

**Ph.D Thesis**

**ATTEMPTS AT INCREASING THE SAFETY OF PANCREATIC SURGERY.  
EVALUATION OF SURGICAL TECHNIQUES**

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## I. INTRODUCTION, AIMS

Inflammatory and tumorous diseases of the pancreas are occurring more frequently and these may produce life-threatening states. According to the literature, 2 of every 100 individuals die due to pancreatic illness. Half of these deaths are caused by carcinoma, while the other half are caused by inflammatory diseases.

In Hungary, chronic pancreatitis is one of the most commonly occurring chronic gastroenterological clinical pictures.

With regard to tumours it is well-known that mortality due to pancreatic cancer occupies fourth place and, according to the statistics, 24,000 new cases are discovered yearly with a five-year survival rate of around 5%.

The treatment of these diseases is primarily surgical, and their number shows a growing tendency year after year.

In the majority of cases, pancreatic carcinoma is detected in the late stages of the disease which plays a role in its poor prognosis. The ratio of resectability is between 10% and 30%.

Most pancreatic diseases affect the pancreatic head. Those tumors which affect the papilla of Vater and its surrounding region are summarized under the title of periampullar tumors and often cannot be distinguished from carcinomas of the pancreatic head. The surgical therapy is identical in both cases. This is the so-called pancreaticoduodenectomy which was first performed by Whipple in a case of carcinoma of the papilla of Vater.

The primary aim of the surgical treatment of chronic pancreatitis is the relief of pain effected by surgical decompression or resection. In cases of chronic inflammation the morphology of the pancreatic duct plays an exceptionally important role. When the pancreatic duct is dilated, surgical decompression can be performed, while in segmental

pancreatitis or, as the case may be, where severe focal destruction is present, resectional surgery is the treatment of choice.

During operations performed on the pancreas a large amount of caution must be employed, bearing in mind its special anatomical situation, tissue structure, its relationship to the large vessels and neighboring organs, important structures, the bile duct, and its relationship to the duodenum. The decision for surgery also includes the examination of the nature of the gland's exocrine and endocrine function.

Considering the above, it is not by chance that the surgery of the pancreas developed later than that of other organs, and new methods and technical changes are being introduced even now.

Performance of pancreatic surgery due to pancreatic disease shows an increasing tendency, however the surgical risk is high despite the fact that as compared to the 1970s where mortality was around 20%, the mortality rate in the 1990s decreased to below 5%.

The aim of my evaluation is to examine the preparation of pancreatic anastomoses, to analyse the surgical techniques directed at the safe treatment of the pancreas, and to verify the best therapeutic result among the surgical possibilities.

The analysis of the surgical treatment of pancreatic diseases is based upon the evaluation of 269 cases of surgically treated pancreatic patients as well as on the evaluation of examinations related to their disease.

The answer to the following questions was searched for:

1. Regarding decompression surgery performed for chronic pancreatitis, did the Wirsungo-gastrostomy or the Wirsungo-jejunostomy have a preferable surgical result?

2. During the performance of decompression surgery, was there a relationship between the occurrence of later complications and the pathological changes witnessed intraoperatively?
3. How does the patient's quality of life change following decompression surgery in the late postoperative stage?
4. When can our modified duodenum-retaining pancreatic head resection be employed and what are the early postoperative results?
5. In cases where pancreatoduodenectomy is utilized for the surgical removal of removal-requiring pathological changes of the pancreatic head, how should the remaining pancreas be treated?
6. Does our newly modified surgical reconstruction technique performed for carcinoma of the papilla of Vater decrease postoperative morbidity?
7. Do glucagon and somatostatin analogs decrease pancreatic secretion, and how does the composition of the pancreatic fluid change?

## II. MATERIALS AND METHODS

The evaluation of the methods used in the surgical treatment of pancreatic diseases is based on the operations and related examinations performed on 269 patients. The early and late results of 123 decompression operations performed for chronic inflammation were retrospectively examined.

I examined the correlation between pathological changes observed during surgery and the complications which developed postoperatively.

The examination of late results occurred on an average of 4,7 years after the surgery, and at this time level of pain, alterations in body weight, occurrence of diarrhea, appearance of additional attacks of pancreatitis, development of diabetes, and late mortality were taken into account. Three groups were considered:

1. In the „good” surgical result group, the patients were complaint-free when receiving pancreatic exocrine substitution.
2. In the „fair” surgical result group, patients complained of non-severe periodic pain, their body weight did not change significantly, bowel movements occurred unchangingly 2-3 times daily.
3. In the „poor” surgical result group, pain was more severe, body weight decreased, late complications (diabetes mellitus) arose. Patients who died were included in this group as well.

I analysed the results of 21 duodenum-retaining surgical resections of the pancreatic head performed for the treatment of chronic pancreatitis.

I examined the results of radical operations performed for the treatment of inflammation and tumors of the pancreatic head.

