

Is chronic post-herniorrhaphy pain always chronic? A literature review

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Introduction: Chronic post-surgery pain (CPSP) has gained increased recognition as a major factor influencing health-related quality-of-life following most surgical procedures, in particular following surgery for benign conditions. The natural course of CPSP, however, is not well-known.

Methods: A literature review was undertaken, searching for studies with repeated estimates of post-herniorrhaphy pain. The hypothetical halvation time was calculated from the repeat estimates.

Results: Eight studies fulfilling the criteria were identified. With one exception, the extrapolated halvation times ranged from 1.3 to 9.2 years.

Discussion: Even if CPSP is generally very treatment-resistant, in many cases it eventually dissipates with time. Further studies are required to evaluate the prevalence of pain beyond the first decade.

Keywords: hernia, pain, chronic post-surgery pain, neuropathic pain, halvation time

Background

The trauma inflicted by a surgical intervention sometimes results in persistent pain. In contrast to acute postoperative pain, which is a physiological reaction to tissue trauma, chronic post-surgery pain (CPSP) persists beyond the usual course of natural healing. Pain persisting at the sight of surgery beyond the usual course of natural postoperative pain usually differs in character from that suffered during the first weeks after an operation. It may be burning, tingling, or electric shock-like, and may be associated with paresthesia, hyperalgesia or allodynia. It is often neuropathic in nature,^{1,2} but may also be caused by chronic inflammation, tension or local compression from a dislocated mesh (“meshoma”).³

CPSP is a condition that has gained increased recognition in recent years.⁴ Several reports have focused on chronic pain, in particular after hernia repair.⁵⁻⁷ Since the main indication for performing a hernia repair is discomfort or pain from the hernia, the risk of developing iatrogenic pain is something that must be taken into account when deciding on a procedure that could cause more harm than good. Studies on CPSP after hernia surgery have reported prevalence ranging from 0% to 54%.⁸⁻¹¹ There are probably several explanations for this spread such as the lack of a uniformly accepted instrument for the assessment of pain.¹² Another factor that may have had a large influence on outcome is the timing of follow-up. Pain persisting longer than 3 months is often considered a criterion for CPSP. In most cases, however, pain gradually decreases with time.^{8,13}

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Measurement of pain prevalence with adequate external validity requires standardized patient-related outcome measures. Standardized tools for assessment of postoperative pain include the Brief Pain Inventory¹⁴ and Short Form McGill Pain Questionnaire.¹⁵ There are also instruments specifically aimed at assessing post-herniorrhaphy pain, including the Carolina Comfort Scale¹⁶ and Inguinal Pain Questionnaire.¹⁷

In most cases, CPSP is not constant. With time, it may progress as well as regress.¹⁸ Fortunately, however, there is a tendency to decrease with time.^{8,13} There are few studies that have explored the natural course of CPSP. An understanding of the natural course can, however, be achieved by considering the prevalence of pain at two different points in time following surgery, and in the same population. By assuming an exponential course, the halvation time can be determined using the following formula:

$$\text{Prevalence}_2 = \text{Prevalence}_1(1/2)^{t/t_{1/2}} \quad (1)$$

The formula defines the estimates, ie, the prevalence of pain, at two separate occasions (prevalence₁ and prevalence₂) at a certain time interval (t). Assuming that the course is exponential during the whole period of observation, the halvation time (t_{1/2}) can be determined from prevalence₁, prevalence₂, and t. Although a complex and multifactorial process such as the natural course of postoperative pain cannot be represented by a mathematical model, assuming an exponential course may help to compare outcomes from several studies and provide a basis for exploring factors that could influence the duration of postoperative pain.

Literature review

A PubMed search from January 1980 to June 2014 was carried out with the search terms “Postherniorrhaphy pain” or “Long-term post-surgery pain and Hernia” or “Chronic postoperative pain and Hernia”. Inclusion criteria were studies including assessment of persisting pain on at least two defined occasions postoperatively at defined intervals, the second occasion being at least 1 year after surgery. Pain estimates within 3 months after surgery were not included in the present review since pain present during the first postoperative months is usually not considered as chronic and may be related to other factors than those that cause pain of longer persistence. Studies describing the same study group in two separate publications were also included. In the case of randomized controlled trials, the randomization arms were considered as separate groups. The following studies were excluded:

- studies with only one estimate of pain prevalence;

- studies with poorly or undefined follow-up intervals;
- studies with incomplete follow-up;
- studies not including pain as endpoint or defining pain in a way that made it impossible to dichotomize it.

Outcome

Altogether 889 publications fulfilling the criteria were identified. After reviewing all abstracts and the full papers of all publications suggesting a follow-up of a previously reported study, eight study groups presented in eleven publications with estimates of pain on at least two occasions were identified (Table 1). The table shows the two estimates, starting from the first time when at least 3 months had elapsed since surgery. With the exception of one of the arms in one study,²⁸ the extrapolated t_{1/2}s ranged from 2.9 to 9.2 years.

