



## MALIGNANT GASTRIC OUTLET OBSTRUCTION: A CLINICOPATHOLOGICAL STUDY IN RIMS RANCHI

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### ABSTRACT

**Background:** Gastric outlet obstruction is the clinical and pathophysiological consequence of any disease process that produces a mechanical impediment to gastric emptying. The causes of gastric outlet obstruction can be broadly classified disease is as very benign poor (non Present study -cancerous) includes or malignant (cancerous of clinical) and unless pathological treated in aspect its early of stage the disease, the prognosis the treatment of this protocol and outcomes in the causes of malignant gastric outlet obstruction.

**Methods:** A total number of forty diagnosed case of gastric outlet obstruction due to carcinoma stomach were included in this study who were admitted to the surgical wards. The diagnosis of the disease was established by subjecting endoscopic them biopsy, to USG the physical abdomen, examination barium meal and x ray special of the diagnostic stomach FNAC Modalities histopathological like, upper GI study endoscopy of operated and specimens.

**Results:** USG examination showed 32 cases out of 40 suggestive of growth in stomach. Barium meal X ray showed 15 patients reported persistent filling defect. Occult blood was 87 % positive. FNAC results showed 91% having epigastric clump and 9 % Virchow node. At laparotomy 75% growth was polypoidal, 20%extravacative and 5% of lientitis plastica.10 cases of early gastric carcinoma were subjected to curative resections. Patients who presented multiple considered metastasis for analysis were subjected to gastrojejunal anastomosis. 12 clinicopathological and surgical factors were

**Conclusions:** Clinicopathological and surgical factors have definite bearing in prognosticating (predicting) the outcome of surgery in carcinoma of stomach.

**KEYWORDS :** Gastric carcinoma, malignant gastric outlet obstruction.

### INTRODUCTION

Gastric outlet obstruction is a disorder where there is an obstruction in the opening of the stomach (pylorus), blocking the entrance of ingested food coming from the stomach to the duodenum.

This portion of the stomach where the blockage is located is known as the pylorus, hence the alternative term for gastric outlet obstruction is pyloric obstruction. Anatomically gastric outlet obstruction means obstruction at the pylorus (Pyloric sphincter) itself, immediately proximal to it (Pyloric antrum) or more distally in duodenal bulb. pyloric antrum is the part of the stomach between the line drawn from incisura angularis in lesser curvature to a bulge corresponding to it in greater curvature to sulcus intermedius which is a groove in greater curvature between the above mentioned bulge pylorus. It is not a disease but rather a consequence of some underlying disease involving the stomach and more specifically the pylorus of the stomach.<sup>1</sup> So, gastric outlet obstruction (GOO) is not a single entity, but it is the clinical and pathophysiological consequence of any disease process that produces a mechanical impediment to gastric emptying. The causes of gastric outlet obstruction can be broadly classified as benign (non-cancerous) or malignant (cancerous). Out of the several causes of Gastric outlet obstruction, gastric carcinoma and peptic ulcer constitute major causes. Previously the latter was more common. Now with the decrease in the incidence of peptic ulceration and the advent of potent medical treatments gastric outlet obstruction should be considered malignant until proven otherwise, in recent years the most common cause of gastric outlet obstruction is gastric cancer.<sup>2</sup> Benign gastric outlet obstruction includes peptic ulcer disease, stomach polyps, pylorus stenosis, duodenal webs, gallstone obstruction, pancreatic pseudocysts and bezoars. Malignant gastric outlet obstruction is due to stomach cancer, pancreatic cancer, ampullary cancer, cholangiocarcinoma and metastatic cancers.<sup>3</sup> Like the etiology which is obscure the symptoms and signs of the disease in early stages is at best nonspecific and eluding even to the most experienced clinician unless treated in its early stage the prognosis of this disease is very poor. So malignant gastric outlet obstruction is very common in this part of the country due to carcinoma of

stomach. Since carcinoma stomach incidence is quite high, induction of upper GI endoscopy reveals and diagnosis the malignant lesions of stomach and duodenum. So, it is essential to study the prevalence, clinical features and their presentations, modalities of treatment and their outcome. Present study includes details of clinical and pathological aspects of the disease, obstruction due to malignant causes, the treatment protocol and outcomes in the causes of malignant gastric outlet obstruction.

