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Case Report

# Cervical spine dislocation on ankylosing spondylitis: A case report

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ABSTRACT

Treatment of cervical spine fracture in patients with ankylosing spondylitis is difficult. Biomechanical changes related to ossified ankylosing spondylitis spine make cervical spine fractures highly unstable. They cover the entire width of the spine inducing.

multidirectional instability and the risk of neurological injuries. Treatment is more difficult that in the non-ossified spine. Different treatments have been proposed including anterior stabilization, posterior stabilization, or both. This paper present a case of an 55-year-old man followed for ankylosing spondylitis admitted for fracture dislocation of c5-c6 following a minimal trauma of which it was operated 4 times in order to obtain a satisfactory reduction and stabilization from which we drew the importance of the osteosynthesis by combined way.

## 1. Introduction

Traumatic damage to the spine is not exceptional in ankylosing spondylitis because most patients continue to lead an active life. The ankylosed spine is not very resistant to trauma and the lesions affect rather electively the points of least resistance, essentially the syndesmophytic disc bridges at the level of the hinge zones of the spine [1].

The management of dislocated fractures of the cervical spine in ankylosing spondylitis (AS) is particularly difficult. These lesions frequently involve the anterior and posterior elements of the vertebral, generating major instability and are frequently responsible for neurological deficit. Surgical management is made difficult by the rigidity of the spine and the frequently associated osteoporosis. Different management strategies have been proposed, including anterior and posterior approaches and combined routes, with or without various external immobilizations [2]. The goal of this study was to show the benefits of surgical treatment by the combine anterior and posterior route in the treatment of these fractures.

## 2. Case report

We report the case of a 54-year-old man, right handed, hypertensive for 15 years and followed for 3 years for ankylosing spondylitis (AS). The diagnosis of AS was based on the association of a pelvic-spinal syndrome of inflammatory origin, a bilateral sacroillitis stage 1 of forest, and a positive HLA B27 background. The patient was not undergoing any treatment for AS, There is no history suggestive of any mental or physical illness.

He was admitted to the emergency room following a motor vehicle accident with an occipital impact point. On admission, the patient was conscious, well oriented, and hemodynamically stable. The neurological examination found a preserved mortice and sensory function (FRANKEL E). He complained of only moderate neck pain. We noticed during the examination that his neck was fixed with imoprtante stiffness, movements in the lateral direction and flexion extension was impossible. The X-ray of the cervical spine showed a transverse fracture-dislocation C5–C6 on a pathological spine (Fig. 1). The cerebral CT scan was normal. The patient was admitted to the neurosurgery department after immobilization with a neck brace, and a cervical CT scan was requested (Fig. 2).

The surgical indication of a reduction and the installation of an osteosynthesis by anterior route was decided by our professor. After preparation of the patient for the operation, he was taken to the operating room. The position was difficult due to the important dorsal cyphosis associated with a fixity of the neck and the head leaning forward. The extension movement was impossible and the headrest of the table had to be lifted for occipital relief (Fig. 3).

We performed a anterior transverse cervical incision after that a dissectomy with screw plate fixation by two screws in C5 and two in C6. The intraoperative control (Fig. 4) showed the reduction of the

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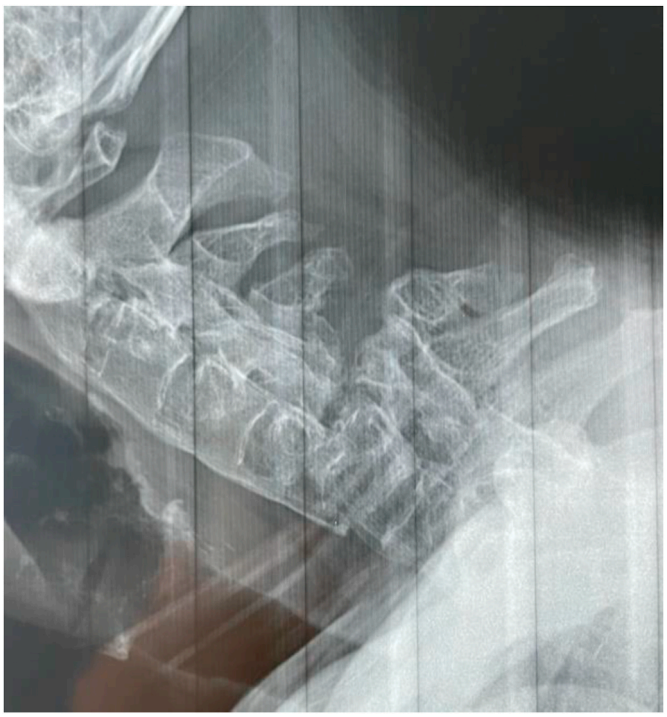

