Eur Spine J
DOI 10.1007/s00586-014-3372-1

CASE REPORT

Spontaneous atlantoaxial pyogenic arthritis surgically managed

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Received: 28 July 2013 / Revised: 4 May 2014 / Accepted: 4 May 2014

Abstract
Purpose Septic cervical facet joints arthritis is a rare pathology, usually revealed by fever and neck pain. As symptoms may be indolent, a high index of suspicion needs to be maintained. Magnetic resonance imaging (MRI) is effective for early diagnostic, looking for local spread and guiding potential preoperative planning. We present a case exhibiting an uncommon pathology with possible significant morbidity if misdiagnosed.
Methods A 75-year-old woman presented with fever, neck stiffness and torticollis accompanied with altered level of consciousness.
Results The diagnosis was established by computed tomography and MRI, identifying atlantoaxial facet joint destruction with para spinal muscles and epidural abscesses. A surgical treatment consisting in posterior decompression of the spinal canal and atlantoaxial pars articularis fixation known as Harms technique, associated with a targeted antibiotic therapy, succeeded in obtaining favorable clinical course.
Conclusion Atlantoaxial septic arthritis is an under reported and severe infection. Early use of MRI should avoid delayed diagnosis and would guide the practitioner in choosing an appropriate therapy. Early surgical treatment for uncontrolled sepsis is also a critical element of the prognosis.

Keywords Atlantoaxial · Septic arthritis · Harms fixation

Introduction

Septic arthritis of the cervical facet joints is a rare clinical entity; only three cases of atlantoaxial arthritis have been reported to date in the English literature [1, 2, 4].

The diagnosis can easily be missed, clinical behavior being not specific. Early use of computed tomography (CT) and magnetic resonance imaging (MRI) would be helpful to avoid delayed diagnosis and related local/systemic spread of the infection. As concerns complications, sepsis with potential multiple organ dysfunction and epidural abscess formation with subsequent spinal cord impairment may compromise the prognosis.

We reported the case of a 75-year-old woman affected with a pyogenic C1–C2 arthritis managed with surgical decompression, drainage and fixation.

Case report

History and examination

A 75-year-old Caucasian woman was admitted to our hospital with a 3-week history of inflammatory neck pain and stiffness. She presented at the Emergency Department with fever (39.7 °C) and chills, cervicalgia, exquisite left-sided tenderness and altered level of consciousness. Neurological examination was normal.

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Published online: 18 May 2014

