A Study of Spectrum of Histopathology of Colorectal Lesions – A Tertiary Care Centre Experience

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ABSTRACT:
BACKGROUND:
Patients with colorectal lesions constitute significant load in routine clinical practice. Colorectal endoscopic biopsies pose significant challenge to pathologists for reporting as they are often inadequate or nonrepresentative.
AIMS AND OBJECTIVES:
1.To study the gross features of colorectal biopsies
2.To study the spectrum of histopathology of colorectal biopsies.
MATERIALS AND METHODS:
This is a retrospective observational study done for a period of 1 year from period of January 2021 to December 2021 in the Department of Pathology,Andhra Medical College.Surgically operated specimens and endoscopic biopsies of colorectal lesions received in the Department of Pathology were included in the present study.All the cases irrespective of age and sex were included in the study.
RESULTS:
A total of 54 specimens of colorectal lesions were received for histopathological examination.Of them ,endoscopic biospies were 23 resected colonic segments were 25 cases and 6 cases of polypectomy.Spectrum of histopathology of colorectal lesions ranged from nonneoplastic lesions to malignancies.Nonneoplastic lesions (23 cases) were nonspecific colitis,nonspecific ulcer,volvulus,gangrene,ulcerative colitis,inflammatory polyp and granulomatous colitis. 30 cases of malignancies seen.
CONCLUSION:
Focussed accurate histological diagnosis is possible with adequate representative colonoscopic biopsies in correlation with clinical history and colonoscopic findings. Histopathology helps in early diagnosis,guidance to treatment,follow up and surveillance for colorectal lesions.
KEYWORDS: *Colorectal lesions,histopathology,endoscopy,adequacy*

I. Introduction:

The dietary pattern is changing constantly among younger generation which has big negative impact on health of their gastrointestinal system. Addictive habits such as consumption of tobacco and cigarette smoking also increased among population. The diets with low fibre content, high chilly content and consumption of alcohol, tobacco result in many gastrointestinal lesions including malignancies. Patients with colorectal lesions constitute significant load in routine clinical practice.There is rising trend in the incidence of colorectal carcinoma in India attributed to changing dietary habits.[1].

The symptoms are heterogenous in terms of severity and frequency for any given colorectal pathology.

Detailed history taking and thorough clinical examination helps to categorise the patients who need further evaluation with radioimaging, endoscopy ,biopsy and also to diagnose, treat malignancies at an earlier stage.Adenocarcinoma of colon is the most common malignancy of gastrointestinal tract.Adenocarcinoma of colorectum is responsible for nearly 10% of all cancer deaths.[2]

Colorectal endoscopic biopsies pose significant challenge to pathologists for reporting as they are often inadequate or nonrepresentative.

The current recommendation for colorectal cancer screening in most countries is to begin screening at age 50 for men and women who are at average risk for developing colorectal cancer with endoscopy and biopsy.Artificial intelligence based histopathology image classification approach for colorectal carcinoma diagnosis is a blooming technology for screening and surveillance for colorectal carcinoma.[3]

Pathologists must be cautious while reporting malignancies in endoscopic biopsies as surgeons proceed for colectomy which has high rate of morbidity and mortality in patients.

This article describes regarding the spectrum of histopathology of colorectal lesions with a short emphasise on importance of endoscopic biopsies of colorectal lesions.

KEYWORDS: Colorectal lesions,histopathology,endoscopy,adequacy

AIMS AND OBJECTIVES:
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II. Materials And Methods:

This is a retrospective observational study done for a period of 1 year from period of January 2021 to December 2021 in the Department of Pathology,Andhra Medical College.Surgically operated specimens and endoscopic biopsies of colorectal lesions received in the Department of Pathology were included in the present study.All the cases irrespective of age and sex were included in the study.Specimens were fixed in 10% formalin for 24 hours.Grossing of specimens was done as per standard protocol and representative sections were submitted for processing.Processed specimens were embedded in paraffin wax blocks and thin sections of 3-4 microns were cut.Sections were stained with Hematoxylin and Eosin stain for histopathological analysis.Special stains were done wherever necessary.

III. Results:

A total of 54 specimens of colorectal lesions were received for histopathological examination.Of them ,endoscopic biospies were 23,resected colonic segments were 25 cases and 6 cases of polypectomy (Table-1)

The age of patients ranged from 3 months to 93 years.Males were 28 and females were 26 cases.Age and sex distribution of cases with colorectal lesions were mentioned in Table-2 and Table-3 respectively.

Majority of lesions were from rectum (15), followed by sigmoid volvulus (10) and rectosigmoid junction (7).Location of colorectal lesions was mentioned in Table-4

Spectrum of histopathology of colorectal lesions ranged from nonneoplastic lesions to malignancies (Table-5).Nonneoplastic lesions were 23 cases and were nonspecific colitis,nonspecific ulcer,volvulus,gangrene,ulcerative colitis,inflammatory polyp and granulomatous colitis.

Endoscopic biopsy of patient presented with bleeding from rectum with multiple rectal erosions showed rectal mucosa with surface ulceration and crypt abscess diagnosed with ulcerative colitis on histopathology(Figure-1)

Volvulus was seen in 5 cases of sigmoid colectomy cases which grossly showed dilated gangrenous intestinal wall.Histopathology showed features of ischemic colitis with transmural ischemia

Multiple tubululovillous adenomas involving caecum,ascending colon,transverse colon,sigmoid colon was diagnosed in a 35 year old female patient presented with chronic abdominal pain (Figure-2).

30 cases of malignancies seen. Of the 30 cases of malignancies ,15 cases were diagnosed on endoscopic tiny biopsies whereas 15 cases were diagnosed in resected colonic segment.

