

Bacteremia in Ibn Al-Baladi hospital in Baghdad; Incidence etiology and antibiotic resistance of pathogens

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Date of acceptance 16 / 12/ 2008

Abstract:-

60 cases of Bacteremia were documented at Ibn Al-Baladi hospital during 6 months (1-1-2002 to 1-7-2002), with an incidence of 5.2 were gram-negative organisms and most common one was *Salmonella* and *Klebsiella*. Incidence was significantly higher in male than female. Antimicrobial sensitivity tests revealed that isolated bacteria are with multiple drug resistance to commonly used antimicrobial agents. *Salmonella* showed high resistance to cephaloxin, co-trimoxazole and amoxicillin and also *Klebsiella* showed resistance to cephaloxin and amoxicillin.

Key words:-bacteremia, pathogens, antibiotic.

Introduction:-

Bacteremia fascinates clinician, microbiologists and epidemiologist for two reasons; first, the presence of microorganism in the blood stream is frequently a manifestation of infection, often indicating a poor prognosis for affected patients and second, identifying the etiology for epidemiological purposes[1].

Reports from developing countries showed a different pattern of community acquired bacteremia, with an increased frequency of pathogen *Salmonella*[2,3]. This study was designed to find out the incidence of bacteremia in Ibn-Al-Baladi hospital in Baghdad and to identify their bacterial causes with antimicrobial susceptibility pattern.

Material and Methods:-

Patients with positive blood cultures and whose clinical courses were consistent with bacteremia were included in this study for the period of 1-1-2002 to 1-7-2002. The study was conducted at Ibn-Albaladi hospital in Baghdad.

Blood cultures were obtained by a strict aseptic technique using chlorhexidine (Hibitane) to clean the

patient's skin. 5ml of the patient's blood were added into a bottle containing brain heart infusion broth (Difco laboratory UK). Cultures were incubated at 37⁰C and monitored every 24 hours for 7 days. Subcultures were performed after 1, 2, 3 and 4 days on blood cultures and MacConky agars. Organisms isolated were identified by standard microbiologic tests[3,4].

Antibiotic susceptibility test was performed on positive subcultures using Kirby-Bauer method[5]. The antibiotics tested for Gram-positive isolates were amoxicillin 10Mcg/disc, penicillin G 6Mcg/disc, cephaloxin 30Mcg/disc, ampicillin 10Mcg/disc, and erythromycin 15 Mcg/disc (Ibn-Sina center for pharmaceutical research. Baghdad). For Gram-negative isolates ampicillin 10Mcg/disc, tetracycline 10Mcg/disc, tobramycin 10Mcg/disc, co-trimoxazole 25Mcg/disc, gentamycin 10Mcg/disc, chloramphenicol 30Mcg/disc, norfloxacin, cefotaxime 30Mcg/disc, cephaloxin 30Mcg/disc and amoxicillin 10Mcg/disc (Ibn-Sina center for pharmaceutical research. Baghdad).

Results:-

During the period of study, there were 11441 admissions to Ibn-Albaladi hospital: 60 cases of bacteremia were documented, giving incidence of 5.2/1000 hospital admissions. There were 39 males and 21 females (age range, 1 day to 6 years) (table 1).

The age of patients with bacteremia ranged from the newborn to 6 years: 22(68.8%) of the patients were less than one year, 10(31.2%) \leq 6 years.

Tabl (1): Incidence of bacteremia among age groups in relation to gender.

Age	% of positive culture	Male%	Female%
<month	34.4	72.7	27.3
<year	34.4	54.5	45.5
<6 years	31.2	80	20
Total	17.6	65	35

A total of 60 bacterial isolates 54 were Gram-negative and 6 were Gram-positive. The predominant isolates of Gram-negative bacteria were *Salmonella* and *Klebsiella*, which accounted for 18 cases for each one (30%). While *Streptococcus* sp. was the sole isolate of Gram-positive bacteria (table 2).

Table (2): Organisms isolated from bacteremic patients

Organisms	Positive culture	%
<i>Salmonella</i> sp.	18	30
<i>Klebsiella</i> sp.	18	30
<i>Citrobacter</i> sp.	5	8.3
<i>Enterobacter</i> sp.	6	10
*Other Gram-negative bacilli	7	11.7
<i>Streptococcus</i> sp.	6	10
Total	60	100

*This includes: *Serratia*, *E.coli*, *Proteus* and *Providencia*.

Salmonella sp. was mostly isolated from patients with age group more than one year while other organisms were mostly isolated from patients less than one year as shown in (table 3).

Table (3): Organisms isolated from bacteremic patients in relation to age groups.

Organisms	Age		
	<Month %	<year %	<6year %
<i>Salmonella</i> sp.	16.6	16.6	66.7
<i>Klebsiella</i> sp.	38.3	83.8	22.2
<i>Citrobacter</i> sp.	40	40	20
<i>Enterobacter</i> sp.	50	50	-
Other Gram-negative bacilli	57.1	42.9	-
<i>Streptococcus</i> sp.	50	50	-
Total	36.7	35	28.3

The results of sensitivity test were obtained for microorganisms isolated from bacteremic patients are shown in (table 4). It was found that isolates of *Salmonella* sp. Show resistance to cephaloxin, cotrimoxazole and amoxicillin while *Klebsiella* sp. Shows resistance to cephaloxin, ampicillin and amoxicillin.

