



Original Article

Biopsychosocial variations in quality of life outcome following microdiscectomy

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ABSTRACT

Background: Lumbar microdiscectomy is one of the most frequently performed neurosurgical procedures. In this review, we ask why patients' outcomes vary so widely even within the same unit, with the same surgeon performing the procedure and utilizing the technique?

Methods: In a cohort of 87 patients, we investigated how/whether multiple patient variables impacted outcomes following single-level lumbar microdiscectomy. We studied whether early surgical intervention improved the patients' quality of life (QOL) versus late intervention. Furthermore, we assessed other variables that could influence patient-perceived improvement. Preoperatively and postoperatively, we additionally utilized the following internationally standardized questionnaires (EQ-5D, Oswestry, and Core Outcome Measures Index [COMI]).

Results: A generalized substantial improvement in QOL was identified throughout the cohort population (<0.05). There was no difference in health measurement scores for those undergoing early versus late surgery. However, there was a statistically significant improvement in all QOL scores for privately insured patients versus publicly insured patients (e.g., on COMI, EQ-5D, and ODI Scores).

Conclusion: There was no objective statistically significant difference in QOL health scores between patients undergoing early versus late surgical lumbar microdiscectomy. This would suggest that the length of time patients is symptomatic before surgery did not significantly impact postoperative outcome. Of interest, however, was the difference in QOL health scores for private versus public patients suggesting that there are more subjective, complex, and psychosocial issues that influence outcome.

Keywords: Lumbar disc disease, Microdiscectomy, Oswestry Disability Index, Quality of life outcomes, Radiculopathy

INTRODUCTION

Patient-based outcome scores may be the most important tools clinicians, patients, and policy-makers can use to identify the effectiveness of lumbar microdiscectomy. Here, we critically assessed whether early versus later surgical intervention would significantly impact patients' postoperative quality of life (QOL) and functionality. In addition, we evaluated whether private versus public insurance (e.g., psychosocial factors correlating with these) impacted patient-perceived outcomes.

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MATERIALS AND METHODS

This is a prospective single-center cohort study. We utilized and analyzed different outcome measures preoperatively and at 2 months following lumbar microdiscectomy. This study included 87 patients, with an equal distribution between men and women.

Patient demographics

Patients in both groups ranged from 31 to 44 years of age and presented with back pain, paresthesias, radiculopathy, and even incontinence. Notably 54% of patients were operated on <1 month following consultation. Of interest, surgery was delayed by 1 year in 34% of patients even though 82.1% of them had been seen by neurosurgery within <3 months of symptom onset. The majority of patients had private health insurance [Table 1].

Data analysis

Qualitative data were compiled over an 8-month preoperative period for patients undergoing single-level lumbar microdiscectomy. They were interviewed preoperatively and 8 weeks postoperative using standardized, internationally validated questionnaires (e.g., including QOL outcomes, the Eurospine core outcome measure index [COMI] patient self-assessment [measuring pain and QOL levels], the EuroQol EQ-5D-3L survey [measuring health state and QOL], and the Oswestry Disability Index [measuring disability levels]).

One of the main variables analyzed was the impact of early (<3 months postsymptomatic onset) or late (>3 months postsymptomatic onset) surgery on outcomes. We also assessed the impact that the patient's socioeconomic health-care status had on their overall outcome.

Statistical analysis

Preoperative and postoperative scores were compared using paired *t*-tests for each instrument. The changes in scores between groups were then compared for each instrument using *t*-tests and ANOVA where appropriate. *P* < 0.05 was considered statistically significant. Data were compiled using Microsoft Excel and analyzed using STATA version 12 and SPSS Version 20.

RESULTS

Postoperative outcomes

Significant statistical improvement was observed utilizing all outcome scores between preoperative and postoperative scores for all health-care measurement instruments [Table 2]. In both COMI and the Oswestry Disability Index, a negative difference score indicated a positive improvement in patient

Table 1: Descriptive statistics.

