

Resection in Chronic Pancreatitis: Anastomosis with the Jejunum or with the Stomach?



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Introduction

Several factors jeopardise the reliable analysis of the different techniques of gastro-intestinal reconstruction following pancreatic resection in chronic pancreatitis.

As our review is focused on this specific disease, the related literature is poor concerning in the pancreaticogastrostomy; actually this approach is mainly utilised following duodenopancreatectomy for periampullar malignancy (1-8). On the contrary, because of its traditional popularity, the available data regarding pancreaticojejunostomy in chronic pancreatitis are numerous both after glandular resection or main duct opening and derivative procedure (9).

Moreover the experiences with longitudinal (side to side) pancreaticogastrostomy are sporadic (10-11).

Finally, with only one exclusion (12), no prospective randomized clinical trials comparing pancreaticojejunostomy versus pancreaticogastrostomy are available. Only not controlled retrospective data with, frequently, a very low number of recruited patients are reported.

Last but not least, the comparison of data related to the different complication rate is difficult because the meaning of such terms like "leakage" or "fistula" is not the same in different centres and there is no homogeneous and world wide accepted definition of postoperative pancreatic fistula.

The aim of this paper is to point out the advantages of one versus other techniques, if any, looking through the English literature focusing on chronic pancreatitis. Moreover we will compare the clinical experiences of the present authors coming from institutions in which the choice of pancreatico-enteric reconstruction following

Abstract

Even in centers where the first choice in the surgical treatment of chronic pancreatitis is a derivative procedure some selected patients require resection.

The most popular solution of gastrointestinal reconstruction still seems to be pancreaticojejunostomy but, the review of the reported experiences, suggests a general trend towards anastomosis with the stomach as a recent policy.

A reliable comparison between pancreaticogastrostomy and pancreaticojejunostomy is difficult because the reported series are seldom related to chronic pancreatitis patients only, but are reporting mixed data concerning mainly periampullary cancer. Moreover with only one exception no prospective randomised clinical trials are available; unfortunately the positive trend in favour of pancreaticogastrostomy reported in uncontrolled studies is not confirmed in the randomised setting.

Also the comparison between the experiences achieved by the present authors working in centers with different approach to the pancreatic anastomosis does not show statistical significant difference for both morbidity and mortality.

In conclusion nowadays the best confidence and experience with any of the two methods represents the basis of choice.

Key words: Surgical therapy, chronic pancreatitis, pancreatoduodenectomy, pancreaticojejunostomy, pancreaticogastrostomy.

Riassunto

RESEZIONE NELLE PANCREATITE CRONICA: ANASTOMOSI CON DIGIUNO O CON STOMACO?

Anche nei centri in cui i provvedimenti chirurgici derivativi rappresentano la metodica di scelta nel trattamento della pancreatite cronica, alcuni pazienti selezionati possono o devono usufruire di metodiche demolitive.

Dopo resezione la tecnica ricostruttiva più popolare è ancora la pancreodigiunostomia anche se la revisione della letteratura più recente sembra indicare un generale aumento di utilizzazione della anastomosi pancreo-gastrica.

Una attendibile comparazione dei risultati ottenuti con le due metodiche è praticamente impossibile in quanto le esperienze riportate solo raramente si focalizzano sulla pancreatite cronica arruolando casistiche "miste" e principalmente costituite da pazienti affetti da neoplasie periampollari.

Inoltre, con una sola eccezione, non esistono studi prospettici randomizzati. L'analisi della letteratura è resa ancor più difficile da interpretare in quanto il generale trend in favore

della anastomosi pancreogastrica rispetto alla pancreodigiuno, in termini di morbilità post-operatoria, non viene confermata dal già citato unico studio controllato esistente.

Anche la comparazione dei risultati delle due diverse metodiche osservati nei due centri di appartenenza degli autori del presente lavoro non mostrano significative differenze né in termini di morbilità né di mortalità.

In conclusione, alla luce della letteratura e della personale esperienza, riteniamo che la scelta ricostruttiva dopo demolizione pancreatica per pancreatite cronica debba essenzialmente fondarsi sulla personale confidenza con una qualsiasi delle due citate opzioni.

