Multifocal Inflammatory Pseudotumor of the Temporal Bone, Maxillary Sinus, and Orbit.

Permalink
https://escholarship.org/uc/item/9tk707h7

Journal

ISSN
1531-7129

Authors
Sakano, Hitomi
Shih, Cheng-Ping
Jafari, Aria
et al.

Publication Date
2018-12-01

DOI
10.1097/mao.0000000000001968

Peer reviewed
Multifocal Inflammatory Pseudotumor of the Temporal Bone, Maxillary Sinus, and Orbit

*Hitomi Sakano, *†Cheng-Ping Shih, *Aria Jafari, *Adam DeConde, and *‡Jeffrey P. Harris

*Division of Otolaryngology—Head & Neck Surgery, Department of Surgery, University of California San Diego, San Diego; †Department of Otolaryngology—Head and Neck Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, ROC; and ‡Division of Head and Neck Surgery, Department of Surgery, Veterans Affairs Hospital, San Diego, La Jolla, California

Objective: This is the first report of multifocal inflammatory pseudotumor (IPT) involving the temporal bone, orbit and paranasal sinus, and the use of rituximab as adjunctive therapy in multifocal temporal bone IPT.

Patient: We describe a 46-year-old man with orbital and maxillary sinus IPT, whose disease progressed despite radiation and steroid burst. He then developed contralateral mastoid disease, otalgia, aural fullness, and hearing loss.

Intervention: He was initiated on rituximab and prednisone therapy. Mastoidectomy with near-total tumor removal was accomplished and histopathology confirmed IPT. A literature review was also performed.

Main Outcome Measure: Tumor regression or recurrence.

Result: Despite disease progression after radiation and steroids, his orbital, sinus, and mastoid disease improved after surgery, steroids, and rituximab. A review of four other previously reported cases of multifocal disease involving the temporal bone suggest that multifocal disease may be a more aggressive entity with higher recurrence rate compared with solitary disease. Although surgery and steroids are typically recommended, there is currently no consensus treatment recommendation.

Conclusions: Multifocal IPT of the temporal bone is a rare but aggressive entity for which surgery and steroid combination therapy should be first line treatment. We suggest rituximab may be an effective adjunctive treatment particularly for recurrent disease or where systemic therapy may be favored. Key Words: Fibrous xanthoma—Histiocytoma complex—Inflammatory myofibroblastic tumor—Inflammatory myofibrohistiocytic proliferation—Inflammatory pseudotumor—Plasma cell granuloma—Rituximab—Xanthomatous pseudotumor.


Inflammatory pseudotumor (IPT), first described by Brunn in 1939, is a benign, fibro-inflammatory lesion (a.k.a, plasma cell granuloma, inflammatory myofibroblastic tumor, histiocytoma complex, xanthomatous pseudotumor, fibrous xanthoma, and inflammatory myofibrohistiocytic proliferation) (1,2). Clinically and radiographically, IPT can mimic malignant disease. The lesion can appear locally erosive on computed tomography (CT) and as low intensity lesions on magnetic resonance imaging (MRI) T1 and T2 sequences. Although the pathogenesis is not well understood, it has been associated with previous inflammation, trauma, infection, surgery, and an altered immune-mediated response (3,4).

IPT is most common in the lung but can occur anywhere (5). IPT of the head and neck accounts for less than 5% of all extrapulmonary cases (6). Within the head and neck, the most common location is the orbit, followed by the meninges, paranasal sinuses, infratemporal fossa, and nasopharynx (7). Temporal bone manifestation is rare, only ~40 cases have been reported (8), and those with distant multifocal disease are exceedingly rare, only four reported cases (9–12) (Table 1). To the best of our knowledge, this is the first case of simultaneous involvement of the temporal bone and contralateral orbit and maxillary sinus. Steroids and surgery are the most common treatment modalities, with occasional use of radiation or chemotherapy. The use of biologic therapy has only been reported in two cases of solitary temporal bone IPT. We report the first successful use of rituximab for adjunctive therapy in recurrent multifocal IPT of the temporal bone.

