Systematic review of laparoscopic live donor nephrectomy: update and re-appraisal

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Authors' objectives
To compare the safety and efficacy of laparoscopic, or laparoscopic-assisted, live donor nephrectomy with the 'gold' standard of open live donor nephrectomy.

Searching
MEDLINE (from 1966 to February 2000), Current Contents (1993 to week 7, 2000), the Cochrane Library (Issue 4, 1999) and EMBASE (from inception to February 2000) were searched; the search terms were reported. Non-English language articles were excluded.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials, controlled clinical trials, case series and case reports were eligible for inclusion. Other study designs were eligible for inclusion if felt to be relevant.

Specific interventions included in the review
Studies evaluating laparoscopic, or laparoscopic-assisted, live donor nephrectomy via extra/retroperitoneal or intra/transperitoneal approaches, with or without gas insufflation, were eligible for inclusion. The comparator had to be retroperitoneal or transperitoneal open donor nephrectomy, or a different laparoscopic, or laparoscopic-assisted, live donor nephrectomy. The interventions in the included studies were: transperitoneal/pneumoperitoneum laparoscopic live donor nephrectomy; transperitoneal/pneumoSleeve hand-assisted laparoscopic live donor nephrectomy; transperitoneal/retraction laparoscopic-assisted live donor nephrectomy; and retroperitoneal/retraction retroperitoneoscopic-assisted live donor nephrectomy, or open live donor nephrectomy.

Participants included in the review
Studies of live kidney donors, or live donor kidney recipients, were eligible for inclusion. Both human and animal studies were reviewed.

Outcomes assessed in the review
Studies reporting peri- and post-operative mortality or morbidity, operative time, blood loss and transfusions, changes in surgical procedure, analgesic requirements, graft functioning, convalescence, and rates of compliance by potential donors for the two techniques, were eligible for inclusion.

How were decisions on the relevance of primary studies made?
Two reviewers screened papers for inclusion, with disagreements resolved by consensus. It was not reported whether screening was undertaken independently by the two reviewers.

Assessment of study quality
Studies were assessed in relation to: the potential for observation bias; misclassification bias and selection bias; attempts to identify and control for confounding factors; the use of a power calculation and appropriate statistics; population characteristics, inclusion and exclusion criteria, and follow-up. The authors did not state who performed the validity assessment.

Data extraction
Data were extracted for the review onto predesigned forms, which were provided in the report. The authors did not state how many reviewers performed the data extraction. The results of statistical testing of the difference between laparoscopic, laparoscopic-assisted and open live donor nephrectomy groups on continuous variables were extracted.
from comparative studies. The relative risks and 95% confidence intervals were calculated for concurrently controlled studies with outcomes that involved count data.

**Methods of synthesis**

How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
The study results were tabulated, grouped by outcome.

**Results of the review**

Thirty human studies were included (n=1928): 15 non-randomised controlled clinical trials (level III evidence), one interrupted time series with no parallel control group (level III), 9 case series (level IV), and 5 case reports (level IV).

**Mortality.**

There was no reported donor mortality in any study. Three concurrently controlled trials showed no difference in the mortality of recipients between laparoscopic live donor nephrectomy and open nephrectomy.

**Operation times.**

Three out of 4 comparative studies reported shorter operating times for open nephrectomy compared with laparoscopic live donor nephrectomy, with a 20% reduction in time. One comparative study reported a significantly reduced operating time for hand-assisted laparoscopic live donor nephrectomy in comparison with laparoscopic live donor nephrectomy (P<0.05).

**Blood loss.**

Four comparative studies showed no significant difference in blood loss between laparoscopic live donor nephrectomy, retroperitoneoscopic-assisted live donor nephrectomy, laparoscopic-assisted live donor nephrectomy, or open nephrectomy.

**Analgesia.**

Three comparative studies reported significant reductions in either the amount or duration of analgesia required with laparoscopic live donor nephrectomy compared with open nephrectomy. Two comparative studies also reported that patients resumed oral analgesia significantly more quickly after laparoscopic live donor nephrectomy than after open nephrectomy.

**Donor complication rates.**

The results of 7 comparative studies were equivocal for laparoscopic live donor nephrectomy. Two studies reported fewer donor complications during laparoscopic live donor nephrectomy, while 3 studies reported fewer donor complications after open nephrectomy. One study reported fewer complications in people undergoing hand-assisted laparoscopic live donor nephrectomy compared with laparoscopic live donor nephrectomy. Another study reported the highest rate of complications with retroperitoneoscopic-assisted live donor nephrectomy, followed by laparoscopic-assisted live donor nephrectomy, with the lowest rate found with open nephrectomy.

**Conversion from laparoscopic to open nephrectomy.**

The conversion rates varied from 0 to 13.3% in 10 comparative studies evaluating laparoscopic live donor nephrectomy.
Six comparative studies reported a shorter hospital stay for people that underwent laparoscopic live donor nephrectomy (mean 2.2 to 3.1 days) than for those who underwent open nephrectomy (3.8 to 5.7 days); the reduction was statistically significant in 5 studies. Five of these studies also reported a 39 to 69% reduction in the time taken to get back to employment after laparoscopic live donor nephrectomy (2.3 to 3.9 weeks) in comparison with open nephrectomy (5.3 to 7.4 weeks).

Graft functioning and survival.

The results for delayed graft function were inconclusive. The results from 6 comparative studies indicated no difference between laparoscopic live donor nephrectomy and open live donor nephrectomy for graft survival.

Recipient survival.

The results from one concurrently controlled study indicated no difference between laparoscopic live donor nephrectomy and open live donor nephrectomy for recipient survival.

Authors’ conclusions
The safety and efficacy of laparoscopic live donor nephrectomy could not be established, owing to an incomplete and/or poor-quality evidence base.

CRD commentary
The review question was clear with regards to the intervention, participants, outcomes and study design. Relevant electronic databases were searched, but since only published English articles were included, this might have led to the introduction of publication bias. The screening of the studies was carried out in duplicate, and a validity assessment was undertaken. However, the authors did not report how the data extraction or validity assessment were carried out; it is therefore not possible to assess whether attempts to minimise error and bias were made. The decision to combine the studies in a narrative seemed appropriate given the clinical heterogeneity of the included studies. The authors’ conclusions appear to follow from the evidence presented.

Implications of the review for practice and research
Practice: For those wishing to undertake laparoscopic live donor nephrectomy, the authors recommended that this procedure should only be undertaken by surgeons with considerable experience in performing open live donor nephrectomy; any team undertaking laparoscopic live donor nephrectomy should have a surgeon with established experience in a range of laparoscopic procedures; and surgeons should update their knowledge of the techniques for laparoscopic live donor nephrectomy. Renal transplant units planning to undertake laparoscopic live donor nephrectomy should do a series of these and maintain records of the costs and outcomes of both techniques. The authors do not believe that laparoscopic live donor nephrectomy has advantages over open live donor nephrectomy.

Research: The authors recommended that a prospective concurrently controlled trial (ideally a randomised controlled trial) comparing laparoscopic live donor nephrectomy and open live donor nephrectomy should be undertaken.

Bibliographic details

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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.