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ISOLATION AND IDENTIFICATION OF BACTERIA *STAPHYLOCOCCUS AUREUS* FROM DIFFERENT PATHOLOGICAL SAMPLES

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Abstract
This study was conducted to investigate staphylococcal bacteria from pathological samples collected from Imam Al- Sadiq Hospital and Al-Sadr Teaching Hospital during the period from October 2022 to March 2023, where 10 samples were collected that can be considered as control samples for comparison with pathological samples, and 55 pathological samples from both sexes (male and female), Where the percentage of females in the samples under study was more than that of males, where the number of female samples was 31 samples with a rate of (56.4%) and the number of male samples was 24 samples with a rate of (43.6%) and of different ages, where the most diseased samples were of age (21-30) years with a number of samples of 15 (27%) and the least samples in Age (71-80) years, with 1 sample and a rate of (2%), The bacteria studied in the research were collected from different pathological sites, and the results showed that the highest number of samples was 55 from boils and acne with a percentage of (46%), and the lowest number of samples from wounds was 2 samples and a rate of(3%). The bacteria isolated from pathological samples were diagnosed through phenotypic, microscopic and biochemical tests.

Keywords: Gram positive bacteria, Grape-like cluster, spherical shape.

Introduction

Bacteria are dyed purple when stained with Gram stain, so they are considered positive for Gram stain. Bacteria have a spherical shape arranged in groups, where their shape is like clusters of grapes. They live in culture mediums that contain 10% salt. Bacterial colonies appear in a golden or yellow color when they are grown on the culture media. These bacteria are facultative aerobic or anaerobic, depending on their need for oxygen, and grow in a culture environment with a temperature ranging from 18 to 40 degrees Celsius. As for the biochemical tests for bacteria, they include the examination of catalase, the positive bacteria test through the appearance of air bubbles, and the blood plasma coagulation test, where the bacteria appear positive, as well as the Manitol test by growing the bacteria on a medium of Manitol salt agar, where it works to ferment the culture medium.(1)

Staphylococcus aureus is the main cause of many common diseases in humans, which include bacteremia, septicemia, inflammation of the skin and soft tissues, and it is possible to isolate the bacteria from samples taken from urinary tract infections and diseases of the stomach and intestines. This bacterium is also a major cause of septic arthritis and toxic shock syndrome. Thus, it is one of the most important types of bacteria that cause many bacterial diseases in humans.(2) .

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It is worth noting that this bacteria causes severe infection and produces toxins that lead to the occurrence of many diseases through samples obtained from the infection sites and the study of the causative bacteria.(2,3)

Depending on the type of bacterial infection of staphylococcal bacteria, the difference in pathogenicity will be significant.(2)

Staphylococcus bacteria are characterized by their ability to form a capsule to protect against phagocytosis, and this method is one of the means of escaping from the immune response of the host cells, as well as its ability to produce a protein, that is, with the aim of isolating antibodies or hiding the antigen. It works to stop the chemical attraction of white blood cells, thus ensuring survival within the cells by forming vital membranes.(3,4)

The importance of this bacteria is through the presence of virulence factors that cause severe human diseases such as bacteremia and endocarditis. The most important virulence factors of this bacterium are the antibiotics of Staphylococcus aureus, which cause toxic shock syndrome.(5,6)

The family of this bacteria under study contains a large number of species that reach a number of more than 26. (7)

There is a close relationship between the pathogen and the microbial host through the symbiotic relationship between them.(8)

The infection with this bacteria can be severe, recurrent, or chronic, and it can last for a long time, so the most important treatment methods must be put in place to eliminate the infection.(9)

Bacteria possess many means of immune defense that enhance the relationship between pathogenic bacteria and humans through the presence of many virulence factors.(10,11)

Staphylococcus bacteria have many immune resistance features compared to other bacterial species that have fewer immune evasion features.(12)

Materials and Methods

Bacterial study design

Through conducting the current study, 55 pathological samples were collected. The pathological samples under study included 20 samples taken from the teeth of people suffering from dental caries, 25 samples taken from carbuncles and acne, 5 samples from tonsillitis under the supervision of the specialist doctor, 3 samples from otitis media, and 2 samples. Wound samples from patients suffering from wound infection from different hospitals in Babel Province, Imam al-Sadiq Hospital and Al-Sadr Teaching Hospital.

