SUMMARY & CONCLUSION

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Inspite of the use of potent antibiotics and intensive supportive care , sepsis is still a major cause of morbidity and mortality during the neonatal period *(Adriaanse , 1996)* .Bacterial sepsis leads to many metabolic disturbances including disturbances in glucose which is the main source of energy for brain growth and metabolism , insulin hormone which plays a central role in glucose homeostasis and lactate which is an intermediary in carbohydrate metabolism *(Bailey et al ., 1990)* .

The aim of this study is to clarify the effects of sepsis on blood glucose, lactate and insulin in newborn infants with bacterial sepsis . The study was carried out on (60) newborns who were classified into (4) groups :-

- ***Group (1)*** included (20) septicemic fullterms proved by positive blood culture .
- ***Group (2)*** included (10) healthy fullterms .
- ***Group (3)*** inclued (20) septicemic preterms proved by positive blood culture .
- ***Group (4)*** included (10) uncomplicated preterms.

All of them were appropriate for gestational age with no history of maternal diabetes or other endocrinal diseases .

Each newborn was subjected to the following investigations :

1- Hematological study : full blood picture with special emphasis on hematological scoring system .

2- C-reactive protein assay by quantitative measure .

3- Blood culture .

4- Blood gases .

5- Blood glucose

6- Serum insulin .

7- Serum lactate .

It is to be noted that all previous investigations were performed once for control group and twice among septicemic babies . The first one on clinical presentation and the second after complete clinical and laboratory cure . Also it is to be noted that dead patients were excluded from the study .

In our work , the number of septicemic patients with a hematological score ≥ 3 were 38 cases , whereas 2 septicemic neonates out of 40 patients were false negative i.e. had positive blood cultures but their hematological score were less than 3 . The sensitivity of HSS as an indirect test for early prediction of neonatal sepsis was 95% , its specificity was 100% , positive predictive value was 100% while the negative predictive value was 90.9% .

As regard to CRP , it was sensitive in 85% of cases , its specificity was 100% , the positive predictive accuracy was 100% while the negative predictive accuracy was 76.9 % .

Gram-negative organisms are still the predominant causes of bacterial sepsis as they represented 67.5% of our cases .

As regard to blood glucose , out of 40 septicemic newborns , 16 cases had hypoglycemia i.e. (40%) (9 preterms and 7 fullterms) no

hyperglycemic cases were reported . Only one preterm of our patients and two fullterms presented with neurological signs in the form of seizures and corrected by intravenous glucose administration . There was no significant correlations between hypoglycemia and poor feeding. Hyperinsulinemia was not detected in our cases i.e. hypoglycemia was not due to hyperinsulinism. The proposed mechanism (s) of sepsis associated hypoglycemia include increased metabolic rate , altered glucose production and increased insulin sensitivity ***(Pildes , 1986)*** .

The normal insulin level has a very wide range (20-180 picomol/ml). So it is difficult to define hypoinsulinism or hyperinsulinism unless the normal for the same individual was previously known ***(Burtis and Ashood , 1994)*** .Also it was difficult for ***Fitzegerald et al. , (1992)*** to define hyperinsulinism in their study on the effect of neonatal sepsis on carbohydrate metabolism , they compared both serum insulin and insulin : glucose ratio of the septicemic group with serum insulin and insulin : glucose ratio of the control group .

In our study , there was significant hypoinsulinism in both fullterm and preterm septicemic newborns . This hypoinsulinism was corrected after treatment . The insulin : glucose ratio was statistically insignificant among fullterms when comparison was made between septic and control groups . Also in the same septic group before and after treatment . The same was observed in preterms .

The mean values of serum lactate in septicemic groups (fullterms and preterms) were significantly higher than that of control groups (fullterms and preterms) . Also , the mean values of serum lactate in septic groups (fullterms and preterms) before treatment were significantly higher than that after treatment .

The causes of hyperlactemia include decreased oxygen delivery to the tissues that will lead to (hypoxic anerobic metabalism) or impaired mitochondrial function i.e. impaired oxygen use . The causes of decreased oxygen delivery are respiratory ($\downarrow PO_2$) , cardiovascular (hypotension) and severe anemia. In our study , we found neither hypoxemia , nor hypotension . Anemia was found but it was not severe enough to interfere with the oxygen delivery to the tissues . Accordingly , the elevated lactic acid might be due to a defect in mitochondrial function with impaired oxygen use .

We can conclude that :

1- Hematological scoring system was found to be a highly valuable test for early prediction of neonatal sepsis .

2- C-reactive protein is of value for diagnosing septicemia at a level of 13 mg/l or more , lesser values (6.5 mg/d) , interpreted as a positive test by the routine qualitative method is not diagnostic of septicemia .

3- Gram-negative bacilli are still the dominant organisms causing neonatal sepsis .

4- Hypoglycemia is a common problem among septicemic neonates . The asymptomatic hypoglycemic neonates are much more common than symptomatic hypoglycemic neonates .

5- Serum insulin levels were significantly decreased among septic groups than control groups .

6- Serum lactate levels were significantly increased among septic groups more than control groups. This hyperlactemia can be explained by impaired oxygen use due to mitochondrial inhibition in septicemic cases .