



The strategy and early clinical outcome of full-endoscopic L5/S1 discectomy through interlaminar approach



Zhen-zhou Li*, Shu-xun Hou, Wei-lin Shang, Ke-ran Song, Hong-liang Zhao

Department of Orthopaedics, The First Affiliated Hospital of General Hospital of Chinese People's Liberation Army, Beijing 100048, China

ARTICLE INFO

Article history:

Received 16 January 2015

Received in revised form 4 March 2015

Accepted 5 March 2015

Available online 14 March 2015

Keywords:

Percutaneous endoscopic discectomy

Interlaminar discectomy

Lumbar disc herniation

Minimally invasive spine surgery

L5/S1 discectomy

ABSTRACT

Objective: To analyze the surgical strategy, safety and clinical outcome of full-endoscopic discectomy through interlaminar approach in the case of L5/S1 intervertebral disc excision.

Methods: From April 2011 to December 2011, 72 cases of intracanalicular non-contained disc herniations at L5/S1 level were treated with full-endoscopic discectomy through interlaminar approach. L5/S1 disc herniation was divided into three types according to position of herniated disc related to S1 nerve root: axilla type, ventral type and shoulder type. Axilla approach was selected for axilla type while shoulder approach was selected for ventral type and shoulder type. After operation, MRI was reexamined to evaluate the resection completeness of prolapsed disc material. Visual analog scales (VAS) of low back pain and sciatica, and Oswestry disability index (ODI) were recorded in certain preoperative and postoperative time points. MacNab scores were evaluated at the 12-month follow-up.

Results: All operations were completed without conversion to other surgical techniques. Average operation time was 45 min (20–80 min). Only one recurrence was revised with microendoscopic discectomy. No nerve injury and infection were complicated. Postoperative ODI and VAS of low back pain and sciatica were significantly decreased in each time point ($P < 0.05$). MacNab scores of 12-month follow-up include 44 excellent, 26 good, 1 fair and 1 poor.

Conclusion: With proper selection between axilla approach and shoulder approach according to the sites of prolapsed or sequestered disc materials, full-endoscopic L5/S1 discectomy through interlaminar approach is a safe, rational and effective minimally invasive spine surgery technique with excellent clinical short-term outcomes.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Full endoscopic excision of lumbar disc refers to the minimally invasive lumbar disc excision surgery under endoscopy in continuous saline lavage [1]. The full-endoscopic approach (FE) has two accesses, one is from interlaminar (IL) access and another is from transforaminal (TF) access. The full endoscopic lumbar disc excision technique was first applied in the treatment of protrusion of intervertebral disc using YESS system via posterolateral intervertebral foramen [2]. Most symptomatic lumbar disc herniations can be successfully treated with this technology, such as intervertebral and lateral disc herniation, as well as ligament slipped disc [3]. However, due to the lateral iliac blocks of L5/S1 segments, the application of this technology is limited in removing nucleus

pulposus tissue. With the progression of the technology, the L5/S1 intervertebral foramen can be effectively expanded, so the endoscope can enter into the spinal canal, which may help to cure the L5/S1 intervertebral disc herniation effectively and completely [4]. Despite the improvement of full endoscopic technology in intervertebral foramen, in the case of highly shift intervertebral disc herniation, there is still a 15.7% failure rate of 15.7% [5]. It was first reported by Choi that full-endoscopic discectomy through interlaminar approach can treat various complex L5/S1 intervertebral disc herniation, but due to the unprotected nerve tissue during the process of surgery, some complications appeared such as nerve root injury and rotor residues [6]. The group of Rutten developed an operation to remove spinal canal out of intervertebral disc tissue by cutting yellow ligament via the lateral (shoulder) under the guidance of endoscopic surveillance [1]. The developed technology improved the security of the operation but the technology brought about the complications of postoperative innervation area paresis and epidural tear. Meanwhile, Wang has reported 10% of patients during the operation chose the open surgery. Based on the reported technology of Choi and Rutten, we applied percutaneous

* Corresponding author at: Department of Orthopaedics, The First Affiliated Hospital of General Hospital of Chinese People's Liberation Army, Beijing 100048, China. Tel.: +86 1068989121; fax: +86 1068989121.

E-mail address: lizhenzhou2014@163.com (Z.-z. Li).

endoscopic approach to cut the yellow ligament in order to cure intracanalicular non-contained disc herniations at the L5/S1 level [7]. In reference to the position of intervertebral disc herniation, we can choose either axillary approach (between the nerve root and dural sac) or shoulder approach (the lateral of S1 nerve root) to target the hernia intervertebral disc tissue to remove the nucleus pulposus tissue. In this way we have successfully treated 72 cases of L5/S1 vertebral intervertebral disc herniation, all of which obtain good result and the incidence of complications decreased obviously (Fig. 1).

2. Materials and methods

2.1. Patients

Case of inclusion criteria: 1, radiation pain in the unilateral lower limb, the leg-raising test is positive; 2, the pain of leg pain is more severe than the waist pain; 3, the effect of conservative treatment is not satisfied; 4, the imaging (CT or MRI) results together with symptoms indicate L5/S1 intervertebral disc herniation, and which is consistent with the symptoms and signs; 5, there is no history of segmental lumbar surgery; 6, patients' informed consent.

Cases of exclusion criteria: 1, imaging suggests significant spinal stenosis and intervertebral disc trailing ossification or segmental instability; 2, recurrence after excision of intervertebral disc L5/S1 segments; 3, severe narrow vertebral plate gap; 4, cauda equina syndrome; 5, L5/S1 extreme lateral disc herniation; 6, infection, tumor, fracture and other pathological state.

