have no competing interests.

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References

1. Mustapha SK, Bolori MT, Ajayi NA, Nggada HA, Pindiga UH, et al. Endoscopic Findings and the Frequency of Helicobacter Pylori Among Dyspeptic Patients in North-Eastern Nigeria. Highland Med Res J. 2007;5:1528–32.
2. Krishnappa R, Horakerappa MS, Karar MA. GouriMangala. A study on histopathologic spectrum of upper gastrointestinal tract endoscopic biopsies. Int J Medical Res Health Sciences. 2013;2(3):418–24.
3. Liacouras CA, Spergel JM, Ruchelli E, Verma R, Mascarenhas M, Semeao E, Flick J, Kelly J, Brown–Whitehorn T, Mamula P, Markowitz JE. Eosinophilic esophagitis: a 10-year experience in 381 children. Clinical gastroenterology and hepatology. 2005 Dec 1; 3(12): 1198–206.
4. Oxentenko AS, Grisolano SW, Murray JA, Burgart LJ, Dierkhising RA, Alexander JA. The insensitivity of endoscopic markers in celiac disease. The American journal of gastroenterology. 2002 Apr 1;97(4):933-8.
5. Yantiss RK, Odze RD. Optimal approach to obtaining mucosal biopsies for assessment of inflammatory disorders of the gastrointestinal tract. Am J Gastroenterol. 2009 Mar;1(3):774–83. 104(.
6. Montgomery E, Voltaggio L. Biopsy interpretation of the gastrointestinal tract mucosa volume 1: Non-Neoplastic. 2nd ed. Philadelphia: Lippincott Williams and Wilkins; 2012.
7. Rosai JI. Rosai and Ackerman's Surgical Pathology. 9th ed. St Louis: Mosby; 2004. pp. 648–711.
8. Barr H. Endoscopic screening for upper gastrointestinal malignancy. In Therapeutic Gastrointestinal Endoscopy A problem-oriented approach 2019 Oct 1; 53–66.
9. Ahmad MM, Rahman M, Rumi AK, Islam S, Huq F, Chowdhury MF, et al. Prevalence of Helicobacter pylori in asymptomatic population - a pilot serological study in Bangladesh. J Epidemiol. 1997;7:251–4.
10. Ramakrishna BS. Helicobacter pylori infection in India: the case against eradication. Indian J Gastroenterol. 2006;25(1):25.
11. Perez-perez GI, Taylor DN, Bodhidatta L, Wongsrichanalai J, Baze WB, et al. Seroprevalence of Helicobacter pylori infections in Thailand. J Infect Dis. 1990;161:1237–41.
12. Hoang TT, Bengtsson C, Phung DC, Sorberg M, Granstrom M. Seroprevalence of Helicobacter pylori infection in urban and rural Vietnam. Clin Diagn Lab Immunol. 2005;12:81 85.

13. Kumar A, Bansal R, Pathak VP, Kishore S, Karya PK. Histopathological changes in gastric mucosa colonized by H. pylori. Indian J Pathol Microbiol. 2006;49(3):352–6.
14. Peixoto A, Silva M, Pereira P, Macedo G. Biopsies in gastrointestinal endoscopy: when and how. GE Portuguese Journal of Gastroenterology. 2016;23(1):19–27.
15. National cancer Registry Programme. First All India Report 2001–2002. Vol. 1. India: Indian Council of Medical Research Bangalore; April 2004.
16. Islam SM, Ahmed AM, Ahmad MS, Hafiz SA. Endoscopic and histologic diagnosis of upper gastrointestinal lesions, Experience in a port city of Bangladesh. Chattagram Maa-O-Shishu Hospital Medical College Journal. 2014 Nov 28; 13(3):11–4.
17. Sarker MMR, Farooq MS, Uddin KS, Islam ASMA, Ali MZ. Pattern of upper GIT lesions diagnosed by histopathological examination of endoscopic biopsies in a rural tertiary hospital. KYAMC Journal. 2018;9(1):20–3.
18. Shennak MM, Tarawneh MS, Al-Sheik. Upper gastrointestinal diseases in symptomatic Jordanians: A prospective endoscopic study. Ann Saudi Medicine. 1997;17(4):471–4.
19. Krishnappa R, Horakerappa MS, Ali K, Gouri M. A study on histopathological spectrum of upper gastrointestinal tract endoscopic biopsies. International Journal of Medical Research Health Sciences. 2013;2(3):418–24.
20. Hirachand S, Sthapit RR, Gurung P, Pradhanang S, Thapa R, Sedhai M, Regmi S. Histopathological spectrum of upper gastrointestinal endoscopic biopsies. Journal of BP Koirala Institute of Health Sciences. 2018 May;3(1):67–74. 1(.
21. 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.
22. 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.
23. 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.
24. Hussain SI, Reshi R, Akhter G, Beigh A. Clinico histopathological study of upper gastrointestinal tract endoscopic biopsies. International Journal of Current Research and Review. 2015 Aug 15; 7(16):78.
25. Neil A, Shepherd, Roland M, Valori. Guidance for endoscopic biopsy in the gastrointestinal tract frontline. Gastroenterology. 2014;5(2):84–7.

