



MULTIVISCERAL RESECTIONS IN CASES OF LOCALLY ADVANCED GASTRIC CANCER. PERIOPERATIVE RESULTS IN A HIGH-VOLUME CENTER

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SUMMARY

Introduction. At the time of diagnosis, gastric cancer is usually an advanced disease. This is related to poor prognosis. Despite of reported improvement of perioperative results after neoadjuvant therapy In cases of locally advanced disease without evidence of distant metastases, only multivisceral resections may be considered as an attempt to achieve better outcome. Typically, these are very challenging surgical interventions involving different organs in the supramesocolic part of the abdominal cavity, requiring great practical experience from the surgical team with potential risks of serious complications.

Aim. To analyze the perioperative results in a group of 59 patients with multivisceral resections of locally advanced T4 gastric cancer without data of distant metastases in hepatobiliary and pancreatic surgery clinic with a large volume of activity.

Material and method. This report is based on a series of 59 patients operated in the Hepato-biliary, Pancreatic and General Surgery Department with T4 locally advanced gastric carcinoma and performed multivisceral resections. This series is subject to a retrospective study.

Results. All patients in the reported group had macroscopic involvement of adjacent organs or anatomical structures without evidence of distant peritoneal or liver dissemination. 36 (61.0%) men and 23 (39.0%) women between the age of 23 and 79 were operated on. Pancreatic resections were performed in 38 (64.4%) patients. In the study group, 2 patients died, with a perioperative mortality rate of 3.3%. Perioperative complications were recorded in 13 patients (22.0%). The most common complication is the postoperative development of pancreatic fistula. The median hospital stay is 10.7 days.

Conclusion. In selected patients, multivisceral resections for locally advanced gastric cancer by an experienced HBP surgical team are associated with acceptable perioperative outcomes in terms of complications and mortality.

Keywords: multivisceral, gastric resection, gastric cancer, radical,

INTRODUCTION

Gastric cancer is one of the most common malignancies worldwide and, unfortunately, is associated with poor prognosis. It is a more common disease in East Asia. Western civilization ranks fifth in the incidence of oncological diseases. The disease affects elderly patients, but it is also observed in young individuals. In recent years, there has been a trend toward more proximal localization in the stomach and decrease in the age of affected patients. A curative surgical resection is the only therapeutic approach than can lead to better outcomes. Palliative surgery, as well as chemotherapy alone, can prolong life expectancy or overcome complications but are generally associated with a poor prognosis. Nowadays, neoadjuvant regimens of peritoneal chemotherapy may influence and improve results. Despite this, after neoadjuvant therapy, locally advanced disease is common. In patients with locally advanced gastric cancer, lack of improved distant metastases, performing multiple organ resections for surgical radicality seems to be the best strategy to improve the prognosis. On the other hand, multi-organ resections in the supramesocolic part of the abdominal cavity are a challenge for the surgeon and are associated with a high incidence of perioperative complications and mortality. There is a discussion in the literature on indications and patient selections when planning such an approach. Sometimes, it is very hard to evaluate the operability of locally advanced gastric cancer. Significant experience in hepatobiliary and pancreatic surgery is required for the assessment and performing multi-organ resections because the pancreatic involvement of the primary process is observed with high frequency. This study is based on multi-organ resections performed in a specialized hepatobiliary and pancreatic surgery clinic.

AIM

To analyze the perioperative results of multivisceral resections in a group of 59 patients with T4 locally advanced gastric cancer without distant metastasis or peritoneal dissemination to achieve surgical radicality in a specialized hepatobiliary and pancreatic surgery clinic.

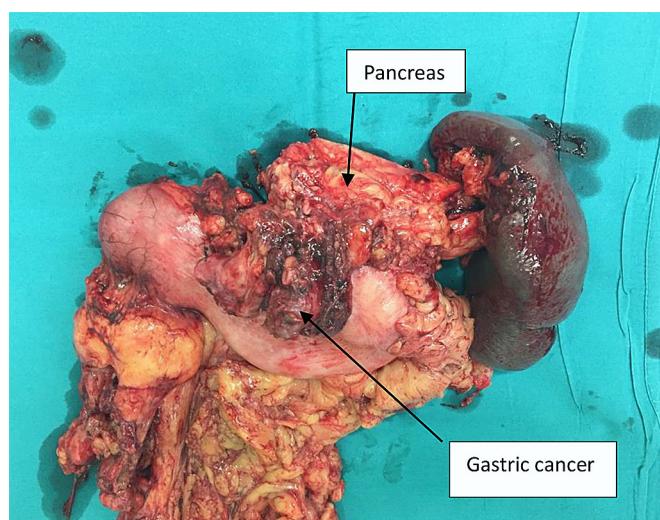
MATERIAL AND METHOD

This study is based on a group of 59 patients with locally advanced gastric cancer with no evidence of distant metastasis or peritoneal dissemination operated at the Clinic of Liver Biliary, Pancreatic and General Surgery at Achibem City Clinic UMHAT "Tokuda Hospital" Sofia for the period of ten years. The study is based on a retrospective analysis of patients with established criteria of macroscopic engagement from the primary process of at least one adjacent organ or anatomical element in the absence of distant dissemination. Different gastric resections were performed with standard D2 lymphadenectomy and resection of the involved by the macroscopic process adjacent organs and anatomical structures.

