Case Report

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Double surgical approach in the treatment of cervical spine pathologies: experience of the Neurosurgery Department of the National Hospital of Niamey

Abstract

Objective: To evaluate the indications, surgical techniques, and outcomes of dual surgical approaches in the management of complex cervical pathologies in a resource-limited setting.

Methodology: A retrospective and prospective study was conducted between January 2021 and December 2023 in the Neurosurgery Department of the Niamey National Hospital. The patients included presented with cervical pathology requiring dual surgical approaches (anterior and posterior).

Results: Five patients underwent dual-access surgery, including three men and two women. Three cases were secondary to cervical trauma, and two to advanced cervical arthritic myelopathy. The indication for dual access was based on failed decompression or persistent instability after a single approach. The operative strategy was dictated by the type of injury, with particular attention to spinal stabilization. Early sensory and motor recovery was observed in all patients postoperatively.

Conclusion: Dual surgical access is a relevant approach for complex cervical pathologies. It allows for effective decompression and optimal stabilization, despite high technical complexity and an increased risk of complications.

Keywords: cervical spine, dual surgical approach, spinal cord compression, cervical instability, niamey

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Introduction

Cervical spine pathologies, whether traumatic or degenerative, can lead to severe spinal cord compression associated with instability. In such cases, a single surgical approach (anterior or posterior) may be insufficient to ensure complete decompression and lasting stabilization. The combined (anterior + posterior) approach, although more complex, is an effective therapeutic option.[1,2] However, its use remains rare in sub-Saharan Africa due to technical and logistical constraints. Here, we report our experience with the combined surgical approach in the neurosurgery department of the National Hospital of Niamey, with the aim of evaluating its indications, techniques, and outcomes.

Methodology

This is a descriptive, retro-prospective study conducted over a 24-month period, from January 2021 to December 2023. Inclusion criteria were:

i. Patients operated on for cervical spinal cord compression;

ii. Indication for a combined surgical approach;

iii. Complete medical records.

Data were collected from surgical files, imaging reports, and postoperative follow-ups. Variables studied included age, sex, etiology, clinical presentation, type of surgical approach, postoperative course, and neurological outcome.

Results

Demographic data

Five patients were included. The mean age was 46 years (range: 33–58 years). Three patients were male, two female.

Etiology

Cervical trauma: 3 cases (60%) with fracture-dislocation or acute post-traumatic compression.

Degenerative myelopathies: 2 cases (40%), resistant to medical treatment and initial surgical approach.

Clinical evaluation

The clinical assessment was performed using the **Frankel neurological scale,** with 3 patients classified as Frankel C, 1 as Frankel A, and 1 as Frankel D. The lesion assessment was based on MRI and CT scans as follows: 3 patients underwent both a CT scan and MRI of the cervical spine, while the other 2 patients had only a CT scan of the cervical spine (Figure 1 & 2).

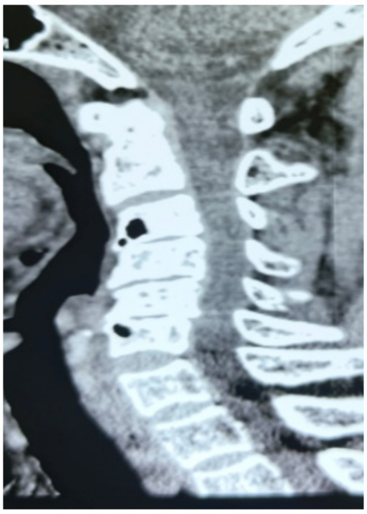

Figure 1 Sagittal CT reconstruction showing cervical curvature inversion (patient AM).

Figure 2 Cervical MRI image of the same patient showing extensive T2 hyperintensity (patient AM).

Surgical indications

In trauma patients, the combined approach was dictated by the need for posterior decompression combined with anterior stabilization. In degenerative patients, the use of the combined approach was motivated by the failure of isolated surgical treatment (anterior approach alone). Among our 5 patients, the posterior approach was performed first in 3 cases; 2 patients underwent surgery during the same operative session (Table 1).

Anesthetic considerations

Preoperative anesthetic evaluation classified two patients with cervico-arthritic myelopathy (CAM) and associated comorbidities as ASA III, while three other patients were classified ASA I. Additionally, two trauma patients with complex cervical fractures underwent stabilization in intensive care for about six hours before surgery.

