



RESEARCH PAPER

EFFECT OF INTRAVENOUS FLUID SUPPLEMENTATION IN HEALTHY TERM NEONATES WITH NON-HEMOLYTIC HYPERBILIRUBINEMIA

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ABSTRACT

Objective: The objective of this study was to evaluate the effect of intravenous fluid supplementation in healthy term neonates with non-hemolytic hyperbilirubinemia receiving phototherapy.

Study Design: Randomized controlled trial conducted in a tertiary level neonatal care unit of a teaching institute in Kota.

Methods: A total of 100 healthy term neonates with non-hemolytic hyperbilirubinemia between 2nd to 14th day of life (total serum bilirubin [TSB] >15 mg/dL [256 µmol/L] to <25 mg/dL [428 µmol/L]) were randomized to two groups. Group I (case group, n=50) received 1/3rd the maintenance intravenous fluid in addition to breastfeeding and phototherapy. Group II (control group, n=50) received only breastfeeding and phototherapy. The duration of phototherapy was compared.

Results: Both the groups were comparable with respect to mean birth weight, gestational age, gender, mode of delivery, age at admission, admission weight, percentage of weight loss at admission, and TSB at inclusion. There was a significant difference in the duration of phototherapy between the two groups (mean [standard deviation (SD)] Group I, 124.48(6.86)h and Group II, 168.67(7.63)h, p<0.05).

Conclusion: Intravenous fluid supplementation in healthy breastfed term neonates with non-hemolytic hyperbilirubinemia significantly reduces the duration of phototherapy.

KEY WORDS : Bilirubin, Breastfed, Duration, Phototherapy

- **INTRODUCTION :** Jaundice is one of the most common symptom present in most newborns and is usually benign, it is imperative to carefully monitor newborns so as to identify high risk one which have tendency to develop bilirubin-induced neurologic dysfunction. Severe neonatal jaundice can cause fatality and serious permanent effect, called kernicterus, in which the brain stem nuclei and basal ganglia are damaged. Phototherapy is a standard treatment for neonatal jaundice. Its relative freedom from complications together with its non-invasive nature, ease of usage, and convenience has resulted in widespread use in virtually all neonatal units. The increase in the amount of body water loss through insensible transepidermal loss due to phototherapy along with stool water loss is commonly seen in newborn suffering from jaundice. Some infants with high bilirubin level are mildly dehydrated and may need supplemental fluid to correct their dehydration. Furthermore, the photoproducts responsible for the decline in serum bilirubin are excreted in urine and bile. Hence, maintaining adequate hydration and good urine output help to improve the efficacy of phototherapy.
- **AIMS AND OBJECTIVE :** To evaluate the effect of intravenous fluid supplementation in healthy term neonates with non-hemolytic hyperbilirubinemia receiving phototherapy.

MATERIAL AND METHOD:

Design: Randomised Control Study

Setting: NICU, Dept. of paediatrics, GMC, Kota

Study Period: February 2018 – July 2018

Sample size: 100

This study was conducted in a tertiary level NICU over a period of 6 months. Written informed consent was obtained from either parent of the neonate. Eligible neonates were randomised to either case or control group using computer generated random numbers.

Group I (case group, n=50) received 1/3rd the maintenance intravenous fluid in addition to breastfeeding and phototherapy.

Group II (control group, n=50) received only breastfeeding and phototherapy. The duration of phototherapy was compared.

Phototherapy was provided by blue light phototherapy unit. Neonates were fully exposed except their eyes and genital area. Phototherapy was discontinued after TSB value is below cut off reference value as per AAP guidelines. Neonates were monitored 6 hourly for hydration, adequacy of feeding, signs of bilirubin encephalopathy, urine and stool frequency. Daily weight was recorded.

Investigations sent were haemoglobin, Serum Bilirubin (Total and Direct), Evidence of hemolysis (Reticulocyte count, DCT, PBF), Blood Group. Maternal Blood Group was obtained from mother's record or was done.

