A CLINICOPATHOLOGICAL STUDY OF TUMOURS AND TUMOUR-LIKE LESIONS OF THE STOMACH

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ABSTRACT

BACKGROUND

Gastric cancer is the second most cancer worldwide after lung cancer despite a global decline in its incidence.¹ In most countries, the annual incidence of new cases of gastric cancer ranges between 8 and 20 per 100,000 population. Gastric cancer is primarily a disease of the old and the rates rise with increasing age and reaches a peak in the sixth and seventh decades.

MATERIALS AND METHODS

This study includes 155 cases of tumours and tumour-like lesions of the stomach. All the biopsy materials along with full clinical details and operative findings as per the working formulation were received. The biopsy materials received were fixed in 10% buffered formalin. Punch biopsy, wedge biopsy and polypectomy specimens were subjected to histopathological examination in toto. Samples for histopathological study were taken from the tumour, the surrounding mucosa, proximal and distal lines of resection, lymph node and other organs resected in the case of radical gastrectomies.

OBSERVATIONS AND RESULTS

In the three years study period from September 1988 to August 2001, 33,329 biopsy materials were received. Of these, tumours and tumour-like lesions of the stomach accounted for 155 cases. Hence, the overall incidence of tumours and tumour-like lesions of the stomach is 0.47%. No benign tumour was reported during the period. The malignant tumours were the most common with a peak incidence in the 4th and 5th decade and increased preponderance of malignant neoplasms in males when compared to females. The current study showed a high incidence of malignancy in the antrum. The most common histological type is the tubular adenocarcinoma forming 78.29%. The incidence of mucinous adenocarcinoma was 8.55%.

CONCLUSION

The study is to analyse the incidence, to classify the benign and malignant tumours and tumour-like lesion of the stomach and study their prevalence along with the clinical correlation and to study the age and sex incidence of tumours and tumour-like lesions of the stomach.

KEYWORDS

Stomach, Tumour, Clinicopathology.

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INTRODUCTION

Gastric cancer is the second most cancer worldwide after lung cancer, despite a global decline in its incidence.¹ In most countries, the annual incidence of new cases of gastric cancer ranges between 8 and 20 per 100,000 population. Highest rates in the world are seen in Japan and China and it is a major clinical problem in India. It is a leading cancer amongst the male population of Chennai.² Gastric cancer is primarily a disease of the old and the rates rise with increasing age and reaches a peak in the sixth and seventh decades. The overall 5 years survival rate is low, because majority of gastric cancers are diagnosed in advance (<5% for stage IV). Gastric cancer when confined to mucosa and submucosa (i.e. early gastric carcinoma) shows a 5 years survival rate varying from 65% to 98%. The end result of treatment for gastric cancer

is primarily dependent on the stage of the cancer. In high prevalence areas such as Japan and China, mass screening methods by radiological and endoscopic tests have been for detection of early gastric cancer.

The study is to analyse the incidence, to classify the benign and malignant tumours and tumour-like lesion of the stomach and study their prevalence along with the clinical correlation, to study the age and sex incidence of tumours and tumour-like lesions of the stomach. This study is to also analyse the site wise distribution of the various neoplasms of the stomach and we do the histological typing of the tumours and tumour-like lesions based on W.H.O. classification and study any associated changes in the non-neoplastic mucosa.

MATERIALS AND METHODS

2,42,346 patients were taken from September 1988 to August 2001. During this study period, there were 155 cases of tumours and tumour-like lesions of the stomach.

The present study evaluates various parameters of these gastric neoplasms including their incidence and distribution according to age, sex and site.

The following types of gastric biopsy materials were received.

1. Punch biopsy.
2. Wedge biopsy.

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3. Polypectomy.
4. Gastrectomy specimens.

