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ORIGINAL ARTICLE

A CLINICAL STUDY OF GASTRIC OUTLET OBSTRUCTION IN ADULTS

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ABSTRACT: From the standpoint of pathology, the term pyloric stenosis is usually inaccurate at least in adult patients, since the site of obstruction is rarely situated at the pylorus itself but is more often placed immediately proximal to the sphincter where the diagnosis of carcinoma is most probable or more distally in the duodenal bulb where the cause is almost invariably a duodenal ulcer. This study has been taken up to review the changes in presentation of gastric outlet obstruction in view of changing trends in the aetiology analysing the occurrence of benign and malignant causes, signs and symptoms, investigatory modalities, management and their results. The present study is an observational study a total of 50 cases were studied with Cicatrised duodenal ulcer and carcinoma pyloric antrum being the major causes. Clinical profile, investigations and treatment outcomes were analysed. The majority of patients had malignant gastric outlet obstruction with 32[64%] patients presenting with Gastric cancer and 18[36%] patients presenting with cicatrised duodenal ulcer. In this study most patients were in the fifth and seventh decades of life. Men outnumbered women by 3: 1. The clinical presentation is not different from those in other studies with non-bilious vomiting being common to all the patients with dehydration. Visible gastric peristalsis and succussion splash were more prominent in Cicatrised Duodenal Ulcer. All cases were subjected to serum electrolyte estimation. Out of them 20 cases [40%] showed electrolyte imbalance barium meal, ultrasound abdomen pelvis and CT scan abdomen being the other investigating tools. Blood group 'O' was common in cicatrized duodenal ulcer patients [77.7%] followed by blood group 'A' [11.1%]. Upper GI endoscopy was done in all cases [100%]. 32[64%] cases had pyloric antral Carcinoma in which 23 cases had fungating growth and the rest 9 had ulcerative growth and 18[36%] had cicatrized duodenal ulcer. 100% of cicatrized duodenal ulcer patients underwent truncal vagotomy with posterior gastrojejunostomy. In carcinoma of pyloric antrum, 56.25% underwent Billroth II Polya gastrectomy after subtotal resection and 25% underwent anterior gastrojejunostomy and 18.75% underwent feeding jejunostomy alone depending on the stage of the disease. The average hospital stay was 10 days. The overall mortality rate was 6% (9.3% for malignant cases). Mortality rate was zero in case of cicatrised duodenal ulcer. Surgical site infection was the most common post-operative complication accounting for 38.2% of cases. One patient with carcinoma pyloric region developed duodenal blow out on the 5th day and died due to biliary sepsis.

KEYWORDS: Gastric outlet obstruction, Cicatrised duodenal ulcer, Carcinoma pyloric antrum, Upper GI endoscopy, Vagotomy, Gastrojejunostomy, Gastrectomy, Feeding jejunostomy.

INTRODUCTION: The lack of uniformity in criteria in accepting a case of gastric outlet obstruction lead to differences in incidences and clinical features in different centres, still, any one of the following can be used to diagnose gastric outlet obstruction[1]:

1. Vomiting of undigested food consumed previous day.
2. Visible gastric peristalsis (VGP).
3. Gastric succussion splash 3-4 hours after the last meal.

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4. Palpable hypertrophied stomach.
5. Delayed emptying of stomach on barium meal studies.
6. A gastric residue of more than 500 ml in an adult.
7. An aspirate of more than 400 ml on saline load test.
8. Demonstration at operation or autopsy of grossly narrowed gastric outlet.

Aetiology varies in infants and adults. Common causes being, congenital hypertrophic pyloric stenosis in infants and chronic cicatrized duodenal ulcers and antral carcinoma in adults, there are number of other rare causes.

It is described by Sir James Walton as "The stomach you can hear, the stomach you can feel and the stomach you can see".[1] Cicatrised DU was the most common cause of gastric outlet obstruction but due to wider usage of H2 blockers and PPIs, better health care facilities with new investigations in the armamentorium, its incidence is on decline and is replaced by carcinoma stomach which is detected early because of early investigatory interventions and in some countries as a part of screening programme.

In this study 50 cases have been selected to include variety of cases of gastric outlet obstruction in adult age group.

OBJECTIVES:

1. To analyse the occurrence of benign, malignant and any other causes encountered as a cause of gastric outlet obstruction.
2. To analyse the various signs and symptoms of gastric outlet obstruction with reference to specific features of benign, malignant and any other causes.
3. To analyse the various modalities of investigations and treatment and their results.

METHODOLOGY: The study subjects were patients, admitted with diagnosis of gastric outlet obstruction, who subsequently underwent required surgery at Adichunchanagiri Institute of Medical Sciences, BG Nagara, between December 2011 to June 2013.

All the patients were selected randomly, and as per the proforma, all the patients were interviewed for detailed clinical history and examined. They were then subjected to routine blood, urine and other investigations and an upper gi endoscopy was performed in all cases.

Inclusion Criteria:

1. All patients admitted to the surgery wards with a clinical diagnosis of gastric outlet obstruction.
2. Endoscopic evidence of gastric outlet obstruction.
3. Radiological evidence of gastric outlet obstruction.
4. Demonstration during surgery or at autopsy, gross narrowing of the gastric outlet.

Exclusion Criteria:

1. Children with gastric outlet obstruction will be excluded
2. All pregnant women are excluded from the study.
3. Patient above 80 years of age who are not operated on.
4. Patients of coagulopathy and on anti-coagulant therapy.

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Method of Collection of Data: A written informed consent was taken from all patients and relatives before their inclusion in the study. The study was approved by the ethical committee of the hospital.

