Does external pancreatic duct stent decrease pancreatic fistula rate after pancreatic resection? A meta-analysis
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CRD summary
This review concluded that use of an external pancreatic duct stent reduced the leakage rate from pancreatic anastomosis, after pancreatic resection. The large consistent effect suggests that this conclusion is likely to be reliable, despite the limitations of the evidence from six moderate-sized studies of variable quality.

Authors' objectives
To determine the effectiveness of an external pancreatic duct stent, for decreasing pancreatic fistula rates, after pancreatic resection.

Searching
MEDLINE, EMBASE, and The Cochrane Library were searched for studies in English, included up to March 2011. Reference lists were searched, and the search terms were specified.

Study selection
Eligible for inclusion were randomised controlled trials or observational clinical studies, comparing pancreatic resection with external stenting versus pancreatic resection without stenting. The studies had to report the number of pancreatic leaks, morbidity rate, hospital mortality, or length of hospital stay. They had to report standard deviations for continuous outcomes, or information to allow their calculation. Case reports were excluded.

The included studies lasted from three to six years. Most of them used the end-to-side technique, and there was a mixture of male and female participants, with the mean age ranging from 58 to 68 years. There were no significant differences between treatment groups at baseline. Studies were conducted in Japan, Thailand, Hong Kong, Germany or France, between 1994 and 2009. The reported outcomes were operative time, blood transfusion requirements, overall morbidity, pancreatic fistula rate, delayed gastric emptying, wound events, intra-abdominal abscess and collection, haemorrhage, gastric outlet obstruction, cardiac events, pulmonary complications, re-intervention, mortality, and length of hospital stay.

The study selection procedure (number of selectors) was unclear.

Assessment of study quality
Randomised controlled trials were assessed using the JADAD scale. Observational studies were scored for prospective versus retrospective data collection, assignment to treatment group on a basis other than surgeon preference, and explicit definition of pancreatic fistula, on a four-point scale.

The number of reviewers who assessed quality was not reported

Data extraction
The event rates were extracted to allow the calculation of odds ratios and 95% confidence intervals, for binary outcomes. Continuous outcome data were extracted, where the mean and a measure of variation were available, for each arm of the study, to calculate mean differences and 95% confidence intervals.

Two reviewers independently extracted the data.

Methods of synthesis
Study effect sizes (odds ratios or mean differences) were pooled using unspecified fixed-effect models. Heterogeneity was quantified using $I^2$ and $X^2$, where $I^2$ of greater than 50% indicated substantial heterogeneity.

Subgroups were explored for randomised versus observational studies, and studies using end-to-side ducts versus the mucosa technique. Visual inspection of a funnel plot was used to assess the potential for publication bias.
Results of the review
Six studies, with 610 patients (range 45 to 158), were eligible for inclusion. Three were randomised controlled trials and three were observational clinical studies. Study quality was variable: randomised controlled trials scored 2 or 3 on the Jadad scale; two of the three observational studies scored 1 for quality.

Use of an external pancreatic duct stent was associated with a statistically significant reduction in overall postoperative morbidity (OR 0.56, 95% CI 0.39 to 0.81; four studies), pancreatic fistula rate (OR 0.34, 95% CI 0.23 to 0.51; six studies), delayed gastric emptying (OR 0.44, 95% CI 0.25 to 0.80; five studies), and length of hospital stay (WMD -3.95 days, 95% CI -6.38 to -1.52; three studies). There was low to moderate heterogeneity in these analyses.

There were no detectable differences between external stents and no stent, for the other outcomes. There was no detectable funnel plot asymmetry, associated with publication bias, for the pancreatic fistula rate. The results of additional analyses were reported.

Authors' conclusions
The use of an external pancreatic duct stent reduced the leakage rate, from pancreatic anastomosis, after pancreatic resection.

CRD commentary
This review addressed a clear question, using appropriate inclusion criteria, search strategy, and quality assessment. Appropriate methods were used to extract and synthesise the outcome data. The evidence was limited, as the three randomised trials were small, and the other three studies were not randomised. The lack of effect may be due to a lack of statistical power rather than no actual effect, but most of the reported outcomes were consistent with a beneficial effect of stenting irrespective of their precision. The effect for pancreatic fistula was large and consistent, and all other detectable differences between external stents and no stent were beneficial.

The authors' conclusion is likely to be reliable, despite the uncertainty inherent in a synthesis based on six moderate-sized studies of variable quality.

Implications of the review for practice and research
No implications were stated.

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