The common bacterial pathogenes isolated from blood culture in paediatric patients

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Abstract :

Fever is a common illness in the pediatric age group ,the causes could be viral ,bacterial and fungal , this study was focused on bacterial pathogens as gram positive like *Staphylococci*, coagulase positive or negative ,*Streptococci* and gram negative like *E-coli* , *Klebsialla* ,*Proteus*, *Pseudomonas*, *Burkhoderia* , *Acinetobacter* and others like *Pusturella* ,*E-alkalescendiaper*, *Haemophillus influenza* and yeast like candida .

Four thousand and seventy eight blood samples (4078)were collected in a period between January 2011 and the end of May 2012 at the child welfare hospital ,all the samples were cultured on suitable culture media and then biochemical tests were done using API-E 20 and sugar fermentation tests ,sensitivity test were done with number of antibiotics [1].

4078 cases examined only ,1107 showed positive growth ,264cases were contaminated and no bacterial growth seen in 2707.

The bacterial isolates during one year in pediatric age groups were mostly gram positive cocci ,followed by gram negative bacilli,and yeasts .

Key words: gram positive ,gram negative, pediatric group

Introduction:

Blood culture is a common diagnostic test for the detection of bacterial pathogens causing fever[1] , bacteremia and septicemia following focal infection seen in children[2,3].The detection of bacterial pathogens could be seen following tonsillitis ,otitis media ,meningitis, bronchitis and various causes of UTI and gastroenteritis[3,4].

Materials and methods

Materials :A total of 4078 blood samples were tested as 1-5 cc of venous blood were collected from children admitted to child welfare hospital /Baghdad . Their age ranged between one month –ten years ,starting from Jan,2011 -December 2011

Methods: The samples sent for diagnosis to be cultured to appropriate media like peadiatric blood culture bottles with brain heart infusion media of 25cc diluted with 1:10-1:20 to be incubated for 24 hours and then 0.5 ml of the bottle was subcultured on media like MacConky media for gram negative bacteria & blood agar under anaerobic condition[5], chocolate agar under CO2 concentration for gram positive pyogenic streptococci isolation [6,7] the incubation is for 24 hours at 37C. More identification were done for the lactose non fermenting colonies by culturing the suspected isolates on API-E 20 test with a set of sugar for bacterial biochemical activity as IMViC , Kligler iron test, indol test and urea test for next 24 hours at 37C for g-ve and[7]. The accurate diagnosis were made using specific

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polyvalent antisera as anti O and anti H antisera can identify salmonella spp .For pyogenic staphylococci coagulase, catalase and optochine tests were done after initial isolation.[8,9].

Antibiotic sensitivity were done for the diagnosed colonies using muller-hinton agar media for culture and the zone of inhibition of bacterial growth was measured to assess the degree of inhbition of each antibiotic disc used,the antibiotics concentrations used were as follows: ,the drugs tested shown in table 1.

Table 1: Antimicrobial drugs used for culture and sensitivity for blood culture Isolates

(ImipenemIPM 10mcg	Cephalothin CF 30mcg	Amikacin AK 30mcg	ciprofloxacin Cip 5mcg	Cefixime CFM 5mcg	Methacilin ME5mcg
ceftiaxoneCOR 30mcg	aztreonam ATM 30mcg	tricoricin , TIM1.25+clovanicacid 10mcg	Trimethoprim COT 1.25mcg	cefotaximeCTX 30 mcg	chloramphenicolC 30mcg
penicillin P10mcg	Ceftazidine CAZ 30mcg	Ticarcillin TIC 1.25 mcg	Gentamycine G 30mcg	Ciprofoxasine CIP 30mcg	Tobramycine TB 10mcg

(ImipenemIPM 10mcg, cephalothinCF 30mcg, amikacinAK 30mcg ,ciprofloxacin Cip 5mcg , ME methacilin5mcg , COR ceftiaxone 30mcg , ATM aztreonam 30mcg ,CFM cefixime 5mcg, TIM tricoricin 1.25+clovanicacid10mcg, trimethprimCOT 1.25mcg ,cefotaximeCTX30 mcg ,chloamphenicolC 30mcg , ampicilinAMP10mcg, , ceftazidineCAZ 30mcg ,ticarcillinTIC1.25 mcg, GentamycineG 30mcg, CiprofoxasineCIP 30mcg TobramycinTB 10mcg) and the result shown next day.

