

Gastroduodenal Surgery in Cirrhotic Patients - Case Series and Literature Review

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Rezumat

Chirurgia gastroduodenală la pacienții cirofici – studiu clinic și revizia literaturii

Introducere: Au fost identificați factori de risc specifici pentru chirurgia gastroduodenală la pacienții cirofici, ceea ce dictează un management personalizat.

Material și metodă: Studiul retrospectiv a fost realizat în perioada 2012-2019 pe un total de 12 pacienți (7 cazuri de ulcer duodenal, 2 cazuri de ulcer gastric și 3 pacienți cu cancer gastric). Am avut în vedere o serie de factori posibili implicați în evoluția nefavorabilă a pacienților, având ca ghid datele publicate în literatură până în prezent. Pentru a urmări implicarea fiecărui factor, am comparat două grupuri de pacienți, unul cu evoluții nefavorabile, către deces, altul cu evoluții favorabile.

Rezultate: Chirurgia de urgență, prezența ascitei la momentul intervenției, un scor mai mare de 30 MELD, ciroza alcoolică, encefalopatia hepatică și insuficiența hepatică sunt factori frecvenți care se regăsesc în procent ridicat (între 75% și 100%) la pacienții care au avut o evoluție defavorabilă, exitus. Aceiași factori de risc se regăsesc în procente mult mai mici la pacienții care au evoluat favorabil postoperator, majoritatea între 12,5% și 25%.

Discuții și revizia literaturii: Am analizat aspecte preoperatorii, de abordare chirurgicală, complicații și factori de risc pentru acești pacienți, le-am comparat cu rezultatele studiului nostru și am identificat posibilități terapeutice de viitor.

Concluzii: Pentru pacienții CHILD B sau C, indicația intervenției chirurgicale trebuie discutată în prealabil multidisciplinar. Disecția submucoasă endoscopică sau abandonarea disecției D2 sunt de luat în considerare la acești pacienți.

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Cuvinte cheie: chirurgie digestivă, chirurgie gastro-duodenală, ciroză, chirurgie de urgență, gastroenterologie

Abstract

Introduction: Specific risk factors for gastroduodenal surgery in cirrhotic patients have been identified, which dictates for a more personalized management.

Material and method: The retrospective study was conducted between 2012-2019 on twelve patients (7 cases of duodenal ulcer, 2 cases of gastric ulcer and 3 patients with gastric cancer). We took into account a number of possible factors involved in the unfavorable evolution of patients, based on data published in the literature so far. In order to follow the involvement of each factor we compared two groups of patients, one with unfavorable evolutions, exitus and another with favorable evolutions.

Results: Emergency surgery, the presence of ascites at the time of intervention, a higher than 30 MELD score, alcoholic cirrhosis, liver encephalopathy and liver failure are common factors that are found in a high percentage (between 75% and 100%) in patients who have had an unfavorable evolution, exitus. The same risk factors are found in much lower percentages in patients who have evolved favorably postoperatively, most between 12.5% and 25%.

Discussions and literature review: We analyzed preoperative aspects, surgical approach, complications and risk factors for these patients, compared them with the results of our study and identified future therapeutic possibilities.

Conclusions: For CHILD B or C patients, the indication for surgery should be discussed in advance with a multidisciplinary team. Endoscopic submucosal dissection or discontinuation of D2 dissection should be considered in these patients.

Key words: digestive surgery, gastro-duodenal surgery, cirrhosis, emergency surgery, gastroenterology

Introduction

Digestive surgery in cirrhotic patients has long been limited to the treatment of disorders related to the liver disease (portal hypertension, hepatocellular carcinoma and umbilical hernia). The improvement in the management for cirrhotic patients has allowed an increase in surgical procedures for extrahepatic disorders. These indications now extend to other nonspecific digestive conditions of the cirrhotic patient (colorectal pathology, biliopancreatic pathology, esophago-gastro-duodenal pathology).