Data was collected and analysed by SPSS software, and quantitative statistical analysis was done. A p value < 0.05 was considered significant.

• INCLUSION CRITERIA:

Healthy term neonates (≥37 weeks) having non-hemolytic jaundice between 2nd to 14th day of life Total serum bilirubin level above cut off for phototherapy as per AAP guidelines

• EXCLUSION CRITERIA:

Signs of bilirubin encephalopathy

TSB>25 mg/dL

Conjugated bilirubin>20% of the TSB

Evidence of hemolysis

Signs of dehydration

Jaundice within 24 hour or persisting beyond 14 days of life

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Sick neonates
Major congenital anomalies
Born to gestational diabetic mother
Cephalhematoma
Neonates on intravenous fluid for any other reason

OBSERVATIONS:

Table 1: Demographic and Laboratory Parameters of neonates*

Sr.No	Parameters	Case	Control	P value
1	Male:Female	33:17	28:22	>0.05
2	Birth weight(kg)	2.4(0.39)	2.42 (0.35)	>0.05
3	Admission weight(kg)	2.34(0.38)	2.36 (0.32)	>0.05
4	Weight loss(%)	2.07(1.3)	1.89(1.1)	>0.05
5	Mode of delivery	VD	30	>0.05
		LSCS	20	>0.05
6	Age of admission(days)	5.94 (1.94)	5.78(2.07)	>0.05
7	Hemoglobin(g/dl)	16.75(1.49)	16.56(1.4)	>0.05
8	Reticulocyte count(%)	1.55(0.31)	1.46(0.29)	>0.05
9	TSB(mg/dl)	18.31(1.1)	18.28(1.64)	>0.05

*Results expressed as mean(SD). SD=Standard Deviation, TSB=Total Serum Bilirubin

Table 2: Duration of phototherapy required (days)



Duration of Phototherapy

Table 3: Duration of Phototherapy required by each group

Parameter	Case	Control	P value
Total duration of Phototherapy (hours)	124.48(6.86)	168.67(7.63)	0.0224*

Results expressed as mean(SD). *Significant P value<0.05.
SD=Standard Deviation, TSB=Total Serum Bilirubin

DISCUSSION

In our study it was showed that intravenous fluid supplementation had significantly reduced the duration of phototherapy in healthy term exclusively breastfed neonates presenting with non-hemolytic hyperbilirubinemia, and thus facilitated early discharge in neonates. The quantity of fluid supplemented differs between different studies. A study done by Goyal et al. [1] found no significant difference in the duration of phototherapy or exchange transfusion between the non-supplemented and fluid supplemented by both intravenous and oral route) neonates receiving phototherapy for severe hyperbilirubinemia. In a study done by Saedi et al. [2], it was showed that additional parenteral fluid therapy in term neonates with non-hemolytic hyperbilirubinemia accelerates the reduction in serum bilirubin in first 24 h of admission. In one of the study done by Iranpour R, they supplemented 25% of the maintenance fluid to their study participants and showed no benefit [3], while a study done by Mehta et al. showed benefit with supplementation of 50% of daily maintenance fluid [4]. Hence, our study was conducted to evaluate whether fluid supplementation of 1/3rd the maintenance has any benefit. In a study done by Mehta et al. [4], benefit of fluid supplementation in term neonates presenting with severe hyperbilirubinemia in the form of decreased rate of exchange transfusion and duration of phototherapy was seen. The American Academy of Pediatrics [5] states that there is no evidence of excessive fluid administration affecting the serum bilirubin concentration and does not recommend routine intravenous fluid, or other supplementation of the term and near-term infants receive

phototherapy unless there is evidence of dehydration. The significance of our finding might be due to an expansion of intravascular volume leading to a slight dilutional lowering of the bilirubin, but the more important effect would be enhanced biliary and bowel function.

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