MORBIDITY, MORTALITY AND SURVIVAL AFTER STOMACH RESECTION WITH OR WITHOUT SPLENECTOMY – THE SINGLE CENTRE OBSERVATIONS

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Over the last decade, gastric cancer treatment has changed from extensive multiorgan resections towards less invasive approaches with limited resections and a more selective lymphadenectomy. Despite all available trials, the conclusions on the extent of necessary resections still remain debatable.

The aim of the study was to assess the short term outcomes (morbidity and mortality) of a total gastrectomy depending on the simultaneous splenectomy status.

Material and methods. We performed a retrospective analysis of the records of all patients treated with a curative intent using a total gastrectomy for gastric cancer between 1997 and 2003. 49 patients fulfilled the inclusion criteria. Patients were divided into two groups: S(+) gastrectomy with splenectomy group (29 patients) and S(-) total gastrectomy with spleen preservation (20 patients).

Results. Survival analysis at one year showed that there was no difference in survival between the two groups (p=0.84). There were six recurrences, one in the group S(+) and five in group S(-) (p>0.05). Dissemination was observed in three patients in group S(-) (p>0.05). Other complications including infectious complications, exenteration, subileus, cardiovascular insufficiency, multiorgan failure were more frequent in the S(+) group (31% v 15%) although the difference was not significant (p=0.17).

Conclusions. Splenectomy during gastrectomy for cancer has no statistically significant impact on short-term morbidity and mortality. Even though it does not show benefit in terms of 5-year overall survival rates it might be performed when needed in more advanced cases in properly selected patients (e.g. upper gastric T3/4 gastric cancer).

Key words: neoplasm; stomach; splenectomy; complications; lymph node excision

Gastric cancer was the fourth most common cancer in males in 2009 in Poland with an incidence rate of 12.3 per 100 000 people and a high mortality rate with poor 5-year overall survival (1). Although we could observe a reduction in mortality over the last decade from 16.5/100 000 people to 12.1/100 000 people it seems that it was rather thanks to the decreased incidence (16/100 000 in year 1999) rather than to changes in surgical practice. As we followed the most recent publications of international trials for gastric cancer we could observe changes in practice being adopted all over the world with a changing approach from
the extensive multiorgan resections towards less invasive approaches with limited resections and a more selective lymphadenectomy (2, 3). Despite all available data, the extent of necessary resections still remains debatable especially with regards to the extent of lymphadenectomy and simultaneous splenectomy. Accurate lymph node dissection certainly requires the removal of No 10 and No 11 lymph nodes. Some authors reported an increased number of lymph nodes dissected when simultaneous splenectomy was performed (4, 5, 6) with an increase in 5 years overall survival (7). Other authors advocate against the use of simultaneous splenectomy as according to their data it does not influence the prognosis and increases perioperative morbidity (8, 9). Therefore we decided to assess the short term outcomes of total gastrectomy depending on the simultaneous splenectomy status.

MATERIAL AND METHODS

A retrospective analysis of the records of 86 patients who underwent a curative total gastrectomy for gastric cancer between the years 1997 and 2003 was performed. There were 21 (24.4%) female and 65 (75.6%) male patients. The mean age was 61 years. The mean time of observation was 1.22 years. 41 (47.7%) patients died during the observation period. All the operations were performed by the same team, in all cases cancer occurred in the stomach body (no gastro-oesophageal junction cancer in studied group). In 72 (83.7%) patients a total gastrectomy with simultaneous reconstruction with the Roux-en-Y loop was performed. In 14 (16.3%) patients a subtotal gastrectomy was performed. In 33% of patients only a total gastrectomy was performed, in 39 (45%) cases a splenectomy was needed and in 19 (22%) patients a partial pancreatectomy, bowel or liver resection was done as well. 80 (93%) patients were operated using an abdominal approach and 6 (7%) using thoraco-abdominal access.

From the above group, 49 patients fulfilled the inclusion criteria and were included in the study. Inclusion criteria were: any gender, gastric cancer confirmed on pathological examination, total gastrectomy, and D2 lymphadenectomy. Patients were divided into two groups: S(+) was for the gastrectomy with splenectomy group (29 patients) and S(-) patients had total gastrectomy with spleen preservation (20 patients).

The study has been approved by the appropriate local ethical committee, according to the Declaration of Helsinki. Statistical analysis was performed using computer statistical software SPSS 9.0 to calculate: chi², t-students test, Mann-Whitney test and Kaplan-Meier survival function test.

RESULTS

Both groups were compared regarding the gender, age, stage, survival, frequency and type of postoperative complications, and the observation time. There were no statistically significant differences between both groups with regards to gender, mean age and observation time (tab. 1). Histological type and TNM staging are shown in tab. 2 and tab. 3.

An analysis of survival at one year showed no difference in the survival between the two groups (p=0.84) (fig. 1).

During the observation period there were six recurrences, one in the S(+) group and five in the S(-) group (p>0.05). Dissemination was observed in three patients in the S(-) group only (p>0.05).