Several specific risk factors for gastro-duodenal surgery in cirrhotic patients have been identified, which dictates a customized management, which is mandatory for obtaining good results for this category of patients. These

factors are respiratory impairment (pleural effusion, hepatopulmonary syndrome, chronic obstructive pulmonary disease), renal failure (hepatorenal syndrome in the context of cirrhosis), hemostasis disorders (low prothrombin ratio, platelet disorder, thrombocytopenia), malnutrition, immunosuppression, or preexisting cardiovascular failure (1).

At present, it is considered that more than 10% of the cirrhotic patients will undergo surgery for a digestive disorder (1), where gastro-duodenal pathology plays an important role. Therefore, it is decisive to quantify and clarify the management attitude of the cirrhotic patients undergoing surgery in the gastro-duodenal sphere, both by knowing and gathering the results and conclusions of the studies existing in the literature at this time, as well as by confronting them with our own experience.

Material and Method

In order to realize where we are in our surgical service regarding the subject of this work, as well as to compare the results with the other studies presented below, we decided to conduct a retrospective study of our own. Even though we had few patients eligible during the respective period, we used our results for comparisons and discussions related to the data from the literature. The study was performed between 2012-2019 on 12 patients. Thus, we included 9 patients with perforated ulcer and liver cirrhosis (7 cases of duodenal ulcer and 2 cases of gastric ulcer). All patients with perforated ulcer were operated in emergency. We also included in this study three patients with gastric cancer and Child A stage cirrhosis, from the scheduled interventions.

To track differences, we compared two groups of patients. The first group was represented by patients operated for gastroduodenal pathology (perforated ulcer or gastric cancer) with unfavorable evolution, taking into account the 4 deceased patients; and the second one, which consisted in patients operated for the same pathology, with favorable evolution, respectively 8 patients operated for perforated ulcer or gastric cancer. We compared the two groups, taking into consideration a number of possible factors involved in the unfavorable evolution of patients, having as a guide the data published in the literature up to the present moment. The factors we studied: CHILD score (scoring system used to determine the prognosis of cirrhosis and need for liver transplantation), emergency of the intervention, MELD (model for end stage liver disease) score >30, the presence of alcoholic cirrhosis, hepatic encephalopathy and hepatic insufficiency.

Results

The results showed that for the patients with perforated ulcer, the stages of cirrhosis were Child A - 1 patient, Child B - 3 patients, Child C - 5 patients. Interventions performed were:

4 perforation sutures (2 of which laparoscopic), 4 excisions of the ulcer and one antrectomy in one Child B patient. Overall mortality was 44.4% (4/9) all deaths being in the Child C group. Mortality in Child C group was 80% (4/5). Both percentages are in accordance with the studies presented in the literature (2).

We also included in the study three patients with gastric cancer, all with cirrhosis in Child A stage. All patients with gastric cancer benefited from scheduled interventions. The interventions performed were the following: 1 total gastrectomy, 1 total oesogastrectomy, 1 gastrostomy. In these patients, there was no morbidity or mortality.

Table 1 presents certain risk factors for unfavorable evolution in this category of patients, as well as their degree of involvement, for each category of patients. We can observe in *Table 1* that the factors for unfavorable evolution were constantly present in percentages ranging between 75% and 100% in patients who died, while their presence was much lower in patients with favorable post-operative evolution. Therefore, analyzing the table, we notice that if we exclude the emergency aspect of the intervention in the group with favorable evolution the risk factors range from 12% to 25%.

Discussion and Literature Review

Regarding preoperative management, if the weight loss of the cirrhotic patient is greater than 10% of body weight, enteral nutrition should be initiated (3). For the respiratory complications, preoperative respiratory phys-

