

**ҚАНДЛИ ДИАБЕТ 1-ТУРИ ФОНИДА РИВОЖЛАНГАН ЎТКИР  
ЙИРИНГЛИ ЎРТА ОТИТНИНГ КЛИНИК ХУСУСИЯТЛАРИ ВА  
ЛАБОРАТОР ВА ИНСТРУМЕНТАЛ КЎРСАТКИЧЛАРИ БАХОЛАШ.**

Қурбонов М.К.

[orcid.org/0009-0003-2716-0688](https://orcid.org/0009-0003-2716-0688)

**Бухоро Давлат Тиббтиёт Институти 2-Педиатрия кафедрa доценти, PhD.**

**Аннотация.** Ўтказилган текширув асосида ЎЙЎОнинг клиник кўринишларининг қуйидаги хусусиятлари аниқланган. Шундай қилиб, қандли диабет фонида ривожланган ўткир йирингли ўрта отитда бемор бола қулоғидан тўсатдан йиринг оқиши (77,5%), қулоқ оғриғи ва қулоқ тикилиши ёки эшитиш қобилиятининг пасайиши ( 82,5%), шунингдек иситма ва бош оғриғи (52,5% ва 67,5%) шикоятлари кузатилган.

**Калит сўзлар:** ўрта отит, қандли диабет, болалар, иммунология, оториноларингология.

Иқтибослик учун: Қурбонов М.К. Ўткир йирингли ўрта отитнинг клиник хусусиятлари ва лаборатор ва инструментал кўрсаткичлари баҳолаш.

**CLINICAL FEATURES AND ASSESSMENT OF LABORATORY AND  
INSTRUMENTAL PARAMETERS OF ACUTE PURULENT OTITIS  
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**Kurbanov M.K.**

[orcid.org/0009-0003-2716-0688](https://orcid.org/0009-0003-2716-0688)

PhD, Associate professor, Department of Pediatrics, Bukhara State Medical  
Institute

**Abstract.** Based on the conducted examination, the following features of the clinical manifestations of acute purulent otitis media were identified. Thus, in acute purulent otitis media developed against the background of diabetes mellitus, the patient's child complained of sudden discharge of pus from the ear (77.5%), earache and ear congestion or decreased hearing (82.5%), as well as fever and headache (52.5% and 67.5%).

**Keywords:** otitis media, diabetes mellitus, children, immunology, otorhinolaryngology.

**For reference:** Kurbanov M.K. evaluation of clinical characteristics and laboratory and instrumental indicators of acute purulent otitis media.

## **ASSESSMENT OF CLINICAL FEATURES AND LABORATORY– INSTRUMENTAL PARAMETERS OF ACUTE PURULENT OTITIS MEDIA DEVELOPED AGAINST THE BACKGROUND OF TYPE 1 DIABETES MELLITUS**

**Kurbanov M.K.**

ORCID: 0009-0003-2716-0688

Assistant, Department of Pediatrics No. 2,  
Bukhara State Medical Institute

### **Abstract.**

Based on the examination of children, the following features of the clinical manifestations of acute purulent otitis media (APOM) were identified. In cases of acute purulent otitis media developed against the background of diabetes mellitus, affected children most frequently presented with sudden purulent ear discharge (77.5%), ear pain and ear congestion or hearing loss (82.5%). Fever and headache were observed less frequently, in 52.5% and 67.5% of cases, respectively. The obtained data indicate specific characteristics of the clinical course of acute purulent otitis media in children with type 1 diabetes mellitus.

**Keywords:** otitis media, diabetes mellitus, children, immunology, otorhinolaryngology.

**For citation:** Kurbanov M.K. Assessment of clinical features and laboratory–instrumental parameters of acute purulent otitis media developed against the background of type 1 diabetes mellitus.

### **Introduction**

Despite the significant role of microbial and other factors in the development of acute otitis media (AOM) in newborns and infants, the condition of the macroorganism and its overall immunological reactivity is of decisive importance. The study of the immune status of children suffering from infectious diseases undoubtedly represents considerable theoretical and practical interest. By the time

of birth, a child possesses a complex of specific and non-specific defense factors [20; pp. 67–68; 52; pp. 24–30].

The maturation of the immune system in children occurs over a wide individual time range. The dynamics of immunoglobulin levels during the first year of life are characterized by well-established evidence, indicating that their levels reach only 35–38% of adult values. At the same time, disturbances in the ratio of individual immunoglobulin classes are observed, as well as qualitative changes of varying degrees in their composition. Alterations in the immunological status of children have a significant impact on the clinical manifestations of acute otitis media.

