

Neonatal septicemia in AL_Najaf AL_Ashref gubererate : bacteriological profile and antimicrobial sensitivity.

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الخلاصة

تعتبر حالة تسمم الدم في الأطفال حديثي الولادة من أهم أسباب العوق والوفاة ومعرفة البكتيريا المسببة لها من أهم الخطوات العلاجية والتي يترتب عليها تأثير كبير في زيادة احتمال العلاج وبتالي تجاوز المشكل الكبير جدا عند الأطفال حديثي الولادة. أجريت هذه الدراسة في مدينة النجف الاشرف للفترة الممتدة من تشرين الثاني-2007 إلى شباط - 2008. شمل بالدراسة وظهر لنا أن 58% اظهروا نتائج ايجابية في زرع الدم و 42% نتائج سلبية من النتائج الايجابية كان عدد الإذات 3 فقط وظهر لنا أن الكلبسيلات تشكل 42.4% من مجموع العزلات البكتيرية بينما كانت نسبة الاس تريكيا القولونية 2% والباقي (30.29%) هو للمكورات العنقودية تحسس المكورات العنقودية للمضادات البكتيرية كان ك الأتي النورفلوكساسين بين 100% والفانكوميسين بين 85.7% والنتاميسين بين 66.6% و التيكوبلانين 66.6% و الازثرومايسين 42.8% بينما كانت نتائج الكلبسيلا ك الأتي الاميكاسيد بين 100% والنورفلوكساسين بين 100% والهيديكس ك أسد 100% والدوكسيسيسايكلين 50% و السيفالكسين 0% و الجنتاميسين بين 0% ونتائج الاس تريكيا القولونية 100% والنورفلوكساسين بين 100% والايكاسيد بين 100% والنتوبراميسين بين 50% والسيفوتاكسد يم و 50% الهيديكس ك أسد أعد أطباء الأطفال خصوصا المتعاملون مع حالات التسمم الدموي في اختيار المضادات الحيوية المناسبة والفعالة للقضاء على مثل تلك المسببات البكتيرية .

Abstract

Neonatal septicemia still one of the most important causes of neonatal sepsis and death. Knowledge of bacteriological profile and antibacterial sensitivity pattern in our locality play an important role in selection of antibacterial drug that will be very effective against causative pathogens. This study conducted in AL- NAJAF AL- ASHREF Governorate during period extended between Nov.2007 to Feb.-2008, about 57 clinically suspected

cases of neonatal septicemia was enrolled, to study bacteriological profile and antibiotic sensitivity pattern. Results showed that 33 cases (58 %) gave positive blood culture results and there was no growth in 24 cases (42 %), from the positive cases there was 20 males and 13 females. On the other hand, *Klebsiella* sp. represented 42.4% of all isolates and *Escherichia coli* were 27.2 %, while the rest (30.29 %) was represented by *Staphylococcus aureus*. Sensitivity pattern showed that *S. aureus* was sensitive to Norfloxacin (100 %), Vancomycin (85.7 %), Netilmicin (66.6 %), Teicoplanin (66.6 %) and Azithromycin (42.8 %). While *Klebsiella* sp. was sensitive to Amikacin (100 %), Norfloxacin (100 %), Nalidixic acid (100 %), Doxycycline (50 %), Cephalexin (0 %) and Gentamycin (0 %). While *E. coli* was sensitive (100 %) to Norfloxacin, (100 %) for Amikacin, (100 %) for Tobramycin, (50%) to cefotaxime and (50 %) for Nalidixic acid. These results will help the physician in our locality to select most sensitive drug by the bacteria for optimum successful treatment to overcome morbidity and mortality in neonate.

Introduction

Neonatal septicemia which is one of the clinical category of neonatal sepsis has been reported as the most common clinical category of neonatal sepsis with an incidence of 24 per 1000 live birth from a total incidence of neonatal sepsis which is 38 per 1000 intramural live births in tertiary birth care institution .⁽¹⁾ Early onset neonatal sepsis is commonly caused by microorganisms acquired from the mother before or during birth (vertically transmitted and prenatal acquired) , Infections presenting after 7 days of birth are considerable late onset infections and are generally caused by microorganisms acquired from the environment rather than from the mother (nasocomial and horizontally transmitted).⁽²⁾

Neonatal septicemia constitute an important cause of morbidity and mortality amongst neonates,⁽³⁾ However, with presently available antimicrobial agents , neonatal septicemia can bring down the morbidity and mortality substantially.

Several studies showed a wide range of bacteriological profile of neonatal septicemia cases and their antimicrobial sensitivity pattern, the present study was undertaken to study the bacteriological profile of neonatal bacteria in AL_NAJAF AL_ASHREF governorate and antimicrobial sensitivity pattern for planning strategy for the management of these cases.

Patints and metmods

Blood culture reports were studied in 57 cases of clinically suspected neonatal septicemia to determine the bacteriological profile and antibiotic sensitivity pattern of the culture ed isolates blood culture is the best guide in cases of suspected septicemia.

