Original Research Article

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A clinical study of gastric outlet obstruction

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ABSTRACT

Background: 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 spinchter where the diagnosis of carcinoma is most probable or more distally in the duodenal bulb where the cause is almost invariably a duodenal ulcer. The aim was to study infantile hypertrophic pyloric stenosis, benign peptic ulcer and gastric carcinoma and evaluation of electrolyte abnormalities in gastric outlet obstruction, to study various modalities of treatment and to assess pertaining to recovery from paralytic ileus.

Methods: This was a clinical observational study comprising of 40 cases of gastric outlet obstruction. The patients for this study have been selected from Prathima Institute of Medical Sciences, Karimnagar, Telangana, India from December 2013- November 2015. The cases were selected who were willing to undergo surgery.

Results: Congenital hypertrophic pyloric stenosis (CHPS) is more common among first born male infants. Parental consanguinity is associated with increased incidence of congenital hypertrophic pyloric stenosis. CHPS is common in the age group of first 3-6 weeks of life (average 4 weeks). Males are more commonly affected with gastric outlet obstructions in adults. Cicatrized duodenal ulcer is more common in the age group of 30-40 years, while carcinoma stomach is more common in age group of 50-60 years. Vomiting and visible gastric peristalsis are the most common and constant symptom and sign of gastric outlet obstruction, more so in cases of cicatrized duodenal ulcers.

Conclusions: Ramstedt's pyloromyotomy is the gold standard treatment for CHPS. Patients with gastric outlet obstruction due to cicatrized duodenal ulcer require truncal vagotomy with posterior gastrojejunostomy. Vagotomy is optional in view of better response with drugs for APD. Antral carcinoma cases require curative or palliative surgery depending on the stage of the disease.

Keywords: Gastric outlet obstruction, Paralytic ileus, Recovery

INTRODUCTION

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 infants, adults, clinical features and investigations used to diagnose and to discuss treatment and postoperative recovery. One of the following can be used to diagnose gastric outlet obstruction.¹

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- Projectile vomiting of undigested food consumed several days previously with absence of bile in vomitus.
- Visible gastric peristalsis (VGP) on empty stomach
- Gastric succession splash 3-4 hours after the last meal.
- Palpable hypertrophied stomach
- Delayed emptying of stomach on barium meal studies.
- A gastric residue containing undigested food on upper GI endoscopy
- An aspirate of more than 400 ml on saline load test.
- 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. Gastric outlet obstruction is described by Sir James Walton as "The stomach you can hear, the stomach you can feel and the stomach you can see." 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. Carcinoma stomach is detected early nowadays because of early investigatory interventions and in some countries as a part of screening programme.

- In managing gastric outlet obstruction, measures employed are designed to
- Improve the local condition of stomach
- Correct fluid and electrolyte imbalance
- Correct anemia, hypoproteinemia and vitamin deficiency
- Treatment of etiological conditions by surgery which is selected to suit individual patient, depending upon age, general condition and associated condition as each surgery is deficient in some respect.

In this study 40 cases have been selected to include variety of cases of gastric outlet obstruction, both in paediatric and adult age groups to study gastric outlet obstruction cases with respect to infantile hypertrophic pyloric stenosis, benign peptic ulcer and gastric carcinoma and evaluation of electrolyte abnormalities in gastric outlet obstruction, to study various modalities of treatment and to assess pertaining to recovery from paralytic ileus.

METHODS

This was a clinical observational study comprising of 40 cases of gastric outlet obstruction. The patients for this study have been selected from Prathima Institute of Medical Sciences, Karimnagar, Telangana, India from December 2013 - November 2015.

The cases were selected who were willing to undergo surgery with following inclusion and exclusion criteria.

Inclusion criteria

- Peptic ulcer disease
- Carcinoma pyloric antrum
- Infantile hypertrophic pyloric stenosis.

Exclusion criteria

Among pediatric age group

- Pyloric or prepyloric atresia, mucosal diaphragm
- Duodenal atresia and stenosis
- Foreign bodies, bezoars and worms.

