

CASE REPORT

Atlanto-odontoid pyogenic arthritis revealing a Jugular Vein Thrombosis

Maroua Slouma  | Abir Dghaies  | Rim Dhahri  | Sirine Bouzid |
Riadh Battikh | Imen Gharsallah | Leila Metoui | Bassem Louzir

Department of Internal Medicine,
Military Hospital, Tunis El Manar
University – Tunisia, Tunis, Tunisia

Correspondence

Maroua Slouma, Department of
Internal Medicine, Military Hospital,
Tunis 1007, Tunisia.
Email: maroua.slouma@gmail.com

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Abstract

Pyogenic arthritis of the atlantoaxial joint is scarce. It can lead to several complications, such as spinal cord compression and cerebral vein thrombosis. A 51-year-old man presented with a twenty-day history of inflammatory neck pain. Physical examination revealed paravertebral muscle contracture, restricted neck movement, and fever. Spine magnetic resonance imaging (MRI) showed synovitis of atlanto-odontoid joint, anterior epidural collection, and cerebral vein thrombosis. Transthoracic echocardiography was unremarkable. The patient was successfully treated with anti-staphylococcal antibiotic treatment for 12 weeks associated with immobilization of the cervical spine. MRI performed one month after the initiation of the treatment showed disappearance of the epidural collection. The diagnosis of septic arthritis of the atlantoaxial joint should be considered in a patient with inflammatory neck pain. MRI findings are relevant in making the diagnosis of a septic atlanto-odontoid joint. Conservative treatment, including antibiotic and neck immobilization, can be sufficient for the treatment of pyogenic arthritis of the atlantoaxial joint. Cerebral vein thrombosis is a rare complication due to septic arthritis of the atlantoaxial joint.

KEYWORDS

atlantoaxial joint, jugular vein thrombosis, septic arthritis

1 | INTRODUCTION

Septic arthritis of the atlantoaxial joint is a rare cause of neck pain¹ with a deceitful clinical presentation that may lead to a late diagnosis.² Septic arthritis of cervical joints, especially the first one, is more serious than infection at other levels because of the proximity to the brainstem. It can be responsible for serious complications, such as spinal cord compression and cerebral vein thrombosis. Magnetic resonance imaging is necessary for an early diagnosis.

We report a case of septic arthritis of the atlantoaxial joint associated with epidural abscess and cerebral vein thrombosis in a patient with no medical history.

2 | CASE PRESENTATION

A 51-year-old man with no significant medical history presented with a twenty-day history of inflammatory neck pain. Physical examination revealed a paravertebral muscle contracture and restricted neck movement. His

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body temperature was 38.7°C. Cardiac and neurological examinations were unremarkable. Laboratory examinations showed a white blood cell count of 13,700/mm³, elevated erythrocyte sedimentation rate, and C-reactive protein level of 80 mm/h, and 185 mg/L, respectively. Urine analysis, blood cultures, and tuberculosis skin test were negative.

Spine magnetic resonance imaging (MRI) showed synovitis of atlanto-odontoid joint and anterior epidural collections (Figure 1). There was thrombosis of the right sigmoid sinus and the internal jugular venous (Figure 2). Transthoracic echocardiography was unremarkable. Computed tomography-guided percutaneous drainage of the epidural collection was unsuccessful.

The diagnosis of arthritis of the atlantoaxial joint was made based on clinical presentation, increased inflammatory biomarkers, and the existence of epidural collection in the MRI.

Given the acute clinical presentation, the existence of hyperleukocytosis with high inflammatory biomarkers, and the importance of anterior epidural collections, a probabilistic anti-staphylococcal antibiotic treatment was started.

A parenteral antibiotic therapy, including cefotaxime 300 mg per kg daily (mg/kg/d) associated with fosfomycin 200 mg/kg/d, was conducted for two weeks.

Then, he underwent an oral antibiotic therapy, including cotrimoxazole 800/160 mg three times daily associated with rifampicin 20 mg/kg/d for ten weeks. Vitamin K antagonist was prescribed for six months. He also had immobilization of the cervical spine.

MRI performed one month after the beginning of treatment showed the disappearance of the epidural collection (Figure 3). Inflammatory markers have decreased and remained within normal limits.

3 | DISCUSSION

The atlantoaxial joint encompasses three synovial joints: the median joint (atlanto-odontoid joint) and two lateral joints (facet joints).

