

COMPARITIVE STUDY BETWEEN ORAL VERSUS INTRAVENOUS FLUID SUPPLEMENTATION ON SERUM BILIRUBIN DURING PHOTOTHERAPY OF TERM INFANTS WITH HYPERBILIRUBINEMIA AT RURAL TERTIARY CARE CENTER

Paediatrics

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ABSTRACT

Aim: To compare the rates of decrease in serum bilirubin levels in hyperbilirubinemia healthy term infants given breast feed and intravenous fluid supplementation during phototherapy. **Methods:** This study is a hospital based randomized control study on term neonates who presented to our department with severe hyperbilirubinemia requiring phototherapy from January 2022 to December 2022. In the study group, 64 term neonates were divided into 2 groups. 32 in each group (exclusive breast feeding and intravenous fluid). **Objectives-** To compare the rates of decrease and duration of phototherapy in serum bilirubin levels in hyperbilirubinemia healthy term infants given breast feed and intravenous fluid supplementation during phototherapy.

KEYWORDS

Exclusive breast feeding, intravenous fluids, Hyperbilirubinemia, Phototherapy

INTRODUCTION

Neonatal hyperbilirubinemia is defined as a total serum bilirubin level more than 95th percentile on the hour-specific Bhutani nomogram.^[1] It is a common condition affecting almost 60% of term and 80% of preterm infants during first seven days of life.^[2] Hyperbilirubinemia can be treated in different ways: Phototherapy converts bilirubin to products which will not interfere in liver's conjugating system and be excreted directly in the bile or in the urine, exchange transfusion removes bilirubin mechanically and pharmacologic agents that interfere with heme degradation and bilirubin production, accelerate the normal metabolic pathways for bilirubin clearance, or bypass the entero hepatic circulation of bilirubin.^[3]

AIMS AND OBJECTIVES

To compare the rates of decrease in serum bilirubin levels in hyperbilirubinemia healthy term infants given breast feed and intravenous fluid supplementation during phototherapy.

To compare the duration of phototherapy in serum bilirubin levels in hyperbilirubinemia healthy term infants given breast feed and intravenous fluid supplementation during phototherapy.

MATERIALS AND METHODS

A randomized control trial was undertaken at GEMS hospital between January-2022 to December 2022 after obtaining clearance from the Hospital Ethical Committee. In the study group, 64 term neonates were divided into 2 groups. 32 in each group (exclusive breast feeding and intravenous fluid).

RESULTS AND OBSERVATIONS

In this randomized control trial, the study group include a total of 64 neonates randomized into 2 groups. In Group-I, intravenous supplementation was given with 10% Dextrose or Isolyte-P for a period of 12 hours based on daily requirement and an extra 20ml/Kg/day as phototherapy allowance. Breast feeds were also given as before entry into the study. In Group- II, exclusive breast feeds were given as before the entry of the study and exclusive breast feed were given every 2nd to 3rd hourly.

Table – 1 Comparison of Serum Total Bilirubin on intervention, 4hours, 8hours and 12hours in Group I and Group II

STB (mg/dl)	Group I (n=32)		Group II (n=32)		t Value	P Value
	Mean	SD	Mean	SD		
At intervention	18.141	0.933	18.016	0.637	0.63	0.53
At 4 Hrs	16.997	0.815	17.247	0.684	1.33	0.19
At 8 Hrs	14.037	0.923	15.422	0.655	6.92	<0.0001
At 12 Hrs	10.691	1.121	13.044	0.971	8.97	<0.0001

Mean difference analyzed quantitatively using T test. T test value worked out to be 0.63 at intervention, 1.33 at 4hours, 6.92 at 8hours and 8.97 at 12hours which was statistically not significant at intervention and 4hours but significant at 8hours and 12hours. (p<0.05)

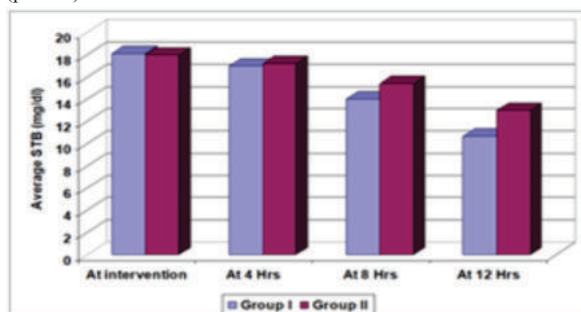


Figure – 1 Bar diagram showing Serum Total Bilirubin on intervention, 4hours, 8hours and 12hours in Group I and Group II

Table – 2 Comparison of percentage change of STB at end of 4hours, 8hours and 12hours in Group I and Group II

% change of STB (mg/dl)	Group I (n=32)		Group II (n=32)		t Value	P Value
	Mean	SD	Mean	SD		
At 4 Hrs	6.256	2.478	4.272	1.495	3.88	<0.0001
At 8 Hrs	22.610	3.412	14.348	3.612	9.41	<0.0001
At 12 Hrs	41.130	4.678	27.556	5.407	10.74	<0.0001