Blood culture procedure

In the procedure of blood culture we try to avoid sources of contamination as much as possible by wear sterile gloves prior to procedure and prepare a patch of skin over proposed veni-puncture site, the area cleaned thoroughly with povidone- iodine before sample is collected. About one ml sample of blood taken for blood culture process which added to blood culture bottle containing 5-10 ml of culture media , then they observed for record the detection of bacterial growth.(4)

Antibiotic sensitivity test

We carry antibiotic sensitivity test for the clinical isolates from the samples of patient against number of antibiotic by using disc diffusion methods as described by Bauer et al (1966)⁽⁵⁾:

Preparation of bacterial inoculums

We prepare the bacterial inoculums for carrying antibiotic sensitivity test by taking loop full added and liner it on nutrient agar and incubated it on 37 c for 24 hour. and then we added to the bacterial culture 10 mill from nutrient broth and mixed the suspension for 30 seconds by using rotating mixture (Vortex) until we notice turbidity in bacterial suspension and we compare this turbidity with tubes containing McFarland the standard suspension which equal to 1.5×10^8 cell ml as we added

functional salt solution for the culture tubes of high turbidity until the turbidity become equal to the turbidity of McFarland tube.

Then the suspension was cultured by sterile cotton swab on the surface of Muller Hinton agar by homogenous way and buy average of 3 repetitions for each isolates and we leave the dishes for 5 minute to dry.The antibiotic discs was distributed on the surface of the culture media agar by using sterile forceps and by average of 5 discs for each dish and to prevent intervention between inhibition zones we leave distance not less than 24 millimeter between discs and another and distance not less than 10 millimeter between the border of the disc and the internal border of the Petri dish and we fix the disc by forceps to ensure the fixing of the discs on the surface of the agar then we incubate the dishes by inverse pattern in temperature of 37 c for 24 hours .

The result readied by measuring the diameter of zone of inhibition for each disc (which is the transparent zone which is free from bacterial growth) and lie surrounding the antibiotic disc and included the diameter of the disc of antibiotic itself by millimeter by using graded transparent measure tool and the results was compared with the standard average for the antibiotic which mentioned in Quinn et al (1998) ⁽⁶⁾ according to the listed tables as we classified the bacteria to: sensitive (S);resistant (R) According to the zone of inhibition.

Results

Blood culture reports of the 57 clinically suspected septicemia cases were reviewed and a culture positive rate of 58% (number = 33 cases) was observed. There was no growth in 42% of cases (number = 24 cases) (Table 1).

Table 1: number and percentage of positive and negative blood culture

	positive	negative	Total
Male	20	14	34
Female	13	10	23
Total Number	33	24	57
Total %	58%	42%	100%

About the types of bacteria isolated from positive culture , Gram negative bacilli constituted 69.69 %of the total isolates . Klebsiella and Escherichia coli were the predominant pathogens among the gram negative organisms by rate of 42.42 % and 27.27 % respectively. While gram positive represent 30.29% from the total positive cases table (2).

Table 2: Bacteriological profile of isolates by number and percentage.

Type of bacteria	Number of isolates	%
Klebsiella	14	42.42%
Escherichia coli	9	27.27%
Staphylococcus aureus	10	30.29%
total	33	100 %

The results of antibiotic sensitivity test revealed that staphylococcus aureus show Norfloxacin, Vancomycin, teicoplanin, and intermediate resistant to Azithromycin as shown by table (3).

Table 3: antibiotic sesensitivity pattern of staphylococcus aureus against some antibacterial drug.

Type of antibacterial drug	% Of sensitivity	% Of resistant
Norfloxacin	100 %	0 %
Vancomycin	85.71 %	14.29 %
Netilmicin	66.66 %	33.34 %
teicoplanin	66.66 %	33.34 %
Azithromycin	42.85 %	57.15 %

While Klebsiella sensitive to Amikacin, Norfloxacin and Nalidixic acid, while they are resistant to Cephalexin and Gentamycin table (4).

Table 4: antibiotic sesensitivity pattern of Klebsiella against some antibacterial drug.

Type of antibacterial drug	% of sensitivity	% of resistant
Amikacin	100 %	0 %
Norfloxacin	100 %	0 %
Nalidixic acid	100 %	0 %
Doxycycline	50 %	50 %
Cephalexin	0 %	100 %
Gentamycin	0 %	100 %

While for *Escherichia coli* show sensitivity to Norfloxacin, Amikacin, and tobramycin and show some resistance to cefotaxime and Nalidixic acid table (5).

Table 5: antibiotic sesensitivity pattern of Escherichia coli against some antibacterial drug.

Type of antibacterial drug	% of sensitivity	% of resistant
Norfloxacin	100 %	0 %
Amikacin	100 %	0%
Tobramycin	100 %	0 %
Cefotaxime	50 %	50 %
Nalidixic acid	50 %	50 %

Discussion

For the effective management of neonatal septicemia cases, study of bacteriological profile with their antibacterial sensitivity pattern play a significant role. In this study, blood culture positivity rate in neonatal septicemia cases was 58 % where as in 42 % of the cases there was no growth.

Such high culture positivity rate (which is 56%) has been reported by Sharma et al (7) which are comparable with our study. However reports from a broad show the incidence of positive culture vary between 23.9 (8) - 59.82 % (9).

