International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

A Histopathological Study of Neoplastic Lesions of Large Intestine

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Abstract: ***Background: Large Intestinal Neoplasm is a common form of neoplasm in India and world. It is a leading cause of death. Carcinoma of the large bowel is the third most common cancer among men and women, and the second leading cause of death from cancer.Classifying large intestinal neoplasms according to its location and histological types along with its staging and grading are helpful in early diagnosis and therapeutic decisions, providing better outcome.Aims and objectives: Study of histological evaluation with staging and gradingof neoplastic lesions of large intestine. Material and method: A study of 67 patients presenting with C/O abdominal pain and bleeding per rectum at B.J.M.C, Civil Hospital, Ahmedabad over a period of three years from 2014 to 2016. All specimens of resected intestine (large bowel) were received and overnight fixation in 10% formalin was done. Gross examination findings were noted followed by routine paraffin embedding and tissue sectioning. Slides were stained using H&E stain, examined microscopically and grading/staging was done followed by comparison with other studies. Results: In present study, out of 67 cases of neoplastic lesions of large intestine51 cases(76.12%) were of malignant nature. The commonest age group affected by neoplastic large intestinal lesions is 51-70 years with male: female ratio of 2:1.Rectum(33/67) is the commonest site of involvement. While 10.4 % cases were of juvenile polyp (benign) among all neoplastic large intestinal lesions, adenocarcinoma(70.14%) was the commonest malignant lesion. With respect to histological grading, the highest number of cases of adenocarcinoma of large intestine were of moderate differentiation (24/47) and DUKE'S STAGE C2(19/35) is the most common stage of adenocarcinoma of large intestine. Other malignant lesions include basaloidcarcinoma(1 case), GIST(2 cases) and malignant melanoma(1 case). Conclusion: Majority of neoplastic intestinal lesions were of malignant nature distributed among the age group of 41-70 years with male preponderance. Polyps and adenocarcinoma are the commonest benign and malignant lesions of large intestine respectively. Classification of large intestinal neoplasms according to its location and histological types along with its staging and grading are helpful for therapeutic decisions providing better outcome.***

Keywords: neoplasia, large intestine, histopathology, staging and grading, adenocarcinoma.

1. Introduction

Large intestine, a part of gastro- intestinal tract has anunique digestive and immune functions. Intestinal lesions are very common in day to day practice. Intestinal Neoplasm is a common form of neoplasm in India and world. It is a leading cause of death in the developed world, although more than half cases of carcinoma occurs in developing world.[1] Adenocarcinoma of the large bowel is more common than its counterpart in the small bowel. Carcinoma of the large bowel is the third most common cancer among men and women and the second leading cause of death from cancer. At the same time, it is by far the most curable form of carcinoma of the gastrointestinal tract. [2]Thus a complete histological evaluation of neoplastic large intestinal lesions must be conclusive and exact staging and grading of various malignant lesions can be done which will be helpful in deciding the proper treatment for a particular lesion. Various techniques such as endoscopy and histopathology can be used for examination of various intestinal lesions. Histopathology is the gold standard in diagnosis of gastrointestinal tumors.[3]In the present study, 67 cases of neoplastic large intestinal lesions were examined to study different categories, distribution and prevalence of various neoplastic lesions of large intestine as well as correlation of the results with other studies.

2. Literature Survey

Neoplastic lesions of large intestine are divided into BENIGN and MALIGNANT lesions.

Benign Lesion of Large Intestine

Colorectal polyps of epithelial origin include tubular adenoma, villous adenoma, serrated adenoma, juvenile polyp, peutz-jeghers polyp and transitional polyps.

1) Adenomatous Polyps are distributed throughout the large intestine(right colon>left colon).[4]Majority of them are asymptomatic in nature.

On gross examination, they are single or multiple (in clusters), sessile or pedunculated measuring less than 1cm of diameter.[5]On microscopic examination,the cells are crowded, contain enlarged hyper chromatic nuclei, and have an increased number of mitoses, some of which may be atypical.[2](Figure 4). There is sharp distinction between normal and dysplastic glands.

