OPERABILITY RATE OF DISTAL GASTRIC CANCER AND THE EFFECT OF GASTRIC OUTLET OBSTRUCTION IN THE OPERABILITY RATE AND POSTOPERATIVE OUTCOME- A RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

Stomach cancer is the fourth most common malignancy in the world.[1] Except in countries where screening for stomach cancer is prevalent, most of the distal stomach tumours are diagnosed at advanced stage. Gastric outlet obstruction is usually believed to be a sign of locally-advanced disease. Complete surgical removal of the disease (R0) is the only potentially curative treatment for resectable gastric cancer.

The aim of the study is to find-

a) The operability rate of gastric cancer in our institution and the incidence of Gastric Outlet Obstruction (GOO) in patients undergoing gastrectomy for distal gastric cancer.
b) To compare the postoperative outcome in patients with gastric outlet obstruction and those without gastric outlet obstruction.
c) To see if the histology of the tumour has any role in the development of GOO.

MATERIALS AND METHODS

This is a retrospective study. The study includes patients who were admitted with carcinoma stomach and underwent operative or nonoperative treatment in our institution during 2013 to 2015.

RESULTS

Overall operability rate was 45.8%. Operable patients in the GOO group were 47%. Operability in the no outlet obstruction group were 45%. Data shows a slightly increased predilection for GOO in diffuse and mixed type of tumours (statistically not significant). Intestinal tumours had significant rate of anaemia compared to diffuse tumours ($p < 0.005$). Overall mortality was 6.7%. Mortality is higher in the GOO group (8.8%).

CONCLUSION

(a). Operability rate of distal gastric cancer in our institution is 45.8%. (b). Incidence of gastric outlet obstruction in patients undergoing gastrectomy is 38.2%. (c). Presence of gastric outlet obstruction does not influence operability rate (47% vs. 45%). (d). Morbidity and mortality after distal radical gastrectomy is comparable in both groups. (e). Both intestinal and diffuse histology have equal incidence of GOO. (f). Chronic blood loss and incidence of anaemia is more in intestinal type of tumours compared to diffuse histology.

KEYWORDS

Gastric Outlet Obstruction, GOO, Cancer Stomach, Intestinal Histology.

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BACKGROUND

Stomach cancer is the fourth most common malignancy in the world.[1] It is the second leading cause of cancer death affecting one million new individuals a year. Except in countries where screening for stomach cancer is prevalent, most of the tumours are diagnosed at advanced stage. Complete surgical removal of the disease (R0) is the only potentially curative treatment for resectable gastric cancer. Operability rate of gastric cancer varies in the literature. Up to 20% of the distal stomach, carcinoma develops gastric outlet obstruction.[3] Gastric outlet obstruction is usually believed to be a sign of locally-advanced disease.[2] But, we do see patients in lower stages of the disease presenting with gastric outlet obstruction.

Aim- The study aims to find- (a) The operability rate of gastric cancer in our institution and the incidence of Gastric Outlet Obstruction (GOO) in patients underwent gastrectomy for distal gastric cancer, (b) To compare the

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postoperative outcome in patients with gastric outlet obstruction and those without gastric outlet obstruction, (c) To see if the histology of the tumour has any role in the development of GOO.

MATERIALS AND METHODS

This is a retrospective study. The study includes patients who were admitted with carcinoma stomach and underwent operative or nonoperative treatment in GMC, Thrissur, during 2013 to 2015. All patients admitted with distal carcinoma stomach, diagnosis confirmed by endoscopic biopsy are included in the study. From records, data collected included demographic data, mode of clinical presentation, duration of symptoms, blood investigation results, imaging, endoscopy findings, preoperative stage of the disease (AJCC staging), peroperative findings and stage of the disease, postoperative outcome and pathological details including type of tumour-intestinal, diffuse or mixed margin status, number of lymph nodes and number of positive nodes. Gastric outlet obstruction was identified clinically by the presence of symptoms like persistent non-bilious vomiting, dehydration and signs like dilated stomach and/or visible left to right peristalsis. It was confirmed by the evidence of stasis in the stomach and inability to intubate duodenum, while doing endoscopy. For assessing operability rate, only those patients with curative surgery, D1/D2 gastrectomy with confirmed R0 resection are included. Palliative procedures, margin positive resections or inadequate lymph node clearance are not included in the gastrectomy group. Microscopic margin positivity after an attempted curative resections are excluded from the study. Data analysed with statistical methods. Chi-square (x^2) test used to test for significance of association between dependent variable and outcome. P <0.05 is taken as significant.

