The Relation Between Expectations and Outcomes in Surgery for Sciatica

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OBJECTIVE: To describe the expectations that patients and their physicians have for outcomes after surgical treatment for sciatica and to examine the associations between expectations and outcomes.

DESIGN: Prospective cohort study.

SETTING/PATIENTS: We recruited 273 patients, from the offices of orthopedic surgeons, neurosurgeons, and occupational medicine physicians in Maine, who had discectomy for sciatica.

MEASUREMENTS AND MAIN RESULTS: Patients' and physicians' expectations were measured before surgery. Satisfaction with care and changes in symptoms and functional status were measured 12 months after surgery. More patients who expected a shorter recovery time after surgery were "delighted," "pleased," or "mostly satisfied" with their outcomes 12 months after surgery than patients who expected a longer recovery time (odds ratio [OR] 2.2; 95% confidence interval [CI] 1.1, 4.4). Also, more patients who preferred surgery after learning that sciatica could get better without surgery had good symptom scores 12 months after surgery than patients who did not prefer surgery (OR 2.9; 95% CI 1.2, 7.0). When physicians predicted a "great deal of improvement" after surgery, 39% of patients were not satisfied with their outcomes and 25% said their symptoms had not improved.

CONCLUSIONS: More patients with favorable expectations about surgery had good outcomes than patients with unfavorable expectations. Physicians' expectations were overly optimistic. Patient expectations appear to be important predictors of outcomes, and eliciting them may help physicians identify patients more likely to benefit from discectomy for sciatica.

KEY WORDS: patient expectations; physician expectations; sciatica; discectomy.

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Almost 200,000 patients per year undergo lumbar diskectomy in the United States.¹ Guidelines recommend considering surgery for patients with objective evidence of radiculopathy who have not responded to conservative treatment.²⁻⁵ Surgery is thought to improve symptoms by relieving tension, pressure, and inflammation involving the nerve root. The natural history of sciatica suggests that symptoms will improve over time, even without surgical intervention. Thus, the decision to undergo surgery is an individual one, made by the patient and the physician. Wide variations in discectomy rates observed across geographic regions suggest that the threshold for surgery varies.⁶

Many factors besides the patient's symptoms, physical examination findings, and imaging findings are thought to be involved in the decision to undergo lumbar discectomy, and to predict outcomes. These factors can include the environment of the medical care setting, the amount and nature of the caregiver's attention, incentives to magnify or minimize symptoms, and expectations of patients, family, friends, and physicians.⁷⁻⁹

We sought to examine one of these factors, the role of the patient's and physician's expectations. We asked whether the expectations of patients or their physicians are associated with the decision to undergo surgery and with its outcomes. If so, understanding such expectations may help future patients with sciatica and their physicians as they consider treatment options including surgery.

METHODS

Subjects

The data were collected during the Maine Lumbar Spine Study (MLSS), a community-based, prospective cohort study. This study was designed to compare outcomes of patients with sciatica who were treated with discectomy and of patients who received nonsurgical therapy. The design, methods, and initial results have been presented elsewhere.^{10,11} From 1990 to 1992, 507 patients with sciatica were enrolled. This report is limited to the 273 patients who had discectomy. Patients with sciatica were recruited from the community-based practices of orthopedic surgeons, neurosurgeons, and occupational medicine specialists. To be eligible, patients had to have sciatica and be older than 18 years of age. The diagnosis of sciatica was made by the treating physician. In addition, patients had to have had at least 2 weeks of conservative therapy without satisfactory improvement within 2 months of presentation. Specific radiographic findings were not required. Patients were excluded if they had prior spine surgery, cauda equina syndrome, developmental spinal deformities,

vertebral fractures, spine infection or tumor, inflammatory spondylopathy, pregnancy, or severe comorbid conditions. Patient demographic characteristics, low-back and leg pain symptoms, findings from the clinical examination, findings from radiographic studies, and functional status measures were obtained before surgery.