All the biopsy materials along with full clinical details and operative findings as per the working formulation were received. The biopsy materials received were fixed in 10% buffered formalin. Punch biopsy, wedge biopsy and polypectomy specimens were subjected to histopathological examination in toto. With the gastrectomy specimens, parameters noted include length of the specimen, size, shape and consistency of tumour, distance of tumour from the resected margins; status of the resected margins (Positive or negative); presence of lymph nodes, etc.

Samples for histopathological study were taken from the tumour, the surrounding mucosa, proximal and distal lines of resection, lymph node and other organs resected in the case of radical gastrectomies (eg. spleen, transverse colon, etc.).

The tissues were processed by paraffin-processing. Paraffin blocks were prepared subsequently and 5 micron thin sections were cut from the paraffin blocks and stained with haematoxylin and eosin.³ Wherever it was essential, the following special stains were used.

Special Stains Uses

1. PAS neutral mucin.
2. Alcian blue for acidic mucin.
3. Alcian blue-PAS for acidic and neutral mucins.
4. Reticulin to differentiate between lymphoma and poorly differentiated carcinoma.

Standard methods of staining as described by Bancroft in theory and practice of histological techniques were followed. Based on histopathology, the lesions were placed into one of the following categories, viz. benign and malignant neoplasms, tumour-like lesions and inflammatory lesions. The study mainly involves the benign and malignant tumours and tumour-like lesions of the stomach.

Photographs of the appropriate specimens and photomicrographs of the sections were taken. The classification of the gastric neoplasms used in the study is based on the W.H.O. histological typing of gastric and oesophageal tumours no. 18, 1977 edited by Oota K. and Sobin L.H.⁴

OBSERVATION AND RESULTS

Incidence of tumours and tumour-like of the stomach. In the three years study period from September 1988 to August 2001, 33,329 biopsy materials were received. Of these, tumours and tumour-like lesions of the stomach accounted for 155 cases. Hence, the overall incidence of tumours and tumour-like lesions of the stomach is 0.47%.

Diagram 1 shows the year-wise distribution of the tumours and tumour-like lesions of the stomach during the study period.

Diagram 2 depicts the overall incidence of tumours and tumour-like lesions of the stomach that were received during the study period. No benign tumour was reported during the period.

Age Incidence

The age distribution of tumours and tumour-like lesions of the stomach is depicted in Diagram 3. The malignant tumours

were the most common with a peak incidence in the 4th and 5th decade.

Sex Incidence

Of the total 155 tumours and tumour-like lesions of the stomach, 100 cases occurred in males (64.52%) and 55 in females (35.48%) as shown in Table 1. The current study showed an increased preponderance of malignant neoplasms in males when compared to females, malignant tumours of the stomach.

Incidence

Of the 33,229 biopsy materials analysed in the three-year study, there were 152 cases of malignant tumours with an overall incidence of 0.46%.

Age Incidence

A wide age range extending from 10 to 70 years with an average age of 45 years has been noted in the current study. Table 2 illustrates the decennial age incidence of gastric malignancies. Most of the cases are found in the age group 41-60 years (65.13%). As much as 22.37% cases were found to be younger than 40 years, there were no patients older than 70 years and the youngest patient was 19 years old in the current study.

Sex Incidence

Table 1 shows the sex incidence of malignant tumours of the stomach. It was noted that 64.47% of malignancies occurred in men compared to 35.53% in females. Thus, there is a near 2:1 ratio for male-to-female incidence of gastric cancer.

Distribution of Malignant Tumours According to the Anatomical Site

The current study showed a high incidence of malignancy in the antrum (29.58%) as shown in Table 3. Tumours occurring in the body and antrum together showed an incidence of 26.06%. The tumours of cardia showed a low incidence of 7.04%. There were 3 cases of tumours arising from the gastric remnant (2.11%).

Signs and Symptoms

Table 4 shows the most common signs and symptoms of gastric cancer patients in the present study. Most patients present with abdominal pain and vomiting, vomiting was the predominant symptom in advanced malignancies. Few patients had haematemesis and some presented with abdominal mass. The constitutional symptoms like loss of weight and loss of appetite alone were the presenting complaints in a very few percentage of cases. The patients with involvement of cardia (proximal third) presented with dysphagia.