Grossly,malignancies were of stricture (3),irregular circumferential growth (10), ulceroproliferative growth (17)

21 were adenocarcinoma .13 cases were well differentiated type (figure-3),7 cases of moderately differentiated type,1 case of poorly differentiated type1 case of poorly differentiated adenocarcinoma showed metastasis to liver on imaging.

8 cases of mucinous adenocarcinoma seen.Abundant mucinous pools are seen in 6 cases and mucin was seen focally in 2 cases.One case of adenocarcinoma of signet ring cell type seen in rectal endoscopic biopsy . (Figure-4).

Extended right hemicolectomy was done in 9 cases in whom malignancy arising from caecum,ascending colon,hepatic flexure and transverse colon.Appendix from all these cases are free from tumour.All these cases are of pT3b with tumour extending upto serosa.Three showed metastasis to lymphnodes in appendices epiploicae.

IV. Discussion:

From this study,it is understood that number of colorectal biopsies for histopathological examination are high for a short duration.Clinical suspicion of malignancy is present in all biopsies of patients above 30 years in the present study insisting on the need for careful processing and histopathological examination of specimen.

The major age group in the present study was 40-60 years and is in concordance with the study done by Ch.Geetha et al[4] and B.Vani et al [5] (Table-6)

Male predominance is seen in present study similar to study by Bhagyalakshmi A et al [6] and B Vani et al [5] (Table-7)

Histopathologial examination of colorectal biopsies helps to diagnose infectious,neoplastic lesions , to monitor the response to therapy and for screening in high risk patients.Flat lesions which are missed in endoscopy and radiological evaluation are picked up by histopathological examination [7]

Malignancies are the common lesion in present study whereas in the studies done by Ch.Geetha et al (2018) [4] noneoplastic lesions are common (Table-8)

Methodical approach is needed for grossing of large resected colon segments with growth for accurate pTNM staging of malignancy.Serosal aspect of colon should be thoroughly for presence of perforation of colon due to growth.pT4 is given if there is colonic perforation due to malignant growth invasion as per AJCC 8th edition [8].In the present study,majority of malignancies belong to pT3 .

Adenocarcinoma is the most common malignancy in the present study and is in concordance with the study done by Rakesh Mehar et al [9].Malignancies such as melanoma,Gastrointestinal stromal tumour are not seen in the present study (Table-9)

Thomas E Read et al (1997) recommended for proximal colonoscopy in patients with diminutive and small rectosigmoid adenomas to detect presence of adenomas or carcinoma of colon at early stage [10].In the present study, one patient had multiple adenomas involving sigmoid colon,ascending colon,caecum detected by sigmoidoscopy followed by colonoscopy

Focussed histological diagnosis as ulcerative colitis was given in an endoscopic biospy in the present study in view of multiple rectal erosions in an young female patient presented with bleeding per rectum and absence of medication intake.The patient responded well to course of steroid therapy which again supported to diagnosis of ulcerative colitis[11].

For a patient with active ulcerative colitis ,minimum of 5-6 biopsies from proximal colon to rectum is advised to know the extent and severity of disease and to tailor the therapy accordingly.[12]

This highlights the importance of providing complete clinical and endoscopic findings,adequate representative biopsy for the pathologists to arrive at accurate diagnosis.

Advanced endoscopic methods such as dye spraying and narrow band imaging help to identify dysplastic mucosa and for targeted biopsies.[12]

Tiny biopsies need much concern while tissue processing as they are lost often.

Of the 25 cases of endoscopic biopsies, 22 cases had clinical suspicion of malignancy where patients presented with intestinal obstruction,perforation and circumferential growths.

We diagnosed 15 cases of malignancies with endoscopic biopsies.Remaining 7 cases were of inadequate and nonrepresentative biopsy to diagnose malignancy and therefore necessitating the need for repeat biopsy. In a study done by Yeowon Choi et al (2011) [13] , a minimum of 3-4 biopsies needed from viable part of growth to diagnose malignancy of gastrointestinal tract. Repeated endoscopic biopsies result in bleeding and perforation and is cumbersome to patient

With endoscopy, 15 cases of malignancy diagnosed whereas in a study done by Bhagyalakshmi A et al, 13 cases (12.5%)of malignancy were diagnosed [6]

In the era of advanced technology in medicine, the utility of various techniques such as endoscopes equipped with high-definition (HD) and high-magnification imaging, digital chromoendoscopy techniques confocal laser endomicroscopy and endocytoscopy (EC) artificial intelligence for computer-aided detection and characterization of neoplasms within the GI tract increased the rate of accurate early diagnosis,quality of patient management and decreased the rate of repeat biopsies in colorectal lesions.However the lack of these equipments in hospitals is the major drawback .Virtual chromoendoscopy with i-scan imaging improves the rate of detection of adenomas and also to predict the histology of polyps in vivo(rath).

This helps to differentiate the polyp which are neoplastic and nonneoplastic in vivo and to avoid unnecessary excision of polyps.In the present study, one polyp was tubulovillous adenoma with moderate dysplasia and 5 polyps were juvenile polyp.

V.   Conclusion:

Focussed accurate histological diagnosis is possible with adequate representative colonoscopic biopsies in correlation with clinical history and colonoscopic findings.The incidence of colorectal malignancy is increasing in view of changing dietary habits and sedentary lifestyle,insisting on the need for screening with colonoscopy for high risk individuals.Histopathology helps in early diagnosis,guidance to treatment,follow up and surveillance for colorectal lesions.

