Pain patterns in lumbar disc hernia

Drawings compared to surgical findings in 159 patients

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We compared preoperative pain-drawing patterns of 159 patients with findings at lumbar disc surgery. Disc pathology was classified into 2 groups: intact anulus (negative exploration and protruding disc) and ruptured anulus (subligamentary perforation and sequestrated hernia). Patients with intact anulus drew fewer modalities, but more often marked pain in the trunk, neck and upper extremities, than those with ruptured anulus. Certain pain-drawing patterns—e.g., extra text, arrows and nonanatomical pain distribution—have previously been shown to correlate to unfavorable pathological traits in psychometric tests in populations of patients with chronic low back pain. In our study, most of these so-called nonorganic pain-pattern items occurred equally often in the 2 groups. In fact, one third of the patients with ruptured anulus produced pathological drawings according to the scoring system designed by Ransford et al. (1976). Although pain drawings help the investigator to obtain a rapid overview of the patient's pain pattern, the use of penalty points as a preoperative psychological screening instrument in patients with pain that is not chronic may be questioned.

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Submitted 95-09-23. Accepted 96-02-26

It has been shown that patients displaying certain psychological test profiles have a poor prognosis after lumbar disc surgery (Herron and Turner 1985, Dvorak et al. 1988, Spengler et al. 1990). Wiltse and Rocchio (1975) found that patients with high hypochondriasis (Hs) and hysteria (Hy) scores on the Minnesota multiphasic personality inventory test (MMPI), had a poor postoperative outcome after chemonucleolysis for lumbar disc hernia. Pain drawing—i.e., an outline of a human body where the patient is requested to mark his/her pain by using a number of given symbols—has been used for clinical documentation (Ransford et al. 1976, Von Baeyer et al. 1983, McNeill et al. 1986, Udén and Landin 1987, Ginzburg et al. 1988, Udén et al. 1988). In a study of a population of patients suffering from chronic back pain, Ransford et al. (1976) designed a scoring system where criteria for nonanatomical or exaggerated pain patterns were defined. A score >2 correlated to elevated Hs- and Hy-scores of the MMPI.

We investigated the correlation between established criteria for a pathological pain pattern (Ransford et al. 1976) and the degree of disc hernia, which is the main prognostic factor for the outcome of surgery (Reynolds et al. 1959, Spangfort 1972, Hurme and Alaranta 1987, Spengler et al. 1990).

Patients and methods

We studied 194 consecutive patients scheduled for surgery because of suspected lumbar disc hernia. The indication for surgery was clinical evidence of compressive radiculopathy, confirmed by physical signs or diagnostic imaging.

Operative findings were classified in 2 groups: intact anulus (negative exploration and protruding disc) and ruptured anulus (subligamentary perforation and sequestrated hernia). Only patients with unilateral and unisegmental disc hernias at the L3–L4, L4–L5 and L5–S1 levels were included in this analysis. 35 patients were excluded: 18 patients suffered from spinal stenosis, 1 patient had a spinal tumor and 16 files were missing or incomplete. Complete files and pain drawings were thus obtained from 159 patients who were included in the study. 13 patients had a negative exploration at operation and 49 had a bulging disc, i.e., the disc was clearly expanding beyond the anatomical limits, but without any visible rupture. There were 40 patients with a subligamentary perforation and 57 with a sequestrated disc. In the group of 62 patients with intact anulus, 29 were women and 33 men (age 43 ± 9 years). In the other group of 97 patients with ruptured anulus, 45 were women and 52 men (43 ±11 years).

Preoperatively, all patients were asked to draw the location and modality of their pain on a special form.

