# Common causes of neonatal sepsis in AL-kadhimiyia Teaching Hospital

Abdul karem jasem albahadle and Areege Abdul abass

**الخلاصة**

يعتبر الخمج من الامراض الخطرة والمهمة والتي كثيرا ماتصيب الاطفال الحديثي الولادة ويعود سبب ذلك الى عدم اكتمال وفعالية الجهاز المناعي لدي هذه الفئة من الاطفال ويحدث الخمج نتيجة انتقال الجرثومة المؤدية للمرض اما من الام الحامل عبر المشيمة او اثناء الولادة والقسم الاخر يحث نتيجة انتقال الجرثومة من الوسط الذي يعيش فية الطفل الحديث الولادة لمعرفة اهم انواع الجراثيم المسببة لمرض الخمج عند الاطفال حديثي الولادة الراقدين في مستشفى الكاظمية التعليمي .اجريت هذه الدراسة على 127 طفل حديث الولاة للفترة من 14 شباط عام 2009 وحتى 25 شباط عام 2010 وقد تم تشخيص مرض الخمج عندهم اعتمادا على الاعراض السريرية ،حيث تم اخذ عينة من دم جميع المصابين وارسالها الى مختبر المستشفي من اجل زرع الدم ، وتم تقسيم المصابين وحسب التقييم العالمي الى مجموعتين

1-الخمج المبكر : وهي التي تضهر عليها اعراض المرض خلال الاسبوع الاول من العمر

2-الخمج المتاخر :وهي مجموعة المصابين التي تضهر عليها اعراض المرض بعد الاسبوع الاول.

اضهرت الدراسة ان اهم الاعراض المؤدية الى تشخيص المرض في مجموعة الخمج المبكرهي قلة اوعدم الرضاعة ،الخمول ،والحمى وحسب النسب الاتية (94.12% ،91.76 % ،52.94 % )وهي مشابهة لمجموعة الخمج المتاخر وحسب النسب الاتية (95.24 % ،92.86 % ،57.14 % ) . وكانت اهم الجاثيم المسبب للمرض في المجموعة الاولى هي العنقوديات الذهبية staph.aureus ،الانتيروبكتر entero bacter ، وستاف ابي ديرمس staph.epidermidis وحسب النسب التالية( 21.18 ،25.89% ،21.18 % ) بينما كانت اهم الجراثيم المسبب للمرض في المجموعة الثانية العنقوديات الذهبية staph.aureus ،الانتيروبكتر entero bacter ،الاشريكية الكولونية E-coli وحسب النسب الاتية( 21.43% ،16.67% ،11.90 % ) .وكانت نسبة الوفيات في المجموعة الثانية(30.95 %) اعلى بقليل من نسبة الوفيات في المجموعة الاولى (29.41%) ،وهي اعلى في الذكور من الاناث .

العنقوديات الذهبية staph.aureus والانتيروبكترentero bacter كانت السبب الرئيسي في الاصابة بلخمج عند المجموعتين ،بينما كانت ستاف ابي ديرمس staph epidermidis. سبب مهم للاصابة بلمرض في المجموعة الاولى والاشريكية الكولونيةE-coli سبب مهم في المجموعة الثانية.

**Abstract**

Sepsis is common in the neonatal period which may be acquired in utero through the placental or trans-cervical routes and during or after birth and because the immunological system of neonates is not well developed make this infection series and fatal if did not treated in optimal manner .

To identify the most common causes of sepsis in AL-Kadhthimyia Teaching Hospital and its mortality rate.

Cross-sectional study was conducted during the period between 14th of February 2009 to 25th of February 2010 on 127 neonates with sepsis diagnosed clinically and they were admitted in AL-Kadhthimyia Teaching Hospital ,they ere divided into two groups according to the time of appearance of the disease which were early onset sepsis and late onset sepsis. blood was taken from them and send for culture.

The most common clinical presentation in early onset sepsis [EOS] were , poor feeding, lethargy and fever( 94.12% ,91.76 % ,and 52.94 % respectively )which is similar to late onset sepsis[LOS] (95.24%,92.86% and 57.14 % respectively). the most common organisms responsible for[EOS] were Staph.aureus, Enterobacteria,and staph.epidermidis (25.89 % ,21.18 % and21.18 % respectively ) while in[LOS] Staph.aureus Enterobacteria and E.coli ( 21.43 % ,16.67 % and 11.90 % ). The over all mortality was 29.92 % which was slightly more in [LOS] 30.95 % than in [EOS] 29.41% also it was more common in male than female in both groups.

Staph.aureus,Enterobacteria were the leading cause of sepsis in both groups while staph.epidermidis wase more common in [EOS]and E.coli was more common in [LOS] .

Key words :early onset, late onset ,sepsis, neonate .