The following laboratory and instrumental examinations were performed in the patients: complete blood count, audiometric assessment of hearing acuity, radiographic examination of the mastoid air cells, as well as bacteriological analysis of purulent ear discharge and determination of antibiotic sensitivity.

Analysis of blood parameters in the examined patients showed that in cases of acute purulent otitis media developing against the background of diabetes mellitus, peripheral blood levels of hemoglobin, erythrocytes, and monocytes were significantly reduced ( $P < 0.05$ ), while leukocytes, neutrophils, eosinophils, and erythrocyte sedimentation rate (ESR) were significantly increased compared with normal values ( $P < 0.05$ ) (Table 3.3).

In acute purulent otitis media developing against the background of diabetes mellitus, signs of inflammation and intoxication were more pronounced: leukocytosis ranged from  $10 \times 10^9/\text{L}$  to  $13 \times 10^9/\text{L}$ ; in 23 patients (57.5%) it reached  $14 \times 10^9/\text{L}$ , and in 7 patients (17.5%) exceeded this level. In some cases, ESR was accelerated to 20 mm/hour, and the percentage of neutrophils exceeded age-related reference values by approximately 20%.

Hemoglobin (89.9 g/L), erythrocytes ( $2.96 \times 10^{12}/\text{L}$ ), lymphocytes (23.55%), and monocytes (2.55%) in children with acute purulent otitis media (APOM) on the background of diabetes mellitus were lower compared with children with APOM without diabetes and significantly lower than age-matched healthy children. The proportion of eosinophils in peripheral blood was of particular interest, as it is one of the markers of allergic inflammation. In children with APOM and diabetes mellitus, the average eosinophil levels in peripheral blood were nearly twice as high as in children with APOM without diabetes.

**Table 3.2***Peripheral blood parameters of examined children*

<b>Parameter</b>	<b>APOM with Diabetes Mellitus (n=40)</b>	<b>APOM without Diabetes Mellitus (n=10)</b>
Hemoglobin, g/L	89.94 ± 2.03*	95.54 ± 2.05
Erythrocytes, 10 <sup>12</sup> /L	2.96 ± 0.07*	3.25 ± 0.07
Leukocytes, 10 <sup>9</sup> /L	12.10 ± 0.23*	10.41 ± 0.26
Lymphocytes, %	23.55 ± 2.46*	20.51 ± 2.15
Segmented neutrophils, %	69.35 ± 2.46*	60.51 ± 2.15
Monocytes, %	2.55 ± 0.226*	4.51 ± 0.215
Eosinophils, %	4.15 ± 0.246*	2.51 ± 0.215
ESR, mm/h	9.72 ± 0.603*	8.79 ± 1.07

**Note:** \* indicates a statistically significant difference compared with the control group,  $P < 0.05$ ; the differences between APOM with diabetes mellitus and APOM without diabetes mellitus were also statistically significant.

Hearing impairment data in the examined patients are presented in **Table 3.3**.

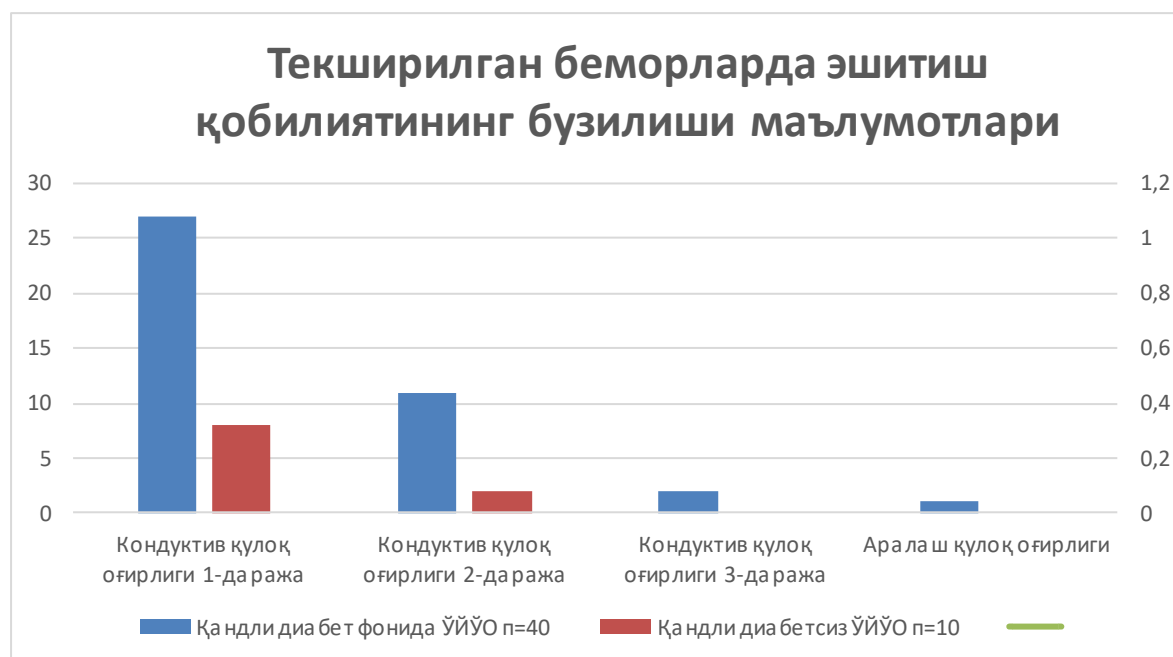
**Table 3.3***Hearing impairment in examined patients*