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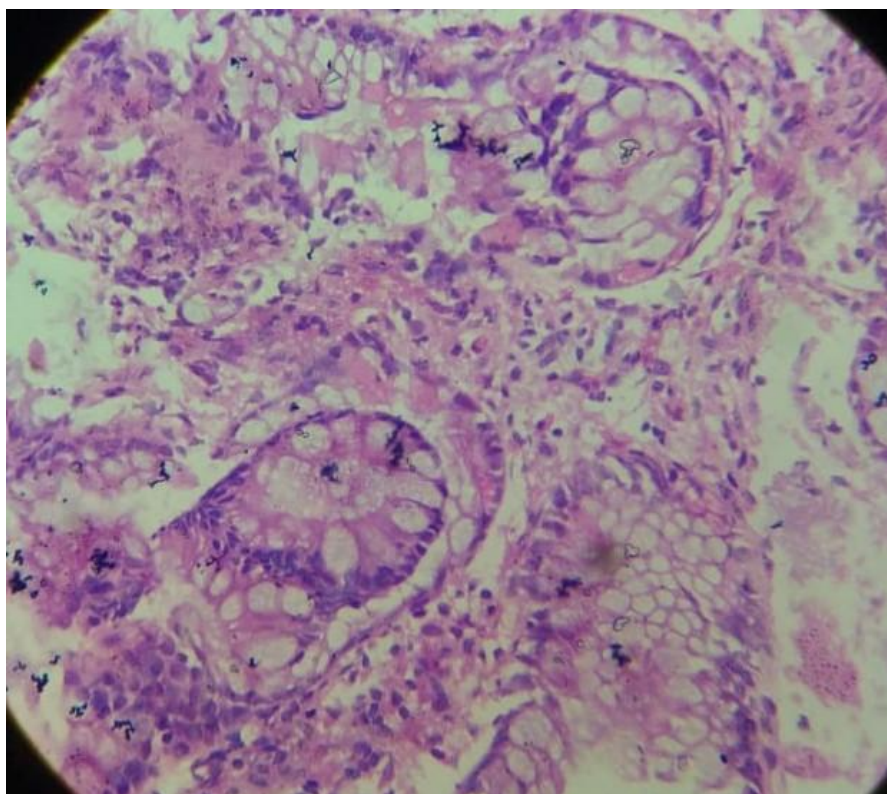
FIGURE LEGENDS:

Figure-1: Photomicrograph of endoscopic biopsy from rectal erosion showing ulcerative colitis with distortion of crypt and surrounding neutrophilic infiltrates in rectal mucosa (H&E stain, 100x)
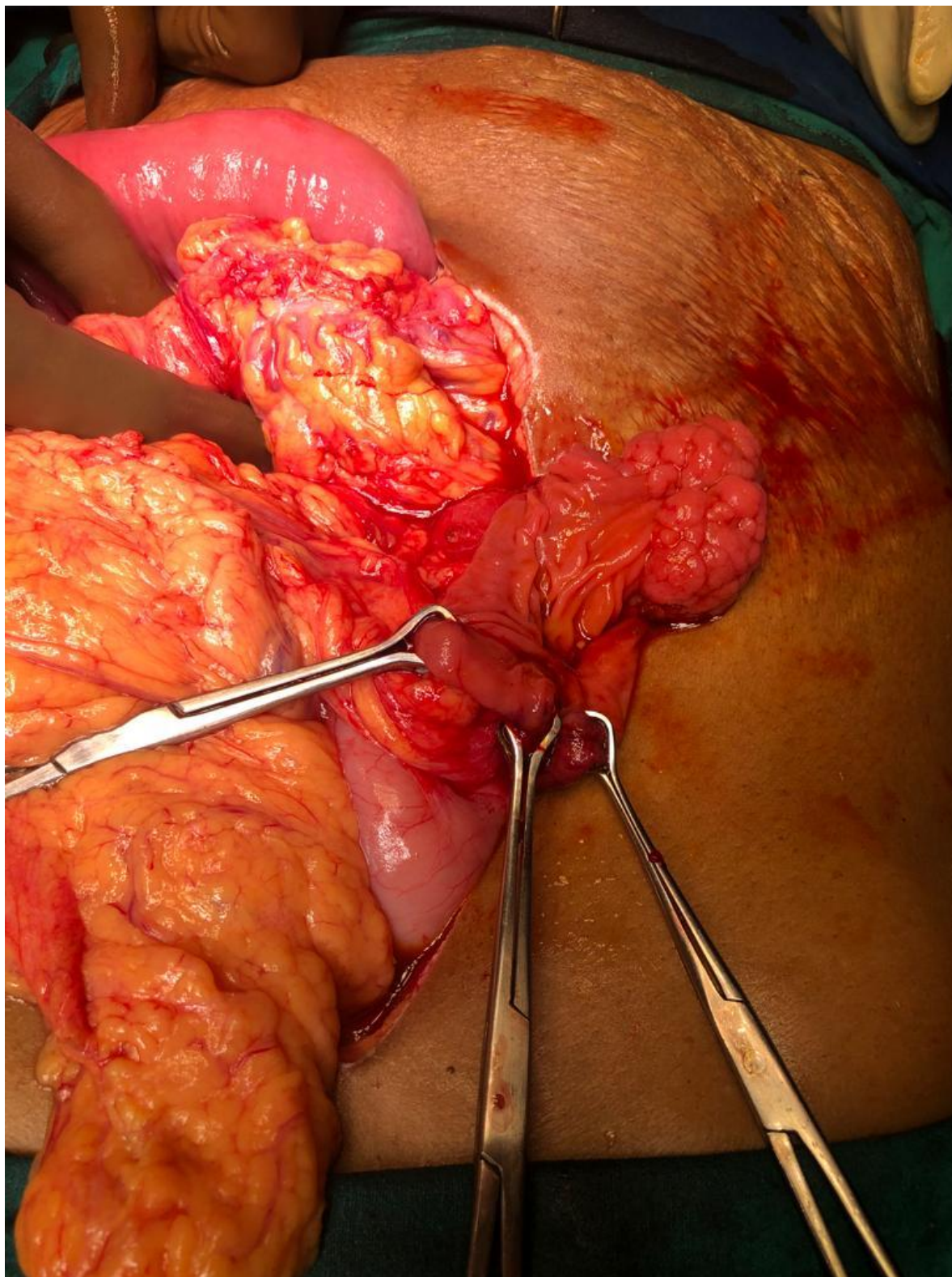
Figure-2a: Intraoperative photograph of pedunculated polyp in ascending colon in a 35 year female patient.