Clinical Staging of Gastric Adenocarcinoma

Out of 142 cases of adenocarcinomas, only 61 were gastrectomy specimens. Staging was done based on TNM classification as shown in Table 5,⁵ on all gastrectomy specimens received in our institution. Excluding the undefined category, the commonest stage encountered was stage II (16.90%) and the next commonest was stage IIIA (12.68%) Table 6.

Histologic Distribution of Malignant Tumours of the Stomach

Incidence of the various histologic types of the malignant tumours of the stomach in the current study is depicted in Table 7. The most common histological type is the tubular adenocarcinoma forming 78.29%. The incidence of mucinous adenocarcinoma was 8.55%. Only three cases of papillary adenocarcinoma were encountered and 7 cases of signet ring cell carcinoma. The incidence of neuroendocrine tumours was 3.29%. The incidence of lymphomas was as low as 3.29%.

Metastatic deposits of the 142 cases of adenocarcinoma in the study; clinical regional lymph node involvement was seen in 65 cases, of which 31 cases were positive histologically for secondaries. Two patients had ovarian secondaries. Clinically omental and peritoneal deposits were seen in 7 cases; supraclavicular lymph node involvement in one patient, 5 patients had liver secondaries; 1 had secondary deposits in both lungs and one each showed infiltration of pancreas of

pancreas and spleen. However, biopsy confirmation was not made in these cases.

Tumour-Like Lesions of the Stomach

Table 8 shows the incidence of tumour-like lesions of the stomach. Hyperplastic polyps were the commonest in the present study (66.67% incidence). One case of a hamartomatous polyp was reported.

Tumour Type	Males		Females	
	Total No. of Cases	Incidence	Total No. of Cases	Incidence
Malignant	98	64.47%	54	35.53%
Tumour-like	2	66.67%	1	33.33%

Table 1: Sex Incidence of Tumours and Tumour-Like Lesions of the Stomach

Decade	Current Study		Srinivasan		Brennan and Karbeh	
	No. of Cases	Incidence	No. of Cases	Incidence	No. of Cases	Incidence
0-10	*	*	*	*	*	*
11-20	1	0.66%	*	*	*	*
21-30	9	5.92%	*	*	16	1.01%
31-40	24	15.79%	5	11.36%	83	5.21%
41-50	48	31.58%	24	54.55%	201	12.63%
51-60	51	33.55%	11	25%	31	23.93%
61-70	19	12.5%	3	6.82%	467	29.33%
71-80	*	*	1	2.27%	349	21.92%
81-90	*	*	*	*	92	5.78%
>90	*	*	*	*	3	0.19%

*Not Encountered

Table 2: Decennial Age Incidence of Malignant Tumours of Stomach - A Comparative Study

Location	Current Study		Borch K et al	
	No. of Cases	Incidence (%)	No. of Cases	Incidence (%)
Cardia	10	7.04	129	11
Body	18	12.68	302	26
Antrum	42	29.58	273	24
Body and antrum	37	26.06	195	17
Gastric remnant	3	2.11	105	9
Undefined	32	22.54	157	14
Total	142	100	1161	100

Table 3: Tumour Location in Patients with Gastric Adenocarcinoma - A Comparative Study

Signs/Symptoms	Total Cases	Incidence (%)
Loss of weight	6	3.95
Loss of appetite	9	5.92
Pain abdomen	46	30.26
Vomiting	52	34.21
Haematemesis	11	7.24
Mass abdomen	14	9.21
Ascites	5	3.29
Dysphagia	3	1.97
Melena	6	3.95

Table 4: Incidence of Signs and Symptoms in Gastric Malignancy in the Current Study

TABLE 5: TNM CLASSIFICATION FOR ADENOCARCINOMA OF STOMACH⁵

Primary Tumour

- T_x Primary tumour cannot be assessed.
- T₀ No evidence of primary tumour.
- T_{is} Carcinoma in situ.
- T₁ Tumour invades lamina propria or submucosa.
- T₂ Tumour invades muscularis propria.
- T₃ Tumour invades adventitia.
- T₄ Tumour invades adjacent structures.

