

Adjacent Level Spondylodiscitis after Corpectomy and Anterior Cervical Fusion: A Case Report

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Abstract

Spondylodiscitis after Anterior Cervical Decompression and Fusion (ACDF) is a rare etiology, accounting for only 1 to 7% of all skeletal infections, with an incidence of 1: 250,000 to 1: 400,000 people.¹¹ Staphylococcus aureus is the main causative organism, accounting for 53-78% of all spondylodiscitis.¹¹ Spondylodiscitis after ACDF diagnosis tends to be delayed due to its rarity and lack of knowledge, which can lead to a poor clinical outcome.

Case Report: 55-year-old male with listhesis and cord compression that required c5-c7 spinal fusion surgery. Seven years later, he presented progressive cervicgia with radicular pain and hypotrophy in both hands. Because multisegmental discopathy with 80% and 50% spinal cord, respectively, he needed reopening, removal of previous implants, C6 corpectomy, neural decompression and C5 to C7 spinal fusion. 14 days later, he reported a sensation of increased volume, pain and leakage of yellow fluid through the surgical scar. A contrast cervical MRI study was performed with findings of spondylodiscitis and spinal cord compression, especially at the C4-C5 level. Immediate antibiotic treatment with meropenem was started and after 5 days without clinical improvement and renal failure data, posterior cervical spinal surgery was proposed for cervical spinal neural decompression through a 3-level laminectomy.

Discussion: When the patient presents compression of the spinal cord and / or nerve roots with neurological findings of radiculopathy and / or myelopathy, surgical exploration and decompression of the spinal cord and / or nerve roots should be performed as soon as possible.

Conclusion: Spondylodiscitis after ACDF requires high diagnostic suspicion for early surgical medical intervention and favorable neurological results.

Keywords: Spondylodiscitis; Cervical Corpectomy; Spine Infection; Cervical Fusion

Abbreviations

ACDF: Anterior Cervical Decompression and Fusion; MRI: Magnetic Resonance Image; ESR: Erythrocyte Sedimentation Rate; CRP: C-Reactive Protein

Introduction

Spondylodiscitis after Anterior Cervical Decompression and Fusion (ACDF) is a rare etiology, accounting for only 1 to 7% of all skeletal infections, with an incidence of 1: 250,000 to 1: 400,000 people [11]. Staphylococcus aureus is the main causative organism, accounting

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for 53 - 78% of all spondylodiscitis [11]. Due to the rich blood supply and the use of preoperative antibiotic prophylaxis, cervical spondylodiscitis that occurs at levels adjacent to those of the initial operation it's quite a rare find with a prevalence ranging from 0 to 1.1% [8,6]. Unlike the cases of lumbar (48 - 60%) and thoracic (26 - 35%) spondylodiscitis in which treatment with neural decompression surgery, evacuation of the disc space and spinal fusion is well known, but in spondylodiscitis after ACDF there are few reports on typical clinical manifestations as well as many inconsistencies in their treatment [2,7].

Spondylodiscitis after ACDF diagnosis tends to be delayed due to its rarity and lack of knowledge, which can lead to a poor clinical outcome [6]. Patients are generally treated with surgery and antibiotics, particularly in cases that demonstrate progressive neurological deficit [11]. The possibility of getting spondylodiscitis after ACDF should be considered in patients with alterations in the nature of their postsurgical recovery. Due to the unusual clinical presentations, it can be challenging to diagnose and treat it where a high index of suspicion and an appropriate therapeutic approach is required for a successful outcome [6].

Case Report

55-year-old male with a history of chronic neck pain, type 2 diabetes mellitus, systemic arterial hypertension, hypothyroidism, and a car accident in 2013 that caused cervical listhesis and cord compression that required C5-C7 spinal fusion surgery without neurological sequelae reported. Seven years later, he presented progressive cervicalgia with radicular pain and hypotrophy in both hands. The cervical spine magnetic resonance image (MRI) study shows caudal C5-C6 disc extrusion with ventral molding of the spinal cord and bilateral root contact and hypertrophy of the yellow ligaments, which determines 80% of spinal stenosis and intramedullary hyperintensity. Electromyography of the thoracic limbs was abnormal, compatible with acute left C7 chronic radiculopathy. In cervical spine x-rays we observed rectification of cervical lordosis, there is no listhesis or scoliosis, the anterior cervical plate from the previous surgery was lateralized to the left, as well as osteophytes projected towards the spinal canal at C5-C6 (Figure 1). Surgery was proposed for C5-C6 and C6-C7 multisegmental discopathy with 80% and 50% spinal cord, respectively, subsequently, it was performed the reopening, removal of previous implants, C6 corpectomy, neural decompression and C5 to C7 spinal fusion were performed (Figure 2).



