

EVALUATION OF INDICATION OF EXCHANGE TRANSFUSION IN NEONATAL HYPERBILIRUBINEMIAPranoy Dey¹, Kangkan Thakuria², Sikdar Anjamul Monowar Hussain³**HOW TO CITE THIS ARTICLE:**

Pranoy Dey, Kangkan Thakuria, Sikdar Anjamul Monowar Hussain. "Evaluation of Indication of Exchange Transfusion in Neonatal Hyperbilirubinemia". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 74, September 14; Page: 12830-12835, DOI: 10.14260/jemds/2015/1850

ABSTRACT: OBJECTIVE: To find out the different causes of neonatal hyperbilirubinemia (NHB) who ultimately undergoes exchange transfusion as a treatment modality for neonatal hyperbilirubinemia in NICU in Fakhruddin Ali Ahmed Medical College & Hospital (FAAMCH), Barpeta- a newly opened academic centre located in rural area. **STUDY DESIGN:** Retrospective and longitudinal study. **SETTING:** Tertiary-level teaching hospital (Level III NICU). **PERIOD OF STUDY:** From 23/06/12 to 15/11/14. **INCLUSION CRITERIA:** Neonate between 0 to 28 days of life whose bilirubin level signals for exchange transfusion as per the Bhutani chart & guidelines provided by the American Academy of Pediatrics for hyperbilirubinemia. **EXCLUSION CRITERIA:** Neonates whose bilirubin level took a decreasing trend after phototherapy & other measures. **RESULTS:** Out of the total number of NHB cases 7.2% babies underwent exchange transfusion. G6PD deficiency was encountered as the most common cause (23%) followed by ABO incompatibility (20%). **CONCLUSIONS:** G6PD deficiency and ABO incompatibility were commonest causes requiring exchange transfusion followed by Rh incompatibility, preterm, exaggerated physiological, sepsis, miscellaneous. The pattern of decrement in TSB values Post Exchange were similar amongst the various causes.

KEYWORDS: Hyperbilirubinemia, Newborn, Kernicterus, Bilirubin encephalopathy, Haemolytic disease of newborn, G6PD.

INTRODUCTION: Neonatal jaundice is one of the most common diagnoses in the neonatal period; it is estimated to occur in 60% of term newborns in the first week of life. In rare instances, the Total Serum Bilirubin (TSB) reaches levels that can cause kernicterus, a condition characterized by bilirubin staining of neurons and neuronal necrosis involving primarily the basal ganglia of the brain and manifested in athetoid cerebral palsy, hearing loss, dental dysplasia, and paralysis of upward gaze. The most common cause of jaundice in the first 24 hours of life due to haemolytic disease of newborn (HDN) is rhesus (Rh) haemolytic disease followed by ABO incompatibility that may cause elevated levels of bilirubin and anaemia but less severe than Rh haemolytic disease. For preventing the kernicterus and other complications of hyperbilirubinaemia, jaundice should be managed by phototherapy or exchange transfusion (ECT). When the bilirubin is rising continuously, instead of declining in spite of phototherapy, to the level that kernicterus is considered a threat, then exchange transfusion (ET) is considered. Although ET is considered to be a safe procedure, it is not risk free, and mortality rates vary from 0.5 to 3.3%. Double volume exchange transfusion is mainly used for the management of hyperbilirubinaemia owing to various causes like haemolytic disease of the newborn, when other methods of treatment such as early and intensive use of phototherapy have been ineffective. In otherwise well babies the risk of exchange transfusion are usually small but in preterm babies who are unwell the risks of exchange transfusion are increased and the procedure must be balanced the high morbidity associated with bilirubin encephalopathy.

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The level of bilirubin concentration at which ET should be indicated remains the subject of disagreement, since the incidence of bilirubin encephalopathy also depends on other variables such as gestational age, the presence or absence of haemolysis and the newborn's clinical status. Current recommendations for performing ET are based on balance between the risks of encephalopathy and the adverse events related to the procedure. This study was undertaken with the objectives of determination of the various indication of neonatal hyperbilirubinemia (NHB) who underwent exchange transfusion and to illustrate the fall in TSB pattern after exchange transfusion.

