CASE REPORT

Tubular Microdiscectomy for Recurrent Disc Prolapse Following Two Rounds of Open Laminectomy and Discectomy: A Case Report and Literature Review


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Abstract

Recurrence of lumbar disc herniation has been reported in 5–11% of patients after conventional discectomy, and most of these patients are usually treated with repeated discectomy through the same initial approach. Tubular microdiscectomy is an increasingly popular surgery for lumbar disc prolapse and has replaced conventional open surgery in the last decade. However, it requires more experience and has a steep learning curve, especially in revision cases. We present the findings of a tubular lumbar microdiscectomy performed after two conventional open laminectomies and discectomies, explaining the challenges and difficulties in such cases and leading the way for the use of minimally invasive spine surgeries after multiple open surgeries. A case report and literature review was performed. A middle-aged man who had undergone two open laminectomies and discectomies several years ago at L5–S1 and fenestrated laminectomy at L4–L5 presented with new radiculopathy over the S1 nerve root dermatome to which a new tubular microdiscectomy was performed. The patient ran a smooth postoperative course, and his symptoms improved. Tubular microdiscectomy achieves the goal of fixation, is cost-effective, and goes with the patient preference. A successful tubular microdiscectomy is tough to accomplish after two spinal surgeries around and near the same involved spinal nerve. Despite that, this case report shows the good outcomes that this type of surgery can achieve, hinting that minimally invasive spine surgery application is not limited to primary cases but can include redo surgeries for such conditions. However, it should be borne in mind that a successful redo surgery requires proper preoperative clinical and radiological assessment (2021ESJ252).

Keywords: Endoscopy, Lumbar spine, Recurrent disc herniation

Introduction

L umbar spine discectomy is the most common procedure used to manage the radiculopathy caused by lumbar disc prolapse. This treatment modality allows rapid relief of symptoms and return of function and has demonstrated an advantage over nonsurgical treatment of lumbar disc herniation (LDH) [1]. LDH affects 1–2% of the population annually [2], although 75% of these patients experience spontaneous resolution of symptoms within 6–8 weeks [3,4].

Several techniques have been developed for the surgical treatment of lumbar disc prolapse, including

https://doi.org/10.57055/2314-8969.1006
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conventional open discectomy and lumbar microdiscectomy that can better visualize the surgical field than open surgery. However, with the emergence of new technologies, other minimally invasive surgeries such as percutaneous endoscopic lumbar discectomy (PELD), tubular microdiscectomy, and transforaminal endoscopic lumbar discectomy have also been developed to treat LDH [2,5].

Recurrence of LDH has been reported in 5–11% of patients after conventional discectomy, and most of these patients are usually treated with repeated discectomy through the same initial approach. In recent years, revision surgeries have been performed through endoscopic procedures such as PELD or transforaminal endoscopic lumbar discectomy and have yielded comparable results to conventional surgery [6], whereas minimally invasive procedures such as tubular microdiscectomy have produced similar results to endoscopy [7].

In this case, we present the findings for a tubular lumbar microdiscectomy performed after two conventional open laminectomies and discectomies, explaining the challenges and difficulties in such cases and leading the way for the use of minimally invasive spine surgeries after multiple open surgeries.

Case presentation

Clinical assessment

A 41-year-old man presented with a history of backache and right-sided radiculopathy for 2 weeks. The pain started as a sudden burning pain in the lower back, which progressed to right radiculopathy involving the S1 dermatomal distribution the next day. The pain was relieved partially by lying down and analgesia and was aggravated by coughing, standing, and prolonged sitting. It was progressive in severity and was associated with paresthesia, which lasted for 12 days. Subsequently, the patient started developing weakness with dorsiflexion of the right big toe. His medical history was unremarkable. However, his surgical history included a laminectomy and fenestration at the L4–L5 and L5–S1 levels for radiculopathy in 2005 and 2010. Despite the two operations, the patient continued to experience backache and paresthesia from time to time, which was controllable with analgesia and spine (facet) injection.