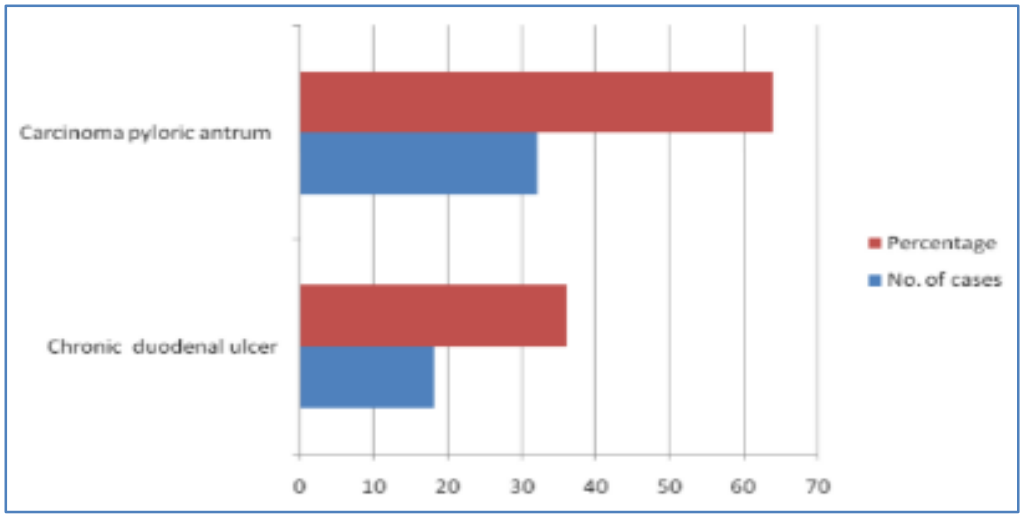
1. Data will be collected from patients who are admitted in surgical wards of SAH & RC, with a provisional diagnosis of gastric outlet obstruction.
2. Clinical study will be through questionnaires and clinical examination.
3. All patients will undergo routine and special investigations.
4. Treatment modality will be planned once the definitive diagnosis of gastric outlet obstruction is arrived at.
5. Post-operative observation of patients for any complication.
6. Post operatively patients referred to oncocentres for chemotherapy.

RESULTS: The various observations made in this study are tabulated.

Causes of Gastric Outlet Obstruction:

Causes	No. of cases	Percentage
Cicatrised duodenal ulcer	18	36
Carcinoma pyloric antrum	32	64
Total	**50**	**100**

Table 1: Causes of Gastric Outlet Obstruction



Graph 1: Causes of Gastric Outlet Obstruction

Age Distribution:

Age in years	Duodenal ulcer		Carcinoma antrum	
	No.	%	No.	%
20-29	0	0	0	0
30-39	2	4	0	0
40-49	8	16	1	2
50-59	6	12	4	8

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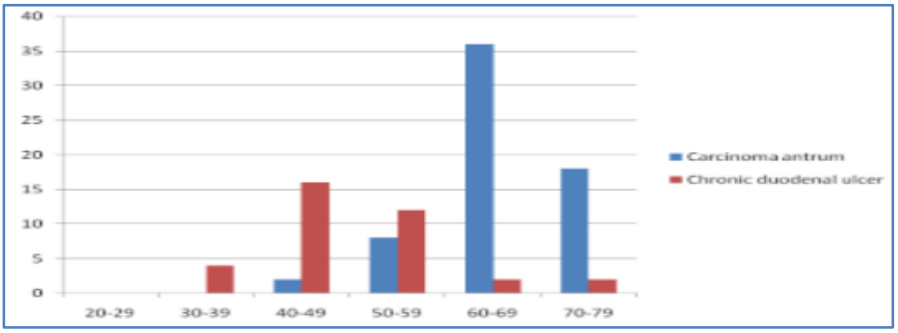
60-69	1	02	18	36
70-79	1	02	9	18

Table 2: Age Distribution in Each Condition



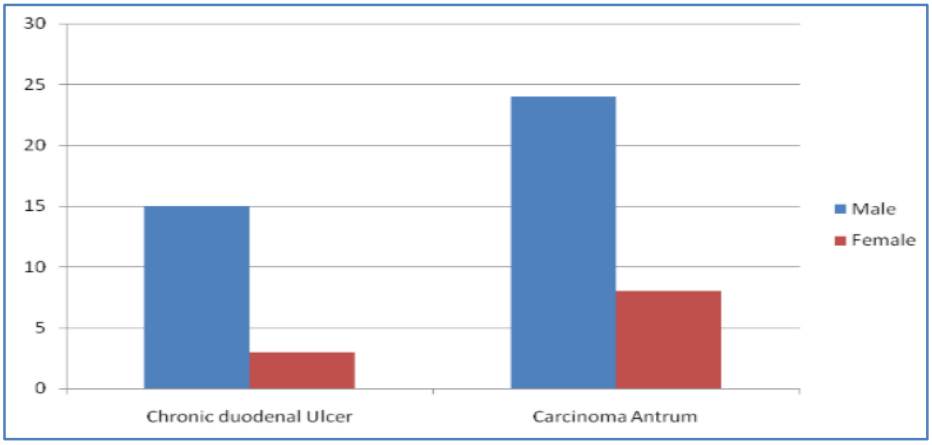
Graph 2: Age Distribution in Each Condition

The age incidence of the patients in this study ranged from 30 years to 78 years with a mean of 54 years. In cases of obstruction secondary to due to duodenal ulcer the maximum age incidence is between 40–49 years. Youngest case of gastric outlet obstruction due to duodenal ulcer in the present series is 30 years. In cases of obstruction secondary to antral carcinoma the maximum age incidence is between 60–69 years. The youngest case of gastric outlet obstruction due to antral carcinoma in the present series is 47 years.

