EXCHANGE TRANSFUSION IN THE TREATMENT OF ENDOTOXIC SHOCK WITH DISSEMINATED INTRAVASCULAR COAGULATION

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INTRODUCTION

Septicemia in the young infant, particularly the newborn, has a high mortality despite the use of potent anti-microbial agents. Case reports and studies reporting the successful use of Exchange Transfusion (E.T.) in Septicemia of the newborn prompted us to apply this measure in this patient. [1,2] However we have not found any reports on the use E.T. beyond the neonatal period, in the critically ill septic child.

CASE REPORT

The patient is a Chinese male infant aged 4 months, the product of a full term normal delivery who was admitted with complaints of bloody diarrhoea for 4 days. He was afebrile, well nourished and not dehydrated. There was no other significant finding. He was initially treated with oral fluids and subsequently put on milk.

On the 3rd day of admission he developed swinging fever. Intravenous Ampicillin and Gentamycin were commenced after a septic workup. As there was no clinical response five days later the previous antibiotics were replaced with oral Cotrimoxazole on the basis of stool culture report. The following day, the patient collapsed and developed cardio respiratory arrest. He was resuscitated and ventilated. A diagnosis of endotoxic shock was made.

Laboratory investigations done following the shock revealed a haemoglobin of 9.8g/dl. (13g/dl. on admission). The WBC count was 88,900 cells/cmm. with 95% mature polymorphs, 5% lymphocytes and reduced platelets. The prothrombin concentration was 65%. Fibrin degradation products were more than 10 ug/ml (n = 4.9 ± 2.8). Blood urea was 13.6 mmol/L, Sodium 147 mmol/L, Potassium 3.0 mmol/L and Chloride 107 mmol/L. Arterial blood gases revealed metabolic acidosis. The liver function test was normal. The 1st stool culture grew *Shigella flexneri* sensitive to cotrimoxazole, ampicillin, kanamycin and cefotaxime but resistant to chloramphenicol. On the 2nd stool culture the same organism was also resistant to ampicillin and cotrimoxazole. The blood culture was negative on five occasions. Similarly the cerebrospinal fluid and urine were sterile. The haematological findings revealed Disseminated Intravascular Coagulation (D.I.C.) with a leukemoid response to infection. Early renal failure was also evident.

Following the collapse, the patient was apnoeic

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and oliguric. He also developed convulsions, melena, prolonged bleeding from venepuncture, generalised sclerema, hepatomegaly and hypertonia. An Exchange Transfusion (100 ml. blood/kg. of blood less than 72 hours old) was performed via a femoral cut down. Twelve hours after his 1st E.T. the patient was able to open his eyes, cry and move his arms. In view of the encouraging response to the 1st E.T., a second bigger volume E.T. (170 ml. blood/kg. of blood less than 48 hours old) was performed 48 hours later. Antibiotics were changed to amikacin and cefotaxime based on the stool culture sensitivity pattern. Supportive treatment included blood and fresh plasma transfusions, correction of metabolic acidosis with Sodium Bicarbonate, hypothermia with radiant warmer, intravenous alimentation and anticonvulsant therapy. The child was ventilated for 8 days.

The sclerema disappeared by one week. He was discharged completely well after six weeks of hospitalization. There was no neurological deficit on immediate follow up and six months later.

DISCUSSION

Endotoxic shock secondary to Shigellosis is a recognised but rare complication. It is due to an endotoxin, a lipomucopolysaccharide found in the bacterial cell wall. The bacteria normally reside in the intestinal crypts and lamina propria and upon lysis of the organism, the toxin is absorbed into the blood stream. Blood invasion, however, is rare and has been reported in about 0.2 percent of the cases only.

E.T. has been shown to provide immediate improvement in blood pressure, cardiac output, urine output and acid-base imbalance, both in animals and humans having endotoxic shock. Furthermore in the presence of sclerema, the clinical course with antibiotic treatment alone is almost invariably fatal. Vain *et al* [3] were able to salvage seven out of ten septicemic infants by performing E.T. Recently Laurenti *et al* [4] reported good results in septicemic neonates using polymorpholeucocyte transfusions. However in the presence of septic shock alone or with D.I.C. they feel that E.T. is superior.

Exchange Transfusion is a simple and rational approach in the management of overwhelming sepsis. It provides immunologically useful factors, viz. competent phagocytes, immunoglobulins, complements (reported to be inefficient in the neonate) and also an endotoxin inhibitor. Undesirable circulating components viz. pathogens, toxins, abnormal split coagulation products, and other components overproduced in the course of sepsis are removed. Tissue perfusion and oxygenation improves and there is a decrease of haemorrhagic complications.

CONCLUSION

The successful use of E.T. in treating endotoxic shock with D.I.C. in a critically ill infant with Shigellosis is reported. The rationale of correcting the pathophysiology is discussed. Exchange Transfusion may be life saving in the management of the critically ill septic child, especially in the presence of Septic Shock and/or D.I.C.

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