



Risk factors for chronic pain after inguinal hernia repair

R DENNIS, D O'RIORDAN

Department Upper GI Surgery, West Suffolk Hospital, Bury St Edmunds, Suffolk, UK

ABSTRACT

INTRODUCTION Chronic postoperative pain after inguinal hernia repair has an incidence of 0.7–36.7%. This study aimed to look for any relationship between patients presenting with severe pain at initial presentation or a past history of chronic pain conditions and the development of severe chronic pain following inguinal hernia repair.

PATIENTS AND METHODS This was a retrospective study in which 24 patients referred to a chronic pain clinic following inguinal hernia repair were compared with 24 age- and sex-matched controls. Hospital notes were reviewed for the severity of presenting pain and a past history of chronic pain.

RESULTS Average age was 55.4 years. In the chronic postoperative pain group, 14 (58%) presented with severe pain versus 3 (13%) in the pain-free group. Twelve (50%) of the chronic postoperative pain group had a past history of chronic pain conditions versus none of the pain-free group. Both of these factors showed a significant ($P < 0.005$) association with severe chronic pain postoperatively.

CONCLUSIONS Patients with severe pain at presentation or with a past history of chronic pain conditions are at increased risk of severe chronic pain after inguinal hernia repair. A prospective study is needed to quantify any increased risk, although this would need to be of significant size.

KEYWORDS

Postoperative pain – Risk factors – Inguinal hernia repair

CORRESPONDENCE TO

D O'Riordan, Consultant Surgeon, Department Upper GI Surgery, West Suffolk Hospital, Hardwick Lane, Bury St Edmunds, Suffolk IP33 2QZ, UK

E: dermat.o'riordan@wsh.nhs.uk

Chronic postoperative pain has been quoted in 0.7–36.7% cases of inguinal hernia repair.^{1,2} Severe chronic pain has been reported in 3% of cases.³ In surgery for benign disease, complications such as severe chronic pain with its debilitating effects must be carefully weighed against the benefits. Given the large numbers of patients undergoing hernia surgery, it is not surprising that a number of studies have looked at intra-operative and postoperative factors which relate to the development of chronic pain. Those intra-operative factors shown to be associated with a lower incidence of non-disabling, mild and moderate chronic pain include the use of lightweight meshes⁴ and the laparoscopic approach.² Postoperatively, the severity of pain at 1 and 4 weeks has also been shown to be a predictive factor for pain at 1 year.⁵

There has been much less consideration of pre-operative factors which may predict chronic pain following inguinal hernia repair. Bowley *et al.*⁸ have shown that pre-operative dispositional pessimism correlates with a delayed return to work. Thus the importance of an individual's personality and previ-

ous experiences in recovery from surgery cannot be underestimated. Pre-operative pain has been established as a significant risk factor for the development of chronic pain in other forms of surgery, notably in limb amputation⁷ and breast surgery.⁸ This study was performed to establish if the severity of pre-operative pain showed any association with the development of severe chronic pain after inguinal hernia repair.

Risk factors for the development of the many forms of chronic pain have been looked at in numerous studies. Severity of acute pain, various biomedical factors and psychosocial factors have been shown to be associated with the development of chronic pain.⁹ A previous history of chronic pain has rarely been considered as a potential risk factor in itself. Studies of back pain have shown that a previous history of chronic pain elsewhere in the body is a risk factor for the development of chronic back pain.¹⁰ Given the psychosocial and behavioural aspects of chronic pain, which may not be specific to the precipitating acute event, it seems reasonable to postulate that an individual with these risk factors would be

Table 1 Presenting symptoms and history of chronic pain/psychosocial risk factors in chronic pain and pain-free patients following inguinal hernia repair

		Chronic postoperative pain	Pain-free postoperatively	<i>P</i> -value*
Presenting symptoms	Severe pain	14 (58)	3 (13)	< 0.005
	Moderate pain/discomfort	6 (25)	5 (21)	
	Asymptomatic lump	4 (17)	16 (66)	
History of chronic pain conditions or psychosocial risk factors for chronic pain		12 (50)	1 (4)	< 0.005

Values in parentheses are percentages.
* χ^2 test.

more likely to develop chronic pain after any future acutely painful event. On this basis, the study also considered whether a past history of chronic pain was a risk factor for the development of chronic pain after inguinal hernia repair.

