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Malignant Gastric Outlet Obstruction: Causes, Clinical Presentation and Management

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Abstract

Malignant gastric outlet obstruction is a medical condition characterized by epigastric pain and postprandial vomiting due to mechanical obstruction due to gastric cancer, lymphoma, or gastrointestinal stromal tumor.

This study aims To evaluate the causes of malignant gastric outlet obstruction and how to treat them, in addition; the application of gastric outlet obstruction scoring system before and after treatment.

A prospective study was conducted in the Surgical Department of the Gastrointestinal and Hepatology Teaching Hospital. It included 51 adult patients diagnosed as all patients with malignant gastric outlet obstruction. Data collected included socio-demographic, clinical presentation, virology status, laboratory, radiological and endoscopic findings, operative findings and surgical procedure performed and postoperative complication and result of histopathology, and pre and postoperative gastric outlet obstruction scoring system.

The mean age was 53.21 ± 14.6 years; 58.8% were males. The most common presentation in our patients was non-bilious vomiting. Loop Gastrojejunostomy alone was the most common surgical procedure in 37.2% of them. Major surgical complications developed in 58.8% of patients. All patients resumed oral intake after surgery.

Malignant gastric outlet obstruction affects males more commonly and is caused mostly by gastric adenocarcinoma with non-bilious vomiting as the most common presenting symptom. Distal gastrectomy is the treatment of choice for resectable tumor, while loop gastrojejunostomy and other types of bypass surgery for unresectable tumor.

Introduction

Malignant gastric outlet obstruction (MGOO) is a clinical disorder characterized by the mechanical obstruction of the pylorus or duodenum as a result of tumor compression/infiltration, resulting in a reduced or impossible oral intake⁽¹⁾. Pancreatic and stomach cancers are the most common causes, but MGOO can also be caused by lymphomas, duodenal carcinoma, biliary tract carcinoma, ampullary carcinoma, and metastatic malignancies. GOO has been reported in 15 percent to 20 percent of pancreatic cancer patients⁽²⁾. Males are more likely than females to be affected, with a 3 to 4:1 ratio for both malignant and benign causes⁽³⁾.

Nausea and/or vomiting, epigastric pain, early satiety, abdominal distension, and weight loss are the most typical clinical characteristics. Vomiting is most commonly defined as non-bilious, and it usually contains undigested food particles. Vomiting may be sporadic in the early stages of blockage and usually happens within one hour of a meal^(4, 5). MGOO has traditionally been treated surgically, with a gastrojejunostomy being the most common procedure. Endoscopically implanted self-expandable metal stents have become commonplace in recent years⁽⁶⁾. On a global scale, researches are being conducted using laparoscopic gastrojejunostomy rather than open gastrojejunostomy. Laparoscopic gastro-intestinal (GI) anastomosis has been found to have lower morbidity and mortality, shorter hospital stays, fewer blood transfusions, and a faster GI transit recovery time as compared to open surgery⁽⁷⁾. For patients who have a GI tract lymphoma causing GOO, chemotherapy is usually the preferred initial treatment⁽⁸⁾. To objectively quantify patients' oral intake, the Gastric Outlet Obstruction Scoring System (GOOSS) was developed. A point score is issued to simplify statistical analysis calculations and may be especially beneficial when comparing oral intake before and after interventions. All therapies for malignant GOO, including surgery, endoscopic methods, and radiation therapy, are covered by the GOOSS. It assigns a score of 0 if there is no oral intake, 1 if only liquids are consumed, 2 if soft solids are consumed, and 3 if low-residues or a full diet are consumed, and it is now the most widely used score to measure clinical improvement following MGOO treatment^(1, 9).

Aim of Study

The aim of this study is to evaluate the causes of MGOO and how to treat them, in addition; the application of GOOSS before and after treatment.

Patients and methods

Study design, setting, and time: This was a prospective study conducted in the Surgical Department of the Gastrointestinal and Hepatology Teaching Hospital, Medical City Complex, Baghdad, Iraq during a period of two years from (January 2016 to January 2018).

