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Indications & Complications of Exchange Transfusion in A Tertiary Care Hospital

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ABSTRACT

In newborns, exchange blood transfusion is indicated after failure of intensive phototherapy to control serum bilirubin levels.
Aim: To determine the indications and complications of exchange transfusion performed for neonatal hyperbilirubinaemia.
Methods: The medical records of 24 newborns, which required exchange transfusion due to neonatal jaundice, were retrospectively reviewed from October 2012 to September 2013.
Results: Indications of exchange transfusion were Rh incompatibility (41.67%), ABO incompatibility (25.0%) and unidentified cause (33.33%). Most common complications were thrombocytopenia (29.16%), hyperkalaemia (16.67%), hypoglycaemia (16.67%). No mortality was observed during the period.
Conclusion: Most common indication of exchange transfusion was Rh incompatibility which may be due to the poor awareness regarding its prevention in our society. Adverse events associated with exchange transfusion were common but majority were asymptomatic and reversible.

KEYWORDS Neonatal jaundice, exchange transfusion

INTRODUCTION:
Neonatal jaundice is a very common problem in the first week of life (1), and is defined as yellowish discoloration of the skin, sclera of the eyeball and mucous membranes caused by deposition of bilirubin in these tissues (2). Newborns appear jaundiced when serum bilirubin level is >7 mg/dl. Approximately 85% of all term newborns and most premature infants develop clinical jaundice (3). About 0.02–0.16% of these infants develop extreme hyperbilirubinemia (1, 4).

The most common cause of jaundice in the neonatal period is usually due to hemolysis from ABO incompatibility and Rhesus (Rh) incompatibility. Glucose-6 phosphate dehydrogenase (G6PD) deficiency, polycythemia, cephalhematoma, sepsis, hypothyroidism, infections, metabolic disorders, congenital malformations, prematurity, and breast-feeding jaundice are the other causes (5).

Treatment is usually given for the prevention of bilirubin encephalopathy (6). If phototherapy fails to control the rising bilirubin levels, exchange transfusion is necessary to lower serum bilirubin concentration. Also exchange transfusion is indicated for severe hyperbillirubinemia with hemolysis and signs and symptoms of kernicterus with different amounts of bilirubin. Small amounts of blood are removed and replaced by blood from Umbilical vein catheter (7). Current recommendations for performing ET are based on balance between the risks of encephalopathy and the adverse events related to the procedure (8).Although ET is considered to be a safe procedure, it is not risk free, and mortality rates vary from 0.5 to 3.3% (9). Complications of ET may be increased by the amount of blood exchanged (10). Most of these complications are asymptomatic and transient (11), such as severe thrombocytopenia, apnea, hypocalcemia, seizures, bradycardia, catheter malfunction, hyperkalemia, and necrotizing enterocolitis, which can occur within seven days after the exchange.

MATERIALS & METHODS:
The medical records of infants < 28 days old who required ET due to neonatal jaundice in Neonatology unit of JK Lon hospital, Government Medical College, Kota, Rajasthan from October 2012 to September 2013 were retrospectively reviewed. ET procedures were performed by the medical team of the unit under all aseptic precautions. Infants' heart rate and oxygen saturation were monitored during the procedure. The umbilical vein was the only access employed for the procedure and the volume of blood used in the exchange corresponded to twice the patient's blood volume. In all cases, fresh whole blood was used for the procedure. All patients were given phototherapy before and after the procedure. Total serum bilirubin (TSB) was measured as soon as possible. All data about the patient's demographic characteristics (birth week, birth weight, maternal age, feeding behavior, and history of sibling with jaundice), causes of hyperbilirubinemia, duration of ET, frequency of exchange, and adverse events associated with ET were collected from the registration medical records.

The cause of jaundice reported in the records was classified by etiology. Appropriate investigations were performed and exchange transfusion related adverse events were duly recorded.

Results:
A total of 25 exchange transfusions were done in 24 neonates during the study period. Exchange transfusion was done twice in 1 newborn. Among them 14 (58.33%) were male and 10(41.67%) were female; 16.67% were inborn and 83.33% were outborn. Mean gestational age of neonates was 36.91 wks and mean birth weight was 2471 gm. Seventeen (70.84%) baby were term and 7 (29.16%) baby were preterm. In this study 20.83% neonates had associated sepsis, 4.16% had respiratory distress syndrome and 4.16% had birth asphyxia, 4.16% had cephalhematoma and 4.16% had HbsAg positive mother. No case of ET related mortality was observed. All of the adverse events had resolved completely before discharge.

TABLE –I Indications of Exchange Transfusion

Indications	Incidence (%)
ABO incompatibility	6(25%)
Rh incompatibility	10(41.67%)
ABO & Rh incompatibility	0
Severe Sepsis	0
G6PD deficiency	0
Unidentified cause	8(33.33%)

Table –II Complications of Exchange Transfusion

Complications	Incidence(%)
Thrombocytopenia	7(29.16%)
Hyperkalemia	4(16.67%)
Hypoglycemia	4(16.67%)
Hypocalcemia	3(12.5%)
Hyponatremia	3(12.5%)
Septicaemia	1(4.16%)
Suspected DIC	1(4.16%)
Death	0

DISCUSSION:

Exchange blood transfusion remains the gold standard for effective treatment of neonatal hyperbilirubinaemia. Although exchange transfusion rate was progressively declining over the years, it is still required in up to 7% of neonates admitted to nurseries (12).

Narag A et al analyzed 501 cases of neonatal jaundice and they found that in 52% cases no cause for exchange transfusion was identified (13). In our study, the most common cause of ECT was Rh incompatibility rather than ABO incompatibility, and this finding is different from those of other studies (14, 15) which could indicate the decreased awareness of prevention of Rh incompatibility or poor affordability of anti-Rh-globulin for Rh-negative mothers in our society. Abdul Wahid et al. (10) reported that no patient was found to have G6PD deficiency which is similar to our study.

Begum et al in Bangladesh performed study on 30 neonates receiving ET, and no causes were unidentified in 50% of the neonates, ABO incompatibility was found in 30.0%, Rh incompatibility in 13.3% and septicemia was found in 6.6% cases. Complications were encountered in 60% cases, most common being thrombocytopenia in 33.3% cases and mortality in 1 case (3.3%) (16). In conclusion, though sample size was small, this report indicates that Rh incompatibility was the commonest identified cause of exchange transfusion. Adverse events remain common after exchange transfusion. Most of the complications were transient and improved with treatment. Thrombocytopenia was the commonest complication. Mortality rate was low in this study. So it is still a good modality of treatment for severe neonatal jaundice.

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