

Improving Surgical Approaches to the Treatment of Chronic Purulent Middle Otitis in Childhood

Boboyorov Rasul Abdullo ugli

*Department of Otorhinolaryngology, pediatric otorhinolaryngology
Tashkent State Medical University*

Abstract: Chronic purulent otitis media (CHSO) remains one of the most pressing problems in modern pediatric otorhinolaryngology, representing a socially significant disease with high prevalence in the pediatric population. According to the World Health Organization, 65 to 330 million people worldwide suffer from chronic forms of otitis media, with 60% of cases occurring in childhood. It is particularly concerning that the incidence of CHSO in the child population continues to grow, despite the improvement of methods for the prevention and treatment of acute otitis media.

Keywords: chronic purulent otitis media, mesotympanitis, epitympanitis, cholesteatoma, mastoiditis, otogenic complications, recurrent otitis, conductive hearing loss

Introduction. The anatomical and physiological features of childhood, including the horizontal location and insufficient length of the eustachian tube, immaturity of the immune system, frequent respiratory infections, and adenoid vegetations, create prerequisites for the development of chronic inflammatory processes in the middle ear. These factors determine the specific pathogenetic mechanisms of CGS development in children, differing from those in adult patients, which requires a differentiated approach to the diagnosis and treatment of this disease. The clinical course of CCSO in childhood is characterized by a variety of forms and variants, including mesotimpanitis, epitympanitis, and mixed forms, each of which has its own features of pathomorphological changes and requires an individual therapeutic approach. Treatment of the complicated forms of SCS, which are accompanied by destructive changes in the auditory ossicles, the development of cholesteatoma, mastoiditis, and intracranial complications, presents a particular complexity.

Conservative therapy of CGSS in children, including antibacterial, anti-inflammatory, and local therapy, despite its importance, is often insufficiently effective in the presence of irreversible morphological changes in the structures of the middle ear. This necessitates the use of surgical treatment methods aimed at sanitizing the focus of infection, restoring the anatomical integrity and functional activity of the sound-conducting apparatus.

Traditional surgical approaches to treating SCS in children, including radical surgery on the middle ear, general cavity trepanation of the mastoid process, and hearing-improving surgeries, have demonstrated their effectiveness in treating the purulent focus and preventing complications over many decades of use. However, long-term observation results show a high frequency of disease relapses, unsatisfactory functional outcomes, and the development of late complications, which stimulates the search for more effective surgical solutions.

The development of modern technologies in otorhinolaryngology, including endoscopic surgery, microsurgical techniques, the use of high-resolution surgical microscopes, and the introduction of new materials for the reconstruction of the auditory ossicles, opens up broad prospects for improving surgical approaches to treating CGSM in children. Endoscopic surgery of the middle ear allows for minimally invasive interventions with excellent visualization of anatomical structures, which is especially important in pediatric practice.

Particular attention is paid to organ-preserving surgical techniques aimed at maximizing the preservation of the anatomical structures of the middle ear while simultaneously achieving radical sanitation of the infection focus. The use of closed methods of tympanoplasty, including the "infect

canal wall" technique and modified variants of mastoidectomy, demonstrates promising results in the child population.

Modern approaches to reconstructive surgery of the middle ear in children include the use of autotransplants, allotransplants, and synthetic materials to restore the integrity of the tympanic membrane and the chain of auditory ossicles. The choice of optimal material and reconstruction technique depends on many factors, including the patient's age, the degree of destructive changes, the condition of the middle ear mucosa, and the function of the eustachian tube.

An important aspect of modern SCS surgery in children is a personalized approach to choosing surgical tactics based on a comprehensive assessment of clinical, audiological, radiological, and endoscopic data. Preoperative diagnostics using high-resolution computed tomography of the temporal bones allows for a detailed assessment of the prevalence of the pathological process, the condition of the auditory ossicles, and the identification of possible anatomical anomalies. Surgical treatment of SCS in children requires consideration of the characteristics of the growing organism, including the ongoing formation of temporal bone structures, the development of pneumatization of the mastoid process, and changes in the size and configuration of the middle ear. These factors influence the choice of surgical equipment, materials for reconstruction, and the prognosis of long-term treatment outcomes. Postoperative management of children with CGS has its own characteristics related to the need to prevent postoperative complications, correct comorbidities (adenoid vegetations, allergic rhinitis), and carry out comprehensive rehabilitation, including audiological monitoring and, if necessary, hearing replacement.

Assessment of the effectiveness of surgical treatment of SCS in children should include not only the immediate results of the operation, but also long-term outcomes, assessed according to the criteria of sanitization of the infection focus, restoration of auditory function, patient quality of life, and frequency of disease recurrence. Modern assessment methods include objective audiometry, impedance measurement, endoscopic monitoring of the postoperative cavity, and quality of life questionnaires.

