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Case Report

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Adjacent segment pathology: case study and management at Niamey national hospital

Abstract

Background: Adjacent segment (AS) pathology is a commonly observed complication after spinal arthrodesis, characterized by degeneration and/or device failure of the segments adjacent to the fusion. These pathologies can lead to severe complications, including pain, neurological deficits, and surgical reinterventions. There is no literature on such pathology in Sub-Saharan Africa. We report two cases of adjacent segment pathology cared for at Niamey National Hospital, focusing on diagnosis, treatment, and outcome.

Case description: Patient 1 – 65 years old male admitted for cauda equina syndrome, three years after lumbar decompression and osteosynthesis for a narrow lumbar canal. Imagery workup showed hardware loosening, a screw malposition and new junctional kyphosis. The surgery consisted of lengthening decompression and readjusting the osteosynthesis prolonged up to D12. The outcome was satisfactory after physiotherapeutic rehabilitation, with free-of-event follow-up. Patient 2 – 62 years old female admitted for cervical cord compression syndrome, Frankel B with polypnea, mJOA score = 5, 6 months after C4-C5 ACDF. The cervical CT scan revealed a C2-C3 listhesis with 50% cervical canal reduction, responsible for cord compression. She went on cervical traction for resuscitation and, unfortunately, could not survive to benefit from the surgery.

Conclusions: Though a rare complication, ASP should be considered, especially when the factors described in the literature are encountered. This should be part of the surgical planning to avoid further complications and ensure the long-term well-being of the patients.

Keywords: adjacent segment pathology, complication, arthrodesis, spine surgery

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Abbreviations: ACDF, anterior cervical discectomy and fusion; ASDis, adjacent segment disease; ASDeg, adjacent segment degeneration; ASP, adjacent segment pathology; CT, computerized tomography; mJOA, modified japanese orthopedic association scoring system; ODI: oswestry disability index

Introduction

Vertebral arthrodesis is a common procedure in the treatment of degenerative spinal pathologies. However, this fusion sometimes leads to complications, including adjacent segment pathology (ASP). Adjacent segment degeneration (ASDeg) includes a wide range of pathologies: listhesis, disc herniation, stenosis, hypertrophic facet arthritis, scoliosis, and vertebral compression fractures. Thes pathologies mostly have a clinical expression called adjacent segment disease (ASDis) or adjacent segment syndrome (ASD).[1,2] When associated with loosening hardware, a fracture of a screwed vertebrae and a proximal kyphosis, it bears the name proximal junction kyphosis (without clinical symptoms) or proximal junction failure (when there is clinical expression).[3] These disorders often occur after spinal stabilization and are associated with various risk factors.[4–8] This clinical entity hasn't been met yet in sub-Saharan literature. This study aims to describe the management of AS at Niamey National Hospital by analyzing two clinical cases following CARE guidelines.

Case presentation

Patient 1 (Figure 1)

Surgical history and clinical presentation: A 65-year-old patient with no significant past medical history presented in 2023 with neurogenic claudication with polyradiculalgia. The diagnosis of narrow lumbar canal was made by computed tomography (CT) and magnetic resonance imaging (MRI), and the patient underwent surgery consisting of recalibration of the lumbar spine by laminectomy from L2 to S1 with rod fixation and polyaxial L2-S1 screws (Figure 2). Post-operative evolution was straightforward, with the resumption of professional activities.

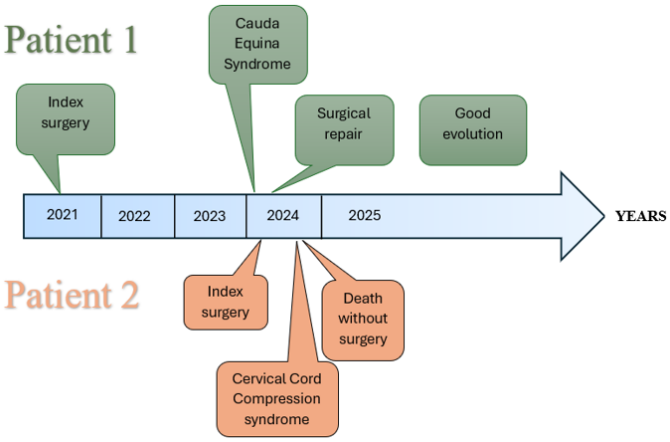

Figure 1 Timeline of historical, clinic and care information for both cases.

Three years after surgery, the patient consulted for polyradiculalgia, difficulty in the supine position, as well as para-paresis, flaccid hypotonia, saddle hypoesthesia, and urinary retention associated with erectile dysfunction making an ODI score of 74%.

Diagnosis assessment: A radiograph of the lumbar spine revealed disassembly of the proximal osteosynthesis, with migration of two screws from L2 and a L1-L2 new junctional kyphosis (Figure 3A and

3B). A CT scan of the lumbar spine revealed a right pedicle fracture of L2 with canal intrusion of the left screw (Figure 4).

