Chronic pain after mesh repair of inguinal hernia: a systematic review
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CRD summary
This review concluded that chronic pain following mesh-based inguinal hernia repair was experienced by 11% of patients, and it impacted on employment and leisure. Chronic pain was less frequent after endoscopic repair and using light-weighted mesh. Poor reporting of the review methods and between-study differences mean that the reliability of the authors’ conclusions is uncertain.

Authors' objectives
To evaluate the nature, severity and consequences of chronic pain after mesh repair of inguinal hernia.

Searching
MEDLINE, CINAHL, EMBASE and the Cochrane CENTRAL Register were searched; the search terms were reported. Articles published between January 1996 and June 2006 were assessed for inclusion. The reference lists of retrieved articles were also checked. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Prospective studies were eligible for inclusion. The majority of the included studies were randomised controlled trials (RCTs); the remainder were prospective observational studies and one cross-sectional cohort study.

Specific interventions included in the review
Studies of inguinal hernia repair with prosthetic material were eligible for inclusion. The surgical procedures included in the review were endoscopic (total extraperitoneal, transabdominal preperitoneal), open anterior (mesh plug repair, Prolene Hernia System, Lichtenstein), Read-Rives, Herthra, Trabucco and memory-ring patch. Methods of anaesthetic and use of analgesics varied between the included studies.

Participants included in the review
Studies of adult patients undergoing inguinal hernia repair were eligible for inclusion. The mean age of the participants ranged from over 25 to 76.8 years. In 15 of the 29 included studies between 3% and 35% of the patients had undergone previous hernia surgery.

Outcomes assessed in the review
Studies assessing chronic pain at 3 or more months post-operatively were eligible for inclusion. Studies also had to have a minimal follow-up of at least 80% of the participants. The included studies used varying definitions of chronic pain. The duration of follow-up ranged from 1.7 to 82 months.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected the studies.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Details of the definition of chronic pain, method of pain assessment, quality-of-life data and factors associated with pain (previous surgery, repair technique and use of analgesics) were extracted. The proportions of patients with chronic pain in each study were extracted.

Methods of synthesis
How were the studies combined?
The proportions of patients with chronic pain were pooled using a fixed-effect model. For data from RCTs, the odds ratios (ORs) were pooled in a fixed-effect model using the Peto method.

**How were differences between studies investigated?**

Heterogeneity was assessed using the Cochrane Q and I-squared statistical tests. The effects of different patient and study characteristics on pain were assessed using meta-regression: a logistic regression model was used for this, assessing factors singly and in combination using a stepwise selection method. The factors considered were: only primary hernias; the exclusion of previous abdominal surgery; mean study age less than 57.5 years; use of local anaesthesia; length of follow-up; and pain assessed by questionnaire.

**Results of the review**

Twenty-nine prospective studies (n=8,350) were included: 19 RCTs, 9 observational studies and 1 cross-sectional cohort.

The proportions reporting chronic pain ranged from 0 to 43% across the studies. The pooled incidence resulting from inguinal hernia mesh repair was 11% (95% confidence interval, CI: 11, 12). However, significant statistical heterogeneity was found between the studies (p<0.001; I-squared 97%). The proportion of cases reporting severity of pain (6 studies, 482 patients) as mild was 74%, moderate 17%, moderate to severe 1% and severe 8%. Limitations in employment and/or leisure activities were reported for 32% of pain patients (7 studies).

In the multivariable analysis, studies including only primary hernias (14 studies) were associated with less chronic pain (OR 0.76, 95% CI: 0.62, 0.92, p=0.005). Studies where pain was assessed by patient questionnaire also reported less pain (OR 0.51, 95% CI: 0.43, 0.60, p<0.001). Studies of younger participants (OR 1.53, 95% CI: 1.29, 1.82, p<0.001) and where local anaesthesia was used for all procedures (OR 1.32, 95% CI: 1.02, 1.73, p=0.039) were both found to have significantly more reports of chronic pain.

The use of light-weighted mesh (2 RCTs) was associated with less pain in comparison with normal-weighted mesh (OR 0.61, 95% CI: 0.43, 0.88, p=0.009). Chronic pain was reported to be significantly less when repair was conducted endoscopically than when using an open anterior approach (OR 0.61, 95% CI: 0.49, 0.77, p<0.0001; 8 RCTs).

**Authors’ conclusions**

Chronic pain following mesh-based inguinal hernia repair was experienced by 11% of patients, and it impacted on employment and leisure activities. Chronic pain was less frequent with the use of light-weighted mesh and when repair was conducted endoscopically.

**CRD commentary**

The review question was defined in terms of the participants, intervention, outcomes and study design. Some relevant sources were searched and no language restrictions were applied, thus limiting the possibility of publication bias. Two reviewers independently selected the studies, thereby reducing the potential for reviewer bias and error. However, the methods used to extract the data were not described, so it is not known whether any efforts were made to reduce errors. Study validity was not assessed and although the authors stated that these were good-quality studies, no details were presented to support this claim. Given the differing definitions of chronic pain and assessment instruments across the studies, a descriptive presentation of pain incidence rather than a pooled result may have been more appropriate. In addition, significant statistical heterogeneity between the studies, and the small numbers of studies included in the meta-regression compared with the number of factors assessed, mean that the results of the analysis may not be reliable. In view of the limitations highlighted, the conclusion should be interpreted with caution.

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

Practice: The authors stated that conducting inguinal hernia repair endoscopically and using light-weighted mesh may prevent chronic pain.

Research: The authors stated that further studies evaluating pre-existent and direct post-operative pain, younger patients, and other patient characteristics are required.
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