Retro-odontoid pseudotumor

Retro-odontoid pseudotumors, also known as periodontoid pseudotumors, are non-neoplastic soft tissue masses adjacent to the odontoid process (dens) of C2, which can cause cervicomedullary compression [1].

Epidemiology

The prevalence of retro-odontoid soft tissue thickening, particularly with mineralization presumed to represent calcium pyrophosphate deposition, increases significantly with age [2].

Classification

Retro-odontoid pseudotumor (ROP) in patients without rheumatoid arthritis [3]. Atlanto-axial subluxation may play a role in developing ROP. ROP unassociated with AAS can be seen in patients without RA but is rare. All cases reported were seen in the elderly and most have severe OA changes at the atlanto-axial joint

Clinical features

These are often asymptomatic. Acute inflammation in these masses (as in Crowned dens syndrome) can manifest as neck pain or headache. As a chronic process, mass effect on the cervical spine can manifest as myelopathy including sensory and motor deficits.

Pathology

Pseudotumors can arise by various mechanisms and etiologies [4] [5].

Atlantoaxial instability

Rheumatoid arthritis (RA): in which case it may be termed pannus

Trauma

Os odontoideum

tenosynovial giant cell tumor

atlantoaxial hypermobility compensating for subaxial ankylosis

diffuse idiopathic skeletal hyperostosis

ossification of the posterior longitudinal ligament

cervical spondylosis/osteoarthritis

deposition diseases

calcium pyrophosphate dihydrate deposition disease (CPPD)

hydroxyapatite deposition disease (HADD)

gout

amyloid arthropathy associated with hemodialysis

dens fracture callus

migrated disc herniation

Diagnosis

Retro-odontoid pseudotumor diagnosis.

Differential diagnosis

Consider:

Retro-odontoid synovial cyst

Epidural hematoma

Epidural lipomatosis.

Treatment

Surgical techniques that are addressed include ventral decompression (both transoral and transnasal), dorsal decompression, and indications for posterior instrumentation in pannus formation, particularly in cases that may be sufficiently treated in lieu of an anterior approach. Fiani et al. examined the role of external orthoses as both a method of conservative treatment as well as a potential adjunct to the aforementioned surgical procedures [6].

Case series

From January 2015 to December 2019, 27 patients (14 women and 13 men) with NRROPs and 19 patients (15 women and 4 men) with RA were enrolled in this study. We evaluated various imaging findings, including atlantoaxial instability (AAI), and measured the maximum diameter of preodontoid and retro-odontoid spaces with magnetic resonance imaging (MRI) and computed tomography (CT). Results: Statistical significance was considered for p < 0.05. AAI was detected in eight patients with

NRROPs and in all patients with RA (p < 0.0001). Seventeen patients with NRROPs and six patients with RA showed spinal cord compression (p = 0.047). Compressive myelopathy was observed in 14 patients with NRROPs and in 4 patients with RA (p = 0.048). Subaxial degeneration was observed in 25 patients with NRROPs and in 9 patients with RA (p = 0.001). Moreover, C2-3 disc abnormalities were observed in 11 patients with NRROPs and in 2 patients with RA (p = 0.02). Axial and longitudinal diameter of retro-odontoid soft tissue and preodontoid and retro-odontoid spaces showed significant differences between NRROP and RA patients (p < 0.0001). Furthermore, CT AAI measurements were differed significantly between NRROP and RA patients (p < 0.05). Conclusions: NRROPs showed prominent retro-odontoid soft tissue thickening, causing compressive myelopathy and a high frequency of subaxial and C2-3 degeneration without AAI [7)]

Case reports

An atlanto-occipital assimilation altered the biomechanics of the cervical spine, causing chronic mechanical stress on the transverse ligament and subsequently the development of a retro-odontoid pseudotumor. This is in accordance with previous studies that have attributed the development of retro-odontoid pseudotumor to a loss of mobility of the cervical spine, in cases without associated rheumatoid arthritis or atlanto-axial subluxation [8)]

A male patient in his late 90's presented with inability to ambulate, global paresis, and long tract signs in the upper extremities. He was found to have a large odontoid mass with compression at the cranio-cervical junction. He underwent cervical fusion with instrumented fixation from C1-6 and decompressive laminectomy from C4-6. Over a follow-up period of two years, there was improvement in the patient's motor weakness and ambulation. Radiographic evaluation at the two-year mark showed marked reduction in pannus size. Indirect approaches to decompression in patients with retro odontoid pseudo tumor using techniques such as cervical fusion may be a safe for effective treatment in patients of advanced age, with multiple co-morbidities, and inability to tolerate lengthy surgical procedures [9)].

General University Hospital of Alicante Retro-odontoid pseudotumors

General University Hospital of Alicante Retro-odontoid pseudotumors

1)
https://radiopaedia.org/articles/retro-odontoid-pseudotumour
2)
Chang EY, Lim WY, Wolfson T, Gamst AC, Chung CB, Bae WC, Resnick DL. Frequency of atlantoaxial calcium pyrophosphate dihydrate deposition at CT. Radiology. 2013 Nov;269(2):519-24. doi: 10.1148/radiol.13130125. Epub 2013 Jun 4. PMID: 23737539.
3)
Yu SH, Choi HJ, Cho WH, et al. Retro-Odontoid Pseudotumor without Atlantoaxial Subluxation or Rheumatic Arthritis. Korean J Neurotrauma. 2016; 12:180–184
4)
Shi J, Ermann J, Weissman BN, Smith SE, Mandell JC. Thinking beyond pannus: a review of retro-odontoid pseudotumor due to rheumatoid and non-rheumatoid etiologies. Skeletal Radiol. 2019

Oct;48(10):1511-1523. doi: 10.1007/s00256-019-03187-z. Epub 2019 Mar 13. PMID: 30868232.
5)

Robles LA, Mundis GM. Retro-Odontoid Pseudotumor without Radiologic Atlantoaxial Instability: A Systematic Review. World Neurosurg. 2019 Jan;121:100-110. doi: 10.1016/j.wneu.2018.10.011. Epub 2018 Oct 11. PMID: 30315972.
6)

Fiani B, Houston R, Siddiqi I, Arshad M, Reardon T, Gilliland B, Davati C, Kondilis A. Retro-Odontoid Pseudotumor Formation in the Context of Various Acquired and Congenital Pathologies of the Craniovertebral Junction and Surgical Techniques. Neurospine. 2021 Mar;18(1):67-78. doi: 10.14245/ns.2040402.201. Epub 2020 Nov 18. PMID: 33211944; PMCID: PMC8021814.
7)

Song YS, Lee IS, Nam KH, Kim DH, Han IH, Lee H, Jeong YJ, Yeom JA. Imaging Characterization of Non-Rheumatoid Retro-Odontoid Pseudotumors: Comparison with Atlantoaxial Manifestation of Rheumatoid Arthritis. Medicina (Kaunas). 2022 Sep 19;58(9):1307. doi: 10.3390/medicina58091307. PMID: 36143984; PMCID: PMC9503343.
8)

Buttiens A, Vandevenne J, Van Cauter S. Retro-Odontoid Pseudotumor in a Patient with Atlanto-Occipital Assimilation. J Belg Soc Radiol. 2018 Oct 2;102(1):62. doi: 10.5334/jbsr.1587. PMID: 30320299; PMCID: PMC6174754.
9)

Elfallal W, Elfallal S. Retro-Odontoid Pseudotumor with Cervical Medullary Compression: A Case Report. Spartan Med Res J. 2018 Apr 27;3(1):6768. doi: 10.51894/001c.6768. PMID: 33655134; PMCID: PMC7746100.