I analysed the surgical results of 11 Whipple-type pancreatic resections and 114 cases of pylorus-retaining pancreatoduodenectomy as well as the methods used to treat the remaining pancreas, the complications and the incidence of mortality.

I dealt separately with the results of resections performed for the carcinoma of the papilla of Vater. A new surgical modification was used in the interest of decreasing early complications and I analysed these results as well.

The retrospective analysis was done on the basis of data found in the patients' records. The case history, data of certain examinations, operation record, and course of the disease were taken into consideration in the analysis of early surgical results. I analysed the late results with the help of follow-up examinations of operated patients and the filling out of a questionnaire.

Studies were done on 31 stray dogs where the effect of glucagon and a somatostatin product, Stilamin, on the exocrine function of the pancreas were examined.

### III. SUMMARY OF ANALYSIS RESULTS

1. Decompression surgery was performed in 123 patients. In 52 cases Wirsungo-gastrostomy, in 37 cases Wirsungo-jejunostomy, in 23 cases cysto-Wirsungo-gastrostomy and in 11 cases cysto-Wirsungo-jejunostomy was done.

On the basis of our examinations it can be determined that the Wirsungo-gastrostomy technique is easier to perform and faster, however, complications are more frequent following Wirsungo-gastrostomy as compared to Wirsungo-jejunostomy.

Postoperative bleeding occurred in 7 cases in our experience, and primarily in the pancreaticogastrostomy group. With regard to late postoperative results there was no significant difference when the two types of operations were compared.

2. When searching for the causes of complications on the basis of retrospective examinations, we found that bleeding complications occurred significantly more frequently when the following were observed during operation: non-extremely dilated (diameter 7-8mm) pancreatic ducts (7 patients), inflammatory edema (6 patients), symptoms of portal hypertension (dilated abdominal veins in 6 patients), or as the case may be, had more frequent attacks of pancreatitis (more than 4 attacks in 6 patients). In my opinion, although the Wirsungo-gastrostomy is more easily performed, in some instances where the diameter of the pancreatic duct is 8mm or less, edema is observable in the operative region or dilated abdominal veins are present which signify portal hypertension, Wirsungo-jejunostomy can be performed more safely.
3. According to the literature, the mortality rate following decompression surgery is low, around 4%. In our clinic this rate is 2,5%. In the literature as well, 70% of patients

live pain-free after a few years. In our sample, on an average of 4,7 years following pancreatic decompression surgery, 80% of patients belonged to the „good” surgical result group. With regard to enzyme substitution following surgery for chronic pancreatitis, all our patients were advised to take enzyme substitution.

4. Among the resection operations, the pylorus-retaining pancreatoduodenectomy and the duodenum-retaining resection of the pancreatic head are also useful in the treatment of chronic pancreatitis. Our modified duodenum-retaining resection of the pancreatic head for the treatment of chronic pancreatitis is used in those cases where the enlarged pancreatic head does not cause icterus, duodenum stenosis is not observed, the bile duct is not dilated (7-8mm according to ultrasound examination), and there is no cholestasis. In all other cases in which the pancreatic head alteration was in the forefront, in our practice the pylorus-retaining pancreatoduodenectomy was the method of choice. Its advantage over the duodenum-retaining resection of the pancreatic head and pancreatoduodenectomy is that this method is less of a surgical burden on the patient as two fewer anastomosis are prepared than in the case of the pancreatoduodenectomy and the degree of resection is smaller.
  
5. During the course of carcinoma of the papilla of Vater, in a portion of cases the induration of the gland does not occur and the suturing of the soft glandular organ is difficult, unsafe, and the treatment of the remaining pancreas is threatened by an increased risk of complications. In 4 patients insufficiency of the pancreatogastrostomy anastomosis developed, for which reason we altered the surgical reconstruction technique. In a further 11 cases during the pylorus-retaining pancreatoduodenectomy performed for carcinoma of the papilla of Vater, following

the removal of the non-indurated pancreatic head the first anastomosis prepared was a pancreaticojejunostomy („duct to mucosa”), the second was a choledochojejunostomy, and the third was a duodenojejunostomy which was at a distance of approximately 40 cm from the pancreatic anastomosis. This ensured that food would not get close to the pancreas even under the influence of intestinal peristalsis, thus in the case of pancreaticojejunostomic insufficiency, this would spontaneously close and the area around the anastomosis could be safely drained. The patients recovered without complications. On the basis of the results this method seems to be safe as a reconstructive method following the removal of the non-indurated pancreatic head.

6. The complications of pancreatic operations are primarily related to the exocrine function of the pancreas. In the perioperative period, the blocking of pancreatic secretion may decrease or prevent these complications. On the basis of our experiments, we established that under the effect of glucagon and Stilamin given intravenously, the pancreatic secretion decreases, and when comparing the extent of this decrease, it can be determined that the average decrease is more definite under the influence of Stilamin. I believe that glucagon and somatostatin can be used in a clinical setting with equally good results- through their secretion-decreasing effect- for the decrease of complications following pancreatic surgery