Cultural Identification

The current study included studying the phenotypic characteristics of the isolated colonies after culturing the bacterial isolates and purifying them on a suitable culture medium, such as Manitol salt agar medium. The study included the shape, size, texture, color, edges, and height of the bacterial colonies isolated from pathological samples.

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Microscopic identification

Smears of bacterial isolates that were grown on medium agars of Manitol salt, aged 18-22 hours, were stained using the gram stain technique, and then examined under a light microscope to see the shape, arrangement, and color of the cells according to their interaction with gram stain. The result was positive for gram stain.

Biochemical Identification

Oxidase Test

This test is performed by placing one or two drops of the oxidase detector on the filter paper, then the bacterial colonies are placed on it and mixed until the result appears. The appearance of a blue-violet color on the filter paper is evidence of a positive test.

Catalase Test

This test is done by taking a small amount of hydrogen peroxide solution and placing it on a glass slide, then adding bacterial colonies over the solution. The appearance of air bubbles indicates a positive test.

Coagulase Test

A little blood plasma is taken and placed in a sterile test tube, then the developing bacterial colonies are placed on top of the blood plasma, after that the test tube is placed in the incubator at 37 degrees for two hours, then the test result is seen, as the coagulation of the plasma is indication of the positive of the test

Results and Discussion

The present study was conducted on pathological samples that were collected during the period from (October 2022 to March 2023) in Imam Al-Sadiq Hospital and Al-Sadr Teaching Hospital. 55 pathological samples were collected and 10 samples were taken as a control sample. The collection of samples from patients was based on the type of pathological samples, where the number of Pathological samples taken from boils and acne (25) samples, with a percentage of (46%), and the least pathological samples from wounds were (2)sample, at a rate of (3%). Otitis media samples were (3) samples, at a rate of (6%). Dental caries samples were (20), at a rate of (36%). As explained in the table below.

Table (1) : Distribution of bacteria *S. aureus* according to type of sample

Type of infection	No. of samples	Percentage %
Dental infection	20	36%
Tonsillitis infection	5	9%
Otitis media	3	6%
Wound infection	2	3%
Boils or acne	25	46%
Total number	55	100%

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This study is consistent with another study conducted in Iraq, where the studied bacteria were isolated from wounds, burns and skin samples.(13)
Likewise, the current study showed that more pathological samples were in females than males, as the number of female samples was (31), with a percentage of (56.4%), and the number of male samples was (24), with a percentage of (43.6%), as shown in Table 2.

Table (2) : Distribution of bacteria *S. aureus* according to gender

Male	Male %	Female	Female %	Total
24`	43.6%	31	56.4%	55

This study is considered almost compatible with the study of Pamela Thomson and others, where the number of total samples was 60 samples, and the pathological samples in females were more than males, as the number of female samples was 35 samples and males 25 samples who were practicing activities in the clinic or hospital and within the age group from 21 to 44, i.e. an average 30 years old.(14)
It was found from the results of this study that the most pathological samples are in the age group 21 to 30 with 15 samples and a percentage of 27%, and the least pathological samples are in the age group 71 to 80 years with a number of up to 1 sample and a percentage of 2% as it was put in Table No. 3.

Table (3) : Distribution of bacteria *S. aureus* according to age

Age	No.	Percentage %
0-10	7	13%
11-20	10	18%
21-30	15	27%
31-40	9	16%
41-50	6	11%
51-60	5	9%
61-70	2	4%
71-80	1	2%
Total	55	100%

Conclusion

The results of this research showed the isolation of *S. aureus* from different pathological samples, and the bacterial isolates were more in females than males and in different age groups, and the most bacterial isolates in the age group (21-30)years and the least bacterial isolates in the age group (71-80)years and the studied bacteria were isolated from different pathological sites and the most bacterial isolates From sites of boils and acne and less isolates from wound samples.

Ethical Approval

The current study was approved by the Biological Ethics Committee in the Department of Life Sciences, College of Science, University of Babylon. Samples were collected from hospitals in Babel Province,

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Imam Al-Sadiq Hospital, and Al-Sadr Teaching Hospital in Iraq, and the date of collection of samples for the period from October 2022 until to March 2023.

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