The Posterosuperior Quadrant of the Tympanic Membrane

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Introduction

Shrapnell, taking into consideration the differences in tympanic structure and mobility, proposed its division into two parts: one, the posterosuperior, and the other, the pars flaccida. In the latter, he noted the anatomical and structural particularities that increase its fragility and lead it to a distinct form of behavior when submitted to pressure modifications, which is the basis of the physiopathology of many of the affections related with the eustachian tube, also revealing great clinical interest.

The posterosuperior quadrant of the tympanic membrane was described in 1948 by Cooper in the work “On the Functional Anatomy of the Tympanic Membrane.” This area is formed by a layer of radial fibres that leads from the malleus to the tympanic annulus. In 40% of the cases, besides this layer, a tight bundle of circular fibres close to the pars flaccida, lamina propria and pars tensa exists, in different thicknesses and shapes (table I). The posterosuperior quadrant is situated over the anterior part of the tympanic cavity, between the annulus and malleus, and covers the posterior border of the tympanic annulus. In this quadrant, contrary to what happens with the others, the annulus is reflect upon the border morphology, that becomes inexistent or that progressively becomes less evident (figure 4). Topographically, the portion of the sulcus situated above the corda tympani nerve corresponds to the edging away of the pars tensa and the pars flaccida. The sulcus is separated from the pars flaccida by a Bio-Rad brand name device without a coating system. Lastly, the study continued with the use of the scanning electron microscope (Jeol JMS 840), varying the magnification from 50 to 12000X, with an acceleration voltage of 20 kV.

Materials and Methods

The study of the lamina propria allowed verifying that the pars tensa fibres are organized according to two planes, separated by the emergence of the pars tensa lamina. Below the nerve, the annulus maintains the same characteristics of the anterior and inferior portions presenting itself always well defined, with a thickness between 0.5 and 0.9 mm on average, evident borders and with an irregular surface (figure 3.1). Above the nerve, the pars is no longer situated at the interface between the pars flaccida and the tympanic annulus and on the contrary, the space becomes larger, making it impossible to define the borders.

In reality, this area represents, as like the middle ear cavity, the foundation of cholesteatoma growth. If we analyze these retracted pockets, based upon the results obtained using the macro and microscopic anatomy of the tympanic membrane and the tympanic frame, we think it is possible, just as for the retracted pockets of the pars tensa, to explain its clinical consequences and to verify the hypothesis that a dynamic process, many times reversible even without treatment, which is an insufficiency associated to the areas of the tympanic membrane of less resistance.

The retraction process and the thickness changes in the pars flaccida, lamina propria and pars tensa are an important factor to explain the clinical events, as this is a dynamic process, many times reversible even without treatment, which is an insufficiency associated to the areas of the tympanic membrane of less resistance.

Study of the thickness and configuration of the tympanic membrane

Results

The results achieved the study of the tympanic membrane lead to the obtained values found grouped in tables I and II as also referred in figure 1 and 2, respectively.

Conclusion

The study confirmed that the posterosuperior quadrant is not affected by retracted pockets. The posterosuperior quadrant presents characteristics relative to the area, the lamina propria structure and the tympanic insertion that explains its high level of susceptibility to pressure changes in the cavity and explains the high incidence of retracted pockets and marginal perforations, the foundation of cholesteatoma growth.