A variation of it referred as VILOGLANDULAR POLYP/ TUBULOVILLOUS ADENOMA OR PAPILLARY ADENOMA shows equal amount of adenomatous and villous components.[6]

ABBERENT CRYPTS(MICROADENOMA) represent enlarged and hyperplastic crypts with foci of dysplasia.[7]The degree of atypia seen in adenomatous polyps can be graded into mild, moderate and severe or as low-grade and high-grade dysplasia(carcinoma in situ).

2) Villous Adenoma (Villous Papilloma) presents as a single mass in the rectum or recto-sigmoid of older patients. On microscopic examination, the villous projections ramify through a long, papillary, crown-like growth.[8]

3) Serrated Adenoma was traditionally designated as HYPERPLASTIC/ METAPLASTIC POLYP which is characteristically sessile and rarely exceeding 5mm in diameter.[9]On microscopic examination, elongated glands with intraluminal infoldings giving rise to the saw toothed configuration constitute its morphologic signature. Mitotic activity is increased only at the base.[10]T*raditional*, *sessile*, and *filiform* serrated adenoma are regarded as the morphologic expression of a neoplastic route different from that operating in adenomatous polyps but also having the potential to eventuate in malignancies.[11]Specifically, the sessile serrated adenoma type is thought to be a precursor of serrated adenocarcinoma.

4) Juvenile (Retention) Polyp is the most frequent colonic polyp seen in children presenting with rectal bleeding; auto-amputation is common, the polyp being sloughed off and passed per rectum.[12]On gross examination, single or multiple juvenile polyp has a granular, red surface and a cystic, lattice-like appearance on cross section. On microscopic examination, cystically dilated glands filled with mucus, devoid of atypical features, and separated by an inflamed and edematous stroma are seen covered by ulceration and granulation tissue formation.[2]

5**) Peutz-Jeghers Polyp** is seen as a part of the syndrome in which the glands are supported by broad bands of smooth muscle fibers, which are thick in the center of the lesion and thinner on the periphery.[13], [14]

6) Polyposis Syndromes and Various Related Lesions
*** Familial Adenomatous Polyposis (FAP)**
It is characterized by presence of multiple (more than 100) small or large, sessile or pedunculated polyps throughout the bowel. Majority of them are caused by mutation in APC gene on chromosome 5q21 followed by small percentage of cases with germline mutation of the base excision repair gene MYH and mutations in KRAS.[15], [16], [17]If left untreated, malignant transformation(100%) takes place.

Variants of FAP are Gardner syndrome andTurcot syndrome.
Other polyposis syndromes includes hereditary flat adenoma syndrome[18], Hyperplastic /serrated polyposis syndrome, Juvenile polyposis[19], Peutz-jeghers syndrome, Cowden syndrome, Cronkhite-canada syndrome.

Malignant Transformation of Polyps
Incidence is very high(100%) in FAP, gardner syndrome and villous adenoma. Not all, but adenomatous polyps can undergo malignant change.

The ADENOMA-CARCINOMA SEQUENCE responsible for malignant transformation of polyps is a series of molecular alterations that include the activational mutation of the *RAS* oncogene, mutations of the *TP53* gene located on chromosome 17, deletion of the *DCC* ('deleted in *c*olonic *c*arcinoma') gene located on chromosome 18 and possibly mutations of the *MCC* ('*m*utated in *c*olonic *c*arcinoma') gene located on chromosome 5.

Three distinct stages of the process that can be recognized pathologically and that bear a direct relationship to the therapeutic approach:[20]

STAGE I– SEVERE DYSPLASIA / CIS / INTRA MUCOSAL CARCINOMA
STAGE II – FOCAL CARCINOMA with free stalk.
STAGE II – FOCAL CARCINOMA with stalk invasion.

