Stomach Cancer: Surgical Treatment, Postoperative Complications and Lethality

Eugenijus Stratilatovas, Egidijus Sangaila, Sigitas Zaremba

Lithuanian Oncology Center, Vilnius, Lithuania

Although the morbidity of stomach cancer is decreasing, it still remains rather high in Lithuania. Dealing with stomach cancer, various treating methods are used, but surgery remains the main one. The aim of this article is to analyse postoperative complications, their characteristics, frequency, and distribution by stages of disease. The analysis is on 834 resective operations performed at the Lithuanian Oncology Centre (LOC) during a 10-year period. (1987–1996). All operations, their character and complications were analysed retrospectively, analysing patients' histories, operation protocols. All data are presented in 8 tables. The most frequent complications after Billroth II stomach resections was postoperative pneumonia (16 cases, or 3.15%), anastomositis (12 cases, 2.36%), and postoperative wound suppuration (15 cases, 2.94%). The main complications after gastrectomies were postoperative pneumonia (12 cases, 5.2%), anastomosis suture leakage (11 cases, 4.78%), subdiaphragmal abscess (6 cases, 2.6%). The most frequent complication after Billroth I stomach resection was anastomositis (4 cases, 4.87%). After proximal stomach resection we observed the following complications: subdiaphragmal abscess – 1 case (6.66%) and anastomositis – 2 cases (13.3%).

Key words: stomach cancer, postoperative complications, surgical treatment

INTRODUCTION

On the grounds of our analysed material and literature data we can state that the results of surgical treatment are better when patients are being treated in specialized centers where many similar operations are being performed.

In Western European countries stomach cancer is not a frequent disease (incidence varies from 5/100,000 to 13/100,000 inhabitants). This cancer is much more frequent in Japan and other Asian countries where incidence rates reach 60/100,000 to 70/100,000 inhabitants. In USA, 13600 patients per year die due to stomach cancer. In Lithuania the incidence of stomach cancer in 2000 was 28.9/100,000. In 2000, 1034 new stomach cancer cases were diagnosed in Lithuania, and 855 died from stomach cancer. Postoperative results of treatment of stomach cancer (5-year survival rate, complications) are widely discussed in the literature. Resectability increased from 37% in 1970 to 48% in 1990, the 5-year survival rate increased from 37.6% in 1970 to 55.4% in 1990 (1). According to data of German surgeons the, desirable resectability could reach up to 80% and postoperative lethality 3–5% (2). According to the Memorial Sloan Kettering Cancer Centre data, common postoperative lethality after stomach operations is 1.1% (1.6% in patients with extended lymphadenectomies) (3). This complies with Japan data (4, 5). A few decades ago these rates varied between 6–12% (6, 7).

However, we can find also very bad results of surgical treatment of stomach cancer; for example, resectability may reach 21% and 5-year survival rate 5% (8).

The results presented in the paper show that the possibilities of improving the surgical treatment of stomach cancer in specialised centres have been fully exhausted (low postoperative lethality and high resectability index). According to literature, these data vary within wide limits, therefore results of surgical treatment of stomach cancer (complications, postoperative lethality) remain to be urgent.

Thus, the aim of our study was to analyse the postoperative complications, their characteristics, frequency and distribution by stage of disease and postoperative lethality.

Correspondence to: E. Stratilatovas, LOC, Santariškių 1, LT-2600 Vilnius, Lithuania. Phone / Fax: 370-2 786747. El-mail: e.stratilatovas @ loc.lt

RESULTS

During 10 years (1987–1996), 834 resective operations due to stomach cancer were performed in LOC, among them 82 Billroth I stomach resections, 507 Billroth II stomach resections, 230 gastrectomies and 15 proximal stomach resections. The most frequent complications after Billroth II operations were: postoperative pneumonia – 16 cases (3.15%), anastomositis – 12 cases (2.36%), and postoperative wound suppuration – 15 cases (2.94%). Insufficiency of anastomosis suture and duodenum stump incontinence in both types developed in 5 patients (0.98%). We obseved 108 complications, the rate of postoperative complications was 21.31%. Nature and number of complications are presented in Table 1.

During the same period 230 gastrectomies were performed in LOC. The most common complications after these operations were: postoperative pneumonia – 12 cases (5.2%), anastomosis suture incontinence of small intestine and oesophagus – 11 cases (4.78%), subdiaphragmal abscess – 6 cases (2.6%). We observed 60 complications in the gastrectomy group, *i.e.* rate of postoperative complications was 26.08%. The nature and number of all complications are presented in Table 2.

In patients with tumour localised in the antral part of the stomach we performed 82 operations, creating anastomosis according to the Billroth I method. The most common complications were: anastomositis – 4 cases (4.87%), operative wound suppuration – 4 cases (4.87%), postoperative pneumonia – 3 cases (3.65%). There were 18 complications, *i.e.* the frequency of complications was 21.95%. The nature and number of complications are presented in Table 3.

