CRD summary
This review found that liberal versus restrictive fixed-volume regimens were not well-defined, which precluded evidence-based guidelines for procedure-specific perioperative fixed-volume regimens. In spite of the potential for bias in the review process and unknown quality of the primary studies, these conclusions appear appropriate given the limitations of the primary data.

Authors' objectives
To compare a liberal and a restricted fixed-volume crystalloid perioperative fluid regimen in major surgery.

Searching
PubMed was searched from 1966 to 2008 for studies published in English. Search terms were reported. Review articles and citations in original papers were searched for additional studies.

Study selection
Randomised controlled trials (RCTs) of adults who underwent major surgery (older than 18 years) that compared the effect of two different fixed fluid volumes on at least one postoperative clinical outcome were eligible for inclusion. Most of the included studies were of major abdominal surgery (including colorectal procedures or a variety of abdominal procedures). One study included knee arthroplasty. American Society of Anaesthesiologists (ASA) class varied among participants; most were class II in the included studies. Epidural anaesthesia was used perioperatively, postoperatively or both in all studies except one. Most studies also provided fluid additional to the fixed-volume regimen. The range of the liberal intraoperative fluid regimen was 2,750mL to 5,388mL; the range of the restrictive fluid regimen ranged from 998mL to 2,740mL. The primary outcomes reported in most studies were wound infection, gastric emptying time, pulmonary function, postoperative complications and death. Fluids used included colloids (hydroxyl ethyl starch 130/0.4 and 200/0.5) and crystalloids (Ringer's lactate and saline plus dextrose or glucose).

The authors stated neither how the papers were selected for the review nor how many reviewers performed the selection.

Assessment of study quality
The authors did not any state any intent to assess validity, but reported the level of blinding. The number of reviewers that assessed blinding was not reported.

Data extraction
The authors stated neither how data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
The studies were pooled in a narrative synthesis and grouped according to outcome (improved, no difference and difference). Tables were available for examination of between-study differences.

Results of the review
Seven RCTs were included in the review (n=705).

Two RCTs were double-blinded and in another three studies the assessor was blinded. The studies used different definitions of the intraoperative and postoperative periods and different definitions of end points for outcomes.

Improved outcomes: Three of the seven RCTs reported improved outcomes with a restrictive fluid regimen after major abdominal surgery. Two RCTs reported improved gastro-intestinal recovery and a reduced length of stay from nine to six days and from nine to eight days. Two RCTs showed reduced rates of complications.
No difference in outcomes: Two RCTs found no difference between liberal and restrictive fluid regimens in wound infection (one RCT) or gastro-intestinal recovery and length of stay (one RCT).

Difference in outcomes: Two RCTs reported benefit from a restrictive or a liberal fluid regimen in a number of different functional parameters (reported in the paper).

Authors' conclusions
Liberal versus restrictive fixed-volume regimens (definition, methodology and results) were not well-defined in the literature. Evidence-based standardised perioperative care principles were either not used or no information was provided, which precluded evidence-based guidelines for procedure-specific perioperative fixed-volume regimens.

CRD commentary
The research question was supported by inclusion criteria for participants, intervention, outcome and study design. The search was limited to one database and restricted to published papers in English; therefore, publication and language biases could not be ruled out. The review process was not described, so the potential for reviewer error and bias could not be assessed. The validity assessment was restricted to blinding and so the reliability of the results of these studies is unknown. A narrative synthesis appeared appropriate given differences between studies and study outcomes. In spite of the potential for bias in the review process and unknown quality of the primary studies, the authors' conclusions appear appropriate given the limitations of the primary data.

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

Research: The authors stated that optimal perioperative fluid management needed to be defined through procedure-specific studies combined with evidence-based principles for perioperative care (fast track surgery). The role of fluid therapy in outcome in high-risk patients needed to be evaluated.

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