Malignant Lesions of Large Intestine
Carcinoma of the large intestine is commonly seen in elderly with mean age of 62 years with equal sex incidence.[2] Environmental and genetic factorsare the cornerstones for the high predisposition for colorectal carcinoma in patients with *FAP*, other forms of polyposis and in those with the hereditary non-polyposis colorectal cancer syndrome (*Lynch syndrome*) and related nonpolyposis associated hereditary conditions.[2]

Hereditary Nonpolyposis Colorectal Cancer Syndrome (*Lynch Syndrome*) and Related Nonpolyposis (Torre–Muir syndrome and familial colorectal carcinoma)
HNPCC is due to germline mutations in one of the genes responsible for repair of DNA mismatches, most commonly *MLH1*, *MSH2*, *MSH6*, and *PMS2*, resulting in high levels of microsatellite instability. The carcinomas most commonly involve the proximal colon.[21]

Carcinomas of the Large Bowel
It may present with rectal bleeding, changes in bowel habits, anemia resulting from chronic blood loss, and vague abdominal pain ultimately leading to intestinal obstruction and perforation. Multiple screening approaches for early detection include performance of appropriately timed endoscopic examinations, Stool examination for occult blood, serum CEA levels etc. A novel and promising screening approach is that of searching for mutations of the *RAS* and *APC* genes in the stools.[22]

Gross Examination
The gross presentation of the lesion can be polypoidal, flat /depressed or invasive/infiltrating/ulcerated. On cross section, grayish white tissue is seen replacing the bowel wall (Figure 1). Highly mucinous tumors have a gelatinous, glaring appearance, and layers of mucus may separate the layers of bowel wall.[23]

Microscopic Examination

The classical colonic adenocarcinoma of the large bowel is usually well-to-moderately differentiated tumor secreting variable amounts of mucin(Figure 5), (Figure 6). The tumor cells represent a combination of columnar and goblet cells, with occasional participation of (neuro) endocrine cells and the exceptional occurrence of Paneth cells.[24] It elicits an inflammatory and desmoplastic reaction. The tumor may be seen invading all the layers of the bowel and extending into the pericolic fat, permeating perineurial spaces, and invading veins.[25]

Immunohistochemistry and Electron microscopic findings of classical colonic adenocarcinoma shows immunoreactivity for MUC1, MUC3, MUC13, CK20, CEA, tumor associated glycoprotein(TAG-72), CDX2 along with variable expression of calretinin and loss of blood group isoantigens. Ultrastructurally, a constant feature of colorectal carcinoma is the presence of prominent collections of microfilaments running perpendicular to the cell membrane and entering the brush border.[26]

OTHER MICROSCOPIC TYPES includes Mucinous carcinoma (Figure 6), Micropapillary carcinoma, Medullary(solid/undifferentiated) carcinoma, Clear cell carcinoma, Signet ring carcinoma, Serrated adenocarcinoma, Squamous differentiation, Basaloid carcinoma (Figure 8), Hepatoid carcinoma, Anaplastic/sarcomatoid carcinoma, Glassy cell carcinoma and Neuroendocrine differentiation.[2]

Staging and Grading

Histological Grading[27]

Grade I - well differentiated carcinoma
Grade II - moderately differentiated carcinoma
Grade III - poorly differentiated carcinoma

Duke's Staging [28]

TYPE A - Carcinoma limited to the rectal wall with no extension to lymph nodes or adjacent tissues.

TYPE B - Carcinoma spread by direct continuity to the surrounding tissues but does not involve the lymph nodes.

TYPE C – Carcinoma presented, in addition to direct penetration of the wall, metastases in regional lymph nodes.

Astler – Coller Staging (modified duke's staging)[29]

STAGE A- Cancer is limited to the muscular mucosa and submucosa.

STAGE B-

B1- Cancer extends into but not through the muscular mucosa.
B2- Cancer extends through the muscle but does not involve lymphnodes.

STAGE C-

C1- Cancer is contained within the confines of the bowel wall and involves lymphnodes.

C2- Cancer extends through the bowell wall and involves lymphnodes

Stage D- Cancer has metastasized.

TNM STAGING has not been included in the present study.[30]

Prognosis

The 5-year crude survival rate after curative resection for colorectal carcinoma ranges between 40% and 60%. Among various prognostically important parameters, the most important ones are age sex, tumor stage, microscopic type and grading.

Carcinoid Tumor

Well differentiated neuroendocrine tumors, most commonly located at the colorectal portion are tend to be large, extend deeply through the wall of the bowel and involve the regional lymphnodes.[31]On gross examination, it may appear as a flat and slightly depressed plaque or as a polypoid lesion with acquisition of the yellow color after formalin fixation.[32]Microscopic features are similar to the small bowel/appendicular carcinoid in association with crypt cell proliferative micronests and a minor tubular and/or acinar component with mucin production. These tumors are consistently argyrophil but usually not argentaffin positive.[33]On IHC, they are positive for pan endocrine markers, variety of polypeptide hormones, peptides of the glucagon-glycentin and of the PP-PYY families while negativity for CDX2 and TTF-1 is the rule.

