

Stye, Bacterial Eye Infection among the Students of the Technical Medical Institute, AL-Mansour

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Abstract

Background: Eye stye is a local infection in the form of a red bump (a boil) caused by a blockage and inflammation of the sebaceous glands whose secretions help to form tears. Approximately 90-95% of the causes of “stye” is an infection with *Staphylococcus aureus*, and it is possible that malnutrition and lack of sleep contribute to the infection as well.

Method: The study was done at Institute of Medical Technology/al–Mansour/Baghdad from January 2018 till January of 2019. 100 conjunctiva eyes swab and Stye swab samples were collected from students suffered from eye redness and conjunctiva, which include 50 male and 50 female. The diagnoses of specimens were done by using the Analytical Profile Index System (API) for chemical tests and by culturing on enriched and selective culture media to isolate and diagnose the bacteria.

Results: The results showed that 57(57%) samples were positive for bacterial eye infections. The study showed high percentage of eye infection among students was due to *Staphylococcus aureus* bacteria, followed by *Staphylococcus epidermides* and *Pseudomonas aeruginosa* (61.40%, 35.08% and 3.50% respectively). Most of bacterial isolates were resistance to antibiotics.

Conclusion: One of the most important conclusions is to go to the doctor or pharmacist to treat eye inflammation to avoid the occurrence of eye pain, burning and redness, and not to repeat the infection. Personal and general hygiene must also be taken care of to reduce the spread of bacteria that cause eye infections among people.

Keywords: Bacterial conjunctivitis, *Staphylococcus aureus*, Stye, Hordeolum.

Introduction

Hordeolum or Stye is an acute bacterial infection that occurs in the covering of the eye or eyelid. This infection is a common condition among Iraqi school and university students, and patients are often directed to go to a university doctor or health care center for diagnosis and treatment. The patient suffers from painful eye inflammation with redness and swelling of the eyelid.

Swelling may form on the outer eyelid or on the inner eyelid. This condition usually lasts one to two weeks, and is usually self-healing. It can be treated with warm compresses, massage therapy and some eye ointments^[1].

The doctor may treat a person with a stye by taking topical antibiotics, and in other cases, the removal of the stye may require surgical intervention. All age groups are affected by the infection, although there is a slight increase in the incidence rate among patients between the ages of 30 and 50 years, and with this, the infection may spread within the age groups between 5-20 years. Several researchers have found that there are no significant differences in the prevalence between populations around the world. And most patients who suffer from chronic conditions such as dermatitis, diabetes, high blood fats

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(such as cholesterol) and a large number of fast foods, pickles and sugars may be the cause of the spread of infection^[2]. Eye begging or humping eyes are the names for furunculosis, or stye, in Latin. It is an inflammation of the sebaceous gland on the eyelid and the sweat glands known as the mole gland^[3]. The lesion appears as a small, swollen, red lump containing pus^[4]. The Stye of the eye are similar to the sebaceous cyst, but it is smaller and more painful. Usually the infection is acute. Its duration is (7-10) days without treatment. The sebaceous cyst is a chronic infection and it is one of the infections that can only be treated with surgical intervention^[5]. One of the most important causes of Stye infection is the bacterial infection by *Staphylococcus aureus* for the meibomian glands (the eyelid gland, which is one of the sebaceous glands located in the eyelid, its secretions prevent eyelids from sticking together) which increase concurrently with poor nutrition, lack of sleep, poor personal and general hygiene, scrubbing the eyes with contaminated hands and the use of contaminated devices such as contaminated towels^[4and5]. *Staphylococcus aureus* causes severe infections between 90% and 95% compared to other bacterial species such as *Pseudomonas aeruginosa*, *Haemophilus influenzae* and *Chlamydia trachomatis*^[6]. There are a number of research studies on stye in Iraq and most of them were in primary schools, but there is no study of a stye prevalence among students of the Medical Technical Institute/Al-Mansour. So, the aims of the current study are isolation and diagnosis of *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Pseudomonas aeruginosa* causing Eyelid inflammation eyelid inflammation from students of the Medical Technical Institute\Al-Mansour\ Baghdad.

Materials and Method

Samples collection and culturing on Enriched and selective culture media: 100 swabs (50 females and 50 males) were collected from students of the Medical Technical Institute\ Al-Mansour, who suffer from Eyelid inflammation, swelling, localized eyelid pain, redness, itching, blurred vision, falling eyes and increased tear secretion. The samples collected during the period from January 2018 to January 2019. Their ages ranged between (19-25) years. All swabs were cultured in a streaking manner on the MacConkey agar, Blood agar and Chocolate agar (Oxoid™ Company, UK) and by two Petri dishes of each type of culture medium for each swab. The dishes were incubated at 37°C for 18-24 hours. The first group of plates was incubated in aerobic conditions, the second group in anaerobic conditions.

