Endoscopic Treatment of Lumbar Spondylodiscitis. Case Report and Literature Review

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ABSTRACT

We describe the case of a 62-year-old male patient with multiple comorbidities who attended the outpatient clinic due to severe low back pain compatible with T12-L1-L2 spondylodiscitis. Endoscopy was performed with a left posterolateral approach and an all-inside technique for diagnostic and therapeutic purposes. A germ was isolated and treated with specific antibiotics. Due to the good clinical evolution, the patient was discharged 7 days after surgery with good pain management and home intravenous antibiotic therapy. A brief literature review is presented.

Keywords: endoscopic surgery, lumbar spondylodiscitis
Level of Evidence: IV

Tratamiento endoscópico de la espondilodiscitis lumbar. Reporte de caso y revisión bibliográfica

RESUMEN

Se describe el caso de un hombre de 62 años de edad, con múltiples comorbilidades que concurre a la consulta por dolor lumbar severo compatible con espondilodiscitis de T12-L1-L2. Se realizó una endoscopia con abordaje posterolateral izquierdo con técnica adentro-adentro para fines diagnóstico y terapéutico. Se aisló un germen y se administró un tratamiento antibiótico específico. Dada la buena evolución clínica del paciente, fue dado de alta a los 7 días de la cirugía, con buen manejo del dolor y antibióticos intravenosos en el domicilio. Se presenta una breve revisión bibliográfica.

Palabras clave: Endoscopia; espondilodiscitis lumbar.
Nivel de Evidencia: IV

INTRODUCTION

Spondylodiscitis is an infection that affects the spine, more specifically the vertebral end plate (osteomyelitis) and the intervertebral disc (discitis). It is the main manifestation of hematogenous osteomyelitis in patients >50 years of age. At present, its prevalence is increasing due to the prolongation of life expectancy and immunosuppressive drugs.[1,2]

Some of the conditions that increase the risk of suffering from this infection are: infectious focus or bacteremia, chronic renal failure, diabetes, immunosuppression, oncological disease, previous surgery, kidney transplant, human immunodeficiency virus infection/AIDS, advanced age, hemodialysis, addiction to intravenous drugs, catheters, corticosteroids, alcoholism, liver cirrhosis, pulmonary fibrosis, obesity, tuberculosis disease, rheumatological diseases, iatrogenesis.[2-7]

The infection is usually treated with antibiotics without the need for surgery. Surgery is considered if the response to conservative treatment is poor, there is progressive spinal deformity, instability, and neurologic deficit.[8]

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Various surgical treatments are available that depend on the clinical conditions of each patient and the characteristics of the disease. In 2007, Ito et al. described a series of 15 patients with lumbar spondylodiscitis who underwent surgical debridement using an endoscopic posterolateral approach with excellent outcomes.[9]

Endoscopic spinal surgery was described by Kambin in 1973 and, since then, the indications and available technology have evolved.[10] Today, several companies manufacture and distribute various endoscopy equipment, facilitating access and encouraging the use of these techniques.

Endoscopic techniques have been shown to achieve at least the same results for the treatment of lumbar disc conditions when compared to conventional techniques.[11-13] In addition, the incision for the uniportal technique usually measures between 6 and 8 mm, depending on the type of cannula used, which reduces the iatrogenic damage caused in conventional surgery.

In accordance with the international consensus for the publication of case reports of the SCARE guidelines,[14] we report the case of a patient with multiple comorbidities who suffers severe low back pain compatible with spondylodiscitis, and we present a brief literature review.

CLINICAL CASE

The patient was a 62-year-old man with a history of smoking, prostate cancer, chronic kidney disease (left nephrectomy) receiving renal replacement therapy with intermittent hemodialysis three times a week. He had right pyelonephritis with exacerbated chronic renal failure for the previous three months, which had progressed to septic shock caused by *Candida tropicalis* and *Pseudomonas aeruginosa* the previous month. He consulted for intense low back pain that had been evolving for a month. The patient gave his written informed consent for the publication of this information.

Clinical findings

Acute low back pain was detected (9/10 visual analogue scale) associated with paresthesias in the lower limbs. The patient reported that the symptoms worsened with activity and also at rest. When the thoracolumbar spinous bones were palpated, there was no pain, and the cervical and lumbar ranges of motion were complete. Right L4 and S1 hyporeflexia were observed, with the rest being unremarkable. In dermatomes from L1 to S1, sensitivity was preserved and symmetric.