**Fig. 1.** Cervical X RAY profile shows a dislocation fracture of c5-c6.

dislocation but in postoperative we noticed the displacement of the screws in C6 and the recurrence of the dislocation in the control X-RAY (Fig. 5).

The decision for a revision was made, still using the anterior approach using the same incision, this time we performed a corporectomy of C6 with placement of an iliac graft reinforced with cement, we place a longer fixed screw plate with 2 screws at C4 and 1 at C5 and one on the graft and 2 at C7. Intraoperative imaging showed a complete reduction (Fig. 6).

But postoperatively, the patient developed a right brachial monoparesis scale at 4/5, with a loosening of the screws causing a worsening of the dislocation.

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The indication for a 3rd revision was given using the same incision, this time we removed the graft and cement and replaced it with an expandable cage and we placed a fixed screw plate on C4 and D1. The intraoperative radiography was satisfying (Fig. 7).

The patient still presents postoperatively the same deficit. The cervical CT-SCAN showed a migration of the cage which points on the spinal canal with the persistence of the dislocation (Fig. 8).

The indication of a 4th revision by posterior approach with a middle posterior cervical incision this time. We placed a 8 screws, 1 in C4, 2 in C5, 2 in C6, 1 in C7 and 2 in D1 associated with 2 rods (Fig. 9).

The postoperative follow-up was simple and a reduction was obtained (Fig. 10). We completed by an immobilization with a neck brace associated with a rehabilitation of 3 sessions per week during 3 months at his exit which was at J8 post op. The patient was then seen in consultation 2 months later. The examination showed a total recovery of his deficit and the neck brace was removed.

This case has been reported in line with the 2020 SCARE guidelines [3].

## 3. Discussion

Patients with AS are at increased risk of osteoporotic vertebral fractures, the prevalence of which varies from 0.4% to 18% according to studies [4]. These fractures occur in 55% of cases in the cervical spine, particularly at the C6–C7 level, and are responsible for spinal cord injury in 65% of cases [5]. Most of them are transdiscal fractures, by hyperextension mechanism, unstable, with high neurological risk. The 1-year mortality rate of vertebral fractures in these patients is 32%, occurring in more than 3/4 of the cases during hospitalization [6]. This rate is correlated with the patient's age, the number of comorbidities and low-energy trauma.

In one third of cases, cervical fracture in patients with ankylosing spondylitis (AS) is fatal. Even a low-velocity accident can result in a serious neurological injury [7].

But the diagnosis is difficult to make and can be delayed [7]. This delay can partly be attributed to the lack of pain associated with these fractures since the patients are undergoing corticosteroid therapy and because the fractures are difficult to visualize on conventional X-rays of the kyphotic cervical-thoracic junction in patients with AS. The fracture is not detected in 36% of cases and led to worsening of the kyphosis; this is a negative situation for a patient who already has kyphosis, as the risk of neurological problems increases [7]. Treatment is controversial: some surgeons have reported a higher risk of complications after surgery, while others prefer using surgical fixation to avoid the risks related to conservative treatment [7].

Patients with advanced AS are 3.5 times more likely to have a cervical spine fracture compared to the normal population, with a high mortality of 35% [8]. In most cases, the fracture extends to the entire vertebral including both anterior and posterior elements and is responsible for major instability. These patients compared to patients with normal spine have a high risk of developing neurological complications [2].

