

CASE REPORT

Year : 2020 | Volume : 68 | Issue : 5 | Page : 1211--1213

Lumbar Spinal Fixation Removal by a Minimal Invasive Microscope-Assisted Technique. Case Report with Technical Description

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Abstract

The concept of minimally invasive spine surgery (MISS) has gained increasing popularity in the last decades. While MISS holds promise for faster patient recovery, and shorter hospital stays, the removal of the surgical fixation, when required, is still performed by an extensive approach often resulting in disabling pain and discomfort. We describe a novel minimal invasive microscope-assisted technique for lumbar spinal fixation removal. This technique has been successfully applied in a 35-year-old man, affected by back pain despite a previous posterior dynamic MISS L4–S1 fixation. The previous skin incisions were opened and under microscopic vision, the screws and the roads were dissected from the scars and removed. The patient was discharged on postoperative day-1. He reported a progressive improvement of the symptoms with a satisfactory cosmetic result. Minimal invasive microscope-assisted technique for spinal fixation removal offers a simple and effective surgical alternative to the traditional open surgery.

How to cite this article:

Grasso G, Paolini S, Salli M, Torregrossa F. Lumbar Spinal Fixation Removal by a Minimal Invasive Microscope-Assisted Technique. Case Report with Technical Description. *Neurol India* 2020;68:1211-1213

How to cite this URL:

Grasso G, Paolini S, Salli M, Torregrossa F. Lumbar Spinal Fixation Removal by a Minimal Invasive Microscope-Assisted Technique. Case Report with Technical Description. *Neurol India* [serial online] 2020 [cited 2021 Mar 10];68:1211-1213

Available from: <https://www.neurologyindia.com/text.asp?2020/68/5/1211/299148>

Full Text

Lumbar fusion is a widely performed procedure for the management of several disorders requiring spinal stabilization, such as traumatic, degenerative, infectious, and neoplastic diseases. Open instrumented lumbar fusion procedures have been associated with long hospital stays and significant costs,[1] increased iatrogenic soft tissue injury and approach-related morbidity.[2] Minimally invasive techniques have become the gold standard for the management of pathologic conditions in several surgical specialties. This progress has rapidly involved the spine surgery and prompted the evolution of the minimal invasive spine surgery (MISS). Accordingly, numerous lumbar fusion procedures can now be performed in a minimally invasive fashion. However, although the insertion of screws and roads by a minimally invasive approach is widely performed, removal or revision of lumbar pedicle screw fixation is still accomplished by a classical open spinal surgery. Spinal construct removal can be necessary for several clinical circumstances such as radicular pain from a

malpositioned screw, or system removal for its uselessness. The latter occurrence is not surprising since the rapid spreading of spinal fusion surgery, even for very frequent symptoms such as back pain, has expanded the surgical indications sometimes without supporting evidence.[3] In this scenario, removal of the spinal construct could not be avoided and a second crippling operation requiring a lengthy recovery phase should be undertaken.

The length of the operation and pain associated with this procedure has always been significant. Accordingly, a surgical approach able to minimize dissection would have clear benefits. In this report, we describe, for the first time in the English literature, a minimally invasive microscope-assisted technique for removal of a lumbar fixation system.

Case and Technical Description

History

This 35-year-old man was admitted for a long history of back pain which became progressive and refractory to medication and extensive physical therapy. Three years before, the patient underwent minimally invasive posterior dynamic L4–S1 fixation in a different hospital without resolution of the back pain [Figure 1]. Considering the worsening of the symptoms following the surgery and the absence of clear indications for fixation, the removal of the fusion system was proposed.{Figure 1}

Surgical technique

Under general anesthesia, the patient was positioned in a prone position. The previous skin incisions were opened. After subcutaneous tissue dissection, a lumbar Caspar self-retractor was positioned [Figure 2]. Under the microscopic vision, the fascia was incised, the muscle was sharply dissected and the screw head was reached. The retractor was then deeply positioned, around the working space. By using the monopolar cauterization, the screw head and the proximal road were cleaned by scar adhesions. After the plug was removed, the screw was unscrewed by its screwdriver and the road detached. This technique was repeated for each screw and when the rods were unlocked, they were extracted [Video 1]. After the fixation system was removed each wound was individually closed. The operating time was 40 minutes and the estimated blood loss was less than 20 mL.{Figure 2}[MULTIMEDIA:1]

The postoperative course was without complications and the patient was discharged on postoperative day 1. He reported a progressive improvement of the symptom since the first week after surgery. These results were maintained at patient's last clinic visit, 2 months after the surgery showing a satisfactory cosmetic result [Figure 3].{Figure 3}

Discussion

Considering that the number of surgical procedures in the spine keeps increasing over the years, the research has been mainly focused on improving the surgical techniques to ameliorate the final outcome. However, spine surgery remains known for its often difficult recovery process.[4],[5] It is well-known that open lumbar fusion procedures are predictably long procedures requiring wide exposure, which may result in ischemic necrosis of the paraspinal musculature, atrophy, and prolonged back pain.[6]

Minimally invasive spine surgical techniques have shown to reduce the required surgical corridor to access spine, to spare the osseotendinous complex of the paraspinal muscles, especially the multifidus attachment to the spinous process and superior articular process, to reduce the blood loss and hospital stay, and to minimize the postoperative morbidity.[1],[7],[8] Accordingly, an increasing number of percutaneous pedicle screw systems have been engineered and commercialized.[9] However, there has been no technical equivalent improvement in pedicle screw removal. Although reports of ingenious surgical methods for extraction of broken

screws are largely reported,[10],[11],[12],[13],[14] the technique of hardware exposure and removal has remained unchanged. The removal of lumbar pedicle screw systems still requires dissections as extensive as the traditional methods initially required for their insertion. This process, therefore, can produce disabling consequences for patients. Also, for MISS fixation, no equally minimally invasive strategies have been proposed for hardware exposure and removal.

Besides the indication for spinal fixation in chronic low back pain, questionable for the case here reported, our proposed method of microscopic-assisted minimal invasive posterior fixation removal can provide a useful alternative able to offer a short-term mild discomfort and patient exposure to the potential risks of a brief period of anesthesia and surgical infection. Also, such a surgical procedure reduces the hospital stay and the overall costs. It can be applied in both open and MISS implanted fixation systems. In MISS revision, fluoroscopic guidance is not necessary. We were able to easily find the implanted hardware by opening the previous skin incisions. In the case of a fixation system implanted by the classical open technique, fluoroscopy guidance would be necessary to tailor the incisions just above the screw heads. A minimal invasive technique for revision of a previously implanted open lumbar spinal fixation construct was described several years ago.[15] Unlike our technique, it used a tubular retractor without a surgical microscopic view. The technique was used for revision surgery almost for screw malposition.

Conclusions

Minimal invasive microscope-assisted technique for spinal fixation removal offers a simple and effective surgical alternative to the traditional open method. It is rapid, limits the blood loss, offers a good cosmetic result, reduces the postoperative hospital stay and costs.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Wednesday, March 10, 2021

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