
Systematic review and meta-analysis of case-matched studies comparing open and laparoscopic distal pancreatectomy: is it a safe procedure?

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CRD summary

This review concluded that laparoscopic distal pancreatectomy appeared to be safe and at least comparable to the open procedure, but randomised trials were required to confirm these findings. The authors' conclusion was suitably cautious, but the evidence was limited and the conclusion should be considered to be tentative.

Authors' objectives

To assess the safety of open compared with laparoscopic distal pancreatectomy, in adult patients.

Searching

MEDLINE, EMBASE, Web of Knowledge, and Cochrane Database of Systematic Reviews were searched for studies published in English between 1992 and January 2011; limited search terms were reported.

Study selection

Studies comparing laparoscopic with open distal pancreatectomy, in adults, were eligible for the review. Studies had to include matched comparisons and score more than 5 out of 9 on the Newcastle-Ottawa Scale. Studies of fewer than 10 people; of combined operations other than splenectomy; and where the data from robotic distal pancreatectomy, hand-assisted laparoscopic distal pancreatectomy, and laparoscopic enucleations could not be separated from laparoscopic distal pancreatectomy, were excluded. Studies were assessed for institution and author overlap, and where either was demonstrated, the study with fewer patients was excluded. Safety outcomes of interest included blood loss, tumour size, operative time, hospital stay, prevalence of pancreatic leak, splenic preservation, morbidity (complications), and mortality.

In the included studies, the mean age of patients ranged from 47 to 65 years, their mean body mass index ranged from 22 to 28 kg per m², and approximately half the patients were female, where reported. All studies matched their two groups by age and diagnosis, three studies matched by gender as well, and one study matched by status and tumour size as well. One study was multicentre with eight separate sites and the remaining three studies were in single centres. Studies were published between 2006 and 2010.

Two reviewers independently selected studies for the review, with disagreements resolved through discussion.

Assessment of study quality

Studies were assessed for quality using the Newcastle-Ottawa Scale for non-randomised studies. Criteria covered the representativeness of the exposed cohort, the selection of the non-exposed cohort, ascertainment of exposure, absence of outcome at the study start, comparability, assessment of outcomes, and the length and adequacy of follow-up.

Two reviewers independently assessed study quality.

Data extraction

Data were extracted on the outcomes to enable the calculation of odds ratios, for binary data, and mean differences, for continuous data, together with 95% confidence intervals. Where necessary, the data were converted for uniformity.

Two reviewers independently extracted data for the review and compared their results.

Methods of synthesis

Where possible, the results of the studies were pooled in meta-analyses and summary effect odds ratios and weighted mean differences, together with 95% confidence intervals, were calculated using both fixed-effect (inverse-variance or Mantel-Haenszel weights) and random-effects models (DerSimonian and Laird). Heterogeneity was assessed using X^2 and I^2 , and a fixed effect model was reported in the absence of heterogeneity. Publication bias was assessed by

inspection of the funnel plots and using the Harbord modified test.

Results of the review

Four studies, with 665 participants (range 30 to 342), were included in the review. All studies were retrospective and case matched. Three had scores of 7, and one had a score of 8 for quality. Only one study had a representative exposed cohort; three had adequate selection of the non-exposed cohort.

Compared with open pancreatectomy, laparoscopic pancreatectomy was associated with a significantly increased operation time (WMD 17.7 minutes, 95% CI 1.5 to 33.9; $I^2=0$; two studies) and a significantly reduced hospital stay (WMD -2.7 days, 95% CI -3.5 to -2.0; $I^2=0$; three studies).

There was no evidence of significant differences in the rates of pancreatic leak (four studies), death (two studies), and morbidity (four studies) between groups. For the meta-analysis of morbidity, significant heterogeneity was identified. The results were reported from both fixed-effect and random-effects models, and they did not change markedly between them.

Two studies reported less blood loss in the laparoscopic group than in the open group, but they were not combined and no values were reported. Two of three studies reported that significantly larger tumours were removed in the open group than in the laparoscopy group, with the other study finding no significant difference.

There was no evidence of publication bias.

Authors' conclusions

Laparoscopic distal pancreatectomy appeared to be safe and at least comparable to the open procedure, but randomised trials were required to confirm these findings.

CRD commentary

The review addressed a clear research question, supported by adequate inclusion criteria. Relevant sources were searched for studies published in English; the authors did not report a search for unpublished studies, so language and publication bias cannot be ruled out. Appropriate methods were used to select studies, extract the data, and assess their quality, minimising the chance of reviewer error or bias. Only four studies met the inclusion criteria. They had high overall quality scores, but small samples and they were retrospective, with case matching, so there was a considerable likelihood of bias.

The data on morbidity and blood loss were reported in different ways, in the included studies, and case matching differed between studies, making it difficult to combine their results in meta-analyses. The synthesis and assessment of heterogeneity were appropriate, but there were too few studies for publication bias to be adequately assessed in funnel plots. The authors applied strict inclusion criteria to minimise the chances of bias in the review, but they reported differential results for morbidity and publication bias, for the excluded unmatched studies, compared with the included matched ones.

The authors' conclusion was suitably cautious, but the evidence was limited and the conclusion should be considered to be tentative.

Implications of the review for practice and research

Practice: The authors stated that the reduction in hospital stay with laparoscopy could result in considerable cost savings.

Research: The authors stated that randomised controlled trials were needed to adequately evaluate the safety and efficacy of laparoscopic distal pancreatectomy.

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