



Journal Website:
<https://theusajournals.com/index.php/ijmscr>

Copyright: Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

THE ROLE OF HIGH-RESOLUTION MSCT IN THE DIAGNOSIS OF OSSICULAR CHAIN DISORDER TYMPANOSCLEROSIS

Submission Date: October 17, 2023, Accepted Date: October 22, 2023,

Published Date: October 27, 2023

Crossref doi: <https://doi.org/10.37547/ijmscr/Volume03Issue10-11>

Kakharov A.J.

Researcher Tashkent State Dental Institute, Uzbekistan

Zokirova Z.J.

Researcher Tashkent Medical Academy, Uzbekistan

ABSTRACT

To review the effectiveness of high-resolution computed tomography in making a diagnosis of tympanosclerosis and its reliability in predicting the postoperative period based on the result of hearing restoration, also based on radiological and surgical data. Methods: A retrospective survey was conducted in diagnostic and treatment institutions, and tympanoplasty was performed for chronic suppurative otitis media (CSOM) 200 ear. In March 2020 and 2021 of the same month, preoperative MSCT images of the temporal bone were reviewed, to verify the prognosis of tympanosclerosis and the integrity of the auditory ossicles. The integrity of the ossicular chain was checked both preoperatively and postoperatively using audiometry (air-bone conduction (ABG)) and the results were assessed: postoperative successful outcome was a tone frequency and sound volume level of 20 dB or less. Results: The study was conducted on 200 ears that underwent tympanoplasty for CSOM, of which 130 out of 200 (49%) ears had tympanosclerosis localized in the eardrum, discovered during surgery (tympanoplasty), ears were affected in 41 out of 130 (30, 1%), Incus-malleus ossicular ligament disorders occurred in 19 of 41 ears. 11 ears with a disorder of the stapes bone, and 6 with a disorder of the connection of all three bones. In the remaining 70 cases, a scan of the temporal bone revealed the integrity of all hearing bones and their conductivity. After 6 months, during repeated observation of patients, audiological results of fixation with sensitivity were obtained

(95.1%) and specificity (93.8%). Conclusions: Based on the conducted research, it is possible to draw the following conclusion: for otolaryngologists, MSCT in combination with clinical data serves to effectively assess the extent of the lesion, as well as inform for the postoperative prognosis for tympanosclerosis.

KEYWORDS

Chronic suppurative otitis media, MSCT of the middle ear, reconstruction of the auditory ossicular chain, tympanoplasty, tympanosclerosis.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is one of the most common recurrent infections of the middle ear or mastoid process (mastoiditis) and is an inflamed process of the mucous membrane of the middle ear and is characterized by the presence of persistent perforation of the eardrum [1,4]. CSOM is considered one of the leading causes of conductive hearing loss in adults, which is secondary to damage to the eardrum and middle ear ossicles [4].

Tympanosclerosis is accompanied by the deposition of hyalinized collagen in tympanic cavity. On the middle ear cavity or on the tympanic membrane, this picture looks like unifocal or multifocal punctate or arachnoid calcifications [3]. On CT of the tympanic cavity, the localization is not definite and is presented as focal calcified compactions in the middle ear cavity along with the tendons opposite the chain of auditory ossicles [5,7]. It is found in 10%-40% case of CSOM sufferers [3].

In most cases with Tympanosclerosis, the lesions are localized in the eardrum (50%). In 30% of cases, the ligaments of the auditory ossicles, interosseous joints, muscle tendons and submucosa are destroyed. In 20% of cases with tympanosclerosis, a mixed type of damage is observed both the eardrum and the structures of the middle ear. Intratympanic CT leads to hearing loss since it mainly affects the small structure of the middle ear, involving 35-45% of the auditory ossicles.

The operations performed to restore the eardrum and restore the auditory ossicles are concentrated on eliminating the disease and restoring hearing [6].

For otolaryngologists, CT scanning in combination with clinical data serves to effectively assess the extent of the lesion, as well as informative for the postoperative prognosis for tympanosclerosis on computed tomography: ossified or calcified areas with high density soft tissue in the middle ear cavity, resulting in ovoid, linear or

web form and this provides information about the condition of the chain of auditory ossicles and, of course, directly determines the further course and prognosis of ear surgery [7,9,10].

