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Review

Chronic pain after mesh repair of inguinal hernia: a systematic review

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Abstract

Background: Chronic pain is a severe complication of mesh-based inguinal hernia repair. Its perceived risk varies widely in the literature. The current objectives are to review the incidence, severity, and consequences of chronic pain and its etiologies.
Data sources: A multi-database systematic search was conducted for prospective trials on mesh-based inguinal hernia repair reporting the measurement and outcome of pain at least 3 months postoperatively with a minimum follow-up of 80%.
Conclusions: After mesh-based inguinal hernia repair, 11% of patients suffer chronic pain. More than a quarter of these patients have moderate to severe pain, mostly with a neuropathic origin. As a consequence of chronic pain, almost one third of patients have limitations in daily leisure activities. Chronic pain is less frequent after endoscopic repair and with the use of a light-weighted mesh.

Keywords: Inguinal; Hernia; Chronic pain; Mesh

Recurrent hernia and chronic pain are the most serious long-term complications following inguinal hernia repair. Recurrence rates are between 0% and10%, depending on the institute's experience [1,2]. The reported frequency of postoperative pain varies widely. In 2000, Poobalan et al reviewed the literature of chronic pain after inguinal hernia repair and found incidences ranging from 0% to 63% [3]. A similar range was reported by Aasvang and Kehlet in an update [4]. The inclusion of data on non–mesh-based repair and of several studies with an incomplete follow-up of less than 80% of patients might explain the wide range in incidences. In both reviews, the overall data suggested more chronic pain following a repair without prosthetic material. Currently, mesh-based inguinal hernia repair is the gold standard, either open or endoscopic. Therefore, the present systematic review focuses on the incidence of chronic pain following mesh-based repair. Moreover, only studies with an adequate follow-up of at least 80% of patients after a period of 3 months were reviewed. The nature, severity, and consequences of chronic pain, as well as its etiologies, were taken into account.

Methods

The Medline database, Cumulative Index to Nursing and Allied Health Literature, Embase, and Pubmed, including e-links to related articles, and the clinical trial registry of the Cochrane Collaboration were searched for relevant prospective trials on inguinal hernia repair reporting chronic pain. The strategy was by free text words: hernia *and* inguinal *and* pain *or* neuralgia *and* mesh *or* tension-free *or* laparoscopy, and whenever possible by medical subject headings. Those considered for full critical appraisal were studies published between January 1996 and June 2006. References cited in retrieved articles were manually cross-checked to identify other relevant papers. No restriction to languages was used.

Chronic pain was defined a priori as any pain reported by the patient at or beyond 3 months postoperatively, as per the International Association of the Study of Pain [5]. Two reviewers independently critically reviewed the publications (S.N., J.S.). Only prospective studies including adult pa-

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tients who underwent inguinal hernia repair with prosthetic material, wherein the method and moment of pain assessment were clearly described, were used for this review. Further selection criteria were a minimal follow-up of at least 80% of the patients and minimal period of 3 months after the index operation. The following data were extracted on full articles only: study design, length of follow-up, number of included and evaluated patients, definition of chronic pain, instrument and method and moment of pain assessment, quality-of-life data, its nature and severity, factors associated with chronic pain (previous groin hernia or lower abdominal surgery, age, technique of repair and anesthesiology, including the use of analgesics perioperatively), and data on testicular pain and numbness.

Statistical analysis

Data are given as percentages or mean with standard deviation. For meta-analysis of proportion of chronic pain, pooled proportion analysis with fixed effects was used, and testing for between-study heterogeneity was done using Cochrane Q and I^2 statistics. The logistic univariate and multivariate regression analyses were applied for bivariate data. For reviewing randomized controlled trials, the Cochrane Review Manager was used. The Peto method for combining odds ratios was used with fixed effects model in case no statistical heterogeneity was encountered. $P < .05$ was considered statistically significant.

Results

Description of the studies

The cumulative search of the databases identified 680 publications. Based on title and/or abstract, 159 were potentially relevant and underwent critical appraisal on full article. Thirty-four studies were included in the review [6–39]. Three of them were long-term results of other included trials [12,14,29] and considered as additional information for the primary report [9,11,30]. Another 2 trials were reported twice [8,23]. The 29 eligible trials included 8,350 evaluated patients (Table 1).

In the majority of the studies the language was English. There was 1 French [24] and 1 German [18] study. The design of 9 studies was prospective observational [7,13,14,19,24,29,34,35,38] and there was 1 cross-sectional cohort study in a prospective setting [20]. The remaining trials were randomized, of which 6 were multicenter. Most trials

Table 1
Study designs and main outcome

Reference (1st author)	Evaluated patients*	Definition of chronic pain	Follow-up‡	Instrument§	Chronic pain¶
Adamonis [6]	96	Pain with(out) limits	21.0	VDS	34 (35)
Alfieri [7]	895	Pain of any severity	12.0	VDS	40 (5)
Bringman [10]	294	In operated area	19.8	Q	17 (6)
Bringman [12]	526	Groin pain	13.6	Q	59 (11)
Bueno [13]	376	Painful nuisances	21.5	Q	30 (8)
Champault [14]	104	Pain of any severity	24.0	VDS	6 (6)
Colak [15]	134	Groin discomfort/pain	11.6	Q	7 (5)
Heikkinen [16]	121	Neuralgia/chronic pain	7.0	Q	4 (3)
Helbling [17]	46	Moderate pain pubic tubercle	3.0	Q	4 (9)
Hildebrandt [18]	121	Persistent groin pain	12.0	Q	3 (3)
Huang [19]	343	Non-disabling pain	26.6	Q	20 (6)
Lau [20]	261	Any pain last 3months	24.0	Q	24 (9)
Lau [21]	78	Chronic pain	12.0	Q	13 (17)
Mahon [22]	119	Chronic pain	28.5	Q	9 (8)
Marre [24]†	386	In operated area	36.0	Q	21 (5)
Mills [25]	46	Pain of any intensity	3.0	VAS	1 (2)
Moreno-Egea [26]	170	Inguinal/scrotal/thigh pain	36.0	Q	2 (1)
Muldoon [27]	224	Discomfort/pain on exertion	82.0	Q	36 (16)
Neumayer [28]	1696	Neuralgia or other pain	24.0	VAS	203 (12)
Nienhuijs [29]	319	Pain of any intensity	15.4	VAS	138 (43)
Nienhuijs [31]	54	Pain of any intensity	1.7	VAS	22 (41)
O'Dwyer [32]	260	Pain of any severity	12.0	VDS	109 (42)
Paajanen [33]	162	Inguinal pain last month	25.2	Q	40 (25)
Pappalarardo [34]	151	VAS >4	29.5	VAS	0 (0)
Pelissier [35]	121	Light pain	24.5	Q	7 (6)
Picchio [36]	678	Pain of any severity	33.5	VDS	167 (25)
Ravichandran [37]	20	Minor discomfort/sharp pain	6.0	Q	3 (15)
Tsakayannis [38]	191	Pain of any severity	12.0	VDS	0 (0)
Wellwood [39]	358	Persistent groin/thigh pain	3.0	Q	67 (19)

* Number of patients who completed follow-up for pain assessment.

† Number retrieved from personal communication.

‡ Moment of measurement in (median or mean), months.

§ Measurement instruments: Questionnaire (Q), Visual Analogue Scale (VAS), or Verbal Descriptor Scale (VDS).

¶ Number of patients with chronic pain (percent of evaluated patients).