Table 1. Mortality risk factors (MRF) incidence

MRF for study group (12 operated cirrhotic patients)	MRF incidence for the group with unfavorable outcome (4 deaths) No (%)	MRF incidence for the group with favorable outcome (8 survivors) No (%)
Emergency	4 (100%)	5 (62,5%)
Preexistent ascitis	3 (75%)	1 (12,5%)
MELD score >30	4 (100%)	1 (12,5%)
Alcoholic cirrhosis	3 (75%)	2 (25%)
Encephalopathy	3 (75%)	1 (12,5%)
Liver failure	4 (100%)	1 (12,5%)

iotherapy is recommended (3). A cardiological examination should be performed for cardiovascular impairment (3). Hepatic biopsy puncture is to be discussed in patients requiring surgery who have cytotoxicity, because alcoholic hepatitis is a common cause of postoperative mortality (4). Assessment of liver fibrosis could be performed by noninvasive measurement of liver elasticity with the fibroscanner. Presence of ascites should be investigated by means of preoperative imaging methods. Grade I or II oesophageal varices without a history of recurrent gastrointestinal bleeding do not contraindicate surgical intervention and have little effect on preoperative management (1).

Transjugular intrahepatic shunt (TIPS), a portocaval diversion procedure may be performed before gastroduodenal surgery. Contraindications for TIPS are encephalopathy, heart failure, thrombocytopenia of hypersplenism. By performing this procedure, the oesogastric or perigastric varices, which are determined by the portal hypertension, decrease in size and the surgical intervention is less hemorrhagic. The complications of TIPS are hemorrhage, haemobilia, and encephalopathy. Therefore, TIPS, as a neoadjuvant for gastric cancer surgery, remains a marginal indication for recurrent gastrointestinal bleeding and refractory ascites (5).

The preferred approach in the cirrhotic patient is laparoscopy because of the least parietal venous sacrifice, a decrease in the frequency of ascites, a decrease in the number of infections and the length of hospital stay (6, 7). If the laparoscopic approach is deemed impossible, then transverse incisions that are less often associated with ascites, leakage and subsequent herniation should be preferred. It is necessary to make a meticulous hemostasis. Unnecessary dissection of the tissues should be avoided.

The patient without ascites and in whom the intervention does not require drainage should not be drained (drainage is a risk factor for ascites and superinfection of the ascites fluid). If drainage is necessary, it is preferable to use a suction drainage (Redon

type) which must pass through the baffled wall to avoid ascites leakage through these openings (8,9). A parietal prosthesis can be placed if necessary.

The presence of intraoperative ascites requires systematic removal of ascites for bacteriological examination. Intraoperative antibiotic prophylaxis is not specific.

In the postoperative period, weight and umbilical perimeter monitoring is implemented (fundamental in the undrained patient). The resumption of food is early with a hydrosoduced restriction. Hepatotoxic or nephrotoxic drugs should be prescribed with caution. Any diuretics prescribed preoperatively are continued immediately postoperatively. Antibiotic prophylaxis of superinfection of ascites fluid is required in these cirrhotic patients.

If drains have been placed, they must be removed quickly (classically around day 5, date of cicatrization of the peritoneum) (1).

In case of persistent ascites leakage after drain removal, proper treatment of ascites and local hygiene could lead to a closure of the tract (9).

When renal or hepatocellular insufficiency occurs, we must look for an infection or toxic drugs and the patients should be transferred to a gastroenterological resuscitation unit.

In the postoperative period, many complications may occur. Ascites frequency is estimated at 20% and is influenced by the presence of ascites intraoperatively, the drainage of the abdominal cavity or extensive dissection of the hepatic pedicle, as in loco-regional dissection for stomach cancer (10, 11, 12). Most often, it is transient and lasts between 5 to 7 days. Ascites of great abundance, persistent, without major hepatocellular insufficiency and excepting chylous ascites it is hard to treat. In this case, superinfection of ascites fluid or renal failure should be investigated.

The frequency of infections is estimated at 20-40% in the cirrhotic patient (13), in particular when opening the digestive tract or a perforated ulcer is being operated (unlike biliary or parietal surgery). Factors favoring abdominal infections in cirrhotic patients are abdominal drainage, opening of the digestive

tract and emergency surgery (10). Infection is the leading cause of death and the lung is a preferred site of infections (11).