Sex Incidence in each Condition:

	Total no. of cases	**Duodenal ulcer**	**Carcinoma antrum**
Male	39	15	24
Female	11	3	8
Total	**50**	**18**	**32**

Table 3: Sex Incidence in Each Condition



Graph 3: Sex Incidence in Each Condition

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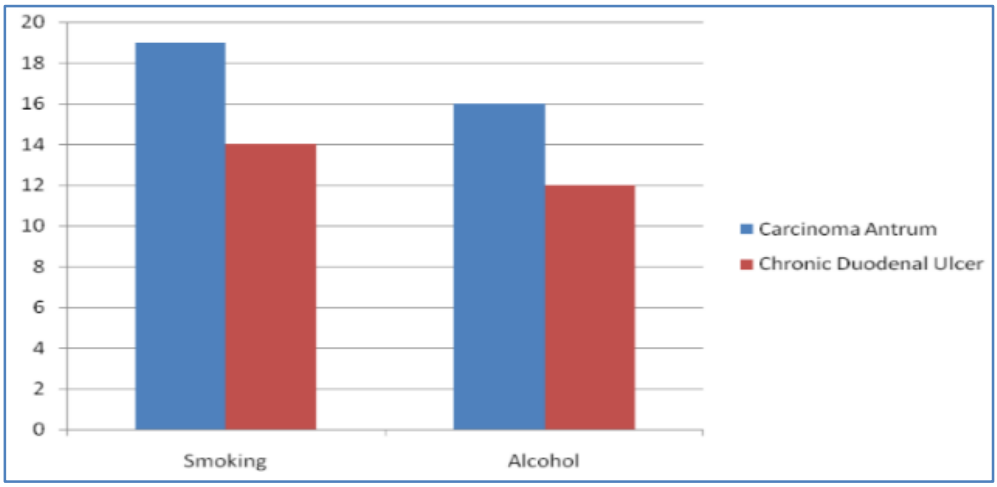
In this series the number of male patients were 39 and the number of female patients were 11. The overall male to female ratio (M: F) was 3.5: 1, M:F ratio in cicatrised duodenal ulcer 5: 1 was and the M: F ratio in antral carcinoma was 3: 1.

INCIDENCE OF SMOKING AND ALCOHOL CONSUMPTION IN EACH CONDITION:

	Smoking	Alcohol
Cicatrised duodenal ulcer	14	12
Antral carcinoma	19	16

Table 4: Incidence of Smoking and Alcohol Consumption in Each Condition



Graph 4: Smoking and Alcohol Consumption in Each Condition

FREQUENCY OF SYMPTOMS:

Symptoms	Cicatrised duodenal Ulcer No. (%)	Carcinoma antrum No. (%)	Total No. of Cases No. (%)
Pain	94.4(17)	90.6(29)	92.5(36)
Vomiting	100(18)	100(32)	100(50)
Anorexia	66.6(12)	87.5(28)	77.05(40)
Weight loss	33.3(6)	75(24)	54.15(32)
History of APD	38.8(7)	50(16)	44.4(23)
History of drug intake	61.1(11)	12.5(4)	36.8(15)

Table 5: Frequency of Symptoms

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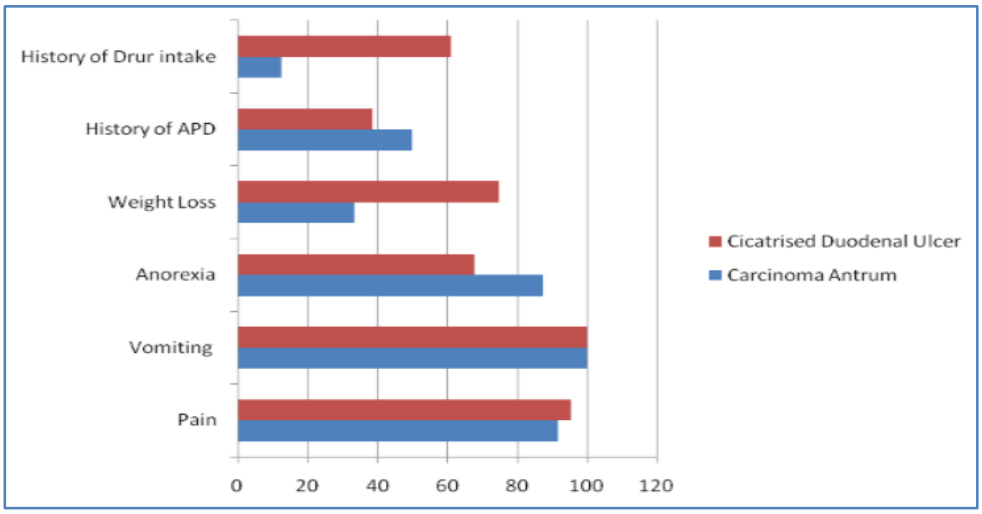

Graph 5: Frequency of Symptoms

Vomiting was the main symptom in all the cases in present series constituting 100% incidence. Vomiting was both spontaneous and induced type, frequency was 2-3 times per day and frequency gradually increased as the pyloric obstruction developed. Vomitus contained mainly undigested food and was non-bilious. In this series, pain, mainly in the upper abdomen was present in 36 out of 50 patients. In duodenal ulcer cases patients were having pain of burning in nature, periodic; pain was of continuous nature after development of obstruction, getting 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. The duration of pain was from 1 months to 2 years with a median of 12 months 23 cases gave history of APD and 16 of them were malignant cases suggesting malignancy developing from gastric ulcer. Anorexia was present in 28 (87.5%) cases of carcinoma of antrum and in 12(66.6%) of duodenal ulcer patients. Loss of weight was in 32(54.15%) cases. 24(75%) cases of carcinoma and 6(33.3%) 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.

