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Common bacterial types in burns in Burn ward of Nasiriyah

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Abstract

Background: Burn infections are one of the most common serious illnesses caused by pathogens, mainly by both gram-negative and gram-positive bacteria. The aim of this study was to detect of the most common bacteria isolated from inpatients with burn infection and the relationship of bacteria to the degrees of burn.

Methods: This cross-sectional study was performed in Al-Hussein teaching hospital ,burn department in Al-Nasyeria city, Iraq from Octoper 2018 to Aprill 2019. A total of 40 burns swabs were collected from hospitalized patients with burn infection

All grown bacterial isolates were identified by standardized microbiological tests.

Results: Of the 40 burn swabs, psedomonus spp was the most common spp with isolates (37.5%) followed by staphylococcus aureus with 11 isolates (25.5%) while E.coli was 8 cases (20%) and klebsiella was the least common with 1 isolates (2.5%) while 5 (12.5%) cases were with no any groth..

Different species were isolated to patients who stay in hospital 8 days and longer.

Introduction:

Burn wounds are highly susceptible to infection and this is a major problem in the management of burn victims (Al-Ibran et al., 2013). Infected burn wounds are not only associated with a delay in epidermal maturation and deep scar formation (Begum et al., 2011). Infected patients also tend to stay longer in the hospital and have a higher mortality rate due to sepsis when compared with non-infected patients (Manikandan and Amsath, 2013). An estimated 75% of all deaths following thermal injuries are related to infections (Idmir et al., 2012; Ikpeme et al., 2013; Valarmathi et al., 2013). The pathogenesis of colonization, infection and invasion of microorganisms is related to the fact that there is a disruption of the normal skin barrier at the site, as well as a large amount of necrotic tissue and protein-rich wound exudates at the burn surface, providing a rich growth medium for colonization and growth of microorganisms, which is poorly controlled due to depressed immune responses (Kalantar et al., 2012). A variety of organisms have been isolated from burn wound colonization and infections. Aerobic bacterial isolates from burn wounds have ranged from Gram-positive organisms like *Staphylococcus aureus*, coagulase negative *Staphylococci* and *Enterococcus* spp, to Gram-negative organisms like *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae*, *Serratia marcescens*, *Enterobacter* spp, *Proteus* spp and *Acinetobacter* spp (Taya et al., 2012). The incidence of infections due to less commonly encountered microbes is increasing, as are multidrug-resistant strains of the more common isolates (Sasirekha, 2013; Bhat, and VinodKumar, 2013). Polyan bio c resistance has been noted in Gram-positive organisms like methicillin-resistant *S. aureus* (MRSA), and also in Gram-negative bacilli like *P. aeruginosa* and *Acinetobacter* spp (Magnet et al., 2013; Taherikalani et al., 2013). The bacteriological spectrum and antibiogram of burn wound infections and colonization can vary in different health care settings.

A series of the VITEK systems (BioMerieux, Marcy l'Etoile, France) has been a fully automated instrument that provides species identification (ID) and antimicrobial susceptibility testing (AST) for a variety of clinical isolates, and are presently used in many clinical microbiology laboratories worldwide.

During the past 3 decades, several revisions have been introduced to the system, resulting in a stepwise improvement of the system performance.

Recently, extensive revisions, including reintroduction of colorimetric reading in lieu of fluorescence technology, and addition of several biochemical substrates and taxa covered by the broadened database comparable with the well-established API series (BioMeriux) are created (Nakasone et al., 2007; She y et al., 1998; Sönksen et al., 2010). The efforts have been focused upon the accurate ID, in particular, to solve its inherent weakness in the IDs of glucose-nonfermentative Gram-negative rods (GNR) and members of the family Streptococcaceae (Sellenriek et al., 2005).

Kombucha is a symbiotic association of bacteria (*Acetobacter xylinum* and *Bacterium gluconicum*) and yeast strains (*Zygosaccharomyces kombuchensis*, *Pichia flu Sellenriek xum* and *Saccharomyces sp.*) (Sreeramulu et al., 2000). The variation of its composition could be due to geographic, climatic and cultural conditions as well as diversity of local species of wild yeasts and bacteria.

