A meta-analysis examining the use of tacker fixation versus no-fixation of mesh in laparoscopic inguinal hernia repair
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CRD summary
This review found that non-mesh fixation in laparoscopic inguinal hernia repair surgery did not increase the risk of hernia recurrence and was comparable with tacker mesh fixation in terms of postoperative outcomes. The review was well conducted and the authors' conclusions regarding the evidence are likely to be reliable.

Authors' objectives
To compare tacker mesh fixation to no-mesh fixation in laparoscopic inguinal hernia repair.

Searching
The Cochrane Library, MEDLINE, EMBASE and Science Citation Index were searched for relevant studies up to September 2011; search terms were reported. References from the retrieved studies were checked for additional studies. There were no language or publication restrictions.

Study selection
Randomised controlled trials in which tacker mesh fixation was compared to no-mesh fixation in patients who underwent laparoscopic surgery for the repair of inguinal hernias were eligible for inclusion. Eligible trials were required to report data on postoperative outcomes.

The included studies were conducted in the United States, India, China, Spain, United Kingdom and Australia between 1999 and 2011. Patient age ranged from 14 to 100 years; in most studies the mean age of the patients was between 46.4 and 61 years. Patients presented with unilateral or bilateral primary inguinal hernias, primary and recurrent pantaloon and femoral hernias. In most trials the total extraperitoneal approach was used for the hernia repair surgery under either general or spinal anaesthesia. One study used the transabdominal preperitoneal approach. In the comparison groups the same approaches were used except that the polypropylene mesh was not fixed with staples. Outcomes assessed were operative time in minutes, postoperative pain, complications, chronic groin pain, recurrence and days of hospital stay.

Two reviewers performed the study selection.

Assessment of study quality
Methodological quality of the included studies was assessed by two independent reviewers who used the Jadad five-point scale and the published guidelines of Chalmers et al. for randomisation, blinding, use of intention-to-treat analyses and allocation concealment and power calculations. Any discrepancies between the reviewers were resolved by discussion.

Data extraction
Data were extracted by two independent reviewers to calculate risk ratios for binary data and mean differences for continuous data, each with 95% confidence intervals (CI). The reviewers attempted to contact study authors for any missing information. Standard deviations were calculated where they were not reported. The reviewers stated that they added 0.5 to each cell where there was a value of zero but it did not appear that this occurred.

Methods of synthesis
Pooled risk ratios, weighted mean differences and 95% confidence intervals were calculated using a Mantel-Haenszel random-effects model. Statistical heterogeneity was evaluated using $\chi^2$ and quantified using $I^2$. Subgroup analyses were undertaken on the basis of procedure type.

Results of the review
Eight randomised controlled trials (1,386 participants, range 40 to 502) were included in the review. The studies were of low to moderate quality. Allocation concealment was adequately reported in three trials. None of the trials reported
intention-to-treat analyses. Double-blinding was reported in two trials and single-blinding was reported in one trial. Power calculations were reported in two trials. Follow-up ranged from one to 36 months.

There were no statistically significant differences in operating time, postoperative pain, length of hospital stay and postoperative complications. Risks of recurrence and development of chronic groin pain were statistically similar between tacker mesh fixation and no-mesh fixation.

Subgroup analyses on the basis of use of total extraperitoneal approach and trans-abdominal preperitoneal approaches in laparoscopic inguinal hernia repair showed no differences between tacker mesh fixation and no-mesh fixation.

Statistically significant heterogeneity was observed only for hospital stay ($I^2=58\%$).

**Authors’ conclusions**
Non-mesh fixation in laparoscopic inguinal hernia repair surgery did not increase the risk of hernia recurrence and was comparable with tacker mesh fixation for postoperative outcomes.

**CRD commentary**
The review addressed a clearly defined question. Inclusion criteria were stipulated and were broad for the outcomes assessed. Several appropriate databases were searched. There were no language restrictions. Unpublished studies were sought. Steps were taken to minimise reviewer error and biases at each stage of the review process. Methodological quality was assessed and the included trials were judged to be of low to moderate quality.

The authors' decision to combine the results of the review in a meta-analysis appeared justified but there was statistically significant heterogeneity across the results for one outcome. The authors acknowledged limitations of the review due to low quality underpowered trials, varying definitions of outcomes (such as chronic groin pain) and relatively short follow-up in the trials. The authors suggested that the findings of the review should be interpreted with some caution due to methodological quality and stated that there was a lack of stronger evidence to support the routine use of non-mesh approaches for inguinal hernia repair.

The review was well conducted. The authors' conclusions reflect the evidence and seem reliable.

**Implications of the review for practice and research**
Practice: The authors stated that non-mesh fixation approaches were safe and viable in laparoscopic inguinal hernia repair and could be considered as an alternative to be applied in selected groups of patients.

Research: The authors stated that a major multicentre trial with longer follow-up was needed to validate the findings of the review.

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