Regional Lymph Nodes

- N_x Regional lymph node(S) cannot be assessed.
- N₀ No regional lymph node metastasis.
- N₁ Metastasis in perigastric lymph node(s) within 3 cm of edge of primary tumour.
- N₂ Metastasis in perigastric lymph node(s) more than 3 cm from edge of primary tumour or in lymph node along left gastric, common hepatic, splenic or celiac arteries.

Distant Metastasis

- M_x Presence of distant metastasis cannot be assessed
- M₀ No distant metastasis.
- M₁ Distant metastasis.

Stage Grouping

Stage 0	Tis, N0, M0
Stage IA	T1, N0, M0
Stage IB	T1, N1, M0, T2, N0, M0
Stage II	T1, N2, M0
Stage IIIA	T2, N2, M0
Stage IIIB	T3, N2, M0 T2, N1, M0 T3, N1, M0 T4, N1, M0
Stage IV	T4, N2, M0, Any T, Any N, M

TNM Stage	Current Study		Borch K. et al 1974-1991		Jin-Pok Kim 1981-1996
	No. of Cases	Incidence (%)	No. of Cases	Incidence (%)	Incidence (%)
IA	4	2.81	45	4	19.2
IB	3	2.11	140	12	11.9
II	24	16.90	98	8	13.6
IIIA	18	12.68	118	10	17.7
IIIB	7	4.93	118	10	22.3
IV	5	3.52	329	28	15.2
Undefined	81	57.04	313	27	-

Table 6: Incidence of Cases of Adenocarcinoma of the Stomach in Each Stage: A Comparative Study

Histologic Type	Current Study		Srinivasan	
	No. of Cases	Incidence (%)	No. of Cases	Incidence (%)
Tubular adenocarcinoma	119	78.29	29	66
Papillary adenocarcinoma	3	1.97	*	*
Mucinous adenocarcinoma	13	8.55	13	29.55
Signet ring cell carcinoma	7	4.61	*	*
Neuroendocrine Tumours	5	3.29	*	*
Lymphomas	5	3.29	2	4.55

Table 7: Incidence of the Histologic Types of Malignant Tumours of the Stomach – A Comparative Study

Tumour-Like Lesions	Current Study		Seifert and Elster	
	No. of Cases	Incidence	No. of Cases	Incidence
Hyperplastic polyps	2	66.67%	132	57.64%
Hamartomatous polyp	1	33.33%	Nil	Nil
Total	3		229	

Table 8: The Incidence of Tumour-Like Lesions of the Stomach

	Total No. of Biopsies (Excluding Gynaecological (Specimens))	No. of Cases			Total	Percentage
		Benign	Malignant	Tumour Like		
Current Study	1,6105	Nil	152	3	155	0.96
Srinivasan Study	8571	Nil	44	Nil	44	0.51

Table 9: Incidence of Tumours and Tumour-Like Lesions of Stomach - A Comparative Study

Location	Patients	Incidence (%)
Proximal third	494	23.54
Middle third	393	18.72
Distal third	919	43.78
Whole stomach	148	7.05
Unknown	145	7.05
Total	2099	100

Table 10: Location of Stomach Cancer in India

Early Gastric Cancer	Incidence (%)	Advanced Gastric Cancer	Incidence (%)
Asymptomatic/silent	80	Weight loss	60
Peptic ulcer symptoms	10	Abdominal pain	50
Nausea or vomiting	8	Nausea or vomiting	30
Anorexia	8	Anorexia	30
Early satiety	5	Dysphagia	25
Abdominal pain	2	Blood loss	20
Gastrointestinal blood loss	<2	Early satiety	20
Weight loss	<2	Peptic ulcer symptoms	20
Dysphagia	<1	Abdominal mass or fullness	5
		Asymptomatic/silent	<5