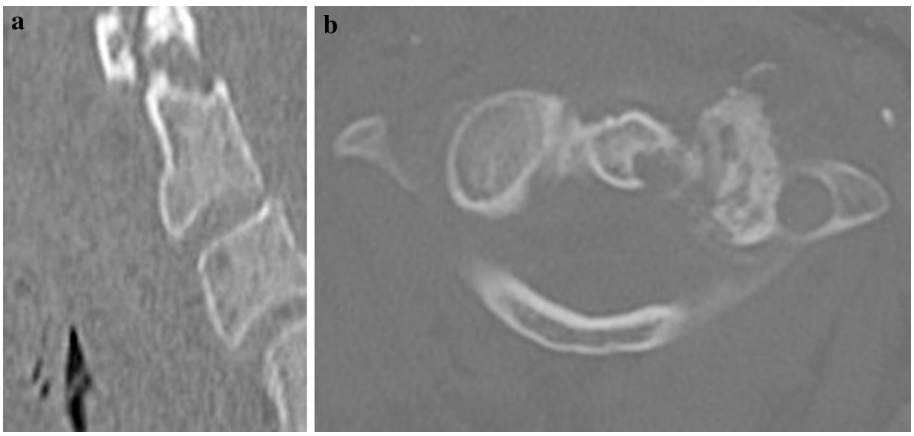

Fig. 1 Cervical spine CT: erosion of odontoid process and left articular mass

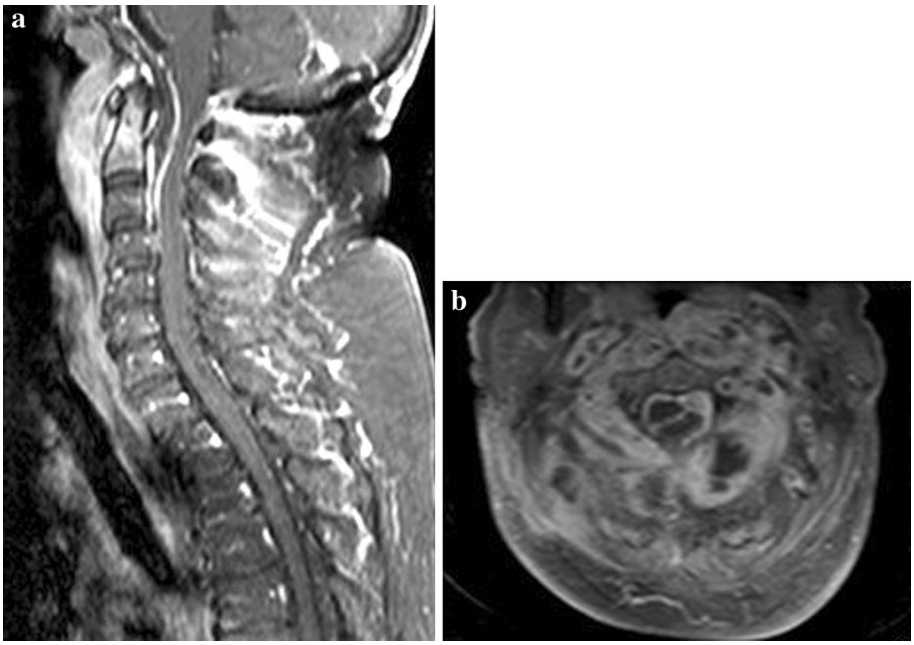

Fig. 2 MRI: soft tissue abscess and anterior epidural collection

She had received from her rheumatologist a single corticosteroid infiltration 7 months ago to relieve pain related to degenerative cervical osteoarthritis. The usual described infectious risk factors were not found in her medical history. We noticed an allergy to penicillin, asthma, knee and hip prosthesis.

Initial plain radiographs were not of a great diagnostic value. Laboratory tests showed elevated leukocyte count of 19 (normal <10 Giga/L), C-reactive protein and procalcitonin, respectively, of 498 (normal <5 mg/L) and 0.2 (normal <0.1 µg/L). Blood cultures revealed *Staphylococcus aureus* bacteremia, motivating the initiation of intravenous Vancomycin therapy owing to the allergy to penicillin.

Cervical spine contrast-enhanced CT detected atlanto-axial arthritis with massive destruction of the left articular mass, and erosions of the odontoid process (Fig. 1a, b). MRI revealed prevertebral, left erector spinae muscles abscesses and anterior epidural collection displacing the spinal cord to the back without abnormal intramedullary signal (Fig. 2a, b). A body CT was performed and did not demonstrate other infectious sites.

Considering persistent fever and intensive pain despite antibiotic and analgesic therapy and severe local complications, a combined medical/surgical management was decided.

Operation procedure

The surgical procedure was performed under general anesthesia. An occipito-cervical incision was made on the patient positioned in prone position, and the head fixed on a Mayfield head holder. The soft tissue abscess was drained off and the joint cleaned. We did C1–C2 laminectomy to the pars articularis on left side.

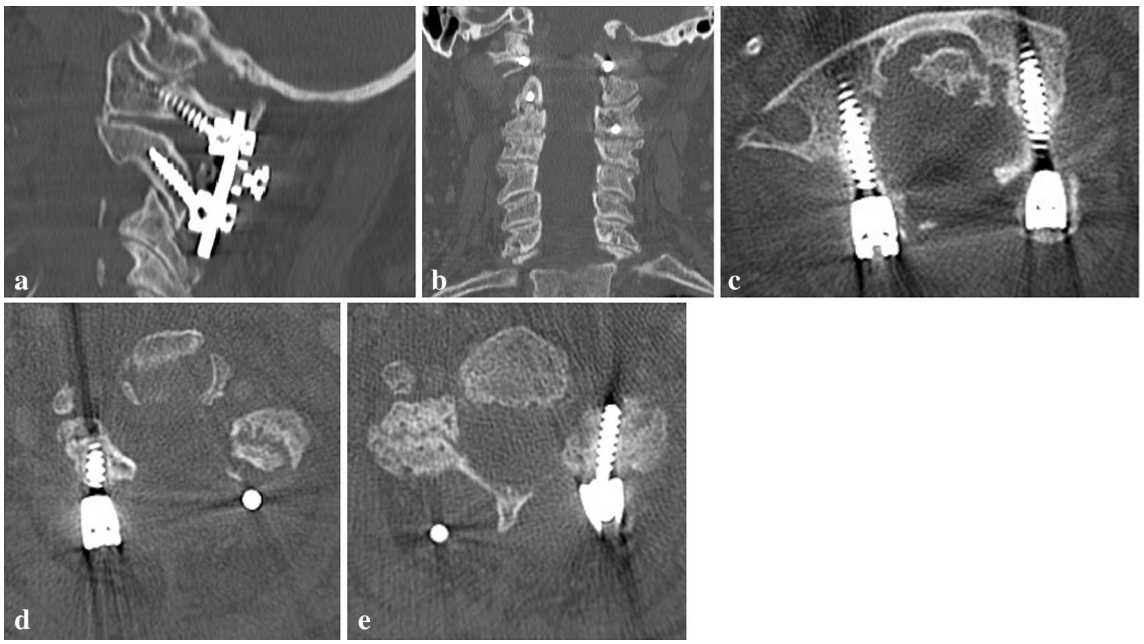

Fig. 3 Immediate post operative CT

All the screws were inserted under lateral C arm control, according to Harms technique: two screws in the articular masses of C1 (length = 30 mm), one in the right pars articularis of C2 (length = 16 mm) and the last one in the left mass of C3 (length = 14 mm) because of the articular destruction on this side. Fixation was achieved with a crosslink.

The analysis of the evacuated paravertebral abscess confirmed a germ methicillin susceptible, so that initial antibiotic therapy was replaced by Linezolide (Zyvoxid*).

