ABCDDV/776

ABCD Arq Bras Cir Dig
2011;24(2): 126-130

Original Article

POSTOPERATIVE COMPLICATIONS AFTER TOTAL GASTRECTOMY IN THE GASTRIC CANCER. ANALYSIS OF 300 PATIENTS

Complicações pós-operatórias após gastrectomia total no câncer gástrico. Análise de 300 doentes

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ABSTRACT - ***Background*** - A total gastrectomy is considered a procedure with a high level of complexity, has high complication rates, both local and general, because patients are mostly with clinical conditions and nutritional compromised by disease. ***Aim*** - To analyse the results and complications of the total gastrectomy in gastric cancer in the period from 1972 to 2007. ***Methods*** - Were reviewed the medical records of 300 patients with gastric adenocarcinoma, divided into two periods: from 1972 to 1992 - comprising 108 patients (36%) and from 1993 to 2007 - comprising 192 patients (64%). They were 67.3% males, 70.7% whites, with ages ranging from 25 to 86 years (mean 63.4 years). The lesions were located in cardia - 40 cases (13.3%), gastric fundus - 83 cases (27.6%), gastric body - 77 cases (25.6%); plastic linitis- 45 cases (15%); gastric stump - 33 cases (11%) and antrum and body gastric - 22 cases (7.3%). A total gastrectomy with extended lymphadenectomy to level D2 was performed in 246 cases (82%). ***Results*** - The reconstruction technique used was the esophagus-jejunal anastomosis end-to-side Roux-en-Y in 257 patients (86.7%). The general complications in the period from 1972 to 1992 totalized 47 cases (43.5%), mainly involving the respiratory (28 cases - 25.9%) and urinary tract (10 cases - 9.2%). In the period from 1993 to 2007 amounted to 48 cases (25%), mainly respiratory complications (27 cases - 14%), followed by urinary (12 cases - 6.2%). The local complications from 1972 to 1992 totalized 45 cases (30.8%) and in the period from 1993 to 2007 amounted to 28 cases (14.5%), being the most frequent the digestive fistulas. The operative mortality through 30 days was 18 cases (6%), while in the period from 1972 to 92 a total of 12 cases (11.1%) and in the period from 1993 to 2007 were 7 cases (3.6%). ***Conclusions*** - Total gastrectomy is a procedure that requires a skilled surgeon, his team, using an improved surgical technique to minimize postoperative complications. The postoperative complications requiring care in controlling infections, airway and nutritional care, reducing mortality, increasing survival and contributing to quality of life of patients.

HEADINGS - Gastric adenocarcinoma. Total gastrectomy. Complications. Digestive fistula.

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Source of funding: none
Conflict of interest: none

Received: 08/12/2010
Accepted for publication: 04/02/2011

RESUMO – ***Racional*** - A gastrectomia total é considerada um procedimento de alto nível de complexidade, apresenta taxas de complicações elevadas, tanto locais como gerais, pois os doentes na sua maioria estão com as condições clínicas e nutricionais comprometidas pela doença. ***Objetivos*** - analisar os resultados imediatos e complicações da gastrectomia total no período de 1972 a 2007. ***Métodos*** - Foram revisados os prontuários médicos de 300 doentes portadores de adenocarcinoma gástrico, subdivididos em dois períodos: 1972 a 1992 – compreendendo 108 doentes (36%) e 1993 a 2007 – compreendendo 192 doentes (64%). Eram 67,3% do sexo masculinos, 70,7% brancos e com faixa etária variando de 25 a 86 anos (média de 63,4 anos). As lesões estavam localizadas em cárdia – 40 casos (13,3%); fundo gástrico – 83 casos (27,6%); corpo gástrico – 77 casos (25,6%); linite plástica – 45 casos (15%); côto gástrico – 33 casos (11%) e antro/corpo gástrico – 22 casos (7,3%). A gastrectomia total ampliada com linfadenectomia até nível D2 foi realizada em 246 casos (82%). ***Resultados*** - A técnica de reconstrução mais utilizada foi a anastomose esôfago-jejunal término-lateral em Y-Roux em 257 doentes (86,7%). As complicações gerais no período de 1972-92 totalizaram 47 casos (43,5%), compreendendo principalmente as respiratórias (28 casos – 25,9%) e as urinárias (10 casos – 9,2%). No período 1993-2007 totalizaram 48 casos (25%), principalmente complicações respiratórias (27 casos – 14%), seguidas também das urinárias (12 casos – 6,2%). No período de 1972-92 estas complicações locais totalizaram 45 casos (30,8%) e no período de 1993-2007 atingiram 28 casos (14,5%), sendo as fistulas digestivas as mais frequentes. A mortalidade operatória até o 30º dia foi de 18 casos (6%), sendo que no período de 1972-92 totalizou 12 casos (11,1%) e no período de 1993-2007 foi de 7 casos (3,6%). ***Conclusões*** - A gastrectomia total é um procedimento que requer experiência do cirurgião, de sua equipe, empregando técnica cirúrgica aprimorada para minimizar as complicações pós-operatórias. As complicações pós-operatórias requerem cuidados no controle das infecções, das vias aéreas e cuidados nutricionais, diminuindo a mortalidade, aumentando a sobrevida e contribuindo para a qualidade de vida do doente.

