

Alfonso Lagares
Iñaki Arrese
Beatriz Pascual
Pedro A. Gómez
Ana Ramos
Ramiro D. Lobato

Pannus resolution after occipitocervical fusion in a non-rheumatoid atlanto-axial instability

Received: 25 January 2005
Revised: 2 May 2005
Accepted: 15 May 2005
Published online: 29 December 2005
© Springer-Verlag 2005

A. Lagares (✉) · I. Arrese · B. Pascual
P. A. Gómez · R. D. Lobato
Department of Neurosurgery,
Hospital 12 de Octubre, Madrid, Spain
E-mail: algadoc@yahoo.com
Tel.: +34-91-3908282
Fax: +34-91-3908153

A. Ramos
Department of Neuroradiology,
Hospital 12 de Octubre, Madrid, Spain

Abstract Periodontoid pseudotumor or pannus is considered to be an inflammatory mass most frequently associated with rheumatoid arthritis. Transoral resection of the pannus has been the treatment of choice for patients with associated myelopathy, followed in many instances by posterior stabilization. However, some authors have reported resolution of pannus associated with rheumatoid arthritis and other forms of chronic atlanto-axial instability only after posterior stabilization. We report a case of a 69-year-old man who presented with a rapidly progressing myelopathy due to a retro-odontoid mass produced by chronic atlanto-

axial instability associated with an occipital assimilation of C1 and tight posterior fossa. An urgent posterior fossa craniectomy followed by occipitocervical fixation was performed. After surgery, the patient's clinical condition improved and 1 year after surgery was asymptomatic, walked without any help and had normal strength. Control MR showed complete resolution of the retro-odontoid pannus.

Keywords Atlanto-axial joint · Dislocations · Arthritis · Rheumatoid · Spinal cord compression · Spinal fusion · Odontoid process

Introduction

The development of an inflammatory mass or pannus in the craniocervical junction due to an atlanto-axial instability is a well-known condition [8, 14]. Some authors have called these masses periodontoid pseudotumor [13]. Due to the chronic instability and the mass effect on the spinal cord, they can produce severe myelopathy [15]. Pannus is most frequently associated with rheumatoid arthritis, although it can also be seen in other conditions in which a chronic atlanto-axial instability exists, such as degenerative arthropathies, os odontoideum or posttraumatic pseudoarthrosis of the odontoid process [1, 15]. Transoral resection of the pannus has been the treatment of choice, followed in many instances by posterior stabilization [2, 10]. However, there are several cases reported of the disappear-

ance of the inflammatory mass only after posterior stabilization of the atlanto-axial instability, more frequently in cases of rheumatoid arthritis [4, 7, 9, 11, 15–17]. We present a new case of chronic atlanto-axial instability and craniovertebral anomaly associated with an inflammatory retro-odontoid mass, anterior to the spinal cord, producing severe and acutely progressive myelopathy, which disappeared after occipitocervical fusion.

Case report

A 69-year-old patient was admitted to our department because of severe cervical pain irradiated to his left arm for 1 month accompanied by progressive weakness in his left hemibody in the last week. On the day of admittance



Fig. 1 Preoperative cervical X-ray showing an assimilation of the posterior arch of C1 and an increase of the atlanto-dental interval suggesting atlanto-axial instability

he was unable to walk. Neurological examination revealed severe left hemi paresis, with strength 0/5 in his left arm and 2/5 in his left leg, accompanied by generalised hyperreflexia, left ankle clonus and left Babinsky's

sign. A cervical X-ray showed an assimilation of C1 with C1–C2 subluxation (Fig. 1). An urgent MR showed the existence of a large retro-odontoid inflammatory mass that caused severe myelopathy. Both the mass and the spinal cord enhanced after the administration of gadolinium (Fig. 2). Due to the quick progressive deterioration of the neurological condition of the patient and the coexistence of a craniovertebral junction anomaly, which was assimilation of the atlas with a tight posterior fossa, with a retro-odontoid mass, we decided to perform an urgent posterior fossa decompression followed by occipitocervical fixation with plates and sublaminar hooks. The patient was positioned prone with a cervical collar and fixed with a Mayfield head holder. A posterior fossa craniectomy was performed. There was an assimilation of C1. Only after opening the foramen magnum, the dura appeared relaxed. Following decompression, plates were positioned over the edges of the craniotomy and secured with screws to the occipital bone. These were connected to bars fixed to sublaminar hooks completing an occipital C2–C3 fixation (Fig. 3).