## Introduction

Neonatal sepsis is a significant cause of neonatal morbidity and mortality in the newborns particularly in preterm and low birth weight infants.(1)The frequency of neonatal bacterial infection range from 1-5 per 1000 live birth .(2)The

epidemiological data from developing countries shows important difference in the incidence ,risk factors, causative micro-organisms and antimicrobial sensitivities of pathogens and mortality rate from that of developing countries.(3,4)group B-streptococcal disease is the most important cause of neonatal sepsis in Europe and north America,(5)but there is preponderance of gram negative organisms in tropical and developing countries.(6) The clinical presentations are non specific in both early and late neonatal sepsis including poor feeding, lethargy ,temperature instability, respiratory distress, seizures and abdominal distention.(7)This study was conducted to determine the clinical presentations, bacteriological profile and mortality rate in neonates admitted in Al-Kadhimiyia teaching hospital in Baghdad with clinical diagnosis of sepsis.

## Materials and Methods

This study includes 127 case of neonatal sepsis, admitted to Pediatric department of Al-Kadhimiyia Teaching hospital during the period between 14th of February 2009 to 25thof February 2010,diagnosis of neonatal sepsis was clinical depending on the signs and symptoms including poor feeding, lethargy, temperature instability, respiratory distress , abdominal distention and seizures.

Early onset sepsis(EOS) was considered when the onset of symptoms was before one week of life and late neonatal sepsis (LOS) was considered in cases present after one week of life. Blood samples were collected from all the cases for culture and sensitivity studies. CRP was not available at laboratory all the time so it was not included in our study.

## Results

A total of 127 newborn with clinical sepsis were evaluated, blood culture reports were +ve in 87 (89.76%) of the cases, males were affected more than females (59.84% and 40.16% respectively) ,as shown in table 1.

**Table -1-distribution of patients according to sex and gestational age.**

| parameter | | Early onset sepsis | | Late onset sepsis | | Total | | P value |
|---|---|---|---|---|---|---|---|---|
| | | NO. | % | NO. | % | NO. | % | |
| Sex | Male | 47 | 55.39 | 29 | 69.04 | 76 | 59.84 | >0.05 |
| | Female | 38 | 44.61 | 13 | 30.96 | 51 | 40.16 | |
| | Total | 85 | 100 | 42 | 100 | 27 | 100 | |
| Gestational age | Pre-term | 21 | 24.70 | 12 | 28.57 | 33 | 25.98 | >0.05 |
| | Full-term | 60 | 70.06 | 29 | 69.05 | 89 | 70.08 | |
| | Post-term | 4 | 5.76 | 1 | 2.38 | 5 | 3.94 | |
| | Total | 85 | 100 | 42 | 100 | 127 | 100 | |

We choose our patient from the pediatric general ward so most of our patients were full term 89 (70.08%), preterm were 33 (25.98%) and post term were only 5 (3.94%).85 cases (66.9%) had early onset sepsis and 42 case (33.7%) had late onset sepsis.Majority of newborns with neonatal sepsis presented with lethargy 117 (92.13%), poor feeding 120 (94.49%), fever 69 (54.33%), respiratory problems 54 (42.52%), vomiting 33 (25.98%), seizure 27 (21.26%), jaundice 26 (20.74%) and abdominal distention 11 (8.66%), this is shown in table 2 .There was no significant difference in clinical presentation between EOS and LOS.

**Table -2-Clinical presentation of neonatal sepsis** .

| Clinical presentation | Early onset sepsis | | Late onset sepsis | | Total | | p value |
|---|---|---|---|---|---|---|---|
| | NO. | % N=85 | NO. | % N=42 | NO. | % N=127 | |
| Poor feeding | 80 | 94.12 | 40 | 95.24 | 120 | 94.49 | >0.05 |
| Lethargy | 78 | 91.76 | 39 | 92.86 | 117 | 92.13 | >0.05 |
| Fever | 45 | 52.94 | 24 | 57.14 | 69 | 4.33 | <0.05 |
| Respiratory problem | 37 | 43.53 | 17 | 40.48 | 54 | 42.52 | >0.05 |
| Vomiting | 21 | 24.71 | 12 | 28.57 | 33 | 25.98 | >0.05 |
| Seizure | 18 | 21.18 | 9 | 21.43 | 27 | 21.26 | >0.05 |
| Jaundice | 17 | 20 | 9 | 21.43 | 26 | 20.47 | >0.05 |
| Abdominal distension | 8 | 9 | 3 | 7.14 | 11 | 8.66 | >0.05 |

Table 3 shows that the most common organisms isolated from blood culture of those with EOS was Staph aureus (25.89%), Enterobacteria (21.18%) and Staph .epidermidis (21.18%).While in LOS Staph .aureus cause (21.43%), Enterobacteria (16.67%) and E.coli (11.9%).