CASE REPORT

A healthy 45-year-old man presented with 6 weeks of epistaxis, left facial pain, nasal obstruction, and 1 week of
diplopia. CT showed a left maxillary sinus and ethmoid mass with erosion of the lamina papyraceae. MRI revealed a circumferential enhancing tumor within the left maxillary sinus with enhancement of the medial rectus but no infiltration of the orbit. Endoscopic maxillary antrostomy and biopsy were performed. Diagnosis of IPT was made on histopathology. Per recommendation by the multidisciplinary tumor board, the patient was treated with 4 weeks of radiation therapy at 27 Gy followed by a prednisone burst.

Unfortunately, symptoms progressed with proptosis, vision loss, and restricted extraocular movement. Repeat MRI revealed persistent disease in the maxillary sinus (Fig. 1A, arrowhead), new diffuse infiltration of the left orbital fat (Fig. 1B, arrow), and evolution of a new right mastoid lesion (Fig. 1A, arrow). The patient was restarted on 40 mg prednisone. Despite treatment, his orbital symptoms worsened with development of optic nerve enhancement on MRI. At this point, rituximab was initiated with a 1000 mg/m² rituximab induction two times followed by 375 mg/m² weekly for 14 weeks. The patient then underwent endoscopic sinus surgery with orbital decompression.

During this time, the patient developed right-sided otalgia, aural fullness, hearing loss, and a new right mastoid lesion on MRI that was not present before radiation. He was thus referred to Neurotology clinic. CT revealed opacification and destruction of the right mastoid air cells with dehiscence of tegmen mastoideum (Fig. 2, arrows) and erosion of the fallopian canal (Fig. 2, arrowhead). Otomicroscopy and facial nerve function were normal and there was no sign of labyrinthine fistula. Pure tone audiometry demonstrated conductive hearing loss with a 5 to 10 dB air-bone gap in the right ear. The patient underwent an intact canal wall mastoidectomy. Intraoperatively, the tumor was noted to be fibrotic, strongly adherent to surrounding structures, and quite vascular. Extensive bony erosion was seen along the tegmen. The ossicles were intact and the mesotympanum was free of disease. Intraoperative frozen sections showed no evidence of malignancy. Near-total tumor removal was achieved. The final histopathologic diagnosis confirmed IPT of the mastoid (Fig. 3). There was mixed inflammatory infiltrate composed predominantly of mature plasma cells, frequent neutrophils, and scattered eosinophils.

### TABLE 1. Characteristics of cases of multifocal inflammatory pseudotumor involving the temporal bone reported in the literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Age/Gender</th>
<th>Symptoms</th>
<th>Location</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodgers et al. (9)</td>
<td>48 M</td>
<td>FP/HL/vertigo/headache/seizure</td>
<td>Bil Temp</td>
<td>Surgery/steroid</td>
<td>Remission</td>
</tr>
<tr>
<td>Tian et al. (10)</td>
<td>51 M</td>
<td>HL/neck swelling</td>
<td>L Temp/L parotid</td>
<td>Surgery/steroid/XRT/Chemo</td>
<td>Three recurrences, remission</td>
</tr>
<tr>
<td>Goh et al. (11)</td>
<td>27 F</td>
<td>Ota/HL</td>
<td>Sinus/Bil Temp</td>
<td>Surgery/steroid</td>
<td>Two recurrences, NED</td>
</tr>
<tr>
<td>Lee et al. (12)</td>
<td>39 M</td>
<td>HL/RP/diplopia</td>
<td>R Temp/Lung</td>
<td>Surgery/steroid</td>
<td>NED</td>
</tr>
</tbody>
</table>

Bil indicates bilateral; Chemo, cyclophosphamide; FP, facial palsy; HL, hearing loss; L, left; M, mastoid; ME, middle ear; NED, no evidence of disease at the last follow-up; Ota, otalgia; R, right; RP, retrobulbar pain; Temp, temporal bone; XRT, radiotherapy.