Study Population and sample size: The study included 51 adult patients diagnosed as all patients with MGOO. GOO was diagnosed based on clinical symptoms, an upper gastrointestinal barium study, and/or an inability to intubate the duodenum during upper endoscopy, as well as histopathological data. Patients with benign causes depending on biopsy and patients who had distal gastric mass, duodenal mass, biliary and pancreatic mass without any endoscopic or radiological evidence of obstruction were excluded from the study. Weight loss was assessed by history and clinical examination, and weighing of patients, which compared with previous most accurate measurements of body weight, if the decrease in body weight about 5% in the last month it was important finding.

All study participants received intravenous fluids to address fluid and electrolyte deficiencies, nasogastric suction, urethral catheterization, and broad-spectrum antibiotic treatment prior to surgery. They were given a preoperative anesthetic evaluation. Good urine flow of 1500-2000 cc/24 hours suggested adequate hydration. Complete blood count, serum albumin, serum electrolytes, urea and creatinine, and a virology test were among the preoperative laboratory tests that were relevant. Plain abdomen x-rays, barium studies, abdominal ultrasound, abdominal computed tomography scan, and (MRI & MRCP) in some circumstances were used as imaging investigations. Each patient received a GOO score prior to surgery.

During the procedure, all patients were given general anesthesia and had an exploratory laparotomy through a midline incision. The diagnosis of GOO was made after surgery by



observing the location of the mass in conjunction with a dilated and thick-walled stomach, and in certain cases, a dilated common bile duct. The type of surgical surgery was determined by the reason of GOO, as well as additional surgical operations such as oophorectomy and ileocolic anastomosis. Biopsy was collected for histological analysis from either a gastric, duodenal, pancreatic, or biliary mass via tissue biopsy, or from a liver mass or material following resection in some circumstances.

Patients were kept nil orally after surgery until bowel sounds returned, at which point the nasogastric tubes were withdrawn. Antibiotics, fluids, and deep venous thrombosis prevention were administered intravenously. The patient's recovery was closely observed after surgery. The postoperative GOOSS for each patient was calculated. It assigns a score of 0 if there is no oral intake, 1 if only liquids are consumed, 2 if soft solids are consumed, and 3 if low-residues or a full diet are consumed, and it is now the most widely used score to measure clinical improvement following MGOO treatment. The patients were followed up on during the short postoperative period till discharge, and then again during their visit to our hospital's outpatient clinic. We define minor postoperative complication as that does not require hospital admission, and major complication those require invasive procedures and hospital admission⁽¹⁰⁾.

Data on each patient were entered into a questionnaire prepared for the study. The study variables included socio-demographic (i.e. age and gender, level of education, occupation and area of residence), clinical presentation, virology status, laboratory, radiological and endoscopic findings, operative findings and surgical procedure performed and postoperative complication and result of histopathology, and pre and postoperative GOOSS.

Statistical analysis: The data analyzed using Statistical Package for Social Sciences (SPSS) version 26. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. A level of P – value less than 0.05 was considered significant.

Results

In this study, age was ranged from 14 – 75 years, with a mean of 53.21 ± 14.6 years; 58.8% were males; 58.8% were living in rural area; past surgical history was present in 25.5% including previous exploratory laparotomy and other abdominal operations; and 47.1% of them had obstruction at the antropyloric region as shown in table (1).

Table 1: Distribution of study patients by general characteristics

Variable	No. (n= 51)	Percentage (%)
Age (Year)		
< 20	1	2.0
20 - 39	7	13.7
40 - 59	26	51.0
≥ 60	17	33.3
Gender		
Male	30	58.8
Female	21	41.2
Residence		
Rural	30	58.8

Urban	21	41.2
Past surgical history		
Yes	13	25.5
No	38	74.5
Site of GOO		
Antropyloric(gastric) mass	24	47
Duodenal mass	9	17.6
Pancreatic mass	6	11.8
Ampullary mass	5	9.8
Recurrent Gastric mass	3	5.9
Duodenal and colonic mass	3	5.9
Gall Bladder mass	1	2.0

The most common presentation in our patients was non-bilious vomiting, which present in all cases; followed by epigastric pain (70.6%) and weight loss (68.6%). Pallor (54.9%) and Succession Splash (74.5%) were the most common signs found, followed by epigastric mass in 37.3% of patients