Key Variables

In addition, patients were asked three questions before surgery, one about the expected recovery time, one about the expected health state after surgery, and one about the desirability of surgery. The question about expected recovery time asked, "How long do you expect it will take you to recover from the operation?" Patients had five choices for a response, from "less than 1 month" to "more than 12 months." Patients were dichotomized into those expecting less than 3 months and those expecting more than 3 months of recovery time. The question about expected health state asked, "Do you expect the surgery to return you to your usual state of health?" The responses were "yes," "unsure," and "no." Before the question about the desirability of surgery, the characteristics of back surgery were briefly described and the interviewer said, "Suppose the surgery will eliminate your symptoms but without surgery you could gradually improve over 3 years anyway." Patients then were asked whether they would still want surgery. Five options ranged from "certainly want surgery" to "certainly would not favor surgery." Patients were dichotomized into those favoring surgery versus those not favoring surgery or unsure about their preference.

Twelve months after surgery, patients were asked two questions, one about symptoms and another about satisfaction. The question about symptoms asked, "Compared to 12 months ago, have the following symptoms become better, worse, or stayed the same?" Then, on a scale from 1 (completely gone) to 7 (much worse), patients were asked to rate symptoms of leg pain; numbness or tingling in the leg, foot, or groin; weakness in the leg or foot; and back or leg pain while sitting. Patients were dichotomized into those with a total score of 12 or lower versus those with a total score greater than 12. A score of 12 or lower indicated that all symptoms were better, while scores higher than 12 indicated that at least some symptoms were either the same or worse. The question about satisfaction asked, "If you were to spend the rest of your life with your back symptoms just the way they are now, how would you feel about that?" The seven responses were, "delighted," "pleased," "mostly satisfied," "mixed (about equally satisfied and dissatisfied)," "mostly dissatisfied," "unhappy," and "terrible." The validity and performance characteristics of this measure have been reported elsewhere.¹²

Before surgery and 12 months after surgery, each patient's functional status was measured with two instruments. The back-specific functional status was measured using the Roland back disability scale,¹³ which was modi-

fied to contain 23 items, each of which asked whether a specific back-related disability was present. Higher scores on the Roland scale reflect worse function. The overall functional status was measured using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36).¹⁴ Although the SF-36 can be used to measure eight domains of health, only the physical function domain was used as a key variable in this study, which was scored from 0 (poor health) to 100 (optimal health), with higher scores reflecting better function. Changes in functional status were calculated by subtracting the baseline data from the 12-month data.

Before surgery, the patient's physician was asked, "How much do you think the quality of this patient's life would improve if she/he had lumbar surgery at this time?" The four possible answers were "a great deal of improvement," "moderate improvement," "slight improvement," and "no improvement at all."

Statistical Analyses

A commercial software package (SPSS Inc., Chicago, Ill) was used for statistical analyses. For bivariate analyses, χ^2 contingency tables, Student's *t* tests, the χ^2 test for trend, and one-way analysis of variance were used. Logistic regression was used to control for baseline differences in confounding variables in multivariate analyses. A backward-stepping algorithm was used, and variables were retained if their *p* values were .05 or lower.

RESULTS

Patients' baseline characteristics are listed in Table 1. Almost two thirds of patients were men, and their mean age was 42 years. Their symptoms and functional limitations were relatively severe, as expected for surgical candidates.

When patients were asked how long they expected their recovery time to be, 66% answered less than 3 months and 34% more than 3 months. When asked about their expectations for health after surgery, 65% expected to return to their usual health state after surgery, 9% did not, and 26% were unsure.

After hearing that sciatica could improve without surgery, 72% favored the surgical option and 28% said that they would not have chosen surgery if they thought their sciatica could get better without surgery. When patients were asked about their main reasons for preferring surgery, a desire for pain relief was reported by 91%. Thirty-four percent of patients said that their doctor (32%) or a family member (10%) or both convinced them to have surgery. Patients were asked what they thought would happen if they did not have an operation. Although many patients stated that persistent pain or restricted physical activity was their greatest concern, the answers reflected a variety of fears and concerns. Some more dramatic answers were, "I would be in pain forever and I couldn't stand it"; "I would eventually cease walking"; "Shriveled up and die—I'd be a vegetable"; and "Pain, depression, useless life."

