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CLINICAL CASE REPORT

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Redislocation After a Failed Surgery to Treat C6/7 Fracture-Dislocation With Pedicular Fracture of the C6 Vertebra

Case Report of a Successful Revision Surgery, Analysis of the Causes, and Discussion of Revision Surgical Strategies

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Abstract: Cervical spinal fracture-dislocation with pedicular fracture of the vertebra has been little reported and the management of such a patient is difficult. Considering the little knowledge of this area, we present this special case of a successful revision surgery for the treatment of redislocation after a failed surgery to treat C6/7 fracture-dislocation with pedicular fracture of the C6 vertebra to share our experience.

A 45-year-old male patient presented to our hospital with history of neck pain for 4 months. According to his medical records, he was involved in an architectural accident and diagnosed with C6/7 fracture-dislocation with pedicular fracture of the C6 vertebra (ASIA: D). A surgery of posterior lateral mass screw fixation (bilateral in C5 and C7; left side in C6) was performed in a different institution. However, 4 months after his primary surgery, he was still troubled by serious neck pain and muscle weakness in all right side limbs. The physical examination of the patient showed hypoesthesia in the right side limbs, myodynamia of the right side limbs weakened to Grade 4. Cervical X-rays, computed tomography (CT), and magnetic resonance imaging confirmed the redislocation of C6/7. A successful revision surgery of anterior cervical corpectomy and fusion (ACCF) with nanohydroxyapatite/polyamide 66 composite fulfilled with vertebral autograft plus anterior plate was performed. The 3 months postoperative X-rays and CT scan showed the good position of the implant and bony fusion. The patient's neck pain was relived and the neurological function recovered to ASIA E grade at the 3rd month follow-up.

ACCF with nanohydroxyapatite/polyamide 66 composite fulfilled with vertebral autograft plus anterior plate is effective for the treatment of redislocation after a failed surgery in patients of fracture-dislocation with pedicular fracture. The best method to avoid such a failed surgery is a combined anterior–posterior approach surgery in our opinion.

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Abbreviations: ACCF = anterior cervical corpectomy and fusion, CT = computed tomography.

INTRODUCTION

In 2013, about 973 million people suffered from injuries that warranted healthcare and about 4.8 million people died from injuries.[1] And the annual incidence rate of trauma-related spinal fractures were reported to range from 0.019% to 0.088%.[2,3] The subaxial cervical spinal fracture-dislocation, often accompanying with direct spinal cord and nerve root injury, is a severe traumatic lesion which most frequently resulting in significant functional disability, high economic burden, and decreased life expectancy.[4] A lot of treatment methods have been reported for the treatment of subaxial cervical spinal fracture-dislocation: prolonged cervical traction, immobilization in a halo thoracic brace, posterior cervical pedicle or lateral mass screw, anterior cervical plating with bone grafting, and combined anterior and posterior stabilization.[4,5] However, the management of patients with subaxial cervical spinal fracture-dislocation still remains controversial and so many methods of treatment often confused our spinal surgeons. Subaxial cervical spinal fracture-dislocation often means a 3 column injury according to the Denis 3 column spine theory.[6,7] Subaxial cervical spinal fracture-dislocation with pedicular fracture of the vertebra has been little reported and the management of such a patient is much more difficult especially for some young spinal surgeons. Considering the little knowledge of this area, we present this special case of a successful revision surgery for the treatment of redislocation after a failed surgery to treat C6/7 fracture-dislocation with pedicular fracture of the C6 vertebra to share our experience. More importantly the causes of the failed primary surgery and the revision surgical strategies were discussed in depth.

CASE DESCRIPTION

The patient provided informed consent for the publication of his clinical and radiological data. This case report was approved by Medical Ethical Committee of West China Hospital, Sichuan University.

A 45-year-old male patient presented to our hospital with history of neck pain for 4 months. According to his medical records, he was involved in an architectural accident and diagnosed with C6/7 fracture-dislocation with pedicular fracture of the C6 vertebra (ASIA: D).[8] January, 2015, he was performed a surgery of posterior lateral mass screw fixation (bilateral in C5 and C7; left side in C6) in a different institution.

After his primary surgery he was sent to department of rehabilitation for subsequent treatment. However, 4 months after his primary surgery, he was still troubled by serious neck pain and muscle weakness in all right side limbs. The physical examination of the patient showed hypoesthesia in the right side limbs, myodynamia of the right side limbs weakened to Grade 4, Hoffmann sign (−), Babinski sign (−). Unfortunately the patient was unable to provide the immediate radiological images after the accident. He was obeyed to take cervical X-ray, computed tomography (CT), and magnetic resonance imaging in our hospital again. The X-rays showed the redislocation of C6/7 after his surgery (Figure 1). The CT scan 3-dimensional reconstruction images confirmed the redislocation of C6/7 and showed the laminectomy and lateral mass screw fixation in his primary surgery (Figure 2). Cervical magnetic resonance imaging showed the redislocation of C6/7 and the oppression of endorhachis (Figure 3).

