Section: Pathology

Original Research Article

SMALL INTESTINAL NEOPLASMS: A 3 YEAR STUDY IN TERITIARY CARE CENTER

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ABSTRACT

Background: The study of Intestinal neoplasms is interesting as these tumours constitute a major component of all neoplasms. The small bowel is the longest portion of GIT, however small bowel malignancies represent only 3 percent of all gastrointestinal tract neoplasms. The most common malignant small bowel tumours include Carcinoid tumors (44%) Adenocarcinoma (33%), Stromal tumors (17%) and Lymphomas (8%). The aim is to study. 1.To age and sex incidence of Small intestine tumours. 2. Anatomical distribution of Small intestine tumours. 3. Histopathological type of Small bowel tumours 4. To apply TNM staging and Immunohistochemistry wherever required.

Materials and Methods: The present study is a retrospective study of resected specimens and biopsies of small intestine received at department of Pathology, at a Teritiary care center in Andhrapradesh between, June 2010 to May 2013.Relevant clinical data was collected from patients through questionnaire, clinical examination, requisition forms and from case sheets. The specimens were cut along the ante mesenteric border. The biopsies and specimens received were kept for fixation for 12-24 hours in 10% formalin. The material received was subjected to elaborate gross and microscopic study.

Conclusion: Among the small intestine tumours 4 were resected specimens and 16 were biopsies. The mean age of patients was 57.54 years. Females outnumbered males marginally. Duodenum was the commonest site and epithelial tumours were more frequent than other histological types

Keywords: Small Intestine, Immunohistochemistry, Carcinoid tumour, Adeno carcinoma.

INTRODUCTION

The study of Intestinal neoplasms is fascinating as these tumours constitute a considerable share of all the neoplasms.[1] Tumours of the GIT have been known from time immemorial. Papyrus scrolls dating back to 1500 BC are the earliest records that have documented intestinal neoplasms.[4] The small bowel is the longest portion of GIT and extends from the pyloric orifice of Stomach to Ileocaecal valve. Curiously the Small Intestine despite its great length and vast pool of dividing cells is an uncommon site for tumours.[1] The small bowel constitutes about 75 percent of the length and about 90 percent of the surface of the alimentary tract; however small bowel malignancies represent only 3 percent of all gastrointestinal tract neoplasms.[2,3] However the small intestine is the main site for metastatic deposits in the gastrointestinal tract,[3] .Wesner in 1765 reported a case of leiomyosarcoma, which was the first clinically reported neoplasm of the small intestine.[5] The most common malignant small bowel tumours include Carcinoid tumors (44%),Adenocarcinoma(33%),Stromal tumors (17%) and Lymphomas(8%). The clinical presentation varies from pain abdomen, weight loss, vomiting, intestinal obstruction. Spread of tumour is by direct spread to adjacent structures in peritoneal cavity, lymphatic spread to regional lymphnodes, hematogenous spread and transcoelomic spread. Reports of diffuse involvement of Ovaries and Krukenberg tumours exist in literature 6 Duodenal Carcinomas may be polypoid, infiltrating or stenosing. Carcinomas arising at the ampulla of

Vater are circumscribed nodules less than 2-3 cm in diameter. Jejunal and Ileal carcinomas are usually relatively large, annular, constricting tumours with circumferential involvement of the wall of the intestine. Unusual macroscopic features like the lack of ulceration, the predominance of an extramural component and the presence of multicentricity, points to the possibility that the tumour is a metastasis.Histologically, small bowel carcinomas resemble their more common counterparts in the colon, but with a higher proportion of poorly differentiated tumours.[7,8] Carcinomas with prominent neoplastic endocrine cells and with tripartite differentiation, i.e. with glandular, squamous, and neuroendocrine components have also been reported.[7,8] Adenosquamous carcinomas are less common.[9,10] Commonly employed diagnostic methods are barium studies, spiral CT, enteroclysis and push endoscopy. On Barium studies, small bowel adenocarcinomas appear as "Apple core lesions" which are short annular lesions, with circumferential narrowed segments with mucosal ulceration and over hanging of proximal and distal borders.[11] On CT- Appear as discrete tumour masses with annular narrowing with abrupt concentric or irregular overhanging edges or as an ulcerative lesions.[11] The prognosis depends on presence of regional lymphnode involvement where patients with positive nodes have an unfavorable outcome. Owing to their rarity of occurance and the delay between onset of symptoms to diagnosis these tumors are diagnosed at an advanced stage.