Post operative course

Thereafter, sepsis resolved with decrease in the inflammatory markers and recovery of a normal level of consciousness. The post operative clinical course was uneventful. The patient did not present any neurologic impairment and the wound was clean.

The control CT confirmed the quality of the decompression and atlantoaxial stabilization. All the screws were positioned correctly (Fig. 3a–e).

The patient was discharged to a rehabilitation center 9 days after the surgery.

At the 2-month follow-up visit, she was able to walk without any support. Pain had disappeared and physical examination was unchanged. Inflammatory markers were negative and the wound healed well.

One-year later, her neck remained unpainfull. She did not need any medication.

Discussion

Pyogenic spine infection more often involves lumbar and thoracic vertebras; cervical spine infection and especially atlantoaxial arthritis are less common conditions, with sometimes unclear clinical picture.

MRI is a reliable tool to confirm the diagnostic at an early stage, changes being noticed from the first week of infection whereas more time may be needed with CT (at least 2 weeks). Within 48 h, it usually shows joint effusion, enhancement of facet joints and soft tissue inflammation. Local spread can be assessed precisely: it detects epidural abscess, paravertebral spinal muscles abscess or pyomyositis and spondylitis [5, 6].

Staphylococcus aureus represent the main causative agent for facet joints arthritis in the adult population.

Infective organisms can be carried to the spine by many routes: in almost cases via the blood supply, and for the others by direct inoculation (as corticosteroid injection) or by extension from an adjacent infectious nidus.

Several risk factors are described for pyogenic spine infection: intravenous drug abuse and AIDS, diabetes, end stage renal disease, long-term steroid therapy and other immunocompromised states.

In this case, the one and only predisposing factor was the patient's age. Even she had received a corticosteroid injection 7 months ago which could have been incriminated, it is likely to be a spontaneous pyogenic bacteriemia with inoculation of the spine as a previous cervical spine MRI did not reveal any abnormalities.

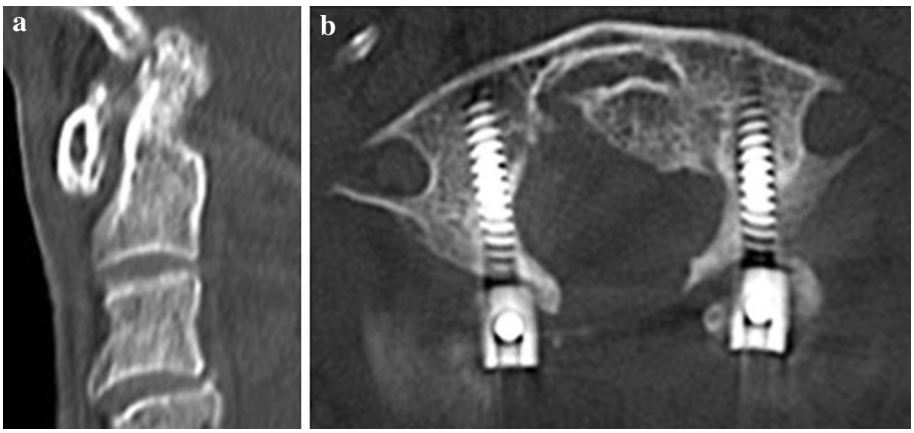

Fig. 4 CT: good fusion 5 months after surgery

The patient presented with a severe septic syndrome, altered consciousness with unfavorable course, local complications on imaging (paravertebral and epidural abscesses with spinal cord compression) despite antibiotic therapy and spinal instability related to massive destruction of left articular mass.

Indeed, a surgical treatment was decided first to decompress spinal cord and to provide bacteriologic information by debridement of the epidural collection and then to stabilize the atlantoaxial complex by posterior instrumental fusion. We preferred a posterior approach to a transoral decompression because there was continuity between the anterior epidural abscess and the soft tissue one. Fixation of C1C2 pars articularis known as Harms procedure stead to be a lighter procedure than occipito-cervical fixation. It allows effective posterior decompression of the spinal canal and provides stable fixation without any implant on the spinal canal [7].

The patient was successfully treated with rapid improvement of neck pain and avoidance of any neurological impairment. The infectious course was favorable too. A good consolidation with bone fusion was seen on the CT performed 5 months after surgery (Fig. 4a, b).

The conservative management based on external immobilization by halo fixation together with long-term appropriate antibiotics administration (6–8 weeks) should be reserved for controlled sepsis without any neurologic impairment related to spinal epidural abscess [2–4]. In this case, the infectious agent should be identified from blood cultures or from computed tomography-guided joint aspiration [4].

Conclusion

This clinical case emphasize to that spinal facet joint arthritis is a severe infection with possible significant morbidity if not treated precociously. Early use of MRI should avoid delayed diagnosis and permit to choose an appropriate management (medical or combined treatment regarding to the existence of an abscess or not) and to obtain favorable outcomes. Early surgical treatment for uncontrolled sepsis is also a critical element of the prognosis.

Conflict of interest None of the authors has any potential conflict of interest.

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