Complications of burn infection:

are responsible for more than 70% of death cases among inpatients with burns. . These infections mainly caused by multi-drug resistant gram-negative and gram-positive bacteria such as *Pseudomonas aeruginosa* (*P. aeruginosa*), *Klebsiella pneumonia* (*K.pneumoniae*) and *Staphylococcus aureus* (*S.aureus*).

Non-sterile burns halls and duration of patients stay in hospital in addition to the surface area of burned skin, are the most important factors related to the increase of persistent and multiplication of pathogenic bacteria in the burned areas.

Multi-drug resist.

ant (bacteria is one of the most common pathogens causing burn infection in hospitalized patients worldwide. These pathogens are resisting to at least three different classes of antimicrobials such as, penicillin's, beta-lactams, cepheps, 3rd and 4th generation cephalosporins, aminoglycosides, tetracyclines and quinolones, and is becoming one of the most dangerous health issues in hospitals. In addition, extended-spectrum β -lactamase (ESBL)-producing bacteria are considered as a potent pathogens due to their resistance to a wide range of antimicrobials like, cefotaxime, ceftriaxone and ceftazidime, that lead to difficulty in the treatment of most

infections such as burn infection and urinary tract infection. Burn infection is characterized by difficult healing due to administration of unsuitable treatment, long stays in hospital and the contaminants of hospital environments lead to the emergence of new multi-drug resistant bacterial isolates causing dangerous complications such as, bacteremia, septicemia and death¹³. Therefore, we must pay attention to all safety standards in hospitals, especially in burns wards through sterilization, performing antimicrobial susceptibility test on all pathogenic bacteria isolated from burn infections, and keeping the burned skin in sterile conditions to prevent the emergence of these pathogens. According to the above, the aim of this work is to detecting the most common bacterial infection of inpatients with burn infections in Al- Hussein teaching hospital in Al-Nasyeria city ,Iraq over 4 month from January 2019 to April 2019 to increase our understanding of the most prominent bacteria prevent the emergence of these isolates in the future.

Methods and material:

This cross sectional study has been carried out in Al-Hussein teaching Hospital in Al-Nassyeri city from October 2018 to April 2019

This study carried on 40 patients 22 (55%) of them are female ,18 (45%) are Male with age between 9 months and 63 years .

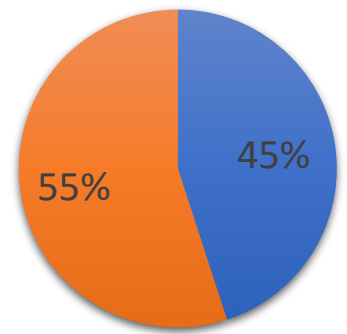
The recorded proformas included history ,clinical examination and investigation which is wound swap and culture , with special emphasis on the percent and the type of burn.

Results

Male to female percent

Table 1; Male to female percent

Male	18	45%
Female	22	55%
total	40	100%



■ Male ■ Female

Table 2; incidence in different age groups;

Age group	Frequency	%
< 10y	7	10%
11 -20 y	9	17.5%
21-30 y	10	25%
31-40y	6	15%
41-50y	1	2.5%
51-60y	2	5%
>60y	1	2.5%