Malignant Lymphoma Of Large Intestine

Lymphoid polyps of benign nature are designated as *lymphoid hyperplasia*, *pseudolymphoma*, and '*rectal tonsil*'. They appear as soft, superficial polyps usually covered by an intact, gray, smooth mucosa.On microscopic examination, they are made up of lymphoid tissue with follicle formation, a lobular pattern, and germinal centers.[34]

Colorectal malignant lymphomas are nearly always of non-Hodgkin type which arethought to belong to the mucosa-associated lymphoid tissue (MALT)-type category. They often show evidence of plasmacytic differentiation followed by mantle cell lymphoma, anaplastic large cell lymphoma, angioimmunoblastic T-cell lymphoma, and Hodgkin lymphoma.[35]

Gastrointestinal Stromal Tumors (Gist) And Smooth Muscle Tumors

GISTs are the most common mesenchymal tumors of small intestine followed by leiomyoma and leiomyosarcoma. On macroscopic examination, they range from small, mural nodules to large exophytic, pedunculated masses (Figure 2). GISTs can be roughly divided into four major categories on the basis of their phenotypic features: 1) tumor showing differentiation toward smooth muscle cells, 2) tumor showing differentiation toward neural type elements, 3) tumor showing double differentiation toward smooth muscle cells and neural type elements, 4) tumors lacking differentiation toward either cell type[2](Figure 7). CD117 positivity is the rule with mutations of KIT OR PDGFR (in contrast to leiomyoma and

leiomyosarcoma in which smooth muscle markers are positive with CD117 negativity).[36]

Methods/approach:
A study of 67 patients presenting with C/O abdominal pain and bleeding per rectum at B.J.Medical college, Civil Hospital, Ahmedabad over a period of three years from 2014 to 2016. All specimens of resected intestine (large bowel) were received and over-night fixation in 10% formalin was done. Gross examination findings were noted followed by routine paraffin embedding and tissue sectioning. Slides were stained using H&E stain, examined microscopically and staging was done followed by comparison with other studies.

Results/ discussion

A retrospective study of 67 cases was undertaken and following observations and results were noted.

Table 1: Distribution of Large Intestinal Lesion According to Type

Large intestinal lesions		No. of cases	Percentage
Neoplastic	Benign	16	23.88
	Malignant	51	76.12
Total		67	100

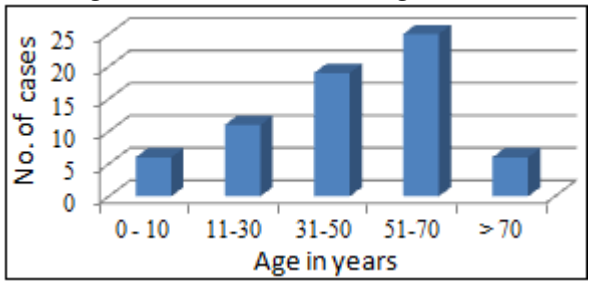
Majority of neoplastic large intestinal lesions were of malignant nature (76.12%) followed by the benign lesions accounting for 23.88% of total neoplastic large intestinal lesions.

Table 2: Comparision of Various Categories of Large Intestinal Lesion

	Present study	ShilpaUplaonkar et al.[37]
Category	%	%
Benign	23.88	12.90
Malignant	76.12	87.10
Total(%)	100	100

Inflammatory lesions in nonneoplastic category and malignant lesions in neoplastic category were leading cause of various lesions of large intestine. Similar results had been obtained in the study by shilpauplaonkar et al.[37]

Table 3: Age Wise Distribution Of Large Intestinal Lesions



Highest number of neoplastic large intestinal lesions were distributed among the age group of 41-70 years.

Chart 1: SEX incidence of the cases of SCT showing malepreponderence.

