Cervical nerve root decompression by lateral approach as salvage operation after failed anterior transdiscal surgery: technical case report

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Abstract Cervical nerve root compression caused by disco-osteophytic changes is classically operated by anterior transdiscal approach with disc replacement. If compression persists or recurs, reoperation via the same surgical route may be difficult, because of scar tissue and/or implants. An alternative approach may be necessary. We recommend the lateral cervical approach (retrojugular) as salvage operation in such cases. We report a patient with cervical nerve root compression operated by anterior transdiscal approach with plate and bone graft. As some compression persisted clinically and radiologically, the patient was re-operated via a lateral approach. The surgical access was free of scar tissue. The arthrodesis could be left intact and did not prevent effective nerve root decompression. The patient became asymptomatic. The lateral cervical approach (retrojugular) as reported here, is an excellent alternative pathway if reoperation after anterior transdiscal surgery with disc replacement becomes necessary.

Keywords Alternative approach · Degenerative cervical disc disease · Myelo-radiculopathy · Recurrence · Revision surgery

Introduction

The anterior transdiscal approach is a standard approach for the surgical treatment of disco-osteophytic cervical disc

disease. In most cases an arthrodesis or arthroplasty is performed [1, 10, 11]. If revision surgery becomes necessary, problems may be caused by scar tissue and/or an implant. The approaches that are generally used are: anterior approach from the same or the opposite side or a posterior approach [5–10].

In the present article, we illustrate such a case of revision surgery after failed anterior transdiscal surgery. The technique we used differs somewhat from the options described above. In fact, for the reoperation we chose the lateral approach that was described in detail elsewhere [3, 4].

Case report

A 65-year-old woman presented with cervicalgia and bilateral radiculalgia. On MRI and CT she had a large central disco-osteophytic spur at C4C5 and bilateral foraminal stenoses (Fig. 1). She was operated by a left anterior transdiscal approach with C4C5 discectomy, iliac bone graft and plating. Arm pain recurred after 3 months in the left arm. At that time, postoperative MRI and CT scan showed an important residual disco-osteophytic compression at the left C4C5-foramen (Fig. 2). She was unsuccessfully treated by corticosteroids and opioids and therefore surgery was offered again. The surgical alternatives included: an anterior approach on the same side or from the opposite side, a posterior approach or a lateral approach. We chose a left lateral approach (retrojugular) allowing for an effective decompression of the junction of the spinal cord and left nerve root. The graft-plate construct from the first surgery did not hinder this surgical approach and remained intact.

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Fig. 1 Pre-operative imaging. **a** Sagittal MRI, T2-weighted: compression of the spinal cord by important C4C5 disc herniation. **b** Sagittal CT scan: significant spondylosis and calcification of the disc herniation. **c** Axial MRI, T2-weighted: large median and left para-median disc herniation and bilateral foraminal stenoses. **d** Axial CT scan showing spondylotic changes with bilateral foraminal stenoses

Main surgical steps (Fig. 3) Left lateral cervical skin incision, dissection in the field between the sterno-cleido-mastoid muscle laterally and the internal jugular vein medially, slight retraction of the internal jugular vein exposing the antero-lateral spine, identification of the sympathetic chain on the longus colli, resection of the intertransverse muscles and partial resection of the longus colli muscle controlling the sympathetic chain, identification and control of the vertebral artery, drilling at the uncovertebral joint of C4C5 (first vertically then obliquely), resection of the posterior longitudinal ligament and the disco-osteophytic mass compressing the junction of spinal cord and nerve root which is completely released and may be followed up to its undercrossing of the vertebral artery.

The clinical and radiological outcome was good. The patient fully recovered from her pain. Postoperative images showed effective decompression with the graft/plate construct left intact (Fig. 4).

Fig. 2 Imaging study after left anterior transdiscal approach with arthrodesis. **a** Sagittal MRI T2-weighted: note the achieved resection of the disc herniation but persistence of a posterior bony spur at the lower part of the C4 vertebral body. **b**: Axial CT: good central and right-sided decompression, but persistent stenosis on the left side which remained symptomatic

Discussion

Revision surgery after anterior transdiscal surgery may be necessary because of persisting or recurring compression. In the present case the different surgical possibilities had been considered:

- ipsilateral anterior approach: the same approach would have been difficult because of scar tissue and the intervertebral bone graft/plate
- contralateral anterior approach: in this approach there is still a problem of access to the intervertebral space
- posterior approach: in some instances this would be a good alternative; in the presented case, however, it would not have been appropriate because the maximum of compression was located anteriorly.

Fig. 3 Schematic drawing illustrating the lateral approach. *MSc* musculus sternocleidomastoideus, *JV* jugular vein, *CA* external and internal carotid artery, *MLc* musculus longus coli

Finally, a lateral approach was chosen which had several advantages. First, being laterally of the cervical vessels instead of medially, the spine was accessed in a zone completely free of scar tissue. Secondly, the exposition of the spine was a more lateral one and therefore drilling was possible without removing the cervical plate and the bone graft from the previous operation. The operative view offered by the lateral approach as compared to the anterior approach is schematically illustrated in Fig. 5.

The postoperative computed tomography well illustrates that not only the foraminal part of the cervical root, but also the pre-foraminal part and even the spinal cord were completely decompressed. According to our experience, this good clinical outcome should persist after long-term follow-up without any secondary clinical or radiological deterioration [4]. In the present case, we did not encounter any intra- or post-operative complication. The potential complications specific to this approach are Horner's syndrome and vertebral artery injury. In our experience, the incidence of permanent Horner's syndrome in lateral cervical approach is about 2.5% [4]. In a large series of standard anterior cervical approaches this risk was evaluated to be about 1% [2]. The higher risk when performing a lateral approach is certainly due to the fact that the sympathetic chain has to be exposed and retracted. However, it is usually well recognizable under the aponeurosis of the longus colli muscle. In order to

Fig. 4 Imaging study after left antero-lateral approach (revision surgery). **a** Coronal CT with bone windows: effective foraminal decompression on the left side; note the screws of the arthrodesis which remained untouched. **b** axial CT: good left-sided decompression; note that the plate does not obstruct the visual axis and the working space

spare the chain, the aponeurosis has to be opened in a parallel way and is then gently retracted laterally together with the chain.

A serious complication when exposing the vertebral artery is avoidable when some key principles are rigorously respected as we reported previously [3, 4]. In brief, analysis of the vertebral artery course on pre-operative imaging studies, visual intraoperative control of the artery, shielding

Fig. 5 Illustration of the maximal views offered by the anterior approach (A shaded area) compared to the lateral approach (L highlighted area); in the presented case the lateral approach allowed complementary decompression of the residual compression although the plate remained in place

technique with the sucker and respect of the periosteal sheath around the artery containing the venous plexus are important for safety.

Conflict of interest statement None of the authors has any potential conflict of interest.

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