Renal failure appears in 10% of patients (10), most often in combination with ascites. The origin of renal failure is functional simple or fit in the context of a hepato-renal syndrome. Can also be organic, related to a drug nephrotoxicity. Renal failure should always be prevented if possible. Its appearance is a sign of gravity. In addition, renal failure is an independent risk factor for mortality.

Respiratory complications are very common in cirrhotic patients (up to 10%) (14). If the intervention is scheduled, then preoperative respiratory physiotherapy is recommended. Transverse or subcostal approaches reduce respiratory complications after digestive surgery.

Gastrointestinal hemorrhage is ultimately rare after gastroduodenal surgery in cirrhotic patients and occurs in less than 5% of patients. It is difficult to distinguish between upper gastrointestinal bleeding associated with rupture of esophageal varices and a stress ulcer. The strategy for preventing bleeding from oesophageal varices is most often implemented before the procedure when patients are referred to the surgeon. Intraperitoneal hemorrhage, by perigastric or periviscular variceal rupture, is much rarer but may be responsible for major bleeding associated with high mortality (15).

Complications of the abdominal wall are represented by wall abscess and leakage of ascites fluid through the abdominal wall (2%), which is a risk factor for the infection of the ascites fluid. The sutures are classically made overlapped in the cirrhotic patient. Drainage does not prevent complications. Care must be taken not to remove the stitches too early (classically after 21 days). Finally, cirrhosis (mostly ascites) is a risk factor for incisional hernia (16,17).

We considered a number of possible factors involved in the unfavorable evolution of patients (mortality risk factors - MRF), having as a guide the data published in the literature up to the present moment.

1. Child Score mortality after digestive surgery (1):

- 10% in Child A patients,
- 30% in Child B patients,
- 82% in Child C patients (noting that patients in this group are operated only in emergency).

2. The MELD score (model for end stage liver disease) was validated as a predictor of mortality after non-hepatic digestive surgery (8). This score takes into account the INR, the total bilirubin, and the creatinine. A MELD score of 25 means a probability of death of 35%, and a MELD score of 30 means 58% probability of death after digestive surgery (8).

Other parameters influence mortality:

3. The emergency of the intervention - the mortality goes from 18% when the intervention is programmed (chronic patients) to 50% for emergency surgery (18).

4. The nature of the intervention - opening of the digestive tract (1).

5. Postoperative liver failure is one of the leading causes of mortality in the cirrhotic patient with a mortality increased from 1.2% to 59%. Therefore, it is necessary to track what causes hepatocellular insufficiency, to look for an ascites fluid infection, bacteriological analysis of drainage liquids and imaging tests (contrast MRI scan, digestive opacification if anastomoses have been performed).

The incidence of PU (peptic ulcer) in cirrhotics is 11.3% Tabaqchali et al. (19), and 8-20% Dudrick et al. (20) Surgical treatment is reserved for emergencies. Rate of acute complications of cirrhotic ulcer is 23% Dudrick et al. (20) and 23-64% Lehnert et al. (21). Within the limits of the local possibilities, the stage of the acute affection, in all cirrhotic patients irrespective of the CHILD stage, but especially in the CHILD B and C ones, it is recommended to perform a simple intervention, the most recommended being the simple laparoscopic or classical suture.

Postoperative complications of peptic ulcer surgery in cirrhotic patients are ascites, encephalopathy, digestive bleeding, hepato-

cellular insufficiency, hepato-renal syndrome or CID. Complications related to cirrhosis account for more than 75% of all complications. For the Child C patients the mortality rate is higher than 40% in all the studies mentioned above.

A.Y. Ikeda et al. (22) published a study in 2009, with D2 gastric resections in cirrhotic patients, 25 patients in stage CHILD A and 10 patients in stage CHILD B. In the first group of patients, morbidity was 6.7% and there was no mortality, so there were no significant differences compared to other patients in whom the same surgery was performed. The situation was very different for the CHILD B group, where the morbidity was much higher (40%) and the mortality was 10% (1 patient with associated hepatocellular carcinoma, who has developed hepatocellular insufficiency).