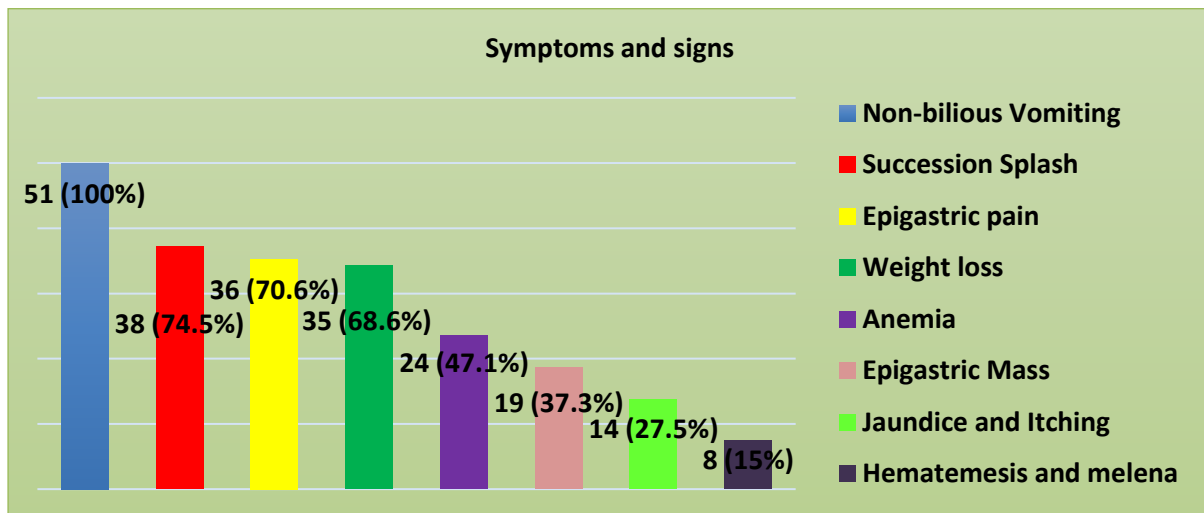


Figure 1: Symptoms and signs of GOO

Out of 51 patients, only 10 (19.6%) patients were amenable to surgical resection, the other 41 (80.3%) patients found to have unresectable tumors either due to be locally advanced tumor, or had omental, peritoneal or liver secondaries. All patients underwent surgical treatment. Loop Gastrojejunostomy alone was the most common surgical procedure in 37.2% of them, followed by gastric and biliary bypass 27.5%. Regarding postoperative complication, 33.3% of patients developed minor surgical complications, and the most common of these was postoperative pyrexia in 17.6% of. Major surgical complications developed in 58.8% of patients. The most common one was delayed gastric emptying in 21.6% of patients as shown in table (2).



Table 2: Operative information and postoperative complication

Variable		No. (n= 51)	Percentage (%)
Resectability			
Resectable		10	19.6
Unresectable	Liver metastasis	17	33.3
	Locally advanced	15	29.4
	Peritoneal metastasis	5	9.8
	Omental metastasis	2	3.9
	Ovarian metastasis	2	3.9
Type of surgery			
Gastrojejunostomy		19	37.2
Gastric and Biliary Bypass		14	27.5
Distal Gastrectomy		10	19.6
Re-Gastrojejunostomy		3	5.9
Gastrojejunostomy and ileocolic Anastomosis		3	5.9
Gastrojuenostomy and Oophorectomy		2	3.9
Complications			
Minor	Postoperative Pyrexia	9	17.6
	Abdominal pain	5	9.8
	Surgical Site Infection	4	7.8
	Paralytic ileus	3	5.9
Major	Delayed Gastric Emptying	11	21.6
	Atelectasis	10	19.6
	Cholangitis	6	11.8
	Deep Vein Thrombosis	3	5.9

Out of 51 patients, 47.1% of patients found to have metastatic adenocarcinoma by histopathology as shown in table (3)

Table 3: Histopathology results of study patients

Histopathological Result	No. (n= 51)	Percentage (%)
Metastatic Adenocarcinoma	24	47.1
Gastric Adenocarcinoma	8	15.7
Pancreatic Adenocarcinoma	7	13.6



Duodenal Adenocarcinoma	6	11.8
Ampullary Adenocarcinoma	3	5.9
Gastric lymphoma (NHL)	2	3.9
Gallbladder Adenocarcinoma	1	2.0

Before surgery, 39.2% of patients had grade 0 score and 60.8% had grade 1 score. We defined clinical success increase in the score 1 point and/or improvement in symptoms (early satiety, nausea, vomiting) seven days after surgery. All patients resumed oral intake after surgery. Postoperative GOOSS were 27.5% of patients had score 2, and 72.5% had score 3 ($P = 0.048$) which was significant as shown in table (4).

