Aspergillosis of the petrous apex

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Abstract
We present the case of an immunocompetent man who presented with multiple and progressive cranial nerve palsies. The cause was found to be aspergillosis of the petrous bone, arising as a result of chronic fungal otitis media. Despite treatment with local excision and systemic anti-fungal therapy, he died after suffering a subarachnoid haemorrhage. Diagnosis rests upon prompt radiological imaging and the acquisition of tissue for histological examination and culture but cannot be made without awareness of the condition.

Keywords: aspergillosis, petrous apicitis, otitis media, elderly

Introduction
Gradenigo’s syndrome is an uncommon condition. It occurs when suppurative otitis media leads to inflammation of the apex of the petrous bone, (petrous apicitis) giving rise to the triad of otorrhoea, sixth nerve palsy and facial pain. Other cranial nerves are often affected. Causative organisms most commonly involved include the pneumococcus and Pseudomonas aeruginosa. We present the case of a patient in whom petrous apicitis was caused by aspergillus.

Case report
An 80-year-old man presented with a 3 month history of morning headaches and the abrupt onset that day of left-sided facial weakness. His only previous medical history was of bilateral deafness since World War II with chronic tympanic perforations, occasionally requiring aural toilet and antibiotic drops.

Initial examination confirmed the presence of a left-sided lower motor neurone seventh nerve palsy. His white cell count was 9.1×10⁹/L (N.R. 4.0–11.0) but his ESR was raised at 68 mm/h. A magnetic resonance scan of the brain was arranged but aborted before completion when picture artefact indicated the likely presence of a metallic foreign body in the right eye. Cranial CT on the same day was reported as unremarkable, and although steroids were not given, the patient was discharged with a diagnosis of Bell’s palsy.

Three weeks later, the patient developed diplopia on left horizontal gaze. He was found to have a left sixth nerve palsy, and bearing in mind his recent normal CT scan, was commenced on oral prednisolone, 30 mg once daily, on suspicion of a vasculitic process. However, his symptoms progressed and he was admitted 5 days later, where, in addition to his left-sided seventh and sixth nerve palsies, there was found to be ipsilateral involvement of the third, fourth and fifth cranial nerves as well as a Horner’s syndrome. There was exposure keratitis due to his fifth and seventh nerve palsies but the fundus was normal. He was pyrexial and auroscopy revealed perforation of the left eardrum with debris seen in the external auditory canal.

Cranial CT was repeated with views of the skull base and orbits, which indicated the presence of an infiltrating erosive process involving the skull base, cavernous sinus and apex of the petrous bone (Figure 1).

Tissue biopsy was achieved via the trans-sphenoidal route and histological examination revealed necrosis and the presence of fungal spores with hyphae (Figure 2).

The appearances were typical of aspergillus. The steroid was stopped and the patient commenced on the liposomal...
preparation of amphotericin at high dose. The diagnosis was later confirmed by culture of an aspirate of fluid debris from the patient’s left external ear canal.

A Hickman line was inserted in anticipation of a prolonged course of anti-fungal therapy and although he continued to spike high temperatures, a repeat sphenoidotomy after 2 weeks of treatment showed appearances suggestive of clinical improvement. However, 2 days later the patient collapsed on the ward, suffering a respiratory arrest. Following intubation, he underwent cranial CT and was found to have had a subarachnoid haemorrhage. He was unsuitable for neurosurgical intervention and died 4 days later.

Discussion

The advent of the antibiotic age has meant that bacterial petrous apicitis as described by Gradenigo [1] has become uncommon. It is likely that aspergillosis of the petrous bone has always been so. The number of reports of neuroaspergillosis increased in the 1970s, probably as a result of both the increasingly widespread use of corticosteroids and other immunosuppressant drugs and the increasing prevalence of AIDS. However, our case is one of the very few reported [2] where immunocompetent patients have been affected by petrous apicitis of fungal aetiology arising from a focus in the middle ear.

The route by which the fungal pathogen reaches the petrous apex is not clear: several longitudinally arranged air cell tracts connect the base of the petrous bone to the apex and it is thought that the aspergillus may extend via this route. It has also been suggested that infection may spread via vascular channels or directly through fascial planes [3].

The involvement of cranial nerves is brought about by local extradural inflammation. Because this is a diffuse process, numerous nerves may be involved and, as in our patient, the spectrum of potential clinical findings is wide.

The diagnosis rests on making the connection between progressive neuroclinical findings and what are often chronic and rather indolent infections of the middle ear. Although MR or CT [4] imaging is mandatory, it cannot easily distinguish infective apicitis from neoplastic or other inflammatory processes and for this reason the acquisition of tissue for culture is vital. The diagnosis of aspergillosis from histological examination alone is thought to be suboptimal, because differentiation from other species of fungi is sometimes difficult.

Treatment of neuroaspergillosis is based upon the use of prolonged courses of systemic antifungal therapy at high dose and in most reported cases, surgical excision of infected tissue. There is a paucity of data regarding petrous apicitis secondary to aspergillosis but overall mortality in patients with invasive neuroaspergillosis is high [5]. Our patient died as a result of catastrophic subarachnoid haemorrhage, presumed to be due to invasion of local blood vessels, a well-described phenomenon [6].
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Key points

• Petrous apicitis is a rare but treatable complication of chronic otitis media.
• Infiltrative processes affecting the skull base are not always neoplastic and infective causes should be considered.

References


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