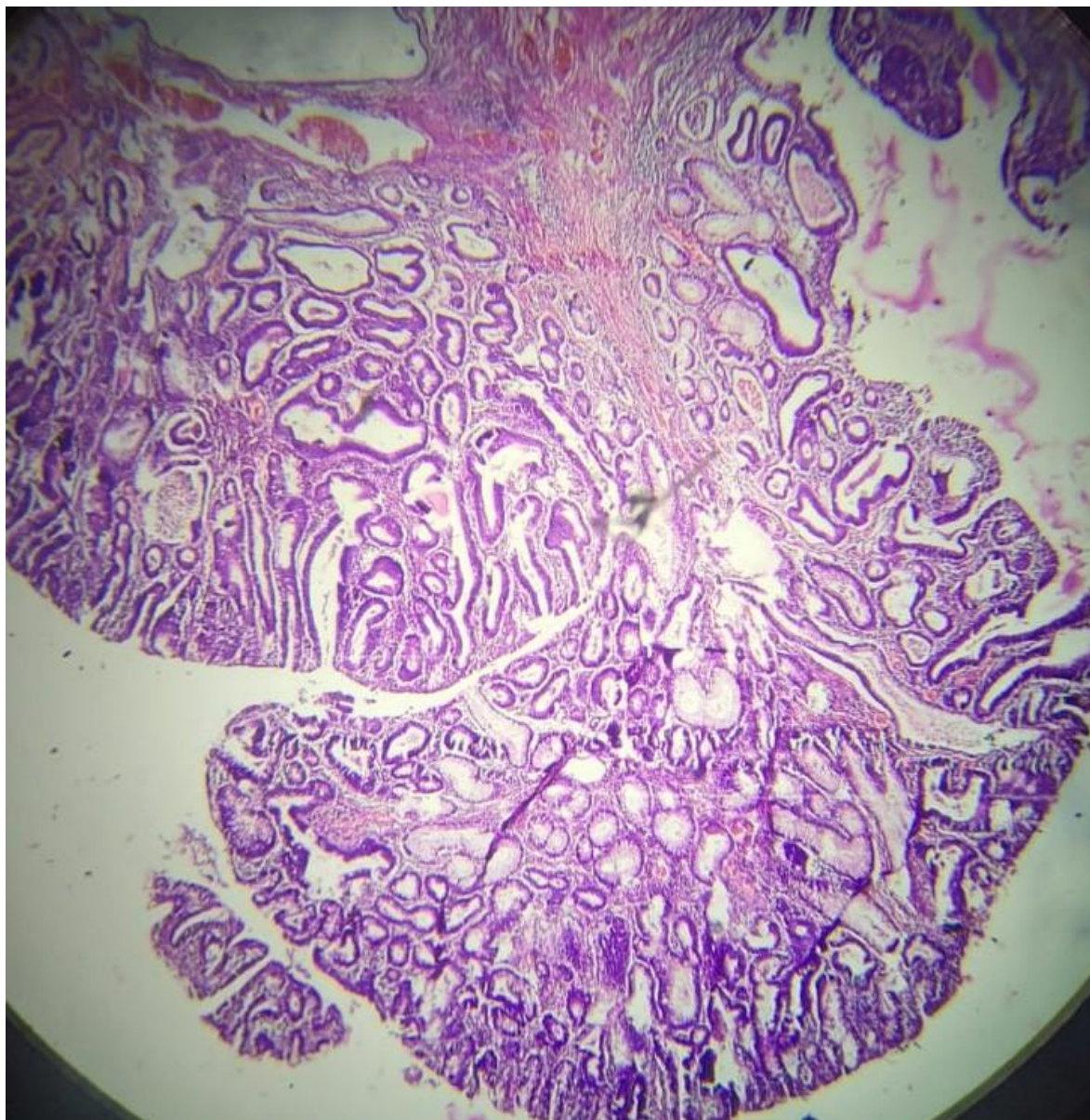
Figure-2b: Photomicrograph showing histological features of tubulovillous adenoma.(H&E stain, 40x).
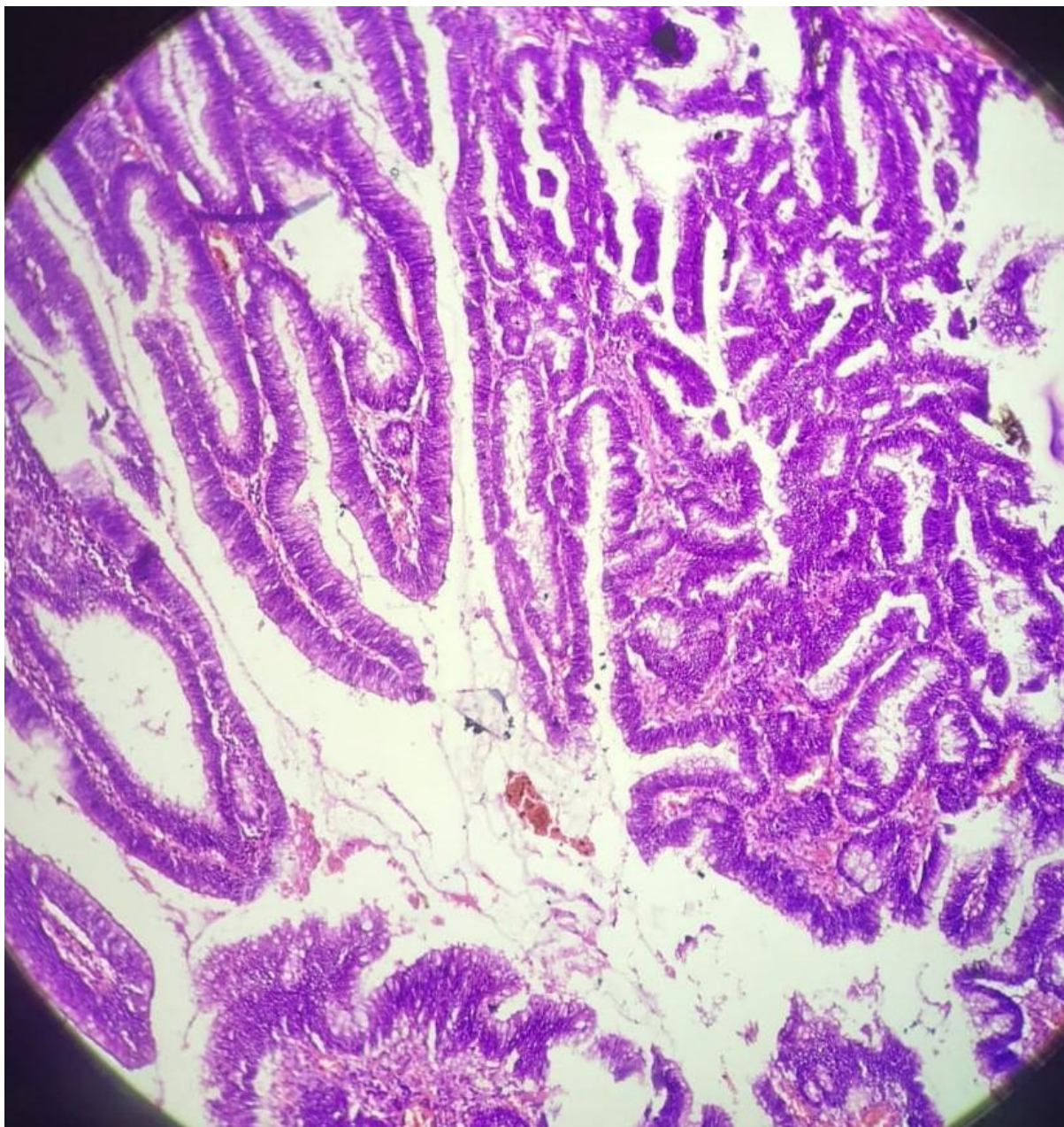
Figure-2c: Photomicrograph showing villous part of adenoma with moderate dysplasia.(H&E stain 400x)