The treatment of this group of AS patients is complex. Many parameters must be considered. The ankylosed cervical spine is more susceptible to fractures than the "normal" spine due to biomechanical changes, scoliotic deformities and often associated scoliotic deformities and often associated osteoporosis. Indeed, they involve all three vertebral columns, leading to multidirectional instabilities [2]. The "bamboo column" aspect of the spine, which behaves like a long bone, makes immobilization techniques more difficult. Numerous surgical treatments have been proposed such as: anterior, posterior, anterior and posterior osteosynthesis, associated or not with an external restraint [2].

Non-surgical treatments (tractions, external restraints) used alone are not recommended because of a high rate of complications, and in particular pseudoarthrosis. The halo corset is also associated with complications [9], although it usually achieves consolidation. Our opinion is that orthopedic treatment is insufficient, especially when there is displacement. Surgical treatment of cervical spine fractures in patients with AS allows immediate stabilization without the need for cervical traction and prolonged bed rest, while providing immediate spinal decompression. Surgical osteosynthesis is the most appropriate technique to stabilize the ankylosed spine while preserving pre-existing deformities and avoiding local hyper-extension phenomena that may generate neurological disorders. Many techniques have been described (Coe et al., 1989; Cooper et al., 1988; Cornefjord et al., 2005; Do et al., 2001; Einsiedel et al., 2006; Taggard and Traynelis, 2000). Because of the high leverage (the spine behaves like a long bone) and bone fragility, isolated anterior or posterior mount osteosynthesis is not sufficient. The combination of anterior and posterior osteosynthesis (360° fixation) has shown to be reliable [2].