DESCRITORES - Adenocarcinoma gástrico. Gastrectomia total. Complicações. Fistula digestiva.

INTRODUCTION

Gastric cancer is a very common disease in Brazil, and for the year 2010 are estimated 13,820 cases among men and 7,680 women. These values correspond to an estimated risk of 14 new cases per 100 000 men and eight women for every 100 000 habitants. For men, except for the non-melanoma skin tumors, is the second most frequent in the North (10/100.000) and Northeast (10/100.000), in the Midwest Region (12/100.000) is third and in the South (19/100.000) and Southeast (17/100.000), the fourth. For women is the third most frequent in the Northern Region (6/100.000), is fourth in the Northeast (6/100.000) and in other regions, South (10/100.000), Southeast (9/100.000) and Midwest (6/100.000), is fifth[20].

Surgery is the only treatment modality that offers hope for disease control and increased survival. Is mainly indicated in patients who have gastric cancer located in the body, fundus, cardia, plastic linitis and gastric stump, and should be associated with regional lymphadenectomy.

The first successful surgery is attributed to Schlatter in Zurich - Switzerland, in 1897, which carried out the reconstruction of digestive transit using omega-jejunal esophageal end to side anastomosis[27]. In Brazil, was first performed by Arnaldo Vieira de Carvalho in Sao Paulo in 1900[30]. Since then the surgeons began to use it more routinely, although with few results encouraging, since the operative complication rates were very high. In the 1940 and 1950s, Lahey in Boston popularized the procedure recommending a total gastrectomy as a routine treatment[12]. In Brazil it was disseminated by Paulino[21].

Over the past decades, has become increasingly used and various types of reconstruction have been proposed, in order to minimize side effects and provide the patient a better quality of life[15,16,17,22,24].

A total gastrectomy is considered a procedure with a high level of complexity and should be performed in referral hospitals, because the morbidity and mortality rates are not negligible. The complications of this surgical procedure are higher, both local and general, because patients are mostly with clinical conditions and nutritional well compromised by disease. Furthermore, it requires hospitalization time longer than the other surgeries, and semi-intensive and intensive postoperative cares, infection control, and general maintenance of the nutritional condition[11].

The most important complications are fistulas and dehiscence of the esophageal-jejunal anastomosis, that literature shows records from 7 to 15%[1,2]. The dehiscence of the anastomosis is associated with high mortality, reaching 30% in some series, and it is very important to the surgeon experience and learning curve to minimize this complication. Other early complications such as abscesses, pneumonia, pulmonary embolism and thrombosis, and urinary tract infections are also present. In most cases, aggressive measures should be taken, such as treatment in the intensive care unit, drainage, re-laparotomy, wide spectrum antibiotic therapy and nutritional support[3,8,13].

Recent randomized trials show no significant differences if the esophageal-jejunal anastomosis is manual or mechanical, since that the procedure is well made and indicated following well-established technical principles[13,26].

The aim of this study is to analyze the immediate results and complications of total gastrectomy indicated for patients referred for specialized treatment at the UNICAMP University Hospital.

METHODS

From 1972 to 2007 were performed a total of 300 total gastrectomy for treatment of gastric adenocarcinomas. The information was obtained from medical records of patients. Most cases were males (67.3%), whites (70.7%) and with ages ranging from 25 to 86 years (mean 63.4 years).

The location of the lesion were indicated in neoplasms of cardia - 40 cases (13.3%), gastric fundus - 83 cases (27.6%), gastric body - 77 cases (25.6%), plastic linitis - 45 cases (15%), gastric stump - 33 cases (11%) and antrum and body gastric - 22 cases (7.3%).

Total gastrectomy with extended lymphadenectomy to level D2 was performed in 246 cases (82%), associated with distal esophagectomy in 42 cases (14%) and esophagogastrectomy total in 11 cases (3.6%).

