COMPARISON OF EARLY RESULTS OF SURGICAL TREATMENT IN PATIENTS WITH PANCREATIC CANCER

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Pancreatic tumours are a serious medical and social issue. Patients come to the doctor too late, when the disease is well advanced. The most frequently applied method of surgical treatment is pancreatoduodenectomy (Whipple procedure). The most frequently used technique of pancreatoduodenectomy is the Child-Waugh method. The procedure can be performed in a classic way or as modified by Traverso (with preservation of the pylorus).

Material and methods. Between August 2008 and June 2011, in the Department of Thoracic, General and Oncologic Surgery of Medical University in Łódź, a total of 79 patients with pancreatic tumours were hospitalized. In 61, pancreatoduodenectomy was performed. The patients were divided into two groups, depending on the diagnosis and the procedures performed: group 1 comprised patients in whom the pylorus was resected (n = 43); group 2 comprised patients in whom the pylorus was preserved (Traverso-Longmire procedure; n = 18).

Results. Mean duration of surgery was about 3 hours and 50 minutes in both groups. Mean duration of hospitalization after the procedure was 15.6 days in group 1 and 12.2 days in group 2 (p < 0.05). Early complications (within 30 days of the procedure) were observed in 33.2% of patients in both groups. Blood transfusion was necessary in 21% of patients in group 1 and 28% of patients in group 2 (p>0.05).

Conclusions. There are specific indications for each method of surgical treatment, however, it seems that both techniques of pancreatic resection can be recommended as standard surgical treatment, and the number of complications after both procedures is similar.

Key words: pancreatic cancer, complications, Kausch-Whipple procedure, Traverso-Longmire procedure.
Although the range of diagnostic tests is constantly broadening, no significant improvement in early diagnosis is noted. Data from literature, as well as our own observations, show that a significant number of patients still come to see the doctor too late, i.e. when the disease is well advanced. There are many reasons for that. Early stage pancreatic tumours present with discrete symptoms, which are not always a source of concern for the patient. Poor awareness of neoplastic diseases in the society, as well as common reluctance to preventive medical check-ups, also delay diagnosis. Yet early diagnosis of the tumour (by way of choosing the right diagnostic workup) provides an opportunity to treat the tumour in its non-advanced stage.

The symptoms of pancreatic cancer are scant and late. The most frequent ones include painless jaundice (up to 82%), abdominal pain (up to 32%), anorexia and weight loss (up to 29%), treatment-resistant pruritus (up to 21%), vomiting and/or diarrhoea with progressing malnutrition, which frequently indirectly leads to death (5).

**MATERIAL AND METHODS**

Between August 2008 and June 2011, in the Department of Thoracic, General and Oncologic Surgery of Medical University in Łódź, a total of 79 patients with pancreatic tumours were hospitalized. In 61 patients, stage II and stage III pancreatic tumours were found. General health status of the operated patients varied; it ranged from ASA class II to ASA class IV. All the procedures were performed as emergency procedures, in general anaesthesia. In addition, all the patients had an epidural catheter placed preoperatively for intrathecal administration of analgesics in the early postoperative period. In all the patients, Kausch-Whipple pancreateoduodenectomy with Child-Waugh pancreateoenteric anastomosis was performed. The process of determining patient eligibility for surgery included the following examinations:

1) case history,
2) physical examination (of the abdominal cavity, per rectum),
3) USG of abdominal cavity,
4) CT or MRI of abdominal cavity,
5) ERCP (optionally, for preoperative decompression in jaundice),
6) Chest X-ray (for possible distant metastasis).

Patients with stage IV tumour were excluded from the study. To determine the number of early postoperative complications after pancreateoduodenectomy, patients were randomized into two groups. In group 1, the pylorus was resected (classic Whipple procedure; n = 43); and in group 2 – the pylorus was preserved (Traverso-Longmire procedure; n = 18).