In adults

- Hypertrophic pyloric stenosis of adults
- Gastroduodenal tuberculosis
- Benign neoplasm of the stomach
- Carcinoma stomach with liver metastasis, ascites, peritoneal implantation.

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 was done which included hydration status, VGP, mass, succussion splash, hepatomegaly and ascites. Associated conditions like anemia, hypertension and diabetes were managed appropriately before surgery.

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

Management of cases

In infants, dehydration was primarily corrected by using intravenous normal saline or half strength normal saline according to the body weight. Surgery was performed as elective as emergency, after improving the infant's general condition. In adults pre-operative treatment included correction of dehydration, metabolic status, anaemia, IV H₂ 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.

Anaesthesia

General anaesthesia was given for all cases.

Surgeries performed

Infantile hypertrophic pyloric stenosis

Ramstedt's pyloromyotomy

Peptic ulcer disease

Truncal vagotomy (TV) with posterior gastrojejunostomy.

Gastric carcinoma

Partial gastrectomy with Billroth II reconstruction. Or anterior gastrojejunostomy alone

Post-operative management

- Half hourly temperature, pulse and respiratory chart for first six hours and fourth hourly chart thereafter
- Fourth hourly blood pressure chart
- Ryle's tube aspiration every hourly for first 24 hours. Then once in 2-4 hours Ryle's tube was removed after appearance of bowel sounds and minimal Ryle's tube output on aspiration

- IV fluids were given according to the requirement that is depending upon body weight
- In infants oral feeds were started 24hrs after the surgery
- Adults were kept nil orally for 4-5 days and oral sips were allowed after the removal of Ryle's tube and gradually shifted to solids from semi-solids
- Inj. Ciprofloxacin 200 mg bid was given in adults. In paediatric cases inj. Taxim was given according to body weight
- Analgesics: Inj. Paracetamol, 1gm mg, IV, bid
- H₂ blockers: Inj. Ranitidine, 50 mg, IV, bid
- In paediatric cases subcuticular sutures were put. In adults sutures were removed by 8-10 days after operation
- The follow-up period ranged from three months to six months.

RESULTS

Table 1: Causes of gastric outlet obstruction.

Causes	Number	Percentage
Infantile hypertrophic pyloric stenosis	10	25
Cicatrised duodenal ulcer	21	52.5
Carcinoma pyloric antrum	09	22.5
Total	40	100

Cicatrized duodenal ulcer was the most common cause of gastric outlet obstruction.

Table 2: Distribution according to symptoms.

Symptoms	Cicatrised duodenal ulcer		Carcinoma antrum		Total	Total	
	Number	Percentage	Number	Percentage	Number	Percentage	
Pain	21	100	08	88.8	29	96.6	
Vomiting	21	100	09	100	30	100	
Anorexia	15	71.42	09	100	24	80	
Weight loss	13	61.9	09	100	22	73.3	
Hematemesis	04	19.04	05	55.5	09	30	
Malena	11	52.38	04	44.44	15	50	

Table 3: Distribution as per the signs

Ciana	Duodenal ulcer		Carcinoma	Carcinoma pyloric regions		Total	
Signs	Number	Percentage	Number	Percentage	Number	Percentage	
Pallor	18	85.7	09	100	27	90	
VGP	21	100	09	88.8	29	96.6	
Succession splash	18	85.7	06	66.6	24	80	
Palpable mass	08	88.8	03	26.6	11	36.6	
Dehydration	15	71.42	06	66.6	21	70	

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 3 months to 6 months with a median of 4 months. 17 cases gave history of APD and 2 of them were malignant cases suggesting malignancy developing from gastric ulcer.

Pallor was present in 27 (90%) cases and more so in carcinoma of pyloric region. VGP present in 29 (96.6%) cases, 8 of which were malignant. Succussion splash was present in 24 (80%) cases of which 6 were malignant cases.