The interdisciplinary approach to managing children with CCS, including collaboration between otorhinolaryngologists, pediatricians, audiologists, allergists, and speech therapists, ensures comprehensive patient rehabilitation and optimization of long-term treatment outcomes. Work with parents and guardians, aimed at ensuring adherence to treatment and prevention of disease recurrence, is of particular importance.

This study is aimed at analyzing modern trends in the surgical treatment of SCS in children, assessing the effectiveness of various surgical approaches, and developing optimal algorithms for choosing surgical tactics, taking into account the individual characteristics of each patient and modern technical capabilities.

Purpose of the study: to improve the surgical approach in the treatment of chronic purulent otitis media in childhood.

Materials and methods of research. The scientific work was carried out in the pediatric otorhinolaryngology department of the clinic of the Tashkent Pediatric Medical Institute and the "Happy Life Medica Centre" clinic. The study group included 80 children aged 3 to 18 years with various forms of chronic purulent otitis media who sought outpatient and inpatient treatment in 2022-2024, and the control group included 30 practically healthy children. All examined sick children were divided into 3 groups.

Results. Clinical examination and dynamic observation of patients were systematically recorded in a specially developed questionnaire. It consistently recorded all the data of sick children, including complaints, anamnesis data and the time of SCS onset, its duration, periods of exacerbation and remission, results of objective examination of the state of internal organs, all data of laboratory and instrumental studies, as well as information about other somatic diseases.

The anamnesis, i.e., the results of the conducted survey-interview, allowed for the identification of specific clinical signs of chronic HCG in these patients. After a thorough examination of the complaints and medical history of all patients, visual examination of all ENT organs was conducted. When collecting the anamnesis of patients with CGS for scientific work, we recorded the most important factors in the questionnaire from a multitude of factors that determine the diagnosis and treatment tactics. Also, all examination data, information about the presence of concomitant diseases in the patient, as well as information about their dispensary observation, were entered for the diagnosis of CGS.

All observed sick children were examined in 3 stages. The first stage of the examination included a general clinical survey of patients, including a complete anamnesis, a detailed study of complaints, the study and registration of general clinical signs, such as the origin and duration of the disease, previous treatment by the patient's parents and its effectiveness, as well as the patient's age and sex.

The second stage of examination includes objective methods characterizing the state of the pathological process in the patient, the degree of activity and the features of the disease, as well as the structural disorders present at the moment in the nose and paranasal sinuses, pharynx, and ear. In addition, it includes the analysis of the results of functional research methods, endoscopic and microscopic examinations of ENT organs, audiological research methods, as well as radiation diagnostic methods such as multispiral computed tomography and, if necessary, magnetic resonance imaging.

In the final, third stage, microbiological studies of pathogenic pathogens causing functional disorders of the pathological process in the ear area in patients under observation were conducted. This included taking a smear from the external auditory canal and tympanic cavity, examining the bacteriological microflora of external auditory canal washings obtained by washing, and pathological masses obtained directly during surgery, as well as determining sensitivity to medications during dynamic observation before and after treatment depending on the result obtained.

When distributing the observed sick children by age, we divided them into the following groups: preschool age - 19 (17.3%), primary school age - 28 (25.4%), middle school age (adolescence) - 31 (28.2%), and high school age (adolescence) - 32 (29.1%). Of the total number of patients, the largest group consisted of children of high school age.

In addition, all the above-mentioned clinical studies were conducted against the background of inpatient treatment of patients after conservative and surgical interventions. Repeated examinations were conducted 1, 3, 6, and 12 months after inpatient treatment to monitor the dynamics, and all obtained indicators were regularly recorded in specially developed individual patient observation records. It is noteworthy that during the rehabilitation process after treatment for a year, we limited ourselves only to otomicroscopy, otoendoscopy, acuminometry, tonal threshold audiometry, and questionnaire data obtained from interviews with parents. From the radiation examination methods, we did not consider it necessary to repeat MSCT and MRI before one year of age, as the obtained data, firstly, may be insufficiently informative, and secondly, to avoid excessive exposure of the child, we prescribed MSCT after 12 months and conducted a comparative analysis with the previous data.

Conclusions: Modern surgical approaches to treating CGSM in children should be based on the principles of personalized medicine, taking into account age-related anatomical and physiological characteristics, the form and prevalence of the pathological process, the state of auditory function, and comorbidities. Individualization of surgical tactics allows achieving optimal results in the sanitation of the infection focus with minimal risk of postoperative complications. Endoscopic technologies in mid-ear surgery demonstrate significant advantages compared to traditional microscopic techniques, providing excellent visualization of difficult-to-access anatomical areas, the ability to perform minimally invasive interventions, and reduced intraoperative tissue trauma. The use of endoscopic surgery in children reduces the duration of surgery and the postoperative rehabilitation period.

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