In both group 1 and group 2, Roux-en-Y gastroenterostomy anteriorly to the colon was performed. Based on the preoperative diagnostic workup, location of the pancreatic tumour was determined. It is presented in tab. 1.

Retrospective analysis of questionnaires and case histories did not reveal any difference in sex or co-morbidities between the groups. Preoperative drainage of the bile ducts was performed in 11 patients – 8 (13.5%) in group 1 versus 3 (5%) in group 2.

The aim of the study was to evaluate early results of surgical treatment of pancreatic tumours, comparing resections and pylorus-preserving procedures.

The statistical analysis was done with the use of the STATISTICA 9.5 software. To determine statistical significance of the results obtained in both groups, the Kruskal ANOVA rank test was used. p < 0.05 was considered statistically significant.

**RESULTS**

The results were collected based on the analysis of surgery reports, case histories and the distributed questionnaires. We obtained 43% of responses.

Mean age of patients operated on was 58.2 years (between 37 and 76 years). 68.7% were men and 31.3% – women. Mean duration of surgery was 3 hours and 50 minutes (between 190 and 330 minutes) in both groups; there was no statistically significant difference. Mean duration of hospitalization after the

<table>
<thead>
<tr>
<th>Tumour location</th>
<th>Child-Waugh method n (%)</th>
<th>Traverso-Longmire method n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>31 (72,1%)</td>
<td>11 (61,1%)</td>
</tr>
<tr>
<td>Body</td>
<td>12 (27,9%)</td>
<td>7 (38,9%)</td>
</tr>
</tbody>
</table>
surgery was 15.6 days (6-42 days, median 13) in group 1, and 12.2 days (5-38 days, median 11) in group 2. The differences were statistically significant; p < 0.05.

The procedures were performed as elective surgeries (97%) or emergency surgeries (3%) in acute conditions, such as haemorrhage into the gastrointestinal tract and gastrointestinal tract obstruction.

Early complications (within 30 days of surgery) were observed in 33.2% patients in both groups. Complications in individual groups were presented in tab. 2. Procedures including resection of the pylorus were more frequently complicated by enteric anastomotic leakage and wound suppuration (p < 0.05), whereas Traverso procedures were complicated by biliary fistulas; the difference was significant.

In the postoperative period, due to drop in the values of morphotic components of peripheral blood, transfusion of packed red blood cells (PRBCs) and fresh frozen plasma (FFP) was required in 9 patients, i.e. in 20.9% of the total number of patients operated on in group 1. In 9%, four or more units of PRBCs were transfused. Mean blood loss in this group was 820 mL. While after Traverso-Longmire procedure, transfusion of PRBCs and FFP was required in 5 patients, i.e. 27.8%. In 11%, four or more units of PRBCs were transfused. Mean blood loss in this group was 730 mL. The differences were not significant.

In both groups, 4.6% vs. 5.5% perioperative mortality rate was observed. The cause of death was circulatory and respiratory failure or multiorgan failure in patients who preoperatively had been classified as ASA grade IV. Reoperation was performed in 8 cases: in 6 (13.9%) patients in group 1 and in 2 (11.1%) in group 2. The differences were not statistically significant (p > 0.05). The most frequent cause of reoperation was a biliary or pancreatic fistula persisting for over 3 weeks and leakage from gastrointestinal anastomoses.

### DISCUSSION

The surgeon who decides on a specific procedure needs to bear in mind possible complications. The largest number of complications is observed in oncologic patients, particularly after gastrointestinal resections, e.g. in colon cancer, pancreatic cancer or liver cancer (6).

