**LITERATURE REVIEW ON THE FEASIBILITY OF MULTISPIRAL COMPUTED TOMOGRAPHY IN MIDDLE EAR INFLAMMATION**

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Chronic otitis media is usually classified according to severity and duration of the disease. Classification based on severity classifies chronic otitis media into mild, moderate and severe depending on the degree of middle ear involvement and associated complications.

Classification based on duration of disease, on the other hand, classifies chronic otitis media into chronic persistent otitis media (CPOM) and chronic recurrent otitis media (CROM) based on duration and frequency of episodes.

Cholesteatoma can be classified into congenital and acquired cholesteatoma. Congenital cholesteatoma is present at birth and is thought to result from abnormal embryonic development. In contrast, acquired cholesteatoma develops later in life as a result of chronic otitis media or tympanic membrane perforation. Adhesive otitis media is usually classified according to the duration and severity of the disease. It can be classified as acute serous otitis media, subacute serous otitis media or chronic serous otitis media, depending on the duration of fluid accumulation and associated symptoms.

**Anatomy of the middle ear:**

The middle ear region is located just behind the external ear canal. The tympanic membrane or eardrum serves as a septum separating the inner and outer ear.

The location of the middle ear just behind the tympanic membrane or eardrum makes direct non-invasive evaluation difficult and limited.

CT and other diagnostic imaging modalities can greatly assist in the evaluation of middle ear complications and disease. The air cavity of the middle ear:

The larger part of the middle ear is a pneumatised or air-filled chamber inside the stony part of the temporal bone. This chamber is called the tympanic cavity or tympanic membrane.

The temporal bones make up the lateral (lateral) base of the skull and form parts of the middle and posterior cranial fossae (depressions in the skull).

The tympanic lid, a protrusion of the stony part of the temporal bone, serves as the roof of the tympanic cavity.

Meanwhile, the tympanic membrane serves as the cavity wall or physical barrier to the outer ear.

**Bones of the middle ear:**

The tympanic cavity contains the three smallest bones of the human body:

- The malleus or hammer with a long handle attached to the centre

- The malleus or hammerhead, which connects the malleus and the stapes.

- The stirrup or stirrup, which has a footplate connected to the oval window of the inner ear or the window of the preauricle.

Together, these three bones are known as the ossicles. The ossicles are named for the shape they most closely resemble.

Together with the eardrum, the middle ear bones transmit sound vibrations to the **Inner ear. pathogenesis:**

Pathogenetic features of chronic otitis media depend on a combination of many factors - physical, infectious, thermal, chemical causes of the disease. In the majority of patients pathology develops as a result of not fully treated acute form of purulent otitis media. Various conditions that are accompanied by a sharp weakening of immunity also often become provocative moments. Still, the main reason for doctors is the entry of the staphylococcal pathogen into the middle ear, against the background of creating favourable conditions for the bacterium: weak immunity, frequent or chronic diseases of the nasopharynx, paranasal sinuses.

According to localisation, such forms of chronic middle ear disease are distinguished as mesotympanitis and epitympanitis.

Chronic purulent mesotympanitis may have different pathological and anatomical manifestations depending on the stage of the process. For example, the stage of remission is characterised by the presence of membrane perforation, with localisation in the distended area mainly in the subcentral region. In the case of large diameter perforations, one can see the handle of a hammer hanging loosely over the drum cavity. The borders of the perforation are thin or have the appearance of a compacted scar. The intact areas of the mtembrane appear normal, without characteristic changes. Closer to the medial wall of the cavity, the mucous tissue in the area of the promontory is moist and pale. In the acute stage of mesotympanitis, the visual picture changes dramatically. The external auditory canal is filled with a large amount of purulent mucous discharge. The preserved parts of the mucous membrane are reddened and thickened, and the mucous cavities are ooterfy and reddened. Formation of granulations and small polyps is possible.