Table (4):Antibiotic susceptibility pattern of the most common isolated bacteria.

Bacteria	<i>Salmonella</i> sp.	<i>Klebsiella</i> sp.	<i>Citrobacter</i> sp.	<i>Enterobacter</i> sp.	<i>Streptococcus</i> sp.
No of isolates	18	18	5	6	6
Tb	50	81.8	33.3	100	---
CP	23	18.1	0	0	33.3
C	57.1	53.8	40	66.6	---
CO	25	---	0	0	---
AM	43	0	0	0	0
AMX	25	83	20	0	16.6
CFM	0	---	0	0	---
CF	75	100	0	100	---
NX	50	100	100	---	---
TE	71.4	100	50	---	---
GM	57	50	0	50	---
PG	---	---	---	---	16.6
E	---	---	---	---	16.6

Tb=Tobramycin CP=Cephaloxin C=Chloramphenicol CO=Co-trimoxazole AM=Ampicillin AMX=Amoxicillin CFM=Cefotaxime CF=Ciprofloxacin NX=Norfloxacin TE=Tetracycline GM=Gentamycine PG=Penicillin G E=Erythromycin.

Discussion:

The incidence of bacteremia in our study is 5.2 cases per 1000 admissions. The rates reported in other studies range from 2 to 13.5 per 1000 admissions[7,8,9]. Incidence of bacteremia was significantly higher in males than in females (at $P > 0.05$) and this is in agreement with other investigators[9]. Patients ages were ranged from 1 day to 6 years 68.8% of them were less than one year, age has always been recognized as a major determining factor in the case-fatality ratio for the patients with bacteremia most of those deaths being in newborn and infants under 2 years old[11]. A total of 60 pathogenic organisms isolated 54 were Gram-negative (90% of bacteremia) and this increasing incidence was noted by other investigators[9], only 6 were Gram-positive bacteria.

The five most common isolates were *Salmonella*, *Klebsiella*, *Citrobacter*, *Enterobacter* and *Streptococcus*. The isolation of facultative and anaerobic Gram-negative bacilli, fungi, and Gram-positive cocci (except viridans *Streptococci* and *Staphylococcus epidermidis*) almost always indicated true bacteremia[12]. *Klebsiella* is currently the most common organism causing Gram-negative bacteremia in children[13]. The other common Gram-negative isolate was *Salmonella*. Other studies from Kuwait and West Indies have reported high prevalence of *Salmonella* bacteremia[2,14]. The most common isolates reported in other studies vary from *E.coli*, *Pseudomonas* and *Klebsiella*[13,15]. to *Brucella*[8] and *Salmonella*[2,14].

Enterobacter sp was also isolated from 6(10%) patients all of them were under one year of age. In a study from Taiwan 23 patients hospitalized in a neonatal intensive care unit developed nosocomial *Enterobacter cloacae* bacteremia and

the source of this bacteria was contaminated saline[16]. So isolation of facultative Gram-negative bacilli may indicate nosocomial bacteremia. The other Gram-negative bacteria isolated were *Citrobacter*, *E.coli*, *Serratia*, *Proteus* and *Providencia*.

The only Gram-positive isolate in our study was *Streptococcus* which also agrees with the finding of other investigators [2, 14]. The antimicrobial susceptibility tests revealed the multiresistance of Gram-negative bacilli as shown in (table 4) and because of the increasing rates of resistance to antimicrobial agents it is important to identify the main infectious agents and their susceptibility, considering carefully when to give antibiotic therapy and what drug should be chosen.

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تجرثم الدم في مستشفى ابن البلدي في بغداد:نسبة الحدوث، المسببات ومقاومة المضادات الحيوية لمسببات تجرثم الدم

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الخلاصة:

تم تشخيص 60 حالة اصابة بتجرثم الدم في مستشفى ابن البلدي للولادة والاطفال في بغداد خلال ستة اشهر (1-1-2002 الى 1-7-2002) وبنسبة حدوث 5.2 لكل 1000 حالة دخول وكان وقوع تجرثم الدم بسلبيات الغرام 90 % وكان من الجراثيم المعزولة الشائعة هي عصيات السالمونيلا *Salmonella* والكلبسيلا *Klebsiella*. كان وقوع تجرثم الدم عند الذكور اعلى من الاناث. كان تجرثم الدم اكثر ترددا في الاطفال بعمر اقل من سنة وقد اظهرت عثر السالمونيلا مقاومة للمضادات وخاصة السيفاليكسين، كو-ترايموكسازول و الاموكسيسيلين بينما اظهرت عثر الكلبسيلا مقاومة للسيفاليكسين، الامبسيلين والاموكسيسيلين.