Figures

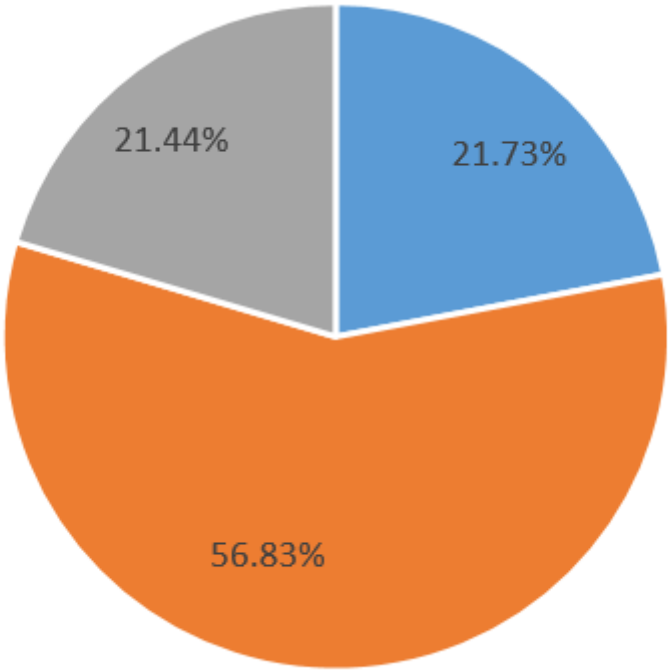

Figure 1

Site distribution of upper GI biopsies

