

C5 palsy after insertion of a winged expandable cervical cage: a case report and literature review

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C5 nerve root palsy is a well-known complication after anterior or posterior cervical decompression. Many theories have been proposed but the etiology is still unclear. The use of a winged expandable cage after single or multiple corpectomy is among the used techniques in reconstructing the cervical spine. Herein we report a case of C5 palsy after a three-level corpectomy and reconstruction using this device for the treatment of cervical spondylosis. In our case the preexisting foraminal stenosis, wide anterior decompression and partial improvement of cervical alignment were factors supposed contributing to the palsy.

Keywords: C5 palsy; winged expandable cage; cervical spondylosis; cervical decompression; cervical corpectomy

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Introduction

Multiple definitions of C5 nerve root palsy (C5P) have been reported basing on the grade of weakness and biceps involvement. One reports it as the loss of motor strength in the deltoid and/or biceps brachii associated to sensory deficit or increased pain in the C5 distribution (1). After cervical spine decompression, it is a well-known complication with a variable incidence ranging from 1.4% to 18.4% (2). Its onset has been reported in both posterior and anterior approaches. The use of a winged expandable titanium cage (WETC) after single or multiple corpectomy is among the used techniques in reconstructing the cervical spine. Herein we report a case of C5P after a three-level corpectomy and reconstruction using this device for the treatment of cervical spondylosis.

Case presentation

We report the case of a 66-year-old man with a two years history of left cervico-brachialgia and spastic ataxia. He referred to our clinic after a fall determined neurological worsening. Neurological exam showed power 4/5 in the left biceps and triceps, 4/5 in the left quadriceps, hyperactive lower limbs tendon reflexes and bilateral Babinski.

Cervical radiograph demonstrated a severe spondylosis and loss of lordosis (*Figure 1*). Degenerative changes and spondylolisthesis at C4-C5-C6 with spinal cord compression were reported at MRI. C4-C5 was the most compressed level where a right foraminal stenosis was present (*Figure 2*). In order to decompress the spinal cord and improve patient's symptoms, a three-level C4-C5-C6 corpectomy followed by the insertion of WETC was executed. In postsurgical hours and on first postsurgical day the patient showed good recovery from the weakness and the post-operative cervical radiograph demonstrated correct position of the device (*Figure 3*). Unfortunately, on second postsurgical day a right C5P was present. Urgent cervical MRI was executed, the exam demonstrated good spinal cord decompression excluding a postoperative hematoma or spinal cord injury (*Figure 4*). Dexamethasone 8 mg e.v. two times a day was started, but the patient did not recover from the palsy in post-surgical days and physiotherapy was continued in a rehabilitation centre. He was followed-up in our clinic and showed a full recovery at 2 months from the operation.

Discussion

Multiple definitions of C5P have been reported in literature



Figure 1 Cervical radiograph showed severe spondylosis.

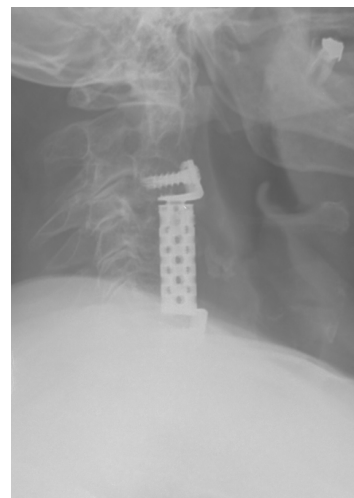


Figure 3 Postoperative radiograph showed the correct position of WETC. WETC, winged expandable titanium cage.



Figure 2 Cervical MRI demonstrated C4-C5-C6 spondylolisthesis and compression of spinal cord. At C4-C5 a right foraminal stenosis was present.