Parole chiave: Terapia chirurgica, pancreatite cronica, duodenocefalopancreatetomia, pancreaticodigiunostomia, pancreaticogastrostomia.

pancreatic resection is historically different, using the jejunum in Verona and the stomach in Budapest.

Material

Despite the theoretical advantages of the derivative procedures in chronic pancreatitis in terms of decreased operative risk and preservation of pancreatic function (9) resections are reported to be safe and effective particularly in cases in which the pancreatic head is severely involved without significant dilatation of the pancreatic duct (16). On the other hand procedures such as duodenum-preserving resection of the head (17) or local head resection combined with pancreaticojejunostomy (18) have been introduced in order to avoid the disadvantages of pancreaticoduodenectomy. Both techniques are equally safe and effective with regard to pain relief and quality of life (19); moreover recently the comparable results of the Frey procedure with the pylorus preserving pancreaticoduodenectomy have been shown (20).

Therefore resection can be one of the selection in the management of chronic pancreatitis. The different type of reconstruction of the pancreato-intestinal continuity is still "the" controversial issue.

Jejunum or stomach both can be used. Generally speaking, despite the theoretical difficult mobilisation of the chronically inflamed pancreatic body to be ready for an end to side pancreato-gastric anastomosis with, the review of the reported experiences seems to suggest a general trend towards anastomosis with the stomach as a recent general policy (1-11). In fact the analysis is difficult because the reported series are seldom related to chronic pancreatitis patients only (10, 11, 13) but are reporting mixed data concerning mainly periampullary malignancies.

Moreover only one prospective randomized trial is reported (12).

Regarding the experiences of the present authors from the Surgical Department of the Verona University 547 patients

(62%) have been operated on out of 882 observed suffering from chronic pancreatitis.

The vast majority (438 patients) underwent derivations procedure (80%), meaning the latero-lateral pancreaticojejunostomy described by Partington - Rochelle and the Frey partial head resection. One hundred and nine (20%) underwent resection (61 Puestow, 43 pancreaticoduodenectomy and 5 total pancreatectomy).

The 1st Surgical Department of the Semmelweis University of Medicine in Budapest represents one of the pioneers in proposing the pancreaticogastrostomy for the reconstruction following pancreaticoduodenectomy (15).

From 1983 to 1998 a total of 315 pancreaticogastric anastomosis have been performed, 188 (59%) of these for benign disease.

Results

As already stressed, the most frequent reconstruction technique for the pancreatic remnant following glandular resection is pancreaticojejunostomy; although the mortality rate has been dramatically reduced the leakage from this type of anastomosis remains in the rate of 10% (1).

Our review shows now about 500 patients having had a pancreaticogastrostomy with a possible leak in 3% of the cases.

As underlined previously it is not always easy to find a clear distinction between patients who underwent surgery with a normal "soft" pancreas (more prone to complications related to the anastomosis) from patients with a chronic inflammatory "hard" tissue (21,22); anyway the difference (10% vs 3%) seems to be clinically remarkable.

This feeling is confirmed looking at the single reported series.

Keeping specific attention to data coming from clinical experiences during 90's, Sauvanet (2) in 1992 reported 32 consecutive cases of duodenopancreatectomy with 15 out of 32 being "sclerotic" pancreas.

Postoperative complications occurred in five patients (16%). Only two complications were related to pancreaticogastrostomy: one patient had intragastric bleeding of the anastomosis and was reoperated on and, another one, with a normal pancreatic tissue, developed a pancreatic fistula (3%) treated conservatively.

Still in 1992 Miyagawa (5) in 52 consecutive, not randomized patients undergoing pancreaticoduodenectomy performed 31 pancreaticojejunostomy and 21 pancreaticogastrostomy. Mortality rate was 6% in pancreaticojejunostomy versus zero in pancreaticogastrostomy. Six patients had leakage from the pancreaticojejunostomy but only one had necrosis of the gastric stump and leakage from the pancreaticogastrostomy.