<i>n</i> =87	
Demographic characteristics	Total <i>n</i> (%)
Age (yrs.)	
18–30	7 (8)
31–44	33 (37.9)
45–59	32 (36.8)
60–80	15 (17.2)
Sex	
Male	43 (49.4)
Female	44 (50.6)
Time period of refractory pain	
<6 months	36 (41.3)
6 months–1 year	21 (24.1)
1–2 years	10 (11.5)
>2 years	20 (23.0)
Time period from GP referral to consult (months)	
<1–3	69 (82.1)
>3	15 (17.9)
Time period from refractory symptoms to imaging (months)	
<1–3	58 (67.4)
>3	28 (32.6)
Time period from consult to surgical intervention (month)	
<1	47 (54.0)
>1	40 (46.0)
Imaging insurance status (MRI)	
Private	77 (88.5)
Public	10 (11.5)
Patient insurance status	
Private	61 (70.1)
Public	26 (29.9)

Table 2: Overall preoperative and postoperative scores.

Health status measures	Preoperative	Postoperative	Difference
Oswestry score EQ-5D 3L	55.4 (19.6)	20.7 (20.6)	-34.6 (22.4)*
Index value	0.16 (0.33)	0.74 (0.38)	0.57 (0.46)*
COMI score	7.5 (1.7)	2.7 (2.5)	-4.7 (2.4)*

**P*<0.001

QOL (e.g., with a COMI difference at - 4.7 and Oswestry at -34.6). EQ-5D 3L identified an impressive increase of 0.57.

Comparative variables

Early versus late timing of lumbar microdiscectomy did not alter patients' postoperative outcomes [Table 3].

Patients with private health insurance reported statistically significant superior postoperative improvement (e.g., health-related outcome scores) versus those on public health care [Table 4].

Table 3: Improvement comparisons in health measure scores preoperatively and postoperatively using objective variables (standard deviation is presented in the brackets).

Characteristic	Change in health measure score between time points			
	Oswestry	EQ index value	EQ-VAS	COMI
Time period of refractory pain				
<3 months	-40.1 (20.6)	0.60 (0.5)	18.8 (30.1)	-5.1 (2.3)
3 months–1 year	-35.4 (23.4)	0.54 (0.5)	19.9 (34.9)	-4.7 (2.1)
1–2 years	-36 (25.9)	0.61 (0.4)	25.1 (15.9)	-5.3 (2.5)
>2 years	-23.2 (19.9)	0.53 (0.5)	3.5 (29.5)	-3.7 (2.7)
	P=0.056	P=0.9	P=0.18	P=0.19
Time period from GP referral to consult (months)				
<1–3	-36.7 (22.5)	0.58 (0.4)	16.2 (31.8)	-5.0 (2.3)
>3	-26.5 (22.4)	0.50 (0.6)	13.1 (23.5)	-3.6 (3.0)
	P=0.12	P=0.54	P=0.73	P=0.10
Time period from refractory symptoms to imaging (months)				
<1–3	-36.2 (22.1)	0.57 (0.5)	16.9 (30.0)	-4.9 (2.4)
>3	-30.4 (22.6)	0.54 (0.5)	12.5 (29.4)	-4.3 (2.5)
	P=0.26	P=0.81	P=0.52	P=0.31
Time period from surgical consult to intervention (months)				
<1	-37.2 (22.9)	0.57 (0.4)	19.9 (29.1)	-5.1 (2.3)
>1	-31.6 (21.6)	0.58 (0.5)	11.9 (31.7)	-4.3 (2.5)
	P=0.25	P=0.91	P=0.22	P=0.15

Table 4: Improvement comparisons in health measure scores preoperatively and postoperatively using subjective variables.

