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### Gastric outlet obstruction, a clinical study in tertiary care hospital South India

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#### Abstract

**Background:** Gastric Outlet Obstruction implies complete or incomplete obstruction of the distal stomach, pylorus or proximal duodenum. Gastric outlet obstruction is not a single entity; it is the clinical and pathophysiological consequence of any disease process that produces a mechanical impediment to gastric emptying. Now in the era of H2 blockers and proton pump inhibitors, incidence of duodenal ulcer producing gastric outlet obstruction has been decreasing as symptomatic ulcer begin to respond to medical treatment, and at the same time the incidence of antral carcinoma of stomach producing gastric outlet obstruction has comparatively increased, which may be due to increased early diagnosis of the condition with the help of flexible fibre optic endoscope.

**Methods:** An elaborate study of these cases with regard to the history, clinical features, routine and special investigations, pre-operative treatment, operative findings, post-operative management and complications in post-operative period is done.

**Results:** Of the 50 cases of gastric outlet obstruction 26 had carcinoma antrum (52%), 23 had cicatrized duodenal ulcer (46%) and 1 had gastric outlet obstruction secondary to corrosive ingestion. The age incidence of the patients in this study ranged from 22 – 84 years with a mean of 53.62 years. In case of obstruction secondary to duodenal ulcer the maximum age incidence is between 31-40 years. The maximum age incidence of gastric outlet obstruction due to carcinoma antrum is 61-70 years.

In this series, 42 patients (84%) were males and 8 patients (16%) were female. Male to female ratio (M:F) is 5.25:1. M: F ratio in cicatrized duodenal ulcer is 10.5:1 and in carcinoma antrum is 3.33:1.

52% of the patients were manual labourers who gave a history of irregular diet habits. 68% of patients had history of smoking and 66% had history of alcohol intake. Post – prandial vomiting and epigastria pain are the main symptoms (96%) in this series. Other symptoms included anorexia (84%), weight loss (72%), post prandial Epigastric fullness (68%), haematemesis (24%), melena (64%) and constipation (48%). Pallor was present in 56% and dehydration in 62%.

Blood group ‘O’ was common in cicatrized duodenal ulcer patients (52.18%) whereas blood group ‘A’ was common in malignant cases (50%).

**Conclusions:** Number of cases with cicatrized duodenal ulcer as the chief etiological factor for gastric outlet obstruction is diminishing and the number of cases of antral carcinoma of stomach as the cause of gastric outlet obstruction is increasing. Upper Gastro intestinal endoscopy should be mandatory in all suspected cases of gastric outlet obstruction. It can diagnose the cause of obstruction very effectively than any other investigative modality. Effective treatment in carcinoma stomach depends on early diagnosis.

**Keywords:** Gastric outlet obstruction (Goo), antral carcinoma, duodenal ulcers

#### Introduction

Gastric Outlet Obstruction implies complete or incomplete obstruction of the distal stomach, pylorus or proximal duodenum [1]. This may occur as an obstructing mass lesion, external compression or as a result of obstruction from acute enema, chronic scarring and fibrosis or a combination of both [1-2].

Gastric outlet obstruction was described by Sir James Walton as “The stomach you can hear, the stomach you can feel and the stomach you can see”. Gastric outlet obstruction is not a single entity; it is the clinical and pathophysiological consequence of any disease process that produces a mechanical impediment to gastric emptying [3]. Gastric Outlet Obstruction may be caused by a heterogeneous group of diseases that include both benign and malignant conditions [1-4].

#### Methods

The patients for this Study have been selected from tertiary care hospital, Mysore from

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November 2011 to May 2013. 50 in-patients of gastric outlet obstruction have been studied. Medical records.

An elaborate study of these cases with regard to the history, clinical features, routine and special investigations, pre-operative treatment, operative findings, post-operative management and complications in post-operative period is done.

In history, details were noted about presenting complaints, duration, history of acid peptic disease, features of metabolic disturbances, occupation and personal history including diet, bowel and bladder habits, smoking and alcoholism. Thorough analysis of the findings of physical examination done, which included hydration status, VGP, mass, succussion splash, hepatomegaly and ascites.