After surgery, the patient's strength slowly improved in his left arm and leg, he was able to walk 2 weeks after surgery, with strength 4/5 in his leg and presented strength 3/5 in his left arm globally. MR performed 2 weeks after surgery still showed the anterior mass though there was adequate posterior decompression (Fig. 4). Three months after surgery, strength was normal in his legs, though still there was strength 4/5 in his left arm. One year after surgery, the patient was asymptomatic, walked without any help and had normal strength. Control MR showed complete resolution of the retro-odontoid pannus (Fig. 5).

Fig. 2 Preoperative MR showing an isointense retro-odontoid mass in sagittal (a) and axial (d) T1 image, which caused severe myelopathy with cord edema in sagittal T2 image (b). Both the mass and the cord enhanced after contrast administration. Sagittal (c) and axial (e and f) contrast T1 images

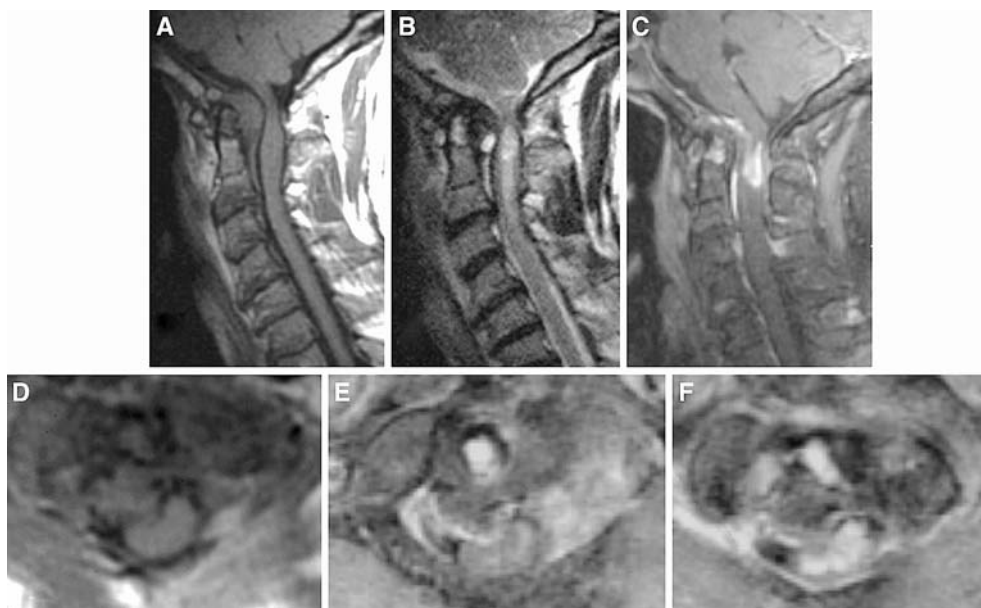


Fig. 3 Postoperative CT 3-D reconstruction showing posterior fossa decompression and occipito cervical fixation

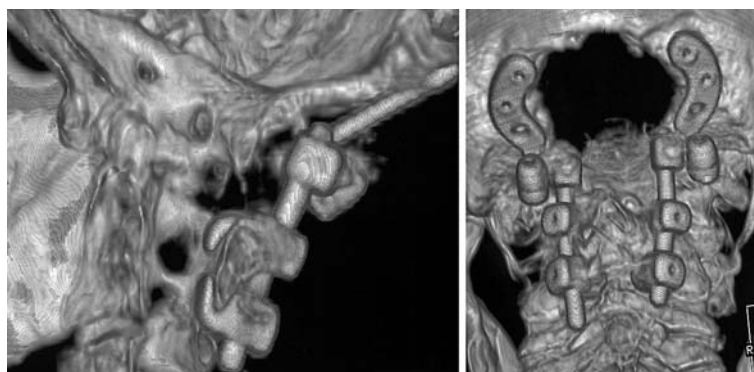


Fig. 4 MR performed 2 weeks after surgery, showing adequate posterior decompression and a slight reduction in the retro-odontoid mass. **a** and **b** sagittal T2; **c** and **d** axial T2