Table 1 Etiology, indication; sequence of approaches and time between approaches

Patient	Etiology	Indication	First	Second	Interval between the 1st and 2nd day
1	Trauma	Injury assessment	posterior	Anterior	12
2	MCA	No improvement	Anterior	posterior	2
3	Trauma	Injury assessment	posterior	Anterior	Same time
4	Trauma	Injury assessment	Anterior	posterior	Same time
5	MCA	No improvement	posterior	Anterior	3

Surgical techniques:

In our series, 4 patients underwent anterior osteosynthesis alone combined with posterior laminectomy, and 1 patient underwent both anterior and posterior osteosynthesis.

Postoperative course

In the immediate postoperative period, 2 trauma patients were admitted to intensive care for 24-hour monitoring; 4 patients showed significant neurological improvement within the first postoperative week. No major complications (infection, hematoma, hardware failure) were noted. Follow-up at 3 months confirmed radiological stability and functional improvement in all patients (Figure 3–9).

Figure 3 Intraoperative image showing the laminectomy—posterior decompression (patient AM).

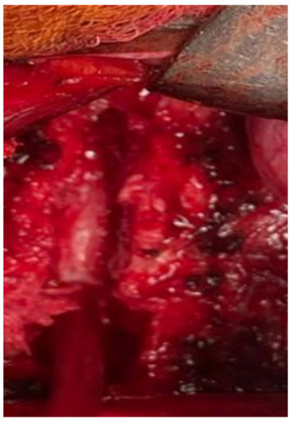

Figure 4: Intraoperative image showing median somatotomy—anterior decompression (patient AM).

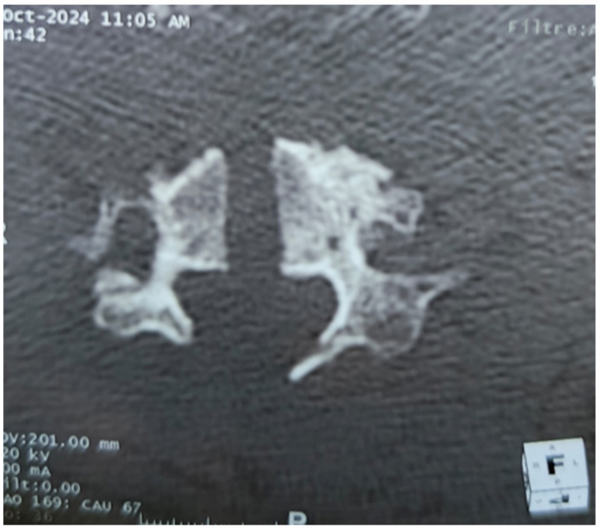

Figure 5 Axial section (bone window) showing median body somatotomy and removal of the posterior arch.

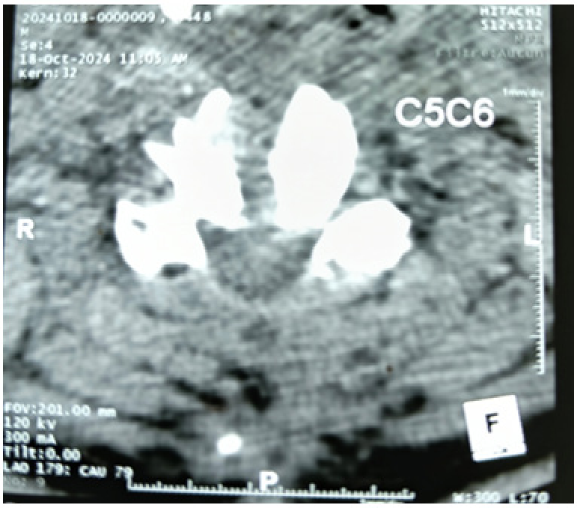

Figure 6 Axial section (parenchymal window) of the same lesion.

Figure 7 Sagittal reconstruction (bone window) showing the removal of the posterior arch.

Figure 8 Sagittal reconstruction showing the median somatotomy.

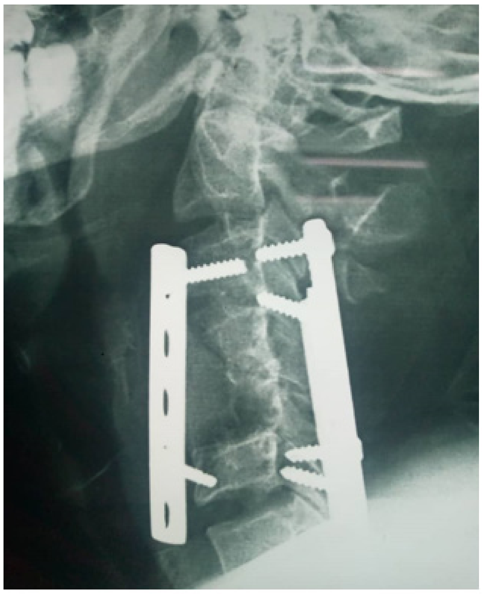

Figure 9 Post-operative control X-ray with osteosynthesis using a screwed body plate and double screwed posterior articular plate.