RESULTS

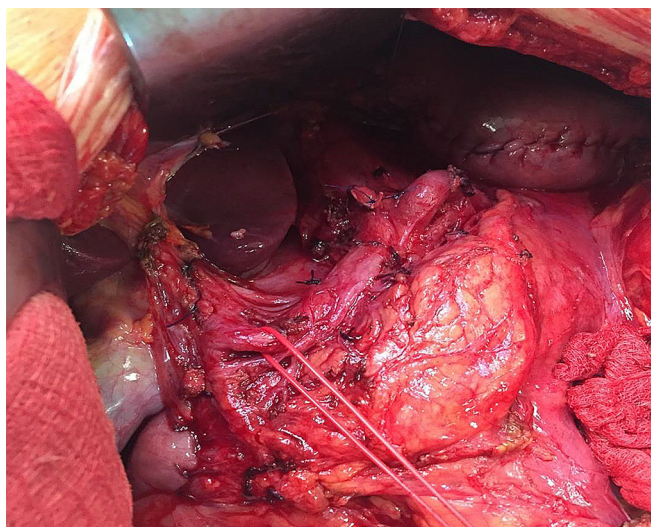
In the group of 59 patients, the gender distribution is as follows: 36 (61.0%) men and 23 (39.0%) women. The average age in the group is 61.5 years (23 - 79 years old). In the presence of macroscopic infiltration to an adjacent organ or anatomical element, we aim to perform resection without violating the adherent to the tumor surface of the affected organ. (Fig. 1).

Fig. 1. Specimen of the multivisceral resection for locally advanced gastric cancer with involvement of pancreatic gland.



When it is possible to perform multivisceral resection, a standard D2 lymphadenectomy is mandatory. (Fig. 2).

Fig. 2. D2 lymphadenectomy after distal gastrectomy and transverse colon resection for locally advanced gastric cancer.



Various interventions have been performed on the stomach. Total gastrectomy was performed in 27 patients. Distal gastrectomy was performed in 23 patients, and a proximal subtotal gastrectomy was made and in 9 - depending on the primary localization of the malignant process. Surgical interventions are performed on all organs in the supramesocolic part of the abdominal cavity. Table. 1 shows the incidence of macroscopic tumor invasion of adjacent organs and anatomical elements by gastric cancer:

Table 1. Interventions on organs in the supramesocolic part of the abdominal cavity.

Organ	N	Organ	N
Pancreas	38	Liver	8
Transverse mesocolon	11	Diaphragm	2
Transverse colon	14	Anterior abdominal wall	1
Left adrenal gland	3	Small intestine	1
Spleen	27	Gallbladder	3

The most frequent interventions affected the pancreas due to macroscopic infiltration from the stomach cancer. Nineteen anatomic resections were performed - left subtotal pancreatectomies, hemi-pancreatectomies, pancreas tail resections. In one patient, distal subtotal gastrectomy with Whipple procedure in case of massive infiltration in the head of the pancreas was performed. In the remaining 19 patients - partial excision of the pancreas in the infiltration area was performed. Liver resections are related to direct infiltration of the liver capsule and parenchyma. In 2 patients, left lateral sectionectomy was performed.

In 37 patients (62.7%), the histopathological diagnosis revealed the presence of poor- or undifferentiated gastric cancer.

Postoperative complications were reported in 13 (22%) patients. Two patients died from surgical complications. The perioperative mortality rate is 3.3%. One patient died due to insufficiency of the gastro-jejunostomy after distal gastrectomy and left pancreatectomy. One died from perforation of the resected stomach.

With the highest incidence, complications associated with pancreas resections have been observed. The group has 4 postoperative pancreatic fistulas Grade A proven by a pancreatic amylase assay from the drains. Another 5 patients were discharged with abdominal drains and suspected secretion but without a proven pancreatic fistula. In all patients, after spontaneous discontinuation of secretion, the drains were extracted without the need for an operational revision. Therefore, the level of the pancreatic fistula is (6.7% - 15.2%).