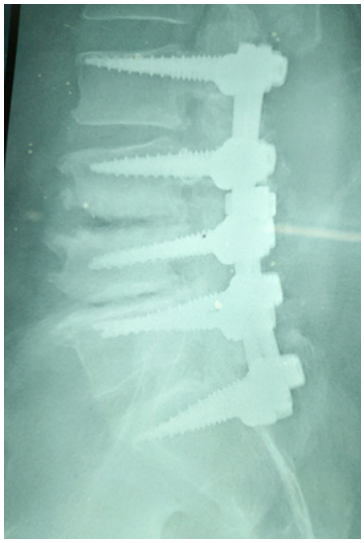

Figure 2 Postoperative radiograph of initial osteosynthesis.

Figure 3A Front X-ray showing the overlying disc disease of the proximal intra-disc screw assembly.

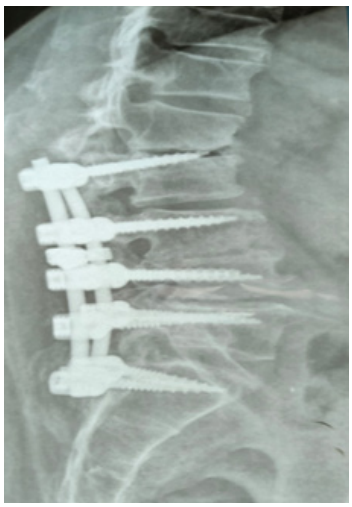

Figure 3B Lateral X-ray showing the overlying discopathy of the proximal intradiscal screw assembly.

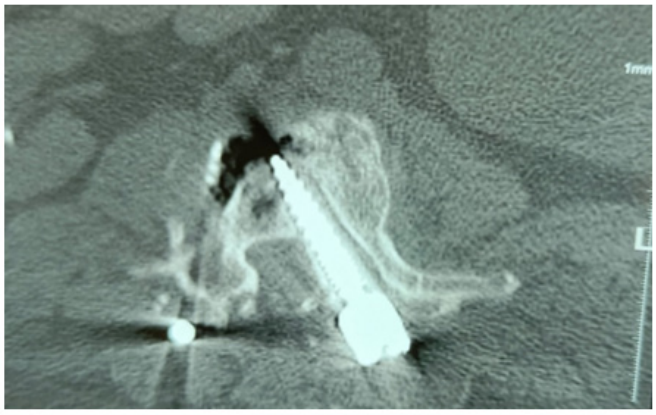

Figure 4 Axial CT scan of the L2 vertebra, showing the right pedicle fracture with intrusion of the left screw into the vertebrae canal.

Surgical management and outcome: The patient was reoperated; the procedure consisted in a prolonged laminectomy and removing the defective screws and inserting new screws and rods at L1, thus lengthening the set-up. On Day 1, the patient was sitting and began walking with assistance on Day 2. Physiotherapy rehabilitation was initiated, with satisfactory results bringing the patient to an ODI score of 19%. A follow-up lumbar X-ray showed the osteosynthesis hardware in place (Figure 5A and 5B).

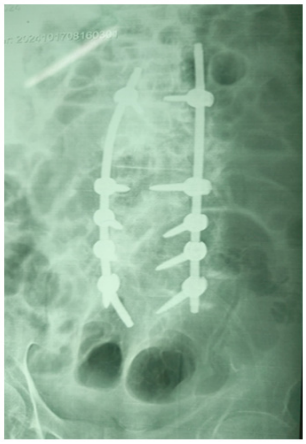

Figure 5A Front X-ray showing the new assembly beyond the disc disease.

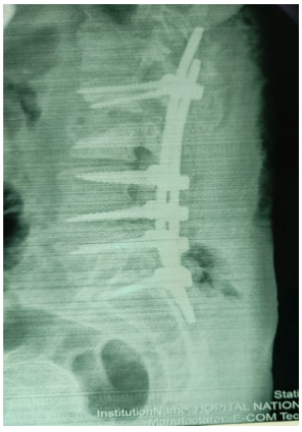

Figure 5B Lateral X-ray showing the new mounting beyond the affected disc and correction of the neo-kyphosis.

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Patient 2 (Figure 1)

Surgical history and clinical presentation: A 62-year-old female patient, whose past medical history included a herniated C4-C5 cervical disc on a degenerative cervical spine, for which she underwent a C4-C5 discectomy, plus iliac graft with C4-C5 osteosynthesis.

Six months after surgery, she presented with a worsening of her neurological condition.

Admission examination revealed Frankel B tetraplegia with neurovegetative signs such as tachypnea, a mJOA score of 5.

Diagnosis assessment: A CT scan of the cervical spine revealed a C2-C3 listhesis of around 50%, responsible for spinal cord compression.

Emergency treatment and outcome: The patient was admitted to ICU for cranial tongs traction for stabilization. Unfortunately, she died the following day due to neurovegetative disorders.