On examination, the patient showed a right-sided antalgic gait and could not sit comfortably on a chair. The straight leg raising test was positive at 30°, and the muscle power of big toe dorsiflexion was grade 3. No fecal or urinary incontinence was observed.

Radiological assessment

Dynamic lateral lumbosacral spine radiographs were obtained at the previous laminectomy site at the level of L4–S1 with no apparent segmental spine instability. MRI showed right-sided recurrent disc prolapse at L5–S1 with a noticeable scar from previous surgeries in the posterior muscular structures of the lower lumbar spine in the T1 and T2 sagittal and axial sections. A computed tomography scan showed loss of the spinous process and most of the lamina on both sides at the L4–S1 levels, with no evidence of calcified L5–S1 disc (Figs. 1 and 2).
Written informed consent was obtained from the patient before surgery and to publish his case.

**Surgical technique**

A tubular microscopic discectomy was planned as the patient had a lower migrated disc at the L5–S1 level with a fair amount of bony structure at the previously operated level and without radiological instability. Surgery was performed under general anesthesia. A first-generation cephalosporin (cefa-zolin 1 g) was administered intravenously at the time of induction of general anesthesia, with the patient in a supine position with pads supporting the chest, elbows, knees, and pelvis.

After identifying the L5–S1 level with a C-arm, a K-wire was inserted to the right side, followed by multiple dilators, after which an 18-mm Medix Tube was inserted and fixed to the arm. The landing was performed lateral to the bony structure of the L5–S1 facet, and soft tissue dissection was performed starting laterally to medially using the bone as a landmark. In contrast, sequestrectomy was performed with foraminotomy and fenestration of the right-sided S1 nerve root without exposing the scar of previous surgeries (medially). The wound was closed in layers, and no drain was used.

Four hours postoperatively, the patient started walking pain free and was discharged on the same day. Residual stitches were removed 2 weeks after the surgery. On regular follow-up examinations at 2, 6, and 12 weeks, the patient regained full muscle power; however, mild paresthesia persisted.

**Discussion**

A successful tubular microdiscectomy is tough to accomplish after two spinal surgeries around and near the same involved spinal nerve. Despite that, this case report shows the good outcomes that this type of surgery can achieve.

Unlike other studies, this article reports the findings of the second redo surgery for recurrent LDH after two previous conventional laminectomies. A review of the literature revealed that most articles focused on open versus tubular discectomies and did not declare the exact number of previous surgeries that the patients underwent for their chief complaints. This could be owing to the absence of a significant relationship between the frequency of surgeries and their outcomes or the limited number of cases to report.

Regardless of the technique, the results after redo surgery for intervertebral recurrent disc herniation (RDH) were favorable [8]. In the present case, a minimally invasive tubular microdiscectomy was used to treat the second recurrence. Some surgeons use endoscopic procedures to treat RDH, whereas others prefer tubular microdiscectomy. However, both procedures have shown equal effectiveness and patient safety [7]. Thus, the choice of a technique is influenced by the surgeon’s experience and availability of resources as the tubular system has a relatively shorter learning curve than other endoscopic procedures. Regarding the use of endoscopic procedures for treating RDH, the transforaminal approach has been shown to have a steep and easy learning curve compared with the interlaminar...
method, which has a flat learning curve and is challenging to master [7,9].

Some authors [2,10,11] have studied the complication rates of different surgical procedures used to treat LDH and found that tubular microdiscectomy and PELD had the lowest complication rates, making them the safest procedures for treating LDH. Felbaum et al. [10] have recommended using tubular microdiscectomy in RDH as it can be safely used for revision surgeries with low morbidity. In addition, this technique offers a significant advantage over the traditional open midline approach in decreasing the exposure of preexisting scar tissue. In this case, the tube was landed at the facet more laterally than that in virgin cases. It was then progressed medially under the guidance of the remnant bony structure, resulting in a significant decrease in the rate of expected complications, including nerve injury and dural tear, for such a double redo surgery.

In a cohort study of 1241 patients who underwent a single-level LDH with a tubular microdiscectomy, Victor et al. [12] have reported that RDH improved with accumulated extensive experience field. Similarly, in a review of the literature, fusion showed no significant superiority over redo discectomy in cases of recurrent LDH, and the choice of surgery should be determined on a case-by-case basis [13,14].