The study was conducted to evaluate the potential value of HRCT in OCF prediction in CSOM. The results of this study can serve as a way for patients to obtain accessible information about downtime activities and accordingly discuss possible issues that may arise before surgery. The main purpose of this study was to determine the reliability High-resolution CT (HRCT) in diagnostics tympanosclerosis based on comparison of radiological and surgical findings [3,7].

Results. The study included 130 patients (200 ears) with CSOM who underwent tympanoplasty of one or both ears. The average age range was from 5 to 50 years with a male-to-female ratio of 1.7. Of the 200 ears with CSOM (98/200), 49% had tympanosclerosis during revision of the middle ear during tympanoplasty.

Tympanosclerosis located on the eardrum (myringosclerosis) in 57 of 98, 58.2% of affected ears. Tympanosclerosis with damage to the auditory ossicles was 41 out of 98, 41.8%. With impaired fixation of the auditory ossicles (Ossicular tympanosclerosis) distributed as follows:

19 out of 41 (46.3)% with incus-malleus fixation, 11 (26.8%) with stapes.

With violation of triple fixation 6 (14.7%).

X-ray data and clinical and radiological indicators

Of 200 ears, preoperative CT revealed cases with disruption of the ossicular chain in 69 (34.5%), 48 with incus-malleus fixation, 17 with stapes fixation, and 4 with complete osseous fixation.

Preoperative X-ray picture with suspicion of tympanosclerosis with impaired fixation of the auditory ossicles was in the 64 ears were distributed as 36 of 56 ears with suspected incus-malleus fixation, 14 of 19 with stapes fixation, and 3 of 4 with triple fixation.

The overall conclusion from the study is that CT is an invaluable information method in the preoperative diagnosis of the integrity of the auditory ossicular chain.

CONCLUSION

Our study once again shows that CT of the temporal bone remains one of the important methods in making the correct diagnosis, as well as predicting the postoperative outcome. With all this, CT in combination with clinical data will serve in diagnose the etiology of hearing loss and identify the localization tympanosclerosis, in patients with chronic otitis media and conductive hearing loss and in preoperative assessment for otolaryngologists.

REFERENCES

1. Modern principles of diagnosis and treatment of patients with chronic purulent otitis media
Garov E.V., Garova E.E. // RMZh.-2012.- No. 27.- P.1355-1359
2. Modern approaches to the diagnosis and treatment of exacerbations of chronic suppurative otitis media in children Baranov K.K., Bogomilsky M.R., Minasyan V.S. // Bulletin of the Russian State Medical University. 2015. No. 1.-P.41-45
3. Multislice computed tomography in the diagnosis of diseases of the middle ear Bodrova I.V.//Medical visualization.-2010.-No.3.-S. 19-32
4. Computed tomography in the diagnosis of mastoid structure types in normal conditions and in chronic otitis media Skakun M.A., Skakun A.V., Dubinets I.D. // Bulletin SMUS74. 2019. No. 1 (24).- P.64-67
5. Computed tomography as a way to study the structure of the temporal bone and identify possible causes of hearing loss in children
Dmitrieva A.N. // Healthcare of Chuvashia.- 2016.-No.2.-S. 42-45
6. Assessment of surgically significant anthropometric indicators of the structures of the middle ear using cone-beam computed tomography (CBCT) Elizaveta Antonovna
Azovtseva // Russian Otorhinolaryngology. 2015. No. 2 (75).-P.
7. Surgically significant features of the anatomical structure of the labyrinthine wall of the tympanic cavity in patients with otosclerosis, identified by cone-beam computed tomography.
Azovtseva E.A., Zubareva A.A., Filimonov V.N. // Russian otorhinolaryngology. 2016. No. 3 (82).-P.11-15
8. The Role of Preoperative Computed Tomography of Temporal Bone in Atticotomy as a New Tool for Determining the Approach. Abdelaziz AA//Indian J Otolaryngol Head Neck Surg. 2019 Nov;71(Suppl 2):1272-1275.
9. Evaluation of the Mastoid Emissary Canals with Computerized Tomography in Patients with Chronic Otitis Media. Ozen O, Sahin C.//J Neurol Surg B Skull Base. 2020 Feb;81(1):82-87. doi: 10.1055/s-0039-3399518
10. Fusion of Computed Tomography and PROPELLER Diffusion-Weighted Magnetic Resonance Imaging for the Detection and Localization of Middle Ear Cholesteatoma. Locketz GD, Li PM, Fischbein NJ, Holdsworth SJ, Blevins NH. //JAMA Otolaryngol Head Neck Surg. 2016 Oct 1;142(10):947-953