Post-auricular abscess from osteoradionecrosis after radical radiotherapy for NPC

Background

Osteoradionecrosis (ORN) is a known complication of radiotherapy in patients with Nasopharyngeal Carcinoma (NPC), especially in patients who underwent conventional 2-dimensional radiotherapy.

Abscesses over the mastoid are rare. Mastoiditis is characterized with pus originating within the air cell system leading to osteomyelitis and extrusion through the periosteum. To the best of our knowledge, there have been no reported cases of abscesses over the mastoid process and temporal bone adjacent secondary to sinusitis.

Case report

We present a 68 year-old Chinese lady with multiple co-morbidities - most significantly sequelae from NPC that was treated with radiotherapy in 1989. This was complicated by panhypopituitarism, dysphagia and bilateral apical lung fibrosis. Details regarding the stage of her disease and treatment regime were unavailable as she was treated in a private hospital 27 years ago.

She was brought to our emergency department for persistent fever for 3 months. This was first associated with purulent right nasal discharge and she subsequently developed right purulent otorrhoea after 2 months. She had initially been treated by a private doctor for an urinary tract infection, otitis externa and sinusitis with culture directed antibiotics. Her symptoms resolved transiently but recurred 1 week prior to presentation – on this occasion with a right post-auricular boggy swelling. On flexible nasendoscopy, there was right middle meatal nasal polyposis with mucopus, as well as exposed bone and crusting at the nasopharynx. CT scan revealed a 6.9x2.9x2.4cm rim enhancing collection over the right temporal region, right sided sinusitis involving the right maxillary, posterior ethmoid and sphenoid sinuses on a background of extensive mottled lytic-sclerosis of the skull-base in keeping with ORN. Bilateral middle ear and mastoid air cells were opacified but the cortex of the right mastoid was intact. The destructive tract caused by ORN communicated between the right-sided sinuses and the mastoid portion of the temporal bone and zygomatic root (Figures 1-3).

Figure 1. Axial CT scan with contrast showing the defect in the posterior aspect of the right maxillary sinus with opacification of the right maxillary sinus extending to the right masticator space.

Figure 2. Coronal CT scan showing the extension to the right superficial temporal space

Figure 3. Axial CT scan of right mastoid abscess with an intact mastoid cortex

She underwent right-sided endoscopic sinus surgery and incision and drainage of the right postauricular abscess. Intra-operatively, the right maxillary, ethmoid and sphenoid sinuses were filled with pus and the large right post-aural sub-periosteal abscess was found to extend from the mastoid region to the zygomatic root and the preauricular area. As the mastoid cortex was intact, a decision was made not to proceed with the cortical mastoidectomy. The intra-operative cultures grew *Peptostreptococcus* and *Streptococcus constellatus*. She was discharged at her pre-morbid condition and completed 6 weeks of antibiotics as recommended by our infectious disease team (IV Ceftriaxone 2g OM and PO Metronidazole 400mg Q8H).

Discussion

Mastoid abscesses, although rare, are known to occur as a result of middle ear infections, which results in osteomyelitis, induces periostitis and bony destruction. These infections may progress via local extension or through emissary veins, resulting in subperiosteal abscesses¹. In these patients, mastoid exploration and eradication of diseased mastoid air cells are important in treating the root of the infection. Mastoid surgery, however, exposes patients to several risks, including facial nerve palsy, deafness, CSF leak and intracranial infections. As such, it is important to identify the true source of the mastoid abscess, so as to control the root of the infection while minimizing surgical risk.

While the right mastoid air cells were opacified, close reading of the CT scan showed that the right mastoid cortex was intact. It also revealed a defect in the postero-inferior wall of the right maxillary sinus. This defect 'opened a path' for the infection in the maxillary sinus to track to the masticator space and supero-laterally to the temporalis and the squamous portion of the temporal bone forming a rim enhancing collection that communicated with the external auditory canal which explains the clinical finding of purulent discharge in the external auditory canal.

Although it has never been reported, sinusitis as the cause of this patient's subcutaneous post-auricular 'mastoid' abscess is not surprising given her history of radiotherapy for NPC which was likely conventional radiotherapy. Osteoradionecrosis, as first described by Ewing in 1926, has been reported in the mandible, frontal bone, cervical spine, maxilla, temporal and nasal bones in decreasing frequency in patients treated with radiotherapy for head and neck cancers². It occurs due to an obliterative endarteritis and periarteritis which results in ischemic and aseptic necrosis. The resulting avascular necrotic bone is prone to infection. In cases of superinfection, the necrotic process accelerates and the ORN continues hence perpetuating the infection^{3,4}.

Conclusion

In conclusion, we recognize that 'mastoid abscesses' secondary to sinusitis are rare. However, in treating patients with a background history of conventional radiotherapy for NPC, we should be more discriminating in defining the origins of head and neck abscesses.

References

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