Several factors influenced the ‘fixation or no fixation’ decision; first, there was no evidence of instability in this case. Second, a tubular microdiscectomy would achieve the goal of decompression while also being cost-effective and patient friendly. There are a multitude of issues regarding the fixation decision, the possible harmful sequelae of sacroiliitis [15], pseudoarthrosis [16] (especially for L5–S1 level because he has had two previous open laminectomies so that we would anticipate extensive bone loss at the level of L5–S1 and so we would have to do an L4–S1 fixation), adjacent segment disease [17], implant failure [18], and the complications of the surgery itself such as extensive blood loss [19], anesthesia risk due to prolonged operative time, and the risk of postoperative infections [20].

Conclusion

The application of minimally invasive spine surgery is not limited to primary cases but includes redo surgeries for conditions such as RDH. The key to a successful redo surgery is proper preoperative clinical and radiological assessment as mechanical spine instability can adversely affect outcomes.

Conflict of interest

There are no conflicts of interest.

Abbreviations list

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>LDH</td>
<td>Lumbar disc herniation</td>
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<td>PELD</td>
<td>Percutaneous endoscopic lumbar discectomy</td>
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<tr>
<td>TELD</td>
<td>Transforaminal endoscopic lumbar discectomy</td>
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<td>MISS</td>
<td>Minimally invasive spine surgery</td>
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References

المملخص العربي

استعمال القرص المجهرى الأدبيوبي من أجل هبوط القرص المتكسر بعد جولات من استخدام الصفائح الفقرية المفتوحة واستعمال القرص تثير حالة ووجبة انتباه الأدباء.

البيانات الخلفية

استعمال القرص المجهرى الأدبيوبي هو عملية جراحية شائعة بشكل متزايد لتثبيت القرص العظمى وقد حصل الجراح المفتوحة التلقائية في العقد الماضي.

ومع ذلك، فهو يتطلب المزيد من الخبرة ولدي منه تعليم جيد، خاصة في حالات الحالة.

الغرض

نقدم نتائج استخدام القرص المجهرى العظمى الأدبيوبي الذي تم إجراءه بعد عملية استعمال الصفائح الفقرية المفتوحة التلقائية وعمليات استعمال القرص، وشرح التصوير والصعوبات التي نواجه في مثل هذه الحالات ونتعرف الطريقة لاستخدام جراحات العمود الفقري طبقية التوتر بعد إجراءات جراحية متعددة مفتوحة.

تصميم الدراسة

تقرير حالة ووجبة انتباه الأدباء

المرضى والطرق

رجل في نصف العمر مصابة بإصابات في عظام العمود الفقري، وقد عانى من إصابة في العمود الفقري حيال سلالة نزيفية في الوريد، وتم تشخيص حالة حيث تم استخدام الصفائح الفقرية المفتوحة وعملية استعمال القرص من عدة سنوات في L5-S1، وتم إجراء استخدامت دفقت أسيسبي جديد له S1، وعاني من ارتفاع ضغط جذري جديد على الجدار الائي L4-5، واستعمال الصفائح الفقرية في L4-5.

المستقبل

اجري المريض مساباً سهلاً بعد الجراحة وتحسن أعراضه.

الخلاصة

من الصعب إجراء استعمال كثري أبيبي ناجح بعد عملية جراحات في العمود الفقري، حيال نفس العصب الفقري وبالقرب منه. على الرغم من ذلك، يظهر تقرير الحالات هذا النتائج الجيدة التي يمكن أن يتواصل فيها هذا النوع من الجراحة مع الجراح، إلى أن تطبق جراحة العمود الفقري طقية التوتر لا يقتصر على الحالات الأولية، ولكن يمكن أن يعالج عمليات إعادة جراحة لمثل هذه الحالات. ومع ذلك، يجب تحليلها مع الأخذ في الاعتبار أن عملية إعادة الجراحة تتعلق تقييمًا سريريًا وإشعاعيًا مكثفًا قبل الجراحة.