### METHODS:

A total number of forty diagnosed case of gastric outlet obstruction due to carcinoma stomach were included in this study who were admitted to the surgical wards of Rajendra institute of medical science( RIMS) between August 2018 to September 2020. These patients presented with clinical features suggestive of carcinoma stomach. The diagnosis of the disease was established by taking an elaborate history of the presenting features at the time of admission, subsequently subjecting them to the physical examination and special diagnostic modalities like, upper GI endoscopy and endoscopic biopsy, USG abdomen, Barium meal x ray of the stomach, contrast CT scan of abdomen and histopathological study of operated specimens. Then the patients were given different modalities of surgical treatment available and the result compared on the basis of relief of symptoms, progress of the disease, and period of survival during their short period of follow up.

### Pre-operative assessment and grouping

After confirmation of diagnosis and assessment of the extent of the disease the patients were grouped into different categories and treatment instituted. Five patients who were grossly anemic were given multiple blood transfusions. Patients with low nutrition were given intravenous protein, lipid preparations along with vitamins and trace elements in addition to their oral intake. Electrolyte imbalance was corrected in some cases. 10 patients were excluded from the operative intervention as they had clinically the evidences of distant metastasis. Patients with DM and essential hypertension received with appropriate medicines for their control.

**Precanaesthetic checkup**

Cardiac checkup for surgical fitness was done in 30 patients. Some patients also had respiratory function tests. The patients were declared fit for general anaesthesia.

**Operative procedure**

Then in all cases abdomen was opened by midline incision. Exploration of abdominal viscera was done in a systematic manner search was specially made for any collection of free fluid in peritoneal cavity, metastatic liver, peritoneal seeding, deposit in pelvis and enlarged para aortic nodes. The location and fixity of the growth was assessed by palpation of stomach. 8 patients had growth in the distal part of the stomach with signs of operability underwent D2 resection (subtotal gastrectomy along with removal of N2 lymphnode), 7 patients had growth in the distal part of the stomach with signs of operability underwent D1 resection (subtotal gastrectomy along with removal of N1 lymphnode), 5 patients had growth arising from upper 2/3<sup>rd</sup> of the stomach without any evidence of fixity/spread or involvement of para aortic nodes were subjected to total gastrectomy, D2 lymphadenectomy along with preservation of spleen and pancreas. In other 10 patients' curative resection was not possible due to loco regional spread. Palliative partial gastrectomy was done in 4 cases. anti-colic gastrojejunostomy was done in 6 cases. Operated specimens were sent for histopathological examinations.

**RESULTS**

Clinical symptoms of Gastric outlet obstruction observed was as follows. Loss of appetite was seen in 80% cases, vomiting in 54 % accompanied with pain in abdomen in 80.7%. Indigestion was found in 50.6 % cases, mass in abdomen was observed in 33 % patients, distension in abdomen due to ascites in 20 % patients.

**Table 1: Different clinical symptoms in malignant gastric outlet patients.**

Symptoms	No. of cases	Percentage
Loss of appetite	32	80
Vomiting	21	54
Indigestion, flatulence and gas formatin	20	50.6
Pain in upper abdomen	33	80.7
Mass in abdomen	13	33
Distension abdomen	8	20
Loss of weight	16	40
Sensation of fullness with small amount of food	30	78
Hematemesis	2	5
Melaena	6	16
Total cases observed	40	100