Table 11: Incidence of Signs & Symptoms in Gastric Malignancy

Histologic Type	No. of Cases	Incidence (%)
Adenocarcinoma	1282	96.32
Lymphoma	21	1.58
Leiomyosarcoma	18	1.35
Carcinoids	7	0.53
Squamous cell carcinoma	2	0.15
Histiocytoma	1	0.8
Total	1331	

Table 12: Incidence of Various Histological Types of Gastric Malignancy (Borch K. et al 1974-1982)

Decade	No. of Cases	Incidence
0-10	Nil	0
11-20	1	0.70%
21-30	8	5.63%
31-40	22	15.49%
41-50	43	30.28%
51-60	49	34.51%
61-70	19	13.38%

Table 14: Age Incidence of Adenocarcinoma of Stomach

Fig. 1: A Case of Poorly Differentiated Tubular Adenocarcinoma showing Tumour Cells with Attempted Tubular Cells in Some Area H&E X100

Fig. 2: Gross Appearance of Stomach from a Patient showing Classical Appearance of Linitis Plastica (Leather Bottle Stomach)

Fig. 3: A Case of Mucinous Adenocarcinoma showing Acid Mucin-Stained with Alcian Blue X100

Fig. 4: Adenocarcinoma with Intracytoplasmic and Extracellular Secretory Material showing Positivity for PAS X100

Fig. 5: Gross Appearance of a Specimen from a Case of Krukenberg Tumour showing Greyish-White Appearance with Haemorrhagic Areas

Fig. 6: Photomicrograph of the Section from a Case of Krukenberg Tumour showing Signet Ring Cells H&E X450

Fig. 7: The Same Case (Mentioned in Fig. 12) showing Signet Ring Cells with PAS Positivity X450

Fig. 8: Complete Intestinal Metaplasia showing Goblet Cells containing Acidic and Neutral Mucin Staining Purple with Alcian Blue X450

Fig. 9: Gross Appearance of Specimen from a Case of Mucinous Adenocarcinoma showing Perigastric Invasion

Fig. 10: Photomicrograph shows Colloid Carcinoma with a Tumour Cells Floating in Extracellular Mucin

Fig. 11: Photomicrograph showing Carcinoid Tumour with Uniform Tumour Cells arranged in Trabecular Pattern H&E X450

Fig. 12: Photomicrograph of a Case of Carcinoid Tumour showing Positivity for Chromogen X100

DISCUSSION

Cancer of the stomach is one of the most common human solid tumours in Asia, despite a worldwide decline in its incidence over the last 4-5 decades.

In India, Kashmir, Chennai and Bangalore have a very high incidence of gastric cancer. Most gastric cancers are diagnosed in an advanced stage. Even in developed countries like United Kingdom, less than 1% of all gastric cancers are diagnosed in an early stage.⁶

Diagram 8 depicts the overall incidence of tumours and tumours and tumour-like lesions of the stomach during the study period from September 1988 to August 2001.

Total biopsies received during the study period excluding gynaecological specimens are 16,105. Table 9 shows the comparative study on the incidence of tumours and tumour-like lesion of the stomach. In the current study the incidence of 0.96%, which is slightly more than the incidence reported by Srinivasan.⁷ No benign tumour was reported in both the studies. While three tumour-like lesions were reported in the current study, similar lesions were not reported in the study by Srinivasan. The incidence of malignant tumours in the current study was 0.94%, while in his study it was 0.51% malignant tumours of the stomach.

Age Incidence

Table 2 illustrates the decennial age incidence of gastric malignancies compared to the study by Srinivasan and the study by Brennan and Karpeh⁸ at Memorial Sloan Kettering Cancer Centre (MSKCC), New York, from July 1, 1985 to July 1, 1995. Overall findings were almost similar regarding the age incidence, which was 41-70 years.

