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Prognostic role of depression after lumbar disc surgery

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Abstract A total of 73 patients underwent microdiscectomy for lumbar disc herniation between September 2001 and May 2002 at the Department of Neurosurgery of the Second University of Naples. Preoperatively and 3 and 6 months after surgery, patients were assessed on the Zung Self-rating Depression Scale (SDS) and on a visual analogue scale (VAS) for the subjective perception of pain. At 3 and 12 months, we found that patients with lower SDS scores (n=41) had a better outcome regarding pain than patients with relevant depressive symptoms (n=32). In agreement with the literature, our results confirm the negative role of depression in outcome after lumbar disc surgery. We emphasize the consideration of psychological factors in the management of lumbar disc herniation.

Key words Lumbar disc herniation • Visual analogue scale • Depressive state

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Introduction

Lumbar disc herniation is one of the most important causes of low back pain or lumbago in adulthood, so it may seriously limit daily activities and worsen a patient's quality of life [1].

Timing for surgical treatment of discectomy is still controversial, particularly regarding the predictive role of inclusion criteria on the postoperative outcome [1, 2]. We evaluated the role of depressive condition in the outcome after surgery for lumbar disc herniation.

Materials and methods

Subjects

A total of 73 patients consecutively admitted to the Department of Neurosurgery of the second University of Naples between September 2001 and May 2002 were enrolled. All patients underwent surgical treatment for lumbar disc herniation by microdiscectomy. They were 48 men and 25 women, aged from 20 to 68 years (mean age, 43.5 years; SD=15.3 years). The level of lumbar disc herniation was L5-S1 in 49 cases, L4-L5 and L5-S1 in 18 cases, and L4-L5 in the remaining 6 cases. Diagnosis was based on clinical and neuroradiological evaluations including lumbar spine radiography and magnetic resonance imaging (MRI).

Significant depressive symptoms were not reported in the clinical history of the patients before the onset of the low back pain.

Procedures

The patients were assessed by means of two instruments:

1. Visual analogue scale (VAS). The VAS consists of a marked 10 cm line. Subjects were requested to select a point on the line corresponding to the subjective perception of pain. A value of 0 indicated no pain, while 10 represented extreme pain.
2. Zung Self-rating Depression Scale (SDS). The SDS contains 20

items assessing different symptoms of depression, such as depressed mood, feelings of guilt, decreased appetite and sleep disorders. The score of SDS ranges from 20 (no depression) to 80 (major depression); a cut-off value of 35 indicates significant depressive symptoms.

Both VAS and SDS were administered preoperatively (baseline), and 3 and 12 months after surgery.

Results

We investigated the impact of depression on the outcome of surgery for lumbar disk herniation in 73 patients. The subjective perception of pain 3 and 12 months after surgery was less than that recorded preoperatively (Table 1). Post-hoc analysis (Scheffé) showed significant differences between VAS scores at baseline as compared with both three months ($p<0.0001$) and twelve months ($p<0.0001$). Comparison of VAS scores at 3 and 12 months did not reach significance ($p=0.3076$).

A one-way ANCOVA on VAS pain scores, with the time of observation as main factor, and neurological and neuro-radiological findings as covariate, showed a significant effect of time on the perception of pain ($F=6.307$; $\lambda=12.613$; $p<0.0001$).

Zung SDS scores for depression did not seem to be change after surgery (Table 1). A one-way ANOVA with post-hoc test (dependent variable, SDS score; factor, time of observation) did not show significant differences on the SDS scores at any time ($F=2.606$). Preoperatively, 36 subjects (49.3%) had relevant depressive symptoms (SDS score ≥ 35). At the 3-month follow-up, the number of depressed patients was almost the same ($n=37$); among these, 33 (45.2%) were formerly depressed, while 4 subjects (5.5%) developed significant depressive symptoms after surgery. At 12-month follow-up, 32 patients (43.8%) were depressed; of these, 28 patients (38.4%) were depressed both at baseline and at 3 months; the remaining four patients were depressed only at 3 months.

When the absolute presence of depression was taken into account, subjects with relevant depressive symptoms (SDS score ≥ 35) had higher scores on VAS at baseline ($F=6.698$,

$p<0.02$), 3 months ($F=179.568$, $p<0.0001$) and 12 months ($F=219.230$; $p<0.0001$).

The impact of depression on long-term surgical outcome was assessed by multiple regression analysis in which the VAS score at twelve months was dependent variable, while age, sex, level of disc herniation and preoperative SDS scores were independent variables. Only depression was an independent predictor of poor outcome at follow-up ($t=7.120$, $p<0.0001$).