**Table 2: Results of upper GI endoscopy and endoscopic biopsy in malignant gastric outlet patients.**

Findings at endoscopy	No. of cases	Site of lesion	Biopsy result	Accuracy
Polypoidal growth	30	Prepyloric 20	+ve for carcinoma of stomach	
		Proximal 10		
Ulcerative growth	9	Prepyloric 5	+ve for carcinoma of stomach	
		Proximal 4		
Mucosa slight pale and loss of peristaltic movement	1	Prepyloric	-ve	
Positive biopsy results		39		97.3

Total no. of cases	40	100%
	4	13.33
Antecolic GJA	6	20
Total no of patients	30	100

**Table 3: Barium meal X-ray finding in gastric carcinoma patients.**

X ray findings	No. of cases	%
Persistent filling defect	15	75%
Pyloric elongation and narrowing	2	10%
Ulcer crater	2	10%
Small tube like undistensible stomach	1	5%
Total cases	20	100%

Growth located at the pre-pyloric region was found in 26 cases. 14 cases had lesion at the proximal part of stomach. Lesion was polypoidal in 30 cases and Laparotomy was done in 30 cases. 15 cases had growth in distal 1/3<sup>rd</sup> of the stomach without local fixity and distant spread. Subtotal gastrectomy along with D1 and D2 lymphadenectomy was carried in them. 5 patients who had growth in the proximal part of the stomach but operable underwent total gastrectomy with D2 lymphadenectomy. Rest 10 cases had palliative surgery.

**Table 4: Types of surgery done for gastric carcinoma patients in our study sample.**

Type of surgery	No. of patients	Percentage
Curative D1 distal subtotal gastrectomy	7	23.33
Curative D2 distal subtotal gastrectomy	8	26.66
Curative total gastrectomy D2 resection	5	16.66

Out of 28 cases of adenocarcinoma, well differentiated in 18 (64.3%) and poorly differentiated in 10 cases. (35.7%). 19 patients had curative resections. The surgical margins of the specimen containing growth were clear of tumor cells. There was wall penetration upto submucosa (T1) in 10 cases (35.7%). The tumour invaded muscularis propria (T2) in 3 cases (10.75%) and serosa (T3) in 5 cases (17.85%). In rest of the 10 cases, (35.75%) the tumour had regional extension. In 12 cases, N2 group of lymphnodes were involved. Tumour size was less than 5 cm in 18 cases (64.3%) and more than 5 cm in 10 cases (35.7%).

**Table 5: Histopathological reports of patients operated in our study sample.**

Features	Findings	No. of cases	%
Type	Adenocarcinoma	28	93.33%
	MALTOMA	02	6.66%
Grade	Well differentiated	18	64.3%
	Poorly differentiated	10	35.7%
Surgical margins for curative resections	Clear of tumor cells	19	63.33%
Wall penetration	T1	10	35.7%
	T2	3	10.75%
	T3	5	17.85%
	T4	10	35.7%
Lymphnode involvement	N1	5	17.85%
	N2	12	42.9%
	N3	3	10.75%
	N4	8	28.6%
Vascular/perineurial invasion		18	64.3%
Tumour size	< 5 cm	18	64.3%
	> 5 cm	10	35.7%

Total cases operated- 30, Curative resection- 19 cases.

**Table 6: Analysis of survival by clinicopathologic and surgical factors after curative resection in our study sample.**