METHOD OF STUDY: The study was carried out in NICU, Dept. of Pediatrics, FAAMCH, Barpeta during the period from 23/06/12 to 15/11/14. Double volume exchange transfusion was done following Bhutani chart & guidelines provided by the American Academy of Pediatrics for all babies with hyperbilirubinaemia. Respective tests like ABO, Rh type, G6PD estimation, blood culture, sepsis screen & other tests were done to evaluate cause of hyperbilirubinaemia. The cause of neonatal hyperbilirubinemia, sex distribution, age of exchange transfusion, pattern of decrement in TSB values are depicted by plotting the values in Pie diagram & graphical representation.

A questionnaire was filled up after inquiring the parents and their due consent was taken & the research ethics board of the institution approved the protocol.

MEASUREMENTS: TSB value of all cases were done prior to exchange transfusion and then at 0, 6, 24 & 48 hours after exchange transfusion.

Total NHB = 1323.

Exchange Transfusion = 96.

CAUSES:

CAUSES	NUMBER
G6PD Deficiency	21
ABO Incompatibility	18
Rh Incompatibility	15
Exaggerated Physiological	12
Preterm	13
Sepsis	10
Miscellaneous	07

Table 1

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Fig: 1: Number of neonate who underwent exchange transfusion (Out of total NHB cases), 2. Sex distribution, 3 day of life (age) on which exchange transfusion was done, 4. Distribution as per cause.

