# Bacterial isolation and Physiological Aspects in Patients with Burn in AL-Hilla city

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## Abstract

The present study is aimed to determine some aspects of microbiological and hematological studies occurring in burn patients . the study included 40 individuals 30 patients and 10 control at the period from January -2013 to July-2013 in burn units of Al-Hilla general teaching hospital the microbiologic results show four genus of bacteria (*pseudomonas aeruginosa* 46.6% ,*Staphylococcus aureus* 23,3%,*Escherichia coli* 13.3% and *klebsilla pneumonia*e 16.6% in burn wound swap while the hematological results show elevated in WBC count in patients and decreased in PCV compared with control.

**Keywords:** White blood cells, Package cells value, *pseudomonas aeruginosa, Escherichia coli*

## الخلاصة

تهدف الدراسة الحالية الى تحديد بعض الحقائق المايكروبايولوجية والدموية في الاشخاص المصابين بالحروق . تشمل الدراسة 40 شخص , 30 مصاب و10 اصحاء كمجموعة سيطرة للفترة من كانون الثاني 2013 الى تموز2013 في وحدة الحروق في مستشفى الحلة التعليمي العام . اظهرت النتائج وجود اربعة اجناس من البكتريا (الزوائف الزنجارية بنسبة 46% , المكورات العنقودية بنسبة 23.3% , الاشريشيا القولونية بنسبة 13.3% , الكلبسيلا الرئوية بنسبة16.6% ) في المسحات الماخوذة من الحروق بينما اظهرت النتائج الدموية في الدراسة الحالية ارتفاعا في عدد خلايا الدم الحمراء ونقصا في حجم خلايا الدم المرصوصة مقارنة مع مجموعة السيطرة.

**الكلمات المفتاحية** : خلايا الدم الحمراء، خلايا الدم المرصوصة، الزوائف الزنجارية ، الاشريشيا القولونية .

## Introduction

Burns are one of the most common and devastating forms of trauma , they induce a state of immunosuppressant at predisposes burn victims to infection complication (Church *et al.*,2006) .Burn injury destroys the physical skin barrier that normal prevents the invasion of microorganisms colonization infection and clinical sepsis (Vinderes and Bjerkres ,1995)infection is a major complication of burn injury is responsible for 50-60% of death, in burn patients (Absston *et al.*, 2000) microbial colonization of the open wound primarily from an endogenous source begins with 24 hours and is usually established by the end of first week after burn injury (Noronha and al meida ,2000)the organisims are predominant as contains agents of burn wound infection in any burn unit change overtime where GV+ organisms are initially prevalent and then gradually superseded by GV- opportunistic (Pruilt and Memauns,1996) *pseudomonas aruginosa* is a non fermentation , aerobic Gv- rod at is prevalent in hospital environment and can cause severe neocolonial infection beside it ability to cause disease in particular susceptible individuals (Passador *et al*., 2003) *S. aureus* is G v+ spherical non motile bacterium usually arranged in group like irregular clusters (Mims *et al*, 2000) *Escherichia coli* is a motile member of cuter bacterium it randy causes disease in healthy individuals (Al-hambera *et al*., 2004) . *Klebsilla pnumoniae* is usually caused human neocolonial infection and most of clinical isolate of klebsilla exhibit mucoid growth , large ,polysaccharide capsule and lack motility (Clark *et al.*, 2009)

While in hematological changes the patients with major burn have suffered from the most severe forms of trauma , hematological changes are complex and fail to

understand their progress, and therapeutic managements can cause the patients further problems , It is well known that a severely patients presents the greatest deregulation of homeostasis of any injury (Muir ,2011) has shown that a general relationship between the extent of burn and amount of red cell destruction . (Baxter ,2010)) observed a shorter life span of red blood cells.

## Materials and methods

This study lasted from January -2013 to July-2013 in 40 individuals (30 patients and 10 control) those patients were admitted to burn units at Al-Hilla general teaching hospital they were suffering from general degree of burn injury , The collection of blood samples was done, 2 ml of blood are drawn for hematological studies , microhematocrite method was used to determine PCV, hepranized capillary tubes was done while in WBC count used chamber slide and turks solution to estimate the total WBC in one cupic millimeters of blood (Brown,1976).

Skin swabs were taken for microbiological studies, A single colony was taken from each primary position culture on blood agar and MaCconkey agar and it was identified depending on its morphological colony shape size, color, border, and then it was examined by the microscope after being stained with grams stain then biochemical tests were done on each isolate for final identification (MacFaddin,2000, Forbes,*et al*, 2007).

## Statically analysis

All values were expressed as mean and standard deviations the data were analyzed by using of computer SSPS program and taking $p<0.05$ as the lowest limit of significant , students t test was used to examine differences between group both t test and anova test were applied to determine the differences between one group and another (Danial ,1999) .

## Results

Biochemical test and microscopic examination of isolated bacteria confirmed that they are Gv- bacteria was determined according to the morphological microscopically characteristic and biochemical test in table ( 1) , table (2).

