Advanced age is a risk factor for post-operative complications and mortality after a pancreaticoduodenectomy: a meta-analysis and systematic review

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CRD summary
The review concluded that there was an increased risk of postoperative mortality and pneumonia among elderly patients following pancreatic surgery. The authors' conclusions were based on the evidence and seem reasonable. Potential for biases and uncertain quality of the evidence means that some caution is warranted when interpreting results.

Authors' objectives
To determine whether advanced age was a risk factor for postoperative complications and mortality after major pancreatic surgery.

Searching
EMBASE, PubMed and Cochrane databases were searched between January 1990 and April 2012. Search terms were reported. Reference lists of included studies were searched.

Study selection
Studies that compared perioperative outcomes after pancreatic surgery in elderly patients (75 to 79 years and over 80 years) versus younger patients (under 70 or 80 years) were eligible for inclusion. Primary outcomes were perioperative mortality and incidence of postoperative complications. Secondary outcomes were considered and included wound infection, delayed gastric emptying, pneumonia and length of hospital stay.

The included studies were published between 1998 and 2012. The study population included pancreatic cancer, ampullary cancer, duodenal cancer and bile duct cancer. Where reported, most studies included both male and female patients.

The authors did not state how many reviewers undertook study selection.

Assessment of study quality
There was no formal quality assessment. The authors stated that methodological qualities were assessed independently and discrepancies were resolved by discussion.

Data extraction
Data were extracted on primary and secondary outcomes and used to calculate odds ratios (ORs) and mean differences, together with 95% confidence intervals (CIs).

Three reviewers independently extracted the data.

Methods of synthesis
Fixed-effect meta-analysis was used to calculate pooled odds ratios and mean differences, together with 95% CIs. Data were analysed separately for patients over 80 years and over 75 years. The I² statistic was used to assess statistical heterogeneity. Funnel plots were used to assess publication bias.

Results of the review
Eleven studies were included in the review (5,186 patients, range 60 to 2,698): four studies of patients over 80 versus under 80 years and seven studies of patients over 75 versus under 75 years.

Patients over 75 years versus under 75 years: Compared with younger patients, patients over 75 years had statistically significantly higher postoperative mortality (OR 5.67, 95% CI 2.14 to 15.02; I²=0%; five studies) and pneumonia (OR 5.03, 95% CI 2.45 to 10.34; I²=31%; six studies). There was no significant difference for length of stay, postoperative complications, pancreatic fistula, wound infection, delayed gastric emptying and bleeding.
Patients over 80 years versus under 80 years: Compared with younger patients, patients over 80 years had statistically significantly higher postoperative mortality (OR 2.14, 95% CI 1.15 to 3.98; I²=0%; four studies), postoperative complications (OR 1.62, 95% CI 1.30 to 2.03; I²=31%; four studies) and pneumonia (OR 2.82, 95% CI 1.62 to 4.92; I²=72%; three studies). There was no significant difference in pancreatic fistula, wound infection and delayed gastric emptying.

The authors deemed that there was minimal evidence of publication bias.

Authors' conclusions
There was an increased risk of postoperative mortality and pneumonia among elderly patients following pancreatic surgery.

CRD commentary
Inclusion criteria for the review were broadly defined and three relevant databases were searched. Publication bias was assessed but the value of an analysis with fewer than 10 studies is limited. Attempts were made to reduce reviewer error and bias during data extraction but it was not clear that the same attempts were made for study selection. Quality assessment was not undertaken using a standard checklist and few study details were provided, which made determining the reliability of the evidence base difficult. The authors noted that some of the included studies were retrospective and so more prone to biases.

Data were combined using fixed-effect meta-analysis. Substantial statistical heterogeneity was detected in one analysis, which may mean that a random-effects model should have been considered. The authors noted that the increased prevalence of comorbidities among elderly patients may have biased results. They also noted that factors such as surgical expertise may have introduced confounding into the analysis.

The authors’ conclusions were based on the evidence and seem reasonable. Potential for biases and uncertain quality of the evidence base means that some caution is warranted when interpreting results.

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

Research: The authors stated a need for additional randomised controlled trials on postoperative outcomes following pancreatic surgery in elderly versus younger patients with standardised comorbidities.

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