Diagnostic evaluation

Due to the oncological history, a positron emission tomography scan was performed, which showed increased uptake in the vertebral bodies of T12, L1 and L2 and in the intervertebral disc of L1-L2 (Figure 1).

Due to severe kidney disease, an MRI without contrast was performed, which revealed hyperintensity of L1-L2 and ruled out compression (Figure 2).

Laboratory analysis revealed high values of acute phase reactants (erythrocyte sedimentation rate 110 mm/h and C-reactive protein 6.66 mg/dl).

Therapeutic intervention

Given the patient's comorbidities, the lack of a certain diagnosis and the poor evolution, an endoscopy was indicated for diagnostic and therapeutic purposes. The procedure was performed under anesthetic sedation, with a uniportal left posterolateral approach 10 cm from the midline at the level of L1-L2 (Figure 3).

The all-inside technique was used (Figure 4), which consists of working inside the disc by placing an intradiscal cannula. We proceeded to take samples of the intervertebral disc of L1-L2, the lower endplate of L1, and the upper endplate of L2 (Figures 5 and 6). Samples were sent to the laboratory for culture and pathological study. An endoscopy system from the company RIWOspine® was used, which has a continuous irrigation-aspiration system. The procedure lasted 17 minutes.

Meropenem and daptomycin were administered to the patient as an empirical treatment. The patient had good tolerance 12 hours after surgery with the use of a thoracolumbar corset, so rehabilitation began with standing position.