No statistical significance in operating time or blood loss

was observed between the two methods. The pancreaticogastrostomy cases without complications had significantly less loss of body weight than those with pancreaticojejunostomy at the date of discharge ($p < 0.05$).

In 1993 Arnauld (3) treated 32 patients with pancreaticogastrostomy; only four had chronic pancreatitis. There were two postoperative deaths (6%) one of which could in part have been due to the anastomotic technique, too tight anastomosis resulting postoperative pancreatitis.

There was one pancreatic fistula (3%) which recovered with further surgery.

Retrospectively Mason in 1995 (1) found 34 pancreaticogastrostomy and 23 pancreaticojejunostomy out of a total of 57 identified duodenopancreatectomy cases. No leaks in any pancreaticogastrostomy were observed, whereas 4 leaks and 2 deaths occurred in the other group.

The average length of stay was 15.5 days for the pancreaticogastrostomy and 14 days for the pancreaticojejunostomy group excluding those who died or had leakage.

The ten patients having a pylorus-sparing operation had an average postoperative stay of 16 days including both types of reconstruction.

Fabre (23) in 1998 reported, in a prospective not randomized trials, the results on 160 consecutive cases (13% with chronic pancreatitis). The hospital mortality was 3% and the rate of fistulas was 2.5%. The texture of the pancreatic remnant did not influence the occurrence of both fistula and gastric emptying.

As regards to the side-to-side pancreaticogastrostomy for chronic pancreatitis the most numerous experience reported in the literature comes from Denmark and Hungary.

Ebbehoj (10) treating 45 patients reported a high mortality rate (4.5%) and good results in the pain control at a median follow-up period of 3.8 years in only 56% of cases. Fair and poor results were achieved in 23% and 21% respectively. The Hungarian experience (not published in English literature) shows a general trend toward the routine of pancreaticogastrostomy for pancreatic derivations. During 1997 out of the 132 derivative procedure done for chronic pancreatitis 100 (75.8%) were pancreaticogastric without mortality.

Unfortunately, despite the general trend in the neither prospective nor randomised trials reported in the literature to show a lower rate of complications related to the gastric versus jejunal anastomosis with the pancreatic remnant, the only prospective randomised trial up to date to the best of our knowledge does not confirm these feelings.

Yeo (12) randomized 145 patients. The pancreaticogastrostomy ($n = 73$) and pancreaticojejunostomy ($n = 72$) groups were comparable with regards to many parameters, including demographics, medical history, preoperative laboratory values and intraoperative factors

such as operative time, blood transfusion, pancreatic texture, length of pancreatic remnant mobilized and pancreatic duct diameter.

The overall incidence of pancreatic fistula, defined as drainage of greater than 50 mL of amylase rich fluid on or after postoperative day 10, was similar for the two tested procedures (12% in pancreaticogastrostomy and 11% in pancreaticojejunostomy).

Factors significantly increasing the risk of pancreatic fistula were ampullary or duodenal malignancies, "soft" pancreas, longer operative time, greater intraoperative red blood cell transfusion and lower surgical volume ($p < 0.05$).

In our experience of 315 pancreaticogastrostomy performed for the management of the pancreatic remnant following pancreato duodenectomy in the 1st Surgical Department of Semmelweis University of Medicine, 188 were done in benign disease. The results achieved in terms of morbidity and mortality are reported in Tab. I.

The overall rate of pancreatic fistula was 5% but there was an increase of fistula formation where the pancreatic tissue was "soft" (4.2% versus 6.3% in the benign and malignant groups respectively).

Table II reports the data of the Surgical Department of the Verona University with pancreaticojejunostomy. The comparison seems to show no statistical difference for both morbidity and mortality.

Discussion

Even in centres in where the first choice in the surgical management of chronic pancreatitis is a derivative procedure some selected patients require resection (9).

