

Estimation of Renal Function on Early Onset Neonatal Sepsis Patients` Admitted To Omdurman Pediatrics Hospital-Sudan

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Abstract: Neo-natal sepsis is a blood infection that occurs in infants younger than 90 days old. It occurs in 1 to 8 per 1000 live birth with highest incidence occurring among infants of very low birth weight. Neo-natal sepsis is commonly associated with acute renal failure. This study aimed to determine the effect of early – onset neonatal sepsis on renal functions. This study targeted 100 Neonates affected with early onset neonatal sepsis admitted to Omdurman Pediatrics Hospital during the period of (January to July 2017). Included neonates were those affected with neonatal sepsis only and aged (1-7 days) while those affected with other diseases and aged more than 7 days, were excluded. Intravenous Blood samples were collected from all neonates affected with neonatal sepsis attending Omdurman Pediatrics' Hospital during the period of study. Plasma was prepared for determination of renal function tests (Urea, Creatinine, Na⁺ and K⁺ and Ca⁺⁺). Questionnaires were filled with mothers of affected children, to obtain information about the type and place of delivery. The findings of this study, revealed a significant increase ($P \leq 0.05$) in the level of Urea, Creatinine and Sodium, while there was no change in the level of Potassium and Calcium of affected neonates, with respect to their age, site and type of delivery, as compared to the normal reference value of the study parameters. Based on the findings of this study it can be concluded that there is a positive relationship between neonatal sepsis and the levels of Urea, Creatinine and Sodium.

Keywords: Neonatal sepsis, age, delivery, kidney functions.

INTRODUCTION

Neonatal sepsis is a blood infection that occurs in infants younger than 90 days old. Neonatal sepsis occurs in 1 to 8 per 1000 live birth with highest incidence occurring among infants of very low birth weight American [1].

Early-onset neonatal sepsis most often appears within 24 hours of birth. The baby gets the infection from the mother before or during delivery [2]. Neonatal sepsis is divided into two categories: Early-Onset Sepsis (EOS) and Late-Onset Sepsis (LOS). EOS refers to sepsis presenting from 1- 7 days of life while (LOS) refers to presentation of sepsis after 8 days. Neonatal sepsis is an important cause of neonatal death in hospital as well as community in developing country [3].

The causes of early onset neonatal sepsis can be Group B streptococcus infection during pregnancy, preterm delivery, water breathing, rupture of membranes that last longer than 24 hours before birth and infection of the placental tissues and amniotic fluid.

Symptoms of neonatal sepsis include; Body temperature changed. Breathing problem, Diarrhea-

vomiting- seizures, Reduced movement, Reduced sucking and Slow heart rate.

Acute renal failure (ARF) is commonly present among sick neonates while asphyxia, Respiratory distress syndrome (RDS) and urogenital anomalies are commonly reported causes of ARF in the West. Sepsis is the leading cause of ARF in the preliminary reports from India. However, data on ARF in neonatal sepsis is scarce, and earlier studies have focused on prenatal asphyxia as the cause of ARF [4].

Neonatal sepsis is one of the most common diseases which affect neonates. It is a life terminating disease and a major cause of disabilities. Most of the researches conducted in neonatal sepsis handled it from immunological and microbiological aspects. Some studies handled this disease from biochemical aspects with high focus on its effect on liver, without focusing

on its effect on renal functions. No studies are found in Sudan handling the relationship between neonatal sepsis and acute renal failure.

This study aimed to estimate the renal functions of early onset neonatal sepsis Omdurman Pediatrics Hospital in terms of changes in the levels of Urea, Creatinine, Sodium, Potassium and Calcium.

MATERIALS AND METHODS

The current study is cross – sectional. The study population was neonates affected with early onset neonatal sepsis admitted to Omdurman Pediatrics Hospital during the period of the study. The sample size was 100 neonatal patients affected with neonatal sepsis at 1-7 days of age. Those who were more than 7 days old and affected with other diseases, were excluded. Intravenous blood samples were collected from all neonates affected with neonatal sepsis admitted to Omdurman Paediatrics` Hospital during the period of study. Plasma was prepared for determination of renal function tests (Urea, Creatinine, Na+ and K+, Ca⁺⁺). Mindary and Spectrophotometer was used for measuring Urea, Creatinine and calcium and Easylyte ion selective electrode used for measuring electrolytes (Sodium and Potassium). Furthermore a questionnaire was filled by mothers of affected neonates inquiring

about the type and site of delivery. All data was analyzed statistically, using the computerized statistical program SPSS. Data was expressed as Mean ± standard deviation at 95% degrees of confidence (P≤0.05).

RESULTS

There was a significant increase (P≤0.05) in the level of Urea, Creatinine and Sodium, while there was no change in the level of Potassium and Calcium of affected neonates, with respect to their age, compared to the normal levels of the study parameters. Results are shown in table 1.

The neonatal sepsis patients who were delivered at home had a significant increase (P≤0.05) in the level of Urea, Creatinine and Sodium compared to one who delivered normally at hospitals, while there was no difference in the level of Potassium and Calcium of affected neonates table (2).

