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Original Article

Lumbar revision microdiscectomy in patients with recurrent lumbar disc herniation: A single-center prospective series

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Received : 15 August 2020
Accepted : 29 October 2020
Published : 25 November 2020

DOI
10.25259/SNI_540_2020

Quick Response Code:

ABSTRACT

Background: Recurrent lumbar disc herniation (RLDH) is a common complication following primary microdiscectomy. Notably, revision surgery for recurrent disc herniation typically warrants "aggressive discectomy (AD)" rather than microdiscectomy due to the marked changes in anatomy, including postoperative scar. Here, we prospectively evaluated clinical outcomes of 22 RLDH patients following secondary aggressive discectomy (AD).

Methods: Records of 15 males and seven females averaging 41.7 years of age (range 21–60) who developed RLDH following primary microdiscectomy at the L4-5 (n = 12) and L5-S1 (n = 10) levels were studied. All patients underwent secondary AD for recurrent lesions (2014–2019). Multiple clinical parameters were assessed for these 22 patients. Outcomes were evaluated an average of 28.8 months postoperatively and included assessment of visual analog scales (VASs) and Japanese Orthopedic Association (JOA) Scores.

Results: The VAS scores for back and radicular pain significantly improved, as did the JOA scores following surgery in all 22 patients after secondary AD.

Conclusion: The authors concluded that secondary conventional revision discectomy (e.g., AD) effectively and safely managed RLDH.

Keywords: Lumbar disc herniation, Recurrent herniation, Revision discectomy

INTRODUCTION

Recurrent lumbar disc herniation (RLDH) following initial microdiscectomy is the most common cause for reoperations.[7] Notably, revision for RLDH is more complex and challenging, thus typically warranting increased exposure offered by more "open" aggressive discectomy (AD). This study evaluated the risk factors for RLDH and clinical outcomes for 22 patients who originally underwent lumbar microdiscectomy followed by secondary AD for RLDH.

MATERIALS AND METHODS

With IRB approval, we prospectively studied outcomes for 22 patients who originally underwent microdiscectomies, but secondarily whose RLDH were managed with 19 AD versus 2 simple excisions of extruded fragments (2014 and 2019) [Table 1]. Patients all underwent X-ray and MR studies to define RLDH. Outcome criteria included: the visual analog scale (VAS; low back/radicular pain) and the Japanese Orthopedic Association (JOA) Scores.[2] Nineteen primary operations were performed by a single surgeon, while three were transferred from other institutions [Figure 1]. Clinical demographic data, the average follow-up duration (28.8 mos.: range 24-70), and level of RLDH were studied (e.g., L4-5 [12 patients; 54.54%] and L5-S1 levels [10 patients; 45.45%]) [Table 2].

Statistical analysis

The quantitative data were analyzed statistically using Statistical Package for the Social Science, version 25, Armonk, NY, IBM Corp.

Table 1: Inclusion and exclusion criteria.

Inclusion criteria
1. Recurrent low back pain with radiculopathy at least 6 months after primary lumbar disc surgery
2. Recurrent radicular pain unresponsive to conservative treatment for at least 6 weeks
3. Recurrent low back pain with progressive neurological deficit 6 months after surgery
4. Magnetic resonance imaging on lumbosacral spine showing disc herniation at the same level as the primary discectomy
Exclusion criteria
1. Low back pain without leg pain
2. RLDH at >2 levels
3. Spinal instability
4. Disc herniation with other

Table 2: Demographic profile of the patients with revision discectomy in RLDH (*n*=22).

Characteristics	***n* (%)**
Age	
21–40	16 (72.73)
41–60	6 (27.27)
Mean±SD	41.7±9.34
Sex	
Male	15 (68.18)
Female	7 (31.82)
Body mass index (kg/m^2)	
>30	17 (77.27)
≤30	5 (22.73)
Mean±SD	31.2±1.5
Involved level	
L4-5	12 (54.55)
L5-S	10 (45.45)
Duration of recurrence (months)	
6–12	8 (36.40)
13–24	10 (45.45)
25–36	3 (13.64)
37–48	1 (4.55)
Mean±SD	17.18±8.47

Table 3: Clinical outcomes of patients with revision discectomy in RLDH (*n*=22).

VAS	**Preoperative**	**Postoperative**	
		After 2 weeks	**After 2 years**
Back pain (mean±SD)	7.86±1.36	2.77±1.86	1.06±1.01
Radicular pain (mean±SD)	7.59±1.64	1.95± 1.65	1.47±1.10

VAS: Visual analog score

RESULTS

The operative time for secondary AD was 95.0 ± 9.0 min (range 65–125 min), the mean blood loss 85 ml (range, 70–150 ml), and average postoperative hospital stay was 5 days (range, 4–8 day). The mean VASs and JOA scores were significantly improved postoperatively [Tables 3 and 4]. Surgical results were excellent in 6 (27.27%), good in 14 (63.64%), and fair in 2 (9.09%) patients. The JOA mean recovery score was 88.8 (±32.25), while the average satisfactory JOA rate was 86.36%. Six (27.27%) patients developed postoperative complications: dural tear (one patient), superficial wound infection (two patients), transient neurological deficit (one patient), postoperative instability (one patient), and additional recurrent herniation (one patient).

DISCUSSION

Surgical options for RLDH

The main two surgical options for RLDH include revision lumbar discectomy (e.g., repeat microdiscectomy vs. AD) [Figure 2] and/or instrumented fusion. Notably, however, revision surgery is much more difficult than primary surgery due to perineural scarring.[2] Although recent papers document that both approaches may be equally efficacious for RLDH cases, AD exposures offer better visualization and lesser rate of complications (e.g., CSF leaks, infection, retained disc, and reoperation), including instability (e.g., more restricted bony exposure).[4]

Timing of redo surgery

The typical pain-free interval between the index microdiscectomy and the RLDH is typically 6 months.[1,7] With MR, establishing the diagnosis of an RLDH within these six postoperative months may be difficult due to

Table 4: Clinical outcomes of patients with revision discectomy in RLDH (*n*=22).

