Case 14843
Chondromyxoid fibroma of the mastoid

Nicolas De Vos¹, ²
David Creytens³
Maritte De Cock⁴
Filip Vanhoenacker¹, ², ⁵

1. Department of Radiology, Ghent University Hospital, Ghent University, Ghent
2. Department of Radiology, AZ Sint-Maarten Duffel-Mechelen
3. Department of Pathology, Ghent University Hospital, Ghent University, Ghent
4. Department of Otorhinolaryngology, AZ Sint-Maarten, Duffel-Mechelen
5. Department of Radiology, Antwerp University Hospital, Antwerp University, Antwerp

University Hospital Antwerp

Section: Neuroradiology
Published: 2017, Aug. 1
Patient: 21 year(s), female

Clinical History

A 21-year-old female presented at the emergency department with drooping of the left eyelid and left mouth corner. Neurological examination showed a left lower motor neuron facial nerve palsy. Otoscopy showed narrowing of the left external auditory canal.

Imaging Findings

Magnetic resonance imaging (MRI) demonstrated a space-occupying lesion in the mastoid portion of the left temporal bone. On T1-weighted imaging (T1-WI), the lesion was of low signal intensity (SI) (Fig. 1A). On T2-weighted imaging (T2-WI), the lesion displayed heterogeneous intermediate to high SI (Fig. 1B). Diffusion-weighted images and apparent diffusion coefficient maps showed no significant diffusion restriction (Fig. 2). After intravenous administration of gadolinium-based contrast medium, the lesion enhanced heterogeneously, with marked enhancement in the areas which were of intermediate SI on T2-WI, and absence of enhancement in the areas which were of
high SI on T2-WI (Fig. 3)  
Cone-beam computed tomography confirmed the presence of a destructive osteolytic  
space-occupying lesion in the left mastoid (Fig. 4). The lesion eroded the facial canal, explaining  
the facial nerve palsy of the patient. The lesion also extended into the external auditory canal,  
explaining narrowing of this canal on otoscopy.

Discussion

CMF is an uncommon benign bone tumor of cartilaginous origin (1, 2, 3). It is usually found in the  
metaphyses of the long bones of the lower extremities, especially the proximal metaphysis of the  
tibia (4). CMF is also seen in the flat bones and bones of hands and feet. There is a slight  
predilection in males and a peak incidence in the second and third decades. CMF is rarely  
encountered in the skull base and is extremely rare in the mastoid portion of the temporal bone (5,  
6). This case is only the eleventh identified in the literature (Table 1).  
Clinical perspective: Patients with CMF of the appendicular skeleton primarily complain of pain  
and soft tissue swelling. Symptoms of CMF of the mastoid include hearing loss (7-11), facial nerve  
palsy (4, 5, 12), otalgia (2, 4, 9), and vertigo (6, 8).  
On plain radiographs, CMF of the appendicular skeleton is often seen as an eccentric radiolucent  
lesion with a well-defined sclerotic margin (13). On MRI, CMF of the appendicular skeleton shows  
low SI on T1-WI and high SI on T2-WI. After intravenous administration of gadolinium-based  
contrast medium, peripheral nodular enhancement is seen in 70 % of lesions, while diffuse contrast  
enhancement is seen in 30% (14). For CMF of the mastoid, (cone-beam) CT and MRI are helpful in  
elucidating bone and soft tissue extension, respectively. On (cone-beam) CT, CMF of the mastoid is  
seen as a destructive, osteolytic, space-occupying lesion. Intratumoral calcifications are more  
frequently seen in CMF of the mastoid compared to CMF of the appendicular skeleton. On MRI,  
CMF of the mastoid shows low SI on T1-WI and heterogeneous intermediate to high SI on T2-WI.  
This heterogeneity can be attributed to the varying composition of chondroid, myxoid, and fibrous  
elements. Sometimes, cystic or hemorrhagic foci are seen. After intravenous administration of  
gadolinium-based contrast medium, there is heterogeneous enhancement, with clear enhancement in  
the areas which show intermediate SI on T2-WI, and absence of enhancement in the areas which  
show high SI on T2-WI. The latter are probably composed of predominantly chondroid tissue.  
Compared to CMF of the appendicular skeleton, CMF of the mastoid can occur at an older age,  
contains more intratumoral calcifications and shows more heterogeneous SI on T2-WI. Since both  
radiological and histopathological findings often show considerable overlap with other diseases,  
including endolymphatic sac tumors and malignant cartilaginous tumors, the diagnosis of CMF  
remains challenging.

Final Diagnosis

Chondromyxoid fibroma of the mastoid

Differential Diagnosis List

Endolymphatic sac tumor, Chondroma and chondrosarcoma, Facial nerve schwannoma
Figures

Figure 1 Axial T1-WI (A) and T2-WI (B)

Axial T1-weighted image (T1-WI) shows a space-occupying lesion of low signal intensity (SI) in the mastoid (asterisk).

© Vanhoenacker FM, Department of Radiology, AZ Sint-Maarten, Duffel-Mechelen, Belgium

Area of Interest: Head and neck;  
Imaging Technique: MR;  
Procedure: Education;  
Special Focus: Tissue characterisation;

Axial T2-weighted image (T2-WI) shows a space-occupying lesion of heterogeneous
intermediate to high SI in the mastoid (asterisk).