For the blood bottle to be discarded as negative , it should be examined 3 times first after 24 hours ,then in the next 2days and after 5 days were the third subculture if still negative the sample noted as no bacterial growth [10,11].

Results:

The total examined cases were 4078, positive growth seen in 1107 as 866(21.23%), of the total isolates were of gram positive cocci,and 185(4.53%) gram negative bacilli as entrobacterae , no bacterial growth seen in 2707(66.38%) cases while 264(6.47%) were contaminated as shown in (table2). Most of the cases were seen in the first year of life 56%, the rest were ranging from 2-12years old.

Table 1: The incidence of pathogenic species in the blood culture samples of pediatric patients

Infective microrganisms	Number of cases	Percentage
Staphylococci	866	21.23%
coagulase+	87	
coagulase-	779	
streptococci	56	1.37%
Entrobacteraesae and others	185	4.53%
Contamination	264	6.47%
No bacterial isolated	2707	66.38%
Total	1371 OUT of 4078 case	100%

The pattern of antibiotic sensitivity was for the gram positive cocci mostly sensitive to VA,G,CIP ,C and resistant to AM,P,ME and COT while the gram negative bacteria showed high sensitivity to AK,TB,IPM and CIP but moderately to G and TIM and resistance to P,CFT, and TIC , the emergence of highly resistant strain of *Klebsiella peumonae* interestingly noticed to the most antibiotics used in the medical practice as G,TIM,CFT,AMP,IPM,TIC and CTR and few strains were sensitive to AK drug only.

Discussion:

Result revealed that incidence of bacterial infection in pediatric age groups was 1st for staphylococci and followed by streptococci while gram negative rods like *E coli ,Klebsiella , Proteus,Salmonella,Shigella,Pseudomonas,Enterbacter, Acenitobacter ,Citrobacter,Burkhoderia* and others like *H .influenza ,Pastrella ,Roovettela , Alkalesced,* and *Candida*, while two thirds of samples showed no bacterial growth which could be related to the predominance of viral causes or to the early administration of antibiotics before sending the patients blood for culture and sensitivity examination as recommended [12,13] ,the incidence of contamination was only 6.47% which could be due to the inappropriate sampling, the use of contaminated media and or, bad handling of the culture media during subculture procedure.

Most of the infections seen during the first year of life which could be related to immature immune system developed against gram negative bacteria during the 1st year of life and probably most of the babies were not breast fed with poor hygienic conditions [14,15]

The new resistant strains are alarming sign for doctors in practice to avoid unnecessary prescription of antimicrobial drugs ,and the use of old antibiotics in the treatment of those wild strains to achieve healing.

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الجراثيم المرضية الشائعة المعزولة من زرع دم للاطفال المرضى

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الخلاصة:

اجريت الدراسة على اربعة الاف و ثمانية وسبعين عينة دم سحبت في مستشفى حماية الاطفال في بغداد لاجل تشخيص المسببات ابكتيرية في حالات خمج الم والاعضاء الاخرى المسببة للبكتريميا وتسسمم الدم البكتيرى و كانت العينات المزروعة على وسائط زرعية مختلفة قد اظهرت وجود نسبة بكتريا موجبة الكرام في 21,22%و انواع البكتريا الاخرى سالبة الكرام 4,53% وكانت نسبة التلوث 6,47 % والغالبية من العينات انها كانت سالبة بنسبة 66,38% والفئة العمرية الاكثر هم الاطفال دون سن السنة وذلك لعدم اكتمال النظام المناعي وعدم الرضاعة الطبيعية واظهرت الدراسة ان نمط مقاومة المضادات الحيوية قد اصبح متغيرا بزيادة واضحة وقد اصبحت البكتريا مقاومة لمعظم المضادات الحيوية المستعملة في الروتين الطبي مما يجعل من الواجب ارسال العينات للتشخيص الحساسية قبل وصف العلاج للاطفال .