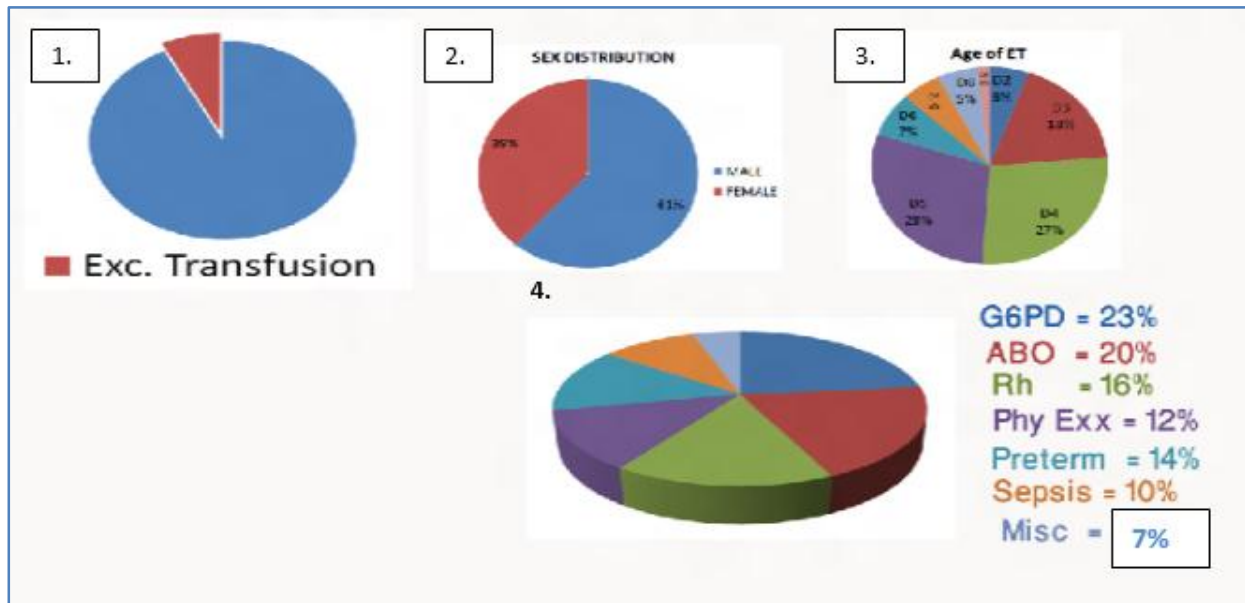
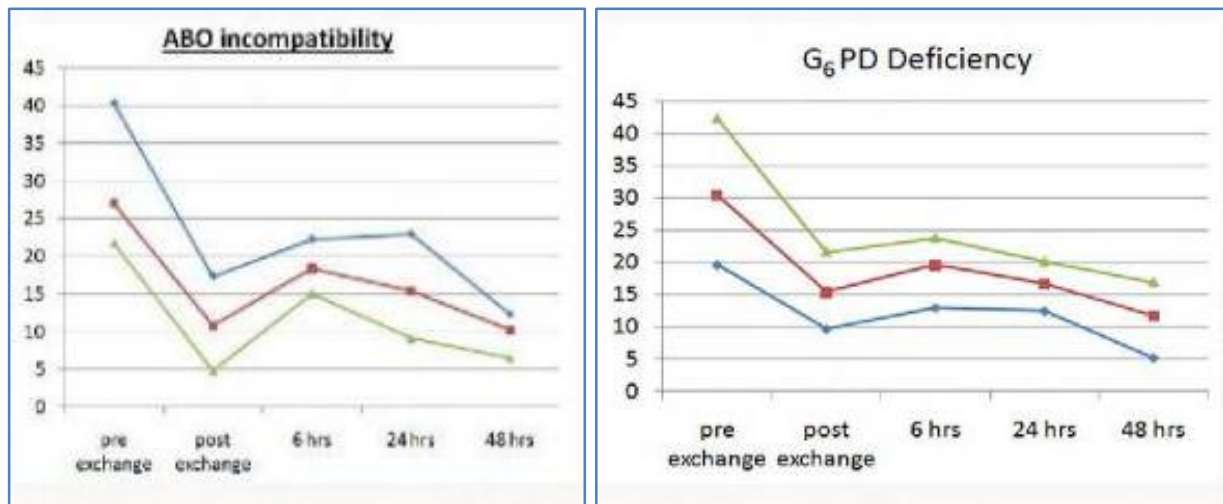
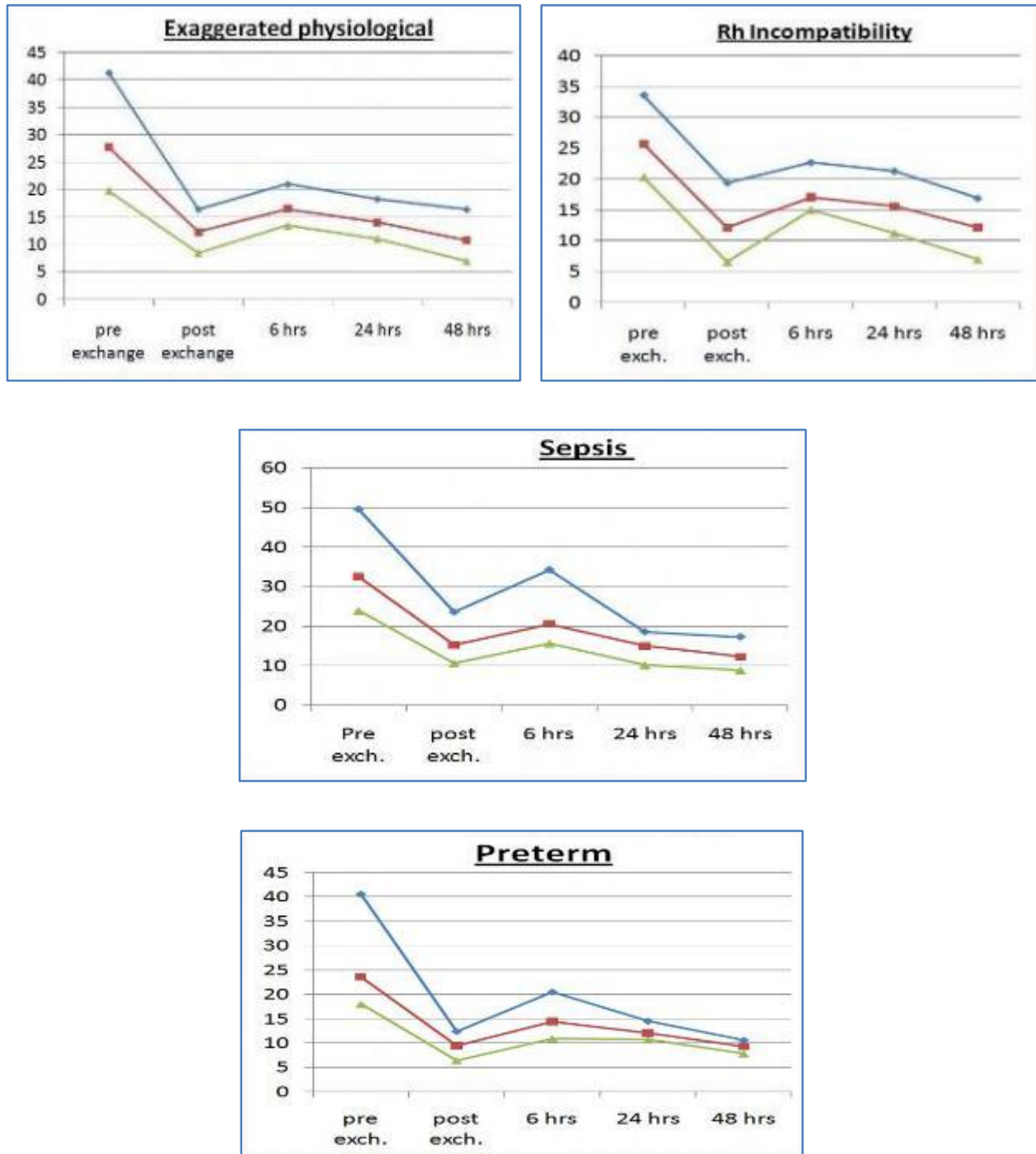