Frequency of Signs:

Signs	Cicatrised duodenal Ulcer No. (%)	Carcinoma Antrum No. (%)	Total No. of cases No. (%)
Pallor	77.7(14)	78.1(25)	77.9(39)
VGP	83.3(15)	21.8(7)	52.25(22)
Succussion splash	55.5(10)	28.1(9)	41.8(19)
Palpable mass	0(0)	28.1(9)	28.1(9)
Dehydration	94.4(17)	93.75(30)	94.07(47)

Table 6: Frequency of Signs

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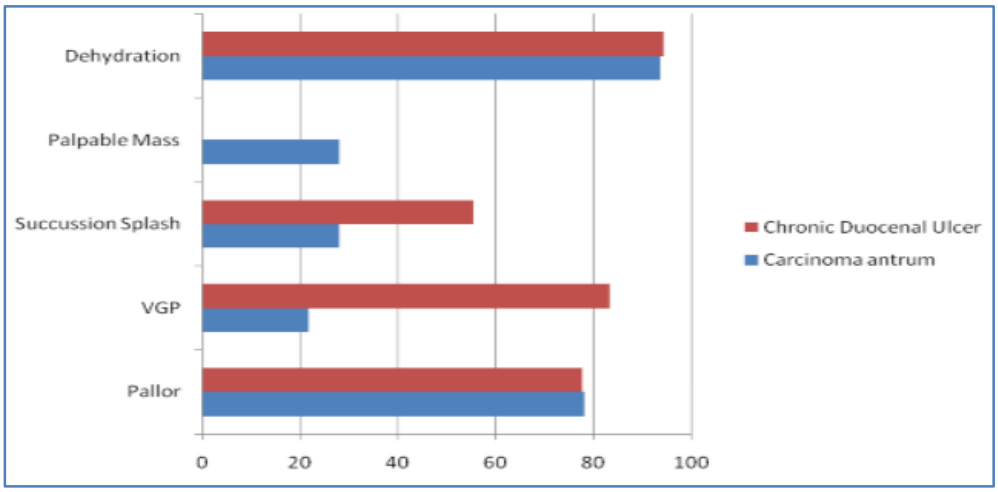

Graph 6: Frequency of Signs

Pallor was present in 39(77.9%) cases and more so in carcinoma antrum. VGP in 22(52.25%) cases, 7 of which were malignant. Succussion splash was present in 19(41.8%) cases of which 9 were malignant cases. Palpable mass was present in 9 cases of carcinoma of pyloric region and nil in duodenal ulcer cases. VGP were less prominent in carcinoma cases.

INVESTIGATIONS: The following investigations were carried out before subjecting the patient to surgery. Hb%, FBS, Blood grouping, Serum electrolytes, Urine routine, Liver function Test, Chest X-ray, ECG, Barium meal examination, endoscopy and ultrasonography examination done whenever possible. Hb% in majority of patients was <11 gm%. Urine routine, FBS, Blood urea were deranged in all cases.

Distribution of Blood Group:

Blood Group	Total No. of cases	Percentage
A	17	30
B	7	18
AB	5	10
O	21	42
Total	**50**	**100**

Table 7: Distribution of Blood Group

Blood Group	Total No. of cases	Percentage
A	2	11.1
B	1	5.5
AB	1	5.5
O	14	77.7

Table 8: Distribution of Blood Group in Duodenal Ulcer

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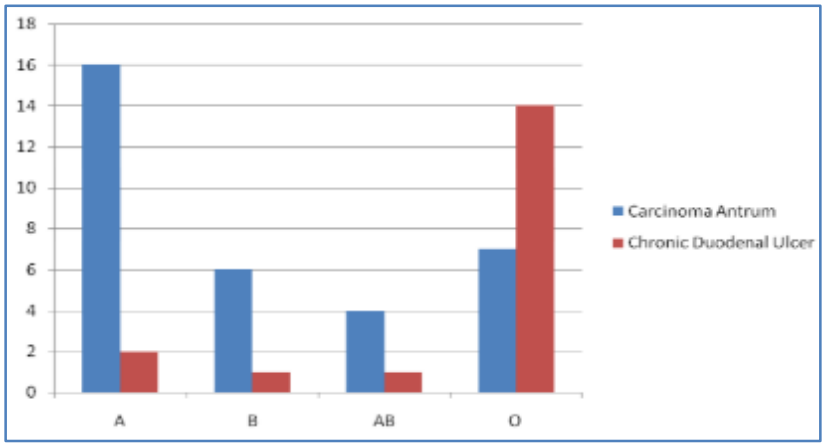
Blood Group	Total No. of cases	Percentage
A	15	40.6
B	6	25
AB	4	12.5
O	7	21.8

Table 9: Distribution of Blood Group in Carcinoma Antrum



Graph 7: Distribution of Blood Groups in Each Condition

Majority of the patients were having blood group O(42%) and next common was blood group A (30%). Most of the cases of duodenal ulcer were having O blood group (77.7%) and 40.6% of the pyloric carcinoma patients were having A blood group.

Barium Meal Examination: Done in 5 cases. Dilated stomach with delayed emptying and deformed cap was present in 3 cases. In 2 cases filling defect in the antral region was present.