Discussions and conclusion

Adjacent segment pathology (ASP) is a frequent complication after spinal arthrodesis. Radiological evidence of adjacent segment degeneration is common, but association with clinical symptoms (adjacent segment disease) are less frequent.[1] According to a review of the literature by Park et al.,[9] radiological adjacent segment degeneration after lumbar arthrodesis varies from 5% to 100%, while clinical symptoms occur in 5% to 18% of cases. In our context, the absence of clinical symptoms in many patients and the lack of regular follow-up contribute to the late management of ASP.

Studies have shown that adjacent segment pathology increases with time, reaching 36.1% of patients 10 years after lumbar arthrodesis.[10] Some risk factors have been described by Nakajima et al. and Tae-Yup Kim et al.[3,5] as influencing the early onset of ASP in lumbar spine surgery. In our two cases, the onset of the complication was relatively fast, with a timeframe of three years for the first patient and six months for the second patient. The intensity of the symptoms might explain why our patients consulted early. There was not a substantial study of pre op imageries to identify some of the risk factors described in the literature.

The risk of adjacent segment pathology is particularly high in patients with degenerative spondylolisthesis.[4] In addition, factors such as pre-existing horizontalization of the lamina and facet tropism appear to influence the onset of AS.[8] Other factors, such as a high number of instrumented vertebrae and preoperative sagittal imbalance, have also been implicated in the pathogenesis of AS.[4,7,11]

Adjacent segment pathology remains a worrying long-term complication after spinal fusion. Although it can be managed with conservative therapies, appropriate surgical management may be necessary in some cases, especially proximal junctional kyphosis/failure. Prevention requires analysis of pre op imageries, careful selection of surgical techniques and effective post-operative rehabilitation. Long-term monitoring of patients is crucial to detect early degradation of adjacent segments and to avoid repeated surgeries. An extended study in our settlement is needed to appreciate the incidence and look after risks factors as far as spine surgery is common.

Declarations

Ethics approval: Ethics approval was provided by the Niamey National Hospital Board.

Clinical trial number: Not applicable

Consent for publication: The first patient and the carer of the second patient gave each a written informed consent for publication of their clinical details along with any identifying images for this study.

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: There is no competing interest in this manuscript

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Authors' contributions: CHS: design of the work, acquisition and interpretation of data, bibliography review, drafting of the manuscript. SNBA: bibliography review, drafting of the manuscript, HML: revision of the manuscript. AII: revision of the manuscript. MSAZ: revision of the manuscript. IHNR: revision of the manuscript. AH: revision of the manuscript. HN: revision of the manuscript. AK: revision of the manuscript, supervision of the work. All the authors read and approved the final manuscript.

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References

1. Hilibrand AS, Robbins M. Adjacent segment degeneration and adjacent segment disease: the consequences of spinal fusion? *The Spine Journal.* 2004;4:S190–S194.
2. Moreau PE, Ferrero E, Riouallon G, et al. Radiologic adjacent segment degeneration 2 years after lumbar fusion for degenerative spondylolisthesis. *Orthop Traumatol Surg Res.* 2016;102(6):558–562.
3. Kim TY, Park T, Shin JW, et al. Adjacent segment pathology in spinal fusion surgery. *Journal of Korean Society of Spine Surgery*. 2023;30(2):83–90.
4. Lee CS, Hwang CJ, Lee S-W, et al. Risk factors for adjacent segment disease after lumbar fusion. *Eur Spine J*. 2009;18(11):1637–1643.
5. Nakajima H, Watanabe S, Honjoh K, et al. Risk factors for early-onset adjacent segment degeneration after one-segment posterior lumbar interbody fusion. *Sci Rep.* 2024;14(1):9145.
6. Chung JY, Park JB, Seo HY, et al. Adjacent segment pathology after anterior cervical fusion. *Asian Spine J.* 2016;10:582–592.
7. Zhang Y, Shao Y, Liu H, et al. Association between sagittal balance and adjacent segment degeneration in anterior cervical surgery: a systematic review and meta-analysis. *BMC Musculoskelet Disord*. 2019;20(1):430.
8. Okuda S, Oda T, Miyauchi A, et al. Lamina horizontalization and facet tropism as the risk factors for adjacent segment degeneration after PLIF. *Spine (Phila Pa 1976).* 2008;33(25):2754–2758.
9. Park P, Garton HJ, Gala VC, et al. Adjacent segment disease after lumbar or lumbosacral fusion: review of the literature. *Spine.* 2004;29(17):1938.
10. Ghiselli G, Wang JC, Bhatia NN, et al. Adjacent segment degeneration in the lumbar spine. *J Bone Joint Surg Am*. 2004;86:1497–1503.
11. Etchart P. Rôle de l'équilibre sagittal dans la survenue du syndrome du segment adjacent après arthrodèse rachidienne. 2017;66.