

GASTRIC RESECTION WITH ROUX-EN-Y ANASTOMOSIS IN THE PATHOLOGY OF THE UPPER DIGESTIVE TRACT

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Keywords: gastric resection, gastrectomy, Roux-en-Y loop, postoperative complications, mortality

Abstract: We conducted a retrospective study on 138 patients from a single surgeon's experience with the aim to analyze the different types of gastric resection performed for both benign and malignant diseases of the upper gastrointestinal tract and to compare the different reconstructive techniques using the Roux-en-Y loop and their postoperative complications and mortality. The restoration of the duodenal passage had no negative influence on the postoperative results, while the multivisceral resections, the splenectomy and the palliative resections for gastric carcinoma increased the mean hospital stay and were associated with a higher incidence of complications and mortality. The gastric resection with Roux-en-Y reconstruction is an operation which can be performed in a various range of diseases of the upper gastrointestinal tract, the gastric cancer being nowadays its main indication. Because of the lower rate of postoperative complications, the subtotal gastrectomy is preferred over the total gastrectomy. The splenectomy in the cases of gastric cancers is only required when there are metastatic lymph nodes in the splenic hilum. Multivisceral resections are indicated only when R₀ margins can be obtained. The restoration of the duodenal passage is a feasible alternative method of reconstruction after gastrectomy.

Cuvinte cheie: rezecția gastrică, gastrectomia, ansa în Y a la Roux, complicații postoperatorii, mortalitate

Rezumat: Prezentul studiu retrospectiv, efectuat pe un număr de 138 de pacienți din cazuistica unui singur chirurg, compară diferitele tipuri de rezecție gastrică practicate pentru afecțiuni benigne și maligne ale etajului eso-gastro-duodenal și analizează diferitele posibilități reconstructive folosind ansa în Y a la Roux prin prisma complicațiilor postoperatorii și a mortalității. Re construcția cu reintegrarea duodenului în tranzitul digestiv nu a influențat negativ evoluția postoperatorie a pacienților în vreme ce rezecțiile multiviscerale, asocierea splenectomiei și rezecțiile paleative în cazurile neoplasmelor au crescut durata de spitalizare, incidența complicațiilor și a mortalității. Rezecția gastrică cu reconstrucție prin anastomoză pe ansă în Y a la Roux este o intervenție ce poate fi practică în multiple afecțiuni ale tractului digestiv superior, neoplasmul eso-gastric fiind în prezent principala indicație. Gastrectomia subtotală este de preferat celei totale prin prisma incidenței mai reduse a complicațiilor. Splenectomia în cancerule gastrice se impune doar în prezența adenopatiilor metastatice în hilul splenic. Rezecțiile multiviscerale se indică doar în cazurile în care se pot obține margini R₀. Reintegrarea duodenului este fezabilă ca și metodă alternativă de restabilire a continuității digestive.

INTRODUCTION

Gastric resection is one of the first operations performed in the modern era of general surgery. Its technique and indications, as well as the reconstructive procedure have known multiple changes over the last century. Nowadays, gastric cancer is the main indication for gastrectomy but for several other diseases of the upper digestive tract, gastric resection is indicated, either as first choice or as alternative technique after the failure of other procedures.

PURPOSE

The current study compares different types of gastric resection (hemigastrectomy, 2/3 distal gastrectomy, subtotal gastrectomy, total gastrectomy, degastro-gastrectomy) performed for both benign and malignant diseases of the upper gastro-intestinal tract and analyzes various reconstructive techniques that use the Roux-en-Y loop regarding the postoperative complications, mortality and postoperative

hospital stay, emphasizing the conditions that influence these parameters.

METHODS

The study was conducted in a retrospective manner by studying the records of 138 patients who underwent gastric resection with Roux-en-Y reconstruction in the surgical departments of the Clinical Emergency Hospital Bucharest and Clinical Emergency County Hospital Sibiu between 1984 and 2002, all cases operated by Acad. Prof. Dr. Zeno Popovici. The patients included in this analysis had the following pathology: cancers (gastric, gastric remnant, gastroesophageal junction), peptic ulcers (gastric, duodenal, gastric remnant), caustic stenosis and gastritis (reflux, hemorrhagic, caustic) – see table no. 1. The cancers were divided according to the Siewert classification (1,2) and the peptic ulcers using the Johnson classification.(3)

From the total of 138 patients, 112 (81%) were men and 26 (19%) women, the age ranged from 20 to 78 years old,

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Article received on 20.07.2012 and accepted for publication on 03.09.2012
ACTA MEDICA TRANSILVANICA December 2012;2(4):233-236