In the present study the incidence in the age group of 41-60 years was 65.13%, while that of Srinivasan was 79.55%. However, at MSKCC, New York, a peak incidence was noticed in the 51-80 years' age group (75.19%). The incidence below 40 years was 22.37% in the present study, while it was over 11.36% in the study by Srinivasan and 6.22% at MSKCC, New York. There were no patients older than 70 years in the present study, whereas the incidence was 2.27% in the study by Srinivasan and 27.89% at MSKCC. The reason could be due to the decreased mean age of survival of Indians compared to that of the population in the developed nations of the west.

Sex Incidence

Table 1 shows the sex incidence of malignant tumours. It was noted that 64.47% of malignancies occurred in men compared to 35.53% in females. This is very much similar to that seen in study by Borch K. et al⁹ in Sweden with a high male sex incidence, where 61.07% cases were males and 38.43% were females. Thus, both studies show a male-to-female ratio of 2:1 in gastric cancer incidence.

Distribution of Malignant Tumours according to the Anatomical Site

Table 3 illustrates the location of gastric adenocarcinoma and also presents the relevant comparative data. The current study and Borch K. et al study show a high incidence of malignancies in the body and antrum. In the data from Tata Memorial Hospital Cancer Registry as shown in Table 10 for the period from 1987 to 1993, it has been found that there is an increased incidence (43.78%) of malignancies in the distal third of the stomach.

Signs and Symptoms

Table 7 shows the incidence of signs and symptoms in the current study. Most patients presented with abdominal pain and vomiting. This correlates well with the incidence of signs

and symptoms in advanced gastric cancer reported by Sleisenger et al¹⁰ as shown in Table 11, in which the most common symptoms were abdominal pain and loss of weight. Other common symptoms were nausea, vomiting and loss of appetite.

Clinical Staging of Gastric Adenocarcinoma

Staging was done based on TNM classification as shown in Table 5 on all gastrectomy specimens received in our institution. Table 6 shows the comparison in clinical staging between the current study and Borch K. et al⁹ study. In the current study excluding the undefined category, most cases were in stage II (16.90%), whereas in Borch K. et al study most of the cases were in stage IV (28%); in another study by Jin Pok Kim of the Department of Surgery in Seoul National University Hospital from 1981 to 1996, most of the patients were in stage IIIB (22.3%).

In our institution, palliative bypass surgery is done for advanced stages of gastric cancer, which may explain the apparent low incidence of stage IV disease in the gastrectomy specimens.

Histologic Distribution of Malignant Tumours of the Stomach

The incidence of the various histologic types of the malignant tumour of the stomach is given in Table 7 and compared with the study by Srinivasan. In both the studies, the most common histological type is adenocarcinoma. In the study by Borch K. et al⁹ as shown in Table 6 also, the commonest histological type was adenocarcinoma making up 96.32% of total malignancies.

In the present study the incidence of mucinous adenocarcinoma was only 8.55%, while it was 29.55% in the study by Srinivasan. The incidence of neuroendocrine tumours was 3.29% in the present study, while in the study by Borch K. et al it was 0.53%. The incidence of lymphomas was low in all three studies.

Tumour-Like Lesions of the Stomach

The incidence of tumour-like lesions of the stomach in comparison with the study by Seifert Elster is shown in Table 8. Hyperplastic polyps were the commonest in both the studies with an incidence of 66.67% in the current study and 57.64% in the study by Seifert and Elster. Hamartomatous polyps showed an incidence of 33.33% in the current study, whereas it was not encountered in the other study.

Benign Neoplasms of the Stomach

Benign epithelial tumour (Adenoma) was not encountered in the current study.

Malignant Tumours of the Stomach

The major histologic type of cancer arising in the stomach is adenocarcinoma with incidence in the sixth and seventh decades and a male-to-female ratio of 2:1.

The current study showed peak incidence in the 41-60 years' age group as shown in Table 13 and a male-to-female ratio of 2:1 approximately as shown in Table 14. The study by Srinivasan also showed an increased incidence in 41-60 years' age group (79.5%).