MATERIALS AND METHODS

A total of 20 cases comprising of resected Small intestine specimens and biopsies of small intestine received at department of Pathology, at a Teritiary care center in Andhrapradesh.
between, June 2010 to May 2013. Relevant clinical data was collected from patients through questionnaire, clinical examination, requisition forms and from case sheets. The specimens were cut along the ante mesenteric border. The biopsies and specimens received were kept for fixation for 12-24 hours in 10% formalin. The material received was subjected to elaborate gross and microscopic study. Gross features of the tumours with respect to the length of intestines, diameter of cut margins, size, shape, site, colour, consistency, extent, appearance of cut section, was recorded.

Blocks were Taken as Following

Three from the tumour proper.

1. One from the normal bowel adjacent to tumour.
2. Two one each from proximal cut margin and distal cut margin.
3. One section each from all the lymph nodes detected

To know the extent of local spread the tumour was cut to the region of deepest penetration. The distance of tumour from resected margins was recorded. A thorough search was performed for presence of lymph nodes and all the lymph nodes identified were subjected for histopathological study. Sections of 4-6 microns thickness were cut using an automated microtome and stained with Haematoxylin and eosin. Special stains and IHC were done wherever necessary. The histological features were studied under light microscopy and the tumours were classified according to WHO international classification of tumours of intestines.

RESULTS

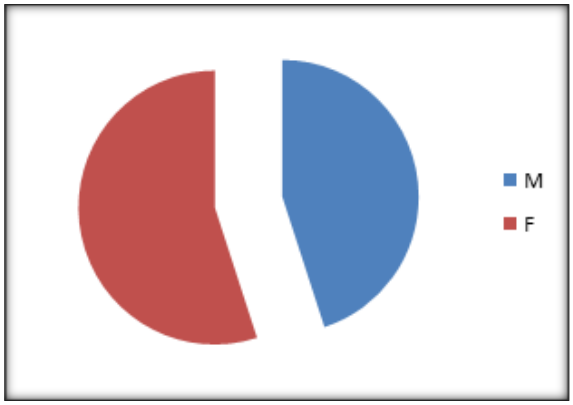


Diagram 1: Gender distribution of small intestinal neoplasms

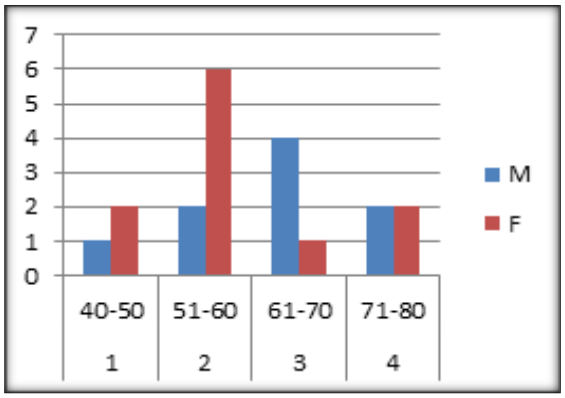


DIAGRAM 2: AGE DISTRIBUTION IN SMALL INTESTINAL NEOPLASMS

In the present study the youngest patient in small intestinal neoplasms was a female patient of 40 years while the oldest patient was a female of 75 years. Eight cases were seen in 5-6 decade, three cases were seen in 4-5 decade and Five and four cases each were seen in 6-7 and 7-8 decade respectively. Females outnumbered males marginally with male to female ratio being 1:1.2. All the small bowel tumours were malignant.