After a heated discussion in several spinal surgeons in our department and an effective communication with the patient, a revision surgical plan of anterior cervical corpectomy and fusion (ACCF) with nanohydroxyapatite/polyamide 66 composite fulfilled with vertebral autograft plus anterior plate was reached. The surgery was performed on a classic anterior right Smith–Robinson approach by a very experienced surgeon after induction of general anesthesia. The operation time is 150 minutes and the estimated blood loss is 100 mL. The 3 months postoperative X-ray and CT scan showed the good position of the implant and bony fusion (Figure 4). The patient's neck pain was relived and the neurological function recovered to ASIA E grade at the 3rd month follow-up.

DISCUSSION

We present this special case to discuss the management and surgical strategies of subaxial cervical spinal fracture-dislocation incorporate with pedicular fracture of the vertebra, analysis of the causes of the failed primary surgery, and discuss the revision surgical strategies in such a patient of redislocation after surgery.

The management of patients with subaxial cervical spinal fracture-dislocation still remains controversial, and fracture-dislocation incorporates with pedicular fracture of the vertebra increases the difficulty and complexity. Sarkar et al[9] compared the operative outcome of unstable lower cervical fracture dislocation by lateral mass screw fixation or anterior plating, and they concluded that both posterior and anterior surgical approaches are viable alternatives for treating subaxial spine injuries with different indication and risk profiles. In our opinion, operative treatment can decrease the complications related to prolonged immobilization in recovery phase in these cervical fracture-dislocation patients. Sribnick et al[10] reviewed 15 patients with traumatic high-grade cervical dislocation, and they recommended either a combined anterior–posterior approach or a posterior-only approach for these patients. However, as subaxial cervical spinal fracture-dislocation often means a 3 column injury, we strongly recommend a combined anterior–posterior approach for these patients especially when incorporates with pedicular fracture of the vertebra or posterior elements fractures such as vertebral lamina.

All of the spinal surgeons in our department took part in the discussion before surgery. Some surgeons in our department think that the cause of the failed primary surgery can be

FIGURE 1. Preoperative anteroposterior and lateral X-rays revealed redislocation of C6/7 after his primary surgery.

