ORIGINAL ARTICLES

Rebound hyperbilirubinemia in term infants after phototherapy

Saad A. Al-Saedi

ABSTRACT

Objectives: To determine whether a rebound in serum bilirubin level occurs within 24 hours after discontinuation of phototherapy in term infants with hyperbilirubinemia.

Methods: A retrospective medical record review of term infants with hyperbilirubinemia requiring phototherapy who were admitted over 24 months, June 1999 to December 2001, at King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia was completed. Total serum bilirubin levels (TSB) at and up to 24 hours after termination of phototherapy (follow-up levels) were recorded. The difference between mean TSB level at termination of phototherapy and at follow-up was calculated using the paired t test.

Results: Three hundred and one infants, 53% (n=161) were boys, mean ± standard deviation (SD) for gestational age was 39.4 ± 1.4 weeks, mean birth weight was 3200 ± 600g, mean TSB ± SD at termination of phototherapy was 193 ± 46 micromole/ liter (mmol/l) and at follow-up was 188 ± 45 mmol/l for all infants with either positive or negative direct coombs' test results. The difference in mean TSB level at discontinuation of phototherapy and at follow-up was statistically significant, (t=3.12, P= 0.002). The mean TSB level at termination of phototherapy was 179 ± 47 mmol/l and at follow-up was 177 ± 47 mmol/l for 65 infants with positive direct coombs' test results. This difference was statistically insignificant (t=0.725, P=0.47). The mean time interval between the termination of phototherapy and the measurement of follow-up TSB level was 8.3 ± 5.3 hour.

Conclusions: The rebound of bilirubin level after termination of phototherapy in otherwise healthy term infants is minimal; thus measurement of serum bilirubin is not required after termination of phototherapy and adds unnecessary expense, prolongs hospitalization, or both.

Saudi Medical Journal 2002; Vol. 23 (11): 1394-1397

Neonatal jaundice is a common problem in newborn infants. It occur in 60% of all newborns.1 Although active treatment is not required in the majority of infants, severe jaundice can cause encephalopathy resultanting in handicap or death. Phototherapy is used worldwide for the treatment of neonatal jaundice.2,3 The need for exchange transfusion has been significantly reduced since the introduction of phototherapy.4 It is effective, noninvasive, convenient, easy to use and not expensive.5,6 However the prolongation of phototherapy is not justified since it has many short- term and possible long-term side effects.5,6 It leads to prolonged hospitalization and may negatively affect the

mother infant bonding. At the same time, discontinuation of phototherapy too early may allow bilirubin to rise to unacceptable levels, which may require reinstitution of phototherapy. The American Academy of Pediatrics (AAP) Practice Parameter on the Management of Hyperbilirubinemia in Healthy term newborn suggests, that infants without hemolytic disease do not require observation for rebound hyperbilirubinemia and these infants may be discharged from the hospital after discontinuation of phototherapy.4 Two previous studies7,8 have showed that the magnitude of rebound in bilirubin level is clinically insignificant. However, measurement of bilirubin level within 24 hours after discontinuation of the phototherapy to detect any rebound increase in the bilirubin level is still a common practice. This practice lengthens the hospital stay and increases the laboratory expense.

The aim of this study was to determine whether clinically significant rebound in serum bilirubin level occurs within 24 hours after termination of phototherapy in term infants with either hemolytic or non-hemolytic hyperbilirubinemia. We hypothesized that the rebound bilirubin levels would be less than or equal to those at discontinuation of phototherapy.

Methods. A retrospective chart review was completed for all term infants who received phototherapy for hyperbilirubinemia between June 1999 and December 2001 at King Abdul-Aziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia (KSA). All healthy term infants (gestational age 37-42 weeks) regardless of the birth weight and the cause of jaundice were included in the study. Total serum bilirubin levels (TSB) at discontinuation and within 24 hour after discontinuation of phototherapy were required for inclusion in the study. Infants who failed phototherapy treatment and required exchange transfusion were excluded from the study. Data including date and time of birth, birth weight, gestational age, infant and mother blood groups, and Direct Coombs test (DCT) results were collected. Date and time of initiation and discontinuation of phototherapy were obtained from nursing notes. Total serum bilirubin at discontinuation of phototherapy and at follow-up (first bilirubin level measured up to 24 hour after termination of phototherapy) were obtained from laboratory flow sheets. Any episode of reinstitution of phototherapy was noted. The Ethics and Research Committee approved the study in KAUH, Jeddah, KSA.

All values were expressed in mean ± standard deviation (SD). The difference between TSB levels at discontinuation of phototherapy and at follow-up were expressed as mean ± SD in micromole per litre (umol/l). Differences among mean values were assessed by paired t test. A P value of <0.05 was considered statistically significant.

Results. Data was available for 301 infants; 53% (n=161) were boys. Mean gestational age was 39.4 ± 1.4 week; mean birth weight was 3200 ±

From the Department of Pediatrics, King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Received 18th May 2002. Accepted for publication in final form 31st July 2002.

Address correspondence and reprint request to: Dr. Saad A. Al-Saedi, Assistant

Professor, Department of Pediatrics, King Abdul-Aziz University Hospital, PO Box 80215, Jeddah 21589, Kingdom of Saudi Arabia. Tel. +966 (2) 6401000 Ext. 18327. Fax. +966 (2) 6403975. E-mail: salsaedi@hotmail.com

Acknowledgment. The author thanks Dr. Grant Stone for reviewing the manuscript, and Dr. Dheia Alhaj for the help in the Arabic translation and the nursing staff in the nursery and NICU for their assistance.

References

1. American Academy of Pediatrics. Practice Parameter: management of hyperbilirubinemia in the healthy term newborn. Pediatrics 1992; 94: 558-565.

2. Ennever JF. Blue light, green light, white light, more light. Treatment of neonatal jaundice. Clin Perinatology 1990; 17: 467-481.

3. Tan KL. Phototherapy for neonatal jaundice. Clin Perinatol 1991; 18: 423-439.

4. Valaes T, Koliopoulos A. Impact of phototherapy in management of neonatal hyperbilirubinemia. Acta Paediar 1996; 85: 273-276.

5. Maisels MJ. Neonatal jaundice. In: Avery GB, editor. Neonatology. Philadelphia (PA): Lippincott; 1994. p. 697-706.

6. Brown AK, McDonagh AF. Phototherapy for neonatal hyperbilirubinemia: efficacy, mechanism and toxicity. Adv Pediatr 1980; 27: 341-389

7. Lazar L, Litwin A, Merlob P. Phototherapy for neonatal nonhemolytic hyperbilirubinemia. Clin Pediatr 1993; 32: 264-267.

8. Yetman R, Parks D, Husely V, Mistry K, Garcia J. Rebound bilirubin levels in infants receiving phototherapy. J Pediatr 1998; 133; 18: 705-707.

9. Gartner LM, Herrarias T, Sebring RH. Practice patterns in neonatal hyperbilirubinemia. Pediatrics 1998; 101: 25-31