RESULTS

In 1993, the new facilities of the Intensive Care Unit of the University Hospital, were enlarged and modernized. Thus, for analysis of immediate postoperative complications, the sample was divided into two periods: from 1972 to 1992 - comprising 108 patients (36%) and from 1993 to 2007 - comprising 192 patients (64%).

The most commum reconstruction technique used by anastomosis was the esophagus-jejunal end-to-side Roux-en-Y in 257 patients (86.7%), followed by the esophagus-jejunal anastomosis end-to-end Roux-en-Y in 21 patients (7%) . The variant Rosanov (duodenal-jejunal end to side anastomosis) was used in 42 patients (14%). The

esophagus-jejunal anastomosis using mechanical staplers was performed in only 12 cases (4%). Table 1 summarizes these procedures in relationship to the periods.

TABLE 1 - Reconstruction techniques used in the series, as the period analyzed

Reconstruction techniques	1972-92	1993-2007	Total
S-S Roux-en-Y manual	-	2	2
S-S Roux-en-Y mechanics	-	1	1
E-S Roux-en-Y manual	41	151	192
E-S Roux-en-Y manual + Rosanov[28]	19	23	42
E-S Roux-en-Y mecanics	4	7	11
E-E Roux-en-Y manual	21	-	21
Esophagus-colo-duodenal	4	-	4
Esophagus-jejunum-duodenal	4	-	4
Esophagus-jejunal + Lefèvre[16]	12	-	12
Total esophagogastrectomy	3	8	11
Total	108	192	300

(S-S: esophageal-jejunal anastomosis side to side; E-S end to side; E-E: end to end)

The associated procedures performed in making radical and oncological surgeries are shown in Table 2.

TABLE 2 - Associated procedures performed during total gastrectomy

Procedures	1972 - 92	1993 - 2007
Cholecystectomy	35	94
Splenectomy	94	107
Caudal Pancreatectomy	14	15
Partial Colectomy	12	12
Hepatectomy	4	14
Enterectomy	4	22
Left Nephrectomy	3	2
Jejunostomy	75	175
Total	241	441

The general complications recorded during the period 1972-92 totalized 47 cases (43.5%), mainly involving the respiratory (28 cases - 25.9%) and urinary tract (10 cases - 9.2%). In the period 1993-2007 amounted to 48 cases (25%), mainly respiratory complications (27 cases - 14%), followed also by the urinary (12 cases - 6.2%).

The local complications are summarized in Table 3. In the period 1972-92 these complications totalized 45 cases (30.8%) and in the period 1993-2007 amounted to 28 cases (14.5%).

The operative mortality of the series until the 30th day was 18 cases (6%), as shown in Table 4. In the period 1972-92 a total of 12 cases (11.1%) and in the subsequent period of 1993-2007 amounted to seven cases (3.6%).

Due to the long period of this series, the final analysis was divide into four distinct periods, namely 1972-80, 1981-87, 1988-92 and 1993-2007 (Table 5). Seven to 15 days was the average of postoperative hospitalization time.

TABLE 3 - Local complications

Local complications	1972-92	1993-2007	Total
Cavitary abscess	6	3	9 (3%)
Esophagus-jejunal fistulas	12	6	18 (6%)
Jejuno-jejunal fistulas	1	1	2 (0,6%)
Duodenal fistulas	5	2	7 (2,3%)
Pancreatic fistulas	4	4	8 (2,6%)
Colic fistulas	2	1	3 (1%)
Wound infections	12	10	22 (7,3%)
Esophagus-jejunal stenosis	3	1	4 (1,3%)
Total	33 (30,8%)	28 (14,5%)	61 (20,3%)

TABLE 4 - Causes of the deaths occurred until 30th day

Causes	1972-92	1993-2007
Cardiac arrhythmia	1	1
Pulmonary embolism	-	2
Esofagus-jejunal fistulas	2	1
Jejunum-jejunal fistulas	2	-
Respiratory failure	3	1
Respiratory + renal failure	-	1
Septicemia	3	1
Total	12 (11,1%)	7 (3,6%)

TABLE 5 - Final analysis of results and complications

	1972-80	1981- 87	1988- 92	1993-2007
Number of cases	42	33	33	192
Local complications	47,6%	22,6%	9,4%	14,5%
General complications	42,8%	32,3%	20,9%	25%
Deaths until 30th day	11,9%	12,1%	9,1%	3,6%
Hospitalization time (7 to 15 days)	47,6%	54,8%	71,3%	75,2%

DISCUSSION

Gastric cancer is a disease occurring worldwide with variable incidence, being particularly higher in Japan, Chile, Colombia, Costa Rica, China, Iceland and Scotland. In the United States, Canada, Australia, Greece, Sweden and the other its incidence is much lower [18,20].