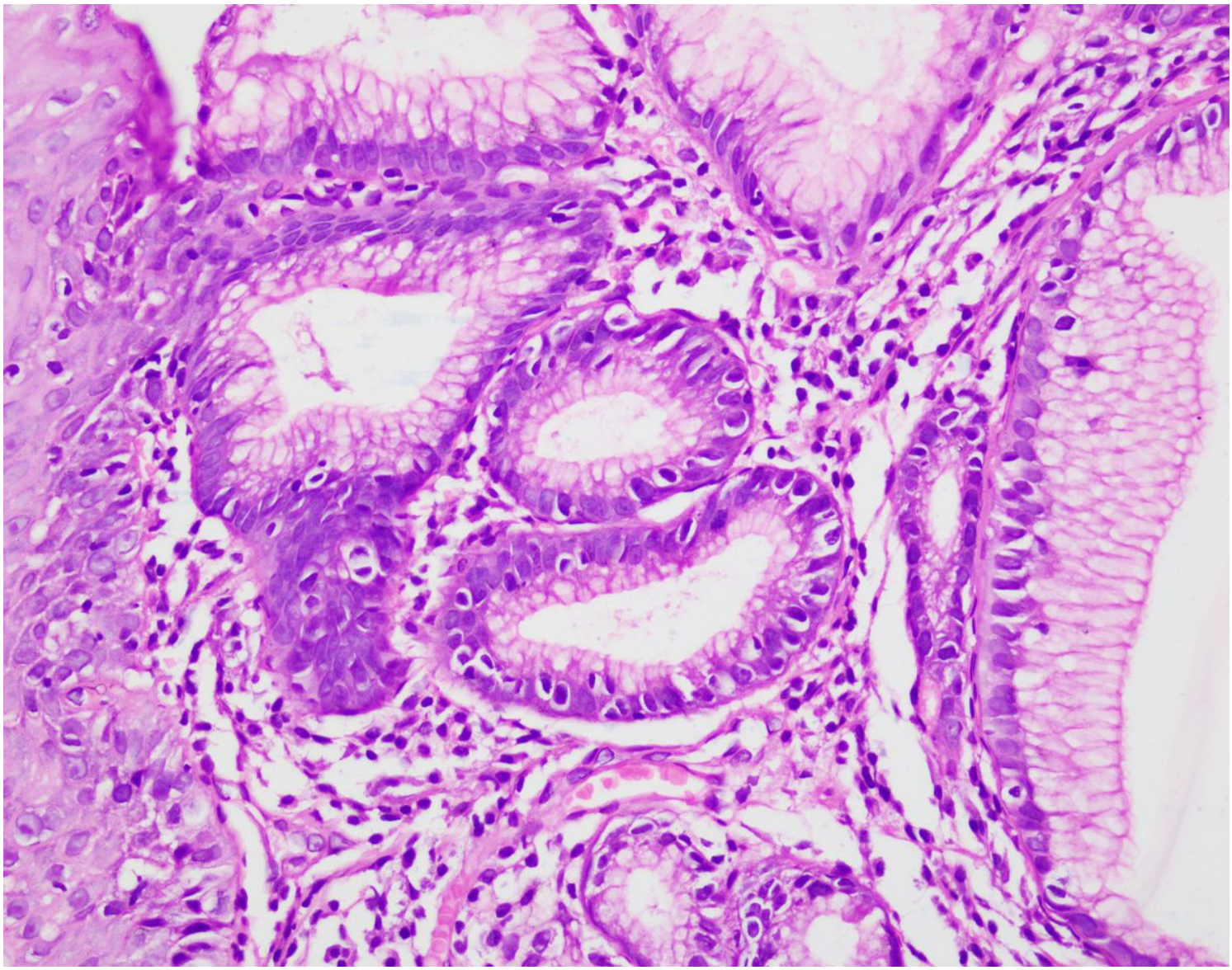

Figure 2

Oesophageal biopsy: Barrett's oesophagus

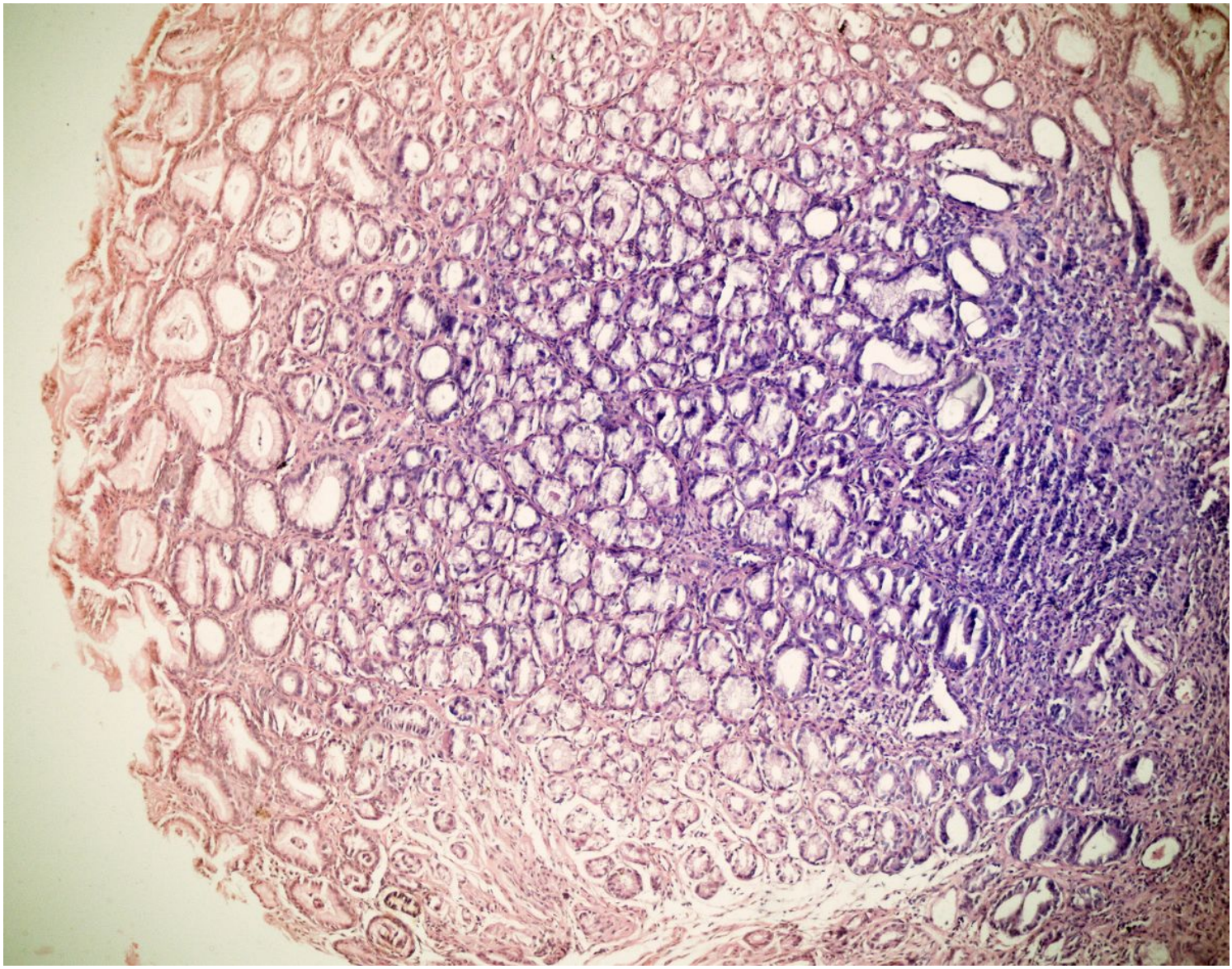

