Anterior corpectomy and fusion for two adjacent levels of cervical stenosis

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Published online: 22 May 2013
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Keywords Cervical stenosis · Spondylotic radiculopathy · Anterior corpectomy · Titanium mesh cage · Cervical decompression and fusion

Learning targets

- To identify a strategy of cervical stenosis treatment at two adjacent levels.
- To learn the steps of anterior cervical corpectomy and decompression.
- To show the management of possible epidural venous bleeding control.
- To learn a fusion technique using a titanium mesh cage filled with autologous bone from the vertebra and anterior plating.

Introduction

Multilevel anterior cervical discectomy and fusion represents a current technique in the treatment of spondylotic myelopathy and myeloradiculopathy, if the stenosis remains

limited to the level of the disc and the lateral recess [1]. A partial or complete corpectomy and fusion may be preferable in situations where access to the posterior aspect of the vertebral body is needed. This is the case, if significant osteophyte formations cannot be completely removed through the intersomatic space, using a drill and a Kerrison rongeur. Cervical corpectomy, strut graft fusion and anterior plating have been recommended for the treatment of double level stenosis [2]. This technique requires bone graft harvesting from the iliac crest. The use of a titanium mesh cage filled with autologous bone from the resected vertebra itself has been described as an alternative reconstruction technique after corpectomy [3]. Additional stabilization using an anterior cervical plate is mandatory after cage reconstruction. The implantation of expandable titanium cages has been advocated for kyphosis correction in single or multiple level corpectomies [4]. The reduction of the sagittal cervical profile seems important, in order to prevent further degeneration at adjacent segments. The role of deep extensor muscles seems crucial for the sagittal alignment, and open posterior techniques, such as laminoplasties or keyhole foraminotomies, might harm the muscular balance [5].

Case description

A 50-year-old male presented progressive neck pain over the last 6 years, which was treated by pain medication and physical therapy. Additionally, a loss of strength of his left arm and neurogenic pain of C7 became the major

Electronic supplementary material The online version of this article (doi:10.1007/s00586-013-2816-3) contains supplementary material, which is available to authorized users.

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complaint over the last 7 months. Neurologic examination revealed paresthesia in the thumb, the index and the middle finger. Direct pressure on the carpal tunnel and the Phalen wrist-flexion test were negative. Extension was graded 4/5 on the Medical Research Council scale and a decreased triceps reflex was evidenced on the left side. Needle electromyography demonstrated a severe denervation of C7, but also suggested a nerve root compression of C6. Lateral, antero-posterior and oblique radiographs of the cervical spine showed degenerative changes of C5-C6 and C6-C7. Computed tomography demonstrated a cervical stenosis, due to osteophytes which were predominantly located at the recessus of C6-C7 on the left side, thus narrowing the space for the C7 nerve root. The recessus of C5-C6 was also narrowed bilaterally. Magnetic resonance imaging evidenced a disc degeneration of C5-C6 and C6-C7 with a Modic I sign at both levels.

Surgical procedure

The patient was placed in supine position and the levels C5-C6 and C6-C7 were marked fluoroscopically. A standard left sided anterior cervical approach was performed through a longitudinal skin incision. The omohyoid muscle was preserved, and the anterior aspect of the spine was exposed from C5 to C7 by retracting the longus colli muscle bilaterally. Caspar screws were inserted in the vertebral bodies and placed on the right side, approximately 7 mm from the midline, to enable the use of these holes for the screw-plate fixation at the end of the procedure. Anterior osteophytes were resected, and a two level discectomy including the posterior longitudinal ligament was performed, thus limiting the anatomical landmarks of the C6 vertebral body posteriorly. The lateral limitation was given by the uncus on each side. First a double action rongeur was used to remove approximately 2/3 of the vertebral body and harvesting cancellous bone for the graft. A high speed drill was then used to continue the resection until the level of the posterior cortical bone was reached. Bleeding from the cancellous bone, especially from the nutrient artery, was controlled by applying bone wax on the tip of a peanut gauze, and held in a hemostat. The posterior cortex was resected using a small Kerrison rongeur. This enabled a complete removal of osteophytes and nerve root decompression under loupe magnification at both levels. Hemostasis of epidural venous bleeding was performed by temporary application of a hemostatic gauze, followed by a gelatin foam sponge, which was left in place. The posterior and anterior cranio-caudal distances between the endplates of C5 and C7 were measured, and a 16 mm diameter titanium mesh cage was cut to allow a lordotic shape. The

endplates were prepared by drilling their central portion to enhance fusion. The cage was filled with bone from C6, fitted into the corpectomy site and checked fluoroscopically. An anterior plate was fixed by four bicortical screws which were inserted on the left side first, while compressing the Caspar screws through a cut away portion of the plate on the right side. This resulted in a rigid and stable lordotic construct.

Postoperative information

The patient started ambulation on the first day after surgery. The total hospital stay in a general spine surgery ward was 4 days. A soft collar was worn for 2 weeks and physiotherapy was started. Increasing physical activities and car driving were allowed after 6 weeks. Pain was significantly reduced and the weakness of the left arm recovered progressively.

Discussion and conclusion

Anterior cervical discectomy and fusion represents a valuable technique if the stenosis remains limited to the level of the disc and the lateral recess. Cervical corpectomy represents an alternative technique, which creates a better access to osteophytes behind the vertebral body. Both techniques seem to have similar clinical outcomes and fusion rates when treating two adjacent levels [1]. The number of complications such as cage subsidence, dysphagia, and hoarseness of nerve root palsy, increases in double level corpectomies [3]. We therefore restrict the indication for a corpectomy to one vertebra. More than two levels of stenosis may be treated by a combined anterior and posterior approach including laminoplasty and anterior fusion. The use of a titanium mesh cage is convenient, because it uses bone graft directly from the resected vertebral body. Furthermore, cancellous bone has a cellular activity which allows a good fusion through the cage.

Conflict of interest None.

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