Stomach proximal resections are rarely performed in LOC. From the oncological point of view, this operation is not radical enough, because the surgeon triesing to preserve a larger part of stomach for creating anastomosis. Furthermore, the risk of postoperative complications is higher after these operations. We performed 15 proximal stomach resections. As we can see in Table 4, the complications we obseved were: subdiaphragmal abscess – 1 case (6.6%), suture leakage – 1 case (6.6%), anastomositis – 2 cases (13.2%). We observed 5 complica-

Table 1. **Character and frequency of complications after operations performed by Billroth II method**

Complications	Number
Postoperative pneumonia	16 (3.15%)
Subdiaphragmal abscess	2 (0.39%)
Cardiovascular insufficiency	7 (1.37%)
Anastomositis	12 (2.36%)
Fistula	4 (0.78%)
Abscess in abdominal cavity	2 (0.39%)
Suture leakage (duodenum)	5 (0.98%)
Leakage of anastomosis suture	5 (0.98%)
Wound suppuration	15 (2.97%)
Postoperative pancreatitis	3 (0.59%)
Peritonitis without suture leakage	2 (0.39%)
Thrombembolia of pulmonal artery	3 (0.59%)
Thrombosis of mesenteric vessels	1 (0.19%)
Postoperative bowel impermeability	4 (0.78%)
Bleeding into abdominal cavity	5 (0.98%)
Others	19 (3.74%)

Table 2. **Character and frequency of complications after gastrectomies**

Complications	Number
Subdiaphragmal abscess	6 (2.6%)
Subhepatic abscess	1 (0.43%)
Anastomositis	7 (3.03%)
Postoperative pneumonia	12 (5.2%)
Leakage of anastomosis suture	11 (4.78%)
Pancreatic fistula	5 (2.17%)
Mediastinitis	2 (0.87%)
Postoperative pancreatitis	2 (0.87%)
Postoperative bowel impermeability	2 (0.87%)
Wound suppuration	5 (2.17%)
Others	7 (3.01%)

Table 3. **Character and frequency of complications after operations performed by Billroth I method**

Complications	Number
Postoperative pneumonia	3 (3.65%)
Acute pulmocardial insufficiency	1 (1.22%)
Subdiaphragmal abscess	1 (1.22%)
Anastomositis	4 (4.87%)
Leakage of anastomosis suture	1 (1.22%)
Postoperative bowel impermeability	2 (2.43%)
Bleeding in the abdominal cavity	1 (1.22%)
Pancreatic fistula	1 (1.22%)
Wound suppuration	4 (4.87%)

Table 4. **Character and frequency of complications after proximal resections**

Complications	Number
Subdiaphragmal abscess	1 (6.6%)
Anastomositis	2 (13.33%)
Leakage of anastomosis suture	1 (6.66%)
Thrombophlebitis	1 (6.66%)

tions in the proximal resection group, and the rate of postoperative complications was 33.3%.

In Tables 5–8 we showed the dependence of complications upon the stage of tumour. As we can see, the more advanced cases were operated on the more complications occurred.

Table 5. **Stomach resections by Billroth II: complications by stage**

Stage	Complication frequency according to stage
I	3 (2.78%)
II	15 (13.89%)
III	68 (62.97%)
IV	22 (20.37%)
Total	100%

Table 6. **Gastrectomies: complications by stage**

Stage	Complication frequency according to stage
I	1 (1.66%)
II	4 (6.66%)
III	43 (71.66%)
IV	12 (20%)
Total	100%

Table 7. **Stomach resections by Billroth I: complications by stage**

Stage	Complication frequency according to stage
I	4 (22.22%)
II	2 (11.11%)
III	9 (50%)
IV	3 (16.66%)
Total	100%

Table 8. **Stomach proximal resection: complications by stage**

Stage	Complication frequency according to stage
I	0 (0%)
II	0 (0%)
III	5 (100%)
IV	0 (0%)
Total	100%

DISCUSSION

Results of the surgical treatment of stomach cancer (frequency of postoperative complications, lethality, and 5-year survival rate), according to literature, vary in wide limits. We want to point out that results become better or more stable with increasing the number of performed operations. In 1987–1995 we performed 230 gastrectomies, postoperative lethality was 4.8%; in 1995–2000 we performed 336 gastrectomies, postoperative lethality was 2.08%, *i.e.* more than twofold less.

After gastrectomies, postoperative septic complications occurred in 12–34%, due to technical problems – 10–18% of cases (9–13). Postoperative lethality may reach 13% after resective operations and 29% after gastrectomy (8). For surgeons who perform up to 9 gastrectomies per year, postoperative lethality could reach up to 22% (8).

The most common complication of stomach cancer surgery is suture leakage and the related suppurative-septic complications.