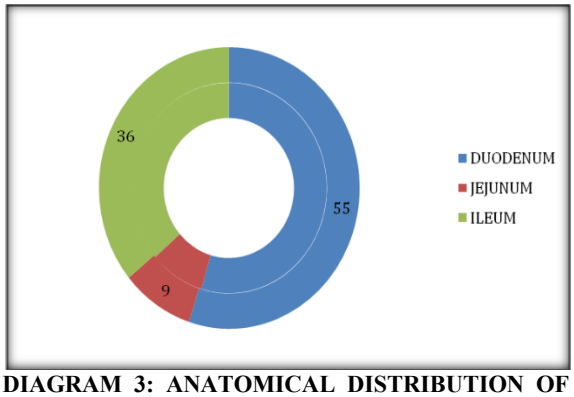


DIAGRAM 3: ANATOMICAL DISTRIBUTION OF SMALL INTESTINE TUMOURS

The tumours of duodenum outnumbered tumours of jejunum and ileum. The duodenal tumours comprised 55% followed by 36% in ileum and 9 % in jejunum.

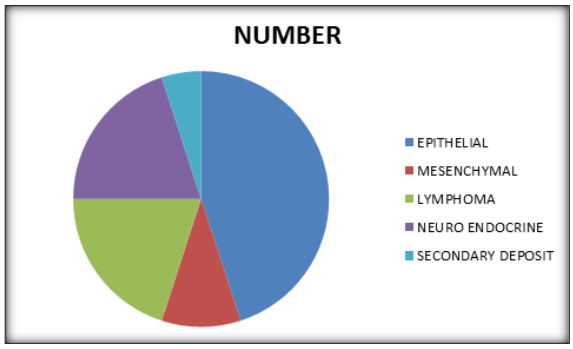


DIAGRAM 4: HISTOLOGICAL TYPE OF SMALL BOWEL TUMOURS

Majority of tumours in small bowel were epithelial in orgin, tumours of lymphoid and neuro endocrine orgin were of equal preponderance. Two cases of mesenchymal tumour and a secondary deposit in small bowel was encountered.

MORPHOLOGY OF RESECTED SMALL INTESTINE TUMOURS

A total of 4 resected specimens of small bowel were received.

ADENO CARCINOMA OF DUODENUM

Out of the 4 specimens, 1whipples surgery specimen of female aged 60 years comprising of Duodenum, Jejunum, head of Pancreas, Gall bladder with common bile duct, regional lymphnodes and omentum was recieved. An irregular ulcerative lesion of 4x3cms, with grey white cut surface was identified in duodenum. Lymphnodes were isolated which showed evidence of secondary deposit.

MUCINOUS ADENOCARCINOMA OF ILEUM

An ulceroproliferative constricting growth was identified in ileum in a specimen of a female aged 60 years. The growth extended upto serosa and none of the lymphnodes showed evidence of secondary deposit.

NON HODGKINS LYMPHOMA OF ILEUM

In the Ileum an ulceroproliferative growth with was identified. The patient was a male aged 70 years with secondary deposit in lymphnodes.

SECONDARY DEPOSIT IN ILEUM

A resected distal Ileal segment of an elderly female aged 75 years, showed multiple irregular nodules, largest of size 3x2 cms, microscopy revealed a malignant papillary tumour with gland pattern and foci of calcifications favoring a diagnosis of secondary deposit from papillary adeno carcinoma.

TNM STAGING IN SMALL INTESTINE TUMOURS

TNM staging was done primarily on pathological findings and was applied to 2 resected specimens of small intestine.

TUMOUR STAGE

Among the two resected specimens one tumor showed infiltration upto muscularis propria and the other showed infiltration upto serosa.

LYMPHNODE INVOLVEMENT

Out of the two resected specimens lymphnode involvement was seen in one specimen.

DISTANT METASTASIS

Distant metastasis was not encountered in neither of the cases and the designation given was M0.

