

A Study on Isolation of Different types of Bacteria from Furunculosis Infection in Adults

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Abstract

Collected (116) samples from skin infected with furunculosis from patients, their ages were between (20-70) years, suffering from furunculosis. The results found that the rate of (76) samples (64.5%) gave positive growth of bacteria, while (40) samples (34.5%) a negative samples. Identification of bacterial isolates was determined by standard microbiologic techniques found that *Staphylococcus aureus* was the predominant (73.68%), followed by Coagulase negative *Staphylococci* (CONS) (7.1%), *Streptococcus.pyogenes* (6.58%), *Klebsiella pneumonia* (3.94%), *Pseudomonasaeruginosa*(3.94%) *Proteus spp.*(2.63%), *Escherichia.coli* (1.31%). The results also has been shown that infections in males (56.6%) were higher than in females(43.4 %). According to age groups, the results showed that furunculosis were common in second age group (30-40) years the a proportion (27.6%), followed by first&third age group(22.4%), followed by fifth age groups (14.5%) and fifth age group (13.1%).

Key words: Furunculosis, *Staphylococcus aureus*, *Staphylococcus sp.* (CONS), *Streptococcus pyogens*, *E.coli*, *Klebsiella sp.*, *Pseudomonas aeruginosa*, *Proteus sp*

Introduction

Microbial studies indicate that the cause of furunculosis is a result of specific types of bacteria and fungi, and research indicates that the bacteria *S. aureus* is the main reason for the appearance of boils because it is naturally present on the skin, specifically on the outer

surface of the skin, Trauma and incisions are the entry point into the human body through hair follicles (Dipiro et al., 2020). Inflammations start when the *S. aureus* bacteria reach the bloodstream, where antibodies in the human body begin to fight those bacteria, and thus, boils and pustules appear (Tim, 2016).

Furunculosis is an inflammation of the follicle hair or sebaceous glands under the skin. It is an infection that affects the skin in different areas that may last several years. Furunculosis affects all age groups without exception, as the skin appears at first as a red area specific to the site of the primary infection. (Daniel et al., 2002). Its causes vary, then a small bump develops on the surface of the skin, and after 4-7 days, these bumps begin to turn white, as pus forms inside them under the outer surface of the skin. It is a white blood cell (WBC) that fought a battle with the attacking bodies of these patches of skin to eliminate them due to the bacteria *Staphylococcus aureus*; This inflammation frequently occurs in places where hair growth is abundant or where sweating increases (Stevens et al., 2014). Furunculosis often appears on the neck, face, under the armpits, thighs, and parties. Teenagers are more likely to develop furunculosis than others because of increased movement and increased sweat glands activity (Habif, 2004). A boil represents a collection of pus surrounded by tissues that may occur in different skin places. If it contains one hair follicle, it is called furunculosis. The boils appear in close groups called a carbuncle. (Ibler & Kroman, 2014).

,Also antibiotic resistance to the commonly used antibiotics is now emerging as a result of misuse and abuse of particular antibiotics .Hence the treatments of infection are required to assess the right kind of antibiotics and the appropriate concentration to be used in infections ,taking in to consideration the etiology of the infection and the duration of the antibiotic treatment (Rajalakshmi et al.,2012). The furunculosis forming microorganisms like *Staphylococcus aureus* ,*Streptococcus sp.*,*Enterococcus sp.*,*Pseudomonas sp.*,*Escherichia coli* and *proteus sp.*(.Huang-Shen et al.,2021) . The aim of this paper was to substantiate the bacterial pathogens isolated from furunculosis samples .

MATERIAL AND METHOD

Sample Collection :

(116) samples of Skin infected with furunculosis were collected from patients ,their ages were between (20-70) year , suffering from furunculosis using sterile cotton swabs but small

screw capped bottle of firmly stopper tube or syringe it must be bearing the patients name ,age.(Koneman,et al.,2005).

Characterization of Bacterial Isolates:

The skin specimen was inoculated on blood and MacConkey agar plates .The streaked plates were incubated at 37C for 24 hr. Bacterial colonies on blood agar plates were later Gram stained characterization of bacterial isolates was based on standard microbiological methods .Identification of isolates were done based on colony morphology , motility ,catalase test ,oxidase test ,coagulase test,Haemolysin test,Bacitracin test and biochemical test like Triple sugar iron agar ,Hydrogen sulfide test,Carbohydrate fermentation test , Methyl red test ,Nitrate reduction test , Urease test , Voges proskaur test , Citrate utilization test , Indole test (Koneman et al.,2005).

Results and discussion

1-isolation

The results show that the number of positive samples for bacterial culture is 76 samples with a percentage of (65.5%). In comparison, the number of negative samples for culture amounted to 40 samples with a percentage of (34.5% of the total samples did not give bacterial growth, the results of our study agree with the results of (Karoomi, 2009)

The high rate of bacterial growth is due to the presence of some types of symbiotic bacteria present in the areas of the skin that participate in the infection, causing many skin diseases that can enter the bloodstream, causing life-threatening diseases, especially in people who suffer from immunodeficiency diseases (kojin et al., 2008).) . As shown in Table No. (1)

Table (1): Numbers and percentages of bacterial growth

bacterial growth	the number	percentage
Presence of the growth	76	65.5%
lack of growth	40	34.5%

2-Diagnosis

Isolated bacterial types of hair folliculitis were diagnosed using the traditional method, based on their culture, microscopic and biochemical characteristics (Table (2), (3))

Table (2): Biochemical tests of Gram-positive bacterial isolates.

bacterial isolates	Mannitol	Sucrose	Motility	Uraese	Liquefy gelatin	Coagulase	Bacitracin	Catalase	Haemolysin	Oxidase
<i>Staphylococcus.aureus</i>	+	+	-	+	+	+	-	+	β	-
<i>Staphylococci</i> sp. (CONS)	-	+	-	V	+	-	-	+	V	-
<i>Streptococcus.pyogens</i>	-	-	-	-	-	-	+	-	β	-

β: beta-type hemolysis v : the result is different + : positive result - : Negative result.

