Laparoscopic versus open live donor nephrectomy in renal transplantation: a meta-analysis


CRD summary
This review compared the effectiveness of laparoscopic with open donor nephrectomy in live donor transplantation and concluded that laparoscopic nephrectomy was a safe alternative to open nephrectomy. The review had a number of serious shortcomings making the authors’ conclusions unlikely to be reliable.

Authors' objectives
To compare the effectiveness of laparoscopic donor nephrectomy with open donor nephrectomy in live donor transplantation.

Searching
MEDLINE, EMBASE and Cochrane Database of Systematic Reviews were searched (1980 to December 2006) for studies published in English; search terms were reported. Reference lists of acquired articles were searched for further relevant studies.

Study selection
Studies that compared laparoscopic to open approaches in patients undergoing live donor nephrectomy and which documented the techniques used as either laparoscopic, hand-assisted or open were eligible for inclusion in the review. Studies also had to report at least one of the specified outcome measures, which fell into four categories: donor operative parameters; donor postoperative parameters; donor adverse events; and graft parameters. Studies of minimal-incision (mini-open technique) or gasless laparoscopic live donor nephrectomy were excluded.

Some patients in the included studies received hand-assisted laparoscopic nephrectomy. Most received either open or laparoscopic nephrectomy (mostly to retrieve the left kidney). A small number of patients needed to have laparoscopic surgery changed to open surgery (often due to bleeding). Operative time, overall complications and length of hospital stay were the most commonly reported outcomes.

The authors did not state how the studies were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Study quality was appraised using a modified version of the Newcastle-Ottawa scale, which assessed patient selection, comparability of groups and assessment of outcomes. Studies were scored on a scale of 0 to 9, except randomised controlled trials (RCTs). Studies with a score of 6 or more were considered to be of high quality. The authors did not state how the validity assessment was performed.

Data extraction
Odds ratios (OR) or weighted mean differences (WMD) were calculated, with 95% confidence intervals (CI), for individual studies. Standard deviations, when not provided, were calculated from means and ranges. Two reviewers independently extracted data. Discrepancies on outcomes were resolved by committee consensus.

Methods of synthesis
The authors stated that they used a Mantel-Haenszel random-effect model to pool ORs. Studies with no events in both groups were discarded from meta-analyses. Sensitivity analyses were performed to assess the effect of study design and quality, and date of publication. Publication bias was assessed using funnel plots. Heterogeneity was assessed using the $\chi^2$ statistic.

Results of the review
Seventy-three studies (n=6,594) were included in the review. Most studies were retrospective (some with a control group); some were prospective with a retrospective control group. There were also 18 prospective non-randomised
studies, and five RCTs. Quality scores ranged from 1 to 7 (out of 9). Funnel plots could not discount the possibility of publication bias.

Patients receiving open surgery had shorter operations WMD, 51.9 minutes (44 studies, 95% CI: 39.7, 64.1, p<0.001) and warm ischaemia times WMD, 102 seconds (24 studies, 95% CI: 102, 155, p<0.001) than the laparoscopic patients, but also had more overall complications OR 0.76 (44 studies, 95% CI: 0.63, 0.93, p=0.007).

Laparoscopic patients had a shorter hospital stay than open surgery patients WMD, -1.6 days (41 studies, 95% CI: -1.9, -1.3, p<0.001) and returned to work more quickly WMD -2.4 weeks, (20 studies, 95% CI: -3.2, -1.6, p<0.001).

There was highly statistically significant heterogeneity (p<0.001) for all four analyses. When the analyses were run for just the high quality prospective studies (which included the RCTs) the results remained statistically significant, except for overall complications where no statistically significant differences were seen between the groups. Further results were reported.

**Authors' conclusions**

Laparoscopic nephrectomy in live donor transplantation was a safe alternative to the open technique. Although open nephrectomy may be associated with shorter operative and warm ischaemia times, patients undergoing laparoscopic nephrectomy may benefit from a shorter hospital stay and faster return to work without compromising graft function.

**CRD commentary**

The review addressed a clear question and was supported by appropriate eligibility criteria. Attempts to identify relevant studies were made by searching databases and checking reference lists, but the restriction to include only studies published in English meant that relevant studies may have been missed. Although most studies were quality assessed, the RCTs appeared to have no such assessment, making it difficult to determine their reliability. It appeared that appropriate methods were used to extract data, but no details were given on methods used to select studies for inclusion or assess study quality, possibly leaving these processes open to reviewer error and bias. The authors confusingly reported they used a Mantel-Haenszel random-effect model to pool results; the reference list suggested they may have used a DerSimonian and Laird method. It was difficult to assess the full extent of clinical heterogeneity between the studies, since neither population nor learning curve details for individual studies were provided, but there was very significant statistical heterogeneity for several analyses. The authors also appeared to pool data from different study designs, and a narrative synthesis may have been more appropriate for many of the analyses they conducted (they ran around 80 analyses in total, increasing the possibility of reporting significant chance findings). Overall, this review had a number of serious shortcomings making the authors' conclusions unlikely to be reliable.

**Implications of the review for practice and research**

Practice: The authors stated that laparoscopic nephrectomy in live donor transplantation was a safe alternative to the open technique.

Research: The authors stated that further prospective trials were needed for a more comprehensive comparison of the two procedures.

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