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MRI features of spontaneous lateral temporal bone cephaloceles

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Purpose/Objectives: To determine the clinical presentation, location and MRI features of spontaneous lateral temporal bone cephaloceles. Spontaneous cephaloceles of the lateral temporal bone are an important and emerging clinical phenomenon. Diagnosis is often challenging due to the non-specific symptoms including hearing loss and middle ear fullness. Prompt and accurate diagnosis is essential as patients are at risk of meningitis. Imaging can have a crucial role in its diagnosis.

Methods and materials: A retrospective cohort study analysed patients with evidence of lateral temporal bone cephaloceles on imaging as defined by CSF or cerebrum traversing the tegmen tympani or mastoidaeum. Cases were identified from radiology and surgical databases between 01/01/2008 to 09/02/2022. Non-spontaneous cephaloceles and patients without 3D T2W imaging were excluded. Data collection included demographic information, presenting signs and symptoms, surgical history. Two head and neck radiologists analysed MRI pre-defined features.

Result: Thirty-one patients were included (M:14, F:17; mean age 58.9, age range 31-88 years). Five patients (16.1%) had bilateral defects. The total cohort included 38 lateral temporal bone cephaloceles. Twenty-two patients (61.1%) underwent surgical repair. Hearing loss (87.7%) was the most common symptom and 4 patients (12.9%) had meningitis. High T2W mastoid signal was found in 32/38 (88.9%) of all cases and 21/22 (95.4%) surgically confirmed cases. MRI imaging features of intracranial hyperintensity were seen in 9/38 (23.3%) of all cases and 6/22 (27.2%) surgically confirmed cases. The tegmen tympani was the most common site of defect found in 17/38 (47.2%) of all cases and 11/22 (50%) surgically confirmed cases. A high T2W CSF cleft, in continuity with an overlying sulcus, was identified in 22/38 (61.1%) cases overall and in 13/22 (59.1%) surgically confirmed cases. High T2W signal, at the margin or pointing towards the defect, was detectable in the 13/14 (92.8%) of the remaining total cases and in 8/9 (88.9%) of the remaining surgically confirmed cases.

Conclusion: The principle clinical and MRI features of spontaneous lateral temporal bone cephaloceles are described with a view to aiding their identification. A high T2W CSF cleft, either at the margin or in continuity with an overlying sulcus traversing the defect, is a potentially useful diagnostic feature.

MRI in the evaluation of the Eustachian tube cartilage in chronic otitis media

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Purpose/Objectives: In this paper, dimensions (length, thickness and volume) and anatomical changes (margins, structure) of the Eustachian tube cartilage (ETC) in patients with chronic otitis media (COM) using MRI are studied. The dimensions and anatomical parameters of ETC measured according to MRI data in patients with COM were compared with the control group and revealed their significant changes ($p < 0.001$).

Methods and materials: The study was performed in 1.5 T MRI in 56 Eustachian tubes (ET) in patients with COM obtaining axial and oblique parasagittal planes of ETC in T2FS, PDW and T1W images.



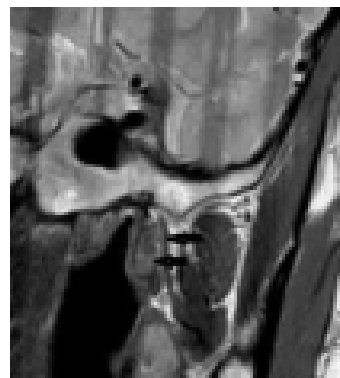
Slightly hyperintense signal of the ET cartilage (arrows) is shown in oblique parasagittal PDW image in the in a healthy person

Patients were aged 13 to 60 years. As a control group, data from MRI studies of 38 ET without middle ear pathology were used (individuals aged from 20 to 42 years).

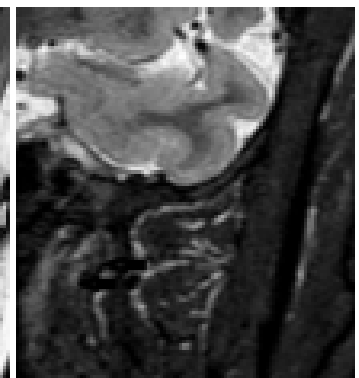
The anatomical parameters of the ET cartilage, such as length, thickness, and volume, were evaluated. ET cartilage margins and structure were assessed in T2FS and PDW images.

Result: Significant differences in the frequency of ETC anatomical parameters ($p < 0.001$) were established in patients with COM, such as margins irregularity (60.7±6.53%), structural heterogeneity (75.0±5.79%), compared with the control group (19.2±7.73% and 11.5±6.27% respectively).

The average values of the length, thickness and volume of the ET cartilage in patients with COM were $1.37±0.03$ cm, $0.39±0.01$ cm and $0.41±0.02$ cm³, in the control group $1.63±0.04$ cm, $0.49±0.02$ cm and $0.7±0.05$ cm³, respectively. When comparing the data of both groups, a significant decrease in ETC parameters was found in patients with chronic otitis media ($p < 0.001$).



Diffuse heterogeneity of the ET cartilage (arrows) is shown in oblique parasagittal PDW image in a patient with COM



Diffuse heterogeneity, margins irregularity and reducing the size of the ET cartilage (arrows) are shown in oblique parasagittal T2FS image in a patient with COM

Conclusion: To sum up, in patients with COM, changes in the parameters of the ETC appear to be distinguishable from the healthy people, which indicates a significantly smaller size of the cartilage in patients. The high frequency of occurrence of the anatomical changes of the ETC indicates degenerative changes in the cartilage, which should also play an important role in the functioning of the tube. The revealed morphological changes of the ETC may prevent the adequate functioning of the ET, aggravating the course of the inflammatory process in the middle ear.