RESULTS

During this period, 194 patients were diagnosed as having distal stomach cancer with 72 of them having features of GOO (37%). Age ranged from 38 to 82 years with mean age 58 years. Male:Female ratio is (2.3:1). The age distribution was similar in both groups. Male:female ratio was (1.8:1) in the outlet obstruction group compared to (3:1) in the other group. Overall, operability rate was 45.9%.

89 patients underwent distal radical gastrectomy (D1/D2) for distal stomach cancer (45.8%). There were 34 patients with e/o gastric outlet obstruction (38.2%) and 55 patients without any e/o GOO in the gastrectomy group. Association between presence of GOO and operability was tested by using Chi-square test. P-value worked out was 0.773, which shows that, there is no association between presence of GOO and operability. Operable patients in the GOO group were 47%. Operability in the no outlet obstruction group were 45% (Chart 2). One hundred and five (105) patients were treated either by palliative procedures (77) or nonoperative treatment (28). Thirty eight (38) patients had evidence of gastric outlet obstruction (36%). Data summarised in Table 1 and 2. Tumour stage in both groups with the operable tumours ranged from stage 1a to stage 4. Percentage of stage 1 and 2 were similar in both groups. GOO group showed increased stage 3 tumour, while the other group had more stage 4 tumours. Association between presence of GOO and stage of tumour was tested by using Chi-square test. P-value worked out was 0.241.

Adenocarcinoma intestinal type was the predominant tumour in both groups of operable tumours (56% and 69%), respectively. Data shows a slightly increased predilection for GOO in diffuse and mixed type of tumours (statistically not significant). There was no difference in the rate of malnutrition (17% vs. 20%) or electrolyte disturbances (nil). Sixty two percent (62%) of patients had anaemia on presentation, 44% had HB <10 g. It was observed that there was significant increase in the rate of anaemia in intestinal type of tumours (35% vs. 7.8%, statistically significant, p <0.01, Chart 2). Very low levels of haemoglobin was always associated with intestinal histology in this study. Overall mortality was 6.7%. Mortality was higher in the GOO group (8.8%). Proportion of the mortality in GOO group and in without GOO group was tested by using t-test for proportion. Z-value worked out was 0.586 and p-value was 0.558, which is greater than 0.05. This shows that the difference in mortality is not significant statistically. Hence, it can be revealed that mortality is not associated with presence of GOO. Postoperative morbidity included wound infections (5.8% vs. 10.9%), respiratory complications (2.9% vs. 3.6%) and urinary tract infection (2.9% vs. 5.4%).