Table 1. Baseline Characteristics

Characteristic	Value
Demographics	
Age, mean, years	42.0
Male sex, %	65.6
Education (<college), %	59.3
Employed in last 4 wk, %	50.5
Compensation, %	36.6
Retained an attorney, %	18.3
Physical examination findings	
Straight leg raise test positive, %	70.2
Asymmetric reflex, %	42.6
Symptoms	
Symptom frequency index, mean*	18.1
Symptom Bothersomeness index, mean*	18.0
Back pain duration (<3 mo), %	42.5
Leg pain duration (<3 mo), %	47.6
Lifetime episodes (<5), %	62.3
Functional status	
Roland scale (0–23), mean	
SF-36 subscales (0–100)	17.9
Physical function, mean	31.7
Physical role, mean	9.7
Emotional role, mean	47.2
Body pain, mean	18.9
Social function, mean	40.8
Vitality, mean	35.9
Mental health, mean	60.8
General health, mean	77.0

*A scale from 0 to 6 was used to assess the frequency (0 = not at all to 6 = always) and bothersomeness (0 = not bothersome to 6 = extremely bothersome) of back and leg symptoms. The indexes were created by summing the results of four symptom questions: leg pain; numbness or tingling in the leg, foot, or groin; weakness in the leg or foot; and pain in the back while sitting.

The results of the bivariate analyses are shown in Table 2. More patients who expected a shorter recovery time reported that they were “delighted,” “pleased,” or “mostly satisfied” with their outcomes 12 months after surgery

than patients who expected a longer recovery time. Patients who expected a shorter recovery time, however, did not have significantly different symptom scores, or different functional status scores on either the Roland scale or the SF-36 physical function domain when compared with patients who expected a longer recovery time. Patients who expected to return to their usual health state after surgery did not have significantly different satisfaction scores, symptom scores, or functional status scores when compared with patients who did not expect to return to their usual health state. More patients who preferred surgery after learning that sciatica could get better without surgery were “delighted,” “pleased,” or “mostly satisfied” with their outcome, and more of these patients had higher symptom scores and higher functional status on the Roland scale but not on the SF-36 physical function domain when compared with patients who did not prefer surgery.

Bivariate analyses showed that the following variables were associated with at least some patient expectations and some outcome variables: worker's compensation status, education level, retaining an attorney, the score for the SF-36 emotional role domain, and the score for the SF-36 general health domain. Therefore, these variables were treated as confounding variables in the multivariate analyses and entered in each logistic regression.

When baseline differences in the confounding variables were controlled for in these analyses, two patient expectations were independently associated with outcomes. More patients who expected a shorter recovery time after surgery were “delighted,” “pleased,” or “mostly satisfied” with their outcomes 12 months after surgery than patients who expected a longer recovery time (odds ratio [OR] 2.2; 95% confidence interval [CI] 1.1, 4.4). Also, more patients who preferred surgery after learning that sciatica could get better without surgery had good symptom scores 12 months after surgery than patients who did not prefer surgery (OR 2.9; 95% CI 1.2, 7.0).

Physicians predicted “a great deal of improvement” after surgery for 87% of their patients and “moderate

Table 2. Association Between Baseline Patient Expectations and 1-Year Outcomes*

Outcomes	Recovery Time*		Recovery Extent†			Scenario‡	
	< 3 mo (n = 122)§	< 3 mo (n = 56)§	Yes (n = 124)§	Unsure (n = 42)†	No (n = 17)§	Favor Surgery (n = 133)†	No Surgery or Unsure (n = 49)§
Satisfaction with results, % high	69.7	48.2	64.5	57.1	47.1	66.2	49.0
Symptoms rating, % favorable	79.6	73.5	76.5	74.3	64.3	81.3	59.0
Roland scale improvement,¶ mean	12.7	11.4	12.4	11.7	8.6	12.8	9.5#
SF-36 physical function improvement,** mean	43.9	38.2	44.2	35.9	34.3	44.1	34.6

* “How long do you expect it will take you to recover fully from the operation?”

