Al Ameen J Med Sci 2020;13(4):255-260 ● US National Library of Medicine enlisted journal ● ISSN 0974-1143

ORIGINAL ARTICLE CODEN: AAJMBG

Clinico-pathological spectrum of small intestinal lesions at a tertiary care hospital

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Received: 31st July 2020; ***Accepted:*** 25th September 2020; ***Published:*** 01st October 2020

Abstract: *Background:* Small intestine is affected by various diseases ranging from developmental abnormalities, inflammatory diseases, malignancies etc. This study was carried out to study the occurrence and evaluate histopathology of small intestinal lesions and ileocaecal region lesions. *Methods:* A cross sectional histopathological study of small intestinal and ileocaecal region lesions of 44 cases was carried out on surgical specimens and biopsy received from Department of Surgery from January 2016 to July 2017. Specimens were preserved and fixation was done in 10% buffered formalin. Subsequently processing was done and slides stained with Haematoxylin and Eosin. Histopathological diagnosis was noted for each case. The data was analysed using SPSS version 20. Categorical data was expressed in terms of rates, ratios and percentage. *Results:* A total of 44 cases were included, among which 25 were males and 19 were females, with peak occurrence in 60 – 70 years age group. Pain abdomen was the commonest symptom. Histopathology spectrum studied in small intestine lesions showed 28 cases (87.5%) were non-neoplastic, whereas 4 cases (12.5%) were neoplastic lesions. The most common non-neoplastic lesion seen was Tuberculosis intestine. Other lesions seen were Perforation, Ischemic enteritis with gangrene, etc. Neoplastic lesions included rare cases like GIST and Metastatic squamous cell carcinoma. In the ileocaecal region, tuberculosis intestine was the most common lesion. Other lesions were Crohns disease, diverticulosis, intusseption etc. *Conclusion:* There is wide spectrum of lesions seen in Small intestine and ileocaecal region. This study emphasises the need for early diagnosis of the disease through histopathology, which when correlated clinically will help the clinician to implement the appropriate treatment and improve the survival of the patients

Keywords: Carcinoma, Small Intestine, Tuberculosis.

Introduction

Small intestine is the principal site for digestion and absorption of ingested food from the gastro intestinal tract. Nearly 75% of the total length of the gastrointestinal tract is made up by small intestine and it constitutes more than 90% of the mucosal surface area. The intestines are also the principal site where the immune system interfaces with a diverse spectrum of antigens present in food and gut microbes [1]. The diseases of small intestine can be broadly classified as following: developmental abnormalities, muscular and mechanical disorders, inflammatory disorders, vascular disorders, epithelial tumours, non-epithelial tumours and tumour-like lesions [2].

The advent of ileoscopy helps to demonstrate various forms of enteritis [3]. Interruption or reduction of the small bowel blood supply results in changes, which vary in severity from superficial mucosal necrosis to irreparable full thickness damage with necrosis [4]. Worldwide, malignant tumours of the small intestine are less than 1.0 per 100,000 population and hence are rare [5].

Extensive study was done by Pan SY et al. [6] who reported 1,609 cases and another by Howe JR et al.,[7] who reviewed 4,995 patients with small bowel adenocarcinoma in the national cancer database. Nearly, two-thirds of the small bowel tumours were

malignant, with commonest being adenocarcinoma. The other types of tumours included carcinoids, sarcomas and lymphomas. In their study most tumours originated in duodenum (55.2%) which was followed by jejunum (17.6%) and the ileum (13%) [8]. Thus, the present study was conducted to evaluate the clinical spectrum and various histological lesions of the small intestine. The objective of this study is to study the histomorphology of all the small intestinal lesions and ileocaecal region lesions and to determine the pattern of the lesions with respect to age, sex, anatomical site and frequency.

Material and Methods

This is a cross sectional study done in Department of Pathology, S. Nijalingappa Medical College, Bagalkot. Ethical clearance was obtained from Institutional Ethical committee for this study. The histopathological study of 44 cases of small intestinal lesions and lesions of ileocaecal region was carried out on surgical specimens and biopsy received from Department of Surgery during January 2016 to July 2017.