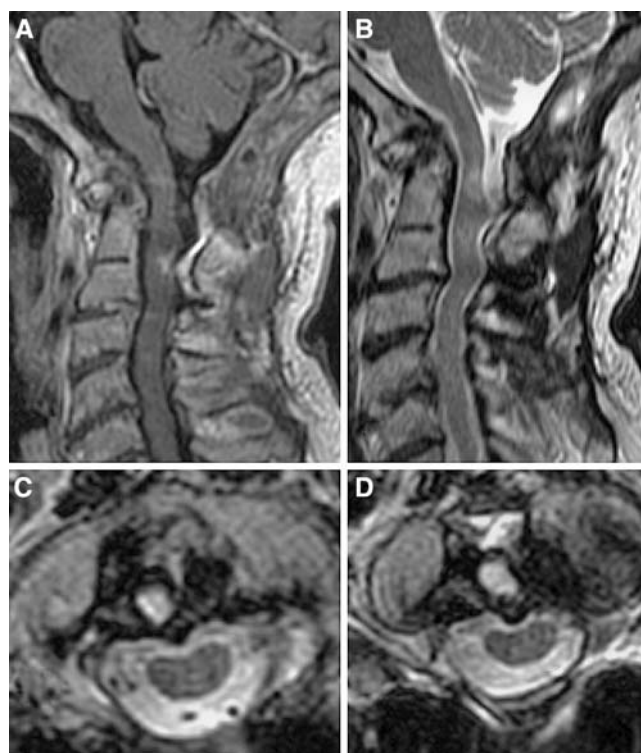


Fig. 5 MR performed 1 year after surgery showing the resolution of both the retro-odontoid mass and cord compression. **a** sagittal T1; **b** sagittal T2; **c** and **d** axial T2

Discussion

Different processes can cause the formation of a retro-odontoid mass at the craniovertebral junction [5, 13]. Pannus is most frequently related to rheumatoid arthritis and its associated chronic atlanto-axial subluxation [12, 14]. This instability also appears in other cases in which this type of tissue has been found in the absence of rheumatoid arthritis [1, 4, 5, 9, 17]. Therefore, many authors have concluded that chronic craniovertebral junction instability plays a very important role in

the development of pannus [3–5]. However, there is some controversy in the nature of this tissue. For some authors, this is an inflammatory granulation tissue, which grows from the sinovial between the dens and the posterior articular facet of the posterior arch of C1, or between the dens and the transversal ligament [2, 8]. For other authors, this tissue is a reactive fibrous tissue secondary to the mechanical stress more than secondary to an inflammatory process [7, 13, 15]. This would be supported by the fact that pannus is found in patients with no systemic inflammatory process and with only chronic atlanto-axial instability, as happens in cases of

traumatic pseudoarthrosis, os odontoideum or degenerative arthropathy [4, 5, 13, 16].

Pannus is located ventrally to the bulbomedullary junction, and can produce a severe myelopathy and even sudden death. Transoral approach has been proposed as the best way to directly manage the ventral compression caused by this tissue [2, 10]. However, several case reports have been reported in the last years in which pannus resolution has been documented after posterior stabilization in different pathologies, such as rheumatoid arthritis, degenerative arthropathies, os odontoideum and traumatic pseudoarthrosis [3, 4, 6, 7, 9, 11, 16, 17].

We present a case that combined the presence of pannus at the craniovertebral junction secondary to chronic atlanto-axial instability with a craniovertebral

junction malformation, that is, C1 assimilation and tight posterior fossa. This associated with the advanced age of our patient and the rapidly progressive clinic he presented, moved us to perform a posterior decompression and stabilization of the craniovertebral junction in the same procedure. Due to the contrast enhancement of the retro-odontoid mass, differential diagnosis with other tumoral or infectious pathology was done, all tests being negative. The fact that both the mass and the enhancement disappeared after stabilization and the good outcome of our patient suggests that posterior decompression and stabilization of the craniovertebral junction is a safe alternative treatment to transoral decompression.