Table 4: Comparison of Male:Female Ratio Of Neoplastic Large Intestinal Lesions

		Present study	ShilpaUplaonkar et al.[37]	RiteshSulegaon et al.[38]
Neoplastic	Benign	2:1	5:1	2:1
	Malignant	2:1	2:1	1:1

Male:female ratio showed male preponderance in benignas well asmalignant lesions of large intestine in the present study correlated with the results of other studies mentioned above.

Table 5: Site Wise Distribution of Large Intestinal Lesions

Site	No. of cases	Percentage
Caecum	5	7.47
Colon	29	43.28
Rectum	**33**	**49.25**
Total	67	100

Large intestinal lesions involved rectum (49.25 %), colon (43.28 %) and caecum (7.47 %) in a descending order.

Table 6: Comparison of Site Wise Distribution of Large Intestinal Malignant Lesions

Site	Caecum (%)	Colon (%)	Rectum (%)
Present study	7.47	43.28	49.25
Dr M Lavanya[3]	10	10	80
Eisenberg et al.[39]	0	72.2	27.8
Priyanksharma et al. [40]	1.12	73	25.84
Abdulkareem et al.[41]	36.9	63.1	0

The anatomical site commonly involved was colo-rectum constituting 92.53% of all neoplastic large intestinal malignant lesion which was in conformity with studies by Eisenberg et al.[39], dr M Lavanya[3]and priyanksharma et al.[40] while study by abdulkareem et al.[41] showed predominant site of colorectal carcinoma being the colon.

Table 7: Distribution of Neoplastic Large Intestinal Lesions According to Histopathological Diagnosis

Histological diagnosis	**No of cases**	**Percentage**
Benign lesion		
Fibroepithelial Polyp	3	4.47
Adenomatous Polyp	4	5.97
Tubulovillous Adenoma	1	1.5
Juvenile polyp	**7**	**10.4**
FAP*	1	1.5
Malignant lesions		
Adenocarcinoma	**47**	**70.14**
Basaloid Carcinoma	1	1.5
GIST	2	2.98
Malignant Melanoma	1	1.5
Total	**67**	**100**

Out of all neoplastic large intestinal lesions, juvenile polyp (10.04 %) was the most common benign neoplasm and adenocarcinoma (70.14 %) was the most common malignant neoplasm. In the present study, all cases of JUVENILE POLYP were reported in RECTUM which is comparable with studies by RiteshSulegaon et al.[38], Roth SI et al.[12] and Robert Franklin et al.[42] In the present study, 10.4 % cases were of juvenile polyp among all neoplastic large intestinal lesions with the mean age of presentation was 5.5years. ShilpaUplaonkar et al.[37] and RiteshSulegaon et al.[38] stated 11.21% and 13.33% cases of juvenile polyps respectively as well as 5.2 years mean age of presentation which was comparable to the present study .

Table 8: Comparison of Distribution of Malignant Lesions of Large Intestine According to Histopathological Diagnosis

	Present study	K.S.Gamit et al.[43]	BIR hospital study[44]
Diagnosis	%	%	%
Adenocarcinoma	92.15	96.97	90.41
Basaloidcarcinoma	1.96	0	0
GIST	3.93	0	4.11
NHL	0	3.03	5.48
Malignant melanoma	1.96	0	0

Among various malignant lesions of large intestine, adenocarcinoma (92.15%) was the commonest histological diagnosis which was in conformity with 96.97% and 90.41% cases of adenocarcinoma of large intestine in studies done by K.S.Gamit et al.[43] and BIR hospital study[44] respectively. In the present study, 2 cases of GIST as well as cases of basaloid carcinoma and NHL one of each were also noted.

Table 9: Distribution of Adenocarcinoma of Large Intestine According to Histopathological Types

Histological types	No of cases	Percentage
Adenocarcinoma	38	80.89
Mucinous adenocarcinoma	2	4.26
Signet ring adenocarcinoma	6	12.76
Medullary adenocarcinoma	1	2.13

In the present study,adenocarcinoma constituted the highest number of cases (80.89%) amongst various histological types of adenocarcinoma of large intestine.