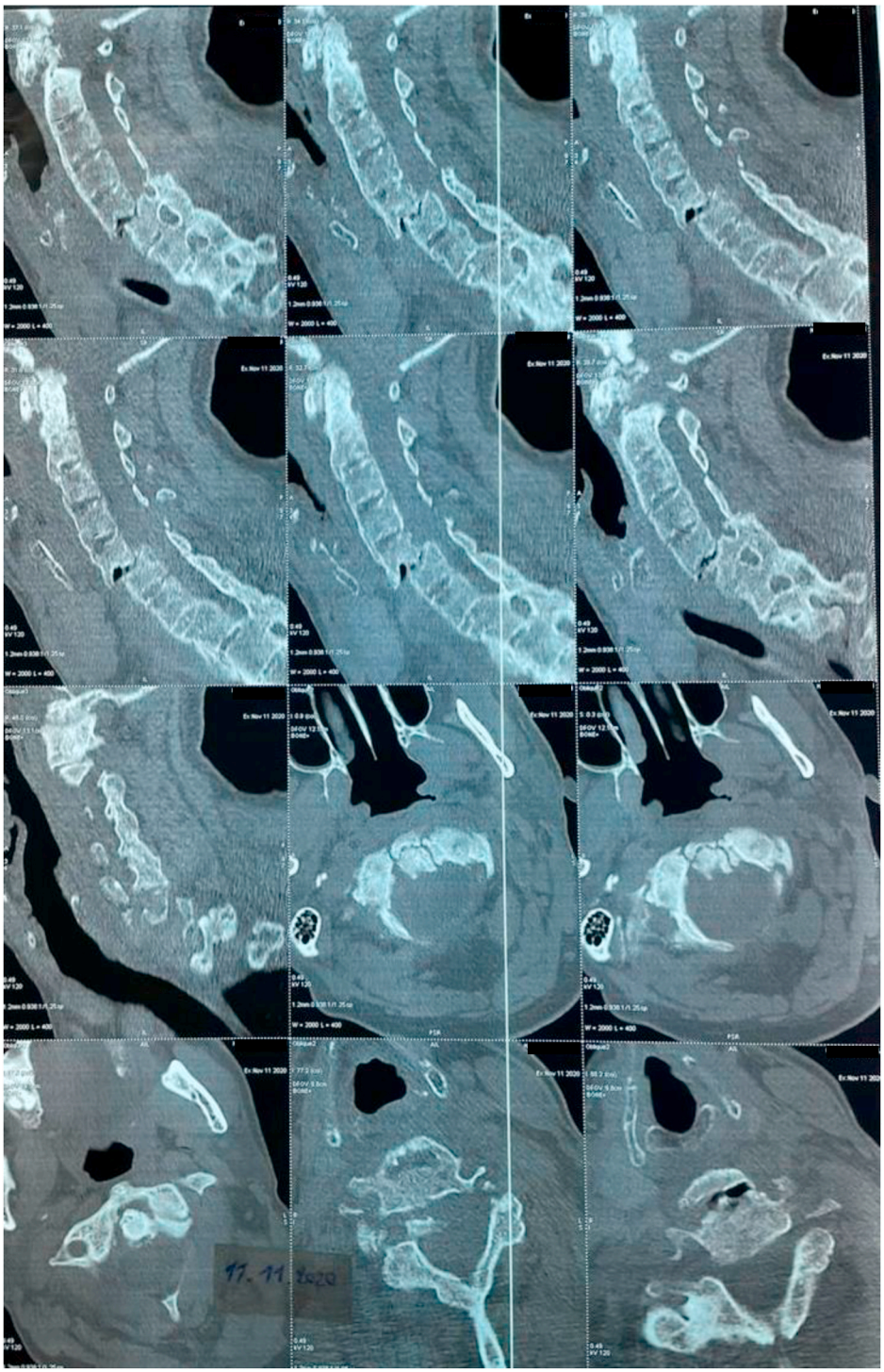

**Fig. 2.** Cervical CT-SCAN shows a dislocation fracture of C5–C6.

There are no reports of a homogeneous series where only anterior fixation is used in this type of patient. Despite many patients having significant kyphosis in the operated spine, an anterior neck incision was performed in all the patients, without sternotomy or sternoplasty. The fixation was sometimes extended to T2 with this anterior surgical approach.

Although certain published reports seem to have a high number of deaths in patients treated surgically, typically only isolated posterior decompression was used, which is a very controversial surgical technique [7]. Surgical treatment is now being used more often. Either a posterior or combined approach is used [7]. Some surgeons have performed fixation with screws and plates alone or added a posterior bone graft if the kyphosis was significant [7,10]. A circumferential graft was used when the anterior column is also deficient. Other authors recommend an anterior approach. But the stability of anterior fixation only has been questioned. Olerud [11] described the results of the surgical treatment of 15 lower cervical fractures. Four patients had anterior fixation only. Six patients had decompression plus anterior and posterior fixation. Four patients had posterior fixation only. Loss of fixation occurred when only one type of fixation was used, this dual fixation