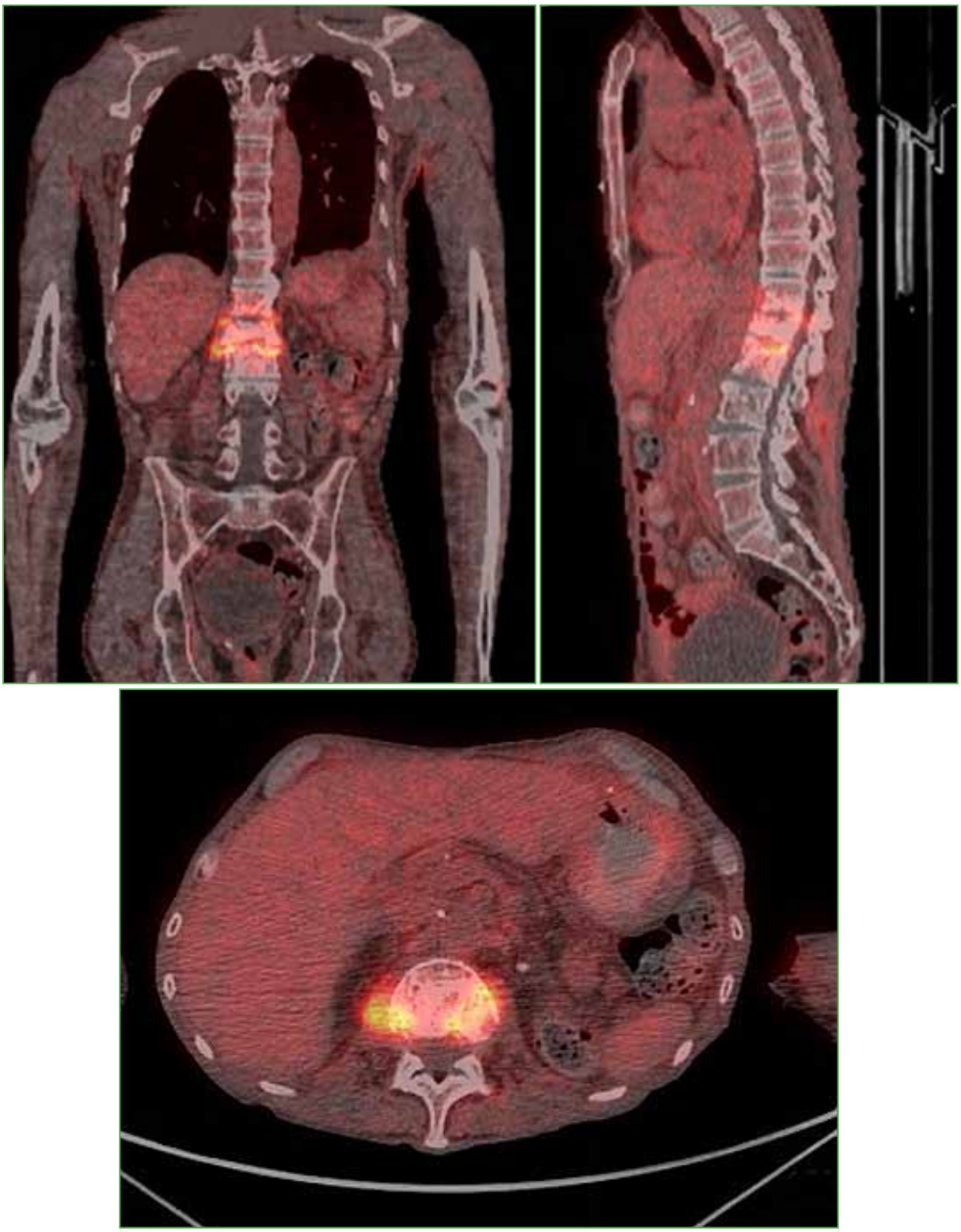

Figure 1. Positron emission tomography of the thoracolumbar spine, coronal, sagittal and axial slices. Hyperintensity of the intervertebral space of L1-L2 and of the vertebral bodies of T12, L1 and L2 is observed.

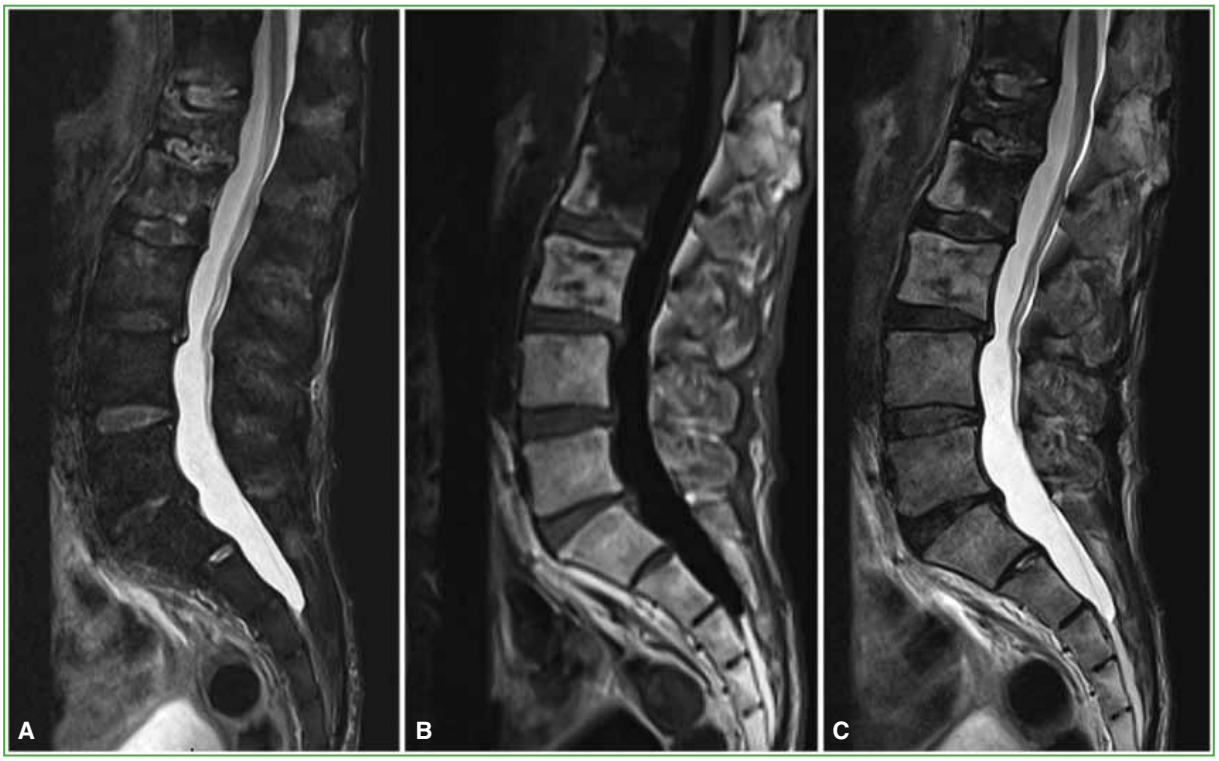

Figure 2. Magnetic resonance imaging of the lumbosacral spine, sagittal section. **A.** STIR sequence. **B.** T1-weighted sequence. **C.** T2-weighted sequence. Images compatible with spondylodiscitis of T12, L1 and L2 are observed.