There were a total of 35 resection specimens, 8 biopsies and 1 polypectomy specimen received during the study period. History and details of all cases were noted. Lesions of the third part of duodenum, jejunum, ileum and ileocaecal junction were included. All samples of appendix and inadequate and poorly preserved biopsy specimen were excluded from the study. Gross examination was carried out to find out the size, shape and extent of lesions. Resected specimens and endoscopic biopsies of small intestine were preserved in 10% formalin and fixation done, processed for paraffin sectioning and stained by routine haematoxylin and eosin stains. Special stains like Zeil-Neelson for AFB and PAS were done wherever required. All sections were examined and various histopathological diagnosis were noted. The data was analyzed and frequency, distribution and percentages were tabulated.

Results

The present study was conducted from January 2016 to July 2017 which included a total of 44 surgical specimens of small intestine and ileocaecal region. The age and gender distribution is shown in Table 1.

There were 25 males and 19 females with a male to female ratio of 1.3:1. The most common site involved by small intestinal lesions (Total: 32 cases) was the ileum (65.25%), followed by jejunum (31.25%) and duodenum (3.50%).

Maximum number of small intestinal lesions were seen in 60-70 years and the same trend was seen in lesions of ileocaecal region.

Table-1: Age and Gender Distribution of Lesions

Age	Small Intestine lesions						Ileocaecal region lesions					
	Non Neoplastic		Neoplastic		Total	%	Non Neoplastic		Neoplastic		Total	%
	Female	Male	Female	Male			Female	Male	Female	Male		
<10	0	1	0	0	1	3%	0	0	0	0	0	0%
11-20	0	1	0	0	1	3%	0	0	0	0	0	0%
21-30	1	5	0	0	6	19%	1	0	0	0	1	8%
31-40	2	3	0	0	5	16%	1	2	0	0	3	25%
41-50	5	2	0	0	7	22%	0	1	0	1	2	17%
51-60	1	2	0	0	3	9%	0	2	0	1	3	25%
61-70	3	1	3	1	8	25%	2	0	0	1	3	25%
>70	0	1	0	0	1	3%	0	0	0	0	0	0%
Total	12	16	3	1	32	100%	4	5	0	3	12	100%
%	38%	50%	9%	3%	100%		33%	42%	0%	25%	100%	

Non-neoplastic lesions of small intestine and lesions of ileocaecal region were seen more commonly in the males where as neoplastic lesions in small intestine region were commoner in females. However, all the 3 cases of malignancy present in the ileocaceal region were seen in males. Symptoms seen in all the lesions are shown in Table 2. Among all the 44 cases, pain abdomen was the commonest symptom seen in 86.36 % patients, followed by vomiting (56.81 %). The least common symptom was generalized weakness seen in 6.81% of cases.

Table-2: Symptoms in patients with lesions of small intestine and ileocaecal region

Symptoms	Number of Cases	Percentage
Pain Abdomen	38	86.36
Vomiting	25	56.81
Fever	10	22.72
Mass Per Abdomen	6	13.63
Weight Loss	4	9.09
Diarrhoea	4	9.09
Jaundice	4	9.09
Aneamia	3	6.81

Histopathology spectrum studied in small intestine lesions showed 28 cases (87.5%) were non-neoplastic, whereas 4 cases (12.5%) were neoplastic lesions. The histopathological spectrum is as described in Table 3. The most common non-neoplastic lesion seen was Tuberculosis intestine (32%) followed by Ischemic enteritis (21%). Other lesions seen were Perforation (18%), Ischemic enteritis with gangrene (7%), Gangrene (7%), Lipomatous polyp (4%), Non specific ileitis (4%), Perforation peritonitis (4%) and Celiac disease (4%). Neoplastic lesions seen included one case each of Inflammatory myofibrobalstic tumour, Inflammatory fibroid polyp, Gastro Intestinal Stromal Tumour (GIST) and Metastatic squamous cell carcinoma.

The spectrum of lesions in the ileocaecal region is shown in Table 4. In the ileocaecal region among the non- neoplastic lesions, Tuberculosis intestine(16.7%) and Non-specific colitis (16.7%) both were most common lesions followed by Crohns disease, Diverticulosis, Intusseption, Meckels diverticulum and Perforation of ileocaecal region. Among the neoplastic lesions of Ileocaecal region, Adenocarcinoma was seen in 16.6% cases followed by a very rare case of Diffuse Large B Cell lymphoma (8.3%).