Diagnosis of *Staphylococcus aureus*:

1. The culture characteristics were studied in the culture media, and the shape and aggregation of the bacteria were studied under light microscope using the Gram stain^[7].
2. Biochemical tests (oxidase, catalase and coagulase) were performed. Mannitol fermentation using the Mannitol salt agar medium was done [8]. [bioMérieux, France] API *Staphylococcus* kits were used to diagnose *Staphylococcus aureus*.

Diagnosis of *Streptococcus pyogenes*:

1. The culture characteristics were studied in the culture media, and the shape and aggregation of the bacteria were studied under light microscope using the Gram stain.^[7]
2. Biochemical tests were performed using the API *Streptococcus* [bioMérieux, France] to diagnose species belonging to the genus *Streptococcus*.

Diagnosis of Enterobacteriaceae (Gram-negative bacteria):

1. The culture characteristics were studied in the culture media, and the shape and aggregation of the bacteria were studied under light microscope using the Gram stain^[7].
2. Biochemical tests were performed using the API20 [bioMérieux, France] to diagnose species belonging to the Enterobacteriaceae.

Antibiotic sensitivity test (disc diffusion method)^[8]: Six antibiotics were used: (Cephalexin (LEX), Cefotaxime (CTX), Chloramphenicol (C), Gentamicin (GM), Tetracycline (TE), Erythromycin (E) (Hi Media Laboratories, India antibiotic discs). Antibiotic sensitivity was determined by measuring the antibacterial inhibition diameter of bacterial isolates on the Muller Hinton agar and comparing it with the index numbers established in the Committee of National Clinical Laboratory Standards (NCCLS)^[9].

Results

100 samples were collected from students of the Medical Technical Institute/Al-Mansour who were apparently infected with eyelid inflammation and whose ages ranged between (19-25) years and for both sexes (50 females and 50 males) during the period between January 2018 until January 2019. The results showed that 57 samples gave a positive result for bacterial growth on

the enriched and selective culture media, with a range (57%, 57/100X100) of the total number of samples. Bacterial isolates were isolated and diagnosed based on [8-11]. As its cultural and phenotypic properties were studied; the shape and aggregation of bacteria under the light microscope were identified after stained with Gram stain and examined under the X 100. After that, the bacteria were diagnosed using biochemical tests. The results showed the following:

Staphylococcus aureus gave white colonies with beta-type hemolysis on Blood agar. Positive for coagulase and mannitol fermentation. *Staphylococcus epidermidis* had white colonies without haemolysis on Blood agar, positive for catalase, and negative for coagulase and mannitol fermentation. The colonies of *Pseudomonas aeruginosa* appeared gray on blood agar, pale yellow and non-fermenting lactose sugar on MacConkey agar; positive for oxidase test and negative for urease test and indole production.

The highest percentage of eye infection among students was due to *Staphylococcus aureus* bacteria (61.40%) (Table 1) and this is close to what Al-Abidi isolated in 2006, which was 52.4% for patients suffering from eyelid inflammation in the province of Diwaniyah [12]. Likewise, an approach to the Alash study in 2015, which was 31%, and the current study did not agree with the results of the same researcher's findings for *Staphylococcus epidermidis* and *Pseudomonas aeruginosa*, as the ratio was 10 (35%) and 7 (24%), respectively [13]. The infection of *Staphylococcus epidermidis* and *Pseudomonas aeruginosa* among Institute students was 35.08% and 3.50%. The results of current study also did not match the results of the researcher Al-Abidi for *Staphylococcus epidermidis* and *Pseudomonas aeruginosa*, which were 7.3% and 14.6%, respectively. The researchers, Thewaini and Abed-Al sahib, concluded in 2014 [14] that the percentage of bacterial infections with eye inflammation after collecting 101 swabs from the eyes of patients who visited Al-Hussein General Hospital and the Hindia Hospital at Karbala in Iraq was 93%, distributed as follows (conjunctivitis eye 2.78) %, Ocular eyelid infections 8.13% and tear sac infections, 9.7%). The results of culturing on enriched and differential culture media showed that the percentage of *Staphylococcus aureus* in both sexes is the most common cause. As for AL-ALani and others [15], their study included isolating and diagnosing the bacteria that cause eye infection in university students who use contact lenses and eyeliner,

