Transforaminal Endoscopic Lumbar Discectomy for Lumbar Disc Herniation Causing Bilateral Symptoms

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■ BACKGROUND: **Transforaminal endoscopic lumbar discectomy (TELD), a minimally invasive spinal technique, has advantages over open discectomy. Unilateral TELD for disc herniation causing bilateral symptoms is challenging. In this study, we describe a percutaneous endoscopic herniotomy technique by using a unilateral approach for lumbar disc herniation with bilateral obvious symptoms.**

■ METHODS: **From June 2014 to October 2015, 26 patients who had back as well as bilateral leg pain and/or weakness due to lumbar disc herniation were treated by TELD with a unilateral approach. Clinical outcomes were evaluated via a visual analogue scale (VAS; 0—10), and functional status was assessed with the Oswestry Disability Index (0—100%) postoperatively and 3 and 12 months postoperatively. Surgical satisfaction rate was assessed during the final follow-up.**

■ RESULTS: **The mean VAS for leg pain on the operative side improved from preoperative 8.39 ± 1.84 to 2.18 ± 1.26 postoperatively, 1.96 ± 0.83 at 3 months postoperatively, and 2.05 ± 1.42 at 1 year postoperatively ($P < 0.01$). The mean VAS for leg pain on the contralateral was 7.12 ± 1.74 and improved to 1.57 ± 1.66 postoperatively, 1.22 ± 1.58 at 3 months postoperatively, and 1.15 ± 1.35 at 1 year postoperatively ($P < 0.01$). The mean preoperative Oswestry Disability was 83.63 ± 8.49, with 23.58 ± 7.24 at 1 week postoperatively, 19.81 ± 11.26 at 3 months postoperatively, and 17.54 ± 13.40 at 12 months postoperatively ($P < 0.01$). Good or excellent global results were obtained in 96.2% of patients.**

■ CONCLUSIONS: **TELD can be effective for lumbar disc herniation causing bilateral symptoms, through one working channel.**

INTRODUCTION

A large number of lumbar disc herniations (LDHs) can result in unilateral leg neurologic symptoms in addition to low back pain; bilateral symptoms also can occur, but this is less common. The herniated disc causing bilateral symptoms often is a huge mass oppressing nerve roots on both sides and sometimes resulting in cauda equina syndrome. Open lumbar discectomy with bilateral partial laminectomy is controversial because of increased approach-related morbidity, including injuries to posterior supporting structures such as bones, ligaments, muscles, and the annulus fibrosus.

Percutaneous endoscopic lumbar discectomy is a minimally invasive procedure of spinal surgery and has been shown to have advantages such as reduced risk of surgery-induced tissue injury, faster rehabilitation, preservation of mobility of operation segments, facilitation of revision operations, and increased patient demands compared with open discectomy techniques.[1-4] Percutaneous endoscopic interlaminar lumbar discectomy without the blockade of crista iliaca is common for paracentral-, and (freely) isolated-type disc herniation, but concerns exist because cauda equina injury or excessive neural retraction for LDH treatment causing bilateral symptoms can occur.[2,5]

Transforaminal endoscopic lumbar discectomy (TELD) is conducted for ventral decompression of spinal canal via a posterolateral route, which provides a chance to decompress nerve

Key words
- Leg pain
- Lumbar disc herniation
- Percutaneous endoscopic lumbar discectomy
- Transforaminal endoscopic lumbar discectomy

Abbreviations and Acronyms
LDH: Lumbar disc herniation
TELD: Transforaminal endoscopic lumbar discectomy
TESSYS: Transforaminal endoscopic spine system
VAS: Visual analogue scale

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roots on both sides at the same time. There is an increasing interest in the percutaneous transforaminal endoscopic spine system (TESSYS) for the treatment of LDH.[6-9] Although some scholars argue that the TESSYS technique can be practiced in any type of LDH, the use of TELD with unilateral tunnel by TESSYS for a disc herniation with bilateral symptoms is challenging.[10,11] In the present study, we tested TELD for LDH with bilateral symptoms through one working tunnel.

MATERIALS AND METHODS

Study Design

From June 2014 to October 2015, 26 patients with LDH with bilateral obvious radiculopathy due to bilateral nerve root compression were admitted to our hospital unit. The sex distribution of our cohort was 12 male and 14 female patients, and the average age was 41.2 years (range, 22–63 years) (Table 1). The average duration was 15.5 months (range, 4 months to 9 years), with an average 3 months of bilateral symptoms per patient (range, 0.5–4 months) (Table 1). In addition, the average follow-up time was 19.3 months (range, 13–30 months). Exclusion criteria were spinal stenosis, segmental instability, extreme lateral disc herniation on both sides, and other pathologic conditions such as acute inflammation, infection, fracture, or tumor. Subjects with a high iliac crest and high upward migrated herniation at L5–S1 also were excluded from the study.

Clinical outcomes were evaluated by with the visual analogue pain score (VAS; 0–10), and functional status was assessed by the Oswestry Disability Index (0–100%) postoperatively and 3 and 12 months postoperatively. Surgical satisfaction was rated by Macnab

Table 1. Demographic Data and Clinical Outcomes

No.	Age, years	Sex	Level	Dominant Leg Pain	Migration	Tunnel Side	Outcome*
1	35	F	L4–L5	Left	Down	Left	Excellent
2	43	M	L5–S1	Right	No	Right	Good
3	31	F	L4–L5	Equivalent	Down	Left	Good
4	55	M	L4–L5	Left, CES	Down	Left	Excellent
5	22	M	L5–S1	Right	Lower right	Right	Excellent
6	40	F	L5–S1	Right	Down	Right	Good
7	41	M	L4–L5	Equivalent	Down	Left	Fair
8	56	F	L5–S1	Left	Lower left	Right	Excellent
9	52	F	L3–L4	Right	Lower right	Right	Good
10	29	M	L5–S1	Left	No	Left	Excellent
11	38	F	L4–L5	Right	Lower left	Right	Excellent
12	27	M	L4–L5	Left	Down	Left	Excellent
13	57	F	L5–S1	Equivalent, CES	Lower left	Right	Good
14	44	F	L5–S1	Left	Down	Left	Excellent
15	25	M	L5–S1	Left	Down	Left	Good
16	24	F	L3–L4	Right	No	Right	Excellent
17	49	F	L4–L5	Left	Lower left	Right	Excellent
18	56	M	L5–S1	Right	Down	Right	Good
19	55	F	L4–L5	Right	Upper left	Right	Excellent
20	62	M	L5–S1	Left	Down	Left	Good
21	46	M	L5–S1	Right	Down	Right	Excellent
22	27	F	L4–L5	Left	Upper	Left	Excellent
23	50	M	L5–S1	Left	Lower right	Left	Good
24	52	F	L4–L5	Right	Down	Right	Good
25	37	M	L5–S1	Left	Down	Left	Excellent
26	50	F	L5–S1	Equivalent, CES	Down	Right	Good

F, female; M, male; CES, cauda equina syndrome.
*Clinical outcomes were measured with the Macnab criteria.