Figure 3

Gastric biopsy: Fundic gland polyp

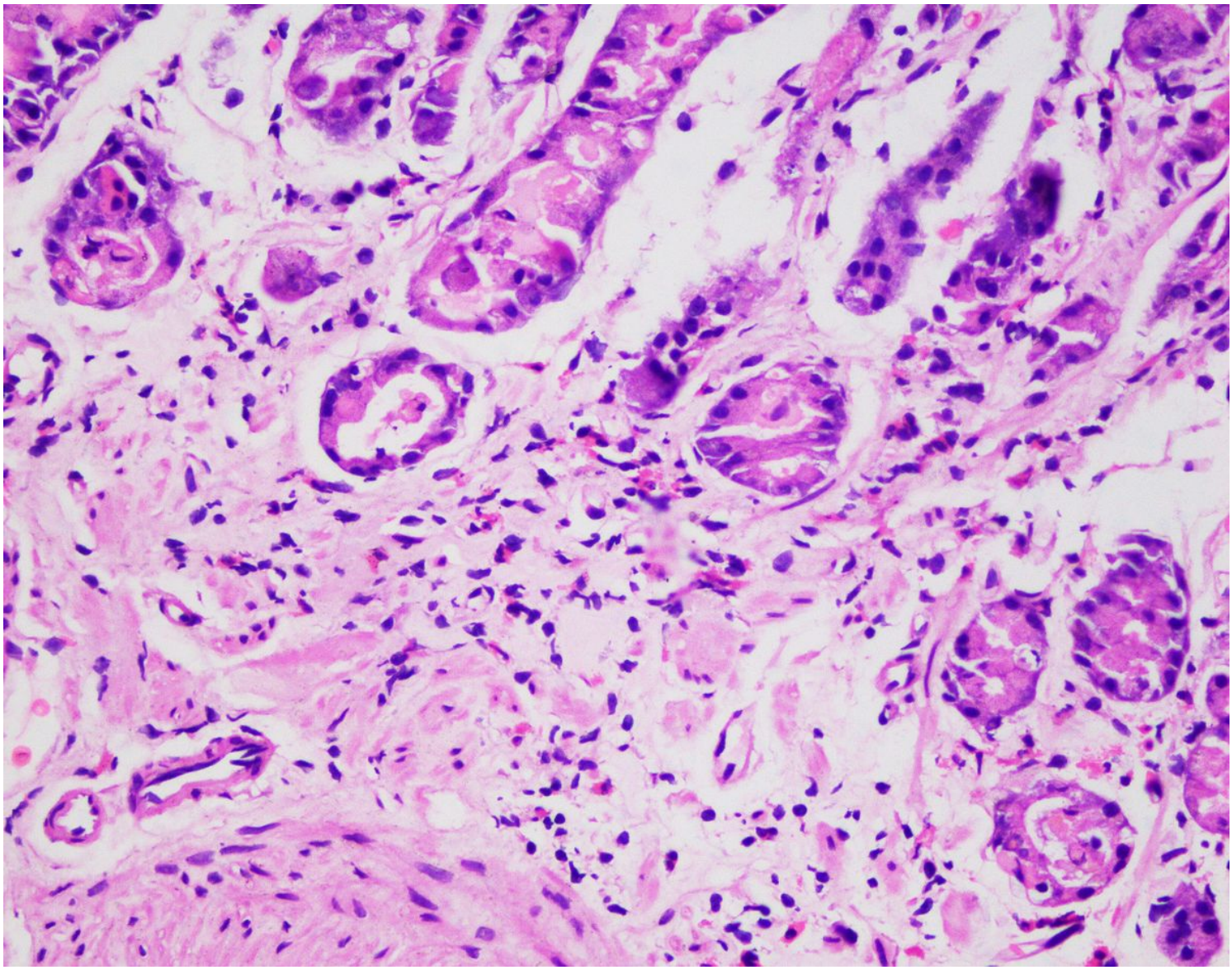

Figure 4