In Brazil, there are no exact statistics data of its actual incidence, but it certainly is among the countries with highest one. It is the most common malignancy that affects the digestive tract, and in some regions is considered the most affecting males, competing with lung cancer[10].

Surgical treatment is most appropriate, contributing to increase considerably the survival of their bearers. Basically the patient will undergo total or subtotal gastrectomy, employing strict oncologic principles.

The choice of the most appropriate surgery for the patient with gastric cancer of any histological type should take into account the location of the lesion and the known pattern of lymph node spread from that location, i.e. the level of resection D1, D2, D3 and D4 to as advocated[14,29].

The question indication of subtotal versus total gastrectomy for the treatment of gastric cancer in the antrum has been discussed in several studies in the literature. The general consensus is that total gastrectomy is unnecessary in antral tumors to a more adequate margin of safety, does not improve survival and may unnecessarily increase the morbidity and postoperative mortality. The expansion of the total gastric resection to the neighboring organs such as esophagectomy, pancreatectomy, partial colectomy, partial hepatectomy and pancreatoduodenectomy is indicated when the surgeon is convinced that is more radical, will extend the disease-free interval, and thus contribute decisively to improve survival of patients, although they will increase morbidity and mortality. Moreover, there is agreement among most surgeons that splenectomy should be performed routinely in total gastrectomy[5,7,23,25].

Complications of total gastrectomy in gastric cancer reported among the authors in the literature are very similar, varying due to the technique used or the conditions of patients. The overall incidence rate is approximately 30%, ranging from 10% to 47%. They are divided into three distinct groups: immediate postoperative complications, which occur 30 days after surgery - secondary to anesthetic, surgical, early postoperative complications -, considered until six months after surgery, due to factors related to surgery and late complications, which occur six months after surgery, but still related to it[1,9,11,13].

The immediate postoperative complications overall are the most common respiratory illnesses, including atelectasis between 12 and 20%, pneumonia by about 9%, respiratory failure in an average of 3% and pulmonary embolism 0.05%. Among the local complications are cited in the eviscerations about 4% and abscess and wound infection totaling about 3%. Other less frequent complications are referred to venous thrombosis of lower limbs in 2%, 1% in subphrenic abscess and acute pancreatitis in 1% of cases[1,8,11].

Fistulas of the esophagus-jejunal anastomosis are the most concern to the surgeon, since its incidence is quite high in literature, ranging from 10 to 22%, significantly increasing the length of hospitalization time and causing considerable morbidity and mortality. His treatment included prolonged fasting, the use of total parenteral nutrition and broad-spectrum antibiotics, greatly increasing the costs of treatment. Jejunostomy left routinely in these patients is not always sufficient to provide the required caloric intake and fluid and electrolyte balance essential. The others duodenal, jejuno-jejunal and pancreatic fistulas range from 2% to 5%, are easier to handle and have lower morbidity[1,2,6,8,11,13].

Among the postoperative complications early and late, are cited stenosis of the esophagus-jejunal anastomosis ranging from 0.05 to 6%, with an incidence slightly higher if performed with mechanical staplers. Furthermore, signs and symptoms associated with physiological alterations caused by the loss of the gastric pouch and its functions, called post-gastrectomy syndromes often highly variable and depending on the type of reconstruction of digestive transit employed. Are cited: dumping in about 2% to 8%, diarrhea and malabsorption in 3% to 10%. Recurrence of cancer at the esophagus-jejunal anastomosis, because inadequate surgical margins is reported to occur in 1% to 4% of cases[3,4,6,19,28,31].

The overall mortality of total gastrectomy for gastric cancer ranges from 2% to 15%, secondary to surgery, and up to 20% if included other complications not directly related to surgery. The most common cause of death is respiratory failure due to atelectasis or pneumonia, nearly 60% of cases. The sepsis occupies the second place, usually secondary to bad evolution of respiratory illness or intracavitary infection, due to fistula or dehiscence of sutures, reaching about 25% of deaths. And then there are the complications of other organs such as cardiac arrhythmia, congestive heart failure and kidney failure, totalizing approximately 12%. Complications secondary to chronic malnutrition of patients are not negligible[2].

CONCLUSION

Total gastrectomy in gastric cancer is a surgical procedure that requires a skilled surgeon, his team, using an improved surgical technique to minimize postoperative complications. The postoperative complications requiring efforts in controlling infections, airway and nutritional cares, reducing mortality and contributing to quality of life of patients.

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