Figure-3a: Gross photograph of right extended hemicolectomy specimen showing an ulceroproliferative growth in caecum
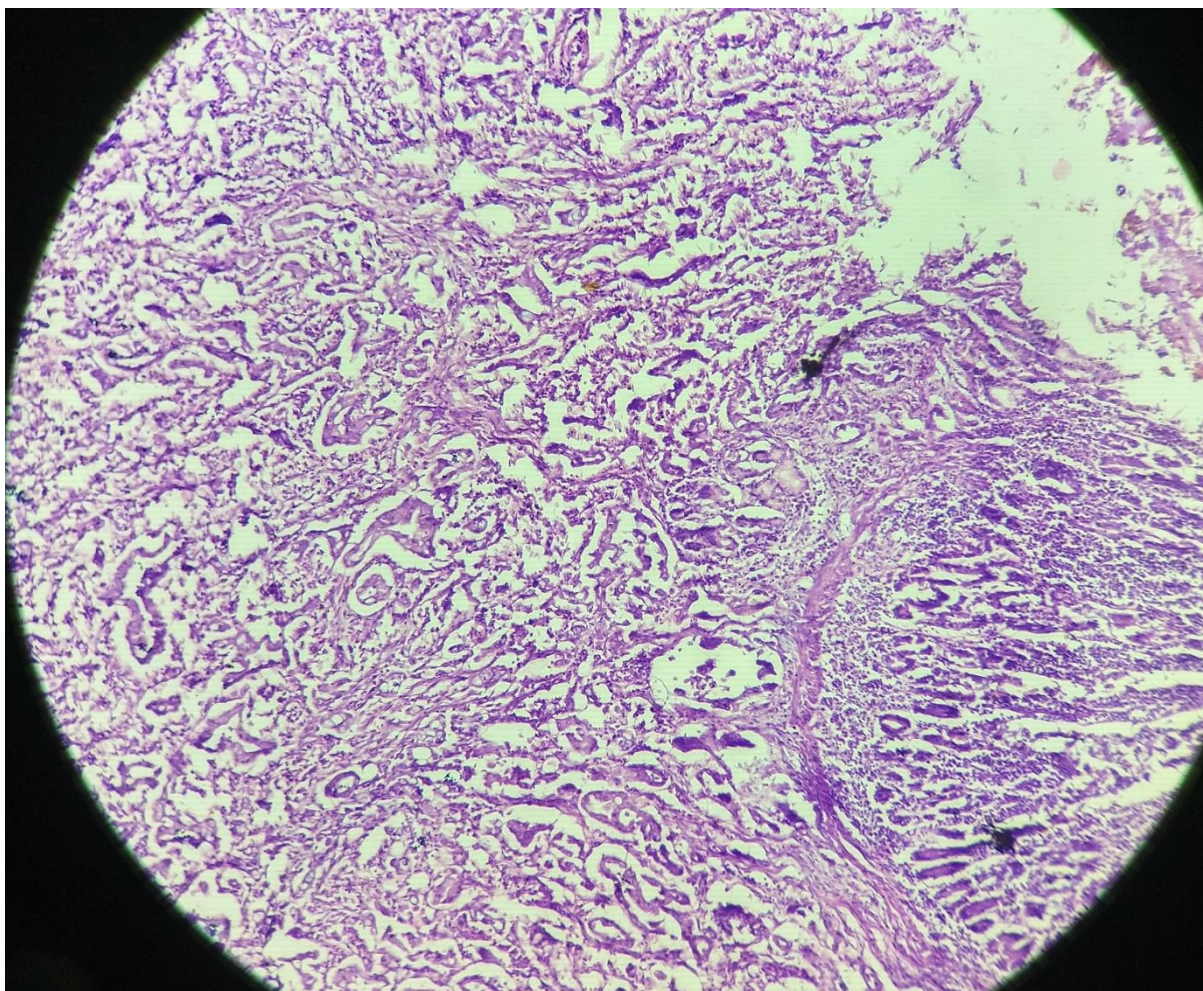