Patients and Methods

Given the relatively low incidence of severe chronic pain after inguinal hernia repair, from computer records, we identified a cohort of 24 patients referred to a chronic pain clinic following inguinal hernia repair. A control group of 24 age- (mean, 55.3 ± 14.7 years) and sex- (3 female, 21 male) matched 'pain-free' patients were chosen from theatre records of inguinal hernia repair in 2001. Four patients underwent laparoscopic repair, 2 patients in each group. Except for one patient in the postoperative chronic pain group who had a 'darn' repair, the other open hernia repairs were non-absorbable mesh repairs. Hospital notes were reviewed retrospectively for the presenting symptoms, a past history of chronic pain and also the psychosocial risk factors (*e.g.* depression) known to increase the risk of chronic pain.

The presenting symptoms were grouped into three categories: (i) severe groin pain; (ii) a lump in the groin associated with discomfort/mild pain; and (iii) a painless lump. For this study severe pain was defined as: pain documented as severe, ++ pain, or pain limiting work/simple daily activities.

The chi-squared test was used for comparison of proportions. Statistical significance was accepted at $P < 0.05$.

Results

In the group of patients who developed chronic postoperative pain, 14 had severe groin pain at presentation pre-operatively and 4 a painless lump. The reverse picture was seen in the pain-free postoperative group with 3 patients

presenting with severe pain and 16 a painless lump. This pattern showed a significant association ($P < 0.005$) between the severity of presenting pain pre-operatively and the development of severe chronic postoperative pain.

Twelve patients in the chronic postoperative pain group had a previous history of chronic pain conditions. None of the patients in the pain-free group had a previous history of chronic pain conditions. This also showed a significant association between a past history of chronic pain conditions and the development of severe chronic pain after hernia repair ($P < 0.005$). Only one patient in the study had psychosocial risk factors for the development of chronic pain (depression and anxiety) and they were in the pain-free postoperative group. These results are summarised in Table 1.

The severity of presenting pain and a past history of chronic pain did not show a significant relationship ($P = 0.09$, ccc² test) and were, therefore, considered to be independent risk factors for the development of chronic pain.

Discussion

The results show that there is an association between the severity of pain at pre-operative presentation, a past history of chronic pain conditions and the development of severe chronic pain after inguinal hernia repair. There are limitations to retrospective studies of this kind, such as selection bias and, with small numbers, our conclusions are strictly applicable to the cohort of patients who are referred to chronic pain clinics. It would seem likely that patients with severe pain at presentation and those with a past history of chronic pain conditions are at increased risk of severe chronic postoperative pain. A prospective study would need to be of significant size to give quantifiable results for any such increased risk. Even if the incidence of severe chronic pain was doubled in our study cohort (*i.e.* 6%), a prospective study

of approximately 5000 patients would be required with 5% significance level and 80% power.

Should pre-operative pain be addressed more aggressively before inguinal hernia repair? Intensive treatment of pre-operative analgesia in limb amputation has been shown to reduce the incidence of phantom limb pain.¹¹ The acute treatment of pain from limb ischaemia with opiate/nerve blockade is very different to out-patient management of the much more heterogeneous group experiencing groin pain with inguinal hernias. Logistically and statistically it would be difficult to prove benefit from simple oral analgesics pre-operatively and common sense would suggest benefits would be marginal, if at all.

Is surgery indicated when the predominant symptom is groin pain associated with an inguinal hernia? A history of severe pain associated with a firm tender lump in the groin is suggestive of strangulation and prompt repair clearly indicated. In this study, 58% of those developing chronic postoperative pain presented initially with severe groin pain and no lump. The pain described by the patients in this study did not arouse any documented concern of intermittent strangulation. The management of patients presenting with groin pain and small/impalpable hernias has been studied more extensively in sportsmen as the 'sportsman's hernia'. The literature in this area has been well reviewed by Fon and Spence.¹² They highlight various theories, which have been proposed for the cause of the pain including distension of the peritoneum, a torn external oblique aponeurosis and a tear in the conjoint tendon. In these sportsmen, modified herniorrhaphy has been recommended. These repairs focus on the structures considered to be damaged, *i.e.* conjoint tendon, external oblique and/or the transversalis fascia of the posterior wall. A number of modified suture repairs of the posterior wall deficiency have been described as well as mesh repairs both open and laparoscopically. In cases of sportsman's hernia in athletes, 63–70% can expect resolution of their pain with herniorrhaphy, 20–31% will improve, but not resolve, and 5% will see no benefit. There are, however, no randomised trials comparing these different approaches.