In three patients in the postoperative period, pleural effusions requiring draining were observed, postoperative upper gastrointestinal haemorrhage was conservatively controlled. Biliary leakage is recorded after liver resection is treated conservatively. One patient has destructive cholecystitis. Pneumonia with the development of respiratory failure was registered in two patients. One patient developed diabetes after a left-side resection of the pancreas. A surgical site infection requiring drainage was recorded in one patient.

The average hospital stay is 10.7 days for the study group.

DISCUSSION.

Gastric cancer at the time of diagnosis is usually an advanced disease [1, 2]. Complications such as chronic hemorrhage and symptoms of pyloric and distal gastric obstruction are usually associated with a higher risk of local involvement of adjacent organs and anatomical elements [3, 4]. Gastric cancer is a loco-regional disease with an 80% risk of recurrence in patients with T4 serosa-positive disease. The recurrences usually occur locally - in adjacent organs and anatomical structures, retroperitoneal space, anastomosis or lymph nodes [5]. Strategies targeting the prevention of local recurrence include surgical techniques of resections of the stomach and adjacent organs and anatomical structures with regional lymphadenectomy, such as the prevention of late lymphogenic dissemination in cases of local disease [6-8]. Performing multivisceral resections in locally advanced gastric carcinoma without evidence of distant metastases is an appropriate strategy in an attempt to achieve surgical eradication [9]. In selected patients, the block multi-organ resection was accompanied by acceptable levels of perioperative complications and mortality [10, 11]. Although, according to a review, literary data are controversial and variable in terms of perioperative mortality [0-15%] and morbidity rate - 11.8 - 90.5% [12]. There is a consensus that performing multivisceral resections is justified only when it is possible to achieve surgical R0

resection [9, 12, 13, 14]. A study [15] shows that comparative analysis of perioperative data in groups of patients with multi-organ resections, gastric resections and palliative operations has achieved perioperative mortality rates of 2.7% and a level of complications of 25.3 %, which are statistically higher than in gastric resections without intervention on adjacent organs - 0.4% mortality; 8.1% morbidity. The data on the type of gastric resection performed were comparable to the current patient series - 9.3% proximal resections, 38.7% distal and 52% total gastrectomies. The authors reported that in the group, the prevalence of poor- and undifferentiated gastric cancer was 81.3%. It is noteworthy that in the literature series [15], the authors report 13.3% of pancreas interventions compared to 64.4% in the present. This is also the reason for pancreatic fistula development of 7.0-15.7% compared to 0.75% indicated in the literature.

Yang et al. [16] report acceptable perioperative morbidity and mortality rate in multivisceral resections for locally advanced gastric cancer with higher five-year survival compared to palliative surgery. Authors identified independent prognostic factors as R+ margin, less than 15 dissected lymph nodes, vascular tumor emboli.

According to some studies [18], the mean life expectancy after multivisceral resections and achieved R0 resection is 34 months, significantly higher survival rates than for palliative surgery or conservative therapy alone. Despite the multimodal character of modern therapy for local gastric cancer and adequately performed surgery, only about 30% of patients live more than 3 years [18]. Tang S, et al. [17] report higher long term survival after proximal gastrectomy compared with total gastrectomy in the course of multivisceral resections for locally advanced disease with proximal localization in the stomach. Aversa JG, et al. [19] demonstrate the safety and long-term feasibility of the multivisceral resections performed in high volume centers and advocate referral of patients in such institutions. Preoperative identification of the risk factors related to postoperative complications is very important. Shimoda Y, et al. [20] demonstrate a higher incidence of perioperative complications in patients with a Glasgow prognostic score of 1/2 compared with a 0 score.

CONCLUSION.

Locally advanced T4 cases without evidence of distant metastases are a challenge for the surgical team because only multivisceral resections can achieve R0 resection related with good long-term survival. The need for organ resections in the supramesocolic part of the peritoneal cavity during block resection is associated with the risk of serious complications. Performing such interventions in high volume center would allow a proper assessment of the possibilities for multi-organ resections and are related to acceptable levels of perioperative complications and mortality.

REFERENCES:

1. Xiao H, Xie P, Zhou K, Qiu X, Hong Y, Liu J, et al. Clavien-Dindo classification and risk factors of gastrectomy-related complications: an analysis of 1049 patients. *Int J Clin Exp Med*. 2015 May 15;8(5):8262-8. [PubMed]
2. Carboni F, Lepiane P, Santoro R, Lorusso R, Mancini P, Sperduti I, et al. Extended multi-organ resection for T4 gastric carcinoma: 25-year experience. *J Surg Oncol*. 2005 May 1;90(2):95-100. [PubMed]
3. Watanabe A, Maehara Y, Okuyama T, Kakeji Y, Korenaga D, Sugimachi K. Gastric carcinoma with pyloric stenosis. *Surgery*. 1998 Mar;123(3):330-4. [PubMed]
4. Lee HJ, Park DJ, Yang HK, Lee KU, Choe KJ. Outcome after emergency surgery in gastric cancer patients with free perforation or severe bleeding. *Dig Surg*. 2006 Oct;23(4):217-223. [Crossref]
5. Gunderson LL, Sosin H. Adenocarcinoma of the stomach- areas of failure in a reoperation series (second or symptomatic look). Clinicopathological correlation and implications for adjuvant therapy. *Int J Radiol Oncol Biol Phys*. 1982 Jan;8(1):1-11. [PubMed]
6. Rajdev L. Treatment options for surgically resectable gastric cancer. *Curr Treat Options Oncol*. 2010 Jun;11(1-2):14-23. [PubMed]
7. Cho BC, Jeung HC, Choi HJ, Rha SY, Hyung WJ, Cheong JH, et al. Prognostic impact of resection margin involvement after extended (D2/D3) gastrectomy for advanced gastric cancer: a 15-year experience at a single institute. *J Surg Oncol*. 2007 May 1;95(6):461-8. [PubMed]
8. Sasako M, Saka M, Fukagawa T, Katai H, Sano T. [Adjuvant chemotherapy using S-1 for curatively resected gastric cancer-the nationwide clinical trial]. [in Japanese] *Gan To Kagaku Ryoho*. 2006 Jun;33 Suppl 1:110-6. [PubMed]
9. Min JS, Jin SH, Park S, Kim SB, Bang HY, Lee JI. Prognosis of curatively resected pT4b gastric cancer with respect to invaded organ type. *Ann Surg Oncol*. 2012 Feb;19(2):494-501. [PubMed]
10. Tran TB, Worhunsky DJ, Norton JA, Squires MH 3rd, Jin LX, Spolverato G, et al. Multivisceral Resection for Gastric Cancer: Results from the US Gastric Cancer Collaborative. *Ann Surg Oncol*. 2015 Dec;22 Suppl 3:S840-7. [PubMed]
11. Martin RC 2nd, Jaques DP, Brennan MF, Karpeh M. Extended local resection for advanced gastric cancer: increased survival versus increased morbidity. *Ann Surg*. 2002 Aug;236(2):159-65. [PubMed]
12. Brar SS, Seevaratnam R, Cardoso R, Yohanathan L, Law C, Hleyer L, Coburn NG. Multivisceral resection for gastric cancer: a systemic review. *Gastric cancer*. 2012 Sep;15 Suppl 1:S100-7. [PubMed]
13. Pacelli F, Cusumano G, Rosa F, Marrelli D, Dicosmo M, Cipollari C, et al. Multivisceral resection for locally advanced gastric cancer: an Italian multicenter observational study. *JAMA Surg*. 2013 Apr;148(4):353-60. [PubMed]
14. Thakur B, Devkota M, Sharma A, Chaudhary M. Evidence Based Surgical Approach to Locally Advanced Gastric Cancer. *J Nepal Health Res Conc*. 2019 Aug 4;17(2):133-140. [PubMed]
15. Yang Y, Hu J, Ma Y, Chen G, Liu Y. Multivisceral resection for locally advanced gastric cancer: A retrospective study. *Am J Surg*. 2021 May;221(5):1011-1017. [PubMed]
16. Xiao H, Ma M, Xiao Y, Ouyang Y, Tang M, Zhou K, et al. Incomplete resection and linitis plastica are factors for poor survival after extended multi-organ resection in gastric cancer patients. *Sci Rep*. 2017 Nov 17;7(1):15800. [PubMed]
17. Tang S, Liu F, Li Y, Zhao L, Wang X, Khan SA, et al. Treatment selection and survival outcomes in locally advanced proximal gastric cancer: a national cancer data base analysis. *Front Oncol*. 2020 Sep 25;10:537051. [PubMed]
18. Mongan AM, Kalachand R, King S, O'Farrell NJ, Power D, Ravi N, et al. Outcomes in gastric and junctional cancer using neoadjuvant and adjuvant chemotherapy (epirubicin, oxaliplatin, and capecitabine) and radical surgery. *Ir J Med Sci*. 2015 Jun;184(2):417-23. [PubMed]
19. Aversa JG, Diggs LP, Hagerty BL, Dominguez DA, Ituarte PHG, Hernandez JM, et al. Multivisceral resection for locally advanced gastric cancer. *J Gasst Surg*. 2021 Mar;25(3):609-622. [PubMed]
20. Shimoda Y, Fujikawa H, Komori K, Watanabe H, Kano K, Yamada T, et al. Preoperative utility of the Glasgow prognostic score on outcomes of patients with locally advanced gastric cancer. *J Gastrointest Cancer*. 2022 Jun;53(2):265-271. [PubMed]

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