Atlantoaxial septic arthritis is scarce. To our knowledge, only nine cases of atlanto-axial pyogenic arthritis, summarized in Table 1,^{1–9} have been reported in the literature. Among them, pyogenic arthritis of atlanto-odontoid joint was reported in only one case,⁹ it was associated with facet joints arthritis in three other cases.^{2,7,8}

Clinical presentation may include neck pain, fever, paravertebral muscle contracture, and restricted neck movement. Inflammatory biomarkers are often increased.

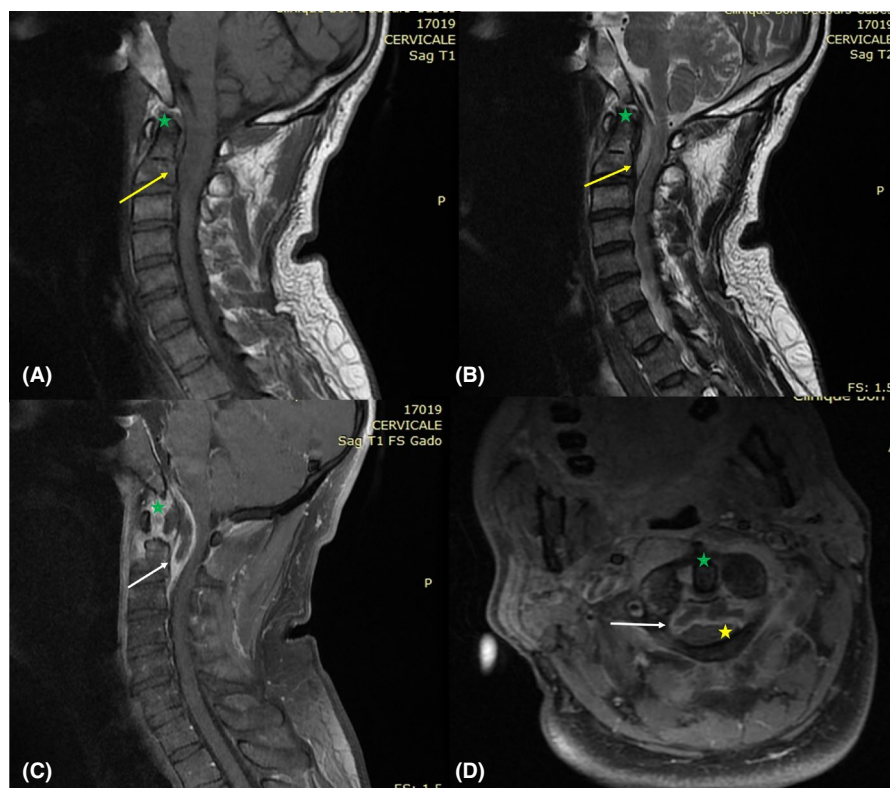


FIGURE 1 Spine MRI showing synovitis of atlanto-odontoid joint (yellow arrow) with hypointensity on sagittal T1-weighted image (A) and hypointensity on sagittal T2-weighted image (B). There was anterior epidural collections at C1–C2 level (white arrow) on sagittal T1-weighted image after the intravenous injection of gadolinium (C) surrounding the odontoid (green asterisk) and narrowing the foramen magnum and upper cervical spinal canal (yellow asterisk) in the axial section (D)

FIGURE 2 Axial cerebral MRI showing thrombosis of the right sigmoid sinus (a) and the internal jugular venous (b) in T1-weighted image after the intravenous injection of gadolinium