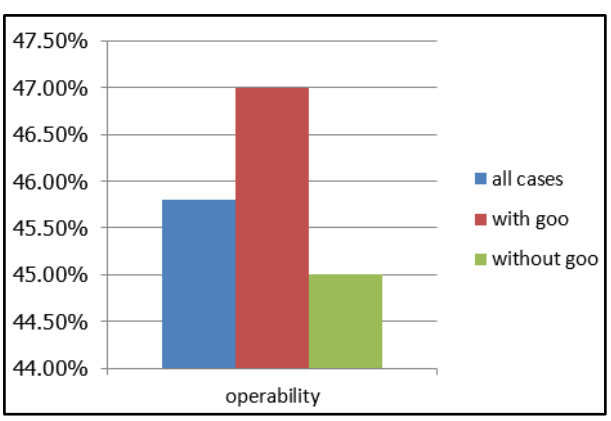

Chart 1. Operability

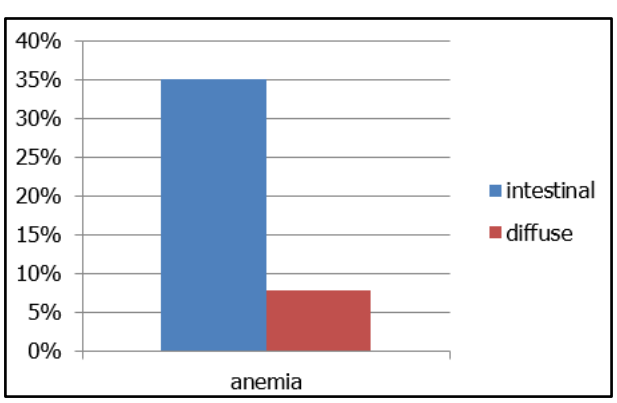

Chart 2. Anaemia

Operated Patients	Total No. of Patients (n=89)	No. of Patients with GOO (n=34)	No. of Patients without GOO (n=55)
M:F	**2.3:1**	**1.8:1**	**3:1**
Stage of Tumour	**No. of patients (%)**	**No. of patients (%)**	**No. of patients (%)**
Stage 1	14 (15.7%)	4 (11%)	10 (18%)
Stage 2	23 (25.8%)	8 (23.5%)	15 (27%)
Stage 3	28 (31.4%)	17 (50%)	11 (20%)
Stage 4	24 (26.9%)	5 (14. 7%)	19 (34.5%)
Histology			
Intestinal	57 (64%)	19 (56%)	38 (69%)
Mixed	5 (5.6%)	3 (8.8%)	2 (3.6%)
Diffuse	24 (26.9%)	12 (35%)	12 (21.8%)
Mucin-secreting	4 (4.4%)	1 (2.9%)	3 (5.4%)
Malnutrition			
Hypoproteinaemia (<3g)	17 (19%)	6 (17.6%)	11 (20%)
Diffuse- Histology	3 (3.3%)	2 (5.8%)	1 (1.8%)
Intestinal- Histology	14 (15.7%)	5 (14.7%)	9 (16.3%)
Mucinous	1 (1.1%)	0 (0%)	1 (1.8%)
HB			
<10G	39 (43.8%)	16 (47%)	23 (41.8%)
Intestinal- Histology	31 (34.8%)	14 (41.1%)	17 (30.9%)
Diffuse- Histology	7 (7.8%)	2 (5.8%)	5 (9%)
<8G	24 (26.9%)	8 (23.5%)	16 (29%)
Intestinal- Histology	17 (19.1%)	6 (17.6%)	11 (20%)
Diffuse- Histology	7 (7.8%)	2 (5.8%)	5 (9%)
Morbidity	15 (16.8%)	4 (11.7%)	11 (20%)
Mortality	6 (6.7%)	3 (8.8%)	3 (5.4%)

Table 1. Distal Gastric Cancer, Operable Patients with Gastric Outlet Obstruction and without Gastric Outlet Obstruction

Inoperable Patients	Total Number	Number of Patients with GOO	Number of Patients without GOO
	105	38	67

Table 2. Distal Gastric Cancer, Inoperable Patients

DISCUSSION

Stomach cancer is the second most common cause for cancer death worldwide. Stomach cancer is the fourth most common malignancy in the world.[1] Distal gastric cancer remains a relatively common cause of malignant GOO accounting for up to 35% of GOO.[3] Stomach cancer incidence is known to increase with age with the peak incidence occurring at 60-80 years. Cases in patients younger than 30 years are very rare.[4,5] The disease shows a male preponderance in almost all countries with rates two to four times higher among males than females.[6,7]

