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TOMOGRAPHIC GRADATION OF OTOSCLEROSIS USING THE SYMONS AND FANNING METHOD: A DOUBLE-BLIND STUDY TO EVALUATE ITS EFFECTIVENESS

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Abstract: Otosclerosis is a primary osteodystrophy of the otic capsule and is one of the main causes of deafness in adults. Several authors have used tomographic grading systems for otosclerosis in their studies, with the Symons and Fanning classification being one of the best known. This study aims to determine the degree of interobserver agreement of this classification. 31 patients with evidence of otosclerosis on Computed Tomography examination on at least one side were selected (77% had bilateral disease). Two neuroradiologists, certified by the Brazilian Society of Neuroradiology, classified the severity of the disease using the Symons/ Fanning classification system. The results showed great disagreement between the cases, with agreement only in 43.5% regarding the presence and degree of otosclerosis. There was absolute agreement between all cases classified as grade 3, with marked discrepancies between the others.

Keywords: otospongiosis, grades, classification, radiology, computed tomography.

INTRODUCTION

Otosclerosis is a primary osteodystrophy of the otic capsule (bony labyrinth of the inner ear), being one of the main causes of deafness in adults. Computed Tomography (CT) is often used as the preferred imaging modality for evaluation. Several authors have used tomographic grading systems for otosclerosis in their studies, with the Symons and Fanning classification being one of the best known.

CLASSIFICATION OF SYMONS AND FANNING

Symons and Fanning's tomographic classification system for otosclerosis was proposed in 2005, stratifying the disease into three distinct grades, characterized as follows:

- Grade 1: characterized by exclusively

fenestral involvement;

- Grade 2: covers the presence of irregularly located cochlear disease, with or without involvement of the oval window. According to the location of cochlear involvement, it can be subclassified into:

2A (involvement of only the basal cochlear turn);

2B (involvement of the middle/apical turns);

2C (involvement of both the basal and middle/apical turns);

- Grade 3: corresponds to confluent and diffuse cochlear involvement, with or without involvement of the oval window.

GOALS

This study aims to determine the degree of interobserver agreement of the Symons and Fanning classification for the grading of otosclerosis.

METHODS

A total of 31 patients with evidence of otosclerosis on Computed Tomography examination on at least one side were selected (77% had bilateral disease). As there was clinical suspicion of otosclerosis in all mastoids evaluated (even in cases where the diagnosis was unilateral), both sides were included in the study (62 in total).

Two neuroradiologists classified disease severity using the Symons/Fanning classification system, while both involved in image analysis in this study are certified by the Brazilian Society of Neuroradiology.

RESULTS AND DISCUSSION

The results showed great disagreement between the cases, with agreement in only 27 of the 62 cases (43.5%) regarding the presence and degree of otosclerosis. There was absolute agreement between all cases classified as grade 3, with marked discrepancies between the other classifications.

When considering the Grade 2 subclassifications as one, without differentiating each one into 2A or 2B or 2C, there was an improvement in agreement for 34 of the 62 cases (54.8%).

Below are examples of study cases and their respective classifications given by neuroradiologists.

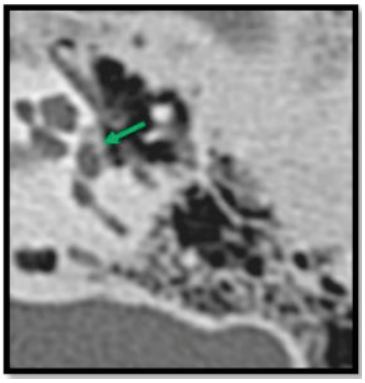

Figure 1. Axial images of a Computed Tomography of the temporal bones showing grade 1 otosclerosis in a 40-year-old patient, noting a small reduction in the usual bone density in the ante fenestram fisula (green arrow). There was agreement in the classification by both neuroradiologists.

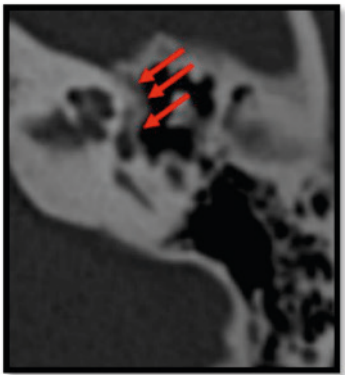

Figure 2. Axial images of a Computed Tomography of the temporal bones showing grade 3 otosclerosis in a 35-year-old patient, noting a significant reduction in the usual bone density in the ante fenestram fissula (red arrow). There was agreement in the classification by both neuroradiologists.

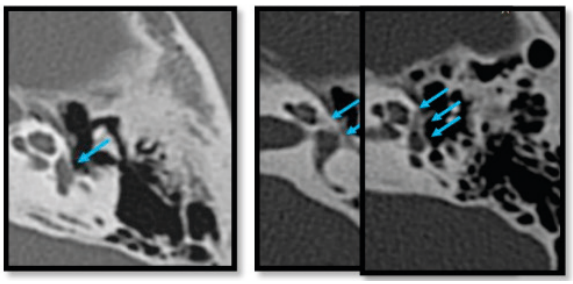

Figure 3: Examples of otosclerosis cases classified as grade 2, but without interobserver agreement in their subdivisions: Grade 2A x Grade 2B x Grade 2C, respectively. Note a reduction in density around different regions of the cochlea (blue arrows).

CONCLUSIONS

Our study questions the interobserver validity of the classification in question. Hypotheses that can be inferred from these data include that the subclassification of grade 2 loses its value in the face of possible heterogeneities in the ossification of the otic capsule, variants of normality and other adjacent anatomical structures that serve as confounding factors in the assessment. Questions also resurface regarding the value, prognosis and therapeutic implications that the classification brings to the patient. We also emphasize that there is a need for more robust studies regarding this for better elucidation.

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