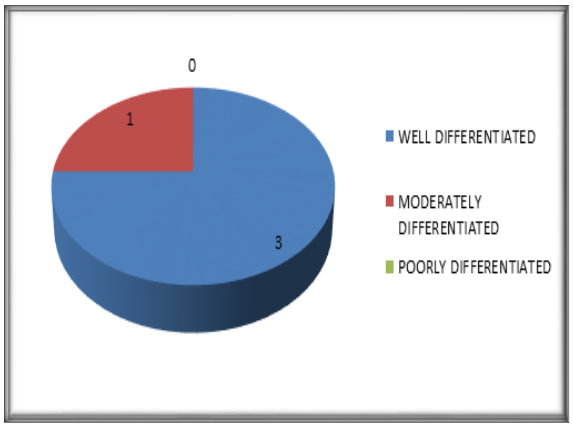


DIAGRAM 5: TUMOUR DIFFERENTIATION IN SMALL INTESTINE TUMOURS

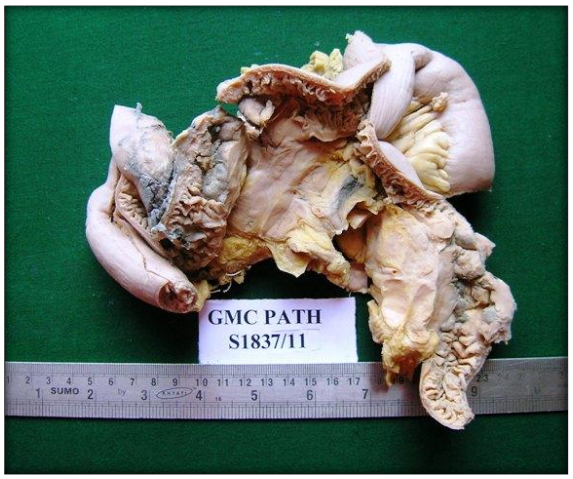


FIGURE 1: LYMPHOMA IN ILEUM

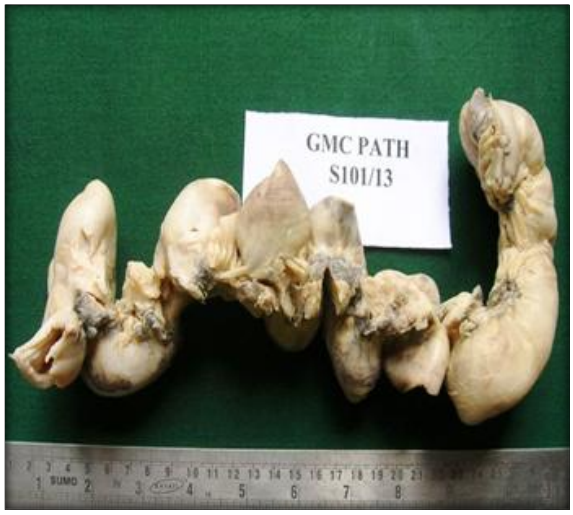


FIGURE 2: SECONDARY DEPOSIT IN ILEUM

CARCINOID TUMOUR–DUODENUM (FIG 1, 2 & 3)

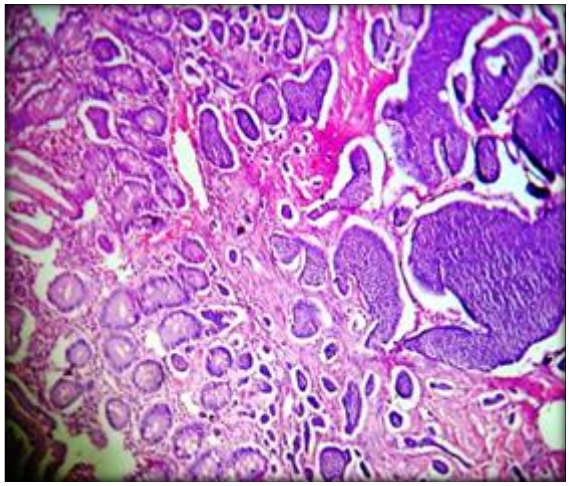


Figure 1- Low power view showing tumour cells arranged in nests (H & E; x200).