Between April 2011 and December 2011, 72 cases of L5/S1 patients with intracanalicular non-contained disc herniations were included. The average age is 40.5 years (18–78 years); male: 36 cases; female: 36 cases; among the included patients, the type of slipped lumbar intervertebral disc: 51 cases, the type of sequestered lumbar disc herniation: 21 cases; there are 51 cases of preoperative S1 hypoesthesia, 13 cases of preoperative decreased muscle strength, 33 cases of preoperative weakened Achilles tendon reflex.

2.2. Surgical instrument

All surgeries were performed and monitored by endoscopic spine surgical system (Richard Wolf GmbH, Germany) and bipolar radio-frequency electrode system (Elliquence LLC, USA).

2.3. Surgical technique

L5/S1 disc herniation was divided into three types according to position of herniated disc related to S1 nerve root: axilla type, ventral type, and shoulder type. (1) In the case of axilla type, protrusions are mainly positioned between S1 nerve root and dural sac, and protrusions vertex located in S1 nerve root dorsal; (2) in the case of the ventral type (Fig. 2a and b): protrusions mainly located in the ventral S1 nerve root, protrusions vertex located below the S1 nerve root dorsal; (3) in the case of shoulder type: protrusions mainly positioned above S1 nerve root while protrusions vertex located in S1 nerve root dorsal. As stated above, axilla approach was selected for axilla type with endoscope and working channel placed at the axilla between S1 nerve root and dural sac. While shoulder approach was selected for ventral type and shoulder type with endoscope and working channel placed at the shoulder lateral to S1 nerve root.

The operation of trachea cannula was conducted under general anesthesia, patients were required to lie in prone position, X-ray fluoroscopy was used to identify the location of L5/S1 vertebral plate gap. The back fascia was cut with a longitudinal incision of

7 mm, then soft tissue expander was applied to separate muscle so that the working tube was inserted along the expander. After that endoscopic was inserted to further clean up the adipose tissue and fully expose the back side of yellow ligament.

In the case of axillary approach, yellow ligament was cut along the S1 vertebral plate edge, then dural sac and S1 nerve root were exposed. Followed by the insertion of working tube into axillary region to remove protruded disc tissue, and then the nucleus pulposus clamp was placed inside intervertebral disc under endoscopic surveillance, after that, those free nucleus pulposus tissue was removed ROM intervertebral disc.

In the case of shoulder approach, yellow ligament was cut at the junction of yellow ligament and S1 joint, then S1 nerve root and hernia intervertebral disc tissue were exposed, followed by the insertion of working tube into lateral S1 nerve root to remove protruded disc tissue, and then the nucleus pulposus clamp was placed inside intervertebral disc under endoscopic surveillance, after that, those free nucleus pulposus tissue was removed from intervertebral disc.

Postoperative evaluation was conducted at Day 1, 3 months after surgery, and final follow-up. Measurements included operative time, blood loss, length of hospital stay and complications, and rate of conversion to an open procedure. The visual analog scale (VAS) was used to evaluate the pre- and postoperative clinical results. Statistical calculations including means and standard deviations were obtained by using the SPSS 17.0 for independent sample t test, paired t test and chi-square test, and one-way analysis was used for the comparison of statistical data. Statistical significance was established at a *P* value of less than 0.05.

2.4. Surgical technique

L5/S1 disc herniation was divided into three types according to position of herniated disc related to S1 nerve root: axilla type, ventral type, and shoulders type. (1) In the case of axilla type, protrusions are mainly positioned in S1 nerve root interiorly, between S1 nerve root and dural sac, and protrusions vertex located in S1 nerve root dorsal; (2) in the case of the ventral type (Fig. 2a and b): protrusions mainly located in the ventral S1 nerve root, protrusions vertex below the S1 nerve root dorsal; (3) in the case of shoulder type: protrusions, mainly located above S1 nerve root, protrusions vertex in S1 nerve root dorsal axilla approach were selected for axilla type with the endoscope and working channel placed at the axilla between S1 nerve root and dural sac while shoulder approach were selected for ventral type and shoulder type with the endoscope and working channel placed at the shoulder lateral to S1 nerve root.

The operation of trachea cannula was under general anesthesia, and the patients were required to lie in prone position, X-ray fluoroscopy was used to identify the location of L5/S1 vertebral plate gap. The longitudinal incision was located in target skin point with the deep of 7 mm, and the back fascia was cut, then soft tissue expanders were applied to separate muscle until S1 vertebral plate flange, next to that the working tube was inserted along the expander, at this time the expanders were replaced by endoscopic to further clean up the adipose tissue, exposing the back side of yellow ligament.

In the case of axillary access, yellow ligament is cut along the S1 vertebral plate edge, the dural sac and S1 nerve root were then exposed. Followed by the insertion of work casing in axillary region to remove dural sac and ventral hernia of intervertebral disc tissue, and then the nucleus pulposus clamp was set in intervertebral disc under endoscopic surveillance, next to that, the loose nucleus pulposus tissue will be removed from intervertebral disc.

In the case of shoulder access, yellow ligament is cut along the junction of yellow ligament and S1 joint, so S1 nerve root and hernia

Download English Version:

<https://daneshyari.com/en/article/3039878>

Download Persian Version:

<https://daneshyari.com/article/3039878>

[Daneshyari.com](https://daneshyari.com)