During this time, the patient developed right-sided otalgia, aural fullness, hearing loss, and a new right mastoid lesion on MRI that was not present before radiation. He was thus referred to Neurotology clinic. CT revealed opacification and destruction of the right mastoid air cells with dehiscence of tegmen mastoideum (Fig. 2, arrows) and erosion of the fallopian canal (Fig. 2, arrowhead). Otomicroscopy and facial nerve function were normal and there was no sign of labyrinthine fistula. Pure tone audiometry demonstrated conductive hearing loss with a 5 to 10 dB air-bone gap in the right ear. The patient underwent an intact canal wall mastoidectomy. Intraoperatively, the tumor was noted to be fibrotic, strongly adherent to surrounding structures, and quite vascular. Extensive bony erosion was seen along the tegmen. The ossicles were intact and the mesotympanum was free of disease. Intraoperative frozen sections showed no evidence of malignancy. Near-total tumor removal was achieved. The final histopathologic diagnosis confirmed IPT of the mastoid (Fig. 3). There was mixed inflammatory infiltrate composed predominantly of mature plasma cells, frequent neutrophils, and scattered eosinophils.
No epithelioid granulomas or giant cells were noted. Plasma cells were immunoreactive for both kappa and lambda light chains. IgG4 to IgG positivity was less than 10%. Flow cytometry was negative for lymphoma. He was restarted on a second course of rituximab (two inductions at 1000 mg/m², 4 weeks of maintenance 375 mg/m² weekly). He continued to remain on steroids.

The patient is now 21 months since presentation and 9 months since mastoidectomy. Long-term steroids and second course of rituximab treatment were completed 4 months ago. His most recent MRI shows resolution of temporal bone, sinus and orbital disease with improved appearance of the optic nerve. His aural symptoms, proptosis and extraocular movement have been restored but his vision has not.

**DISCUSSION**

IPT is characterized histologically by non-neoplastic proliferation of spindle cells, with varying proportions of lymphocytes, plasma cells, histiocytes, fibrocytes, and extracellular collagen (5, 7, 10). Recently, there have been reports to suggest an association between IPT and IgG4 (8). Our periorbital pathology showed that nearly all plasma cells were IgG positive and that IgG4 positivity near 20%. This is however much less than what is expected for IgG4 disease. Most acceptable cutoff criteria for IgG4 disease are set at more than 40% (13). Interestingly, the mastoid sample obtained 6 months after initiating rituximab and steroids yielded low IgG4 (<10%) content. This may represent tumor response to rituximab and steroids. Whether IPT is a subtype of IgG4 disease is unclear at this point.

Compared with pseudotumor in other locations, lesions of the temporal bone tend to be more aggressive (14). The locally destructive tumor has been reported to invade surrounding dura, sigmoid sinus, tentorium, facial nerve, and otic capsule and have perineural involvement.

Literature review suggests that multifocal disease involving the temporal bone is even more aggressive than solitary temporal bone IPT. Of ~40 cases with IPT of the temporal bones that have been described, only four cases are reported with additional distant sites (Table 1). Among these four, there is a male preponderance (3:1) (4:1 including this case). Two cases had bilateral lesions of the temporal bones. Extra-temporal sites include parotid gland, paranasal sinus, and lung. Our case is...
temporal bone IPT is a rare but locally aggressive entity that can be associated with severe neurologic complications. A review of the literature reveals only five patients, including our case, that have temporal bone IPT with distant multifocal disease. At this point, it is unclear if IPT is indeed a subtype of IgG4 disease, but we do find elevated levels of IgG4:IgG levels. There appears to be a slight male preponderance. We conclude that 1) multifocal IPT is more aggressive and likely to recur than isolated temporal bone IPT and 2) our case shows that combination therapy which includes surgery, steroids, and rituximab was successful in disease remission. Surgical excision followed by immunosuppressive therapy including corticosteroids is the mainstay of treatment and the addition of rituximab may be helpful for recurrent or persistent disease. Early recognition and treatment should result in favorable outcomes, and long-term follow-up is indicated due to the tendency of the disease to recur.

CONCLUSION

IPT of the temporal bone is a rare but locally aggressive entity that can be associated with severe neurologic complications. A review of the literature reveals only five patients, including our case, that have temporal bone IPT with distant multifocal disease. At this point, it is unclear if IPT is indeed a subtype of IgG4 disease, but we do find elevated levels of IgG4:IgG levels. There appears to be a slight male preponderance. We conclude that 1) multifocal IPT is more aggressive and likely to recur than isolated temporal bone IPT and 2) our case shows that combination therapy which includes surgery, steroids, and rituximab was successful in disease remission. Surgical excision followed by immunosuppressive therapy including corticosteroids is the mainstay of treatment and the addition of rituximab may be helpful for recurrent or persistent disease. Early recognition and treatment should result in favorable outcomes, and long-term follow-up is indicated due to the tendency of the disease to recur.

REFERENCES