**Table -1-Biochemical test and microscopic examination of gram negative isolated bacteria .**

| test | *E. coli* | *P. aeruginosa* | *K.pneumoniae* |
|---|---|---|---|
| Grams stain | Gve-, short rode | Gve- rods | Gve-, short rode |
| capsule | - | + | + |
| Oxidase | - | + | - |
| Catalase | + | + | + |
| indole | + | - | - |
| MR | + | - | - |
| VP | - | - | + |
| Citrate | - | + | + |
| Urease | - | - | + |
| H2s | - | - | - |
| Motility | + | + | - |
| hemolysis | - | Beta+ | - |
| EMB | Metallic sheen | pale | Centrally dark |
| Lactate fermentate | + | - | + |

**Table (2)Morphological feature and biochemical test for identification of gram positive isolated bacteria**

| Test | *S. aureus* |
|---|---|
| Gram stain | Gv+cocci clusters |
| Capsule | - |
| Oxidase | - |
| Catalase | + |
| coagulase | + |
| Hemolysis | beta |
| Esculin test | - |
| Urease | - |
| Growth on MaCconky | - |
| Manitol fermentation | + |
| Motility | - |

Table (3)Showed the number and percentage of isolated bacteria. In this table, high percentage of isolation was found in *Pseudomonas aurogenosa* 46.6% , *Staphyllococcus aureus* 23.3%, *Escherichia coli* 13.3%, *Klebsiella pneumonia* 16.6%.

**Table( 3) showed the number and percentage of isolated bacteria**

| Bacteria | No. | Percentage% |
|---|---|---|
| *Pseudomonas aurogenosa* | 14 | 46.6% |
| *Staphyllococcus aureus* | 7 | 23.3% |
| *Escherichia coli* | 4 | 13.3% |
| *Klebsiella pneumoniae* | 5 | 16.6% |

Total number of patients=30 and control 10

Table (4) showed hematological investigation, significant decrease of PCV value while high value of WBCs in burn patients compare with control.

**Table(4) Haematological investigation of patients according to the type of isolated bacteria.**

| Bacteria | PCV control | PCV patients | WBCs control | WBCs patients |
|---|---|---|---|---|
| *p.aurogenosa* | 0.439± 0.0380 | 0.393+0.0426 | 6.61±1.959 | 13.621±1.322 |
| *S.aureus* | 0.439 ±0.0380 | 0.392+0.0416 | 6.61±1.959 | 13.741±1.2005 |
| *E .coli* | 0.439 ±0.0380 | 0.313+0.026 | 6.61±1.959 | 11.975±1.353 |
| *K. pneumoniae* | 0.439 ±0.0380 | 0.343+0.0322 | 6.61±1.959 | 15.02±2.1553 |

Values are mean ±sd $p<0.05$

## Discussion

The result in tables (1 ,2) demonstrates general characters of gram positive Gv+ and gram negative Gv- bacteria that obtained from burn wound swabs positive culture regarding skin swabs were positive bacterial culture consisting of single and mixed bacterial growth , while no bacterial growth of skin swabs culture control these result agree with that obtained by( Bagdonas, 2004) who found that 86.5%of skin swabs were positive for bacterial growth also (Al –Akaylah, 2004) reported that negative bacterial growth were found in approximately 8% of cultures of skin swabs the high percentage of positive bacterial culture of the skin swabs may be attributed to the fact that burn wound has a higher incidence of interaction compared with other forms of trauma because of extensive skin barrier distribution as well as alteration of cellular and humeral immune response (Sanyal, *et al* ,1998).

Swabs sample showed positive cultures of them were of single growth , these findings reflect the higher percentage of bacterial contamination of the burn units which explain the higher percentage of positively of skin cultures found in this study (Torregorossa *et al*, 2010)observe that nosocomial infections are now clear in a phase of expansion as testified by statistical findings and particularly intensive care units including burn units which showed the frequency of bacteria skin swab it is clear from the total number of isolate that gram negative bacteria are more frequent than gram positive this agrees with (Kamel and Al- Megeed, 1997) who found all gram negative Gv-bacteria represented about 65% of micro organisms that cause burn wound infections and that this type of bacteria has assumed a primary lethal role among the cases of burn wound infection and septicemia the predominant of gram negative bacteria is clear from the high frequency of *p. aeroginosa* in each source of the cultures this agree with (Maitra, 2003) who state that the most common isolated microorganisms are the opportunistic type like *p . aeroginosa* (Mousa 1997) found that *p. aeroginosa* is the most frequents bacteria in burn wound infections in swab culture, Other gram negative bacteria are *E.coli* and *k. pnumoniae* in this study the 2 bacteria have less frequency in burn unit (Ravathi *et al* ,1993; Mansour and Enayat, 2004) than that of *p.aurogenosa* and *S. aureus* in this study the more frequent gram positive Bactria isolate from burn wound infection swab is *S. aureus* these result were approximately fitted with that of (Sanyal *et al* ,1998) who found that methicillin resistant *S. aureus* comprised 92% of gram positive bacterial isolate were as (Emmerson ,2012) noted that *S. aureus* is still one of the most frequently encounter single bacteria species in hospital and frequent case of burn wound sepsis .

Results of hematological changes the concentration of packed cell volume in burn patients are significant decrease in compression with control table( 4) all these changes have been attributed to the presence of some type of detrimental plasma factor because when the red cells injected in to normal person they survive a normal length of time also the serum of burn patients contain substances that inhibit the erythropoiesis that decrease in HB and PCV value in blood , significant leucocytosis was noticed in burn patients (Gruber and Farese ,2011) this study agree with (Esonbaty and Elotiefy ,2006) who pointed out that PCV concentration show decrease in gradually bellow control level by day 4 post burn , the decreasing of PCV concentration are expected with adequate fluid resuscitation but may also be a hallmark of cult bleeding (Stewart ,1998) (Delming *et al*., 2004) found hematocrit decreasing because of either plasma volume replacement in case of hemolysis from prolonged heat exposure or major loss of blood from non-burn injury preexisting anemia or hypervolemia , significant leucocytosis was noticed in burn patients (Alesandro and Gruber, 2009) noticed leukocytosis after 30%

injury leukocyte quantities were 3 to 5 times normal value and that because increased consumption production by bone marrow.

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