Table (3): Biochemical tests for Gram-negative bacteria.

bacterial isolates	Urease	Motility	H ₂ S	Gas	Citrate u.	V.p	M.R	Indole	Lactose.f	Oxidase	Catalase
<i>Escherichia.coli</i>	-	+	-	+	-	-	+	+	+	-	+
<i>Klebsiella pneumoneae.</i>	+	-	-	+	+	+	-	-	+	-	+
<i>Proteus sp.</i>	+	+	+	+	+	V	+	V	-	-	+
<i>Pseudomonas .aeruginosa</i>	+	+	-	-	+	-	-	-	-	+	+

v : the result is different + : positive result - : Negative result.

The results of the diagnosis of boils infections showed the bacterium *Staphylococcus. aureus* was the most common among the pathogens of infection, 56 isolates were isolated from them with a percentage of (73.68%), and this result was in agreement with (Najat et al., 2012),

Staphylococci sp. (CONS). (6) by 7.1%

The coagulase-negative staphylococcus bacteria is one of the natural symbioses in humans' skin, hair and mucous membranes. Still, recent studies have proven that it is one of the bacterial pathogens of humans (Brooks et al., 2001). *Streptococcus pyogenes* (5) (isolates) (6.58%), *Klebsiella pneumoniae* (3) isolates (3.94%), *Pseudomonas aeruginosa* (3) (3.94%) *Proteus spp.* (2) With a rate of (2.36%), *Escherichia coli* (1) with a percentage of (1.31%) The lowest percentage was in Gram-negative bacteria, *Sp. E. coli*, *Proteus*

This result agreed with what the researcher mentioned (Verma, 2012). The researcher (Huang-Shen et al., 2021) stated that *Staphylococcus aureus* is the dominant bacteria over other species and the only cause of skin abscess inflammation ranging from (25-69 %). This discrepancy in the incidence of this bacteria It may be due to the fact that the rate of injuries they cause is not fixed.

Among the factors that increase the likelihood of developing boils are poor nutrition, diabetes, neglect of personal hygiene, and other skin problems such as acne and other skin infections, and a weak immune system due to certain diseases or the use of drugs that lead to Immunodeficiency, (Ibler & Kroman, 2014)

As shown in Table No. (4)

Table (4): Numbers and percentages of diagnosed isolates from boils infections.

bacterial isolates	The number	percentage
<i>Staphylococcus aureus</i>	56	73.68
<i>Staphylococci sp.(CONS)</i>	6	7.1
<i>Streptococcus pyogenes</i>	5	6.58
<i>Escherichia coli</i>	1	1.31
<i>Klebsiella pneumoniae</i>	3	3.94
<i>Proteus spp.</i>	2	2.36
<i>Pseudomonas aeruginosa</i>	3	3.94
totals	76	100 %

Table No. (5) shows the numbers and percentages of samples taken from the sources of boils, distributed by gender. Whereas the infection rate of males (56.6% is higher than that of females by 43.4%) in boils infections, It is clear from the results that there is a discrepancy in the prevalence of infection between males and females. The reason for the high incidence in males may be attributed to the surrounding circumstances, the nature of work and health awareness, and this may be because males are more exposed than females to factors that

contribute to the disease. Also, the differences in the rate of infection between the gender may be due to the physiological, anatomical and immune susceptibility of the body, which put barriers to the arrival of the pathogen and the occurrence of bacterial infection in a specific area of the body (Davidsons et al., 2002).

Table (5): Distribution of the number of infections with boils and their percentage by gender.

bacterial growth	the number	percentage
Presence of the growth	43	%56.6
lack of growth	33	43.4%

Regarding the distribution of the number of injuries to the age groups of patients from whom samples were taken, the highest infection rate was for the second age group, with a rate of (27.6%), The first and third age groups follow it with a rate of (22.4%) followed by the fourth age group (14.5%), followed by the fifth age group with a rate of (13.1%)

This result is consistent with what was indicated (Mohanty et al., 2018). who noticed that most of the injuries are prevalent in the age groups from (40-21) years, at a rate of (24.6%) The reason may be that patients of this age are characterized by an increase in hormonal activity, high physical activity and the use of cosmetic preparations of fatty ointments. Sharing personal tools such as shaving tools at barbers and poor personal hygiene. Also, the genetic structure of young people may pave the way for the high incidence of these age groups and then gradually decrease with age (Joshua et al., 2017).

Table (6): Distribution of the number of infections of boils and their percentage according to age groups

age groups	the number	percentage%
20-30	17	22.4
30-40	21	27.6
40-50	17	22.4
50-60	11	14.5
60-70	10	13.1

Totals	76	100%
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