Upper GI Endoscopy: Done in all cases, 32(72%) cases had pyloric Carcinoma which was confirmed with biopsy. 18(36%) had cicatrized duodenal ulcer.

Ultrasonographic Examination: Done in all cases, 9 cases showed epigastric mass. 5 of the patients had liver secondaries. None of the patients in this series with carcinoma pyloric region had presence of ascites.

Serum Electrolytes: In present series, all cases were subjected to serum electrolyte estimation, out of them 11(61.1%) of duodenal ulcer and 9(28.1%) patients of carcinoma pyloric antrum showed electrolyte imbalance.

All patients underwent pre-operative treatment to get the optimum metabolic Status. The preoperative treatment included liquid diet, liquid antacid and intravenous pantoprazole. Stomach wash using no. 16 Ryle's tube with normal saline was given twice a day for three days prior surgery. Anaemia, when present was corrected with blood transfusion.

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Types of Surgical Procedures Adopted in the study:

Procedure	No. of cases	Percentage
1. Duodenal ulcer cases: -Truncal vagotomy with posterior Gastrojejunostomy	18	100
2. Carcinoma antrum cases: - Subtotal gastrectomy with Billroth II anastomosis - Anterior gastrojejunostomy - Feeding Jejunostomy	 18 8 6	 56.25 25 18.75

Table 10: Types of Surgical Procedures Adopted in The Study

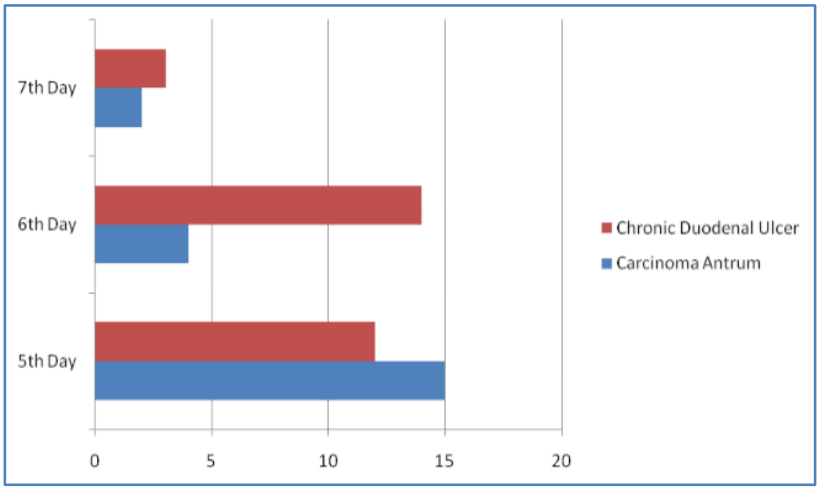
For duodenal ulcer cases: 18 patients (100%) underwent truncal vagotomy with posterior gastrojejunostomy.

Carcinoma antrum cases: 18 patients (56.25%) had operable disease underwent Subtotal gastrectomy with Billroth II anastomosis and in 8 patients (25 %) growth was fixed and they underwent anterior gastrojejunostomy alone and 6 patients (18.75%) underwent feeding jejunostomy alone.

Starting Oral Feeds:

	5th day	6th day	7th day
Cicatrised duodenal ulcer	12	4	2
Carcinoma antrum	15	14	3

Table 11: Starting Oral Feeds



Graph 8: Starting of Oral Feeds

All the patients were kept nil orally and on Ryle's tube aspiration for duration varying from 4 to 7days. Oral sips were allowed after removal of Ryle's tube and on appearance of bowel sounds.

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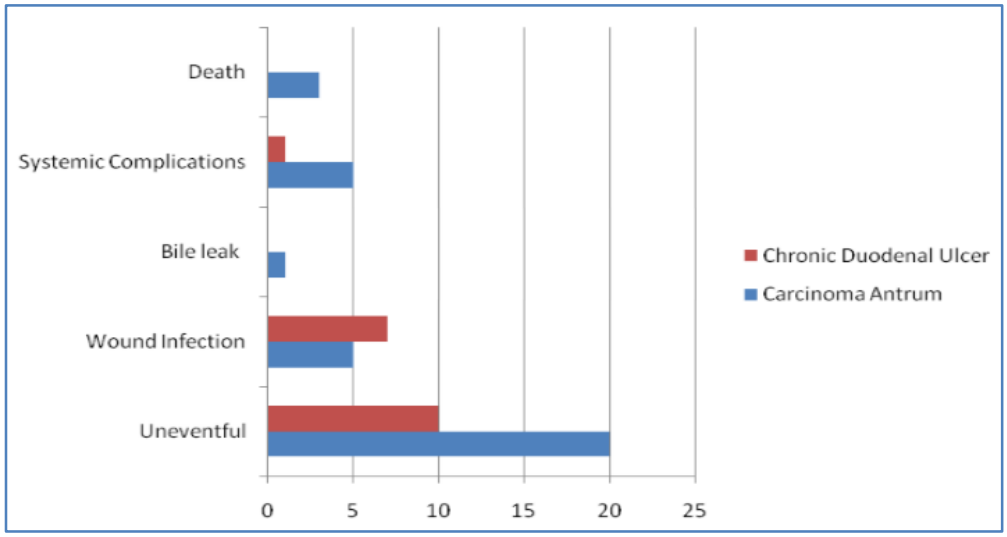
Post-Operative Complications:

	Cicatrised duodenal ulcer	Carcinoma antrum
Uneventful	10	20
Wound infection	7	5
Bile leak	0	1
Systemic complications	1	5
Death	0	3
Total	**18**	**32**

Table 12: Post-Operative Complications



Graph 9: Post-Operative Complications

Wound infection developed in twelve patients, who were treated by repeated dressing and appropriate antibiotics. In four patients, respiratory tract infection developed which was treated by chest physiotherapy and review of antibiotics. One patient of carcinoma pyloric region died because of Duodenal Blow out on 9th postoperative day. Rest of the patients had an uneventful postoperative period.