Haemoglobin level, bleeding time, clotting time, routine urine examination, chest screening, ECG, blood grouping, fasting and post prandial blood sugar, blood urea, serum creatinine, serum electrolytes were estimated as a part of general work-up for surgery. Special investigations like barium meal, Upper GI Endoscopy, USG abdomen were done wherever feasible.

Pre-operative treatment included correction of dehydration, metabolic status, anaemia, IV H<sub>2</sub> blockers; liquid diet and antacids were given along with twice a day stomach wash for a minimum of three days. According to the investigation reports and operative findings, definitive surgery was undertaken. The patients were managed by Ryle's tube aspiration and Intravenous fluids till the bowel sounds appeared. Oral feeding with fluids was then commenced, solids being given later. Early ambulation was encouraged, especially in elderly patients. Routine antibiotics were given during the immediate post-operative period. Regular monitoring of the temperature, pulse, respiratory rate and blood pressure was done.

## Results

### Causes of gastric outlet obstruction

Of the 50 cases of gastric outlet obstruction 26 had carcinoma antrum, 23 had cicatrized duodenal ulcer and 1 had gastric outlet obstruction secondary to corrosive ingestion.

**Table 1:** Causes of gastric outlet obstruction

Causes	Number of cases	Percentage
Carcinoma antrum	26	52
Cicatrized duodenal ulcer	23	46
Due to corrosive ingestion	01	02
Total	50	100

### Age distribution

The age incidence of the patients in this study ranged from 22 – 84 years with a mean of 53.62 years.

In case of obstruction secondary to duodenal ulcer the maximum age incidence is between 31 – 40 years.

Youngest case of gastric outlet obstruction due to duodenal ulcer in present series is 22 years.

The maximum age incidence of gastric outlet obstruction due to carcinoma antrum is 61 – 70 years. The youngest case of carcinoma in present series is 32 years.

**Table 2:** Age distribution

Age group	Number of cases	Percentage (%)
0-10	0	0
11-20	0	0
21-30	4	8
31-40	10	20
41-50	8	16
51-60	9	18
61-70	12	24
71-80	5	10
81-90	2	4

### Sex incidence

In this series, 42 patients (84%) were males and 8 patients (16%) were female.

Male to female ratio (M: F) is 5.25:1.

M: F ratio in cicatrized duodenal ulcer is 10.5:1 and in carcinoma antrum is 3.33:1.

**Table 3:** Sex incidence

	Total number of cases	Duodenal ulcer	Carcinoma antrum	Others
Male	42	21	20	1
Female	8	2	6	0
Total	50	23	26	1

### Personal history in present series

#### 1. Occupation

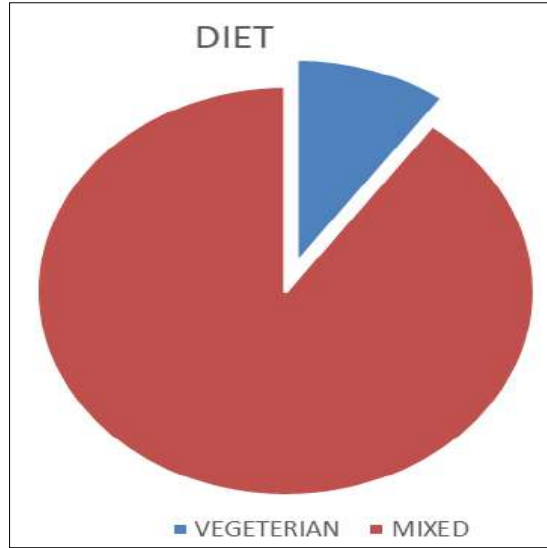
In this series, 26 patients (52%) were manual labourers, 19

patients (38%) were farmers, and 5 patients (10%) were housewives. The majority of patients were labourers by occupation.