Table 10: Distribution of Adenocarcinoma of Large Intestine with Respect to Histological Grade

Grade	Histological grade	No. Of Cases	Percentage
I	Well differentiated Adenocarcinoma	10	21.28
II	Moderately differentiated adenocarcinoma	24	51.12
III	Poorly Differentiated Adenocarcinoma	13	27.60
	Total	47	100

Moderately Differentiated Adenocarcinoma (51.1%) constituted approximately half the burden of adenocarcinoma of large intestine followed by Poorly Differentiated Adenocarcinoma (27.60%).

Table 11: Comparison of Adenocarcinoma of Large Intestine According to Histological Grade

Grade	Present study(%)	Riteshsulegaon et al.[38]	Caliskan et al.[45]	Shefali h. Karve et al.[28]
I	21.28	18.03	13.16	35.3
II	51.12	57.37	56.02	36.8
III	27.60	24.6	30.82	27.9

In the present study, 51.12% cases of adenocarcinoma were of grade II. In other studies by Riteshsulegaon et al[38], Caliskan et al.[45] and Shefali H. Karve et al.[28], grade II adenocarcinoma was seen in maximum number of cases i.e. 57.37%, 56.02% and 36.8% respectively.

Table 12: Distribution Of Adenocarcinoma Of Large Intestine According To Modified Duke Staging

Stage	*No of Cases*	*Percentage*
A	0	0
B1	1	2.8
B2	14	40
C1	1	2.8
C2	19	54.4
D	0	0
TOTAL	35	100

The highest number of cases of adenocarcinoma of large intestine were DUKE'S stage C2 (54.4%).

Table 13: Distribution Of Adenocarcinoma Of Large Intestine According To Modified Duke's Staging

Stage	Present study (%)	Vernon b. astler et al.[29]	Safa M. M. Al-Obaidi et al.[46]
A	0	0.28	4.2
B1	2.8	13.64	14.3
B2	40	46.59	17.1
C1	2.8	3.98	23
C2	54.4	35.51	20
D	0	0	21.4

In the present study, the highest number of cases of adenocarcinoma of large intestine were of DUKE'S stage C2 (54.4%). This distribution showed wide variations with different studies as shown in table 13.

Table 14: Comparison Of Age And Sex Wise Incidence of Various Malignant Lesions Of Large Intestine

Present study:

Age Group (Years)	Adeno Carcinoma		GIST		NHL		Basaloid Carcinoma		Malignant Melanoma		Total
	M	F	M	F	M	F	M	F	M	F	
0-15	1	0	0	0	0	0	0	0	0	0	1
16-30	3	1	0	0	0	0	0	1	0	1	5
31-45	7	3	1	0	0	0	0	0	0	0	11
46-60	10	4	1	0	0	0	0	0	0	0	15
61-75	10	7	0	0	0	0	0	0	0	0	17
>75	1	0	0	0	0	0	0	0	0	0	1
Total	32	15	2	0	0	0	0	1	0	1	51

M- male, F- female

BIR hospital study [44]

Age group (years)	Adeno Carcinoma		GIST		NHL		basaloid carcinoma		Malignant melanoma		Total
	M	F	M	F	M	F	M	F	M	F	
0-15	1	0	0	0	1	0	0	0	0	0	2
16-30	1	3	1	0	1	0	0	0	0	0	6
31-45	6	3	0	0	2	0	0	0	0	0	11
46-60	15	14	0	0	0	0	0	0	0	0	29
61-75	16	2	1	0	0	0	0	0	0	0	19
>75	4	1	1	0	0	0	0	0	0	0	6
Total	43	23	3	0	4	0	0	0	0	0	73

K.S.Gamit et al.[43]

Age group (years)	Adeno Carcinoma		GIST		NHL		basaloid carcinoma		Malignant melanoma		Total
	M	F	M	F	M	F	M	F	M	F	
0-15	0	0	0	0	0	0	0	0	0	0	0
16-30	0	3	0	0	0	0	0	0	0	0	3
31-45	4	5	0	0	0	0	0	0	0	0	9
46-60	9	4	0	0	1	0	0	0	0	0	14
61-75	5	2	0	0	0	0	0	0	0	0	7
>75	0	0	0	0	0	0	0	0	0	0	0
Total	18	14	0	0	1	0	0	0	0	0	33

In the present study , Adenocarcinoma was the most common malignancy of large intestine with maximum no. of cases(32) in age group 46-75 years with a male preponderance (male:female= 2.13:1). Also there were 2 cases of GIST and one case of basaloid carcinoma and one case of malignant melanoma. BIR hospital study[44] reported 66 cases of Adenocarcinoma (age group 46-75 years), 3 cases of GIST and 4 cases of NHL. Another study by K.S Gamit et al.[43]showed 32 cases of Adenocarcinoma (age group 46-75 years) and 1 case of NHL. Thus results obtained in present study were comparable with other studies mentioned above.