Chronic purulent epitympanitis has other pathological and anatomical manifestations, as the process involves both the mucous tissue of the tympanic cavity and the bone tissue of the mastoid process. The inflammatory reaction spreads to the auditory ossicles, the antrum and cave, and the walls of the suprabarbital space. Because of these processes, the term ‘epitympanitis’ refers to pathology affecting the attico-antral zone. This variety is characterized by the marginal localisation of perforation in the unstretched segment of the membrane: it is in this area that there is no tendon ring of the drum. Because of these features, inflammation quickly spreads to the bone tissue, leading to the development of osteitis. The bone tissue is filled with thick pus, and there is a foul odour. In some cases, granulations may form. The term ‘cholestoma’ is used to describe a lung mass covered with multilayered squamous epithelium. The bone tissue is broken down by the cholestoma - previously referred to in medicine by another term ‘caries’. Increased formation can lead to forceful destruction in the temporal zone, which often causes the development of intracranial complications.

From a clinical and radiological point of view, there are a limited number of structures and pathological formations in the temporal bone with which it is necessary to be familiar in order to skilfully interpret the results of multislice computed tomography (MSCT) or magnetic resonance imaging (MRI) studies of the temporal bone. It is useful to study the region in an organised and systematic way, going through the same checklist of key structures each time. This is the first of a two-part review that presents a practical approach to understanding temporal bone anatomy, localising the pathological process with emphasis on inflammatory and tumour processes, identifying relevant positive and negative factors and making a differential diagnosis.

There are a limited number of structures and pathological lesions in the temporal bone with which it is necessary to be familiar in order to be able to interpret the results of MSCT or MRI of the temporal bone skilfully. It is useful to study the region in an organised and systematic manner, going through the same checklist of key structures each time. The temporal bones make up the lateral base of the skull, forming parts of the middle and posterior fossa. Each temporal bone consists of five bony parts: flat, mastoid, stony, tympanic, and styloid. Several internal canals, internal fractures and external sutures are often visible on CT images and can mimic fractures (pseudofractures). The main anatomical landmarks of the temporal bones are depicted on axial and coronal CT images and are described in the following subsections.

**Pathophysiology:**

The ciliated, pseudolayered columnar epithelium of the respiratory tract extends up the eustachian tube to the anterior part of the middle ear cavity. Due to the presence of bocaloid cells and mucus-secreting glands, this epithelium is capable of producing mucus. Posteriorly, the mucosa changes irregularly into a simple cuboidal or multilayered epithelium without secretory elements. The medial part of the tympanic membrane and the air cells of the mastoid process are lined with a single layer of cells, the shape of which varies from cuboidal to flat. In the early stages of inflammation, irrespective of the cause, vasodilation of submucosal tissues occurs. Glandular secretion is stimulated by the production of a thin mucoid fluid. Some epithelial cells die and bacteria, which are normally found in this area, multiply on the denuded areas and aggravate the condition. Neutrophils in the blood cause a polymorphonuclear reaction, resulting in a mucopurulent discharge. These secretions may remain stagnant in the middle ear and mastoid air cell system due to immobility or loss of cilia, including in the eustachian tube.

Dissolution often occurs, but if the condition is prolonged for any reason, such as failure of secretion to drain down the eustachian tube, the number of glands and bocaloid cells increases, and areas previously covered by cuboidal or squamous epithelium become areas of similar but perhaps less differentiated pseudolobular columnar epithelium. Differentiation into squamous epithelium, most often neocorneal, may also occur.Granulation tissue occurs as a result of non-resolution of the inflammatory process. Localised areas of mucosa become hyperplastic with invasion of fibroblasts, capillaries, macrophages, plasma cells and lymphocytes. Granulation tissue may be covered by all types of mucous membranes described above, but because the tissue is often ulcerated, it has no mucous membrane.

Anatomical considerations also contribute to the pathophysiology of middle ear disease. The Eustachian tube plays an important role in the regulation of middle ear pressure, protection against pressure and discharge from the nasopharynx, and clearance (into the nasopharynx) of secretions produced in the middle ear. The Eustachian tube has been found to be highly malleable in infants and young children, providing the Eustachian tube with abnormal patency. The greater permeability of the Eustachian tube not only allows gas to flow freely from the nasopharynx to the middle ear, but also facilitates access for unwanted nasopharyngeal secretions. This increases the likelihood of infection. The length of the eustachian tube is another key anatomical factor in the pathogenesis of inflammatory middle ear disease. The shorter the tube, the more likely it is that secretions can reflux into the middle ear. For example, young children with cleft palate and children with Down syndrome have statistically shorter eustachian tubes than controls of the same age up to 6 years, which may explain the frequent occurrence of unpleasant otorrhoea in these populations.