Factors	No. of patients	2 years survival N (%)
<b>Clinical age (years)</b>		
< 50	12	9 (75%)
> 50	08	5 (62.5%)
<b>Gender</b>		
Male	16	11 (68.8%)
Female	4	2 (50%)
<b>Tumour mass</b>		
Not palpable	14	9 (64.3%)
Palpable	06	3 (50%)
<b>Weight loss</b>		
< 50%BW	08	5 (62.5%)
> 50% BW	12	7 (58.3%)
<b>Anaemia(gm/dl)</b>		
< 9	13	8 (61.5%)
> 9	7	5 (71.4%)
<b>Pathological Tumour appearance</b>		
Polypoidal	13	10 (70.9%)
Ulcerated	6	4 (66.6%)
Diffuse	1	
<b>Size</b>		
< 5 cm	14	10 (71.3%)
> 5 cm	6	3 (50%)
<b>Histology</b>		
Well differentiated	12	8 (66.6%)
Poorly differentiated	8	4 (50%)
<b>Wall penetration</b>		
T1	10	8 (80%)
T2	3	2 (66%)
T3	5	2 (40%)
T4		
<b>Node invasion (Group)</b>		
N1	5	4 (80%)
N2	13	8 (61.5%)
N3		
<b>TNM stage</b>		
I	6	4 (66.6)
II	8	5 (62.5%)
III	4	2 (50%)
IV		
<b>Surgical factors</b>		
D1 resection	7	5 (71.5%)
Sub total		
D2 resection	8	6 (75%)
Total resection D2	5	2 (40%)

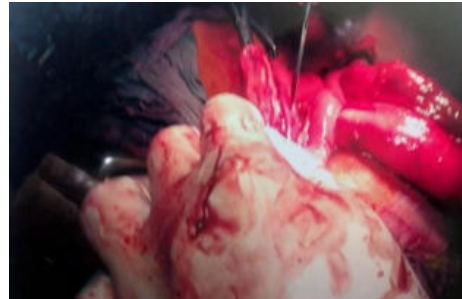
There were 12 clinico pathological and surgical factors considered for analysis. These were evaluated as to how individually or jointly would affect outcome (mortality, survival, Complications and Recurrence) of surgery. Table 6 shows survival appropriate as to age, gender, palpable mass, operative strategy and pathology. Matched with pathology, the survival after curative surgery notably declined as individually (T<sup>n</sup> and N<sup>n</sup>) or collectively factored (TNM Staging). Thus, stage I early disease (T1, NO -1, MO) revealed 66% 2 years survival whereas stage - III (T3 N1 - N2, MO) case showed 50%.

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**Figure 1: Incidence of gastric carcinoma in different age group in present study.**

In the present study majority of cases occurred after 40 Years of age. Highest age recorded in a 69 years old male and Lowest in 27 years. Average age was 46.6 years. Highest incidence was found between 41-50years of age. In malignant gastric outlet obstruction involves complex surgery to remove the entire stomach.

Gastrojejunostomy is a surgical procedure in which an anastomosis is created between the stomach and the proximal loop of the jejunum. This is usually done either for the purpose of draining the contents of the stomach or to provide a bypass for the gastric contents.



**Figure 3: Gastro-jejunostomy.**



**Figure 4: Specimen of subtotal gastrectomy.**

Subtotal gastrectomy (also known as a partial gastrectomy) is performed if the cancer is in the lower portion of the stomach, near the intestines. In some cases, though, it may be performed to remove the upper portion of the stomach.



**Figure 5: Resection of stomach from esophagus.**

An esophageal resection is the surgical removal of the esophagus, nearby lymph nodes, and sometimes a portion of the stomach. Total gastrectomy involves total removal of stomach.



**Figure 6: Specimen of stomach during total gastrectomy.**

**DISCUSSION**

In our present study the ratio between male and female was 3.4: 1. In India less number of females are suffering from gastric carcinoma in comparison to the USA probably since Indian women are not habituated to smoking habit and drinking of alcohol.<sup>36</sup>(Figure 1)