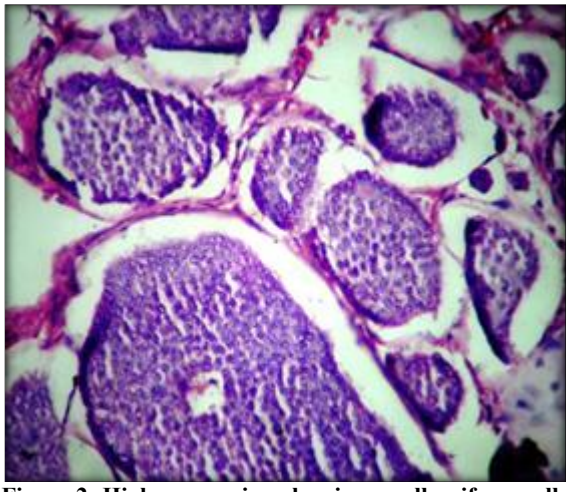


Figure 2: High power view showing small uniform cells with scant pink granular cytoplasm and round to oval stippled nucleus (H & E;x400)

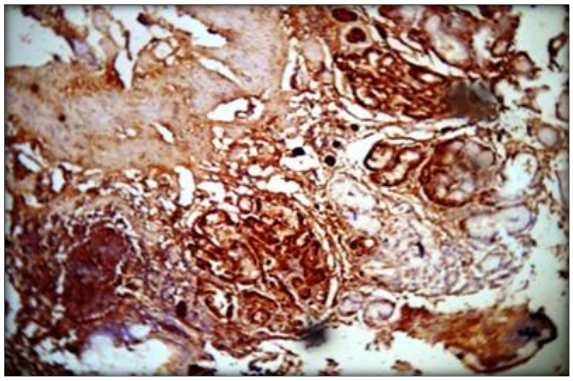


Figure 3: Low power- Chromogranin positive in carcinoid tumour (IHC; x200)

NON HODGKINS LYMPHOMA – ILEUM (FIG 4 & 5)

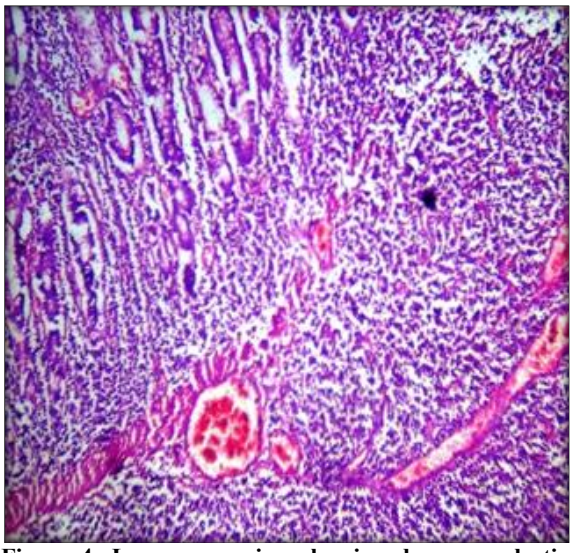


Figure 4: Low power view showing dense neoplastic lymphoid tissue (H&E; x200).

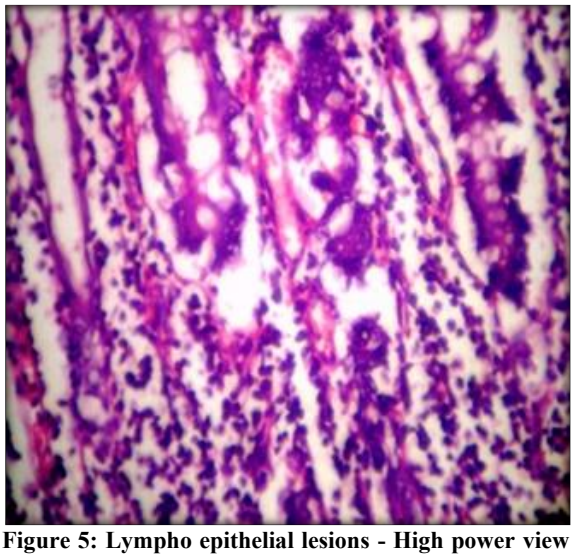
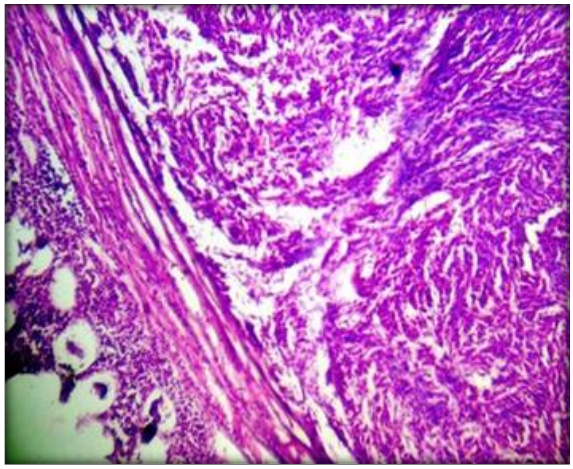