Table-3: Nonneoplastic And Neoplastic Lesions of Small Intestine

Lesion	Small Intestine lesions	
Non Neoplastic	**Cases**	**%**
Tuberculosis intestine	9	32%
Ischemic enteritis	6	21%
Perforation	5	18%
Ischemic enteritis with gangrene	2	7%
Gangrene	2	7%
Lipomatous polyp	1	4%
Non specific ileitis	1	4%
Perforation peritonitis	1	4%
Celiac disease	1	4%
Total	**28**	**87.5%**
Neoplastic		
Benign		
Inflammatory Myofibroblastic tumor	1	3.1%
Inflammatory fibroid polyp	1	3.1%
Malignant		
GIST	1	3.1%
Metastatic squamous cell carcinoma	1	3.1%
Total	**4**	**12.5%**

Table-4: Nonneoplastic and Neoplastic Lesions of Ileocaecal region

Lesion	Lesions of Ileocaecal region	
	Count	**% of Total**
Non Neoplastic		
Tuberculosis intestine	2	16.7%
Non specific colitis	2	16.7%
Crohns disease	1	8.3%
Diverticulosis	1	8.3%
Intussusception	1	8.3%
Meckels diverticulum	1	8.3%
Perforation	1	8.3%
Total	**9**	**75.0%**
Neoplastic		
Malignant		
Adenocarcinoma	2	16.6%
DLBCL	1	8.3%
Total	**3**	**25.0%**

Discussion

In the present study, the highest number of cases was seen in 61-70 years age group which accounted for 25% of cases, whereas study conducted by Nanavati MG et al [9] showed highest number of cases in 21-30 years age group. A male predominance was observed in present study with 56.81% being males and 43.19 % females with a male to female ratio of 1.3:1. The study conducted by Nanavati MG et al [9] found a male predominance with 63.5% and 36.5% being females and male to female ratio of 1.73:1 which was comparable to present study. Study conducted by Ansari HA et al, [10] showed a male predominance with 55.26% and 44.74% being females and male to female ratio of 1.24:1 which was again comparable to our study justifying males are more commonly affected than females.

The most common type of surgical procedure received in our study was resection specimens with 79.54 %of cases which is similar to study Uplaonkar S et al [11] which showed higher incidence for resections with 69.45%. The other specimens received for intestinal lesions in our study were biopsy (18.18 %) and polypectomy (2.28%).

Non- Neoplastic Lesions

Tuberculosis of Intestine: In present study, the most common non-neoplastic lesion in small intestine including the ileocaecal region was found to be tuberculosis Intestine which was seen in 25% of cases which was higher compared to studies conducted by Nanavati MG et al [9] and Sisodia S M et al [12] with 11.5% and 11.6% respectively. The microscopic findings in tuberculosis of intestine were multiple confluent epitheloid cell granulomas with langhan's giant cells and foreign body giant cells were seen in all the layers of intestine with caseation necrosis at places.

Zeihl-Neelson stain demonstrated acid fast bacilli in cases. A study by Pulimood et al [13] found the following histopathological features specific for tuberculosis, and were used to differentiate between tuberculosis and Crohn's disease- caseation; confluent granulomas; lymphoid cuff; granulomas larger than 400 micrometer; 5 or more granulomas in biopsies from one segment; granulomas located in the submucosa or granulation tissue: often with palisaded histiocytes and disproportionate submucosal inflammation.

Ischeamic Enteritis with or without Gangrene: In present study, Ischaemic enteritis with or without gangrene was seen in 18.8% of cases, whereas studies conducted by Nanavati MG et al[9] and Sisodia SM et al [12] found a lower incidence of 10.1% and 11.6% respectively. Macroscopic findings were the intestine was oedematous and congested. Thinning of the intestinal wall was noted focally. On cutting open, the mucosa was necrotic covered by patches of white slough. Microscopic findings were mucosa was eroded with patchy lesions, with crypts showing necrosis and there was a surface membrane composed of mucus, fibrin, blood cells and necrotic tissue. There was vascular congestion with oedema and haemorrhage in the intestinal wall.

Perforation: Small intestinal perforations in adults may follow ingestion of foreign bodies, peptic or other ulceration, acute or chronic inflammatory bowel disease, thinning and weakening of the bowel wall due to systemic sclerosis or diverticula, or follow obstruction of the bowel lumen from a large number of causes. Microscopic findings were acute inflammatory exudate along with haemorrhage, oedema and congested blood vessels was seen. In present study, the incidence of perforation of intestine was found to be 13.63 %, while studies conducted by Nanavati MG et al [9] and Sisodia SM et al [12] found a higher incidence of 20% and 18.7% respectively.