Discussion

The cervical spine is a highly mobile yet vulnerable structure. The cervical segments C3 to C7 are particularly prone to degenerative or traumatic injuries.

The anterior approach allows direct access to vertebral bodies and discs, facilitating discectomy, corpectomy, and interbody fusion.

The posterior approach permits laminectomy, laminoplasty, and posterior fixation.

However, in cases of circumferential compression, three-dimensional instability, or major deformities, a combined approach is sometimes unavoidable.[3]

Indications in complex cervical trauma include

Unstable fracture-dislocation involving both the anterior and posterior columns.

Irreducible cervical dislocation.

Spinal cord compression associated with burst fractures.

For severe degenerative myelopathies

Multilevel cervical canal stenosis with instability.

Failure of decompression by a single approach.

Other indications such as tumors, infections, and malformations include:

Destructive lesions requiring circumferential decompression.

Osteomyelitis, metastases with vertebral body collapse.[4–9]

In our series, we mainly had 3 cases of complex trauma with unstable fracture-dislocation involving both anterior and posterior columns, and 2 cases of cervicoarthrotic myelopathy where the main indication was failure of decompression by a single approach.

Surgical techniques

The combined approach can be performed in a single operative session or in two separate stages.

Anterior approach (Smith-Robinson): discectomy or corpectomy with graft or cage plus cervical plate.

Posterior approach: decompressive laminectomy plus fixation (lateral mass or pedicle screws).

The order of procedures (anterior first or posterior first) depends on the primary objectives: decompression or stabilization.

In our series, 2 patients had both approaches during the same surgery, while in the others the second approach was performed after intervals of 2, 3, and 12 days respectively. Although the trend toward osteosynthesis at each level is widespread in the literature, in our series we performed 3 anterior osteosyntheses (graft + plate) according to Smith-Robinson with posterior laminectomy; in one patient an anterior Smith-Robinson approach combined with posterior facet screws and double plate fixation; and in the last case, anterior decompression (median somatotomy + plate) with posterior laminectomy.

The involvement of the anesthesiology team was crucial, especially for high-risk patients (ASA III) with cervicoarthrotic myelopathy and comorbidities, as well as trauma patients with complex cervical fractures. The need for preoperative optimization in intensive care and close postoperative monitoring aligns with existing literature. Indeed, maintaining a high mean arterial pressure intraoperatively (≈ 80–90 mmHg) is recommended to ensure adequate spinal cord perfusion in patients with severe spinal cord compression.[10] Finally, major spinal surgery requires intensive hemodynamic monitoring, rigorous hemostatic management, and multimodal pain control, underscoring the need for early and comprehensive anesthetic consultation.[11]

Outcomes

Four (80%) of our patients experienced rapid and significant improvement, consistent with the literature where despite being used in complex cervical spine pathologies, this technique yields high satisfaction. Fehlings et al.,[12] in a review of recommendations, concluded that the combined approach provides good functional outcomes in multilevel myelopathies. Mummaneni et al.[13] highlight the benefit of this strategy to reduce the risk of failure of a single approach, and Joaquim & Riew[14] report high fusion rates and durable stability.

However, the combined approach is a demanding technique, with increased risks of:

Prolonged bleeding, airway injury, postoperative edema.

Dysphagia, recurrent laryngeal nerve injury.

Infection, non-union, hardware failure.[15,16]

No complications were recorded in our patients during the entire follow-up period.

Conclusion

The combined surgical approach is a valuable option for managing complex cervical spine pathologies. It provides effective decompression and durable stabilization, though it requires high technical expertise and carries potential risks of complications. Its indication must be carefully determined after thorough clinical and radiological evaluation. In resource-limited countries, the combined approach remains exceptional, often reserved for complex cases or after failure of initial treatment. Our series demonstrates that this strategy can be successfully performed, provided there is adequate technical equipment and thorough preoperative planning.

The encouraging results obtained here align with those reported in the international literature, which emphasize the benefit of the combined approach for cases of extensive compression, major instability, or spinal deformity.

Study limitations

The small number of patients and lack of long-term follow-up limit the strength of the conclusions. A multicenter study would be desirable.

Acknowledgements

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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