



EVALUATION OF THE BIOLOGICAL CHARACTERISTICS OF THE CAUSATIVE AGENTS OF ACUTE BACTERIAL CONJUNCTIVITIS

Shaimamatov Jamshid Chorievich

assistant

Urgench Technological University RANCH

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ABSTRACT

The conjunctiva, or the connective membrane of the eye, is a mucous membrane that connects the eyeball and the eyelids. It covers the posterior surface of the eyelids and extends onto the eyeball. The main physiological function of the conjunctiva is to protect the eye. When a foreign particle enters the eye, tear secretion and blinking increase, resulting in the removal of the foreign body from the conjunctival sac. In addition, the mucus secretion of the conjunctival sac continuously moistens the surface of the eyeball, reduces friction during eye movements, and helps maintain the transparency of the moistened cornea.

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Aim of the study. The aim of the study was to analyze the biological characteristics of the causative agents of acute bacterial conjunctivitis among children and adults and to assess their variability.

Materials and methods. The study included children aged 12–18 years and adults aged 19–60 years with a clinically confirmed diagnosis of acute conjunctivitis ($n = 62$). For comparative analysis, bacteriological examination of ocular discharge samples was also performed in practically healthy individuals ($n = 21$), who were representative of the patient group in terms of age, sex, place of residence, and lifestyle. Patients with occupational diseases adversely affecting the eyes, as well as patients with ocular infections caused by specific pathogens, such as gonococci, *Mycobacterium tuberculosis*, and others, were excluded from the examined patient group, which constituted the main group.

Results. During the study, 16 strains of *Staphylococcus aureus* were identified. All strains occurred as monocultures, and no microbial associations were detected. Since one of the isolated strains exhibited hemolytic activity, it was classified as a hemolytic strain. In terms of morphological characteristics, the isolates demonstrated taxonomic features typical of the genus *Staphylococcus aureus*: Gram-negative, spherical cells arranged in clusters within

the microscopic field of view (100%, $n = 16$). No atypical strains were observed. With regard to cultural characteristics, the following taxonomic features of *Staphylococcus aureus* were identified: on the surface of the nutrient medium, egg yolk salt agar, raised, opaque, S-form colonies were observed (100%, $n = 16$); all colonies of the pathogen produced a “golden pigment” (100%, $n = 16$); and the ability to grow on a nutrient medium containing 10% NaCl was demonstrated by 15 strains ($93.8 \pm 6.0\%$).

At the next stage, extended bacteriological investigations allowed species-level identification of the isolated representatives of *Staphylococcus* spp. The results were as follows: coagulase activity was detected in all strains, indicating coagulase-positive strains (100%, $n = 16$); growth in nutrient broth with flocculent sediment formation was observed in 15 strains ($93.8 \pm 6.0\%$, $n = 15$); the ability to ferment mannitol under anaerobic conditions was demonstrated in all strains (100%, $n = 16$), while sensitivity to novobiocin was observed in 14 strains ($87.5 \pm 8.3\%$, $n = 14$). The Voges–Proskauer reaction was positive in 15 strains ($93.8 \pm 6.0\%$, $n = 15$). Lecithovitellase activity, or the ability to hydrolyze lecithin with the formation of an “iridescent halo” around the colony, was detected in 11 strains ($68.8 \pm 11.6\%$, $n = 11$). Fermentation of carbohydrates was recorded as follows: glucose — 100% ($n = 16$), lactose — 100% ($n = 16$), mannose — 100% ($n = 16$), and sucrose — $93.8 \pm 6.0\%$ ($n = 15$).

Conclusion. Thus, all 16 staphylococcal strains isolated from the pathological material of patients with bacterial conjunctivitis were identified as belonging to *Staphylococcus aureus* based on their morphological, tinctorial, cultural, and enzymatic characteristics. The pathogenicity of the isolated strains was also confirmed