Palpable mass was present in 8 cases of carcinoma of pyloric region and nil in duodenal ulcer cases. Succussion splash and VGP were less prominent in carcinoma cases. 21 patients (100%) underwent truncal vagotomy with

posterior gastro-jejunostomy. Five patients (55.5%) had operable disease underwent Billroth II resection and in 4 patients (44.4%) growth was fixed and they underwent anterior gastro-jejunostomy alone.

Table 4: Types of surgical procedures adopted in the study.

Cases type	Procedure	Number	Percentage
Duodenal ulcer	Truncal vagotomy with posterior gastro- jejunostomy	21	100
Carcinoma antrum	Billroth II gastrectomy	05	55.5
	Anterior gastro- jejunostomy	04	44.4

Table 5: Start of oral feeds.

Cagag	5th day	5th day		6th day		7th day	
Cases	Number	Percentage	Number	Percentage	Number	Percentage	
Cicatrised duodenal ulcer	09	42.8	09	42.8	03	14.28	
Antral carcinoma	03	33.3	05	55.5	01	11.1	

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 appearance of bowel sounds.

Table 6: Postoperative complications.

Postoperative complication	Number
Wound infection	04
Respiratory tract infection	03
Died	01
Total	08

Wound infection developed in four patients, who were treated by repeated dressing and appropriate antibiotics. In three patients, respiratory tract infection developed which was treated by chest physiotherapy and review of antibiotics.

One patient of carcinoma pyloric region died because of anastomotic leak on 10th post-operative day. Rest of the patients had an uneventful postoperative period. Postoperative hospitalization was in the range from 8 to 12 days with average of 10 days.

Follow up for a period of 3 months to 6 months was done. Three patients of antral carcinoma were treated postoperatively by chemotherapy with 5-fluorouracil. 5 cases (23.95%) of cicatrized duodenal ulcer and 4 cases (44.4%) of carcinoma antrum were lost for follow up. One patient with antral carcinoma developed multiple secondaries and expired one month after surgery on follow up.

Table 7: Duration of follow up.

Cagas	Follow up		Amono ao Jamotion	Montolitu	
Cases	Number	Percentage	Average duration	Mortality	
Cicatrised duodenal ulcer	16	76.1	4 months	00	
Antral carcinoma	05	55.5	2.6 months	01 (11.1%)	

DISCUSSION

This study included 10 cases of gastric outlet obstruction in paediatric age group. All cases are of congenital hypertrophic pyloric stenosis.

Male infants accounted for 80% of the cases, which is in comparison with the results of Swenson.²

There is preponderance of the disease in 1st born infants (80%) in this study which is similar to the observations as shown by Swenson and as per Gibba MK et al there is increased incidence among first born infants (44%).^{2,3}

In the present series of cases history of consanguineous marriage between parents was noted in 4 cases showing a hereditary tendency. As the stomach becomes dilated and muscle becomes flaccid in a neglected infant due to decompensatory stage, the vomitus becomes regurgitant in type. The vomitus is never bile stained. The infant does not appear to be in any discomfort but feels hungry and readily accepts feeds immediately after vomiting. All the 10 infants in the present series presented with the complaints of vomiting which is similar to the study of Clifford D Benson.⁴

In all the cases (100%), vomiting was nonbilious. The average age at the onset of vomiting was 30 days i.e. 4 weeks after birth which is in comparison with the study by Spicer and Benson CD who reported the average as 3 weeks.⁴

Visible gastric peristalsis and palpable pyloric mass was observed in 100% of the cases which can be compared with report of spicer.⁵

In the present series, 6 infants with prolonged vomiting presented with serum electrolyte abnormalities. Ramstedt's Pyloromyotomy was performed under general anaesthesia in all 10 cases (100%) using a supra umbilical transverse muscle cutting incision. Intra operative and post-operative periods were uneventful in all cases (100%) and no incidence of burst abdomen was noticed in the present study though Ramstedt's operation had a particular tendency to predispose for burst abdomen according to several authors. Oral feeds were started within 24-48 hours after surgery. 8 out 10 cases operated (80%) were followed up. Average period of follow up was 6 months and they were asymptomatic with significant weight gain. 2 cases (20%) were lost to follow up

The total number of adult cases of gastric outlet obstruction in this study was 30. This consisted of Gastric outlet obstruction secondary to cicatrised duodenal ulcer (21) and gastric outlet obstruction secondary to malignancy (9).

