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RISK FACTORS FOR EARLY NEONATAL SEPSIS

Aida Abd Al-Karim Manther

Aida Abd Al-Karim Manther MBChB, CABP, Lecturer, Department of Pediatric College of Medicine, University of Basrah, Iraq.

ABSTRACT

The risk factors of early neonatal sepsis were studied in 90 neonates with culture proven sepsis and 90 healthy neonates less than one week old with gestational ages ranging from 28-40 weeks. A significantly higher number of cases were born to mothers with either maternal fever, prolonged rupture of membranes, urinary tract infection or combination of these factors ($P<0.01$). It was found also that about 1/3 of cases have asphyxia ($P<0.0005$), similarity a significantly higher number of cases were subjected to procedures like umbilical catheter and intubation.

INTRODUCTION

The term neonatal sepsis refers to bacterial infection of infants during the first months of life, the primary site of invasion is most often the blood stream with spread to meninges in 25-30% of cases[1].

Early neonatal sepsis is a syndrome with severe pneumonic and septicaemic illness either at birth or within any time during the first week reserving the term late onset for cases presenting after 7 days of age[2]. It often begins in utero and is usually due to infection by bacteria in the mother's genitourinary tract[3].
It continues to be an important cause of neonatal morbidity and mortality in non-malformed infants[4]. It's fatal outcome have led to a variety of suggestions regarding prevention[5].

The aim of this study is to identify circumstances and predictors of the development of early neonatal sepsis to help in prevention of such serious problem.

PATIENTS AND METHODS

The study was carried out at Basrah maternity and children hospital from October 1993 to October 1995 on 90 patients in the 1st week of life with gestational ages between 28 and 40 weeks. All of them were admitted to nursery care units and diagnosed to have neonatal sepsis by blood culture.

Control group included 90 healthy full term neonates and low birth weight infants who were admitted to nursery care units for observation or for feeding practices and were normal in the 1st week of life.

An effort was made to match the age, sex, gestational age and birth weight. A detailed history to elicit possible risk factors such as maternal, those related to delivery or neonatal were taken and thorough clinical examination was made on all cases and controls.

RESULTS

This study was a prospective case-control study, the cases and control were similar in their age, sex and birth weight. These results are shown in table 1.

The potential maternal risk factors including maternal fever, prolonged rupture of membranes, urinary tract infection or combination of them are presented in table 2. A significantly higher number of cases were born of mothers with one of these factors or combination of them ($P<0.005$).

Concerning factors related to delivery, the results demonstrate that 71.1% of cases and 93.3% of the controls are delivered at hospital.

Table 1. Comparison of cases and controls with respect to sex, gestational age and birth weight.

Characteristics	Cases	Controls	Total
A. Sex. Males	60	56	116
Females	30	34	64
Total	90	90	180
X^2=0.39 P>0.05			
B. Gestational age (weeks)			
28-32	29	27	56
33-36	27	27	54
37-42	34	36	70
Total	90	90	180
X^2=0.13 P>0.05			
C.Birth weight (gms)			
<1500	23	21	44
1600-2000	23	22	45
2100-2500	14	15	29
2600-4000	30	32	62
Total	90	90	180
X^2=0.21 P>0.05			

The difference is statically significant (Table 3). It seems also that normal vaginal delivery carried more risk than assisted delivery (forceps or vantouse) with respect to early neonatal sepsis P<0.05 (Table 3).

In respect to neonatal factors it is noticed in the present study that all infants in the control group are normal at birth whereas nearly two thirds of the cases (67.6%) are normal while others have asphyxia (Table 4).

Similarly, cases are more likely to have been subjected to some procedures than control (Table 4) this is statistically a highly significant ($P<0.005$).

Table 2. Comparison of cases and controls with respect to potential risk factors related to mothers.

Risk factor	Cases No.	%	Controls No.	%	Total No.	%
Fever	7	7.8	4	4.4	11	6.1
Prolonged rupture of membranes	17	18.9	4	4.4	21	11.7
Urinary tract infection	11	12.2	6	6.7	17	9.4
Combined factors	14	15.6	2	2.2	16	8.9
None	41	45.6	74	82.2	115	63.9
Total	90	100	90	100.0	180	100.0

Over all $X^2=29.01$ $P<0.005$

X^2 for none against those with any risk factor = 26.22 $P<0.01$

Odds ratios

Fever versus others	1.8
Prolonged rupture of membranes versus others	5
Urinary tract infection versus others	1.9
Combined factors versus others	5.5

Table 3. Comparison of cases and controls with respect to selected risk factors related to delivery.

Risk factor	Cases No.	%	Controls No.	%	Total No.	%
A. Place of delivery						
home	26	28.9	6	6.7	32	17.8
Hospital	64	71.1	84	93.3	148	82.2
Total	90	100.0	90	100.0	180	100.0
X^2= 15.2 P<0.01 Odds ratio = 5.7						
B. Nature of delivery normal vaginal	46	71.9	46	54.8	92	62.2
Assisted and caesarean section	18	28.1	38	45.2	56	37.8
Total	64	100.0	84	100.0	148	100.0
X= 4.5 P<0.005 Odds ratio = 2.1						

Table 4. Comparison of cases and controls with respect to neonatal risk factors.