References

- Chang H, Park JB, Kim KW, Choi WS (2000) Retro-dental reactive lesions related to development of myelopathy in patients with atlantoaxial instability secondary to Os odontoideum. *Spine* 25:2777–2783
- Crockard HA, Pozo JL, Ransford AO, Stevens JM, Kendall BE, Essigman WK (1986) Transoral decompression and posterior fusion for rheumatoid atlantoaxial subluxation. *J Bone Joint Surg Br* 68:350–356
- Grob D, Wursch R, Grauer W, Sturzenegger J, Dvorak J (1997) Atlantoaxial fusion and retrodental pannus in rheumatoid arthritis. *Spine* 22:1580–1583
- Isono M, Ishii K, Kamida T, Fujiki M, Goda M, Kobayashi H (2001) Retro-odontoid soft tissue mass associated with atlantoaxial subluxation in an elderly patient: a case report. *Surg Neurol* 55:223–227
- Joly-Torta MC, Martín-Ferrer S, Rimbau-Muñoz J, Domínguez C (2004) Reducción de las masas periodontoid-eas tras artrodesis posterior: revisión a propósito de 2 casos no vinculados a artritis reumatoide. *Neurocirugía (Asur)* 15:553–564
- Jun BY (1999) Complete reduction of retro-odontoid soft tissue mass in os odontoideum following the posterior C1–C2 transarticular screw fixation. *Spine* 24:1961–1964
- Lansen TA, Kasoff SS, Tenner MS (1990) Occipitocervical fusion for reduction of traumatic periodontoid hypertrophic cicatrix. Case report. *J Neurosurg* 73:466–470
- Larsson EM, Holtas S, Zygmunt S (1989) Pre- and postoperative MR imaging of the craniocervical junction in rheumatoid arthritis. *AJR Am J Roentgenol* 152:561–566
- Lu K, Lee TC (1999) Spontaneous regression of periodontoid pannus mass in psoriatic atlantoaxial subluxation. Case report. *Spine* 24:578–581
- Moskovich R, Crockard HA (1990) Posttraumatic atlanto-axial subluxation and myelopathy. Efficacy of anterior decompression. *Spine* 15:442–447
- Pare MC, Currier BL, Ebersold MJ (1995) Resolution of traumatic hypertrophic periodontoid cicatrix after posterior cervical fusion: case report. *Neurosurgery* 37:531–533
- Pettersson H, Larsson EM, Holtas S, Cronqvist S, Egund N, Zygmunt S, Brattstrom H (1988) MR imaging of the cervical spine in rheumatoid arthritis. *AJNR Am J Neuroradiol* 9:573–577
- Sze G, Brant-Zawadzki MN, Wilson CR, Norman D, Newton TH (1986) Pseudotumor of the craniovertebral junction associated with chronic subluxation: MR imaging studies. *Radiology* 161:391–394
- Toolanen G, Larsson SE, Fagerlund M (1986) Medullary compression in rheumatoid atlanto-axial subluxation evaluated by computerized tomography. *Spine* 11:191–194
- Yamashita Y, Takahashi M, Sakamoto Y, Kojima R (1989) Atlantoaxial subluxation. Radiography and magnetic resonance imaging correlated to myelopathy. *Acta Radiol* 30:135–140
- Young WF, Boyko O (2002) Magnetic resonance imaging confirmation of resolution of periodontoid pannus formation following C1/C2 posterior transarticular screw fixation. *J Clin Neurosci* 9:434–436
- Zygmunt S, Saveland H, Brattstrom H, Ljunggren B, Larsson EM, Wollheim F (1988) Reduction of rheumatoid periodontoid pannus following posterior occipito-cervical fusion visualised by magnetic resonance imaging. *Br J Neurosurg* 2:315–320