Incidence of wound Infection in Diabetic and Non-Diabetic Patients:

	Healthy wound	Wound infection
Diabetics	58.3%(14)	41.6%(10)
Non – Diabetics	92.3%(24)	7.6%(2)

Table 14: Incidence of Wound Infection in Diabetic and Non-Diabetic Patients

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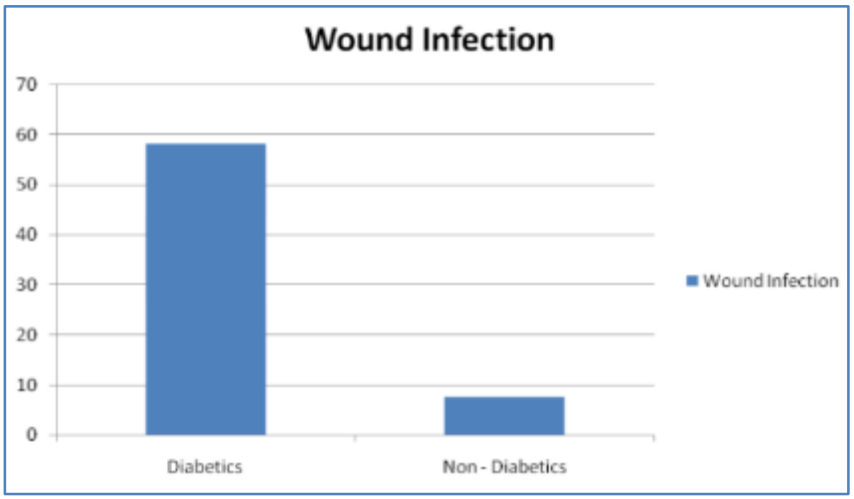

Graph 10: Incidence of Wound Infection in Diabetic and Non-Diabetic Patients

Duration of Follow Up:

	% Followed up	Average duration	Mortality
Cicatrised duodenal ulcer	95.5	6 months	0
Carcinoma antrum	87.5	4 months	2

Table 14: Duration of Follow Up

Follow up for a period of 3 months to 6 months was done.4 cases (12.5%) of carcinoma.

Fig. 1: VGP in Cicatrised Duodenal Ulcer

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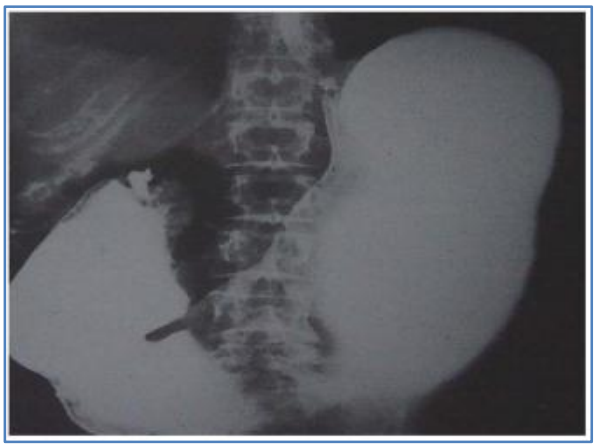

Fig. 2: Barium Meal showing Dilated and Delayed Emptying of Stomach in Cicatrised Duodenal Ulcer

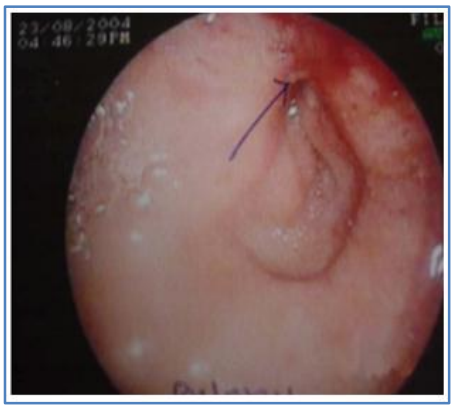

Fig. 3: Endoscopic picture of Cicatrised Duodenal Obstructing Pylorus

Fig. 4: Endoscopic picture showing Antral Carcinoma Ulcer showing Narrowed Pylorus