Considering the type of delivery, normal delivery neonatal sepsis had significant higher levels of Urea, Creatinine and Sodium compared to those who were born by Caesarian section, while there was no change in the level of Potassium and Calcium of affected neonates of two groups table (3).

Table-1: status of renal functions tests in neonatal sepsis patients according to their ages (in days)

Age	Urea	Cr	Na	K	Ca
2day	60.5 ± 21.2	0.9 ± 0.4	141 ± 5.9	4.4 ± 1.0	8.7 ± 1.6
3 day	104 ± 86	1.5 ± 1.2	154 ± 16.1	4.6 ± 16.1	9.4 ± 0.9
4 day	114 ± 72	1.3 ± 0.9	150 ± 1.8	4.4 ± 0.7	8.9 ± 0.98
5 day	64 ± 52	1.0 ± 0.96	141 ± 7.3	4.4 ± 0.3	9.2 ± 1.5
6 day	143 ± 118	2.1 ± 2.9	150 ± 2.2	4.7 ± 1.2	193 ± 31.3
7 day	126 ± 9.9	2.0 ± 2.4	150 ± 19.0	4.8 ± 1.0	8.9 ± 1.6

Data is expressed in means ± SD at 5% degree of confidence with (P ≤ 0.05) significance

Table-2: Effect of site of the delivery on kidney functions of neonatal-septic participants

Site of delivery	Urea	Cr	Na	K	Ca
House	136.6 ± 96.8	2.0 ± 2.2	152 ± 19.9	4.7 ± 1.0	11.3 ± 13.7
Hospital	64.8 ± 47.6	0.9 ± 0.6	144 ± 10.3	4.5 ± 0.91	9.5 ± 0.97

Data is expressed in means ± SD at 5% degree of confidence with (P ≤ 0.05) significance

Table-3: Effect of type of delivery on kidney functions of neonatal-septic participants

Site of delivery	Urea	Cr	Na	K	Ca
Normal delivery	121 ± 92	108 ± 1.92	150.3 ± 18.2	4.7 ± 1.0	10.8 ± 13.8
Caesarian section	59.4 ± 37.5	0.9 ± 0.6	140.8 ± 9.6	4.4 ± 0.7	9.5 ± 0.94

Data is expressed in means ± SD at 5% degree of confidence with (P ≤ 0.05) significance

DISCUSSION

This study aimed to determine the effect of early – onset neonatal sepsis on renal functions of neonatal septic patients admitted to Omdurman Paediatrics` Hospital, in the period of (January to July 2017).

The findings of this study, revealed a significant increase (P≤0.05) in the level of Urea, Creatinine and Sodium, while there was no change in the level of Potassium and Calcium of neonates affected with sepsis (and have low birth weight), with respect to their age, site and type of delivery, as compared to the normal reference value of the study parameters.

Regarding the site of delivery, 58.6% delivered their children at home and only 41.4% delivered them at hospitals. The same percentage was true with respect to the type of delivery (58.6% delivered their children normally while 41.4% delivered them by Caesarian sections).

A study conducted by [4]. In India, revealed that 15% of neonates with sepsis were oliguric. A significantly higher number of babies with Acute Renal Failure (ARF) weighed less than 2500 gm as compared to those without ARF. Factors including gestational age, weight, onset of sepsis, culture positivity, associated meningitis, asphyxia, shock, prior administration of nephrotoxic drugs were subjected to univariate analysis for prediction of fatality in neonates with sepsis and ARF; only shock was found to be a significant predictor of fatality ($p < 0.001$).

In another study conducted by [5], it has been reported that sepsis is one of the most predisposing causes of Acute Renal Failure.

The findings of these two studies, agree with the findings of the current study, in that neonatal sepsis is highly associated with low birth weight as well as high levels renal dysfunction (i.e ARF).

The fact that neonatal sepsis in our study is associated with significant increase ($P \leq 0.05$) in the level of Urea, Creatinine and Sodium, can be attributed to the fact that this disease highly retards the functions of the kidneys and agrees with the findings of [4] who reported that septic neonates were oliguric.

The study revealed that the majority (= 58.6%) of neonates affected with sepsis, were born at home. This ensures that home delivery subjects the newborn to infection due to lack of hygiene, which subjects the newborn to neonatal sepsis. Furthermore, usually at home, most of the family members do not recognize the signs of neonatal sepsis and many days may pass without referring the newborn to the hospital. Usually the affected neonate, refuses to receive breast feeding and as days pass without getting any milk, the neonate becomes dehydrated, the reasons which retards his/her renal functions.

CONCLUSION

This study aimed to determine the effect of early – onset neonatal sepsis on renal functions of neonatal septic patients admitted to Omdurman Paediatrics` Hospital, in the period of January to July 2017).

Based on the findings of this study it can be concluded that there is a positive relationship between neonatal sepsis and the levels of Urea, Creatinine and Sodium.

RECOMMENDATION

Based on the findings of this study, the following points should be considered:

- Raising the awareness of community to the hazards of home delivery
- Encouragement of hospital delivery
- Pre-natal care should be encouraged since the early months of pregnancy.

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