

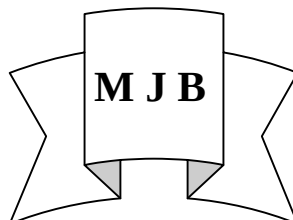
Bacteriological study in burn wound infection

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Abstract

This work aims to study the infectious etiological agents of common bacterial pathogens associated with burn wound infections.

In this study ,56 samples were collected from patients with burn wound infections in Hilla Surgical Teaching Hospital .A total of 47 samples showed bacterial growth ,identified as following: *Pseudomonas aeruginosa* [(31 isolates),*staphylococcus aureus* (6 isolates),*Klebsilla spp.* (4 isolates),*E.coli* (4 isolates), and *Proteus spp.*(2 isolates) where as the reminder (9) samples showed no bacterial growth .

The effect of some antibiotics on these bacterial isolates was studied , and the results showed that Amikacin was the most effective antibiotic among them.The ability of *Pseudomonas aeruginosa* to invade tissues depends production of extracellular enzymes(proteases).

الخلاصة

يهدف هذا العمل دراسة الممرضات البكتيرية الشائعة والمرتبطة بالتهابات جروح الحروق .في دراستنا هذه : تم جمع (56) عينة من المرضى المصابين بجروح الحروق في مستشفى الحلة التعليمي .وأظهرت النتائج (47) عينة اظهرت نموا "بكتيريا" عزلت كالتالي: الزوائف الزنجارية(31) عزله *Pseudomonas aeruginosa* ،المكورات الذهبية(6) عزله *Staphylococcus aureus* أنواع الكلبسيلا (4) عزلات *Klebsilla spp* الاشرشيا القولونية (4) عزلات *E.coli* وأنواع البروتيس (2) عزله *Proteus spp* في حين المتبقية(9) عينات لم تظهر نموا "بكتيريا". وقد تمت دراسة تأثير بعض المضادات الحيوية على هذه العزلات البكتيرية وقد أظهرت النتائج بان أكثر المضادات الحيوية تأثيرا "هو الاميكاسين . قابلية الزوائف الزنجارية على غزو الانسجة يعتمد على إنتاج الانزيمات الخلوية الخارجية.

Introduction

Burn injuries by fire and hot liquids and contact with hot surfaces have been recognized as a significant and major public health problem.

Pseudomonas aeruginosa is one of the most important and most common causes of serious infections in burn patients [1,2].

The invasive type burn wound infections is characterized by green pigment visible in subcutaneous fast, which is erythematous and later becomes (a black ,necrotic,nodular lesion)ecthyma gangrenosum vesicular

lesions and crusted serrated margins of partial – thickness facial burns are characteristic of burn wound infection of viral origin . [3,4]

Consequently broad –spectrum antibiotics are routinely used in the treatment of bacterial burn infections. The many antibiotics in use is the group of (Aminoglycosides) particularly amikacin [5].

Aminoglycosides groups were more effective in the treatment of burns infections than some other broad spectrum antibiotics e.g.

cefotaxime , carbencillin , Amoxycillin , and tetracycline[6] .This work was carried out to study the bacteriological agents of burn wound infection.

Materials & methods

*** patients :-**

Swabs of burn infections were obtained from fifty-six patients with age range from(2-70)years , who were attendants of burn unit in Hilla teaching hospital during the period of five months (October2007-February2008).

***Specimens:-**

Swabs of bacterial cultures were collected from patients suffering from burn infections and the swabs were put into transport medium in the sterilized swab tube , then they were sent to the investigating laboratory within two hours of collection ,where they were placed & inoculated onto medium [7] . Inoculating the swabs onto Blood agar enriched with 5% human blood and MaConky agar .

Laboratory Dignosis :

According to the diagnostic procedures recommended by [8,9] The isolation and identification of bacteria were performed as follows :

****A single colony was taken from each primary positive culture and its dignosis depended on the morphology properties and then colonies were selected and investigated by gram – stain to observe a specific shape, color and aggregation . After staining specific biochemical test were done to reach the final identification such as (catalase test, Oxidase test).**

Pseudomonas produce indophenol oxidase , an enzyme that renders them positive. This test frequently used in diagnosis to discriminate them from other gram - negative bacteria.

Colonies of *pseudomonas aeruginosa* are distinguished from other bacteria of this genus by production of the water – soluble pigment pyocyanin and pyoverdinin giving them a characteristic blue- green color on

agar plates also the colonies have acharacteristic fruity or grapes like odor.[10,11]

****Antibiotic sensitivity test (Kirby-Bauer method) .**

It was performed by using a pure culture of previously identified bacterial isolate. A sterile swab was used to obtain an inoculum from standardized culture . This inoculum then was streaked on a Muller , Hinton plate [12] .

*****Protease :**

One of the major virulence factor of *Pseudomonas aeruginosa* is the ability to produce extra cellular protease .

Results

In the tables

Discussion

Infection is one the most serious complication in burn patients and *Pseudomonas* especially *Pseudomonas aeruginosa* ,is the most important resistant ,and dangerous organism in burn wound infection[13] .

In this study , *Pseudomonas aeruginosa* was found to be the commonest pathogens causing wound infection and bacteremia in burn patients .

Pseudomonas is notorious for its resistance to antibiotic, there fore a particularly dangerous and dreaded pathogen . The bacterium is naturally resistant to many antibiotics due to the permeability barrier afforded by its outer membrane L P S .Also , its tendency to colonize surface in a biofilm form makes the cells impervious to therapeutic concentration antibiotic .

The ability of *Pseudomonas aeruginosa* to produce two extracellular proteases have been associated with virulence that exert their activity at the invasive stage .

: elastase and alkaline protease . Elastase has several activities that relate to virulence . The enzyme cleaves collagen, IgG, IgA, and complement component . Alkaline protease interferes with fibrin formation and will lyse

fibrin . Together , elastase ,and alkaline protease destroy the ground substances of the cornea and other supporting structures composed of fibrin and elastine . Elastase and alkaline protease together are also reported to cause the inactivation of gamma interferon (IFN) and tumor necrosis factor (TNF).The use of penicillin led to the emergence of staphylococcus aureus as the commonest gram-positive early colonizer of burn wounds.As staphylococcus can be seeded into the circulation from an abscess, early diagnosis and prompt drainage can minimize or prevent haematogenous dissemination of staphylococcus infection.The subsequent development and use of broad-spectrum antibiotic effective against Staphylococcus led to the emergence of gram-negative organism, particularly Pseudomonas aeruginosa,as the predominant organism causing invasive burn infections in burn patients[14].

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Table 1: The number of percentages of bacterial burn infection in the cases.

type of result	T	N	%
Positive culture	P	4	8
Negative culture	N	9	1
total	t	5	100

Table 2: Distribution of bacterial species in the burn infection.

type of bacteria	T	N	%
<i>Pseudomonas aeruginosa</i>	P	3	(55.3)
<i>Staphylococcus aureus</i>	S	6	100
<i>Klebsiella spp.</i>	K	4	(7.3)
<i>E. coli</i>	E	4	(7.3)
<i>Proteus spp.</i>	P	2	(3.4)
total	T	4	(84)

Table :3 Antibiotic profile of *Pseudomonas aeruginosa*

Type of bacteria	Number of isolates	CTX	CIP	CN	AK	AX	+	-
<i>Pseudomonas</i>	1							
	2							
	3							
	4							

(-) sensitive

(+)Resistant

Concentration:CTX(30mcg),CIP (5mcg),CN

(10mcg),AK(30mcg),AX(25mcg)

****All *Pseudomonas* isolates were able to produce extra cellular protease**