JOA score	Preoperative	Postoperative	Difference	95% CI	*P*-value
Low back pain	0.23±0.42	1.82±0.65	1.59	1.11–2.07	<0.001
Leg pain and/or tingling	0.27±0.45	2.00±0.60	1.73	1.25–2.21	<0.001
Ability to walk	0.41±0.49	2.27±0.62	1.86	1.38–2.34	<0.001
SLRT	0.36±0.48	1.86±0.34	1.50	1.02–1.98	<0.001
Sensory disturbance	0.77±0.42	1.73±0.45	0.96	0.69–1.22	<0.001
Motor disturbance	0.50±0.50	1.86±0.34	1.37	0.27–2.45	<0.001
Restriction of daily activity	7.36±0.88	13.41±0.72	6.05	4.96–7.14	<0.001
Urinary bladder function	–0.55±1.16	0.00±0.00	0.55	0.05–1.05	0.032
Total JOA score	9.36±2.25	24.95±2.06	15.59	14.50–16.67	<0.001

JOA: Japanese Orthopedic Association, SLRT: Straight leg raising test

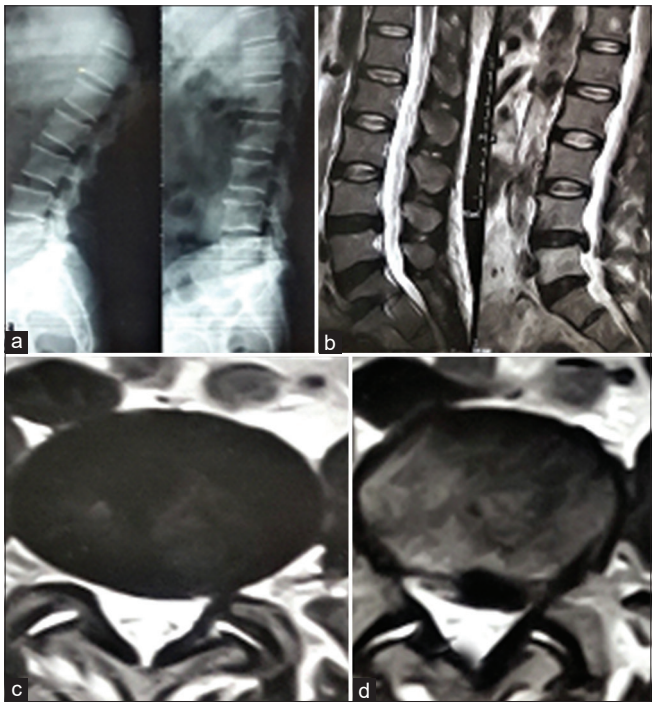

Figure 1: Primary discectomy done on January 11, 2014 at L 4-5 level of 46-year-old man. (a) Dynamic X-ray shows no instability (b), and (c,d) sagittal and axial view of T2W magnetic resonance imaging shows disc herniation.

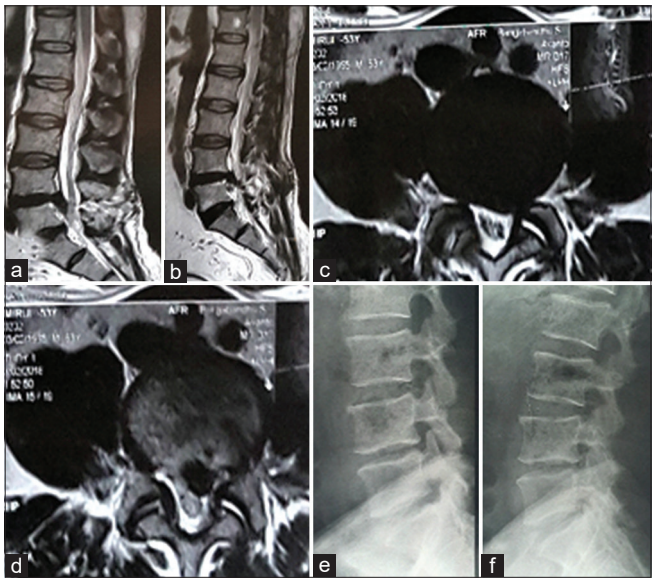

Figure 2: Revision discectomy is done of the same patient on February 20, 2018 after 4 years. (a-d) shows recurrence disc herniation in sagittal and axial magnetic resonance imaging in T2W image, (e) and (f) preoperative dynamic X-ray in lateral position showing no instability.

postoperative scarring. Various risk factors have reportedly been associated with RLDH, including (1) older age/male sex, (2) occupation (e.g., heavy labor), (3) elevated BMI, and (4) more severe Modic changes.[5,7] The higher risk of recurrence in older patients is believed to be attributable to the greater disc degeneration in these patients.[4] Heavy laborers, heavy weight lifters, the lack of regular physical exercise, low body mass index (BMI), higher BMI, and obesity (BMI ≥30 kg/m^2) were all significant predictors for reoperations.[3,5,6]

CONCLUSION

The management of the RLDH requires following original microdiscectomy that warrants AD for better visualization and safer operative dissection (e.g., to more readily deal with postoperative scar formation).

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Ahsan MK, Hossain MR, Khan MS, Zaman N, Ahmed N, Montemurro N, *et al*. Lumbar revision microdiscectomy in patients with recurrent lumbar disc herniation: A single-center prospective series. Surg Neurol Int 2020;11:404.