Pancreaticojejunostomy versus pancreaticogastrostomy: systematic review and meta-analysis


CRD summary
The authors concluded that, based on randomised controlled trials, there was no significant difference between pancreaticojejunostomy and pancreaticogastrostomy after pancreaticoduodenectomy. In contrast, observational studies found pancreaticogastrostomy to be superior to pancreaticojejunostomy; however, these results were likely to have been influenced by publication bias. Despite the limited search, this was generally a well-conducted review and the authors' conclusions are likely to be reliable.

Authors' objectives
To compare the effectiveness of pancreaticojejunostomy (PJ) versus pancreaticogastrostomy (PG) anastomosis in reducing post-surgery complications and mortality in patients who have undergone pancreaticoduodenectomy (PD).

Searching
MEDLINE (1966 to March 2006) and the Cochrane CENTRAL Register were searched using the reported search terms. In addition, the reference lists of identified studies were screened.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and observational clinical studies (OCS; defined as cohort or case-control studies) were eligible for inclusion in the review.

Specific interventions included in the review
Studies that compared PJ with PG were eligible for inclusion. Over half of the included observational studies were conducted in study centres experiencing a time of change from the originally used PJ to the PG technique. Where reported, the overall operation time ranged from an average of 3.6 to 9.1 hours.

Participants included in the review
Studies of patients who had undergone PD were eligible for inclusion. The majority of participants in the included studies had undergone PD due to various types of cancer (pancreatic ductal carcinoma, duodenal carcinoma, ampullary carcinoma and distal bile duct carcinoma). The average age of the participants ranged from 48.2 to 65.5 years. Most of the included studies reported more male than female participants.

Outcomes assessed in the review
Studies that reported quantitative data on complications, mortality and hospital stay were eligible for inclusion. The complications assessed were complications overall, pancreatic fistula, intra-abdominal fluid collection, delayed gastric emptying and bile leak. The included studies used a variety of definitions to describe pancreatic fistula.

How were decisions on the relevance of primary studies made?
Two reviewers independently conducted literature searches and selected studies for inclusion.

Assessment of study quality
Two reviewers independently assessed the quality (allocation concealment, blinding, randomisation, sample size and definition of pancreatic fistula) of the RCTs. All studies were also graded using the hierarchy of study design described by the Centre of Evidence-Based Medicine (Oxford, UK).

Data extraction
Two reviewers independently extracted the data.
Methods of synthesis
How were the studies combined?
RCTs and OCS were analysed separately. Pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using the random-effects model of DerSimonian and Laird; individual studies were weighted by sample size. Pooled weighted mean differences (WMDs) with 95% CI were calculated for continuous data. A funnel plot based on the rate of pancreatic fistula among OCS was used to assess publication bias.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the I-squared statistic. Higher quality (level 2b evidence) OCS were analysed separately and the results compared with the pooled analysis of all OCS.

Results of the review
Sixteen studies (n=2,150) were included: 3 RCTs (n=445) and 13 OCS (n=1,705).

RCTs.

One study reported a sample size calculation. Two studies performed intra-operative randomisation but only one described the methods used. One study reported blinding and one defined outcome measures. The RCTs were graded as level 1b evidence.

There was no significant difference between PG and PJ in overall post-operative complications (OR 0.93, 95% CI: 0.63, 1.38, p=0.71), mortality (OR 1.10, 95% CI: 0.42, 2.93, p=0.51) or pancreatic fistula (OR 0.85, 95% CI: 0.50, 1.44, p=0.54). No statistical heterogeneity was found for these analyses.

There was no significant difference between PG and PJ in intra-abdominal fluid collection, delayed gastric emptying or bile leakage, but the results were statistically heterogeneous.

Length of hospital stay was significantly shorter in the PG group than in the PJ group (WMD -0.73, 95% CI: -1.42, -0.05, p=0.04; based on 2 studies).

OCS.

Six studies were classified as level 2b evidence; the other seven were graded as level 4 evidence.

The funnel plot based on pancreatic fistula suggested the absence of smaller studies showing no benefits for PG.

The studies showed a statistically significant reduction in post-operative complications (OR 0.53, 95% CI: 0.34, 0.82, p=0.005; based on 2 studies), pancreatic fistula (OR 0.22, 95% CI: 0.12, 0.40, p<0.0001; based on 12 studies), mortality (OR 0.36, 95% CI: 0.22, 0.58, p<0.0001; based on 12 studies), intra-abdominal fluid collection (OR 0.47, 95% CI: 0.24, 0.92, p=0.03; based on 5 studies) and bile leak (OR 0.32, 95% CI: 0.13, 0.79, p=0.01; based on 7 studies) in patients who had undergone PG compared with PJ. There was evidence of heterogeneity when comparing pancreatic fistulae.

There was no significant difference between PG and PJ in delayed gastric emptying or length of hospital stay. The results for length of hospital stay were heterogeneous.

Analysis of only higher quality OCS papers revealed no statistically significant differences.

Authors' conclusions
RCTs showed no significant differences between PJ and PG, suggesting the results were similar for both techniques, whereas observational studies showed PG to be superior to PJ, but the results were likely to have been influenced by publication bias. This highlights the need for basing surgical practice on well-designed RCTs.
CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Only two databases were searched, which might have resulted in the omission of other relevant studies. The authors acknowledged that publication bias likely influenced the results from the OCS, although the limited search might also have resulted in the omission of valid RCTs. Two reviewers independently selected the studies, assessed validity and extracted the data, thus reducing the potential for reviewer bias and errors. Study validity was assessed using defined criteria and the results reported. The studies were appropriately grouped by study design and separate meta-analyses were conducted. Statistical heterogeneity was assessed and the studies were appropriately pooled. Apart from the limited search, this was a well-conducted review and the authors' conclusions are likely to be reliable.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.

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