**Table-3-Organisms isolated from blood culture from neonate with sepsis.**

| Microorganism | Early onset sepsis | | Late onset sepsis | | Total | | P value |
|---|---|---|---|---|---|---|---|
| | NO. | % | NO. | % | NO. | % | |
| Staph.aureus | 22 | 25.89 | 9 | 21.43 | 31 | 24.40 | >0.05 |
| Enterobacteria | 18 | 21.18 | 7 | 16.67 | 25 | 19.68 | <0.05 |
| Staph.epidermidis | 11 | 12.94 | 3 | 7.14 | 14 | 11.26 | >0.05 |
| No growth | 9 | 10.59 | 4 | 9.52 | 13 | 10.34 | >0.05 |
| E. coli | 8 | 9.42 | 5 | 11.90 | 13 | 0.34 | >0.05 |
| Pseudomonas | 5 | 5.89 | 2 | 4.77 | 7 | 5.51 | >0.05 |
| Contaminated | 4 | 4.70 | 3 | 7.14 | 7 | 5.51 | >0.05 |
| Strep.viridans | 3 | 3.52 | 4 | 9.52 | 7 | 5.51 | >0.05 |
| Strep.faecalis | 3 | 3.52 | 3 | 7.14 | 6 | 4.82 | >0.05 |
| Proteus | 1 | 6.47 | 0 | 0 | 1 | 0.07 | >0.05 |
| Klebsiell | 1 | 6.47 | 2 | 4.77 | 3 | 2.56 | >0.05 |
| Total | 85 | 100 | 42 | 100 | 27 | 100 | >0.05 |

In this study the over all mortality rate was 29.92 % (total number 38 ) ,the total number of death in males were 24 (63.16 % ) while the number of females were 14 (36.84 ) .also the study show that 66 % of death occur in [EOS] and 34 % occur in [LOS]. In regarding to gestational age it was found that 65.79 % (25 ) of death occur in premature ,and the other 34.21 % (13 ) occur in full term and there is no death in post mature, as shown in table 4 .

**Table -4-Demographic profile and mortality rate.**

| Parameter | | Early onset sepsis | | Late onset sepsis | | Total | |
|---|---|---|---|---|---|---|---|
| | | NO. | % | NO. | % | NO. | % |
| Sex | Male | 16 | 64 | 8 | 61.54 | 24 | 63.16 |
| | Female | 9 | 36 | 5 | 38.46 | 14 | 36.84 |
| | Total | 25 | 100 | 13 | 100 | 38 | 100 |
| Gestational age | Pre-term | 17 | 68 | 8 | 62 | 25 | 65.79 |
| | Full-term | 8 | 32 | 5 | 38 | 13 | 34.21 |
| | Post-term | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 25 | 100 | 13 | 100 | 38 | 100 |

## Discussion

For the effective management of neonatal sepsis , knowledge about bacteriological profile play a vital role ,in this study we found that EOS was more common than LOS which is similar to other reports.(8,9) Males are affected more than females as documented by other studies.(9,10,11)

The international criteria for the diagnosis of sepsis include lethargy, no sucking, respiratory rate>60, grunting, fever, convulsion and abdominal distention, (5) in this study there is no statistically significant difference in the clinical presentation between , EOS and LOS ,as the P values > 0.05 except in fever where there is statistical difference as the P value is < 0.05.

In this study blood culture is +ve in( 89.76%) , -ve blood culture (10.34%) could be due to administration of antibiotic before blood collection or may be due to infection by anaerobes, negative blood culture dose not exclude sepsis and this finding is comparable to other reports(10,11,12), where about 26-30%of all neonatal sepsis caused by anaerobes.

In this study there is no significant statistical difference regarding the etiological organism between EOS and LOS as the P value is > 0.05,except in Enterobacteria the statistical difference is significant as the P value is < 0.05 .

In our study the predominant organism isolated from blood culture is staph . aureus, which is in agreement with other reports.(13,14)In Europe and north America group B streptococci is the most common organism.(5)

In this study Enterobacteria is the predominant gram –ve organism in both EOS and LOS, the report of the National Neonatal –Perinatal showed Klebsiella as the predominant gram –ve pathogen.(15)A study in Nepal showed that Enterobacteria as well as Klebsiella as the predominant gram –ve agents.(16)

Mortality rate is 29.92%,and in males the mortality rate is much higher than in females (63.16% , 36.84% respectively), these results are similar to that found by other studies in Karatchi and in Taiwan,(17,18) while a study in Italy shows a mortality rate of 6% only.

## Conclusion

Thus it is concluded that Staph. aureus and Enterobacteria are the leading cause of sepsis in both early and late onset groups, while staph.epidermidis was more common in EOS and E.coli was more common in LOS and the mortality rate were more in male and premature neonate .

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