**Table 4:** Occupation

Occupation	Total number of cases	Percentage
Labourer	26	52
Farmers	19	38
Housewife	5	10

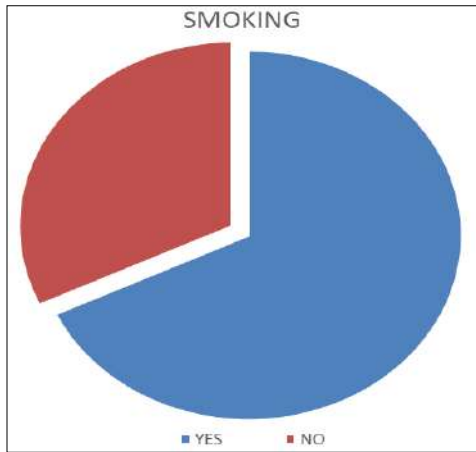
**Diet.**



**Fig 1:** Diet 45/50, 90% of patients were taking mixed diet and 5/50, 10 % patients were taking vegetarian diet. 39 patients (78%) had history of irregular diet habits.

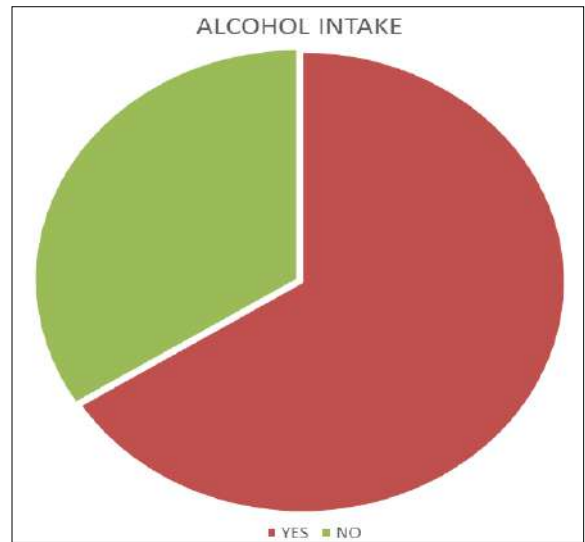
**3. Smoking**

68% (34/50) of the patients were smokers in this series and 32% (16/50) were non – smokers.



**Fig 2:** Smoking history

alcoholic.



**Fig 3:** Alcohol intake

**4. Alcohol**

66% (33/50) of the patients in this series gave history of consuming alcohol and 34% (17/50) patients were non –

**Symptoms**

**Table 5:** Symptoms

Symptoms	Cicatrized duodenal ulcer (%)	Carcinoma antrum (%)	Others (%)	Total number of cases (%)
Pain	22 (95.65)	25 (96.15)	1 (100)	48 (96)
Vomiting	23 (100)	24 (92.30)	1 (100)	48 (96)
Anorexia	19 (82.60)	22 (84.62)	1 (100)	42 (84)
Weight loss	19 (82.60)	17 (65.40)	0	36 (72)
Post prandial fullness	18 (78.26)	15 (57.70)	1 (100)	34 (68)
Haematemesis	5 (21.74)	7 (26.92)	0	12 (24)
Malena	14 (60.86)	18 (69.23)	0	32 (64)
constipation	11 (47.82)	13 (50)	0	24 (48)

In this series, pain and vomiting were the main symptoms.

**Abdominal pain**

It was mainly in the upper abdomen and present in 48 out of 50 patients. In duodenal ulcer cases patients were having pain of

burning nature, periodic; pain was of continuous nature after development of obstruction; pain was aggravated by food and relieved by vomiting. In cases of carcinoma the pain was

constant dull aching or gripping in nature, used to get aggravated by food and vomiting used to give relief from the pain.

In 5 cases of carcinoma the pain was radiating to back suggesting involvement of pancreas and adjacent structures. 12 cases gave history of APD and 3 of them were malignant cases suggesting malignancy developing from gastric ulcer.

**Vomiting**

Vomiting was present in 48 patients (96%) in the present series. Vomiting was both spontaneous and induced type, frequency was 2 – 3 times per day and frequency gradually increased as the pyloric obstruction developed. Vomitus mainly contained undigested food and was non – bilious.