Figure-3b: Photomicrograph showing well differentiated adenocarcinoma with tumour cells forming well formed glands (H&E stain,100X).
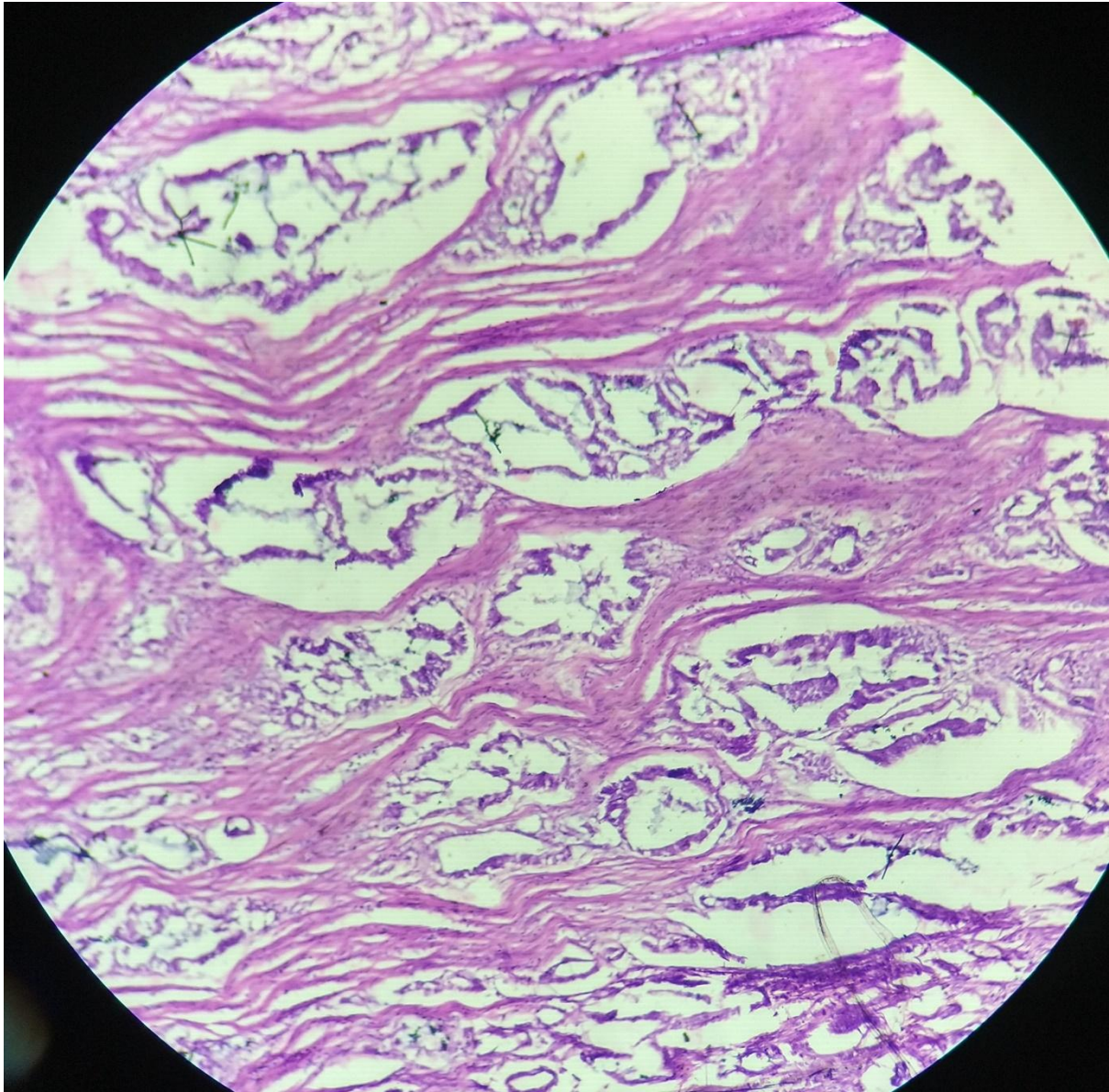
Figure-3c: Photomicrograph of well differentiated adenocarcinoma infiltrating and splitting the muscularis propria layer (H&E stain,400X)
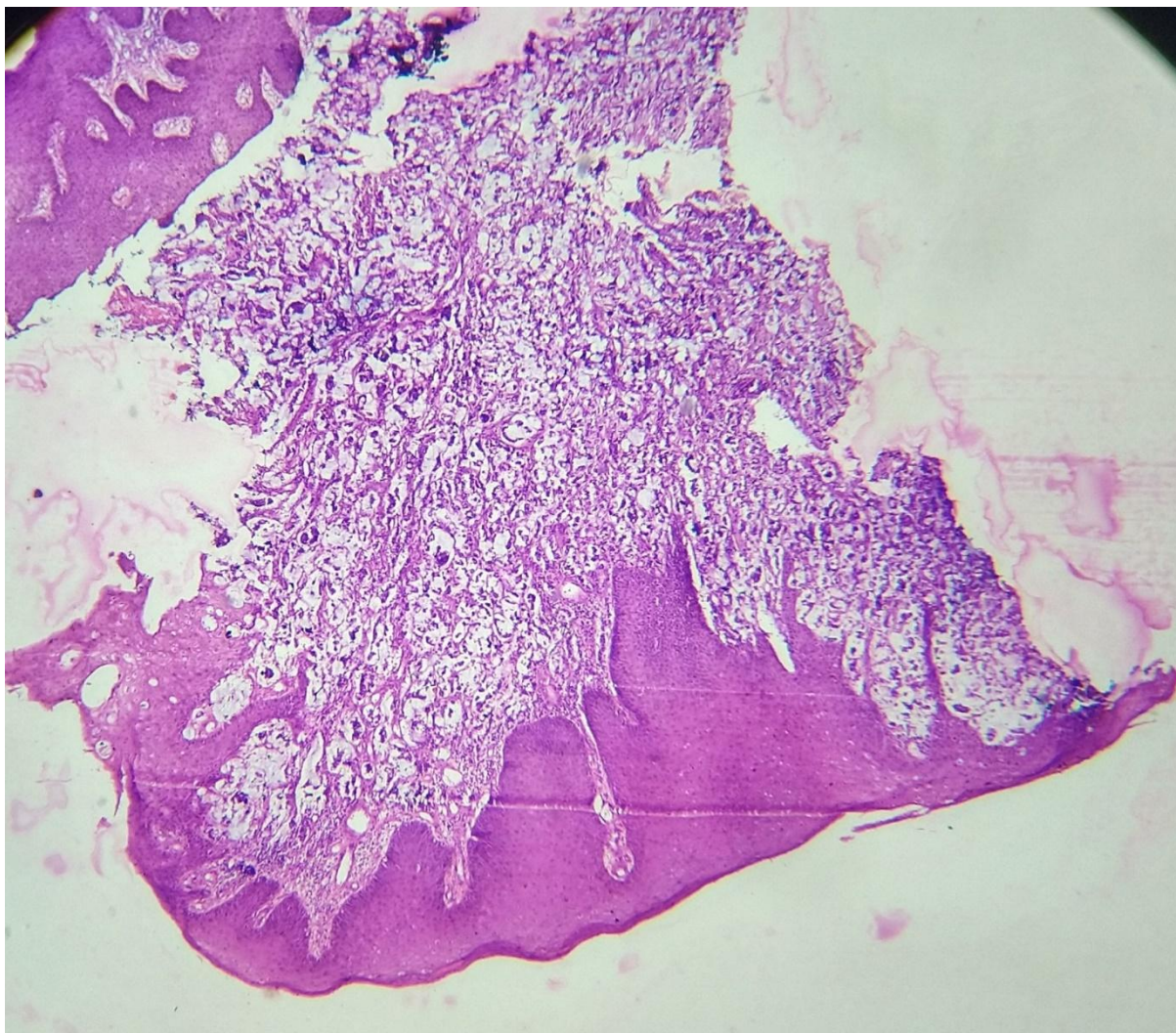
Figure-4a: Photomicrograph of rectal endoscopic biopsy showing adenocarcinoma with signet ring cells and abundant mucinous pools.(H&E stain,100x).
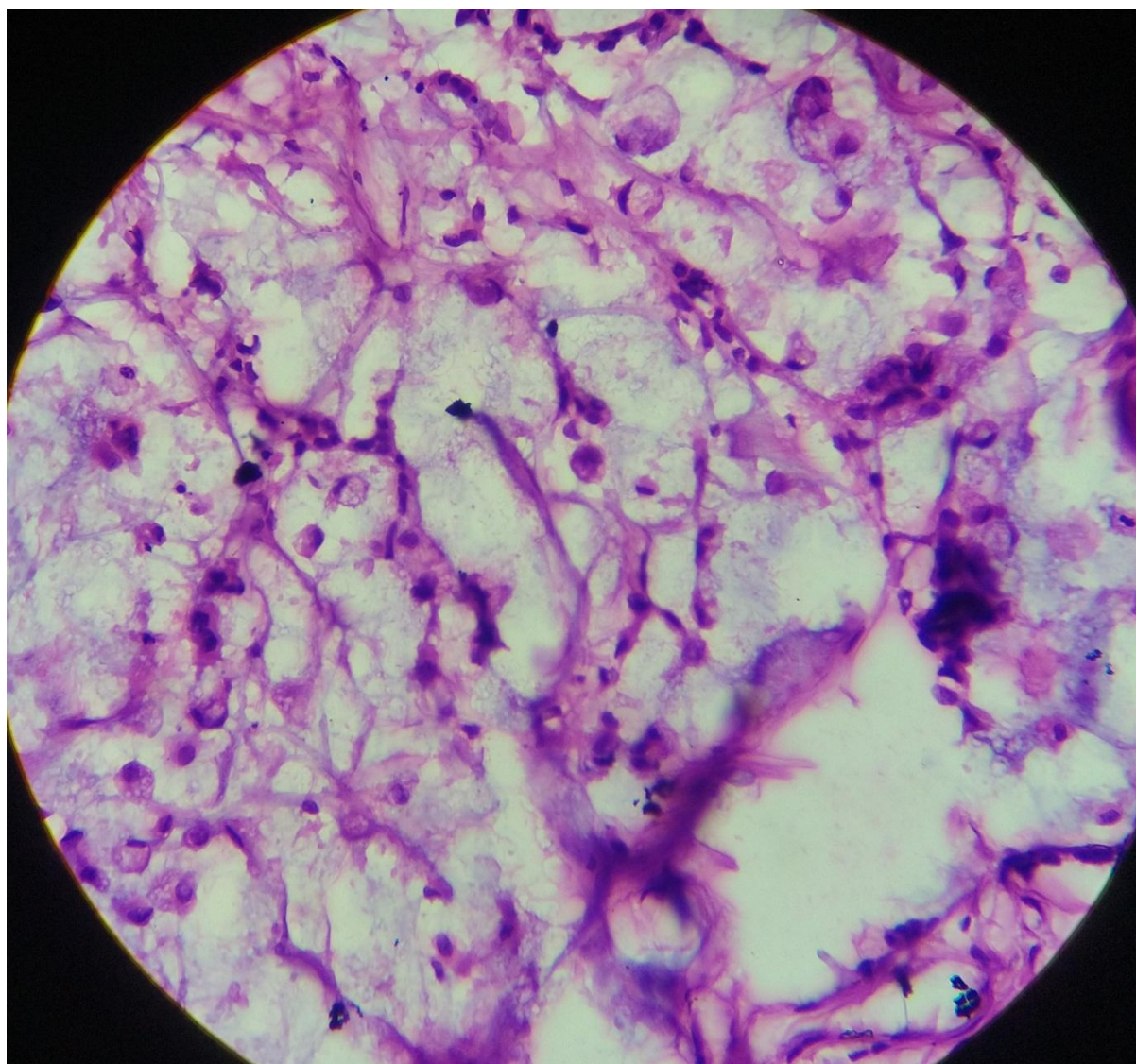
Figure-4b: Floating mucin laden signet ring cells in mucinous pool (H&E stain,400x)