Leakage of the oesophageal-jejunal anastomosis suture after gastrectomies remains the most threatening complication. Its frequency varies from 3 to 7.4% (14, 15). This complication often requires relaparotomy, after which lethality may reach 100%. This complication usually develops due to technical problems during operation and also due to a poor performance status of patients.

The lowest frequency of the leakage of oesophageal-small intestines anastomosis described in literature, was 0.8% (6).

We would like to emphasize the importance of subdiaphragmal abscess which is one of the most frequent suppurative-septic complications. This complication usually occurs after gastrectomies combined with splenectomy. For example, according to data from the New York Hospital, from 185 patients after splencetomies in 72 (39%) suppurative complications developed. The most common of them were suppuration of postoperative wound and subdiaphragmal abscess. Postoperative lethality was 15%, and infectious complications were the main cause of death (17). Other authors indicated that the frequency of postoperative complications after stomach operations with simultaneous splenectomy can reach 45%. Schwartz and co-authors found that in gastrectomy with simultaneous splenectomy the rate of postoperative complications rate reached 28%. This percentage approximately complies with the frequency of complications that occur after splenectomy due to trauma, spleen and blood diseases (18).

It is worth noting that splenectomy increases the number of complications in men (19). The ratio between complications in patients that underwent splenectomy and did not was 1.73 (20). Splenectomy increases markedly the number of postoperative complications, so it is not indicative in all cases of gastrectomies. Moreover, only in 2 patients of 163 metastases in the hilus of spleen were found after splenectomy (19).

The other frequent complication is postoperative pneumonia. It is one of the most frequent complications after extended operations in abdominal cavity. Its pathogenesis is related to infection of bronchi with gastrointestinal bacteria (21–23). A wide use of H_2 blockers in order to decrease the cases of stress ulcers neutralises stomach pH and causes the growth of pathologic bacteria in gastrointestinal tract (24).

According to literature, the frequency of postoperative pneumonia reached 18.16–20% (25). Factors ifluencing the appearance of postoperative pneumonia are age, albumin level and smoking, chronic pulmonary diseases (26, 27). The nature and time of operation also stimulate the development of postoperative pneumonia (25). In patients with postoperative pneumonia other infections occur 2 times more frequently and the number lethal outcomes is 10 times higher (25). One of the ways to solve this problem is to use local and not resorbable antibiotics affecting the mouth mucous membrane and infragastric region, at the same time decreasing the colonisation of pathologic microorganisms (28).

CONCLUSIONS

1. The level of postoperative complications and lethality decrease with increasing the surgeon's experience and the number of operations.

2. The most frequent complication is pneumonia, but the most threatening one is postoperative suture leakage.

3. The number of postoperative complications is higher in patients with an advanced stage of cancer.

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E. Stratilatovas, E. Sangaila, S. Zaremba

SKRANDŽIO VĖŽYS : CHIRURGINIS GYDYMAS, POOPERACINĖS KOMPLIKACIJOS, MIRTINGUMAS

S a n t r a u k a

Nors sergamumas skrandžio vėžiu mažėja, tačiau Lietuvoje jis išlieka gana didelis. Gydant skrandžio vėžį, taikomi įvairūs gydymo metodai, bet pagrindiniu ir toliau išlieka chirurginis. Šio straipsnio tikslas – remiantis LOC 10 m. laikotarpiu atliktomis 834 rezekcinio pobūdžio operacijomis, išnagrinėti pooperacinių komplikacijų pobūdį, jų dažnį, pasiskirstymą pagal stadijas. Dažniausios komplikacijos po skrandžio rezekcijos Billroth II metodika buvo pooperacinė pneumonija – 16 (3,15%), anastomozitas – 12 (2,36%) bei pooperacinis žaizdos supūliavimas – 15 atvejų (2,94%). Pagrindinės komplikacijos po gastrektomijos: pooperacinė pneumonija – 12 (5,2%), anastomozės siūlių nelaikymas – 11 (4,78%), subdiafragmalinis abscesas – 6 atvejai (2,6%). Dažniausia komplikacija po skrandžio rezekcijos Billroth I metodika buvo anastomozitas – 4 atvejai (4,87%). Proksimalinės skrandžio rezekcijos komplikacijos: subdiafragmalinis abscesas – vienas (6,66%) bei anastomozitas – 2 atvejai (13,3%).

Išvados:

1. Pooperacinių komplikacijų skaičius ir mirtingumas priklauso nuo atliktų operacijų kiekio.

2. Dažniausia pooperacinė komplikacija yra pneumonija, tačiau grėsmingiausia išlieka pooperacinis siūlių nelaikymas.

3. Pooperacinių komplikacijų daugiau, operuojant ligonius, sergančius vėlyvomis skrandžio vėžio stadijomis.

Raktažodžiai: Skradžio vėžys, pooperacinės komplikacijos, chiruginis gydymas, mirtingumas