**Anorexia**

Anorexia was present in 22 (84.62%) cases of carcinoma of

antrum and in 19 (82.60%) of duodenal ulcer patients.

**Loss of weight**

Loss of weight was present in 36 (72%) cases. 17 (65.40%) cases of carcinoma and 19 (82.60%) cases of duodenal ulcer gave history of weight loss. In duodenal ulcer cases the loss of weight was gradual but in cases with carcinoma, the loss was rapid.

**Postprandial fullness**

Postprandial fullness was present in 18 (78.26%) cases of duodenal ulcer patients and 15 (57.70%) cases of carcinoma antrum.

Hematemesis was present in 12 (24%) cases and melena in 32 (64%) cases in this series. Constipation was present in 24 (48%) cases.

**Table 6: Signs**

Signs	Duodenal ulcer (%)	Carcinoma antrum (%)	Others (%)	Total number of cases (%)
Pallor	7 (30.44)	21 (80.77)	0	28 (56)
VGP	16 (69.56)	10 (38.46)	0	26 (52)
Succussion splash	15 (65.22)	13 (50)	0	28 (56)
Palpable mass	0	9 (34.62)	0	9 (18)
Dehydration	12 (52.17)	18 (69.23)	1 (100)	31 (62)

Pallor was present in 28 (56%) cases and more so in carcinoma of pyloric region. VGP was present in 26 (52%) cases, 10 of which were malignant. Succussion splash was present in 28 (56%) cases of which 13 were malignant cases. Palpable mass was present in 9 (18%) cases of pyloric region and nil in duodenal ulcer cases.

electrolytes, urine routine, chest X-ray, ECG, barium meal examination, endoscopy and ultrasonography examination done whenever possible.

Hb% in 35/50 (70%) of patients was <11gm%.

3/50 (6%) were diabetic

**Investigations**

The following investigations were carried out before subjecting the patient for surgery. Hb%, FBS, blood grouping, serum

**Distribution of blood group**

**Table 7: Distribution of blood group**

Blood group	Total number of cases	Percentage
A	20	40
B	9	18
AB	3	6
O	18	36
Total	50	100

Blood group in duodenal ulcer

**Table 8: Blood group in duodenal ulcer**

Blood group	Total number of cases	Percentage
A	6	26.08
B	4	17.40
AB	1	4.34
O	12	52.18

Blood group in Carcinoma pyloric region

**Table 9: Blood group in Carcinoma pyloric region**

Blood group	Total number of cases	Percentage
A	13	50
B	5	19.23
AB	2	7.77
O	6	23.00

Majority of the patients were having blood group a 20/50 (40%) and next common is blood group O 18/50 (36%).

Most of the cases of duodenal ulcer were having O blood group (52.18%) and 50% of the pyloric carcinoma patients were having A blood group.

**Barium meal examination**

Done in 14 cases. In 8 cases filling defect in the antrum was present. Dilated stomach with delayed emptying and deformed cap was present in 6 cases.

**Upper GI Endoscopy**

Done in all cases. 26 cases of pyloric carcinoma diagnosed and confirmed with biopsy. 23 had cicatrized duodenal ulcer. I had Gastric erosions.

**Ultrasonographic examination**

Done in 32 cases. Carcinoma pyloric region with ascitis was

present in 4 cases. Ascites with liver secondaries was present in 1 case. The rest 27 cases showed normal study.

**Serum electrolytes**

In present series, all patients were subjected to serum electrolyte

estimation, out of them 9 patients showed electrolyte imbalance. Types of surgical procedures adopted in the study

**Table 10:** Types of surgical procedures adopted in the study

Procedure	Number of cases	Percentage
1. Duodenal ulcer cases		
▪ Truncal vagotomy with gastrojejunostomy	23	100
2. Carcinoma antrum cases		
▪ Bill Roth II gastrectomy	7	26.92
▪ Anterior gastrojejunostomy	11	42.30
▪ Roux-en-Y anastomosis after total gastrectomy	2	7.70
▪ Anterior gastrojejunostomy with limbal anastomosis	3	11.54
▪ Bill Roth II gastrectomy with feeding jejunostomy	3	11.54
1. Others		
▪ Posterior gastrojejunostomy	1	100

**Duodenal ulcer cases**

All 23 (100%) cases underwent truncal vagotomy with posterior gastrojejunostomy.