Figure 2 Axial DWI (A) and ADC maps (B)

Axial diffusion weighted image (DWI) shows no significant diffusion restriction (asterisk).
Axial apparent diffusion coefficient (ADC) map shows no significant diffusion restriction (asterisk)

Area of Interest: Head and neck;
Imaging Technique: MR;
Procedure: Education;
Special Focus: Tissue characterisation;

Figure 3 Axial T1-WI after intravenous administration of gadolinium-based contrast medium

On axial T1-WI after intravenous administration of gadolinium-based contrast medium, the lesion shows clear enhancement (asterisk), with exception of the anterior part, which does not enhance (arrow).
Figure 4 Axial cone-beam computed tomography of the left mastoid

Axial cone-beam computed tomography confirms the destructive osteolytic space-occupying lesion in the left mastoid (asterisk), with erosion of the facial canal (arrow).
Axial cone-beam computed tomography confirms the destructive osteolytic space-occupying lesion in the left mastoid (asterisk), with erosion of the posterior wall of the external acoustic meatus (arrow).

Area of Interest: Head and neck;
Imaging Technique: CT;
Procedure: Education;
Special Focus: Tissue characterisation;

Figure 5 Overview of all published cases of CMF of the mastoid

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>AGE</th>
<th>GENDER</th>
<th>SYMPTOMS/DESCRIPTION</th>
<th>CT</th>
<th>MRI</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>F'abricis et al., 2017</td>
<td>45</td>
<td>F</td>
<td>Facial nerve palsy; impaired hearing;Swollen mastoid</td>
<td>Soft tissue mass extending along mastoid</td>
<td>T1: low SI; T2: mixed SI</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Gupte et al., 2012</td>
<td>50</td>
<td>M</td>
<td>Otalgia, hearing loss</td>
<td>Soft tissue mass extending along mastoid</td>
<td>T1: low SI; T2: mixed SI</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Abbey et al., 2008</td>
<td>57</td>
<td>M</td>
<td>No history available</td>
<td>No further data available</td>
<td>No further data available</td>
<td>No further data available</td>
</tr>
<tr>
<td>Kassamkhanji et al., 2013</td>
<td>58</td>
<td>M</td>
<td>Facial nerve palsy; painful ear; Swollen mastoid</td>
<td>X-ray: chondroid tissue</td>
<td>Not performed</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Kimura et al., 2009</td>
<td>40</td>
<td>M</td>
<td>Facial weakness, otalgia, tinnitus, blocked hearing</td>
<td>Soft tissue mass extending along mastoid</td>
<td>Not performed</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Le.MeR et al., 2017</td>
<td>72</td>
<td>M</td>
<td>Otalgia, headache</td>
<td>Soft tissue mass extending along mastoid</td>
<td>T1: low SI; T2: mixed SI</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Oh et al., 2013</td>
<td>25</td>
<td>F</td>
<td>Conductive hearing loss; Swollen EAC</td>
<td>Soft tissue mass extending along mastoid; Lodestones x2</td>
<td>T1: intermediate SI; T2: heterogeneous CE</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Oh et al., 2013</td>
<td>76</td>
<td>F</td>
<td>Tympanic membrane</td>
<td>Soft tissue mass extending along mastoid; Lodestones x2</td>
<td>T1: intermediate SI; T2: heterogeneous CE</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Pinto-Cumbe et al., 2013</td>
<td>35</td>
<td>M</td>
<td>Conductive hearing loss; Swollen EAC</td>
<td>Soft tissue mass extending along mastoid; Lodestones x2</td>
<td>T1: intermediate SI; T2: heterogeneous CE</td>
<td>Microsurgery</td>
</tr>
<tr>
<td>Thomson et al., 2009</td>
<td>73</td>
<td>F</td>
<td>Facial nerve palsy; pain; Swollen mastoid</td>
<td>Soft tissue mass extending along mastoid; Lodestones x2</td>
<td>T1: intermediate to low SI; T2: high SI</td>
<td>Microsurgery</td>
</tr>
</tbody>
</table>

ca = calcifications; CE = contrast enhancement; EAC = external auditory canal; NA = not available; SI = signal intensity

Overview of all published cases of chondromyxoid fibroma (CMF) in the mastoid

Area of Interest: Education;
Imaging Technique: RIS;
Procedure: Education;
Special Focus: Tissue characterisation;
References

[1] Jaffe HL, Lichtenstein L (1948) Chondromyxoid fibroma of bone; a distinctive benign tumor likely to be mistaken especially for chondrosarcoma Arch Pathol 45(4):541-51


Citation

Nicolas De Vos¹, ²
David Creytens³
Maritte De Cock\textsuperscript{4}  
Filip Vanhoenacker\textsuperscript{1, 2, 5}

1. Department of Radiology, Ghent University Hospital, Ghent University, Ghent  
2. Department of Radiology, AZ Sint-Maarten Duffel-Mechelen  
3. Department of Pathology, Ghent University Hospital, Ghent University, Ghent  
4. Department of Otorhinolaryngology, AZ Sint-Maarten, Duffel-Mechelen  
5. Department of Radiology, Antwerp University Hospital, Antwerp University, Antwerp (2017, Aug. 1)

\textbf{Chondromyxoid fibroma of the mastoid \{Online\}}

URL: http://www.eurorad.org/case.php?id=14843