Characteristic	Change in health measure score between time points			
	Oswestry	EQ index value	EQ-VAS	COMI
Imaging insurance status				
Private	-36.9 (21.2)	0.61 (0.4)	17.4 (31.2)	-5.0 (2.3)
Public	-17.2 (24.9)	0.3 (0.5)	7.7 (22.7)	-2.7 (2.5)
	P<0.01*	P=0.03*	P=0.35	P=0.02*
Patient insurance status				
Private	-38.2 (20.9)	0.63 (0.38)	20.0 (29.5)	-5.1 (2.4)
Public	-26.3 (23.7)	0.43 (0.57)	7.4 (31.1)	-3.7 (2.3)
	P=0.02*	P=0.04*	P=0.08	P=0.01*

*P<0.05

DISCUSSION

Postoperative outcomes

In keeping with the published literature, the results presented indicate a definite improvement in health related quality of life amongst microdiscectomy patients.^[3,6,8] This was tangible in all patient-orientated physical, psychological and social domains and thus was mirrored in the validated standardised instruments of this research. The parameters constituting quality of life should be considered as key outcome measures for these patients. However, it should be noted that conservative treatment can also have similar benefits on patients suffering from lumbar radiculopathy^[4,5]. While surgery has more immediate benefits, as noted here by the

substantially improved outcome measurements at 8 weeks, the early advantages provided by surgery are soon matched by conservative care.^[4]

Waiting times within the healthcare system are generally short amongst patients undergoing microdiscectomy. 82.1% of patients referred by their General Practitioner were seen within 3 months. Of this cohort, 53% of the patients deemed suitable underwent surgical intervention within one month of neurosurgical consult. This study identified that the length of pre-operative waiting time was not statistically significant. Treatment of patients less than 3 months following symptomatic onset did not have any influence on post-operative patient outcome. The duration of patient radiculopathy had no bearing on the cohort's post-operative health-related quality of life scores. This objective variable was neither clinically nor statistically significant. Early operative intervention did not improve patient outcome. Thus it can be argued that the degree and duration of pre-operative pain is not a key determinant of patient outcome and should not be taken into consideration when assessing patient suitability for surgery. Potential surgical candidates should be reminded that long term beneficial outcomes when comparing operative management and multiple non-operative treatments on quality of life is equivocal.

All health measurement instruments identified a statistically significant superiority in private patient post-operative health-related scores compared to public patient post-operative health-related scores. This was also true for patients who underwent private imaging pre-operatively. Private patients displayed superior post-operative outcome

compared to public patients, with p values of 0.02, 0.04 and 0.01 for ODI, EQ-5D-3L and COMI respectively. Patient quality of life is equally a result of their subjective perception of the disease and their objective condition. The neurogenic symptoms domain is usually the least improved dimension of patient quality of life.^[1] The importance of psychological and social factors is becoming increasingly acknowledged in the field of spinal surgery, with this study adding further merit in relation to spinal surgery outcomes.^[9]

Minimal research has been completed looking at the cost burden of non-operative and operative management of these patients. The general consensus is that long-term effectiveness is emphasised more than short-term gains. High upfront costs associated with surgery may allow researchers to conclude that operative intervention may not be cost-effective in a 2-3 month time frame. However, by extending the time interval and assuming that minimal costs are incurred after the index surgery, the value equation calculated at 2 years may conclude that that same intervention is in fact more cost-effective.^[2] Furthermore, the Spine Outcomes Research Trial (SPORT) found that surgery for lumbar disc herniation was associated with greater costs but also greater QALY improvements.^[7]

This is the first study that analyses both objective external and patient perceived subjective variables in a comparative manner. This research highlights aspects of this prevalent condition, evaluating pre-operative and post-operative health-related biological, psychological and social elements of patient outcome. A limitation of this study is the short follow-up period with minimal information gathered regarding the financial implications of surgical intervention.

CONCLUSION

It is our responsibility to evaluate the reasoning behind our management decisions. Microdiscectomy is beneficial, however given the significant influence psychological mindset has on patient outcome, it is imperative that candidates are appropriately triaged prior to intervention. The onus is on clinicians to ensure patients receive the optimal and most suitable treatment that will symptomatically alleviate their condition and ultimately improve their quality of life.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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