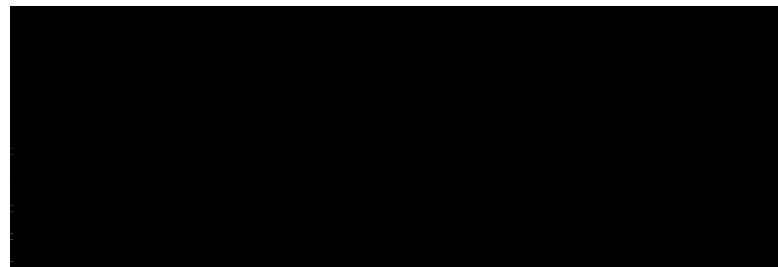
whose ages ranged between (19-26) years at Al-Anbar University during 2009. The incidence of Staphylococci bacteria was 83.32%, and *Pseudomonas aeruginosa*, 67.16%. Also, they found that the sensitivity to antibiotics was 5.69% for Erythromycin, 52% for Gentamycin, and 8.47% for Tetracycline. While recorded the highest resistance to the antibiotic Penicillin, which was 93.6%, followed by Cephalexin with 93.6%, this may be due to the wrong and excessive use of these antibiotics by patients as well as their use of these antibiotics without consulting a specialist doctor.

Table 1: Percentage of bacterial isolates from patients with eyelid inflammation

Bacteria that cause eyelid inflammation	Number of isolates (%)
<i>Staphylococcus aureus</i>	35 (61.40)
<i>Staphylococcus epidermidis</i>	20 (35.08)
<i>Pseudomonas aeruginosa</i>	2 (3.50)
Total	57(100)

The results of the current study showed that the incidence of *Staphylococcus aureus* in females was more than males, it was 55.55% and 64.10%, respectively. Whereas, the infection rate of *Staphylococcus epidermidis* and *Pseudomonas aeruginosa* was almost identical for males and females (Table 2).

Table 2: Percentage of bacterial isolates from patients with eyelid inflammation according to sex



The results showed sensitivity to antibiotics Cephalexin (LEX), Cefotaxime (CTX), Chloramphenicol (C), Gentamicin (GM), Tetracycline (TE), Erythromycin (E) as follows:

- ***Staphylococcus aureus***: 17.14% sensitive to CTX, LEX, E and C antibiotics; And it is sensitive to 51.42% to GM antibiotic and 5.71% to TE.
- ***Staphylococcus epidermidis***: 17.14% sensitive to CTX, LEX, E and C antibiotics; And it is sensitive to 51.42% to GM antibiotic and 5.71% to TE.

- ***Pseudomonasaeruginosa***: The resistance rate was 100% for all antibiotics under study.

The researchers Al-Dorri and Al-jebouri^[16] were found that the causes of conjunctivitis and eyes redness in Tikrit General Hospital patients in 2004 were result from *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Staphylococcus epidermidis* infection in percentages 42%, 27% and 12%, respectively. Also, they were found that the isolates had the highest sensitivity to the antibiotic norfloxacin. The current study did not agree with the researchers' study in relation to gender. The researchers found that the percentage of infection with the bacteria that cause eye inflammation was higher in men than it is in women, as it was 55% and 45%, respectively. In Babil Governorate, the researchers Abid and Ewadh^[17] found that bacterial etiology of eye inflammation, eyelid and tear cyst inflammation in patients reviewing a number of Hilla hospitals in 2012 was represented by a high incidence of *Staphylococcus aureus* followed by *Escherichia coli* with a percentage of 38.06% and 2.7 % Respectively. As the patients suffer from the appearance of a point tending to yellow in the middle of the eye and then it turns into pus and spreads slightly to the surrounding area.

The bacteria that cause eye inflammation can be easily transmitted from one person to another when using contaminated towels. So, hands should always be washed with water, soap, sterilizers, and wash the face frequently; in addition to not use contact lenses until they are completely cured, and not wearing glasses between people or wearing contact lenses or put contaminated eye makeup, and it is also recommended to remove makeup before bed. Azithromycin eye drops can be used after consulting a doctor or pharmacist as a topical treatment, in order to avoid some complications such as bleeding from the eyelids or when the vision is not clear. In addition, students and their supervisors in colleges and institutes should be advised to follow the aforementioned advice in order to prevent the transmission of infections among the students. Sometimes it may be necessary to keep students in their homes to avoid transmitting the infection to colleagues^[18].

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

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