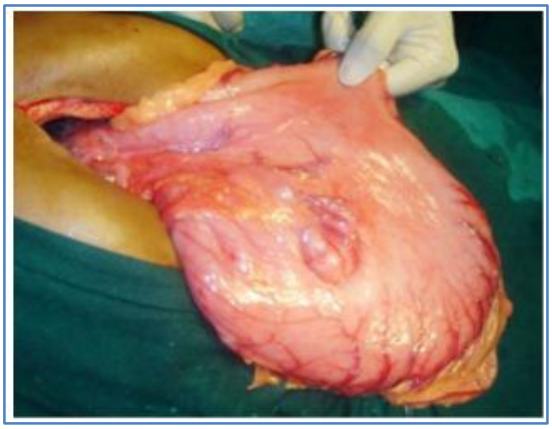

Fig. 5: Hugely Dilated Stomach in Cicatrised Duodenal Ulcer

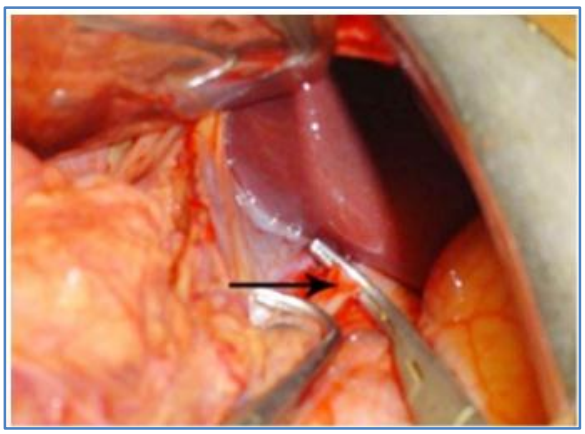

Fig. 6: Arrow showing Anterior Vagus

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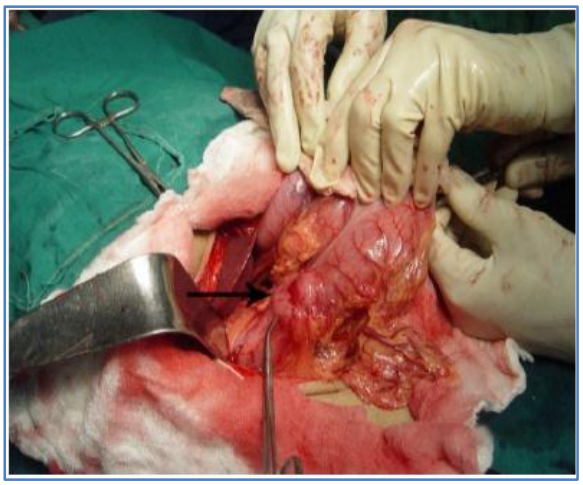

Fig. 7: Antral Carcinoma of Stomach

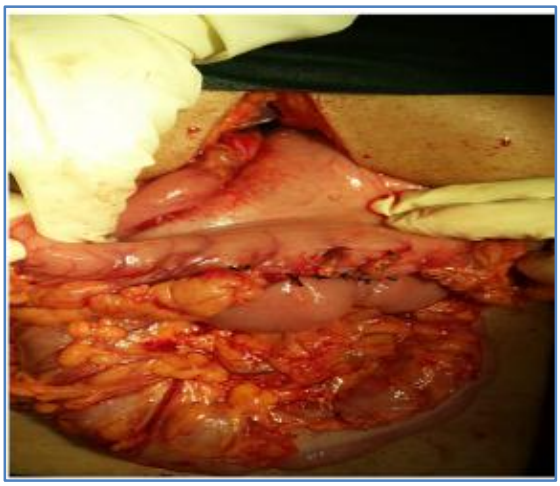

Fig. 8: Showing Completed Posterior Gastrojejunostomy

Fig. 9: A Case of Duodenal Blow Out-Showing Tube Duodenostomy

Fig. 10: Stapler Anastomosis of Posterior Gastrojejunostomy

DISCUSSION: The various observations and results of this present series were compared and analysed with observations and results of previous studies. The total number of adult cases of gastric outlet obstruction in this study was 50. This consisted of:

- Gastric outlet obstruction secondary to cicatrised duodenal ulcer–18.
- Gastric outlet obstruction secondary to malignancy–32.

The commonest cause of gastric outlet obstruction is Carcinoma Antrum. The next commonest cause is carcinoma of Cicatrised Duodenal Ulcer. The values are close to the values observed by Shone DN et al series.[2] The incidence of gastric outlet obstruction secondary to cicatrized duodenal ulcer in Misra S P et al series,[3] is 76%, which is more than present series. The incidence of gastric outlet obstruction secondary to carcinoma pyloric antrum is 35% in Abdul Samad et al series,[4] which is less than present series. Gastric cancer was the commonest cause of malignant gastric outlet obstruction while peptic ulcer disease was the commonest benign cause.

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This is keeping with other studies which reported similar etiological pattern.[2,3,4] In recent decades, 50 to 80 percent cases have been attributable to malignancy.[4,5,6]

In this study most patients were in the fifth and seventh decades of life. In antral carcinoma cases, the maximum incidence seen in the age group of 60-69 years (38%). The youngest age of presentation was 47 years and the oldest was 78 years with the average age being 62.5 years. The incidence of malignant gastric outlet obstruction in patients of older age group was also reported by others.[2,4,7]

The majority of patients, came from the rural areas as observed in the study by Hyasinta Jaka et al,[8] in chronic duodenal ulcer cases the maximum incidence seen in the age group of 40-49 years (18%). The average age being 31 years with a range from 30 to 62 years. Men out numbered women by 5:1. In the series of Fisher et al,[9] the average age was 54 with a span from 20-89 and men outnumbered women by 2:1.

Men outnumbered women by 3:1 as compared to 5.5:1 observed by Yogiram and Chowdhary.[10] The benign and malignant gastric outlet obstruction was found to be more commonly amongst the males than females.[8] This higher incidence in males, worldwide can be explained as because of more consumption of gastric irritants by males compared to females.

	Present Series		**Kozoll & Meyer Series.[11]**		**Hyasinta Jaka series.[8]**	
	No	%	No	%	No	%
Alcohol	28	56	31	52.3	104	56.5
Smoking	33	66	46	76.2	67	36.4

Table 15: Comparing personal habits

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 with those observations of previous studies. Duration of abdominal pain in chronic duodenal ulcer varied from three months to two years. Seven patients with chronic duodenal ulcer gave history of Acid Peptic Disease and eleven patients gave history of long term drug intake.