**Carcinoma antrum cases**

7 (26.92%) cases underwent Bill Roth II resection and 11 (42.30%) patients underwent anterior gastrojejunostomy alone. 2 (7.70%) cases underwent Roux-en-Y anastomosis after total gastrectomy. 3 cases had anterior gastrojejunostomy with limbal anastomosis while the other 3 had Bill Roth II resection with Feeding jejunostomy.

1 Case with gastric outlet obstruction due to corrosive ingestion underwent palliative posterior gastrojejunostomy.

5 patients of antral carcinoma were treated postoperatively by chemotherapy with 5-fluoro uracil. 18 patients of antral carcinoma, post operatively were referred to Oncology centre for

further management.

One patient of carcinoma pyloric region died on the 9<sup>th</sup> post-operative day. Rest of the patients had an uneventful post-operative period. Post-operative hospitalisation ranged from 7 to 40 days with an average of 11 days.

**Discussion**

**Causes of gastric outlet obstruction**

Of the 50 cases in our study gastric outlet obstruction 26(52%) had carcinoma antrum, 23(46%) had cicatrized duodenal ulcer and 01 had gastric outlet obstruction secondary to corrosive ingestion.

Malignancy is the commonest cause of gastric outlet obstruction even in a developing country like India. Similar cause for gastric outlet obstruction seen in the studies of Misra *et al*,<sup>[10, 5]</sup> Shone DN *et al*,<sup>[11, 6]</sup>.

**Table 11:** Causes of gastric outlet obstruction comparison with other studies

Cause	Number	Present study (%)	Jaka <i>et al</i> . <sup>7</sup> (%)	Balint Spence <sup>8</sup> (%)
Carcinoma antrum	26	52	42.9	11.0
Cicatrized duodenal ulcer	23	46	28.3	80.5
Others	01	2	28.8	8.5

**Age distribution & Sex incidence**

In our study mean Age group of gastric outlet obstruction 53.62 years.

In this study most patients were in the sixth and seventh decade. In chronic duodenal ulcer cases the maximum incidence seen in the age group of 31-40 years. The average age being 47.52 years with a span from 22 to 73 years. Men outnumbered women by 10.5:1. In the series of Fisher *et al*.<sup>[9]</sup> the average age was 54 with a span from 20 – 89 years and men outnumbered women by 2:1.

In antral carcinoma cases, the maximum incidence is seen in the age group of 61 – 70 years. The youngest age of presentation is 32 years and the oldest is 84 years with the average being 59.73 years. Men outnumbered women by 5.25:1 as compared to 5.5:1 observed by Yogi Ram and Chowdhary<sup>[10]</sup>

**Personal history in present series**

52% of the patients were manual labourers who gave a history of irregular diet habits, which seemed to contribute to disease process. The series of Donald D. Kozoll and Karl A. Meyer<sup>[11]</sup> also showed the same pattern with the non-skilled day labourer group listed most frequently with obstruction.

In this series 68% of patients had history of smoking and 66% had history of alcohol intake. Donald D. Kozoll and Karl A. Meyer<sup>[11]</sup> reported this to be 76.2 and 52.3% respectively. This points to the commonly observed fact that a higher incidence of use of alcohol and tobacco is seen in these patients and are significant risk factors.

**Symptoms.**

Post – prandial vomiting and Epigastric pain are the main symptoms (96%) in this series. Vomiting is usually spontaneous and projectile type containing partially digested food particles. Other symptoms included anorexia (84%), weight loss (72%), post prandial Epigastric fullness (68%), hematemesis (24%), malena (64%) and constipation (48%). In the series of Michael L. Schwartz *et al*.<sup>[12]</sup> post prandial vomiting was the commonest symptom (91%). Other symptoms included Epigastric pain (86%) and weight loss (52%).