Gastric biopsy: Active gastritis

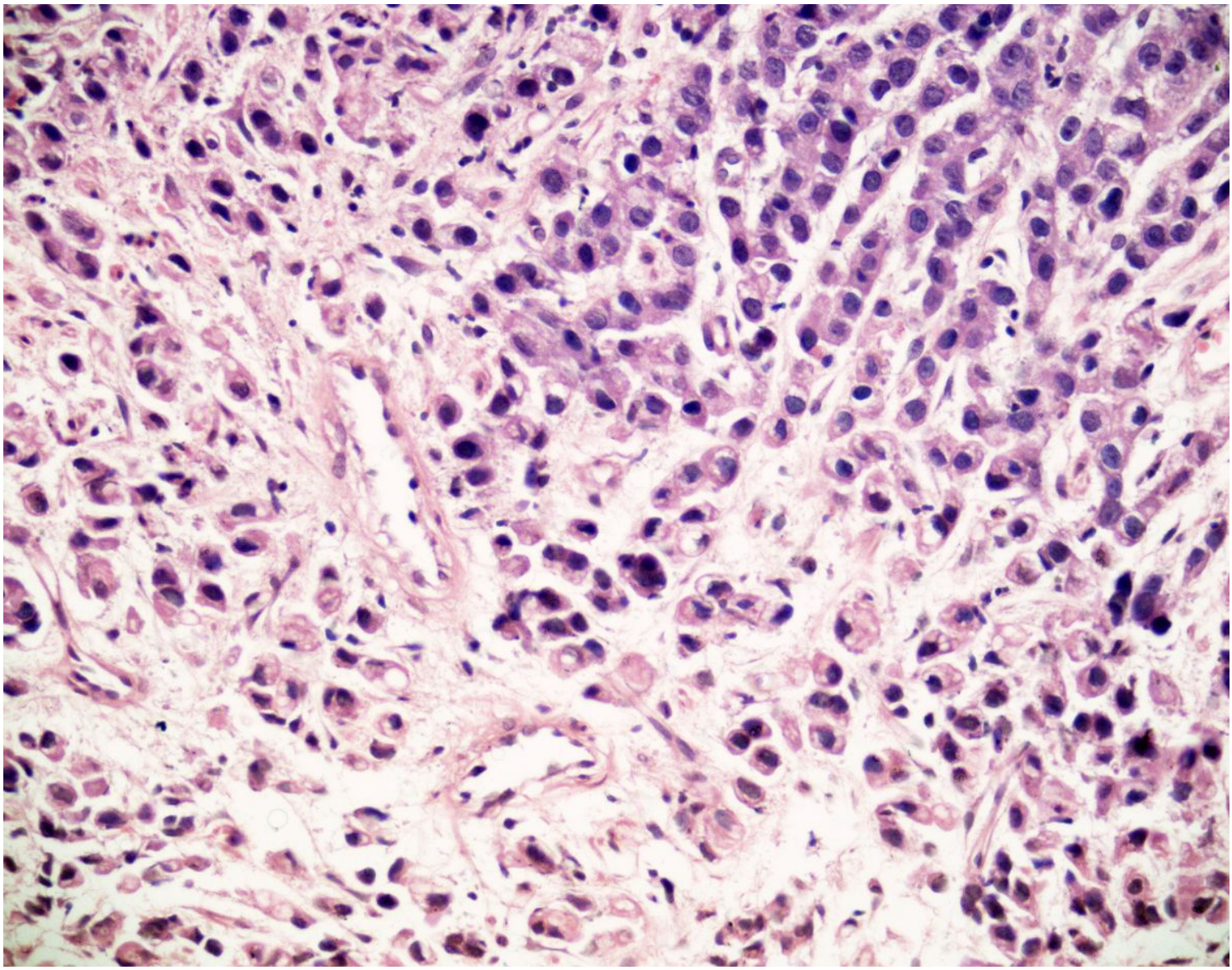

Figure 5

Gastric biopsy: Signet