The clinical symptoms of malignant gastric outlet obstruction gave crucial insights into pathophysiology of the disease (Table 1). Loss of appetite was seen in 80% of cases. It is due to infiltration of the muscle coat of the stomach by carcinomatous deposits as revealed in 20 cases. Vomiting was observed in 54 percent of cases. It is due to gastric outlet obstruction. The growth was present in pre-pyloric region in these cases as seen at laparotomy. Fischbach et al, Spampatti et al, reported vomiting in 50% of cases and Mosconi et al in 45% of cases. Pain in abdomen was complained in 80.7% of cases.<sup>7-9</sup> Pain occurs due to involvement of serosa, gastric outlet obstruction and posterior infiltration to pancreas. In this series, gastric outlet obstruction was observed in 23 cases and posterior fixation in 7 cases. Jemal et al got similar result in his study. Indigestion, flatulence and gas formation were found in 20 cases, it is due to reduction in the size of stomach and destruction of parietal cell mass leading to hypochlorhydria. Mass in abdomen as a symptom was observed in 33 percent of cases.<sup>10</sup> Growth in the pyloric region is felt by the patient when it is too advanced in the present study maximum number (44%) of patients were admitted to this Hospital within 4 to 6 months period. This result corresponds with that of Janssen et al who reported average duration of symptoms prior to consultation to be 5 months.<sup>11</sup>

40 patients suspected to be suffering from carcinoma stomach (from clinical findings and other investigations) underwent endoscopic examination of the stomach and duodenum (Table 2). Biopsy was taken from suspected lesions in all the cases. Growth located at the prepyloric region was found in 26 cases. 14 cases had lesion at the proximal part of stomach.

40 patients were subjected to ultrasonographic examination out of which in 32 cases evidences suggestive of growth in stomach were detected. Ultrasound is utilized as a supportive investigation. In present study USG of 22 patients shows irregular circumferential wall thickening in antrum and pylorus of the stomach. 10 patients show gastric mass involving the body region with multiple adjacent enlarged nodes minimal ascites.

20 cases were subjected to barium meal and X-ray study (Table 3). Filling defect was seen in 75.4 percent cases. It is due to polypoidal growth inside the lumen of stomach which produce irregular outline with uneven density. Pyloric elongation and narrowing was seen in 10 percent of cases. It is due to the scirrhous carcinoma as has been observed at the operation. Similar result was also observed by Breslin et al where he found pyloric elongation in 8% of cases.<sup>12</sup>

Cases were first subjected to exploratory laparotomy. In 67% of cases the growth was limited to the pylorus and prepyloric region. In 33% of cases the growth was found only in the body of the stomach. Present study also shows increased incidence of proximal cancer. At laparotomy 75% of growth was found to be polypoidal, 20% of ulcerative variety and 2 cases of linitis plastica. Laparotomy was done in 30 cases 15 cases had growth in distal 1/3rd of stomach without local fixity and distant spread. Subtotal gastrectomy along with D1 and D2 lymphadenectomy was carried out in them (Figure 4). Palliative partial gastrectomy is the procedure of choice, when at laparotomy it reveals that the growth is resectable but not curable. It is recommended for distal lesions which are not fixed. Proximal gastric lesions pose greater problem as palliative total gastrectomy is contraindicated because of the substantially increased risk of operative mortality and postoperative sequelae.<sup>13</sup> All patients who underwent laparotomy had adenocarcinoma of stomach in 28 cases, and MALOTOMA in 2 cases, out of 28 cases of adenocarcinoma, well differentiated in 18 (64.3%) and poorly differentiated in 10 cases (35.7%). 19 patients had curative resections. The surgical margins of the specimen containing growth were

clear of tumor cells. There was wall penetration upto submucosa (T1) in 10 cases (35.7%). The tumour invaded muscularis propria (T2) in 3 cases (10.75%) and serosa (T3) in 5 cases (17.85%). In rest of the 10 cases, (35.75%) the tumour had regional extension. In 12 cases, N2 group of lymph nodes were involved. Tumour size was less than 5 cm in 18 cases (64.3%) and more than 5 cm in 10 cases (35.7%) (Table 4).

