A systematic review of laparoscopic live-donor nephrectomy

CRD summary
This review compared laparoscopic live-donor nephrectomy (LLDN) compared with open live-donor nephrectomy (OLDN). It concluded that LLDN seemed at least as safe and efficacious as OLDN in the short term, although the available evidence base was insufficient to make accurate comparisons of the two techniques. These limited conclusions are reasonable given the limitations of the primary research studies.

Authors' objectives
To assess the safety and efficacy of laparoscopic live-donor nephrectomy (LLDN) in comparison with open live-donor nephrectomy (OLDN).

Searching
MEDLINE, Current Contents, the Cochrane Controlled Trials Register, the Cochrane Database of Systematic Reviews, DARE, NHS EED and EMBASE were searched from inception to March 2003. The UK National Research Register, ClinicalTrials.gov and HTA were searched in March 2003. Grey literature, including international and national transplant conference proceedings, was searched from 1995 to March 2003. The search terms were reported and no language restrictions were applied. Further searches and checks based on identified studies were undertaken to locate additional studies.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and non-randomised comparative studies with concurrent or historical controls were eligible for inclusion. There were studies of all three designs in the review.

Specific interventions included in the review
Comparative studies using a laparoscope for live-donor nephrectomy were eligible for inclusion. Studies using hybrid open-laparoscopic approaches were excluded, as were studies in which laparoscope nephrectomy had been performed for a reason other than for live-donation. The included studies either compared LLDN with OLDN or compared different LLDN techniques.

Participants included in the review
Studies involving live human kidney donors and recipients with end-stage renal failure were eligible for inclusion. Studies where laparoscopic nephrectomy was used for any other purpose were excluded, unless the results of live-donor nephrectomy could be separated from other indications.

Outcomes assessed in the review
To be eligible for inclusion in the review, the studies had to have reported at least one of the following outcomes: peri- and post-operative morbidity and mortality of donors; intra-operative and early post-operative factors; graft function and survival; convalescence. The outcomes reviewed were donor mortality, donor conversion rate, donor complication rate, donor blood loss, donor peri-operative outcomes, donor convalescence, graft function and survival (including warm ischaemia times).

How were decisions on the relevance of primary studies made?
Two reviewers independently made decisions, and any disagreements were resolved by consensus.

Assessment of study quality
Methodological quality was judged on a number of factors: randomisation, allocation concealment, blinding, other
attempts to minimise bias, sample size, statistical power, statistical methods, generalisability and the quality of reporting. The authors did not state how the papers were assessed for quality, or how many reviewers performed the quality assessment.

Data extraction
The authors did not state how many reviewers performed the data extraction. The data were extracted using pre-designed standardised tables.

Complication rates were calculated for each study as the total number of complications reported divided by the number of donors or recipients.

Methods of synthesis
How were the studies combined?
The results of the individual studies were combined in a narrative for each outcome of interest. For some outcomes the results were also tabulated, grouped by study design.

How were differences between studies investigated?
Differences between the studies were not explicitly investigated.

Results of the review
The review included 44 studies, involving 4,249 participants in total. There was one RCT (50 participants), 6 non-randomised studies with concurrent controls (407 participants) and 37 non-randomised studies with historical controls (3,792 participants).

The RCT was of average to good quality. The non-randomised studies were largely limited by poor reporting of methodological detail, and many by the use of historical controls.

Safety.
There were no donor deaths with either LLDN or OLDN in the 8 studies reporting this outcome (longest follow-up 62 months). The rate of donor conversion from LLDN to an open procedure ranged from 0 to 13.3% (25 studies). Donor complication rates ranged from 5 to 26% for LLDN (22 studies) and from 0 to 38% for OLDN (17 studies). The types of complications reported differed for the two procedures. Estimated donor blood loss was higher in open procedures than in laparoscopic procedures, although this was not always statistically significant (12 studies). Donor transfusion rates and haemorrhage rates were similar with LLDN and OLDN.

Efficacy.
Operative times were significantly shorter for OLDN than LLDN (23 studies). Hand-assisted LLDN was significantly shorter than standard LLDN (3 studies). Donor narcotic use, both peri- and post-operatively, was lower with LLDN than OLDN (11 studies). The one RCT found no significant difference in time to oral intake between the two procedures. Length of hospital stay (19 studies), time to ambulation (4 studies) and time to return to work (7 studies) were significantly shorter for LLDN than OLDN in the majority of studies reporting these outcomes. Warm ischaemia time was significantly longer for LLDN than OLDN (11 studies), but significantly shorter for hand-assisted than standard LLDN (3 studies). Similar patterns in recipient creatinine levels were reported for the two procedures (24 studies). The rate of delayed graft function (19 studies) ranged from 0 to 12% with LLDN and 0 to 14% with OLDN, and in the two studies that reported a direct statistical comparison there was no significant difference. Similarly, the numbers of acute rejection episodes (16 studies) were similar with the two procedures and were not statistically significantly different in the two direct comparisons. Recipient complication rate ranged from 0 to 31% for LLDN and from 0 to 19% for OLDN (21 studies); standard LLDN had more complications than hand-assisted LLDN (2 studies). One-year graft survival rates ranged from 93 to 100% for LLDN and from 91 to 100% for OLDN (17 studies). One-year recipient survival was 97 to 100% for LLDN and 93 to 100% for OLDN (8 studies).
Cost information
The authors found 7 studies that reported cost data, but considered these too lacking in detail to provide any useful information.

Authors' conclusions
LLDN appeared at least as safe and efficacious as OLDN in the short term. However, the available evidence base was insufficient to make accurate comparisons of the two techniques. In addition, the technique was still in development and it was unclear whether hand-assisted or other modifications of LLDN were superior to standard LLDN.

CRD commentary
The review addressed a clear question, and the inclusion and exclusion criteria were well defined. A thorough search, involving attempts to locate unpublished material, was performed and it is unlikely that relevant studies were missed. Two reviewers independently selected the studies, which should have minimised the introduction of bias and errors at this stage. Study quality was assessed and the studies were grouped by study design in outcome tables. The authors acknowledged the likelihood of bias in the results of many of the included studies, the majority of which had historical controls. The conclusions of the review were accordingly cautious. The conclusions and recommendations appear reasonable given the limitations of the available primary evidence.

Implications of the review for practice and research
Practice: The authors stated that LLDN should no longer be considered a new procedure, and that appropriate training and accreditation for the technique should be defined.

Research: The authors stated that further high-quality studies are required, in particular to assess the long-term follow-up of donor complications and recipient graft function and survival.

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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.