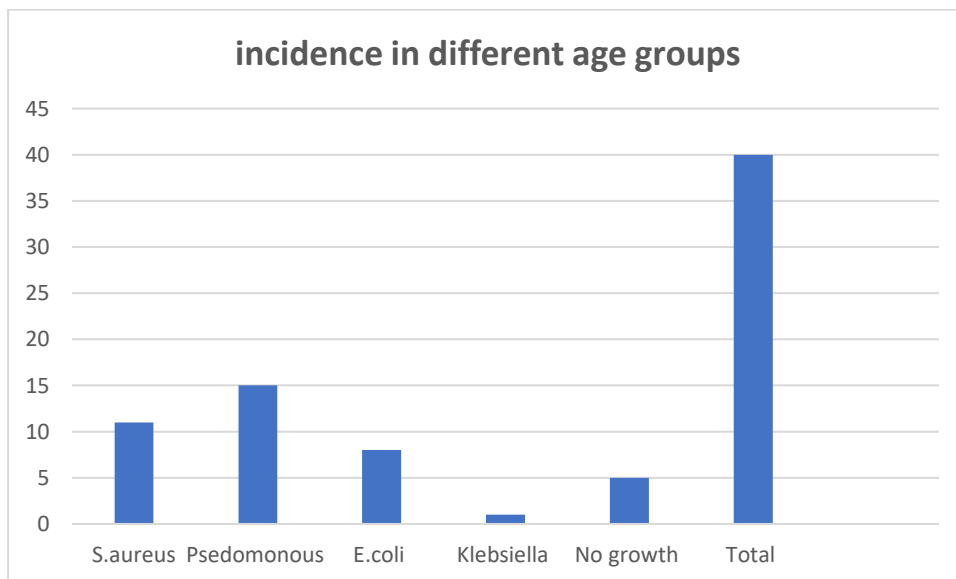


Table 3; causative agent of burn;

Type of burn;	Frequency;	Percent%;
Hot water	13	32.5%
Fire	18	45%
Boiled oil	4	10%
Electricity	3	7.5%
Friction	2	5%
Total	40	100%

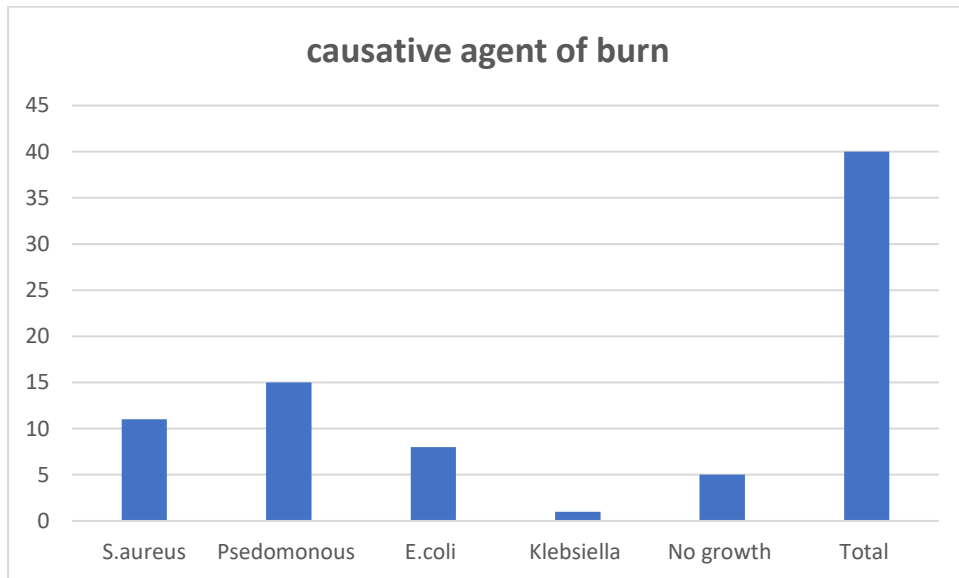


Table 4; degree of burn;