Three cases with lesions having T2 involvement (muscularis propria/subserosa), three distally located, underwent subtotal gastrectomy along with D2 lymphadenectomy. Other five patients had total gastrectomy with D2 lymph node removal for T3 lesions involving proximal part of the stomach. In total gastrectomy series, during follow up one patient died at one and half years and another at 2 years. And the remaining 3 are surviving; one has developed metastasis in liver (Figure 2, 5, 6). Patients who presented late with large fixed growths and multiple metastases were subjected to bypass surgery namely antecolic GJA (gastrojejunal anastomosis) (Figure 3) in 6 cases and 4 patients had palliative partial gastrectomy. The median survival was 9 months with antecolic GJA, and 5 months with palliative partial gastrectomy. This was due to early invasion of the anastomotic site by the tumour detected by endoscopy.

There were 12 clinico pathological and surgical factors considered for analysis (Table 6) The patient's age and condition had the greater influence on complications. Pathology played a bigger role in determining long term survival namely wall penetration and node invasion. Disease recurrence was mainly a function of the extent of the resection. There was no recurrence in the series undergoing D1 resection. Patients with D2 resection were also free from it. D2 resection along with total gastrectomy for proximal lesion had two recurrences.

Gastric outlet obstruction due to malignancy is quite common. In the present work an attempt has been made to study the incidence, clinical presentations, methods and investigative procedures necessary for diagnosis and results of different surgical procedures used for treatment of the disease and histopathological study of operated biopsy specimens (Table 5) with correlative study of clinicopathological and surgical factors prognosticating the outcome of the disease.

The disease is quite common in this part of Odisha and men are most sufferers. Majority of patients suffered from the disease after 40 years of age. Along with vomiting, sensation of fullness with after small amount of food other common symptoms were, loss of appetite, indigestion, flatulence, mass in abdomen, pain upper abdomen, loss of weight. Majority of the patients attended the hospital between 4 to 6 months of the starting of the symptoms. The common physical signs are anaemia, palpable epigastric lump, and metastatic features.

In the present series 30 cases offered some sort of surgery to get rid of the obstruction. At laparotomy when no signs of regional lymph nodes metastasis or other metastasis was found curative surgery was done and the result was encouraging and very beneficial. Palliative resection is better than simple bypass procedure as debulking increases response to chemotherapy by reducing the tumour mass. Chemotherapy improves survival in advanced carcinoma of stomach particularly in those in whom some debulking of the mass is done. An analysis was also done to find out the influence of clinicopathological and surgical factors on survival, mortality, complications and recurrence (outcome of surgery) after curative resection of the carcinoma stomach. Wall penetration, node invasion, TNM staging, resection margins and tumor size were considered as prognostic factors for survival. Analysis further showed wall penetration, node metastasis, adequate resection and pathologic stage to be

strong independent factors for survival. The depth of penetration is a crucial and compelling factor. There is a decline in survival of serosa invaded T3 lesions and the serosa- negative (T1-T2) that is 50% vs 66%. More ever, serosa positive lesions are associated with 61 % diseased nodes compared to 4 to 15% in serosa free lesions.

Survival of carcinoma stomach worsened with the extent of nodal involvement (2 years survival = 80%. versus 60%) without and with positive nodes. Because of the frequent occurrence and inaccurate determination of not only nodes but tumor depth at operation; we suggest a liberalized policy of D2 resection for all resectable case is reasonably sound and valid (except simple D1 for low risk early lesions). Radical subtotal gastrectomy with D2 lymphadenectomy (D2 resection) is an effective (2 years survival- 75%) procedure. And if, indeed there should be residual disease after surgery, resection amounts to better palliation with low risk or it could affect salvage and even cure.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions. Informed consent or substitute for it was obtained from all patients for being included in the study. The authors declare no conflicts of interest. Permission was obtained from the Institutional Ethics Committee. Patients who met the eligibility criteria were explained regarding the risks and benefits of the study. The patients were who met the eligibility criteria were pooled in. Their consent was obtained in written form. Rajendra institute of medical science Ranchi Jharkhand .

## CONCLUSION

To conclude, clinicopathological and surgical factors have definite bearing in prognosticating (predicting) the outcome of surgery in carcinoma of stomach.

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