<b>Type of Hearing Loss</b>	<b>APOM with Diabetes Mellitus (n=40)</b>	<b>APOM without Diabetes Mellitus (n=10)</b>
Conductive Hearing Loss, Grade 1	27 (67.5%)	8 (80.0%)
Conductive Hearing Loss, Grade 2	11 (27.5%)	2 (20.0%)
Conductive Hearing Loss, Grade 3	2 (5.0%)	—
Mixed Hearing Loss	1 (2.5%)	—

**Note:** Numerator indicates the number of patients; denominator (percentage) indicates the proportion of patients within the group.

The analysis of hearing impairment among the examined patients revealed distinct differences between children with acute purulent otitis media (APOM) with and without diabetes mellitus. In the group of children with diabetes mellitus (n=40), 27 patients exhibited Grade 1 conductive hearing loss, 11 patients had Grade 2,

and 2 patients showed Grade 3 conductive hearing loss. Additionally, one patient presented with mixed hearing loss. In contrast, in the group without diabetes mellitus (n=10), 8 children had Grade 1 conductive hearing loss and 2 children had Grade 2 conductive hearing loss, with no cases of Grade 3 or mixed hearing loss detected. These findings indicate a higher prevalence and severity of hearing impairment in children with APOM complicated by diabetes mellitus compared to those without diabetes.



In patients with chronic otitis media (COM) developing against the background of diabetes mellitus, hearing loss was detected at grade I in 67.5% and grade II in 27.5% of cases, while only 2 patients (5%) exhibited grade III hearing loss. COM developing against the background of diabetes mellitus was identified in 2.5% of pediatric patients. In COM without diabetes mellitus, no sensorineural type of hearing loss was detected.

In the speech frequency range in patients with diabetes-related COM, the mean air conduction hearing threshold was 20–40 dB in 25 patients (62.5%), 40–60 dB in 14 patients (35%), and 60–80 dB in 1 patient (2.5%). In 37 patients (92.5%), bone conduction thresholds in the normal frequency range remained within normal limits; in 2 patients (5%), it increased by 10 dB, and in 1 patient (2.5%), it increased by 20 dB. Air conduction patterns were horizontal in 28 patients (70%), rising in 11 patients (27.5%), and falling in 1 patient (2.5%).

These clinical features are important for indirectly assessing the presence of anaerobic microflora and timely adjusting treatment with anaerobic-targeted drugs. Purulent ear discharge in 20 patients (25%) contained a bacterial-fungal microbial association. During examination, in patients with a bacterial-fungal association, the discharge appeared dirty green or dirty gray with a fetid odor. Their clinical presentation was characterized by persistent otorrhea, labyrinthine symptoms, headache, ear pain, general intoxication signs, and poor responsiveness to conservative therapy.

While in COM without diabetes, the clinical manifestations of fungal-bacterial flora associations correspond to literature data, in diabetes-related COM, the occurrence of fungal flora has not been documented in available literature.

Overall, the obtained results indicate that COM developing against the background of diabetes mellitus has specific clinical progression and clinic-laboratory characteristics, which differ significantly from COM without diabetes and are characterized by less pronounced signs of middle ear inflammation.

### **Conflict of Interest**

The authors declare that this study, its topic, subject, and content did not influence any competing interests.

### **Funding Sources**

The authors report that no funding was received during the course of this study.

### **Data Availability**

All data obtained or analyzed during this study are included in this published article.

### **Authors' Contributions**

All authors contributed to the preparation of the study and the interpretation of its results, as well as to the manuscript preparation. All authors have read and approved the final version of the manuscript.

### **Ethical Approval and Consent to Participate**

All international, national, and/or institutional guidelines for the care and use of animals were followed.

### **Consent for Publication**

Not applicable.

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