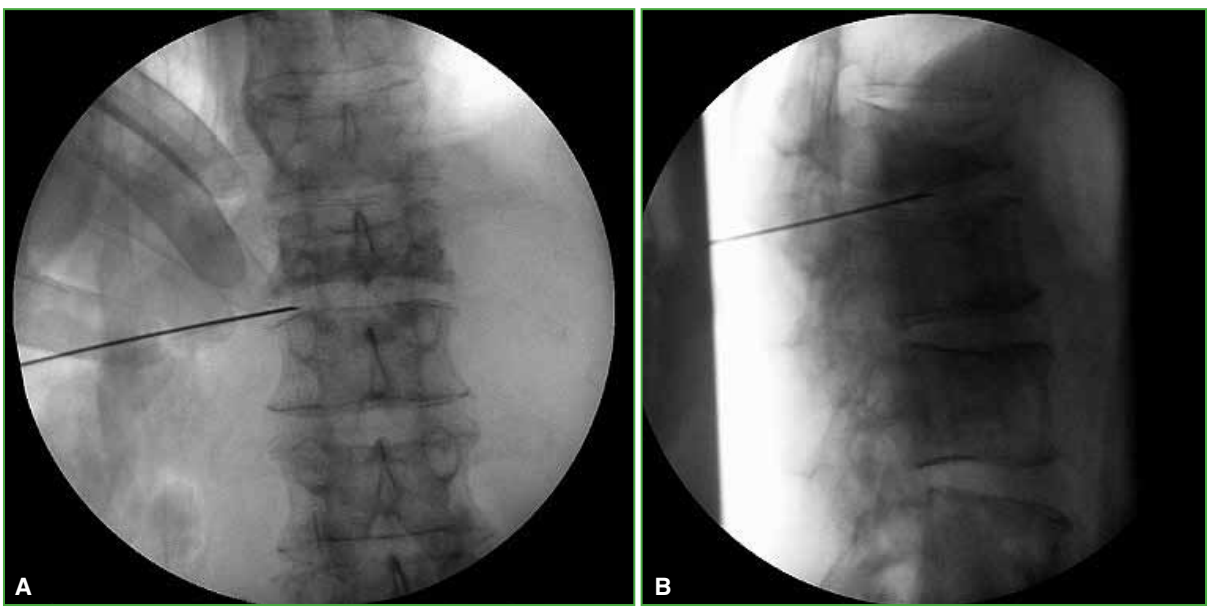

Figure 3. Intraoperative anteroposterior (**A**) and lateral (**B**) radiographic projections. The posterolateral entry point is visualized.

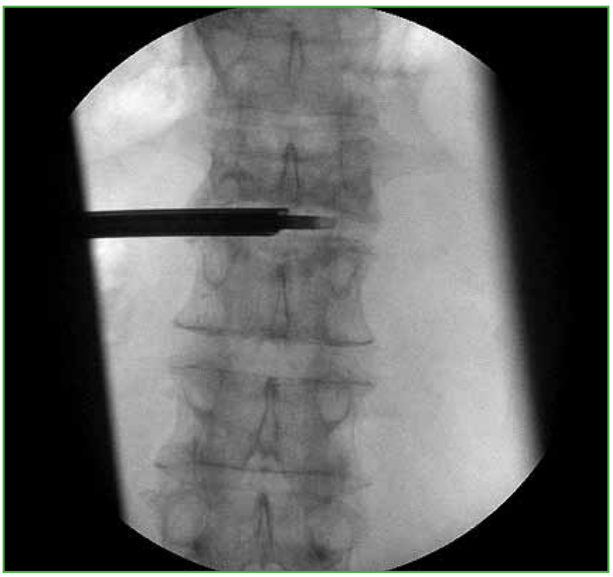

Figure 4. Anteroposterior radiographic projection. The placement of the endoscope according to the all-inside technique is observed.