Average hospitalization time in the S(+) group was 8 days and in the S(-) group it was 11 days, though the difference was not statistically significant. As expected, the white cell count was significantly increased in patients

<table>
<thead>
<tr>
<th>Table 1. Basic characteristics</th>
<th>S(+)</th>
<th>S(-)</th>
<th>p</th>
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<tr>
<td>M:F ratio</td>
<td>3:1</td>
<td>4:1</td>
<td>p=0.4</td>
</tr>
<tr>
<td>Mean age</td>
<td>58</td>
<td>60</td>
<td>p=0.5</td>
</tr>
<tr>
<td>Mean observation time (years)</td>
<td>1.2</td>
<td>1.36</td>
<td>p=0.9</td>
</tr>
<tr>
<td>S(+) group with splenectomy, S(-) spleen preservation; M – male; F – female</td>
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<table>
<thead>
<tr>
<th>Table 2. Histological type of gastric cancer</th>
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<tbody>
<tr>
<td>Histological type</td>
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<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
</tr>
<tr>
<td>Mucocellular carcinoma</td>
</tr>
<tr>
<td>Mucinous carcinoma</td>
</tr>
<tr>
<td>Poorly differentiated carcinoma</td>
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<td>Data not available</td>
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following gastrectomy with simultaneous splenectomy (79% vs 50%; p=0.001). Other complications were more frequent in the S(+) group (31% vs 15%) although the difference was not significant (p=0.17). Specific complications are shown in tab. 4.

DISCUSSION

Gastric cancer remains one of the top five most frequent neoplasms in male patients in developed countries. Its overall incidence worldwide remains quite stable, though we can observe an interesting shift of the onset time towards a younger age. In countries with routine screening for gastric cancer most of the cases are diagnosed at a relatively early stage, but in countries like Poland with no screening most of the patients present at later stages and quite often the neoplasms are advanced with the presence of metastases.

The mainstay of gastric cancer treatment is surgery and there is limited evidence showing if adjuvant chemotherapy might be successful in advanced cases (10, 11). Therefore an adequate extent of surgery remains most crucial in these patients. Several studies such as the MRCs trial (2) and the Dutch trial (3) indicated that there is no need for an extended lymphadenectomy in gastric cancer as it does not influence survival and increases the risk for potential complications.

So far splenectomy was performed for two different reasons. One is that it allows effective dissection of lymph nodes located in the splenic hilum (lymph node No. 10) and along splenic vessels (lymph node No. 11). The other reason is an iatrogenic injury to the spleen or its vessels.

The obvious and well documented risks of splenectomy are: wound infection, abdominal abscess, pancreatitis, pancreatic leakage, anastomotic leakage, prolonged ileus (12) as well as the immune system changes following spleen resection (13). On the other hand, Yu W. et al. showed that none of the gastric cancer patients with positive lymph node No. 10 lived more than 5 years after surgery, thus one should be less concerned with the possible complications of splenectomy (14). Positive lymph node No. 11 had slightly better prognosis with regards to the 5-year overall survival in 23.4% of cases in the splenectomy group and 20% for patients without a splenectomy.

Metastases to lymph nodes in the splenic hilum are usually seen in more advanced cases, with rates of 15.4% (15) and 21% (16).
Sasada et al reported that in a group of 349, none of the T1-2 patients had lymph node No. 10 metastases suggesting that in these patients spleen should be preserved, although some benefit might be seen in more advanced stages (15). Similarly, Fang WL et al. concluded in their study that the only benefit from splenectomy might be seen in patients with advanced disease (stage III and IV) and large tumours at the posterior wall (17) showing no difference in morbidity and mortality in remaining patients.

A large analysis of the database of the American College of Surgeons that included over 12400 patient records showed a slight difference in intra-operative mortality between operations with and without splenectomy of 9.8% vs 8.6% (18). It also showed an increased number of distant metastases in the splenectomy group (29% vs 15.5%) as well as a decreased 5-year survival rate of 20.9% vs 31%. Nevertheless Wanebo et al. still recommend performing a splenectomy in selected patients with lymph node metastases or with splenic extension of the tumour to achieve good local control.

Other studies (19, 20) on relatively large groups showed that the extent of lymphadenectomy as well as splenectomy status were not independent risk factors influencing morbidity and mortality in patients with proximal gastric cancer. However, spleen preservation was related to shorter operative times and hospital stay and decreased the amount of blood transfusions (20). They also showed that the age, number of retrieved lymph nodes, lymph node metastases and the depth of invasion were independent risk factors for morbidity and mortality (19, 20, 21).

The presence of metastases to lymph node No. 10 certainly is connected with a worse prognosis, shortened overall survival and an increased risk for local and distant recurrences or metastases. The question is if it only confirms that the disease at this stage is so advanced that our efforts including a splenectomy and extended lymphadenectomy will bring no benefit or should we look for better operative methods and do something differently. Maybe we should look for a method to assess these nodes before the operation and give neo-adjuvant chemotherapy followed by surgery.

Finally, a meta-analysis of three randomized trials performing a splenectomy for gastric cancer (n=466 patients) by Yang et al. showed no difference in the morbidity and mortality between the groups who had splenectomy vs spleen preservation (22). They also stressed significant discrepancies between the results of RCT studies showing no difference between spleen resection and preservation and non-RCT studies that showed significant differences in terms of morbidity and overall mortality. They drew the conclusion that this difference might arise from the specificity of non-randomized retrospective studies, where patients with more advanced disease usually underwent splenectomy while less advanced patients had it preserved (22). In our view it is a valid and very true conclusion supporting our thesis that spleen resection during gastrectomy does not add much risk to the basic operation and should be performed in more advanced and well selected patients (e.g. upper gastric T3/4 gastric cancer).

**CONCLUSIONS**

Splenectomy during gastrectomy for cancer has no statistically significant impact on short-term morbidity and mortality. Even though it does not show benefit in terms of the 5-years overall survival it might be performed when needed in more advanced and well selected patients (e.g. upper gastric T3/4 gastric cancer).

**Acknowledgements**

The authors are grateful to Professor Andrzej W. Szawłowski MD, PhD, FACS from Cancer Center, Warsaw, Poland for his critical review of the manuscript and helpful suggestions.

Authors would like to thank Marta Kedrzycki, student of the Faculty of Medicine (English Division), Medical University of Gdansk, Poland for the manuscript's language revision.
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