ring cell carcinoma

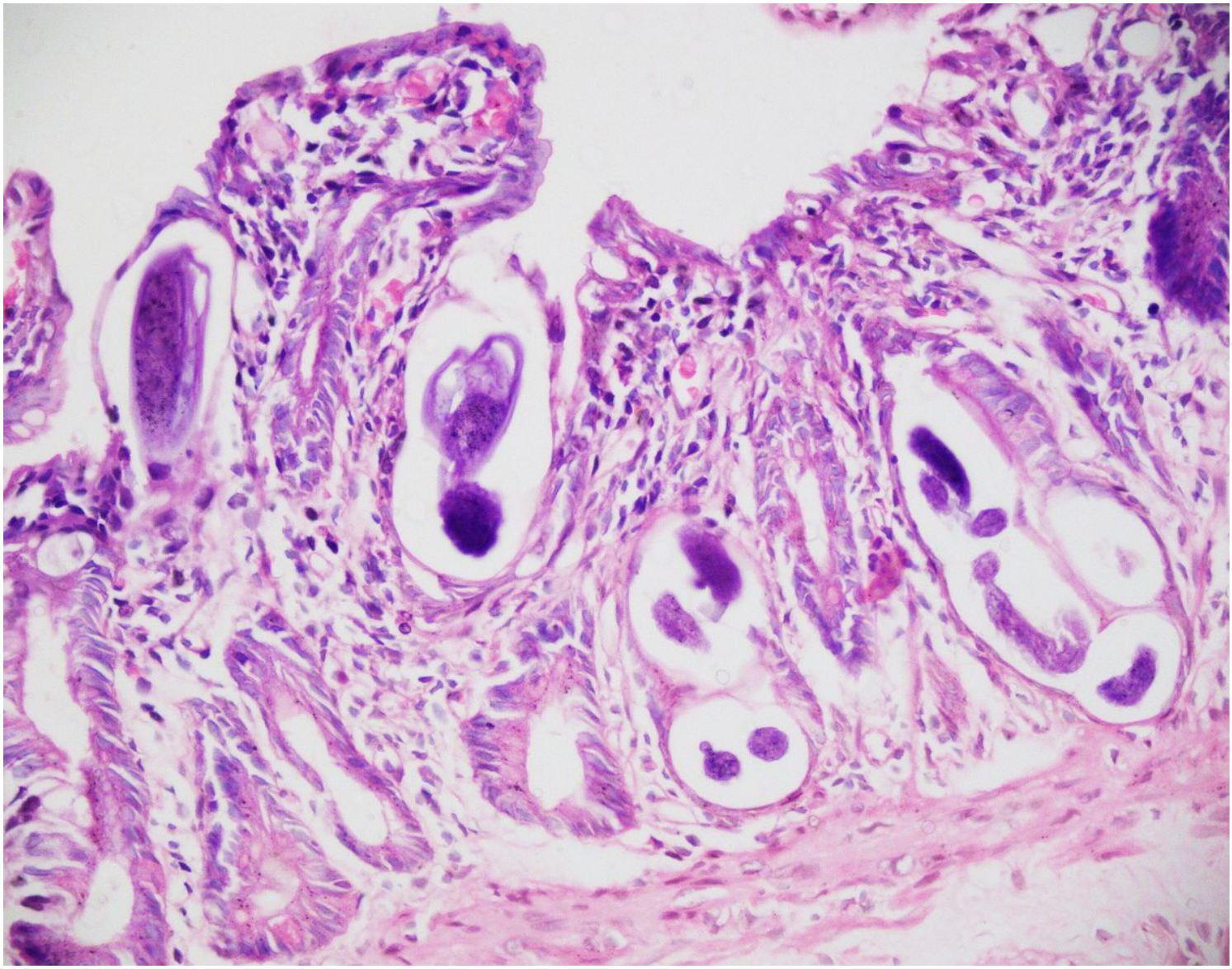

Figure 6

Duodenal biopsy: Strongyloides Stercoralis