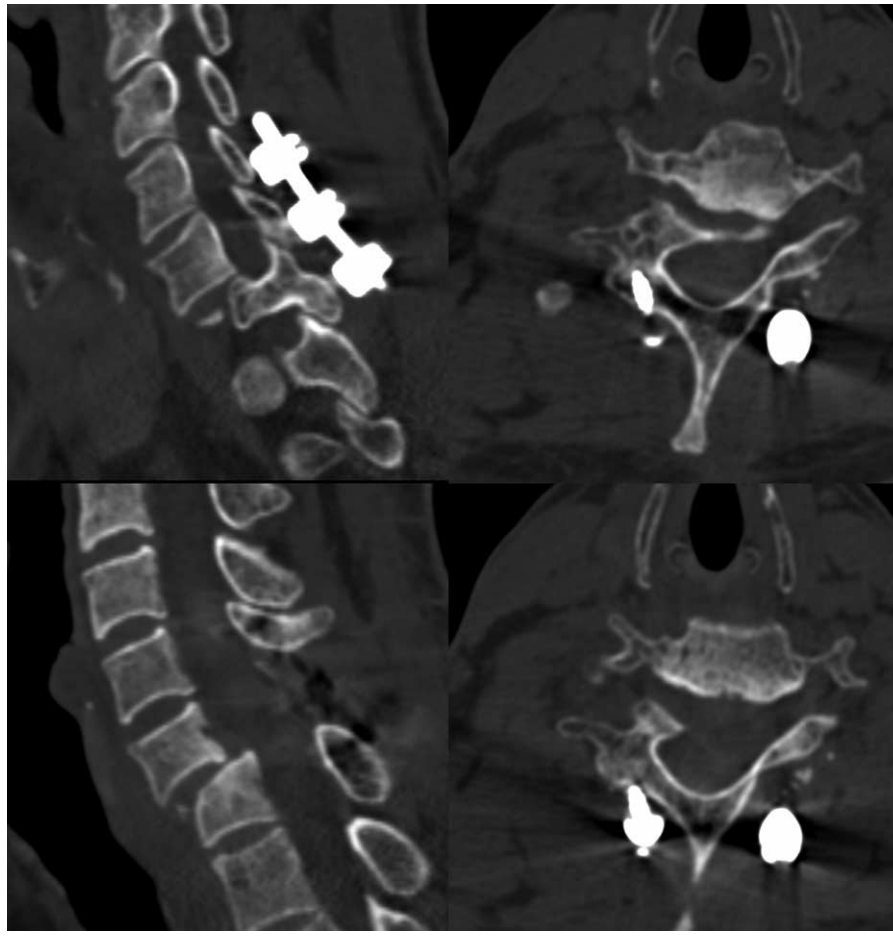

FIGURE 2. The computed tomography (CT) scan 3-dimensional reconstruction images confirmed the redislocation of C6/7 and showed the laminectomy and lateral mass screw fixation in his primary surgery.

FIGURE 3. Cervical magnetic resonance imaging (MRI) showed the redislocation of C6/7 and the oppression of endorhachis.

attributed to the short fixation segments and they think the posterior fixation and fusion segments should be as long as C5 to C7 or T1. Some surgeons think that the cause of the failed primary surgery is the lateral mass screw fixation and they think the strength of pedicle screw is better. However, most spinal surgeons think that the main cause of the failed primary surgery is the single posterior fixation as C6/7 fracture-dislocation with pedicular fracture of the C6 vertebra makes the C6 vertebra almost like a free vertebra. Single posterior lateral mass screw fixation in this patient can hardly restore the intervertebral height and the stability of anterior column, so the C6/7 segments can hardly reach bony fusion. The best method to avoid such a failed surgery is a combined anterior–posterior approach surgery in our opinion.

The last discussion point in this case report is the revision surgical strategies. If we understand the causes of such a failed surgery and the Denis 3 column spine theory, we can easily reach a revision surgical plan that the revision surgery should be performed through an anterior approach. In our opinion, both ACCF and anterior cervical discectomy and fusion are suitable for this patient. However, ACCF is much easier for reduction and we choose ACCF according to the intraoperative situation in this patient of redislocation. As ACCF with nanohydroxyapatite/polyamide 66 composite fulfilled with vertebral autograft plus anterior plate has been widely reported to be effective and safe, we did not use the autologous iliac bone in our surgery.[11,12]

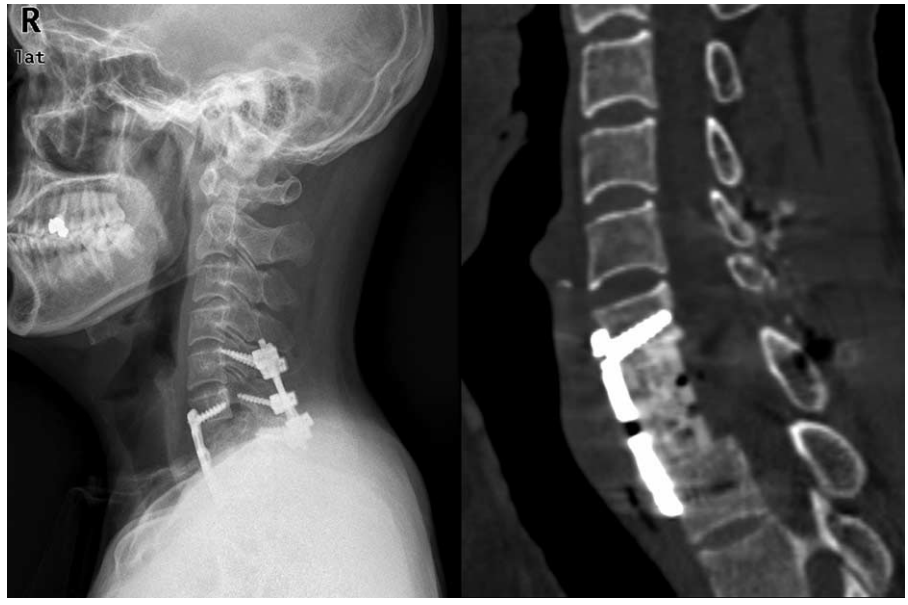

FIGURE 4. The 3 months postoperative X-ray and computed tomography (CT) scan showed the good position of the implant and bony fusion.

CONCLUSION

Anterior cervical corpectomy and fusion with nanohydroxyapatite/polyamide 66 composite fulfilled with vertebral autograft plus anterior plate is effective for the treatment of redislocation after a failed surgery in patients of fracture-dislocation with pedicular fracture. The best method to avoid such a failed surgery to deal with fracture-dislocation incorporates with pedicular fracture is a combined anterior–posterior approach surgery in our opinion.

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