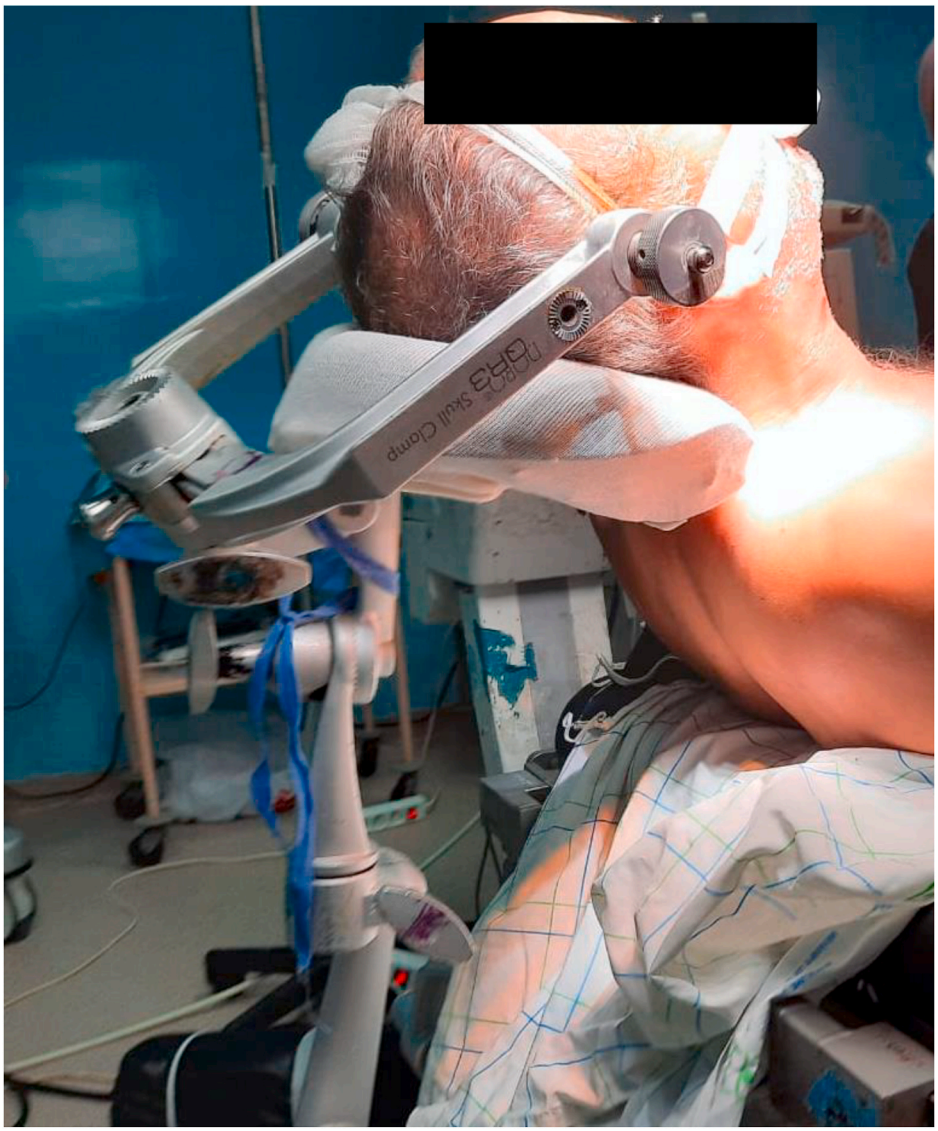


**Fig. 3.** Difficult position of the patient head up with an impossible extension.

approaches were recommended for this type of fracture [7].

Anterior osteosynthesis will involve a discectomy or corporectomy with placement of an iliac graft and a screw plate. Posterior osteosynthesis may be performed using various techniques; for short fixtures, the use of lamellar hooks may be considered. For long mounts, posterior pedicle screw fixation appears to be mechanically better, although it is made difficult by the disappearance of the usual anatomical landmarks during ossification [2].

For postoperative immobilization, most surgeons agree that a halo brace should not be used. We and others prefer using a moulded cervical collar, as fusion occurs in three months [7].

In this type of fracture, we advocate the realization of a "360°" anteroposterior osteosynthesis with a long montage and we immobilize the patients in a Philadelphia neck brace for three months postoperatively conclusion from which we drew from this case.

## 4. Conclusion

Fractures in patients suffering from ankylosing spondylitis are often missed, so better education for emergency service providers seems necessary. These fractures have a high risk of serious and sometimes fatal neurological complications. The presence of neurological deficits requires appropriate imagery. These fractures are often unstable and require appropriate treatment. Orthopedic treatment alone is inadequate. Isolated anterior or posterior osteosynthesis is also insufficient. The rule should be the combination of both (360° fixation) when technically feasible. A cervical neck brace should be maintained afterwards.

**Provenance and peer review**

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**Ethical approval**

Written informed consent for publication of their clinical details and/or clinical images was obtained from the patient.

Ethical approval has been exempted by our institution.