The problem we here facing is the type of reconstruction

Tab. I – RESULTS OF PANCREATICOGASTROSTOMY FOR THE MANAGEMENT OF PANCREATIC REMNANT FOLLOWING PANCREATODUODENECTOMY. (1st SURG. DEPT. SEMMELWEIS UNIVERSITY-BUDAPEST)

Lesions	Number	Reoperation	Leak	Mortality
Malignant	127	28 (22%)	8 (6.3%)	12 (9.4%)
Benign	188	15 (8%)	8 (4.2%)	6 (3.2%)
Total	315	43 (13.6%)	16 (5%)	18 (5.7%)

Tab. II – RESULTS OF PANCREATICOJEJUNOSTOMY AFTER PANCREATIC DEMOLITION IN CHRONIC PANCREATITIS (SURG. DEP. UNIVERSITY OF VERONA)

	Number	Reoperation	Leak	Mortality
DP	43	4(9.3%)	3(6.9%)	1(2.3%)
LP	61	1(1.6%)	5(8.1%)	2(3.2%)
Total	104	5(4.8%)	8(7.6%)	3(2.8%)

DP: Duodenopancreatectomy
LP: Left pancreatectomy

following glandular resection; the most popular solution still seems to be the pancreaticojejunostomy.

The gastric derivation shows several theoretical advantages.

A favourable factor from the technical point of view is the presence of a thicker gastric than jejunum wall. The blood supply is excellent that favours better wound healing. On the other hand there seems to be an increase risk of postoperative gastrointestinal haemorrhage the site of origin being the cut pancreatic surface. This might be due to the larger gastric than the jejunal lumen. This factor does not favour spontaneous clotting; a perfect haemostasis, with stitches rather than electrocoagulation, is essential (23). Bleeding, if present, can be controlled endoscopically.

In pancreaticogastrostomy the presence of a long jejunal blind loop is eliminated. Because the preparation of a jejunal Roux loop is unnecessary the operative time is shortened. Finally with the easily controllable naso-gastric-pancreatic stent the juice is derived from the anastomotic site.

From the physiological point of view the lack of enterokinase in the gastric mucosa prevent protease activation (8) and then acute pancreatitis and late duct stenosis; moreover, the alkalisation avoids marginal ulceration.

Pain and Knight (24) noted a higher incidence of steatorrea in pancreaticogastrostomy for chronic pancreatitis and Johnson (25) demonstrated, many years after operation, the presence of pancreatic enzymes secretion in response to hormonal stimulation.

Statistical evaluation of the 24 hours gastric pH monitoring before and after operation in humans did not show alterations in gastric pH levels (11).

In most common problematic postoperative complication reported in prospective (23) or randomised (12) studies is the delayed gastric emptying: the rate is 22% in both trials (independently of pylorus-preserving or classic Whipple procedure or the type of pancreatic anastomosis). The cause is unknown and clinical findings do not correlate with the presence of a gastric filling defect during upper gastrointestinal radiographic series (26).

Some technical details must be underlined (1, 23): the pancreatic remnant should be freed from the splenic vein and artery to allow it to lie upright without strain against the gastric wall. This is not always easy in chronic pancreatitis. The gastrotomy through which the pancreas is inserted should be tight and secured with one layer of adsorbable interrupted stitches. In order to prevent the Wirsung duct from closure during the anastomosis the main pancreatic duct should be stented with a catheter. Following these recommendations (together with the already stressed need of a careful haemostasis) the edge of the gland protrudes in the lumen by 1-2 cm.

In conclusion, the analysis of the literature and the comparison between the results of our two institutions do not show a clear superiority of one or the other technique.

The pancreaticojejunostomy being the more popular generally it seems important to underline that it did not prove to be safer and more effective either.

Further prospective randomized trials are needed in order to define if the "gastric way" is really better in terms of postoperative complications as stressed by several not controlled studies.

The only randomized trial performed until now does not support this feeling. The common conclusion from this review by authors working in centres with close scientific collaboration but different approach to the pancreatic anastomosis is: "make your choice on the basis of your best confidence and experience with any of the two methods".

The ideal goal in clinical practice and for future studies should be the capability in doing both to be able to apply it depending upon the particular case.

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