Mean difference analyzed quantitatively using T test. T test value worked out to be 3.88, 9.41 and 10.74 at 4hours, 8hours and 12hours respectively which was statistically significant. (p<0.0001)

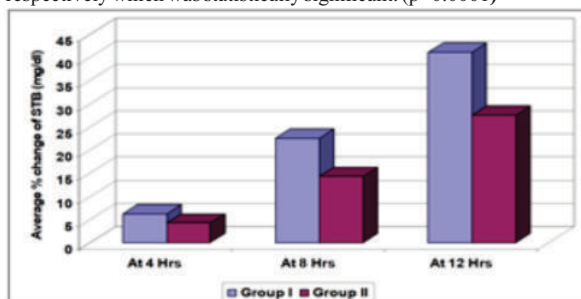
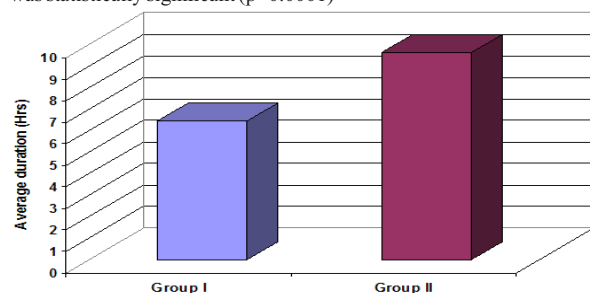


Figure – 2 Bar diagram showing percentage change of STB at end of 4hours, 8hours and 12hours in Group I and Group II

Table – 3 Comparison of duration of phototherapy in group I and group II

Phototherapy	Group I (n=32)		Group II (n=32)		t Value	P Value
	Mean	SD	Mean	SD		
Duration (Hrs)	6.44	1.435	9.63	1.897	7.58	<0.0001

Mean duration in group I was 6.44(S.D.±1.43). Mean duration in group II was 9.63(S.D.±1.89). Mean difference analyzed quantitatively using T test. T test value worked out to be 7.58 which was statistically significant ($p<0.0001$)

**Figure – 3 Bar diagram showing duration of phototherapy in group I and group II**

DISCUSSION

In present study, mean serum bilirubin levels were significantly reduced among intravenous group cases as compared to exclusive breast feed group cases at 8hours and 12hours of treatment in the study group. Significant change was not observed in mean serum bilirubin levels at the time of intervention and at 4 hours after intervention among both the groups.

In a study conducted by Shailendra Mehta, Praveen Kumar and Anil Narang (2005) in which they assessed rate of decrease in TSB in severely jaundiced term infants given oral or intravenous fluid results were conflicting. They observed a significant drop in TSB levels in intravenous fluid group when compared to oral feed group at 4, 8 and 24 hours of life.^[4]

Boo NY, Lee HT (2002) compared the effect of enteral or extra parenteral fluid supplementation on serum bilirubin levels in severely jaundiced term infants receiving phototherapy. Fifty-four healthy term infants with severe hyperbilirubinemia were randomized to receive either exclusively enteral feeds or both enteral and intravenous fluid during phototherapy results showed that the mean rates of decrease in TSB during the first 4 hours of phototherapy were also not significantly different between the enteral group and intravenous group.^[5]

In present study mean percentage change in fall in TSB were significantly high among the group who received intravenous fluid treatment as compared to oral fluid treatment.

In the study conducted by Shailendra Mehta, Praveen Kumar and Anil Narang assessed the fall of serum bilirubin in term neonates who were receiving phototherapy by giving extra intravenous fluid. The percentage of fall in TSB levels at 4,8,24 hours is more in intravenous fluid group when compared to oral feed group.^[4]

In present study mean duration of phototherapy in intravenous fluid group was 6.44±1.435 hours and in oral fluid group is 9.63±1.897 hours. Duration of phototherapy for infants in intravenous feed group is less when compared to oral fluid group.

In a study conducted by Mittal Patel, Sucheta Munshi, K. M. Mehariya (2014) evaluated the role of intravenous extra fluid supplementation in accelerating the reduction of serum bilirubin level in neonates and whether fluid supplementation decrease the total duration of phototherapy and need of exchange transfusion. Study was conducted with 84 subjects divided in two groups with 42 each assigned randomly to receive either breast milk exclusively or intravenous fluid in addition to breast milk. Mean duration of phototherapy was significantly less

among group with oral fluids only as compared to intravenous fluid supplementation. Mean duration of phototherapy in oral fluid supplementation group was 48hours and among intravenous fluid group was 62hours.^[6]

CONCLUSION

Neonates with hyperbilirubinemia given with continuous intravenous fluids have faster decrease in the serum bilirubin than exclusive breast feeding and required shorter duration also. But rebound hyperbilirubinemia was found to be less in the neonates given with exclusive breast feeding.

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