In our study, incidence of neonatal septicemia confirmed by blood culture was 58 %. Our possible explanations for this high result are:

1- Early blood culture and sensitivity (as delayed culture and sensitivity may reduce the incidence because of high possibility of using antibacterial drugs especially as we mention before that neonatal septicemia one of the most important causes of morbidity and mortality in neonate.

2- Careful and accurate clinical diagnosis of neonatal septicemia that will increase the incidence of positivity rate.

Despite of these results, a negative blood culture does not exclude sepsis, so neonate with clinical suspicion of sepsis should put under close observation and consider in high risk situation.

In the present study, gram negative bacteria constituted a major group of isolation (69.69 %) from neonatal septicemia cases; amongst this group *Klebsiella* has been found to be predominant pathogen (42.4 %). Our results are higher than other studies that show wide range of incidence started by 8.9 % (8) and reach up to the 38.5 % (10). Our possible explanations for this high rate of gram negative bacteria are due to cross infection from hospital infection or from genital tract of the mother during process of delivery. Our results in contrast to reports from other parts of the world especially western countries as *Escherichia coli* are the most common gram negative microorganisms isolated from blood culture of neonate with suspicion of sepsis (11). Also we found that *Escherichia coli* represent 27.2 % of all isolates. Reports from other parts of the world show a wide range of incidence of *E. coli* in neonatal septicemia extend from 10.64 % (10) up to the 77.1% (9) While about gram positive results we see that *Staphylococcus aureus* was the most common gram-positive bacteria by 30.29 % which are comparable with Makuolu et al (12), on other side our results are in contrast to Aurangzeb et al (9) that show very low percentage (4.4 %). Our possible explanation for this high rate of

staphylococcus aureus may be due to contamination from skin , hospital tools or poor hygiene by neonatal intensive care unit that can lead to such results which can be over come by proper sterilization.Regarding antibiotic sensitivity pattern against isolated bacteria we see that staphylococcus aureus 100% sensitive to Norfloxacin . Our results are comparable with Nalini et al ⁽¹³⁾ who report 96.3 % , but they are wildy differ from results reported by Roy et al ⁽¹⁴⁾ that report sensitivity rate of less than 60 % . Our possible explanations for this high result are

1- Quinilones are relatively new antibacterial drug that are not yet commonly used by general population and occurrence of misuse that will lead to formation of new resistant generation.Also we see that S. aureus was 85.7 % sensitive to Vancomycin, our results are slightly differ from that reported by Roy et al⁽¹⁴⁾.tat show 100 % sensitivity rate . we can explain such high results because Vancomycin not commonly used antibiotic also because its parantral dosage form that play a role in limitation of its misuse by general population.We found that S. aureus 66.66% sensitive to Netilmicin, Our results differ from reports of Nalini et al ⁽¹³⁾ that show 83.3 % .We found that S. aureus 66.66 % sensitive to Teicoplanin while Roy et al ⁽¹⁴⁾ mention 100 % sensitivity rate. Also we found that S. aureus 42.85 % sensitive to Azithromycin, Our results widely differ from that of Makuolu et al ⁽¹²⁾ who report 100 % sensitivity rate.Klebsiella show 100 % sensitive to Amikacin, Our results relatively comparable with that reported by Nalini et al ⁽¹³⁾ who show 94.6 % .Regarding Norfloxacin, Our study show 100 % sensitive rate, other studies like Aurangzeb et al (8) show 88 % sensitivity rate. Our studies show Nalidixic acid sensitivity rate 100 % , also Doxycycline sensitivity rate of 50 % but they are 100 % resistant to Cephalexin .and 100 % resistant to Gentamycin that in contrast to results reported by Nalini et al ⁽¹³⁾ as the resistant rate 45.5 %.

Regarding Escherichia coli we found that they are 100 % sensitive to Norfloxacin Aurangzeb et al ⁽⁹⁾ report sensitive rate of 88. 1%.We found that E. coli was 100 % sensitive to Amikacin , Our results are relatively comparable with that reported by Nalini et al (12) 94.6 % but they are differ from that reported by

Aurangzeb et al ⁽⁹⁾ which is 77.7 % . Also we found that E coli 100 % sensitive to Tobramycin, Aurangzeb et al ⁽⁹⁾ show different results which are 65.7 %.Our study show that E coli was 50 % sensitive to Cefotaxime , Our results are close to Nalini et al ⁽¹³⁾ and Aurangzeb Et al ⁽⁹⁾ that show percentage of sensitivity 44.5 % and 44.8 % respectively , Our explanation for our results

Conclusion

- 1- It is essential to have general idea about bacteriological profile of neonatal septicemia in our locality, because high morbidity and mortality associated with neonatal septicemia will not wait the results of culture and sensitivity.
- 2- Sterilization and good hospital hygiene can highly prevent neonatal septicemia or at least will affects bacteriological profile.
- 3- Selection of antibacterial drugs for starting treatment of neonatal septicemia before appearance the results of culture and sensitivity widely different in different area all over the world.

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