Table 1. Criteria for penalty points according to Ransford et al. (1976)

1. *Unreal drawing:*
1.1 total leg pain
1.2 lateral whole leg pain
1.3 circumferential thigh pain
1.4 bilateral anterior tibial area pain
1.5 circumferential foot pain
1.6 bilateral foot pain
1.7 use of all modalities
2. *Drawings showing "expansion" or "magnification" of pain:*
2.1 back pain radiating to iliac crest, groin, or anterior perineum
2.2 anterior knee pain
2.3 anterior ankle pain
2.4 pain drawn outside the outline
3. *"I particularly hurt here" indicators:*
3.1 adds explanatory notes
3.2 circles painful areas
3.3 draws lines to demarcate painful areas
3.4 arrows
3.5 goes to excessive trouble and detail in demonstrating the painful areas
4. *"Look how bad I am" indicators:*
Additional painful areas in the trunk, head, neck, or upper extremities drawn in

Table 2. Pain patterns in patients with lumbar disc hernia with intact and ruptured anulus; frequencies, rate ratio (RR), and 95% confidence intervals (CI)

Pain pattern item	Intact (n 62)	Ruptured (n 97)	RR	CI
Pain in trunk	17	11	2.4	1.2–4.7
Pain in neck	13	1	20	5.2–70
Pain in upper extremities	9	5	2.8	1.0–7.7
Back pain radiating to iliac crest	19	13	2.3	1.2–4.2
Anterior knee pain	17	13	2.0	1.1–3.9
Pain drawn outside the outline	3	11	0.4	0.1–1.4
Adds explanatory notes	5	17	0.5	0.2–1.1
Circles painful areas	1	6	0.3	<0.1–1.8
Draws lines to demarcate painful areas	3	3	1.6	0.3–7.5
Arrows	1	7	0.2	<0.1–1.5
Additional painful areas in head	2	3	1.0	0.2–6.1

Each drawing was read blindly, using the criteria described by Ransford et al. (1976) (Table 1). A transparency with defined anatomical areas was superimposed on the pain drawings in order to standardize the evaluation. If the drawing contained any pain pattern meeting the criteria, the patient was assigned 1 point for each. A score > 2 was classified according to Ransford et al. (1976) as pathological. Most criteria are unequivocal, such as writing inside or outside the drawing, use of extra text, encircling areas, use of arrows and brackets. Some are less well defined, such as total leg pain, lateral whole leg pain and "going to excessive trouble and detail in demonstrating the painful areas". Inter- and intraobserver error was 3 percent for evaluating scores > 2.

95% confidence intervals for proportions were calculated using the test-based method. Chi-squared tests were used to evaluate differences in proportions and t-tests to evaluate mean differences in continuous variables. A significance level of 5% was employed.

Results

Patients with an intact anulus marked pain in the trunk, neck and upper extremities more often than those with a ruptured anulus (Table 2). On the other hand, the former described fewer pain modalities: 2.9 (SD 0.15) compared with 3.7 (0.12) ($p = < 0.01$). There was no statistically significant difference between the groups regarding other pathological patterns of drawing, such as pain drawn outside the outline and use of extra symbols/text (Table 2). However, the number of patients in each group that used these variables was quite small. Summarized as penalty points (Ransford et al. 1976), the incidence of pathological pain drawings, a score > 2, did not differ statistically significant between the groups: 48% of patients with intact anulus and 35% of patients with ruptured anulus (n.s).

Discussion

About a third of the patients with ruptured hernia made pain drawings that have been regarded as pathological in patients with chronic low back pain (Ransford et al. 1976). Conclusions about psychological aberrations should therefore be reached with great caution in patients with pain that is not chronic. Moreover, patients with ruptured anulus also draw significantly more modalities than others. Perhaps they have a larger component of neuralgic pain. In the individual patient, it is impossible to be certain whether an aberrant psychological profile is constitutional or the result of attrition of the individual's stamina by chronic pain. A vulnerable psychological constitution does not, of course, make an individual immune to somatic disease. Pain, after all, by definition, always has an emotional component. Such secondary effects may explain why psychological tests give quite divergent results (McNeill et al. 1986) and also tend to normalize after successful spinal surgery (Herron and Pheasant 1982).