In the current study, the commonest site of adenocarcinoma was the antrum. This correlates well with the data obtained from the Tata Memorial Hospital Cancer

Registry, which also show a high incidence of distal third cancers. Grossly, most of the tumours were ulcero-infiltrative in nature (Fig. 2). The diffusely infiltrative carcinomas showed diffusely thickened gastric wall with three cases of linitis plastica type of tumours.

Microscopically, adenocarcinoma has been classified into papillary, tubular, mucinous and signet ring cell carcinoma as per the W.H.O. classification. This classification is based on the dominant pattern, since most adenocarcinomas show different histological features depending upon the layer in which the tumour infiltrates.

The other histological classifications of gastric adenocarcinomas are given in Table 15.

Papillary Adenocarcinoma

Papillary adenocarcinomas showed prominent intraglandular folding and projections with cuboidal to high columnar carcinoma cells lining the narrow bands of interstitial tissue. Although some tubular formation was seen, the papillary pattern was evident in cystic areas. The present study included three cases of papillary adenocarcinoma with one of them showing lymph node metastases.

Tubular Adenocarcinoma

This tumour showed tumour cells arranged in branching tubular pattern. According to the degree of tubular formation, it was graded into well, moderately and poorly differentiated.

1. Well Differentiated

This tumour showed a distinct glandular pattern with columnar epithelium throughout and amount of stroma was moderate or small. Invasion of muscle coat by the tumour cells are also seen.

2. Moderately Differentiated

This tumour showed small or incomplete tubular structures with cuboidal or flat epithelium. A cribriform structure was occasionally found.

Poorly Differentiated

This tumour showed a few glandular structures, which were recognized only with difficulty (Fig. 1). In the current study, there were 66 cases of well-differentiated adenocarcinoma, 7 cases of moderately-differentiated adenocarcinomas and 46 cases of poorly-differentiated adenocarcinomas. Three of the total gastrectomy specimens of poorly-differentiated adenocarcinoma showed diffuse thickening of the gastric wall producing linitis plastica (Fig. 2).

The mucin secreted by adenocarcinomatous cells is mainly intestinal acidic mucins, which was strongly positive for Alcian Blue at PH 2.5 (Fig. 3) and also PAS positive (Fig. 4).

Early Gastric Carcinoma

In the current study there were 4 cases of early gastric carcinoma limited to the mucosa and submucosa, as described by the Japanese Gastroenterological Endoscopy Society. In the Japanese National Statistics Type IIC was the most common (33.8%) followed by Type IIC + Type III (23.4%).

In the current study, there were 3 cases of gastric adenocarcinoma arising from the gastric remnant. In one patient poorly-differentiated adenocarcinoma developed in the gastric remnant, 20 years after gastrectomy done for benign peptic ulcer.

Two cases of Krukenberg tumour of ovary were encountered in the present study (Fig. 5). One patient was a 19-year-old female with poorly-differentiated adenocarcinoma with secondary involvement of the left ovary. In the other patient (34-year-old Female) both the ovaries showed diffuse infiltration by tumour cells with many signet ring shaped tumour cells (Fig. 6). The tumour cells were PAS positive (Fig. 7) and Alcian blue positive.

In the current study the associated intestinal metaplasia was noted in seven cases of adenocarcinoma, of which three cases showed complete metaplasia. Complete intestinal metaplasia showed positivity with Alcian blue PAS stain with the goblet cells containing acidic and neutral mucins staining purple (Fig. 8). Chronic atrophic gastritis was seen in three cases and dysplasia in one case.

Mucinous Adenocarcinoma

In the current study there were 13 cases of mucinous adenocarcinoma (8.55%), whereas in the study by Srinivasan the incidence was 29.54% in some of the cases, grossly itself the mucin was clearly visible (Fig. 9). Microscopically, distended glands showing fragmentation were seen floating in mucin lakes (Fig. 10). In a few cases, signet ring cells were also seen.