Our observations, as well as world reports clearly show that the treatment of pancreatic cancer is changing (7). In the last century, the Kausch-Whipple procedure was broadly used, as well as its modifications – Traverso-Longmire, Clagett, Beger and other. These procedures were always associated with complications. Unfortunately, complications following pancreatic surgeries still occur, they are still numerous, and their number is decreasing insignificantly and slowly. Our results show that the total number of early complications after 61 pancreatoduodenectomies was 33.2%. The results do not differ from the ones reported in Western Europe publications (8). The number of surgical indications for pancreatic cancer resection is continually growing. For an experienced surgeon, tumour infiltration into mesenteric vessels is no longer an issue, though in the previous century it made patients illegible for the surgery (9). New methods of gastrointestinal tract reconstruction are introduced, e.g. the Blumgart technique (10). One cannot forget about techniques used in the past, which are still used in some cases. At the same time, one should remember about attempts to develop newer and better surgical modalities (11).

We analyzed data concerning patients operated on in our clinic with the use of two methods: Traverso-Longmire pylorus-preserving procedure with duodenojejunal anastomosis and classic Kausch-Whipple procedure with antrectomy and gastrojejunal anastomosis. According to our studies, these methods are comparable. There are no statistically signifi-

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Table 2. Early complications in both groups

<table>
<thead>
<tr>
<th>Item</th>
<th>Complication</th>
<th>Group 1 n = 43 (%)</th>
<th>Group 2 n = 18 (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>biliary fistula</td>
<td>9 (21)</td>
<td>5 (27.8)</td>
<td>0.03</td>
</tr>
<tr>
<td>2</td>
<td>postoperative wound suppuration</td>
<td>4 (9.3)</td>
<td>1 (5.5)</td>
<td>0.02</td>
</tr>
<tr>
<td>3</td>
<td>haemorrhage into the peritoneal cavity</td>
<td>2 (4.7)</td>
<td>1 (5.5)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>4</td>
<td>pancreatic fistula</td>
<td>8 (18.6)</td>
<td>4 (22.2)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>5</td>
<td>leakage from enteric anastomosis</td>
<td>2 (4.6)</td>
<td>0</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Significant differences in surgery duration. The parameter of blood loss volume was deemed important, as in many publications it is considered a prognostic factor in neoplastic diseases. During the classic Whipple procedure, skeletonization of the stomach is performed, which is considered a simple surgical technique. Still, during this technically easy procedure, bleeding may occur. The quantity of blood we transfused was similar and there was no difference between the groups. However, there were statistically significant differences in the number of individual complications, though the total number of complications in both groups was similar, there were no differences. A significant difference was shown during hospitalization, which was significantly shorter in group 2. It was probably connected with the more rapid return of normal peristalsis in the non-resected stomach. The most frequent cause of reoperation was persistent biliary fistula and/or pancreatic fistula. The amount of daily bile and/or pancreatic leak above 500 mL for more than 20 days was treated as an indication for reoperation. In two cases, we observed repeated pancreatic fistula after reoperation, which, however, closed spontaneously in week 2 after surgery, and did not require further treatment. We did not use somatostatin analogues in such cases.

Unfortunately, even though new methods are explored, the number of complications does not decrease (12). It may result from more and more advanced surgical techniques. The growing number of indications for pancreatic resection itself entails increased number of complications. It is possible that more extensive and precise lymphadenectomies, which extend the duration of surgery, indirectly cause increased use of analgesics, which may contribute to increased blood loss and patient cooling. All these factors considerably contribute to a high rate of complications, in spite of growing experience of surgical teams.

The new era brings development of laparoscopic techniques, single-incision laparoscopic techniques, hybrid techniques and robotic techniques (13, 14, 15). It may be those techniques that will contribute to reduction of the number of pancreatectomy complications in the future.

CONCLUSIONS

1. Pancreatoduodenectomy is a recognized and broadly used surgical treatment technique in cancer of pancreatic head and body.
2. Pancreatic tumour resection is a safe procedure; however, it is encumbered by a relatively high rate of complications.
3. Procedures involving resection of the pylorus, as well as pylorus-preserving procedures, are encumbered by a similar number of perioperative complications.

REFERENCES

Comparison of early results of surgical treatment in patients with pancreatic cancer


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