Conclusion

Neoplastic lesions of large intestine are very common in practice nowadays. Majority of neoplastic intestinal lesions were of malignant nature distributed among the age group of 41-70 years with male preponderance. Polyps and adenocarcinoma are the commonest benign and malignant lesions of large intestine respectively. Classification of large intestinal neoplasms according to its location and histological types are useful for deciding further treatment of the patient. Histological grading and modified DUKE'S staging are very important for therapeutic decisions providing better outcome and good prognosis. Ancillary techniques are the future of the diagnostic workup and therapeutic sensitivity of the neoplastic lesions.

Figures

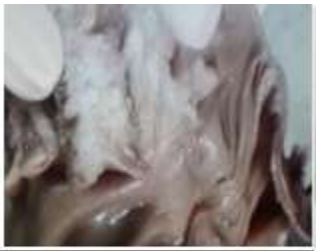


Figure 1: Gross photograph of adenocarcinoma of large intestine showing tumor mass with grayish white cut surface.

Figure 2: Gross photograph of GIST of large intestine showing well defined whitish nodular growth.

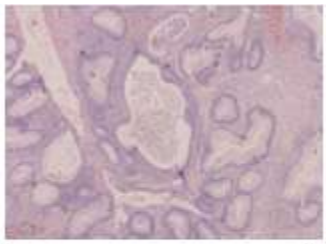


Figure 3: Microscopic photograph of juvenile polyp showing cystically dilated glands. (H&E, 10X)

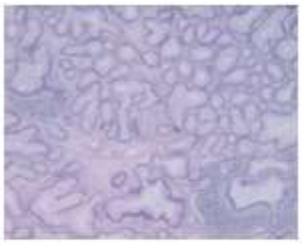


Figure 4: Microscopic photograph of adenomatous polyp showing increased number of glands. (H&E, 2X)

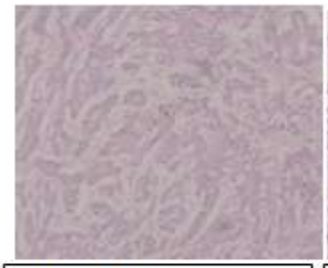


Figure 5: Microscopic photograph of moderately differentiated adenocarcinoma colon. (H&E, 10X)

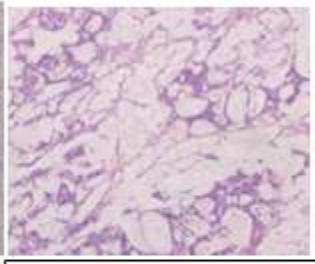


Figure 6: Microscopic photograph of mucinous adenocarcinoma colon showing large lakes of extracellular mucin with collections of tumor cells. (H&E, 10X)

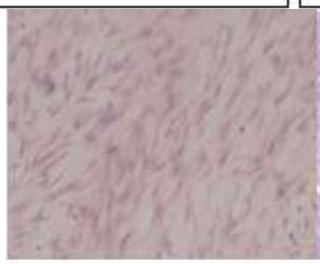


Figure 7: Microscopic photograph of GIST showing spindle shaped cells in fascicular pattern. (H&E, 20X)

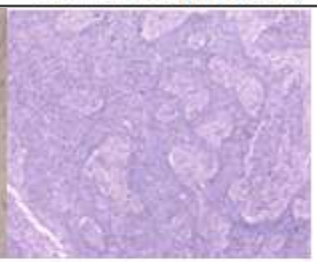


Figure 8: Microscopic photograph of basaloid carcinoma showing solid tumor nests with peripheral palisading. (H&E, 4X)

Figure 4: Gross photograph of GIST of large intestine showing well defined whitish nodular growth

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