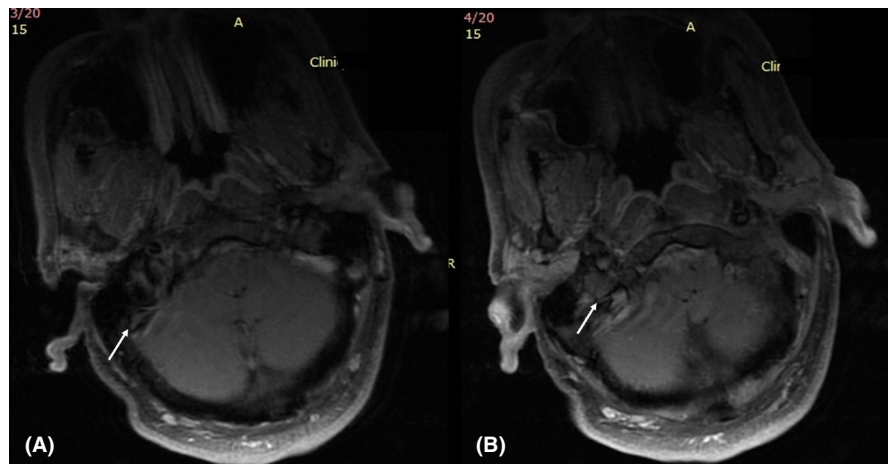
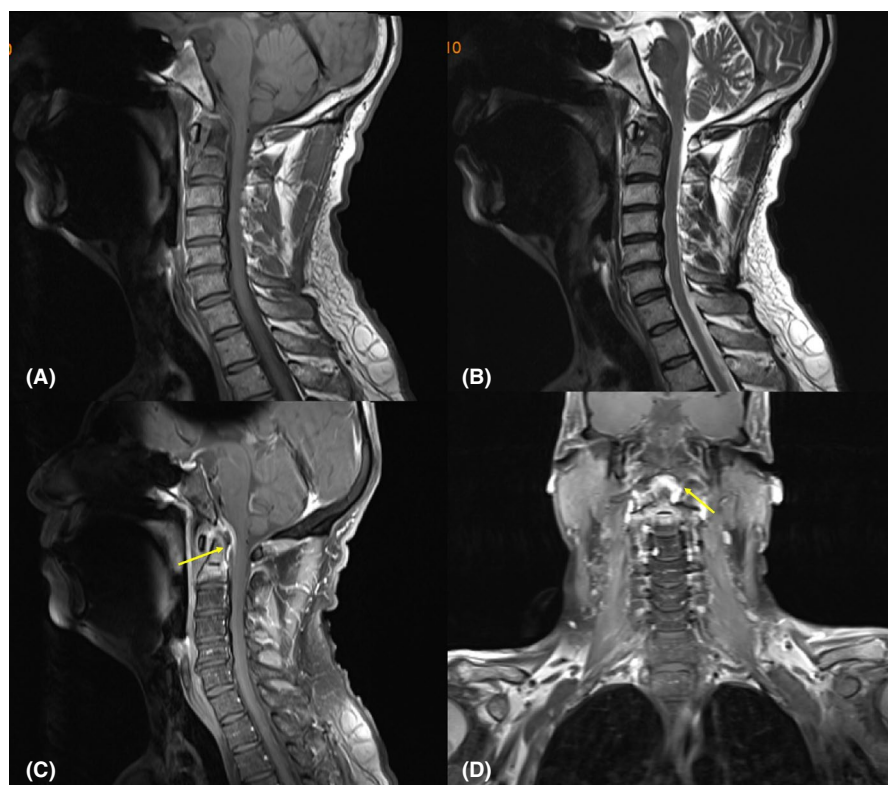


FIGURE 3 Spine MRI performed after one month of treatment showing total regression of the anterior epidural collection at C1–C2 level with persistent synovitis of the atlanto-odontoid joint. in sagittal T1 (A), sagittal T2-weighted (B) images, sagittal (C) and coronal T1FS-weighted image after the intravenous injection of gadolinium (D)



Nevertheless, they were within the normal limit in a patient with septic arthritis of the facet joint.¹

MRI allows an early diagnosis of synovitis of atlantoaxial joint. In this stage, different diagnoses may be discussed, such as cervical spine crystal deposition, rheumatic inflammatory diseases especially rheumatoid arthritis, and infectious atlanto-odontoid arthritis. At a late stage, MRI can show epidural collection, abscess, and spinal compression. In our case, the presence of epidural collection led to the diagnosis of a septic atlanto-odontoid joint.

The identification of the bacterial agent is sometimes difficult. *Staphylococcus aureus* is the most causative agent in septic cervical arthritis.¹

Although the presence of epidural collection in our case, the conservative treatment led to clinical and imaging improvement as shown in Table 1, a conservative treatment was prescribed in 4 cases.^{2,5,6,9} Percutaneous drainage of abscess may be necessary. Surgical treatment can be indicated in cases of refractory infection to antibiotic treatment or neurological complications.⁵

Septic arthritis of atlantoaxial joint can be responsible for serious complications, such as neurological compression and cerebral thrombosis.⁶ In our case, internal venous thrombosis was due to neck abscess. Signs and symptoms of internal venous thrombosis can associate

TABLE 1 Literature review: characteristics of patients with atlantoaxial septic arthritis.

