Short communication

Odontogenic infection and pachymeningitis of the cavernous sinus

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Abstract

Hypertrophic pachymeningitis is a rare inflammatory process that causes thickening of the dura mater. Most cases are idiopathic, but it can result from many inflammatory and infective conditions. We present a case of pachymeningitis of the cavernous sinus, the aetiology of which may have been dental.

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Introduction

Odontogenic infections rarely spread intracranially to cause complications such as thrombosis of the cavernous sinus, abscess, or meningitis. Hypertrophic pachymeningitis is a rare condition that involves inflammatory dural thickening. Most cases are idiopathic, but inflammatory, infective, and malignant processes are known. We report to the best of our knowledge the first case of pachymeningitis of the cavernous sinus of probable odontogenic aetiology.

Case report

A 60-year-old man with a history of chronic tobacco and cannabis use presented with pain in the right maxillary second molar. On examination there was a root stump with gingival inflammation. Immediate extraction was recommended but the patient refused. A month later he returned with intermittent, right-sided, periorbital headache, ptosis of his right eyelid, mild periorbital oedema, and blurring of vision in his right eye. There was complete ophthalmoplegia (cranial nerves III, IV, and VI) (Fig. 1) with a dilated non-reactive pupil and paraesthesia of the VI branch of the V cranial nerve on the same side. He had no orbital congestion or oedema. His medical history cast no light on his symptoms.

His erythrocyte sedimentation rate was raised, but his hepatic and renal function was within normal limits. A magnetic resonance image (MRI) of the brain showed intense homogeneous enhancement of the right cavernous sinus with pachymeningeal thickening along the right temporal pole (Fig. 2). No thrombus was visible in the dural sinuses on a MR venogram. Examination of his cerebrospinal fluid (CSF) showed a moderately increased concentration of protein. We found no organism on staining or culture in blood or urine. Investigations for tuberculosis, HIV, herpes simplex virus, hepatitis B and C, and syphilis were within the normal ranges, as were concentrations of antinuclear antibodies, antineutrophil cytoplasmic antibodies, and rheumatoid factor, chest radiograph, and serum concentrations of angiotensin converting enzyme and prostate-specific antigen.
The root was extracted and pus drained from the vestibule, culture of which grew coagulase-negative staphylococci. He was treated with ceftriaxone, vancomycin, and steroids, which resulted in considerable improvement in nerve function over the next month.

**Discussion**

Pachymeningitis refers to focal or multicentric chronic inflammatory dural thickening. However, the term is not correctly representative of the disease as pia mater and arachnoid mater are also involved, with fusion of all 3 meningeal layers by a dense fibrotic membrane. Charcot and Joffroy reported the first cases of pachymeningitis in 1869, which were attributed to syphilis. Thereafter cases have been reported but mostly of unknown aetiology. The condition can therefore be one of two types, primary or idiopathic with no identifiable cause, or secondary as a result of an autoimmune, infective, or infiltrating process. Headache and multiple cranial neuropathies according to the site of involvement are common presenting symptoms.

With the involvement of the cavernous sinus, the meningeal walls become thickened and fibrous and result in associated neuropathy of the cranial nerves (III-VI). Investigation of these patients includes ruling out all possible aetiological factors. Granulomatous conditions (sarcoïdosis or Wegener’s granulomatosis), infections (tuberculosis or syphilis) vasculitis, connective tissue disorders, and malignant conditions must be ruled out.

There are signs of hyperintense laminal dural thickening on MRI, with enhancement after contrast has been given. Examination of CSF may show minimal changes or may be entirely within normal limits. A dural biopsy will differentiate between idiopathic and secondary causes. In the absence of a possible cause the disease is termed idiopathic. Differential diagnosis includes Tolosa-Hunt syndrome, intracranial hypotension, and neoplastic meningitis as a result of lymphoma, leukaemia, adenocarcinoma, melanoma, or meningioma. Steroids are the primary treatment with the addition of appropriate antibiotics for infections.

Otological infection has been implicated as a cause of pachymeningitis, but we know of no reports of dental processes. Maxillofacial infections are known to spread intracranially by direct extension along the fascial planes, or by the haematogenous route into the cavernous sinus. In the present case, after detailed investigation for possible aetiological factors, the infected maxillary root was suspected to be the potential cause. A dural biopsy, with isolation of bacteria, would have provided better evidence but the patient refused. Nevertheless, we think that in the absence of any other cause, his chronic dental infection, the potential pterygoid route of spread of the infection, and his response to antibiotics, shows a definite relation between the two conditions.
Conflict of interest

The authors declare that they have no conflict of interest.

References