Figure 5: Lympho epithelial lesions - High power view depicting lymphocytes infiltrating intestinal glands (H& E; x400).

GASTROINTESTINAL STROMAL TUMOUR-JEJUNUM
(Fig6 & 7)



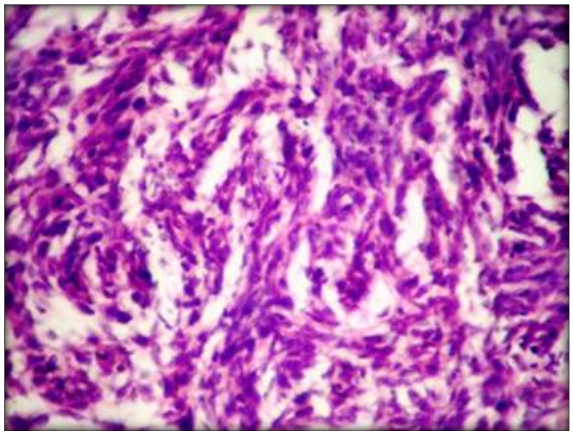


Figure 6 & 7- Low power (H&E; x200) and high power (H&E; x400) views showing fascicles of spindle shaped tumor cells.

Table 1: Percentage of intestinal tumours in comparison to all the tumours during the study

SL NO	TYPE	TOTAL NUMBER	PERCENTAGE
1.	Total number of tumours	2170	100
2	Total number of small intestine tumors	20	0.92

Table 2: Gender distribution of all intestinal tumours

SITE	M	F
SMALL INTESTINE	9	11

Table 3: Age and gender distribution of small intestinal tumours

SLNO	AGE(IN YEARS)	M	F
1	40-50	1	2
2	51-60	2	6
3	61-70	4	1
4	71-80	2	2
	TOTAL	9	11

Table 5: Anatomical distribution of small intestine tumours

SL NO	SITE	NO OF CASES	PERCENTAGE
1	DUODENUM	11	55
2	JEJUNUM	2	9
3	ILEUM	7	36

Table 6: Hhistological type of small bowel tumours

HISTOLOGICAL TYPE	NUMBER	PERCENT
EPITHELIAL	9	46
MESENCHYMAL	2	9
LYMPHOMA	4	18
NEURO ENDOCRINE	4	18
SECONDARY DEPOSIT	1	9

Table 7: TNM staging in small intestine tumours

SNO	TNM	NO OF CASES	PERCENTAGE
1	0	0	0
2	I	0	0
3	II	1	50
4	III	1	50
5	IV	0	0

Table 8: Tumour differentiation in small intestine tumours

WELL DIFFERENTIATED	3
MODERATELY DIFFERENTIATED	1
POORLY DIFFERENTIATED	0

Table 9: Immunohistochemistry in small intestine tumours

S no	Age	Sex	Site	IHC marker employed	Diagnosis
1	50	M	Ileum	CD 45 +, CD 20 +, CD 3 -	NHL
2	50	M	Duodenum	Chromogranin+	Carcinoid
3	44	F	Duodenum	Chromogranin+	Carcinoid

DISCUSSION

From a total of 2170 specimens received at the Department of Pathology, from June 2010 to March 2013 a 4 resected tumours of small intestine and 16 biopsies were studied.Small intestinal tumours account for 3-6 % of the gastrointestinal tumours, a surprising fact as the small bowel constitutes 75% of length and 90% of mucosal surface of alimentary tract.In the present study 20 cases were reported from small bowel which included 4 resected specimens and 16 biopsies.