Degree	Frequency	Percent
Second	26	65%
Third	14	35%
Total	40	100%

■ S.aureus ■ Pseudomonas

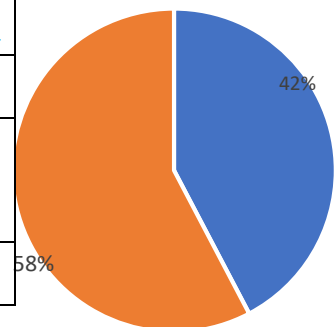
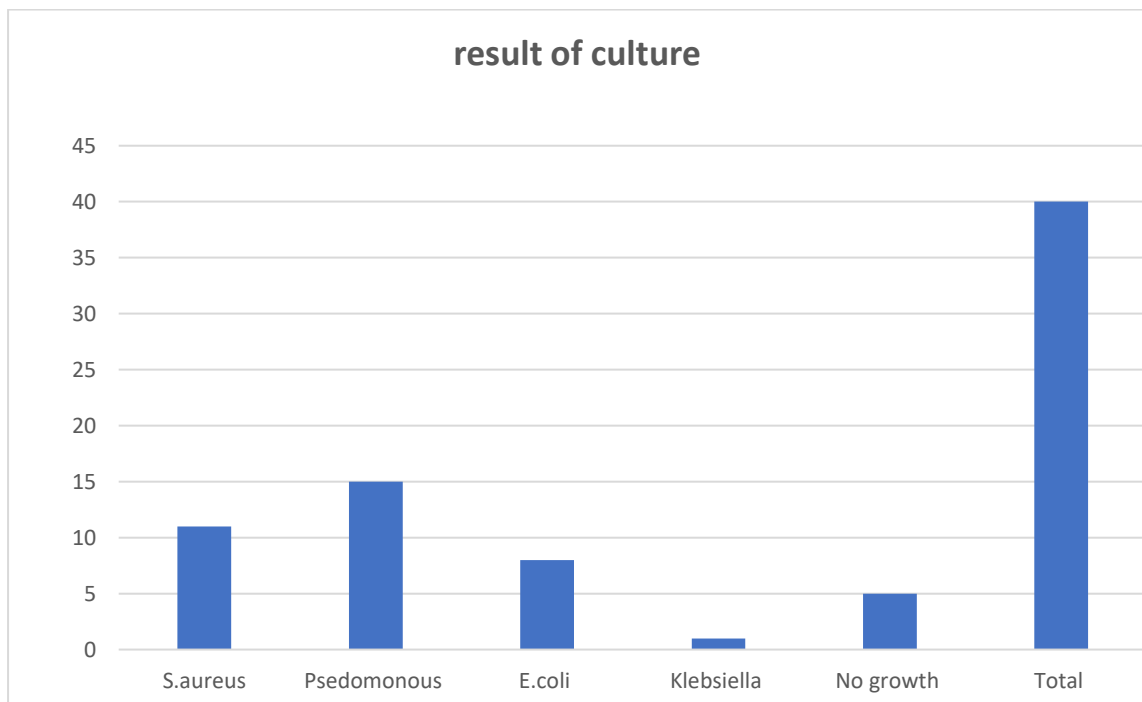


Table 5; result of culture;

Type of bacteria	Frequency	Percent
S.aureus	11	27.5%
Pseudomonas	15	37.5%
E.coli	8	20%
Klebsiella	1	2.5%
No growth	5	12.5%
Total	40	100%



Discussion

The bacteria isolated from burn wound samples are shown in (Table 5). Four types of bacteria, namely, *Pseudomonas* 15 (37.5%), *Saureus*.11 (27.5%), *Escherichia coli* 8 (20%), *Klebsiella* 1 (2.5%) and 5(12.5%) cases still still with no growth , compared with another study carried out in 1997 showing that nine gram nega ve bacteria, namely, *Acinetobacter baumannii* 24 (23%),*Enterobacter spp.*4 (4%), *Escherichia coli* 9 (8%),*Klebsiella oxytoca* 6 (6%), *Micrococcus luteus* 3 (3%), *Morganella morganii* 4 (4%), *Proteus mirabilis* 3 (3%), *Pseudomonas aeruginosa* 22 (21%) and *Serratia marcescens* 4 (4%) and four gram posi ve bacteria, *Enterococcus faecalis* 2 (2%), *Staphylococcus aureus* 15 (14%), *Staphylococcus haemolyticus* 6 (6%) and *Staphylococcus hominis* 2 (2%) were isolated from the burn wound samples.

In our research there is only four types of bacteria had been grow on the burned patient compare with nine gram negative bacteria had been calculated in the study above .

Conclusions

The present study concluded that the burned patient are very susceptible to infection with 35 (87.5%) of 40 patients had been infected with the Pseudomonous has the highest incidence rate followed by S.aureus and E.coli but the Klebsiella with the lowest incidence rate while some patient still with no growth .

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