Figure 1: A) A-P X-rays of cervical spine, before surgery the cervical plate is lateralized to the left side
 B) MRI sagittal T2 view, observe intraspinal cervical diameter is reduced by posterior osteofitic complex in C4-C6, hyperintense changes of myelopathy are observed in cervical spinal cord specially C4-C6. C) MRI axial T2 view, observe intraspinal cervical diameter is reduced by posterior osteofitic complex.

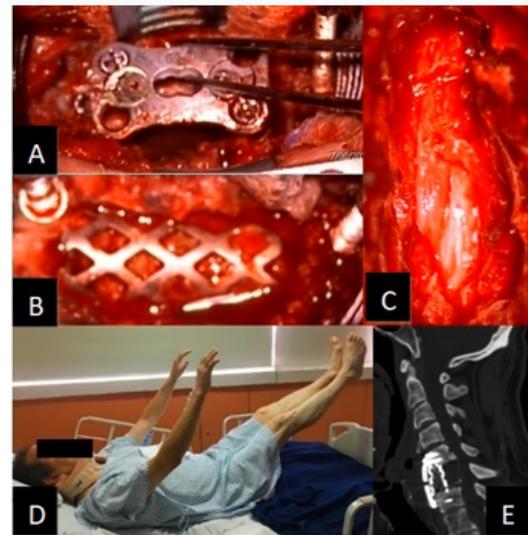


Figure 2: A) anterior cervical plate was retired and performed anterior C6 corpectomy with titanium mash cage and cervical plate was fixed to C5 and C7 (B an E) C)Anterior viewof cervical corpectomy , we observed dural pulse during surgery, haemostatic control. D) Postoperative evaluation of patient reveals no postquirurgical déficit, move 4 extremity.

The trans-surgical findings demonstrate abundant fibrosis tissue in the skin and pre-vertebral fascia, anterior cervical plate level C5-C6, the right lateral border at the midpoint of C5 and C6 vertebral bodies, as well as swept and worn C5 and C6 right lateral screws, C5-C6 neural compression and C6-C7 due to disc osteophyte complex and highly vascularized epidural fibrous tissue. Also, the patient presented trans-surgical bleeding of 300 ml and surgical time of 7 hours and 16 minutes. He completed antibiotic prophylaxis treatment with ceftriaxone but 14 days later, he reported a sensation of inflammation, pain and leakage of yellow fluid through the surgical scar. On physical examination, there was no neurological deficit, just a right anterior scar with punctate dehiscence in its lower third (figure 3). Admission for intravenous antibiotic therapy was proposed, but the patient refused to be hospitalized. 3 months after, he reported loss of strength in his legs that exacerbated to quadriplegia. A contrast cervical MRI study was performed with findings of spondylodiscitis and spinal cord compression, especially at the C4-C5 level (Figure 3). Immediate antibiotic treatment with meropenem was started and after 5 days without clinical improvement and renal failure data, posterior cervical spinal surgery was proposed for cervical spinal neural decompression through a 3-level laminectomy. A pulsatile dural sac was observed after laminectomy, without cerebrospinal fluid fistula and followed by surgical washing were observed (Figure 4). During the immediate postoperative period, the patient had total motor recovery.

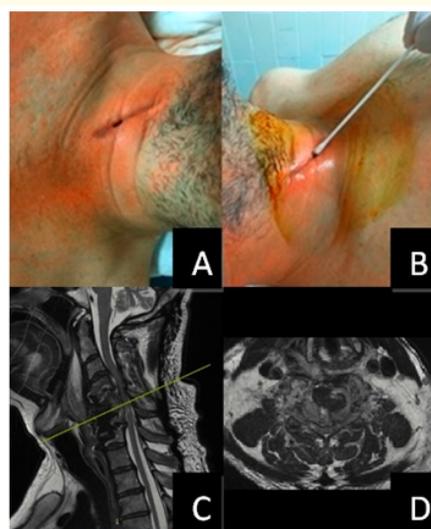


Figure 3: A) Following consult of the pacient reveals heat, blush and pain in wound. B) Cotton Swap sample was obtained with non- purulent fluid C and D) T2 sagital and axial secunce respectively, noted intraspinal canal is reduced by posterior components, inflamatory reaction specially C5-C6 (site with titanium mesh). We Observe hiperintensity in levels C5-C6.