Table-1: Type of colorectal specimens received (n=54)

Sl.No	Type of specimens received	Number of specimens
1.	Endoscopic biopsies	25 (46.29%)
2.	Large resected colonic segment	23 (42.59%)
3.	Polypectomy	6 (11.11%)
	Total number of colorectal specimens(n)	54

Table-2 : Age distribution of cases with colorectal lesions (n=54)

Age	Nonneoplastic lesion	Malignancy	Benign lesion	Total
<20 years	6	1	-	7 (12.96%)
20-40 years	5	8	-	13(24.07%)
>40 years	14	19	1	34(62.96%)

Table-3: Gender distribution of cases with colorectal lesions (n=54)

Gender	Noneoplastic lesions	Malignancy	Benign	Total
Male	15	12	1	28(51.85%)
Female	8	18	-	26(48.14%)

Table-4: Location of colorectal lesions (n=54)

Site	nonneoplastic	Malignancy	Benign	Total
Rectum	6	9	-	15 (27.77%)
Rectosigmoid	2	5	-	7 (12.96%)
Sigmoid colon	8	2	1 (multiple)	10 (18.51%)
Transverse colon	-	5	1(multiple)	5(9.25%)

Hepatic flexure	-	4	-	4 (7.40%)
Caecum	3	1	1(multiple)	4(7.40%)
Ascending colon	-	2	1(multiple)	3(5.55%)
Descending colon	-	1	-	2(3.70%)
Colonic biopsies(Site not mentioned)	3	2	-	5(9.25%)

Table-5: Spectrum of histopathology of colorectal lesions (n=54)

	Subtypes	Total
Nonneoplastic lesion	Hirschprung disease-3 Nonspecific colitis-4 Gangrene-2 Sigmoid colon Volvulus-5 Moderate dysplasia-1 Nonspecific ulcer-1 Ulcerative colitis-1 Granulomatous colitis-1 Juvenile polyp-5	23(42.59%)
Malignancy	Adenocarcinoma-21 Mucinous adenocarcinoma-8 Adenocarcinoma –signet ring cell type -1	30(55.55%)
Benign lesion	Tubuvillous adenoma-1	1(1.85%)

Table-6: Comparison of major age group with colorectal lesions

Study	Major age group
Ch.Geetha et al (2018) [4]	51-60 years (24.5%)
B.Vani et al (2019) [5]	40-49 years (23.7%)
Bhagyalakshmi A et al (2016) [6]	41-50 years (9.6%)
Present study (2021)	Above 40 years (62.96%)

Table-7: Comaprison of Gender distribution with literature

Study	Male	Female	Total
Ch.Geetha et al (2018) [4]	121	75	196
B.Vani et al (2019) [5]	45(59.2%)	31(40.8%)	76
Bhagyalakshmi A et al (2016) [6]	70 (67%)	34(33%)	104
Present study (2021)	28(51.85%)	26(48.14%)	54

Table-8 : Comparison of distribution of colorectal lesions with literature

	Nonneoplastic lesion	Benign lesions	Malignant lesions	Total	Type of specimens
Bhagyalakshmi A et al (2016) [6]	91(87.5%)	-	13(12.5%)	104	Colonoscopic biopsies
Ch.Geetha et al (2018) [4]	104(52.5%)	27(13.77%)	65(33.16%)	196	colonoscopic biopsies
B.Vani et al (2019) [5]	24(31.5%)	19(25%)	33(43.4%)	76	Colonoscopic biopsies
Present study (2021)	23(42.59%)	1(1.8%)	30(55.55%)	54	Colonoscopic biopsies,polypectomy and large resected colon segments

Table-9: Comparison of distribution of malignancies with literature

Type of malignancy	B.Vani et al (2019)[5]	Ch.Geetha et al (2018) [4]	Rakesh Mekhar et al (2020) [9]	Prachi S Patil et al (2017) [14]	Present study(2021)
Adenocarcinoma	27 (81.8%)	61 (56.2%)	17(68%)	(800)100%	21(70%)
Adenocarcinoma- mucinous type	4(12.1%)	2(3.1%)	5(20%)	133(16.6%)	8(26.6%)
Adenocarcinoma- signet ring cell type	1(3.03%)	1(1.5%)	0	107 (13.4%)	1(3.3%)
GIST	1(3.03%)	0	0	0	0
Melanoma	0	1	2(8%)	0	0
Squamous cell carcinoma			1(4%)	0	0
Total	33	65	25	800	30