Table 4: Gastric Outlet Obstruction Score before and after operation

Gastric Outlet Obstruction Score	Preoperatively (%) n= 51	Postoperatively (%) n= 51	P – Value
0 (No oral intake)	20 (39.2)	0 (0)	0.048
1 (Only liquids)	31 (60.8)	0 (0)	
2 (Soft solids)	0 (0)	14 (27.5)	
3 (Low-residues or full diet)	0 (0)	37 (72.5)	

Discussion

General surgeons face diagnostic and therapeutic issues with GOO, which adds to increased morbidity and mortality⁽¹¹⁾. This study was carried out in our environment to report our own experiences in the management of this difficult disease, a topic that had not before been researched at our facility. Relief of obstructive symptoms and improved food intake are two goals of palliative care for people with MGGO. In this study, we found that 51% of patients is > 50 years. This high incidence of malignancy in old age group also reported in other studies conducted by Jaka H et al in 2013⁽¹²⁾, Sukumar V et al in 2015⁽³⁾, and Soo I et al in 2016⁽¹³⁾. Our patients' clinical presentations of gastric outlet obstruction are similar to those seen in other research, with non-bilious vomiting being the most prevalent symptom, followed by epigastric discomfort (70%) and weight loss (68.6%). This feature was observed in other study conducted by Purkayastha J et al in 2019⁽⁵⁾. The majority of patients in this study had obstruction at gastroduodenal region (antropyloric 47%, duodenal 17.6%) this finding is consistent with what mentioned in other studies^(4, 12). With the discovery of *Helicobacter pylori* and the use of proton pump inhibitors, the most common causes of GOO have shifted dramatically. Until the late 1970s, benign disease accounted for the majority of GOO cases in adults, with malignancy accounting for just 10% to 39% of cases. In recent decades, however, malignancy has been blamed for 50 to 80 percent of cases⁽¹⁴⁾. The most common cause of MGGO was gastric adenocarcinoma, followed by pancreatic adenocarcinoma. This was in line with other research that found stomach cancer to be the most common cause of MGGO⁽¹⁵⁻¹⁷⁾. In contrast Van Hooft JE et al study reported that pancreatic cancer was the most common cause of MGGO⁽⁴⁾. Food consumption improved following surgery, which was one of our study's findings. The GOOS was used to measure it. Clinical success is defined as alleviation of obstructive



symptoms and/or a one-point improvement in GOOS based on these data. All of our patients improved in at least one point during our research. It took an average of five days to restart oral intake. This has been discovered in other studies^(8, 18).

In current study, gastrojejunostomy was considered the standard palliative operative approach in palliation of patients with unresectable tumor. About 80% of patients, as only procedure or combined with biliary bypass or colonic bypass. Blakely AM et al in 2015⁽¹⁹⁾, Keränen I et al in 2013⁽²⁰⁾, and van hooft JE et al in 2010⁽⁴⁾ studies were also reported the same results. Due to a shortage of facilities to execute such procedures, the endoscopic or laparoscopic technique was not popular in our study. Other surgical procedures such as biliary bypass through choledochoduodenostomy, ileocolic anastomosis to avoid colonic invasion, and oophorectomy were performed if needed. Complications have an impact on the eventual fate of individuals who present with GOO. Postoperative pyrexia was identified as a common mild consequence, which could be connected to surgical stress, wound infection, or chest infection. Delayed gastric emptying was a common complication in our patients (21.6 percent). This is attributable to the type of the disease and the duration of the obstructed symptoms of gastric obstruction; the longer the obstruction, the slower the postoperative recovery of gastric function^(10, 21).

Conclusion

MGOO affects male more commonly and caused mostly by gastric adenocarcinoma with non-bilious vomiting as the most common presenting symptom. Applying Gastric Outlet Obstruction Score is important in pre- and post-operative assessment; we have improvement in GOOS in all our patients. Distal gastrectomy is the treatment of choice for resectable tumor, while loop gastrojejunostomy and other types of bypass surgery for unresectable tumor.

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