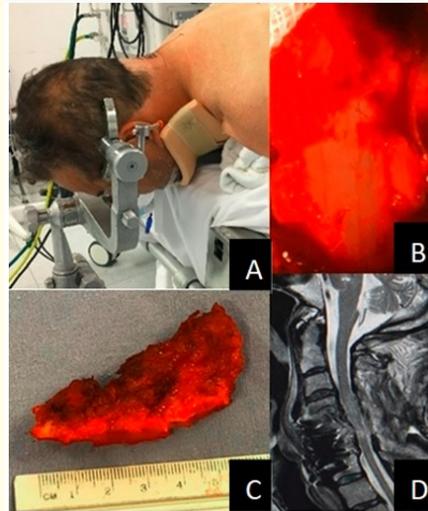


Figure 4: A) Patient positioning with Mayfield clamp, ventral position, no flex of cervical spine. B) Dural pulse view posterior of laminectomy. C) Photograph of cervical spine lamina and base spinous process. D) Postoperative MRI T2 sagittal view, mielopathic changes in C4-C6, hyperintensity of cervical spine levels due to corpectomy, increase of cervical spine canal in C3-C6.

Discussion

In the medical literature, the protocols regarding the duration of prophylactic antibiotics to be administered in spinal fusion surgeries are not very clear. There are recommended protocols range from no antibiotics for anterior spinal surgery until 3 days of antibiotics for all spinal surgeries. Kulkarni, *et al* [6]. recommend in spinal fusion surgery the use of antibiotic prophylaxis with a preoperative dose followed by a 2-day course of intravenous cefazolin [6].

As mentioned before, the incidence of cervical spondylodiscitis is a rare disease, within the possibilities of infection there is the possibility of hematogenous spread of infectious agents, or contamination through the contaminated Caspar pins, including the drill to create holes for the screws used in the anterior cervical instrumentation [6]. The diagnostic protocol consists of clinical, laboratory and image tests. The most significant findings are the presence of leukocytosis, (sensitivity 27.2%). Considered of greater diagnostic value, although paradoxically with less diagnostic specificity, are erythrocyte sedimentation rate (ESR) and C-Reactive Protein (CRP) [2].

MRI with gadolinium administration can show hypointense T1 and hyperintense T2 images with homogeneous reinforcement of the lesions.² This is considered to be the most sensitive technique for the diagnosis of spondylodiscitis in the acute phase, while it is comparable to computed tomography in the chronic phase of the disease [1]. Contrast and simple T1-weighted MRI images are suggested in the follow-up for spondylodiscitis [3].

Recommendations for the treatment of spondylodiscitis after ACDF remain controversial. Some authors recommend conservative treatment with immobilization and antibiotics in cases with minor bone destruction, with the aim of spontaneous fusion of the vertebral bodies or at least achieving fibrous rigidity [4]. Another treatment option is the minimally invasive abscess reduction with local installation of antibiotics and subsequent immobilization using a brace or external fixator. Radical surgery with debridement, autologous bone graft and rigid stabilization with the possibility of correcting deformities is now more frequent [4].

Surgical intervention is performed when there is compression of neural elements, spinal instability due to extensive bone destruction, severe kyphosis, or failure of conservative treatment [8]. In the special case of hemodynamically unstable patients with signs of sepsis, septic shock, and severe or progressive neurological disorders, immediate administration of broad-spectrum antimicrobial drugs is recommended. In addition, in the case of radiological and asymptomatic spinal abscess, immediate open or percutaneous surgery is recommended for drainage and debridement with or without spinal stabilization² in our clinical case we performed a 3-level laminectomy after anterior cervical fusion. When the patient presents compression of the spinal cord and / or nerve roots with neurological findings of radiculopathy and / or myelopathy, surgical exploration and decompression of the spinal cord and / or nerve roots should be performed as soon as possible [9].

The main goals and advantages of surgery include debridement of infected tissue, correction of any deformities in the spine, re-stabilization of the spine, decompression of the spinal cord, identification of the causative organism, and provision of specific antibiotic therapy [11]. The selection of an optimal surgical procedure in spondylodiscitis after ACDF depends on the primary location of the infectious lesions. In typical anterior spondylodiscitis, anterior debridement and suction drainage are preferred [10]. In the advanced stages of the disease, intravenous antibiotic treatment is mandatory first followed by oral antibiotics for 2 to 4 and 6 to 12 weeks of follow-up. Treatment of spinal infections is a complex process that requires good multidisciplinary cooperation [5]. Various mechanisms to avoid post-surgical vertebral body infection should be considered. There are some novelty considerations to avoid infection along with proven techniques and specific procedures for wound closure and elimination of dead spaces [4].

Conclusion

Cervical spondylodiscitis is a very rare infectious process in sites adjacent to surgery. Its probable multifactorial etiology requires high diagnostic suspicion in order to get early surgical medical intervention and favorable neurological results.

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