infection

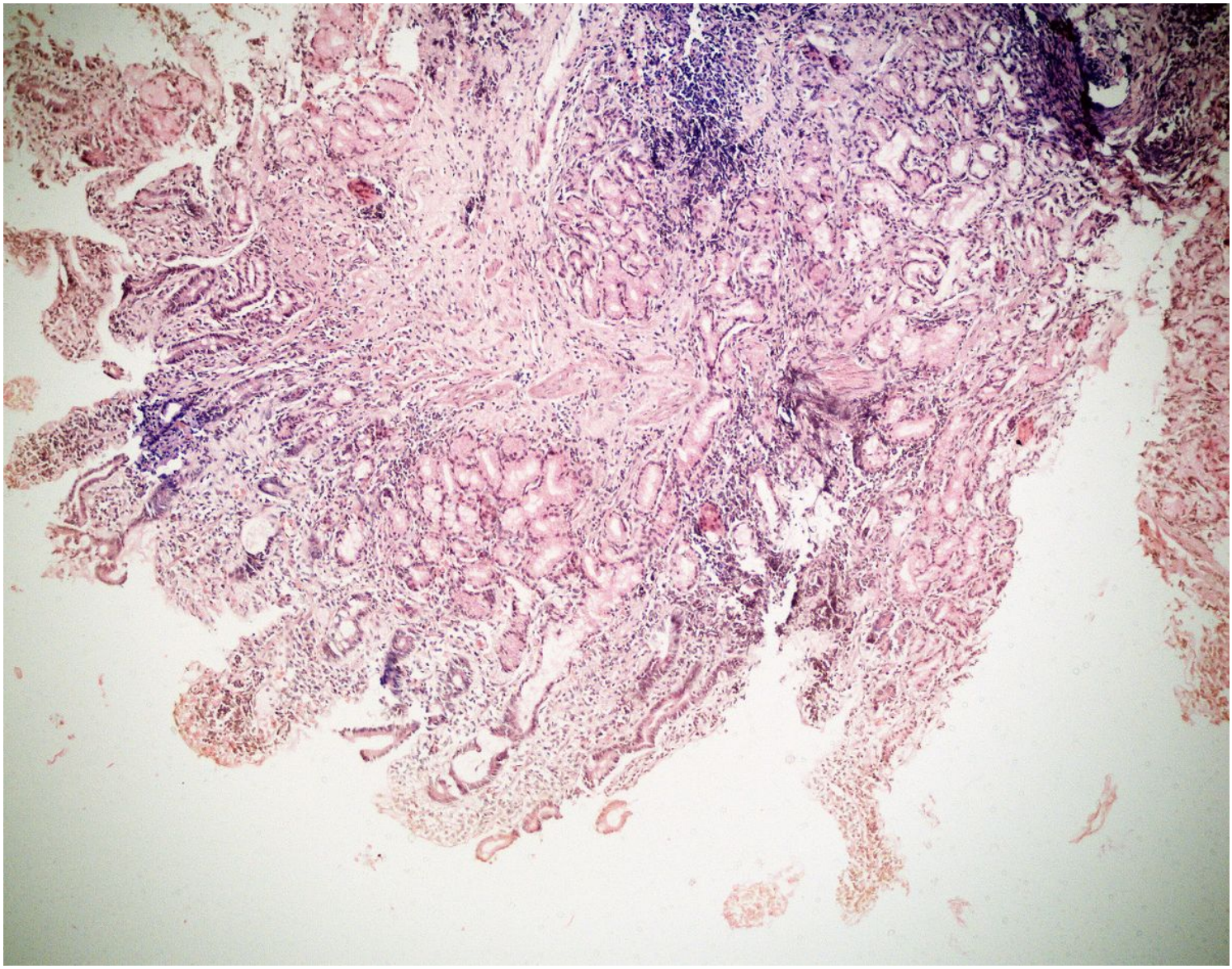

Figure 7

Duodenal biopsy: Brunner gland hyperplasia