Patients with ruptured anulus tended to concentrate their drawings on the legs and back. They also marked pain on the anterior aspect of the knee and on the iliac crest less often than patients with intact anulus. This is possibly due to lateral inhibition—i.e., that patients suffering from more severe sciatica do not experience other causes of pain to the same extent as patients with an intact anulus, whose back pain has a more multifactorial cause.

Most individual penalty points described by Ransford et al. (1976) for evaluating psychopathology from pain drawings in patients with chronic back pain were produced by only a minority of our patients. The value of these criteria must therefore be questioned in a population having pain that is not chronic.

Aberrant pain patterns have been called "nonorganic" (Udén et al. 1988). We believe that this term may be inappropriate. In the first place, the organic basis of pain is not completely understood and terms like "organic/nonorganic" lend an unwarranted scientific objectivity to a subjective interpretation. Secondly, as shown in this study "nonorganic" pain often has a definite anatomic cause.

Pain-drawing tests are used to sort out patients with poor psychometrics since these patients are thought to have a worse outcome after surgery. These tests have grown popular as they are easy to use and less time-consuming than more extensive ones, like the MMPI. Our observations show that pain drawings cannot be indiscriminately used as a psychological screening before lumbar disc surgery. The value of preoperative psychological screening for predicting outcome has also been questioned (Cashion and Lynch 1979, Herron and Pheasant 1982).

Acknowledgements

Grants were obtained from Stiftelsen Tornspiran, Förenade Liv and SALUS. We thank Dr. K. Ormstad for linguistic revision.

References

Cashion E L, Lynch J. Personality factors and results of lumbar disc surgery. Neurosurgery 1979; 4 (2): 141-5.

Dvorak J, Gauchat M-H, Valach L. The outcome of surgery for lumbar disc herniation. Spine 1988; 13 (12): 1418-22.

Ginzburg B M, Merskey H, Lau C L. The relationship between pain drawings and the psychological state. Pain 1988; 35: 141-6.

Herron L D, Pheasant H C. Changes in MMPI profiles after low-back surgery. Spine 1982; 7 (6): 591-7.

Herron L D, Turner J. Patient selection for lumbar laminectomy and discectomy with a revised objective rating system. Clin Orthop 1985; 199: 145-52.

Hurme M, Alaranta H. Factors predicting the result of surgery for lumbar intervertebral disc herniation. Spine 1987; 12 (9): 933-8.

McNeill T W, Sinkora G, Leavitt F. Psychologic classification of low-back pain patients: a prognostic tool. Spine 1986; 11 (9): 955-9.

Ransford A O, Cairns D, Mooney V. The pain drawing as an aid to the psychologic evaluation of patients with low back pain. Spine 1976; 1 (2): 127-34.

Reynolds F C, McGinnis A E, Morgan H C. Surgery in the treatment of low-back pain and sciatica. J Bone Joint Surg (Am) 1959; 41 (2): 223-35.

Spangfort E V. The lumbar disc herniation. A computer-aided analysis of 2,504 operations. Acta Orthop Scand (Suppl 142) 1972.

Spengler D M, Ouellette E A., Battié M, Zeh J. Elective discectomy for herniation of a lumbar disc. J Bone Joint Surg (Am) 1990; 72 (2): 230-7.

Udén A, Landin L A. Pain drawing and myelography in sciatic pain. Clin Orthop 1987; 216: 124-30.

Udén A, Åström M, Bergenudd H. Pain drawings in chronic back pain. Spine 1988; 13 (4): 389-92.

Wiltse L L, Rocchio P D. Preoperative psychological tests as predictors of success of chemonucleolysis in the treatment of the low-back syndrome. J Bone Joint Surg (Am) 1975; 57 (4): 478-83.

Von Baeyer C L, Bergstrom K J, Brodwin M G, Brodwin S K. Invalid use of pain drawings in psychological screening of back pain patients. Pain 1983; 16: 103-7.