There was no evidence of intra- or post-operative complications in any patient. Patients with persistence of symptoms without neurological deficits received conservative treatment.

MRI was performed in patients refractory to conservative therapy or with neurological disorders (16 patients at the 12-month follow-up). MRI revealed recurrence or scar tissue in 7 of 16 patients with persistence of low back pain; these seven subjects underwent surgical treatment again. The remaining nine patients were both clinically and neuroradiologically negative: for these patients, we preferred clinical observation and additional conservative treatment.

Discussion

Low back pain in one of most frequent symptoms in adulthood: about 80% of persons worldwide complain about low back pain once in their lives [1]. The most frequent cause of low back pain or lumbago is lumbar disc herniation. Timing for surgical treatment of discectomy is still controversial: the first intervention is quite easy to get, while a repeated intervention is quite hard to do and has a poorer outcome. Finneson and Schmidek [1] suggested not to perform the first intervention when inclusion criteria do not exist in order to avoid the "failed back syndrome": these data are suggestive, especially if we consider that success rates after lumbar disc excision range from 75% to 80% [2] and decrease after repeated operation. Despite the well known indications for lumbar microdiscectomy (recurrent or refractory pain, positive MRI results corresponding to clinical signs, neurological disorders) [1], there are many contraindications for surgical treatment that are related

Table 1 Parameters of pain and depression pre- and postoperatively in 73 patients who underwent microdiscectomy for lumbar disc herniation. Values are mean (range)

	Pain score ^a	Zung SDS score ^b
Baseline	6.4 (1.4–10.0)	37 (26–51)
3 months	3.9 (0–10.0)	37 (26–52)
12 months	3.1 (0–10.0)	34 (23–53)

SDS, self-rating depression scale

^a Measured from 0 (no pain) to 10 (extreme pain) on a visual analog scale (VAS)

^b Scores range from 20 (no depressive symptoms) to 80 (significant depressive symptoms)

to both symptoms (e.g. regression of pain after medical or physical therapy, clinical and neuroradiological improvement, long history of recurrent low back pain with uncertain radiological findings) [1] and risk factors (e.g. elevated body mass index, smoking) [3].

Regarding the role of psychological factors on the clinical expression and outcome of lumbar disc surgery, our study shows that depressive symptoms are a feature of lumbar disc disease. Depression affects, at different levels, about one-half of patients eligible for disc surgery. Furthermore depressive symptoms may persist over time in a large percentage of patients also when surgical treatment has been performed well. Finally, late-onset post-surgical depression may be observed in a small but relevant number of patients.

Surgical treatment is associated with a significant reduction of pain in patients suffering from disc herniation, but the improvement regards the first period after intervention. However, when the role of depression was taken into account, we observed a clear distinction of the population into two subgroups, i.e. subjects with relevant depressive symptoms and high level of pain, and patients with no or subclinical depression and low level of pain. Furthermore, preoperative depression was shown to be an independent predictor of poor outcome.

The role of psychological factors in the clinical outcome of lumbar disc surgery has recently been emphasized by several authors. In 1999, Graver et al. [4] described a poor outcome at the 7-year follow-up after lumbar disc surgery in patients with preoperative psychological disorders. In the same year, Donceel and Du Bois [5] emphasized the role of preoperative psychological stress as a poor prognostic factor, suggesting the customary use of psychometric tests, such as SDS, before performing lumbar disc surgery. Trief et al. [6] performed a prospective study of 102 patients surgically treated for lumbar disc herniation, and remarked that psychological screening tests should be used before lumbar disc surgery in order to get a successful outcome in these patients. Asch et al. [2] showed a correlation between two main factors (i.e. patient's age and worker's compensation) and poor outcome after lumbar disc excision; furthermore, they strongly recommended to employ evaluation tests like the VAS as inclusion criteria for lumbar disc surgery. We used unavoidable clinical and neuroradiological examinations,

and we administered the SDS and the VAS in order to evaluate depressive state [4–6] and subjective perception of pain [2, 4, 5, 8], respectively.

Our study suggests that depression has an independent role as predictor of poor outcome in patients suffering from lumbar disc herniation. This should encourage neurosurgeons to pay attention to psychological and psychiatric evaluations in managing these patients. An ongoing study by our group will address the role of therapeutical interventions, with special regard to medication with new antidepressant drugs (selective serotonin reuptake inhibitors, SSRIs), on depression in improving functional outcome of surgical treatment.

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