**Fig. 4.** Intraoperative image shows the screwed plate with reduction of the dislocation.

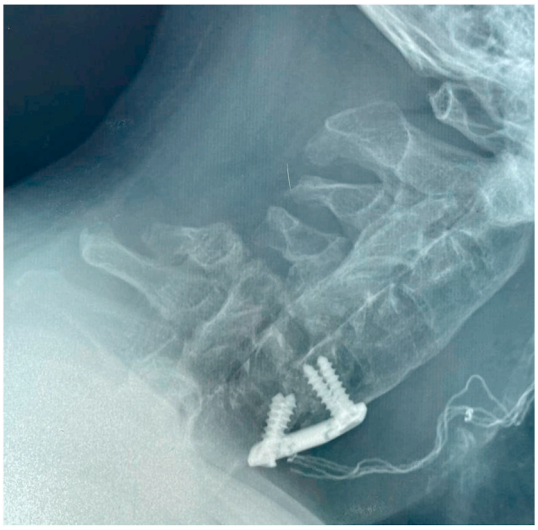

**Fig. 5.** Screwing of the screws in C6.

## Authors contribution

Tarik MESBAHI: writing the paper.
Marouane MAKHCHOUNE: Corresponding author and writing the paper.
Reda MOUINE: study concept.
Abderrahmane RAFIQ: Correcting the paper.
Abdelhakim LAKHDAR: Correcting the paper.

## Research Registration Unique Identifying Number (UIN)

None.

## Guarantor

Makhchoune Marouane.