Schwartz M.C. *et al*., 1982, Gastric outlet obstruction in peptic ulcer disease, an indication for surgery, Am. J. Surg., 143:90.

In the series of Yogiram and Chowdhary<sup>10</sup> Epigastric pain was the commonest symptom (87%). Other symptoms included post – prandial vomiting (80%) and constipation (30%).

Keith A. Kelly<sup>13</sup> in his series, reported intractable vomiting and weight loss in 54% of patients and upper gastro intestinal haemorrhage in 34%.

Weight loss was seen in 59.5% of patients in the series of Donald D. Kozoll and Karl A. Meyer<sup>[11]</sup> and 32% in the series of Harvey J. Workmen and Harold P. Roth<sup>[14]</sup>.

Thus weight loss seemed to be significant in patients with pyloric obstruction and this points to the long standing nature of the disease and the need for proper pre-operative nutritional supplementation in these patients.

In carcinoma pyloric antrum cases, pain (96.15%) was the leading symptom. Other symptoms included vomiting (92.30%), anorexia (84.62%), weight loss (65.4%), and post prandial fullness (57.70%). Haematemesis was present in 26.92%, malena in 69.23% and constipation in 50%.

Pain, vomiting, anorexia and post prandial fullness (100%) were the leading symptoms in gastric outlet obstruction.

### Signs

Pallor was present in 56% and dehydration in 62%. In the series of Michael L. Schwartz *et al.*<sup>[12]</sup> dehydration was present in 22%.

Visible gastric peristalsis was seen in 69.56% of cicatrized duodenal ulcer cases. In the series of Yogiram and Chowdhary<sup>[10]</sup> visible gastric peristalsis was present in 74%.

Succussion splash was seen in 65.22% of cicatrized duodenal ulcer cases which is comparable to that of Ellis H. *et al.*<sup>[15]</sup> in there study observed succussion splash in 64% of cases.

Visible gastric peristalsis (38.46%) and succussion splash (50%) were less prominent in malignant cases. This corresponds in observation made by Ellis H. *et al.*<sup>[15]</sup>.

Palpable mass was present in 34.62% of malignant cases.

### Distribution of blood group

Blood group 'O' was common in cicatrized duodenal ulcer patients (52.18%) followed by blood group 'A' (26.08%). This is significant as persons of blood group 'O' are about three times more likely to develop acid peptic disease than persons of other blood groups. Blood group 'A' was common in malignant cases (50%).

### Types of surgical procedures adopted

In the present series, 100% of cicatrized duodenal ulcer patients underwent truncal vagotomy with gastrojejunostomy.

In carcinoma antrum cases, 26.92% of the patients underwent Bill Roth II Polya gastrectomy and 42.30% patients underwent anterior gastrojejunostomy. 2 cases (7.70%) underwent Roux-en-Y anastomosis after total gastrectomy while 3 cases (11.54%) underwent anterior gastrojejunostomy with limb anastomosis. The remaining 3 cases underwent Bill Roth II gastrectomy with feeding jejunostomy.

All the patients were subjected to a standard pre-operative treatment, which included stomach wash twice a day for three days prior to surgery. Pre-operatively stomach was dilated in majority of the cases. Post-operatively aspiration was continued till bowel movements established by noting bowel sounds, passing of flatus and gross reduction in quantity of Ryle's tube aspiration. Later on patients were allowed to take oral fluids and then liquid and solid diet.

In this series two patients had wound infection and were treated by repeated dressing and appropriate antibiotics. Four patients had respiratory tract infection and were treated by review of antibiotics and chest physiotherapy.

Patients of antral carcinoma were treated postoperatively by

chemotherapy with 5-fluoro uracil. 18 patients of antral carcinoma were referred to Onco centre for further management. Most of the stenosing duodenal ulcer cases were lost for follow up. There has been no recurrence of symptoms in any of the cases that turned up for follow up.

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#### Declarations

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**Conflict of interest:** No conflict of interest declared

**Ethical approval:** Institution ethical clearance taken

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