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with an average age of 49,8 years old and a 13.8 standard deviation. More than half of the cases were surgical emergencies (77 patients, 55.8%), while the rest of the cases were operated under elective conditions (61 patients, 44.2%). Surgical emergencies consisted of penetration, perforation and hemorrhage. While penetration (6 cases) was present only in the group of peptic ulcers, perforation (29 cases) and hemorrhage (42 cases) were recorded in the group of cancers but also for peptic ulcers and gastritis. Six different types of resection were performed: esophagogastrectomy (n=9; 7%), total gastrectomy (n=18; 13%), subtotal gastrectomy (n=31; 22%), degastro-gastrectomy (n=23; 17%), 2/3 distal gastric resection (n=53; 38%) and hemigastrectomy (n=4; 3%). In the cases of esogastric cancers, lymphadenectomy was routinely performed (most frequent D₂ type) and in some cases multivisceral resections were required (25 patients). For the peptic ulcer, a bilateral truncal vagotomy was associated. In the cases of multivisceral resections, the operations combined with the gastrectomy consisted of: splenectomy (with or without distal pancreatectomy), colectomy (transverse colon resection, left hemicolectomy), cholecystectomy, hepatic resection (atypical resection of segments II and III) and abdominal wall resection. Palliative surgery was performed in 15 patients with advanced gastroesophageal cancers who presented complications (perforation or hemorrhage).

Table no. 1. Postoperative diagnosis

Postoperative diagnosis		No.	
Gastroesophageal cancer	Gastric cancer	30	
	Gastric remnant cancer	6	
	Gastroesophageal junction cancer (Siewert classification)	Siewert I	4
		Siewert II	3
		Siewert III	5
Peptic ulcer	Duodenal ulcer	46	
	Gastric ulcer (Johnson classification)	Johnson I	4
		Johnson II	2
		Johnson III	4
		Johnson IV	8
		Johnson V	1
	Anastomotic ulcer	Reichel-Polya	4
		Pean	7
Hoffmeister		3	
Caustic stenosis	Caustic stenosis	2	
Gastritis	Reflux gastritis	2	
	Caustic gastritis	2	
	Hemorrhagic gastritis	5	

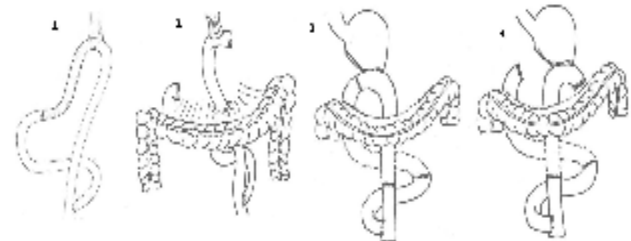
From the total of 138 patients, 112 (81%) were men and 26 (19%) women, the age ranged from 20 to 78 years, with an average age of 49,8 years old and a 13.8 standard deviation. More than half of the cases were surgical emergencies (77 patients, 55.8%), while the rest of the cases were operated under elective conditions (61 patients, 44.2%). Surgical emergencies consisted of penetration, perforation and hemorrhage. While penetration (6 cases) was present only in the group of peptic ulcers, perforation (29 cases) and hemorrhage (42 cases) was recorded in the group of cancers but also for peptic ulcers and gastritis.

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The reconstructive procedures using the Roux-en-Y jejunal loop were classified in two categories each with another 2 subcategories: duodenal bypass procedures (89 cases) – esophagojejunostomy (n=9; 7%) and gastrojejunostomy (n=80; 58%) and procedures with restoration of the duodenal passage esophagojejunoduodenostomy (n=20; 14%) and gastrojejunoduodenostomy (n=29; 21%). The procedures are graphically represented in figure no 1.

Figure no. 1. Reconstruction after gastrectomy: 1. esophagojejunoduodenostomy, 2. esophagojejunostomy 3. gastrojejunoduodenostomy, 4. gastrojejunostomy



RESULTS

From the total of 138 patients, 110 (79.81%) had an uneventful postoperative course. 28 patients developed local or general complications, so the overall morbidity was of 20.28%.

The postoperative complications were divided in surgical and medical complications. The first category comprised: anastomotic leakage (3), duodenal stump leakage (1), abdominal abscess (3), postoperative ileus (3), hemorrhage (2), upper digestive hemorrhage (2), wound complications (infection, evisceration). (6) The medical complications were: bronchopneumonia (3), myocardial infarction (2), intravascular disseminated coagulation (1), acute pulmonary edema (1) and pulmonary embolism. (1) The overall mortality was of 5.07% (7 cases) and it was mainly due to the medical complications (5 cases, 3.62%) and not to the surgical complications (2 cases, 1.45%). The hospital stay was 17 days ± 8.8 days (mean ± standard deviation), varying from 2 to 49 days.

The univariate statistical analysis on all of the patients highlighted the factors with significant influence on the morbidity, mortality and hospital stay. The results are comprised in table no. 2.

Table no. 2. The influence of the perioperative factors on the morbidity, mortality and hospital stay (analysis on the entire series)

Analyzed factor	p-value Morbidity	p-value Mortality	p-value Hospital stay
Patients' age	0,964	0,062	0,413
Emergency surgery	0,311	0,072	0,881
Disease type	0,031	0,463	0,124
Gastric resection type	0,986	0,264	0,047
Restoration of	0,758	0,261	0,614

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the duodenal passage			
Multivisceral resections	0,045	0,028	0,045

A similar univariate analysis was conducted on the patients with cancer (which nowadays is the main indication for gastrectomy). The results are shown in table no. 3.