In patients undergoing herniorrhaphy in whom the predominant symptom is pain, it seems more appropriate to counsel them on the basis of the above figures rather than simply a 3% risk of severe chronic postoperative pain. These figures should also be highlighted as the best possible results that can be expected since sportsmen are a highly motivated cohort who could be expected to see better postoperative results in terms of a return to competition/work. The risk–benefit analysis for inguinal hernia repair is complex and there is only a small demonstrable benefit in herniorrhaphy over conservative measures.¹³ This analysis does not include the costs to both the healthcare system and the patient of chronic postoperative

pain. Pain alone, therefore, remains an unclear and controversial indication for surgery in the general population.

Conclusions

In the out-patient clinic, severe groin pain and a past history of chronic pain conditions should be noted as significant factors associated with severe chronic pain after inguinal hernia repair. At present, any increased risk associated with these factors is unquantified, but may be significantly higher than the overall 3% previously quoted. A large prospective trial is needed to give more robust data.

Future research studies should also consider the severity of presenting pain and a past history of chronic pain conditions as possible independent risk factors for chronic pain following inguinal hernia repair.

References

1. Kingsnorth AN, Bowley DM, Porter C. A prospective study of 1000 hernias: results of the Plymouth Hernia Service. *Ann R Coll Surg Engl* 2003; **85**: 18–22.
2. The MRC Laparoscopic Groin Hernia Trial Group. Laparoscopic versus open repair of groin hernia: a randomised comparison. *Lancet* 1999; **354**: 185–90.
3. Bay-Nielsen M, Perkins FM, Kehlet H and Danish Hernia Database. Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study. *Ann Surg* 2001; **233**: 1–7.
4. O'Dwyer PJ, Kingsnorth AN, Molloy RG, Small PK, Lammers B, Horeysek G. Randomized clinical trial assessing impact of a lightweight or heavyweight mesh on chronic pain after inguinal hernia repair. *Br J Surg* 2005; **92**: 166–70.
5. Callesen T. Inguinal hernia repair: anaesthesia, pain and convalescence. *Dan Med Bull* 2003; **50**: 203–18.
6. Bowley DM, Butler M, Shaw S, Kingsnorth AN. Dispositional pessimism predicts delayed return to normal activities after inguinal hernia operation. *Surgery* 2003; **133**: 141–6.
7. Jensen TS, Krebs B, Nielsen J, Rasmussen P. Immediate and long-term phantom limb pain in amputees: incidence, clinical characteristics and relationship to pre-amputation limb pain. *Pain* 1985; **21**: 267–78.
8. Kroner K, Krebs B, Skov J, Jorgensen HS. Immediate and long-term phantom breast syndrome after mastectomy: incidence, clinical characteristics and relationship to pre-mastectomy breast pain. *Pain* 1989; **36**: 327–34.
9. Dworkin RH. Which individuals with acute pain are most likely to develop a chronic pain syndrome? *Pain Forum* 1997; **6**: 127–36.
10. Smith BH, Elliott AM, Hannaford PC, Chambers WA, Smith WC. Factors related to the onset and persistence of chronic back pain in the community: results from a general population follow-up study. *Spine* 2004; **29**: 1032–40.
11. Jahangiri M, Jayatunga AP, Bradley JW, Dark CH. Prevention of phantom pain after major lower limb amputation by epidural infusion of diamorphine, clonidine and bupivacaine. *Ann R Coll Surg Engl* 1994; **76**: 324–6.
12. Fon LJ, Spence RA. Sportsman's hernia. *Br J Surg* 2000; **87**: 545–52.
13. Bell DS. Inguinal hernia (Ch.14). In: Eve A. Kerr, Steven M. Asch, Eric G. Hamilton, Elizabeth A. McGlynn (eds) *Quality of care for general medical conditions: a review of the literature and quality indicators*. Santa Monica: RAND Corp. 2000; 193–205.