Factor	Cases		Controls		Total	
	No.	%	No.	%	No.	%
A. Immediate condition normal apgar score	61	67.8	90	100.0	151	83.9
Mild asphyxia	15	16.7	0	0.0	15	8.3
Moderate asphyxia	11	12.2	0	0.0	11	6.1
Severe asphyxia	3	3.3	0	0.0	3	1.7
Total	90	100.0	90	100.0	180	100.1
B. Procedures endotracheal tube	3	3.3	0	0.0	3	1.7
Umbilical catheter	8	8.9	3	3.3	11	6.1
L.V. line	49	54.4	11	12.2	60	66.7
None	30	33.3	76	84.4	106	58.9
Total	90	100.0	90	100.0	180	100.0

X^2 = For none versus all others = 48.56 $P<0.005$

DISCUSSION

The incidence of early neonatal sepsis varies among hospitals depending on such risk factors as the rate of prematurity, predisposing maternal conditions and extent of life support procedures required postanatally[4]. Many studies have been undertaken to identify the risk factors for occurrence of early neonatal sepsis. This case control study suggests an association between early neonatal sepsis and some maternal risk factors (Table 2) like early and prolonged rupture of membranes, maternal fever and maternal urinary tract infection or combination of these factors, these findings are consistent with a previous study[3] which identified maternal risk factors as combined factors, early rupture of membranes followed by maternal fever than maternal urinary tract infection. The association between these maternal factors and early neonatal sepsis had been explained by many studies[5], which had shown that intrauterine exposure to group B streptococci (as ascending infection) plays a significant role in causing early neonatal sepsis in the presence of these maternal factors.

In the present study, regarding factors related to delivery (table 3), it has been shown that 28.9% of the cases are home delivered compared to 6.7% of the controls. This can be explained on the basis that most control cases were taken from hospitals. Failure to explain an association between home delivery and early neonatal sepsis may be related to the small number in the control group.

Regarding nature of delivery (table 3), the study also showed that normal vaginal delivery is more risky than assisted delivery, this could be due to that babies who were delivered by assisted delivery are less likely to have asphyxia which has a significant association with early neonatal sepsis[6].

This study also revealed that early neonatal sepsis had significant association in babies who were subjected to certain procedures.

Similar finding was reported in previous study[7] which showed that intravenous catheter predisposes to infection with coagulase negative staphylococci.

CONCLUSION

Identifications of risk factors of early neonatal sepsis can help in prevention of such serious problem resulting in reducing neonatal morbidity and mortality. Early neonatal sepsis can be prevented in the presence of maternal risk factors (early rupture of membranes, maternal fever, maternal urinary tract infection) by intrapartum chemoprophylaxis.

Encouragement of hospital delivery and adequate monitoring of labour process will prevent asphyxia which is a significant risk factor resulting in reducing early neonatal sepsis. Similarly, using neonatal procedures appropriately leads to reducing early neonatal sepsis.

REFERENCES

1. Singel J.D., Mccraken G.H. (sepsis neonatorum). The New England Journal of Medicine. 1981; 304 (11): 642-646.

2. Roberton. NRC, infection in the newborn. Text book of neonatology churchill Livingstone 1986, 41-776.

3. Robert Kliegman, neonatal sepsis. Essential of pediatrics W.B. saunders company 1990: 199-200.

4. Starr SE. Antimicrobial therapy of bacterial sepsis in the newborn infant. Journal of pediatrics 1985; 106 (6): 1043-1046.

5. Baker CJ. Early onset group B streptococcal disease. The Journal of pediatrics. 1987; 93(1): 124-125.

6. Eldahab M. frenkel LD. (Evaluation of routine lumbar punctures in the newborn infants with respiratory distress syndrome). Pediatric infectious diseases 1987; (6): 243-245.

7. Munson DP. (coagulase-negative staphylococcal septicemia experience in a newborn). The Journal of pediatrics. 1982; 101(4): 602-605.

8. Freedman RM. (A half century of neonatal sepsis at Yale {1928-1978} American Journal of diseases of children 1981; 135(2): 140-144.

9. Dillon HC. (Group B streptococcal carriage and disease. A 6 year prospective study). Journal of pediatric. 1987; 110: 31-36.

دراسة حول عوامل الخطورة للخمج المبكر عند الاطفال حديثي الولادة

م.د. عائدة عبد الكريم منتر

لقد درست عوامل الخطورة للخمج المبكر الذي يصيب الاطفال الحديثي الولادة في ٩٠ حالة اثبت اصابتها بالخمج بالزرع الجرثومي. اعمارهم اقل من اسبوع واحد ومدة حملهم تتراوح بين ٢٨ اسبوع الى ٤٠ اسبوع.

وقد تبين بأن عدد اكبر من حالات الخمج مولودون لامهات مصابات بحمى خلال فترة الولادة او انشقاق النسيج الامنيوسي الذي يزيد على ٢٤ ساعة او التهاب المجاري البولية او هذه العوامل مجتمعة كما وجد اصابة ٣/١ حالات الخمج بالاختناق وكذلك تعرض عدد عالي منهم لبعض الاجراءات مثل محجاج السرة او تنبيب الحنجرة.