Discussion

All studies reviewed found a gradual decrease in pain with time. Even if t_{1/2} is a very simplified way of describing the course of CPSP, it may help to understand the slow but gradual healing process.

None of the studies included in the present review had a follow-up time exceeding 10 years. It cannot, therefore, be excluded that the gradual decrease seen during the first 10 years ceases later on. Since it is only in the last 10 years that the problem of CPSP has gained focus, it is difficult to identify patient cohorts dating further back in time. Nevertheless, there are no obvious reasons to believe that the natural course of CPSP has changed over history.

The natural course of persisting pain should be considered before advocating aggressive measures to deal with it, such as a reoperation. It cannot be ruled out that the favorable long-term outcome after reoperation is, at least partly, regression to the mean phenomenon. Even without re-intervention, time itself would have led to improvement.¹⁹

An exponential model is only fully adequate if reduction in pain is constant over time. Needless to say, there are several factors that do not fit into such a model. The course of post-herniorrhaphy pain is probably dependent on a number of factors that vary with time, including nerve entrapment, inflammatory reaction, nerve regeneration, psychological assimilation, and decreasing demands on physical performance with age. The pathogenesis of CPSP varies and depends on the intervention. Nerve lesions play a major role in the development of persistent pain following hernia repair.^{1,2} The ilioinguinal, iliohypogastric, and genital branch of the genitofemoral nerve are the nerves most at risk for being damaged. Preoperative pain,⁶ inflammatory

Table 1 Studies with repeated estimates of pain prevalence following groin hernia surgery

Publication	Interventions to prevent persisting pain	First estimate	Prevalence at first estimate	Second estimate	Prevalence at second estimate	Pain prevalence halvation time	Health-related quality -of-life instruments
Aasvang et al, 2001 ¹⁰	No uniform intervention	1 year	162/174 (93%)	6 years	49/174 (28%)	2.9 years	None.
Bay-Nielsen et al, 2006 ²²	Not specified	1 year	41/577 (7%)	5 years	23/659 (3%)	3.9 years	None.
Eklund et al, 2006 ^{33,24}	Not specified	1 year	15/546 (3%)	5 years	12/616 (2%)	8.1 years	None.
TEP group*	Not specified	1 year	129/362 (36%)	5 years	54/269 (20%)	4.8 years	None.
Grant et al, 2004 ²⁵	Not specified	1 year	108/390 (28%)	5 years	51/282 (18%)	6.5 years	None.
Lichtenstein group	Not specified	1 year	22/63 (35%)	7.3 years	11/81 (14%)	4.6 years	None.
Grant et al, 2004 ²⁵	Acetaminophen and dextropropoxyphene	1 year	14/64 (22%)	7.3 years	6/73 (8%)	9.2 years	None.
Andersson et al, 2003 ²⁶	Acetaminophen and dextropropoxyphene	1 year	32%	5 years	28%	20.8 years	SF-36. No clear progression noted.
Hallén et al, 2008 ²⁷	Not specified	1 year	23%	5 years	15%	6.5 years	SF-36. No clear progression noted.
TEP group	Not specified	1 year	8/215 (3.7%)	3 years	5/215 (2.3%)	3.0 years	SF-36. No clear progression noted.
Eker et al, 2012 ²⁸	Not specified	1 year	11/177 (6.2%)	3 years	4/185 (2.2%)	1.3 years	SF-36. No clear progression noted.
TEP group	Not specified	6 months	32/67 (48%)	3 years	14/58 (24%)	2.5 years	SF-36. No clear progression noted.
Eker et al, 2012 ²⁸	Not specified	6 months	28/64 (44%)	3 years	7/58 (12%)	1.3 years	SF-36. No clear progression noted.
TEP group	Not specified	6 months	28/64 (44%)	3 years	7/58 (12%)	1.3 years	SF-36. No clear progression noted.

Note: *Moderate or severe pain.**Abbreviations:** SF-36, short form-36; TEP, Total Extraperitoneal Repair.

reaction, and genetic susceptibility,²⁰ may also contribute. Neuropathic pain seems to be more persistent,²¹ whereas nociceptive pain and pain caused by mechanical compression or tension may gradually decrease with time as a result of tissue rearrangement. Psychological adaptation and coping may also influence the long-term course. Whatever, it must be a solace for these patients to know that the pain is likely to gradually decrease with time.

Since the main indication for hernia surgery is to reduce pain, great care in decision-making should be taken in order not to cause iatrogenic pain following a procedure undertaken on vague indications. Patients who are at risk for developing CPSP (young patients,⁷ women,⁷ patients perceiving intense preoperative pain,¹ patients with tendency to develop anxiety and depression,⁶ and patients with previous history of high sensibility to nociceptive pain) should be identified before the decision to perform surgery is taken. Even if some of the symptoms may resolve with time, great care should be taken not to cause iatrogenic pain that may persist for many years.

Disclosure

The author has no conflicts of interest to declare.

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