Table no. 3. The influence of the perioperative factors on the morbidity, mortality and hospital stay (analysis on the cancer group)

Analyzed factor	p-value Morbidity	p-value Mortality	p-value Hospital stay
Patients age	0,252	0,773	0,586
Emergency surgery	0,028	0,009	0,023
Type of gastric resection	0,047	0,046	0,033
Restoration of the duodenal passage	0,682	0,657	0,210
Multivisceral resections	0,038	0,040	0,063
Splenectomy	0,028	0,035	0,036
Palliative surgery	0,045	0,050	0,556
Type of lymphadenectomy	0,669	0,941	0,397
Tumour stage	0,032	0,688	0,069

DISCUSSIONS

The overall morbidity was of 20.28%. The separate analysis of morbidity in the patients with benign and malignant diseases shows a statistically significant difference ($p=0.031$), the incidence of complications in the cancer group being of 31.25%, as compared to the benign diseases group which reached 14.44%. The current literature studies that analyze the morbidity are mainly conducted on patients with gastric cancers. Bonenkamp reports, on a series of 771 patients, a morbidity between 25% and 43% according to the lymphadenectomy type (D_1 or D_2). (4,5) Similar results are published by Cuschieri on a series of 400 patients with a morbidity of 28-46%. (6,7) A study similar to the current analysis, published by Schwarz, analyzes the immediate postoperative course after gastrectomy (total, subtotal, distal or proximal) for both benign and malignant conditions. The morbidity reported by the author was of 41%. (8) We can thus conclude that the morbidity in the present study is comprised between the limits of larger studies in the literature, and that the incidence of postoperative complications is higher for malignant diseases.

Overall, the patient's age, the restoration of the duodenal passage and the emergency surgery had no significant negative influence on the postoperative course, the multivisceral resections on the other hand significantly increasing the complications rate, the mortality and the mean hospital stay.

The mortality was of 5.07%, without any significant difference between the patients with benign and malignant pathology. Regarding the mortality, the literature data is far more heterogeneous as compared to the studies that analyze the morbidity. Different authors report a mortality rate between 1% and 17%, varying according to the design of the study. These studies, conducted mainly on patients operated for gastric cancer, show that metastatic tumour stage, emergency surgery and multivisceral resection are factors with negative influence on mortality. (9,10)

Similarly to the analysis on the whole series, in the cancer group, the patient's age had no statistically significant influence on morbidity, mortality and hospital stay.

Emergency gastrectomy for complicated cancers (perforation, hemorrhage) had a higher morbidity, mortality and hospital stay as compared to the elective procedures. Another factor with a negative influence on these three parameters was the type of gastric resection, these being significantly higher in the total gastrectomy group ($n=26$) compared to the subtotal gastrectomy group ($n=22$). Many other studies on larger series confirm the result obtained through the current analysis. (11,12) Multivisceral resections, performed in order to obtain negative tumour margins, were also associated with higher morbidity and mortality but not with the hospital stay, splenectomy on the other hand significantly increasing all of the three parameters. Multiple prospective randomized studies have demonstrated the negative impact of the splenectomy and the multivisceral resections on the morbidity and mortality, the splenectomy being thus recommended only for positive lymph nodes in the splenic hilum. (13,14) The literature data is less trenchant regarding the multivisceral resections due to the major operative risk these procedures imply. The indications for multivisceral resection must be individually, patient adapted, and performed only in the cases in which an absolute R_0 resection can be obtained. (15,16) Palliative resection and radical resection for metastatic tumour stage, even when a radical cure was obtained, were associated with a high incidence of postoperative complications.

The type of reconstruction after gastrectomy and the procedures with restoration of the duodenal passage had no statistically significant influence on morbidity. The retrospective design of the study did not allow a more detailed analysis of the operative time, late postoperative complications, quality of life. Strictly based on morbidity, mortality and postoperative stay, we can consider the restoration of the duodenal passage a feasible alternative method of reconstruction after gastrectomy.

CONCLUSIONS

The gastric resection with Roux-en-Y reconstruction is an operation that can be performed in various diseases of the upper digestive tract, the gastroesophageal cancer being nowadays its main indication. Subtotal gastrectomy is preferred over total gastrectomy due to the superior postoperative results, provided that local conditions do not impose the second procedure.

Emergency gastrectomy for gastroesophageal cancer is associated with high rates of morbidity and mortality and should be avoided for the cases where the surgical procedure can be delayed. Multivisceral resections for gastric cancer are associated with high incidence of postoperative complications and should only be performed in the cases where a R_0 resection can be obtained. The association of the splenectomy increases morbidity, mortality and the mean hospital stay, thus being indicated only in the cases with metastatic adenopathy in the splenic hilum.

Restoration of the duodenal passage has no negative influence on the postoperative course, the procedures with duodenal passage restoration being feasible as alternative methods of reconstruction of the digestive tract after gastrectomy.

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