† “Do you expect the surgery to return you to your usual state of health?”

‡ “Suppose the surgery will eliminate your symptoms but without surgery you could gradually improve over 3 years anyway.”

§ Exact n values vary slightly for different variables due to missing values.

|| p value ≤ .05.

¶ Roland score at baseline minus Roland score at 12 months.

p value < .005.

** SF-36 physical function at 12 months minus baseline.

Table 3. Association of Baseline Physician's Expectation with 1-Year Outcomes*

Outcomes	Great Improvement (n = 176) [†]	Moderate Improvement (n = 27) [†]
Satisfaction, % high	61.4	50.0
Symptoms rating, % favorable	74.5	65.0
Roland scale improvement, [‡] mean	11.7	9.2
SF-36 physical function improvement, [§] mean	41.6	28.0

* "How much do you think the quality of this patient's life would improve if she/he had lumbar surgery at this time?"

[†]Exact n values vary for different variables due to missing values.

[‡]Roland score at baseline minus Roland score at 12 months.

[§]SF-36 physical function at 12 months minus at baseline.

^{||}p ≤ .05.

improvement" for 13%. They predicted that only one patient would have "slight improvement" and only one would have "no improvement at all." When physicians predicted "a great deal of improvement," more patients were "delighted," "pleased," or "mostly satisfied" with their outcome, and more of these patients had higher symptom scores and higher functional status than when physicians predicted "moderate improvement," although only the difference in SF-36 physical function scores was significant (Table 3). Despite these differences, when physicians predicted "a great deal of improvement" after surgery, 39% of patients were not satisfied with their outcomes and 25% said their symptoms had not improved.

DISCUSSION

We found that patients' expectations about the need for surgery and the duration of recovery were associated with their surgical outcomes. For example, we found that more patients with expectations for a shorter duration of recovery were satisfied with the results of their surgery at 12 months than patients with expectations for a longer duration of recovery.

We also found that patients who might have chosen nonsurgical therapy if they understood the natural history of sciatica had less symptomatic improvement than those who continued to prefer surgery after hearing that symptoms could improve without surgery. This information was gathered after patients had already chosen surgery, and they might have had "second thoughts" about their decisions because they chose surgery with an incomplete understanding of the natural course of the illness in patients without surgery.¹⁵ We do not know whether patients who did not want surgery after hearing that symptoms could improve without surgery would have had fewer symptoms if they had chosen nonsurgical therapy. The fact that these patients had less symptomatic improvement, however, means that further research should be done regarding this association.

When physicians predicted that patients would have "a great deal of improvement" after surgery, 39% of patients were not satisfied with their outcomes and 25% said their symptoms had not improved. Therefore, physicians'

predictions of highly favorable outcomes were only modestly accurate and may have been overly optimistic.

When interpreting our results, several limitations should be kept in mind. For example, our results are based on self-reported measures. Therefore, it is possible that patients biased their outcome reports to be consistent with the expectations they had expressed previously. Also, this observational study allowed us to identify associations but not necessarily cause and effect. Finally, although we used multivariate techniques to control for confounding factors that we could identify, there may have been confounding factors that we did not identify.

Despite these limitations, we believe that our study shows that patients with better expectations about their surgery and stronger preferences for surgery will have better outcomes after discectomy for sciatica. Therefore, asking patients about their expectations for surgery could help physicians identify patients who are more likely to benefit from discectomy, and primary care physicians may want to consider the patient's expectations when deciding whether to refer the patient for a surgical opinion. Finally, surgeons should be aware of their tendency for overly optimistic predictions of surgical outcomes after discectomy for sciatica.

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