Jun Ho Lee et al. (23) publishes in 2005 a study in which gastrectomy with D2 lymph node dissection for carcinoma of the stomach was performed in 94 patients with histologically proven hepatic cirrhosis. Thirty-seven patients (39.4%) experienced postoperative complications, mortality being 2.1% (1 patient Child B and 1 patient Child C), the conclusion of the study is, however, that gastrectomies with D2 lymph dissection can be successfully performed in patients with cirrhosis in CHILD A stage, with the same results as in ordinary patients.

In these contexts, there is some discussion regarding the possibility of giving up D2 dissection in cirrhotic patients with a CHILD B score, and for those in the CHILD C stage the current tendency is to opt out of major surgery, choosing palliative treatment.

A very recent variant proposed for cirrhotic patients with gastric cancer in early stages is submuscular endoscopic dissection (DES) which is performed for tumors that invade the mucosa or submucosa. The important step forward for patients with cirrhosis associated with gastric cancer was to propose for these patients to extend DES indications for tumors with a maximum diameter of 40 mm. In this way, many surgical interventions with the related risks would be avoided. In the *Table 2*, Repici et al. (24) present a study comparing

the groups of cirrhotic patients in whom endoscopic submucosal dissection (DES) was performed. As can be seen in *Table 2*, the results were excellent, with the reduced incidence of complications, represented by a single perforation and some cases of local hemorrhages, which were also resolved endoscopically (24-27).

According to the up-to-date data presented in the literature review, we took into account the main risk factors for mortality in cirrhotic patients operated for a digestive disorder, comparing two groups of patients with favorable and unfavorable outcome. Analyzing *Table 1*, we can see very clearly that the data obtained by us, although on limited number of patients, corresponds with those of the specialized literature.

Thus, emergency surgery, intraoperative ascites, a higher than 30 MELD score, alcoholic cirrhosis, hepatic encephalopathy and hepatic insufficiency are common factors found in high percentage in patients who have had an unfavorable evolution, exitus (between 75% and 100%). The same risk factors are found in much lower percentages in patients who have evolved favorably postoperatively, the majority between 12.5% and 25%, only the emergency surgery factor being met in 62.5% of the patients in this group.

Conclusions

For CHILD B or C patients the indication for scheduled interventions should be discussed

Table 2. Comparative studies with endoscopic submucosal dissection (DES) in cirrhotic patients

STUDY	Choi	Ogura	Kwon	Repici
Mean lesion size; (range) mm	14 (ND)	18 (5-34)	NA	30 (20-40)
Number of lesions removed	23	18	22	5
R0 resection	21 (91.3)	16 (88.9)	19 (86.4)	5 (100)
Time; Mean $\pm$ SD; (range) min	41 $\pm$ 26.1	70 (10-450)	35	101 (75-130)
Bleeding (%)	1 (4.3)	3 (16.7)	2 (9.1)	2 (33.3)
Perforation (%)	0	0	1 (1.45)	0
Recurrence at follow-up	None	None	NA	None

with a multidisciplinary team beforehand. Palliative endoscopic procedures may be the choice for those patients.

We propose the quantification of the data in clearly defined protocols for each of the CHILD categories of cirrhosis, in patients who have a gastro-duodenal disease, or will benefit from an intervention in this area.

The first choice for abdominal access in the cirrhotic patient is laparoscopy (to be performed for perforation ulcer). If the first laparoscopic approach is impossible, transverse incisions are preferred, which are less commonly associated with ascites leakage and subsequent herniation.

Drainage should be avoided, if possible, in patients without ascites.

Further studies are necessary to decide whether to abandon the D2 dissection in cirrhotic patients with a CHILD B / C score, or even abandon surgery for CHILD C category altogether and choosing a palliative, non-surgical treatment method.

In the cirrhotic patients with early gastric cancer DES may become the standard in the future, for tumors that invade the mucosa or submucosa up to a maximum diameter of 40 mm.

Conflict of Interest

The authors declare no conflicts of interests.

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