Figure 5. Sample of the L1-L2 intervertebral disc that was sent for studies.

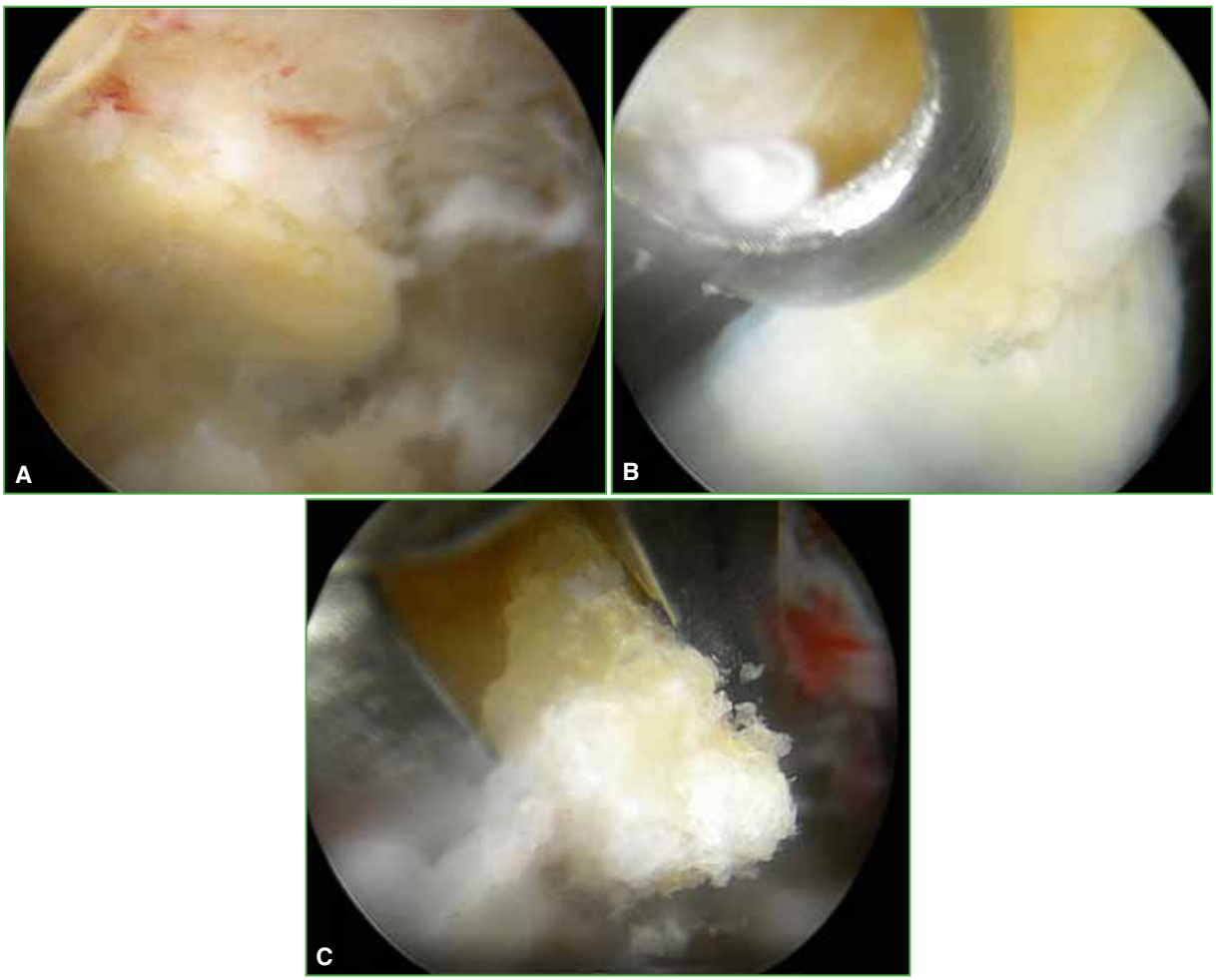

Figure 6. Endoscopic vision. **A and B.** The L1-L2 intervertebral disc is visualized and the infected tissue is excised. **C.** Resection of a bone fragment corresponding to the inferior end plate of L1.