In carcinoma antrum cases the duration of abdominal pain varied from 1 months to 1 year. Sixteen cases of pyloric carcinoma had past history suggestive of APD. Previous history of peptic ulcer disease was reported in 35(19.0%) patients.

In agreement with other studies,[4,5,12,13,14,15] the diagnosis of gastric outlet obstruction in this study was based on clinical presentation, an upper gastrointestinal barium study, and/or an inability during upper endoscopy to intubate the second portion of the duodenum (Upper gastrointestinal endoscopy) and confirmed by histology and intra-operative findings. Other diagnostic investigations included abdominal ultrasound and computerized tomography (CT) scan.

The clinical presentation of gastric outlet obstruction in our patients is not different from those in other studies,[5,12,13,14,15] with non-bilious vomiting being common to all the patients. Pallor was present in 77.9% of cases. Visible gastric peristalsis and succussion splash were more prominent in Cicatrised Duodenal Ulcer. The very high incidence of visible gastric peristalsis (77.9%) in the present series due to the late presentation of the patients to the reaching hospital after taking treatment for months together in peripheral centres.

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Blood group 'O' was common in cicatrized duodenal ulcer patients [77.7%] followed by blood group 'A' [11.1%]. 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 [40.6%].

In the present series all cases were subjected to serum electrolyte estimation. Out of them 20 cases [40%] showed electrolyte imbalance. In the series of Maichel L Schwartz[16] electrolyte imbalance was present in 30% patients.

Upper GI endoscopy was done in all cases [100%]. 32 cases [64%] had pyloric antral Carcinoma in which 23 cases had fungating growth and the rest 9 had ulcerative growth and 18[36%] had cicatrized duodenal ulcer. One of the cases with bleeding ulcerative growth which was reported as chronic inflammatory lesion in histopathology report of endoscopic biopsy proved to be intestinal type of adenocarcinoma after surgery, where subtotal gastrectomy with Billroth II anastomosis was undertaken in view of bleeding ulcerative growth. Two cases presented in the late stage, where during endoscopy they were found to have growth spreading along the greater and lesser curvatures upto the fundus where Palliative feeding Jejunostomy was undertaken. Two cases who had previously undergone gastrojejunostomy presented with antral growth where Feeding Jejunostomy alone was done.

In the present series, 100% of cicatrized duodenal ulcer patients underwent truncal vagotomy with posterior gastrojejunostomy as in the study by Hyasinta Jaka et al.[8] In carcinoma of pyloric antrum cases, 56.25% patients underwent Billroth II Polya gastrectomy after subtotal resection and 25% patients underwent anterior gastrojejunostomy and 18.75% underwent feeding jejunostomy alone. For few of our patients linear staplers were used to perform the resection and anastomosis which resulted in lesser operative time.

In unresectable cases only anterior gastro jejunostomy and feeding jejunostomy were done as the self-expandable metallic stents are not available in our hospital.

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 Ryle's tube aspiration continued till bowel movements established by noting bowel sounds, passing of flatus and gross reduction in quantity of Ryle's tube aspiration. Later on majority of patients were allowed to take oral fluids on 5th or 6thday followed by semisolid and solid diet. The average hospital stay in this series was 10 days. This is almost similar when compared to the series of Ralph A. Matteis and Robert E. Hermann where the average hospital stay was 8.3 days and of Fisher et al.[9] where it was 6.8 days.

Few of the patients developed vomiting after surgery which was treated conservatively with reinsertion of Ryle's tube and vomiting gradually subsided over 4-5 days. This was more commonly observed in the cases who underwent Anterior Gastrojejunostomy.

In this series 12 patients had wound infection which was treated by repeated dressings and appropriate antibiotics. Surgical site infection was the most common post-operative complication accounting for 38.2% of cases.[15,17,18] 6 patients had respiratory tract infection who were treated by review of antibiotics and chest physiotherapy. One patient with carcinoma pyloric region developed duodenal blow out on the 5th day and died due to biliary sepsis.

The overall mortality rate was 6% (9.3% for malignant cases). Mortality rate was zero in case of cicatrised duodenal ulcer.

Most of the patients with cicatrized duodenal ulcer and antral carcinoma were followed up. There has been no recurrence of symptoms in any of the cases that turned up for follow up except for two antral carcinoma cases who presented with multiple secondaries and expired one month after surgery.

CONCLUSION: The present study is an observational study of gastric outlet obstruction. Though a large number of patients are required to arrive at a firm conclusion, based on the data and results obtained in the present study, the following conclusions can be drawn:

- Males are more commonly affected with gastric outlet obstructions in adults. Carcinoma stomach is common in the age group of 60–69 years and cicatrised duodenal ulcer is more common in the age group of 40-49 years.
- A high incidence of use of alcohol and tobacco are found in patients with gastric outlet obstruction.
- Vomiting, Visible Gastric Peristalsis, succession splash and dehydration are the most common and constant symptom and symptom of gastric outlet obstruction.
- Electrolyte imbalances are more commonly encountered in the patients presenting with prolonged vomiting.
- Upper GI endoscopy, barium meal, ultrasound abdomen pelvis and CT scan abdomen are the investigating tools for gastric outlet obstruction.
- Preparation of stomach and correction of fluid electrolyte imbalances in the pre-operative period is a must prior to the surgery for gastric outlet obstruction.
- Patients with cicatrised duodenal ulcer require Truncal Vagotomy and Posterior Gastrojejunostomy and patients with carcinoma antrum require curative (Subtotal Gastrectomy with Billroth II Anastomosis) or palliative treatment (Anterior Gastrojejunostomy or Feeding Jejunostomy) depending on the stage of the disease.

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