Gastric outlet obstruction due to carcinoma stomach is a leading cause of cancer deaths second only to lung cancer.⁶ The commonest cause of gastric outlet obstruction is cicatrized duodenal ulcer. The next commonest cause is carcinoma of pyloric antrum. The values are close to the values observed by *H. Ellis* 1 series.

In this study most patients were in the fifth and sixth decade of life. In chronic duodenal ulcer cases the maximum incidence seen in the age group of 30-39 years (38.09%). The average age being 42.5 years with a span from 21 to 67 years. Men outnumbered women by 6:1. In the series of Fisher et al.⁷

The average age was 54 with a span from 20-89 and men outnumbered women by 2:1. In antral carcinoma cases, the maximum incidence was seen in the age group of 50-59 years (44.4%). The youngest age of presentation was 38 years and the oldest was 67 years with the average age being 53 years. Men outnumbered women by 3.5:1 as compared to 5.5:1 observed by Yogiram and Chowdhary. This higher incidence in males, worldwide can be explained as because of more consumption of gastric irritants by males compared to females.

43% 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 also showed the same pattern with the non-skilled day labourer group listed most frequently with obstruction.⁹

The duration of pain was from 3 months to 6 months with a median of 4 months 17 cases gave history of APD and 2 of them were malignant cases suggesting malignancy developing from gastric ulcer. Anorexia was present in 9 (100%) cases of carcinoma of antrum and in 15 (71.42%) of duodenal ulcer patients. Loss of weight was seen in 22 (73.3%) cases. 9 (100%) cases of carcinoma and 13 (61.9%) 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. Haemetemesis was present in 9 (30%) cases and malena was present in 15 (50%) cases. These findings are similar to other studies. 8,10

In the present series 29 cases were subjected to serum electrolyte estimation. Out of them 15 cases (50%) showed electrolyte imbalance. In the series of Maichel L Schwartz electrolyte imbalance was present in 30%. Upper GI endoscopy was done in 30 cases (100%). ¹⁰ 9 cases (30%) had pyloric antral carcinoma and 21 (70%) had cicatrized duodenal ulcer.

In the present series, 100% of cicatrized duodenal ulcer patients underwent truncal vagotomy with posterior gastrojejunostomy. In carcinoma of pyloric antrum cases, 55.5% patients underwent Billroth II polya gastrectomy and 44.4% patients underwent anterior gastrojejunostomy. In this series four patients had wound infection which was treated by repeated dressings and

appropriate antibiotics. Three patients had respiratory tract infections that were treated by review of antibiotics and chest physiotherapy. One patient with carcinoma pyloric region developed anastomotic leak and expired on the tenth post-operative day.

The overall mortality rate was 6.66% (22.2% for malignant cases). Mortality rate was zero in case of cicatrised duodenal ulcer. Three patients of antral carcinoima were treated postoperatively by chemotherapy with 5 FU. Most of the patients with cicatrized duodenal ulcer (76.1%) and antral carcinoma (55.55%) were followed up. There has been no recurrence of symptoms in any of the cases that turned up for follow up one patient with antral carcinoma case which presented with multiple secondaries postoperatively and expired one month after surgery.

All the patients were subjected to a standard preoperative treatment, which included stomach wash twice a day for three days prior to surgery. Preoperatively stomach was dilated in majority of the cases. Postoperatively 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 6th day 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 where it was 6.8 days. ^{7,11,12}

CONCLUSION

Ramstedt's pyloromyotomy is the gold srandard treatment for CHPS. Patients with gastric outlet obstruction due to cicatrized duodenal ulcer require truncal vagotomy with posterior gastrojejunostomy. Vagotomy is optional in view of better response with drugs for APD. Antral carcinoma cases require curative or palliative surgery depending on the stage of the disease.

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institutional ethics committee

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