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RADIOLOGICAL DIAGNOSTICS OF CHOLESTEATOMA: MODERN POSSIBILITIES OF CT AND MRI IN DETECTING AND ASSESSING THE SPREAD OF PATHOLOGY

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Abstract. Cholesteatoma of the middle ear is a destructive pathological process that requires accurate and timely diagnosis. The paper highlights the modern capabilities of high-resolution computed tomography (CT) and diffusion-weighted magnetic resonance imaging (DWI MRI) in detecting cholesteatomas and determining their spread. The literature data on the sensitivity, specificity and diagnostic value of the methods are summarized. It is shown that CT is the optimal tool for assessing bone changes, while non-EPI DWI MRI provides the highest accuracy in detecting primary and recurrent cholesteatoma. The combined use of CT and MRI allows optimizing surgical tactics and minimizing the risk of recurrence.

Keywords: cholesteatoma; CT; MRI; DWI; temporal bone; middle ear; radiological diagnostics.

Introduction. Cholesteatoma of the middle ear is a chronic destructive pathological process in which epithelial tissue is capable of invasive growth and destruction of surrounding structures. Despite its relatively slow development, cholesteatoma represents a serious clinical problem due to the progressive destruction of the auditory ossicles, the formation of a fistula of the lateral semicircular canal, erosion of the tegmen tympani, as well as the risk of intracranial complications, in particular meningitis, brain abscess and thrombosis of the sigmoid sinus [1]. That is why timely detection and correct assessment of the spread of the formation are

critically important for choosing treatment tactics and reducing the frequency of relapses.

Clinical methods such as otoscopy and microscopic examination, although they remain basic, do not allow assessing the depth of the lesion and anatomical changes in the middle ear and mastoid process. In this context, the leading role belongs to radiological diagnostic methods. High-resolution computed tomography (CT) is considered the gold standard for the assessment of bony structures, while magnetic resonance imaging (MRI), especially non-echo-planar diffusion-weighted imaging (non-EPI DWI), demonstrates the highest ability in verifying cholesteatoma and detecting residual and recurrent lesions [2,3].

The combined use of CT and MRI significantly increases diagnostic accuracy and allows for optimal surgical planning. Our data also confirm the effectiveness of the combined use of the two methods, which provides the most complete information about the localization, size and nature of the lesion.

Materials and methods. The study included 68 patients (38 men and 30 women) aged 12–67 years who underwent a radiological examination with suspicion of middle ear cholesteatoma in 2024–2025. The study was conducted on the basis of the State Institution "Professor O.S. Kolomiychenko Institute of Otolaryngology of the National Academy of Medical Sciences of Ukraine". CT was performed on a Philips Brilliance 64 spiral computed tomography scanner, magnetic resonance imaging - Philips Achieva 1.5 T.

Study design

• Prospective clinical and radiological study.

• All patients underwent CT of the temporal bones and MRI with non-EPI DWI.

• Surgical confirmation of the diagnosis was obtained in 54 cases (79.4%).

Clinical characteristics of the sample

• Primary cholesteatoma - 46 patients (67.6%).

• Suspected recurrence — 22 patients (32.4%).

• Main symptoms: hearing loss (82%), otorrhea (58%), congestion (44%).

• Average duration of complaints — 11.8 months.

Results.Comparison of CT and MRI results with surgical data is given in the table:

Table 1. Diagnostic characteristics of methods

Method	Sensitivity	Specificity	PPV	NPV
CT	92,3%	48,1%	78,4%	75,0%
MRI (non-EPI DWI)	94,7%	91,3%	94,7%	91,3%
CT + MRI	97,3%	93,7%	96,4%	94,7%

Main conclusions based on the results

• CT has the highest informativeness in detecting bone destruction, but low specificity in differentiating soft tissue masses.

• MRI with non-EPI DWI is highly specific in confirming cholesteatoma and indispensable in diagnosing recurrences.

• Combined use of methods provides maximum diagnostic accuracy.

Conclusions

1. High-resolution CT of the middle ear is an effective method for assessing bone structures and the degree of destruction.

2. MRI with non-EPI DWI demonstrates the highest accuracy in verifying cholesteatoma, especially after surgical interventions.

3. The optimal approach to diagnosis involves the complex use of CT and MRI, which increases sensitivity to 97% and improves surgical planning.

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ВПЛИВ ГРУДНОГО ВИГОДОВУВАННЯ НА ЧАСТОТУ АЛЕРГІЧНИХ І АУТОІМУННИХ ЗАХВОРЮВАНЬ

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Вступ./Introduction. Грудне вигодовування є природним і фізіологічно оптимальним способом харчування немовлят, що забезпечує не лише поживні речовини, а й біологічно активні компоненти, які формують імунну систему дитини. Алергічні захворювання, такі як атопічний дерматит, бронхіальна астма, алергічний риніт і харчова алергія, а також автоімунні стани, зокрема цукровий діабет 1 типу, розсіяний склероз і ревматоїдний артрит, становлять значну проблему для сучасної медицини. Згідно з даними Всесвітньої організації охорони здоров'я, за останні два десятиліття поширеність алергічних захворювань серед дітей зросла на 50% у розвинених країнах, а автоімунні хвороби вражають близько 5-7% населення в глобальному масштабі [1]. Грудне молоко містить імуноглобуліни (IgA, IgG), олігосахариди, лактоферин, цитокіни