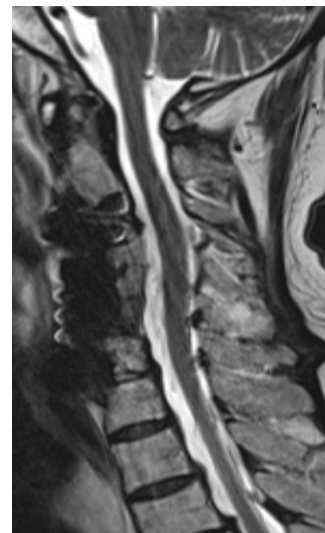


Figure 4 After the onset of C5 palsy the cervical MRI showed good spinal cord decompression and no evidence of spinal cord injury or hematoma.

basing on the different grade of weakness in the deltoid and biceps muscle and this may have contributed to its variable incidence. Nevertheless, C5P is a well-known complication after anterior or posterior decompression. Herein we report a case of C5P after a triple corpectomy for the treatment of cervical spondylosis using a WETC in reconstructing the spine.

In posterior decompression, the most described theory

is the spinal cord shift due to wider posterior space after surgery determining C5 nerve root traction. A direct correlation between wider posterior decompression and C5P has been reported (3) and some authors propose a limited decompression in order to reduce the spinal cord shift. Nevertheless, Klement *et al.* (4) evaluated the width of laminectomy at CT imaging reporting no correlation between width of laminectomy and nerve root palsy. Preexisting foraminal stenosis has been associated with C5P (5,6) and some authors recommend prophylactic foraminotomy to prevent the palsy (7,8). A higher incidence of C5P has been reported in patients with ossified posterior longitudinal ligament, presumably because the spinal cord shift undergoes a wider movement after the removal of the ligament. In some studies laminectomy, laminoplasty and laminectomy plus fusion have been compared with contrasting results. Yang *et al.* (9) confronted laminectomy group *vs.* laminoplasty group reporting a higher incidence in laminectomy group. On the other hand, Basaran *et al.* (10), after a review of the literature, reported a higher incidence in laminoplasty compared to laminectomy, perhaps the highest incidence was found in laminectomy and fusion. The correction of cervical lordotic alignment with posterior instrumentation has been supposed as a contributing factor since able to induce iatrogenic foraminal stenosis and increase the spinal cord shift (11).

In anterior cervical decompression, the change in the intervertebral height after ACDF has been reported as a possible mechanism (12). Wang *et al.* (13) reported an association to cervical lordosis correction, preexistent C4/C5 foraminal stenosis and larger decompression. On the same way, the C5P has been described after single or multiple corpectomies. Bydon *et al.* (14) reported an incidence of 4% after single or multiple corpectomy and 1% after ACDFs. In corpectomy a wide and asymmetric anterior decompression has been supposed to determine asymmetric dural expansion and tension to the ventral rootlets (15). Hashimoto *et al.* (16) reported higher incidence after multilevel corpectomy respect to single level corpectomy.

Other proposed mechanisms are due to the iatrogenic injury during surgery as spinal cord ischemia and reperfusion injury. Takenaka *et al.* (17) proposed the use of chilled saline irrigation during bone drilling in order to reduce this damage. On the other hand, an intraoperative nerve root injury has been ruled out by Tanaka *et al.* (18) who monitored the intraoperative evoked potentials and no abnormalities were seen even in those patients who

developed postoperative C5P.

The use of a WETC after single or multiple corpectomy was proposed to overcome the limits of the non-expandable cages as the high rates of subsidence and is considered more practical respect the expandable cages since the anterior plate is included. In literature, a case series about the use of this device for the treatment of cervical spondylosis has been recently reported with good results (19).

In this case the patient presented a preexisting right C4-C5 foraminal stenosis and we fully decompressed the foramen during the corpectomy. Nevertheless, a C5P was present on second post-operative day. We suppose that the preexisting foraminal stenosis, wide anterior decompression and partial improvement of cervical alignment were all factors contributing to the palsy.

Conclusions

In literature, many theories at the base of the onset of C5P after anterior or posterior cervical decompression have been advanced. In this case we report that the preexisting foraminal stenosis, wide anterior decompression and partial improvement of cervical alignment were all factors contributing to the palsy.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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