Authors (year)	Location in atlantoaxial joint	Sex (Age(years))	Signs and symptoms
Kuyumcu et al. ¹	C1–C2 lateral facet joint	M (56)	Right-sided neck pain.
Northrup et al. ²	Atlanto-odontoid and lateral facet joint	M (45)	Neck pain, stiffness, headache, hoarse voice, trismus, and odynophagia
Halla et al. ³	C1–C2 lateral facet joint	M (76)	Neck pain, stiffness, torticollis, a mass on the right side of the neck
Compes et al. ⁴	C1–C2 lateral facet joint	F (75)	Neck pain, stiffness, fever, torticollis, alterations of consciousness
Jones et al. ⁵	C1–C2 lateral facet joint	M (60)	Acute shoulder and neck pain, confusion, fever, photophobia
Sasaki et al. ⁶	C1–C2 lateral facet joint	F (76)	Progressive pain and stiffness of the neck
Takashi et al. ⁷	Atlanto-odontoid and lateral facet joint	M (53)	Neck pain, stiffness, and high fever.
Hajar et al. ⁸	Atlanto-odontoid and lateral facet joint	M (68)	Neck and right shoulder pain, fever, and diplopia [†]
Robinson et al. ⁹	Atlanto-odontoid	M (76)	Fever, neck cellulitis, decreased range of motion of the neck [‡]

Abbreviations: F, female; M, male; MRI, Magnetic Resonance Imaging; PET scan, 18fluorodeoxyglucose-positron emission tomography; SA, *Staphylococcus aureus*.

[†]septic arthritis was associated with Septic Thrombosis of the Ophthalmic Vein.

[‡]septic arthritis had occurred after acupuncture.

swelling and sensitivity along the front edge of the sternocleidomastoid muscle.¹⁰

4 | CONCLUSION

The diagnosis of septic arthritis of the atlantoaxial joint should be considered in a patient with inflammatory neck pain and paravertebral muscle contracture. We highlighted the importance of MRI findings in making the diagnosis of a septic atlanto-odontoid joint.

We suggest that the conservative treatment including antibiotic and neck immobilization are sufficient for the treatment of septic arthritis of the atlantoaxial joint without serious complications. Cerebral vein thrombosis is a rare complication due to septic arthritis of the atlantoaxial joint.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTIONS

Dr. Maroua SLOUMA has substantively revised the work. Dr. Abir DGHAIES and Sirine BOUZID have drafted the work. Dr. Rim DHAHRI contributed to the interpretation of the figure. Dr. Imen GHARSALLAH has made substantial contributions to the conception of the work. Dr. Leila METOUI and Dr. Riadh BATTIKH contributed to the bibliographic research. Pr Bassem LOUZIR approved the final version.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Elevated inflammatory markers	Bacteriological culture	Imaging features	Treatment
No	Streptococcus anginosus in intraoperative tissue samples culture	MRI: diffuse soft tissue enhancement around the C1–C2 facet extending through the right neural foramen to the atlantoaxial joint.	Surgical treatment Antibiotic therapy
Yes	SA in blood culture and C1/C2 joint fluid	MRI: capsular distention of C1–C2 joints, enhancement of the joint capsule and retropharyngeal edema.	Antibiotic therapy
Yes	SA in blood cultures	MRI: destructive changes of the right lateral masses of C1 and C2 and the clivus, and a peridontoid soft tissue mass	Surgical treatment Antibiotic therapy
Yes	SA in blood cultures	MRI: atlantoaxial facet joint destruction, para spinal muscles, and epidural abscesses	Surgical treatment Antibiotic therapy
Yes	SA in C1/C2 joint fluid	MRI: edema of the soft tissues with joint effusion of C1/C2.	Antibiotic therapy
Yes	SA in blood cultures	CT scan: erosive changes of the left lateral masses of the atlas and axis MRI: high signal intensity of the left atlantoaxial joint on T2-weighted image and low signal intensity on T1	Antibiotic therapy
Yes	SA in C1/C2 joint fluid.	MRI: cord compression due to an abscess around the dens with erosive changes of the lateral masses of the atlas	Antibiotic therapy Surgery
Yes	SA in blood culture.	MRI and CT-scan non contributive PET scan: abnormal hypermetabolic activity in the atlantoaxial joint and right shoulder	Surgical treatment Antibiotic therapy
Yes	SA in blood culture	MRI: atlantoaxial septic arthritis without signs of infection of the tissues between the superficial cellulitic area and the atlantoaxial joint,	Antibiotic therapy

ORCID

Maroua Slouma  <https://orcid.org/0000-0002-6889-9687>

Abir Dghaies  <https://orcid.org/0000-0002-9312-1498>

Rim Dhahri  <https://orcid.org/0000-0002-7297-0837>

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