Table 10: Comparison of number of small intestine tumours

Author	Number
Mandakini et al[12]	16
Mohammed et al[13]	2
Shahid Jamal et al [14]	84
Zhoic Zei wi et al[15]	75
Thomas et al[16]	2951
Present study	20

In the present study only 20 small intestine tumours were encountered a feature consistent with the above authors.

Table 11: Comparison of age distribution of small intestine tumours

Age	20-30	31-40	41-50	51-60	61-70	71-80	Total
Mohammed et al[183]	0	0	0	0	1	1	2
Present study	0	0	3	8	5	4	20

In the present study 4 tumours were seen in 5 – 6 decade closely followed by 3 tumours in 4-5 decade. However in the study conducted by Mohammed et al the age incidence was between 6-8 decade.

Table 12: Comparison of gender distribution of small intestine tumours

AUTHOR	Males	Females
Mohammed et al[13]	2	0
Mirana H.farhat et al[17]	25	8
Thomas et al[16]	1547	1407
Zhoic Zei wi et al[15]	42	33
Present study	9	11

In the present study a slight female preponderance was noted, however in the studies conducted by above authors male's outnumbered females.

Table 13: Comparison of anatomical distribution of small intestine tumours

AUTHOR	DUODENUM	JEJUNUM	ILEUM
H.Saadatinia et al[18]	98	33	23
Zhoic Zei wi et al[15]	18	28	29
Mirana H.farhat et al[17]	10	11	12
Present study	11	2	7

In the present study duodenum was the commonest site, harbouring 11 cases (54.54%) a finding consistent with H.Saadatinia et al.

Table 14: Comparison of histological types of small intestine tumours

Histological type	Mohammed et al[13]	Zhoic Zei wi et al[15]	Mirana H.farhat et al[17]	Mandakini et al[12]	Present study
Epithelial	0	25	11	9	9
Mesenchymal	1	26	9	0	2
Lymphoma	1	20	12	4	4
Neuro endocrine	0	0	1	1	4
Ma;ignant soft tissue	0	4	0	0	0
Secondary	0	0	0	2	1

Mandakini et al did a study in Government medical college, Surat and showed a preponderance of epithelial tumours, the findings in present study was in conformity with it.

Table 15: Comparison of clinical presentation small intestine tumours

Clinical feature	Mirana et al[17], No,%	Present study NO,%
Pain abdomen	22(67.7)	7(63.63)
Weight loss	19(57.6)	6(54.54)
Nausea/Vomiting	9(27)	8(72.72)
Bowel obstruction	8(24)	4(36.36)
GI bleeding	8(24)	3(27.27)
Anemia	7(21)	3(27.27)
Bowel perforation	4(12)	1(9)
Acute abdomen	4(12)	1(9)
Jaundice	4(12)	4(36.36)
Constipation	3(9)	4(36.36)

The most common presenting complaint in the present study was pain abdomen, followed by loss of weight. In the present study 7(63.63%) patients presented with pain abdomen, a finding consistent with Mirana et al.

Table 16: Comparison of type of surgery small intestine tumours

Type of surgery	Mirana et al[17]	Present study
Whipples procedure	5	1
Duodenal resection	2	
Ileal resection	9	2
Right hemicolectomy	3	
By pass	2	

In Mirana et al study the commonest surgical procedure undertaken was ileal resection and the present study also showed ileal resection as commonest surgical procedure.

IMMUNOHISTOCHEMISTRY IN SMALL BOWEL TUMOURS

Immunohistochemistry was employed in 3 small bowel cases.