Evolution and results

The patient evolved favorably. After 48 h, he reported significant pain relief (2/10 visual analogue scale). In all the samples, *Pseudomonas aeruginosa* was isolated at 48 h and the antibiotic treatment was adjusted with intravenous meropenem. Acute phase reactant values had improved significantly after surgery.

Due to the good clinical evolution, the patient was discharged seven days after the procedure, with an indication of intravenous antibiotics for three weeks and oral antibiotics for three months.

The patient was monitored with clinical and laboratory tests (complete blood count, erythrocyte sedimentation rate, and C-reactive protein) by the infectious disease and spinal surgery teams. Three months later, he came back to the clinic and reported back pain (visual analog scale 2/10); laboratory tests were normal (erythrocyte sedimentation rate 11 mm/h and C-reactive protein 0.32 mg/dl).

DISCUSSION

This patient had multiple comorbidities and a delicate clinical state that made him vulnerable to larger-scale surgeries. The absence of germ isolation could have been resolved with a guided puncture. In the center where he was treated, we opted for endoscopic lavage and sample collection, since access to the endoscopic method is easy

and allows us not only to obtain a quality sample, but also gives us the possibility of performing the lavage with physiological solution and, at the same time, resecting the devitalized tissue using the same endoscope.

In patients with spinal infection, bacterial identification using CT-guided puncture techniques has a variable range of 36% to 91%.[15-21] Yang et al. reported a 90% positivity for the endoscopic technique used to take samples from infected patients.[15] Germs were isolated in all of our patient's samples, which is consistent with the investigations described by these authors.

Currently, there are few literature reports on the endoscopic treatment of spondylodiscitis. Abreu et al. carried out a systematic review that included 14 studies with a total of 342 patients. They pointed out that it is a safe and effective procedure, although there is no clear consensus regarding the surgical indication.[22]

Spinal surgery is exponentially migrating to less and less invasive procedures. Endoscopic surgery has great potential to become the new gold standard for treating lumbar disc herniations.[23] Much remains to be investigated on its use for spinal infections.

One of the main difficulties for its routine use is the high economic costs of the instruments. Another difficulty in applying this technique is the learning curve. Within the spectrum of diseases that can be treated with the endoscopic technique, the all-inside technique used in the described case is one of the simplest in terms of technical aspects and the risk of complications is low. At the beginning of the learning curve, training with surgeons with experience in this type of technique, attending courses on simulated models or cadavers, and having a mentor surgeon who provides pre-surgical advice is recommended.[24]

The fact that there is little tissue damage is not the only reason why this technique is recommended. Currently, they can be used to treat almost all diseases of the spine, leaving out deformity surgeries. Endoscopic surgery minimizes iatrogenic damage and preserves the integrity of the articular facets; in turn, the vision achieved with the probe is greater than that achieved with a microscope. The overall risk of infections is 4.4% for spinal surgeries,[25] but there are few cases reported with endoscopic techniques. In terms of economics, these procedures shorten hospital stays and return to work times. Choy et al. published a cost-effective comparison of microdiscectomy and endoscopy, and the results were better with endoscopy.[26]

Regarding the complications caused by these techniques, increased intracranial pressure, epidural hematoma, and incidental dural injury have been reported. Intracranial hypertension can lead the patient to develop headaches and, in some cases, seizures. It is recommended to finish the procedure as quickly as possible if dural injury occurs. Regarding epidural hematoma, if bleeding is excessive when irrigation is interrupted, it is advisable to place an epidural drainage catheter. Dural injuries <1 cm can be treated without the need to suture the sac, while for those >1 cm, conversion to conventional/tubular surgery is recommended.[27]

In conclusion, the results in this patient were satisfactory and recovery was faster than when opting for conservative treatment. Taking into account the low post-surgical morbidity caused by this type of procedure, it is a safe and effective option in trained hands.

Given the advantages of endoscopic surgery over conventional surgeries, we believe it is important for spine surgeons to develop skills in this type of procedure, whether it is for the treatment of infections or other types of spinal conditions.

Conflict of interest: Dr. José-Carlos Sauri-Barraza is a spokesperson for RIWOspine®. Dr. Enrique Gobbi is a spokesperson for Nuvasive ®. The rest of the authors do not report conflicts of interest.

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