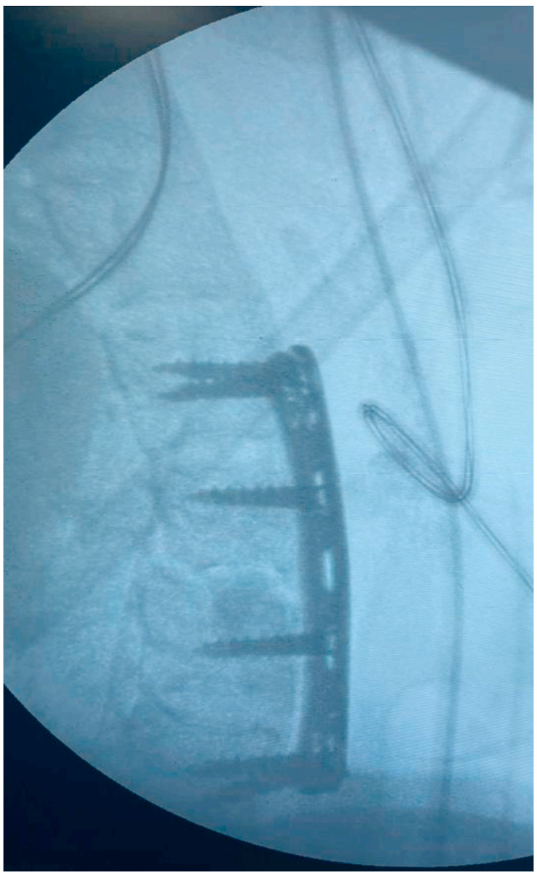

**Fig. 6.** Control X-ray shows the reduction of the dislocation with the longer screwed plate.

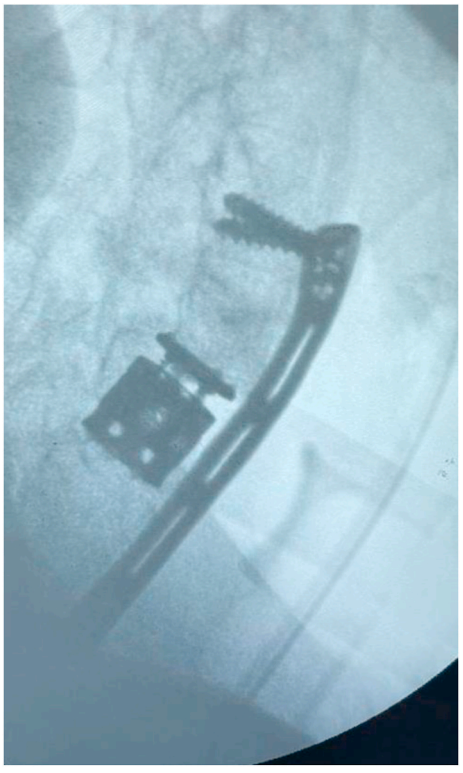

**Fig. 7.** Intraoperative control shows the cage in place with the screwed plate.

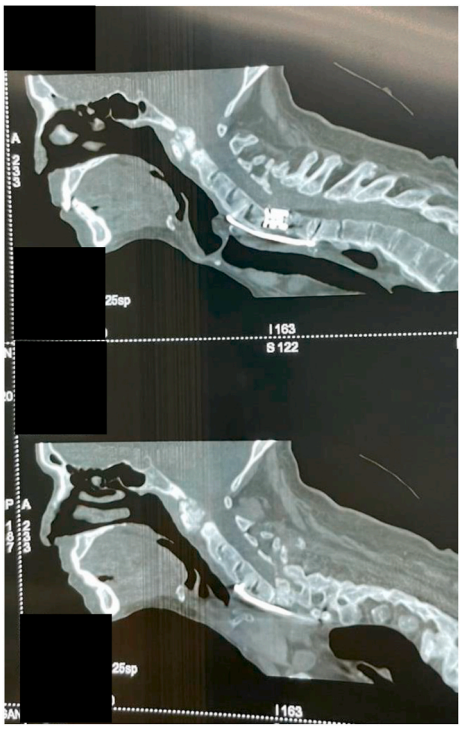


**Fig. 8.** Control CT-SCAN shows the moving of the cage.

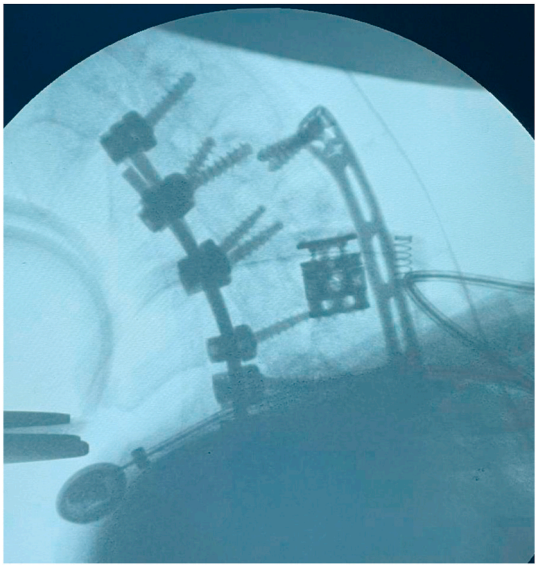

**Fig. 9.** Intraoperative image shows the posterior screws.

## Declaration of competing interest

The authors declare having no conflicts of interest for this article.

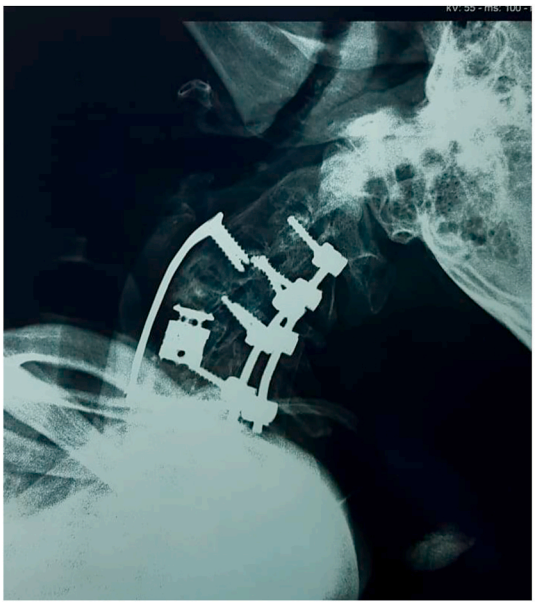

**Fig. 10.** Control X-ray showing reduction of the dislocation with combined fixation.

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