CASE 1

In the present study an Ileal biopsy of a male patient aged 50 years showed small blue round cells with hyperchromatic nuclei and brisk mitotic activity. Lymphoepithelial lesions were frequent. A panel of IHC markers CD45, CD20, CD 3 were applied, IHC was positive for CD 3 confirming a diagnosis of B cell lymphoma.

CASE 2

A diagnosis of carcinoid was confirmed by IHC in a female patient aged 44 years. Microscopy revealed round to oval cells arranged in organoid pattern. IHC was positive for chromogranin favoring a diagnosis of carcinoid tumour.

CASE 3

A duodenal biopsy of 50 year male patient revealed round to oval cells with scant pink granular cytoplasm arranged in nesting pattern. The diagnosis of carcinoid was clinched as IHC was positive for chromogranin.

TNM STAGING IN SMALL INTESTINE TUMOURS

TNM staging was employed in two small intestine tumours.

CASE 1

A female patient diagnosed as periampullary carcinoma presented with complaint of jaundice and intestinal obstruction.

Resected specimens of duodenum, jejunum, head of pancreas, gall bladder with common bile duct, regional lymphnodes and omentum were received.

GROSS

A total of four specimens were received

- Specimen 1- A segment of small intestine of 11 cms with attached grey brown to dark brown mass of 6x4x3.5 cms was seen. The proximal cut end was 2cms and distal cut end was 1.5 cms.
- Specimen 2- A gall bladder specimen measuring 8.5x4x1 cms filled with bile.
- Specimen 3- Three irregular grey white to grey brown masses larger mass of 3x2x1 cms and smaller mass of 1.5x1x0.5 cms.
- Specimen 4- Omental mass of 22x22x2 cms.

MICROSCOPY

- Specimen 1- Sections studied showed histological picture of well differentiated papillary adeno carcinoma involving ampulla and duodenal mucosa upto muscularis propria. Cut ends of intestine were free from tumour. Pancraetic tissue showed chronic non specific pancreatitis.
- Specimen 2- Gall bladder showed chronic non specific cholecystitis changes.
- Specimen 3-Out of the two lymphnodes one lymphnode showed secondary deposit changes and the other showed lymphadenitis with sinus histiocytosis.
- Specimen 4- Omentum showed only conjestion and chronic inflammation. No evidence of secondary deposit.

TNM STAGING-T2N1M0, WHO STAGE III.

- **T2-**As tumour invaded muscularis propria.
- **N1-** As there was regional lymphnode metastasis.
- **M0-** As distant metastasis was absent.

CASE 2

A female patient aged 60 years presented with intestinal obstruction.

GROSS

- Specimen 1-Multiple grey brown to dark brown bits of total size 3.5x3 cms.
- Specimen 2- Specimen of intestine of 50 cms and 2 cm diameter. Cut section showed constricting growth of 5x4 cms involving entire circumference upto serosa. The growth was at a distance of 9 cms from one cut end and 36 cms from other cut end.

MICROSCOPY

- Specimen 1- Mucinous adeno carcinoma.
- Specimen 2- Mucinous adeno carcinoma infiltrating upto serosa without evidence of lymphatic or venous invasion. Cut ends were free from tumor. One lymphnode showed reactive changes.

TNM STAGING-T3N0M0, WHO STAGE – II.

- **T3-** As tumour extended upto serosa.
- **N0-** As there were no lymphnodes involved.
- **M0-** As there was no distant metastasis.

CONCLUSION

1. This is a retrospective study undertaken in the Department of Pathology, at a Teritiary care center over a period of 36 months from June 2010 to May 2013.
2. Resected specimens and biopsies of tumours and tumour like lesion of small bowel were received in the department during this period of study.
3. Among the small intestine tumours 4 were resected specimens and 16 were biopsies.
4. The mean age of patients was 57.54 years.
5. Females out numbered males marginally.
6. Duodenum was the commonest site and epithelial tumours were more frequent than other histological types.
7. Ileal resection was the most commonly employed surgical procedure in small bowel tumous in the present study.
8. On TNM staging 1 tumour was in stage II and the other in stage III.
9. IHC was employed in diagnosis of NHL of ileum and in diagnosis of carcinoid tumour.

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