Signet Ring Cell Carcinoma

It is an adenocarcinoma in which the tumour cells contain various amounts of mucin compressing the nuclei giving it a signet ring shape.

In the current study, there were 7 cases of signet ring cell carcinoma (4.61%). Microscopically, the tumours showed diffuse infiltration by signet ring cells with surrounding zones of desmoplasia.

Adenosquamous and Squamous Cell Carcinoma

Incidence of adenosquamous and squamous cell carcinomas are very rare. (Mori et al) No adenosquamous or squamous cell carcinoma was encountered in the present study.

Undifferentiated Carcinoma

It is defined by W.H.O. as a tumour, which lacks specific evidence of differentiation, either structurally or functionally. No such tumour was encountered in the current study.

NEURO-ENDOCRINE TUMOURS OF THE STOMACH Carcinoids

The tumour cells showed uniform centrally located nuclei with finely stippled chromatin, small nucleoli and infrequent mitosis (Fig. 11). Positive immunoreactivity for chromogranin could be demonstrated in the section (Fig. 12).

Gastro-Intestinal Stromal Tumours

In the current study, no such tumour was encountered.

Malignant Haematopoietic and Lymphoid Neoplasms

In the current study, there were 5 cases of primary gastric lymphomas of which 2 cases showed characteristic features of low-grade MALT lymphomas (MALTomas).

Of the other 3 cases in the present study, two were of the diffuse small cell type and the other case showed infiltration by a mixture of small and large cells with serosal invasion.

Gomori's staining method for reticulin fibers was used to differentiate lymphoma from poorly differentiated carcinoma.

In the current study the incidence of lymphoma was 3.29%, whereas in the study by Srinivasan it was 2.27% and Boech K. et al study it was 1.58%.

TUMOUR-LIKE LESIONS

Hyperplastic Polyp

Two cases of hyperplastic polyps are reported in the current study. A 45-year-old female presented with complaints of abdominal pain from 1 month and melena. OGD showed a highly vascular sessile polyp in the fundus just distal to oesophagogastric junction. Wedge resection was done. Microscopically, there was no evidence of any dysplastic change.

Hamartomatous Polyp

In the current study, there was one case of hamartomatous polyp in a 74-year-old male in the antrum. Microscopically, the polyp showed gastric glands without any dysplastic change with inflammatory cell collection in the lamina propria. The polyp showed a central core of smooth muscle bundle.

SUMMARY AND CONCLUSION

1. In the current study, the incidence of tumours and tumour-like lesions of the stomach was 0.47%.
2. The current study did not encounter any benign tumours of the stomach.
3. Malignant tumours of the stomach comprised 98.1% of all tumours and tumour-like lesions of the stomach with a male-female ratio of 2:1.
4. Among the tumour-like lesions, hyperplastic polyps were the commonest with an incidence of 66.67%.
5. The peak age incidence for majority of gastric malignancies (65.13%) was seen in the age group between 41 and 60 years and correlates well with the other Indian study.
6. The commonest clinical symptoms were abdominal pain and vomiting.
7. In the current study, four cases of early gastric carcinoma limited to the mucosa and submucosa were identified.
8. Adenocarcinoma was the predominant histological type of malignancy (93.42%) and well-differentiated adenocarcinoma was the commonest.
9. Regional lymph node involvement was seen in 65 cases, of which 31 cases were positive histologically.
10. Reticulin stain was of considerable use in delineating lymphomas from poorly-differentiated carcinoma.

11. PAS and Alcian blue stain were useful to differentiate adenocarcinoma, mucinous adenocarcinoma and signet ring cell carcinoma.
12. The current study did not include any gastrointestinal stromal tumour.
13. Immunohistochemistry for chromogranins to confirm the diagnosis of carcinoid tumour and leukocyte common antigen and cytokeratin for MALTomas were done.
14. Associated intestinal metaplasia was noted in 7 cases of adenocarcinoma, of which 3 cases showed complete intestinal metaplasia.

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