In conclusion, chronic middle ear disease includes a variety of diseases that affect the middle ear over a long period of time. These diseases can lead to significant complications, including hearing loss and hearing loss. Understanding the definition and classification of chronic middle ear diseases is critical for effective management and prevention. By classifying these conditions according to their underlying causes, clinical features and treatment options, health care providers can provide individualised interventions to improve the condition.

**Literature**

1. Bodrova I. V. Multispiral computed tomography in the diagnosis of middle ear diseases // Medical imaging. – 2010. – No. 3. – pp. 19-32. URL: https://elibrary.ru/item.asp?id=15649559

2. Boyko N. V., Kolesnikov V. N., Soroka G. G. Computed tomography in the diagnosis of ear diseases in children // Medical Bulletin of the South of Russia. – 2012. – No. 2. – pp. 22-25. URL: https://cyberleninka.ru/article/n/kompyuternaya-tomografiya-v-diagnostike-zabolevaniy-uha-u-detey .

3. V.V. Pak The importance of multispiral computed tomography of the temporal bone in the diagnosis of pathology of the structures of the middle ear // Bulletin of KazNMU. 2014. №2-3. URL: https://cyberleninka.ru/article/n/znachenie-multispiralnoy-kompyuternoy-tomografii-visochnoy-kosti-v-diagnostike-patologii-struktur-srednego-uha

4. Vasiliev A. Yu. et al. Modern methods of diagnosis of chronic purulent otitis media // Medical Bulletin of the Ministry of Internal Affairs. – 2007. – №. 1. – Pp. 13-17. URL: https://elibrary.ru/item.asp?id=9437030

5. Vakhrushev S. G., Kuzovkov V. E., Golofaev D. O. Review of methods of endoscopic intraluminal examination of the auditory tube // Russian otorhinolaryngology. – 2018. – №. 6 (97). – Pp. 83-90. URL: https://cyberleninka.ru/article/n/obzor-metodov-endoskopicheskogo-vnutriprosvetnogo-issledovaniya-sluhovoy-truby (date of application: 03/14/2024).

6. Vishnyakov V. V., Talalaev V. N., Atlashkin D. N. Evaluation of the effectiveness of using a CO2 laser in the surgical treatment of patients with acute otitis media with effusion // Laser medicine. – 2019. – Vol. 23. – No. 2. – pp. 22-26. URL: https://goslasmed.elpub.ru/jour/article/view/463 (date of reference: 03/14/2024).

7. Vorobyova L. E., Kustova O. V. The role of multispiral computed tomography in pediatrics // Diagnostic issues in pediatrics. - 2009. – No. 3. – pp. 39-44. URL: https://elibrary.ru/item.asp?id=12861695

8. Gamirovna E., Veselova T. List of dissertations defended in 2014 URL: https://elibrary.ru/item.asp?id=23732552 (date of application: 03/14/2024).

9. Garashchenko T. I. Nasal breathing difficulties in children: diagnosis and principles of treatment // Pediatrics. The journal named after G. Speransky. – 2008. – Vol. 87. – No. 5. – pp. 65-72. URL: https://cyberleninka.ru/article/n/zatrudnennoe-nosovoe-dyhanie-u-detey-diagnostika-i-printsipy-lecheniya.

10. Garashchenko T. I., Bogomilsky M. R., Radzig E. Y. Synopret in the treatment of diseases of the nasal cavity, paranasal sinuses and middle ear // Russian rhinology. – 2002. – Vol. 3. – pp. 38-42. URL: https://medi.ru/info/9136 /).

11. Garov E. V. Chronic purulent otitis media: terminology, diagnosis and therapeutic tactics // RMZH. – 2011. – Vol. 19. – No. 6. – pp. 390-393. URL: https://elibrary.ru/item.asp?id=20168619 (date of reference: 03/14/2024).

12. Garov E. V., Garova E. E. Modern principles of diagnosis and treatment patients with chronic purulent otitis media // Breast cancer. – 2012. – Vol. 20. – No. 27. – pp. 1355-1359. URL: https://elibrary.ru/item.asp?id=18428028 (date of application: 03/14/2024).