Meta-analysis of relaparotomy for secondary peritonitis
Lamme B, Boermeester M A, Reitsma J B, Mahler C W, Obertop H, Gouma D J

Authors' objectives
To compare the effectiveness of planned relaparotomy and relaparotomy on demand in patients with secondary peritonitis.

Searching
MEDLINE, the Cochrane Database of Systematic Reviews, the Cochrane Controlled Trials Register, DARE, Current Controlled Trials and EMBASE were searched from inception to January 2001 for potentially relevant studies; the keywords and MeSH terms were reported. In addition, a manual cross-reference search of the eligible papers was performed to identify further relevant articles. It was unclear whether any language restrictions were applied.

Study selection
Study designs of evaluations included in the review
All study designs were eligible for inclusion. The review was based upon observational studies, which were defined as effectiveness studies using data from existing databases, cross-sectional studies, case series, case-control studies, or studies with a historical control or a cohort design.

Specific interventions included in the review
Studies that compared a planned relaparotomy with a relaparotomy on-demand strategy in patients who had undergone an initial laparotomy for secondary peritonitis were eligible for inclusion.

Participants included in the review
Participants with secondary peritonitis were eligible for inclusion. Secondary peritonitis was defined in the review as an intra-abdominal sepsis caused by perforation, infection, ischaemia, or necrosis of part of the digestive tract or visceral organ, or peritonitis due to a post-operative complication. Participants aged less than 18 years, or with peritonitis due to continuous ambulatory peritoneal dialysis or with pancreatitis, were excluded from the review. The population included ranged from participants with severe generalised peritonitis to those with intra-abdominal infection due to a post-operative complication. The median severity of disease (where stated), as expressed by the Acute Physiology And Chronic Health Evaluation (APACHE) II score, was higher in the planned relaparotomy group at 15.9 (range: 10.0 to 17.6) than in the on-demand relaparotomy group at 10.5 (range: 10.0 to 11.8).

Outcomes assessed in the review
Studies that reported in-hospital mortality data were included.

How were decisions on the relevance of primary studies made?
Three reviewers independently assessed the studies for inclusion in the review, with any disagreements resolved by discussion.

Assessment of study quality
Validity was assessed in terms of the methods of randomisation, the timing of treatment strategies, adjustment for baseline differences and criteria used. Three independent reviewers evaluated the quality of the studies, with any disagreements resolved by discussion.

Data extraction
Three reviewers independently extracted the data, with any disagreements resolved by discussion. Data were extracted on the participant population, intervention and outcome measures. The odds ratio (OR) for in-hospital mortality was calculated for each study.
Methods of synthesis
How were the studies combined?
The studies were combined in a meta-analysis using either a fixed-effect or random-effects model. When significant heterogeneity was found, the random-effects method was used to calculate the pooled OR. The authors made no attempt to assess publication bias.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test, with a P-value of less than 0.05 being considered significant.

Results of the review
Eight observational studies were included (n=1,266: planned relaparotomy n=286; relaparotomy on demand n=980). Three studies were prospective, two were secondarily prospective and three were retrospective.

There was significant heterogeneity between the included studies (chi-squared 40.7, d.f.=7, P<0.001). The median mortality rate was 33% (range: 21 to 77) for the planned strategy and 22% (range: 12 to 89) for the on-demand strategy. The relative risk of both treatment strategies in the individual studies ranged from 6 to 78%. The pooled OR showed that the point estimates favoured the relaparotomy on-demand strategy, but as the confidence intervals (CIs) were wide and crossed unity this was not statistically significant (OR 0.70, 95% CI: 0.27, 1.80). Further stratified analysis of the results from the five prospective studies indicated that relaparotomy on demand was marginally significantly better than the planned strategy (OR 0.52, 95% CI: 0.27, 1.00, P=0.05). The four studies published from 1995 onwards produced an OR of 0.21 (95% CI: 0.09, 0.53).

Authors' conclusions
The combined results of observational studies showed a statistically non-significant reduction in mortality for the on-demand relaparotomy strategy compared with the planned relaparotomy strategy. However, owing to the non-randomised nature of the studies, the limited number of patients per study and the heterogeneity between studies, the overall results were inconclusive.

CRD commentary
The review question was well-defined in terms of the intervention, participants and outcome measures of interest. A number of databases were searched for relevant studies, but it was unclear whether any efforts were made to address either language or publication bias. The methods of the review were clearly reported, with adequate steps being taken to minimise bias and errors in the review process. However, the quality of the primary studies was only partially assessed. Details of the primary studies were tabulated. The studies were appropriately combined in meta-analyses using a random-effects model, and differences between the studies were examined. The authors discussed the limitations of the studies included in the review, and the impact these had on any conclusions that could be drawn. The authors' assessment that the overall results were inconclusive is warranted.

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

Research: The authors stated that there is a need for a well-designed, sufficiently large, randomised trial involving clearly defined patient groups to resolve the uncertainty about the best surgical strategy in patients with abdominal sepsis.

Bibliographic details
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.