

The Meta-analysis of randomized clinical trials comparing open and laparoscopic inguinal hernia repair

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This paper published in November 2003 provides a meta-analysis of randomized trials looking into laparoscopic versus open inguinal herniorrhaphy. The aim was to determine the relative merits of both types of repair. All randomized trials published in the English language between January 1990 and the end of October 2000 were identified. Standard technique of reporting at meta-analysis was employed using the quality of reporting of meta-analyses statement (QUOROM). The authors looked at six outcome variables; operating time, times to discharge from hospital, return to normal activity and return to work, post-operative complications and recurrence rate.

5588 patients were identified from 29 trials. There were 3017 laparoscopic and 2972 open herniorrhaphies.

Unpublished studies and abstracts presented at National and International meetings were excluded. Published studies including three or fewer outcome variables were also excluded as they were considered to contain insufficient information but every effort was made to obtain unpublished or missing data from the original authors. Duplicate publications were also excluded.

Open inguinal herniorrhaphy was performed using a variety of tension creating (Bassini, McVay, Shouldice, Maloney darn) and tension free (Stoppa, Lichtenstein, Gilbert and Rutow, Robbins) techniques. TAPP repair was the most common laparoscopic technique (22 studies) followed by TEP repair (6) and intraperitoneal onlay mesh repair (1). Thus there is a significant variability to the types of repair used in both arms of the meta-analysis creating significant heterogeneity.

For two outcomes (recurrence and operating time) the summary point estimate favoured open hernia repair over laparoscopic repair. For duration of operation there was a statistically significant increase of 15.2 minutes for laparoscopic versus open repair ($p < 0.001$). The relative odds of short term recurrence was increased by 50% after laparoscopic hernia repair compared with open hernia repair although this result was not statistically significant. Furthermore the authors recognise that in the early days of laparoscopic hernia repair there was a 20% risk of recurrence rate which was unacceptably high which was remedied early on by the use of larger size mesh to reinforce the entire weakened inguinal floor and cover all potential hernia sites adequately.

For the remaining outcomes the summary point estimates favoured laparoscopic over open repair. There was a statistically significant reduction of 38% in the relative odds of complications and the mean reduction in hospital stay of 3.43 hours. There was a reduction in time to return to normal activities of 4.73 days ($p < 0.001$) and in time to return to work of 6.96 days ($p < 0.001$).

The result of subgroup analysis comparing TAPP and TEP showed that for all outcomes except hospital discharge the direction of affect was consistent.

Of the 28 trials reporting duration of operation 19 revealed statistically significantly longer operations for laparoscopic than for open herniorrhaphy. Pooling these trials revealed an overall significantly longer operating time for laparoscopic. Subgroup analysis showed this trend for both TAPP and TEP against both tension free and tension creating open repairs. This has implications to healthcare providers. However against this the majority of trials showed a trend towards earlier discharge from hospital after laparoscopic repairs. However it has to be said that in sensitivity analysis the extreme findings of one particular trial influenced the overall effect. Excluding this trial removed the statistical difference.

Normal activity returned much sooner after laparoscopic repair. This finding was universal amongst reported trials and confirmed by the analysis. Group analysis confirmed earlier return by either TAPP or TEP compared with open repair. Furthermore when laparoscopic was compared with tension free and tension creating open repair, the effect remained in favour of laparoscopic. These data are likely to be important for employers and worker's disability compensation. It should also be of interest to PCTs contracting for hernia repairs.

The authors comment that there is the loss of 10 million working days each year at some enormous cost. They comment that an early return to work would have significant importance for society in general. The earlier return to work defined by this analysis in favour of laparoscopic herniorrhaphy should be an incentive to the use of this technique to both employers and healthcare commissioners and providers. However this will have to be at the accepted increase in cost due to the increase in operating time and equipment necessary.

Previous reports have commented upon increased complication rates of laparoscopic surgery but in this analysis no such finding occurred. On the contrary the overall number of complications after laparoscopic repair was less than that after open repair. This discrepancy however may be explained by the small numbers of patients in individual series, experienced and senior surgeons performing laparoscopic compared with open repair and the reporting of only significant complications after laparoscopic repair. The authors state that the early observations of a higher risk of complications after laparoscopic repair no longer appear valid. The risks of trocar site hernia at 12 or 10 mm ports and neuralgia have been virtually eliminated by the closure of all trocar sites, avoiding staples for repair and judicious staple placement or use of tacking device if the mesh is fixed. Once again this may have a significant effect on healthcare providers as the cost of complications in inguinal herniorrhaphy must be significant taking into account that the cost of repairing 500 to 700,000 inguinal hernias per annum in North America is approximately \$3 billion.

In the present analysis there was a trend towards an increase in the odds of short term hernia recurrence following laparoscopic of 50% compared with open, but this difference was not statistically significant. Since half of all recurrences after open hernia surgery occur after five years and 75% within 10 years after surgery, longer term follow up after laparoscopic repair remains essential.

The authors conclude that laparoscopic inguinal hernia repair is a safe and effective alternative to open inguinal hernia repair enabling a faster convalescence and return to productive activity. The increased short term recurrence rate is of concern and must be addressed in further large randomized trials now that the learning phase of this technique has passed.

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