Intussusception: There was one case of intusseption in our study with an incidence of 2.27% which was slight higher than study conducted by Nanavati MG et al [9] who found an incidence of 1.3%. The study done by Sisodia SM et al [12] had nil cases. Macroscopic findings were longitudinally sectioned specimen showed three definite layers, namely the outermost investing intussuscipiens and the entering (inner) and returning (outer) layers of the invaginated intussusceptum. Microscopic findings

confirmed the presence of intussusception with mild inflammatory infiltrate and congested blood vessels.

Developmental Defects: Under this group, present study reported 1 case of Meckel's diverticulum, 1 case of diverticulosis which all together accounted for 4%. Study conducted by Sisodia SM et al [12] found a comparable higher incidence of 8% and study conducted by Nanavati MG et al [9] found an incidence of 3.8% which is similar to present study.

Crohn's disease: In present study 1 case of Crohn's disease was found. Histopathology showed transmural lymphoid infiltrate, submucosal oedema, and granulomas which were non-caseating and discrete. In Crohn's disease, granulomas are discrete, and the lymph node do not show granuloma if none are seen in the intestine. In contrast, the granulomas in tuberculosis are confluent and could be found in lymph node even if the intestine shows none [13].

There were difficulties in distinguishing Crohn's disease from tubercular enteritis. A fact observed by Dutta AK et al. [14], Navaneethan U et al [15]. Pulimod A et al.[13] described the crohns disease granulomas are small (<200 micrometer), discrete, very few / single, poorly organized, commonly located in the mucosa along with crypt centric inflammation and with aggregates of histiocytes. Microgranulomas helped in diagnosing Crohn's disease. The three features that are generally regarded as the hallmarks of intestinal Crohn's disease are focal ulceration (which is often fissuring and may result in fistula formation), transmural inflammation in the form of lymphoid aggregates and granulomas.

Neoplastic Lesions

Adenocarcinoma: In present study, the most common neoplastic lesion of small intestine was found to be adenocarcinoma with 4.54% of cases, which is comparable with study conducted by Nanavati MG et al [9] who found adenocarcinoma as the most common neoplastic lesion of small intestine. These findings were also similar to observations by Terada T [16] and Dabaja BS et al [17].

Gastrointestinal Stromal Tumor (GIST): GISTs are mesenchymal neoplasms of the gastrointestinal tract that express C-kit, with rare exceptions. Two thirds arise from stomach and one fourth from small intestine and the rest occurs in large intestine. The macroscopic features shows usually solitary, rounded or ovoid mass varying in size from 2-20 cm. On cross section they are circumscribed, lack a true capsule and reveal a pink or grey cut surface with rubbery consistency. They may have areas of haemorrhage, necrosis, myxoid change or cavitary degeneration [18]. In our study, the incidence of GIST was found to be 2.27 %, while the study conducted by Nanavati MG et al [9] found to be of 2.3% which is almost similar to our findings.

Other Neoplastic lesions: There was one case each of Infammatory Myofibroblastic tumor and Inflammatory fibroid polyp in benign tumours of small intestine. There was one case of each of Diffuse Large B Cell Lymphoma and Metastatic squmaous cell carcinoma which are both rare lesions in small intestine.

Conclusion

Disorders of the small intestine account for a large portion of the human diseases. There are only a few extensive and comprehensive studies of small intestinal lesions from this part of country. The clinical features and radiological findings are non-specific in various diseases and thus histopathological study is mandatory for confirming the diagnosis with constant correlation with clinical and radiological findings for better patient management.

Acknowledgements

We thank Department of Pathology and Department of Surgery, S. Nijalingappa Medical College and HSK Hospital, Bagalkot in conducting this study. We also acknowledge technical staff, postgraduates and teaching staff of our department for all the support.

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

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Cite this article as: Prabhu Mural MH, Kalyan NV, Pattanashetti MA and Inamdar SS. Clinico-pathological spectrum of small intestinal lesions at a tertiary care hospital. *Al Ameen J Med Sci* 2020; 13(4):255-260.

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