Fig. 1

Pattern of Decrement in TSB Values:



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RESULTS: Out of the total number of NHB cases 7.2% babies underwent exchange transfusion. G6PD deficiency was encountered as the most common cause (23%) followed by ABO incompatibility (20%), Rh incompatibility (16%), preterm (14%), exaggerated physiological (12%), sepsis (10%), miscellaneous (7%). Male constituted about 61.44% of the target group. Majority of cases required exchange transfusion on day 5 of life (29.09%) followed by on day 4 of life (27%). The pattern of decrement in TSB values Post Exchange were similar amongst the various causes. The complications

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noted were kernicterus (7.2%), severe anaemia requiring blood transfusion (5.2%) and death (1.04%) out of the total exchanges done.

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.¹ This reduction in the number of exchange transfusion may be due to the development of anti-Rh globin for Rh-negative mothers and the widespread use of phototherapy for neonatal jaundice.^{2,3}

Our study demonstrated that G6PD deficiency was encountered as the most common cause (23%) followed by ABO incompatibility (20%) & 7% of causes were unidentified. Narag A et al analyzed 501 cases of neonatal jaundice and they found that in 52% cases no cause for exchange transfusion was identified.⁴ Exchange transfusion was done due to ABO incompatibility in 9 (30%) cases. Dikshit and Sanpavat reported that ABO haemolytic disease of newborns was the most common cause of ET in neonates (35.9% and 21.3%, respectively).^{5,6}

Suraiya Begum,⁷ reported that causes of exchange transfusion were unidentified in 15(50%) cases & Prematurity (73.3%), but in our study it was found to be around 7% & 14% respectively, needed ET in this group.

Mohammad Kazem Sabzehei,⁸ reported that among 118 neonates 80(54.9%) were female whereas in our study male constituted about 61.44% of the target group. Hemolytic disease was found in 72(48.6%) of newborns but in our study it is 59%. The most common cause of hemolysis was ABO incompatibility in 54(36.5%) but in our study G6PD deficiency was found to be the most common cause for ET. The etiologic factors were unidentified in 61(41.2%) neonates but it only 7% in our scenario

Multiple exchange transfusion was required in 3% of our neonates. This is lower to findings of Abu- Ekteish et al,⁹ (10%) & Dikshit SK study.⁵

The limitation of our study is that we could not establish causes like inborn error of metabolism, minor blood group incompatibility, thyroid disorders & other rare causes which ultimately leads to neonatal hyperbilirubinemia leading to exchange transfusion.

CONCLUSION: G6PD deficiency and ABO incompatibility were commonest causes requiring exchange transfusion followed by Rh incompatibility, preterm, exaggerated physiological, sepsis, miscellaneous causes. The pattern of decrement in TSB values Post Exchange were similar amongst the various causes. Mortality rate (1.04%) was low in this study. So it is still a good modality of treatment for severe neonatal jaundice. Exchange transfusion can be safely & adequately done in a newly opened academic center located in rural area with minimal complications.

According to various studies ABO incompatibility was found to be the most common cause amongst haemolytic disease of newborn, but G6PD deficiency probably may be one of the major cause amongst haemolytic disease of newborn leading to ET, which needs further research in different centers.

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for appropriate portions of the content. Authors serve as “guarantors,” i.e. persons who take responsibility for the integrity of the work as a whole, from inception to published article.

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