Gastric Outlet Obstruction (GOO) is a term used to describe a condition characterised by the inability of gastric contents to go beyond the proximal duodenum. Distal gastric carcinoma is the common cause of gastric outlet obstruction in many parts of India.[8,9] The obstruction maybe partial or complete. Apart from the mechanical impediment of the flow of gastric contents; there are other concerns in patients with GOO such as malnutrition and electrolyte imbalance.[10] Abnormalities in water and electrolyte balance occur not only because of interference with the normal intake of food, water and salt, but are also due to the uncontrollable, large losses of water and electrolyte caused by vomiting or the use of gastric suction in the management of these patients.[10] These patients develop hyponatraemia, hypokalaemia, hypochloraemia and alkalosis due to excessive loss of these ions and hydrochloric acid.[10]

In our series, the mean age of the patient was 58 years and males were affected more (2.3:1). On subgroup analysis, the age distribution was similar, but male:female ratio was lower in the gastric obstruction group (1.8:1) vs. (3:1).

AJCC staging is used to stage the disease, which is based on tumour (T), nodes (N) and metastasis (M). Except in countries where screening for stomach cancer is prevalent, most of the tumours are diagnosed at advanced stage. Surgery is the only potentially curative treatment for advanced, resectable gastric cancer[11] and complete removal of the tumour gives the best chance of survival. Operability rate varies in the literature. Complications like gastric outlet obstruction is usually regarded as a sign of locally-advanced disease.[2] Contrary to the belief that gastric cancer presenting with gastric outlet obstruction is associated with higher stage disease, stage distribution were similar in both groups for early stage tumours. There is a relative increase in the stage 3 disease in the GOO group, which may be due to the fact that most of the stage 4 tumours in this group were not operable/resectable because of massive disease in the region of SMA axis and head/neck region of pancreas, which is explainable by the more distal location of the tumour.

Anaemia was seen in 62% of patients. Haemoglobin less than 10 was seen in 44% of patients. Anaemia in stomach cancer is believed to be due to chronic blood loss.

Over the past half century, the histologic classification of gastric carcinoma has been largely based on Lauren's criteria in which intestinal type and diffuse type adenocarcinoma are the two major histologic subtypes plus indeterminate type as uncommon variant.[12] The relative frequencies in literature are approximately 54% for intestinal type, 32% for the diffuse type and 15% for the indeterminate type.[13] Diffuse type gastric carcinoma is more often seen in female and young individuals,[14] while the intestinal type adenocarcinoma is more often associated with intestinal metaplasia and Helicobacter pylori infection,[12] chronic H. pylori infection, gastric atrophy and its associated hypo/achlorhydria are also complicated by poor absorption of iron and can result in iron deficiency anaemia could be reversed by eradication of the H. pylori infection.[15] Epidemiological data suggest that iron deficiency increases the risk of gastric cancer, but the mechanism is not clear.[16] Rate of anaemia in our series was higher in intestinal tumours and more severe anaemia was seen exclusively in intestinal tumours.

Our series agrees with the literature, intestinal 57%, diffuse 24% and mixed 5%. Mucin secreting carcinoma was 4%. Even though, statistically not significant, the GOO group showed a relative increase in the diffuse and mixed type, and a lower male:female ratio in the GOO group (1.8:1).

Contrary to the literature and belief, the rate of malnutrition was not significantly different between the two groups. None of the patients in both groups had any significant electrolyte disturbance at presentation or when awaiting surgery maybe due to the absence of complete obstruction in these patients. Overall mortality was 6.7%. Mortality was higher in the GOO group (8.8%). But, the two patients who died in this group had significant other (cardiac and pulmonary) morbidities.

CONCLUSION

(a). Operability rate of distal gastric cancer in our institution is 45.8%. (b). Incidence of gastric outlet obstruction in patients undergoing gastrectomy is 38.2%. (c). Presence of gastric outlet obstruction does not influence operability rate (47% vs. 45%). (d). Morbidity and mortality after distal radical gastrectomy is comparable in both groups. (e). Both intestinal and diffuse histology have equal incidence of GOO. (f). Chronic blood loss and incidence of anaemia is more in intestinal type of tumours compared to diffuse histology.

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