

# Rebound Hyperbilirubinemia after Phototherapy Treatment in Newborns

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## Abstract

**Objectives:** To determine the need for total serum bilirubin measurement after the discontinuation of phototherapy.

**Methods:** A retrospective study done at our nursery reviewing medical records for 136 newborns receiving phototherapy for hyperbilirubinemia during the first 2 weeks of life due to any cause (ABO, Rh incompatibility, sepsis and dehydration). The level of serum bilirubin in the second day was compared to the level of bilirubin at discontinuation of phototherapy looking for rebound hyperbilirubinemia.

**Results:** Total serum bilirubin level at the second day was found to be lower or equal to the level of discontinuation. No significant differences among infants regarding weight categories.

**Conclusion:** Newborn completing phototherapy for hyperbilirubinemia before the age of 2 weeks, who are cured, do not require a follow up test in the second day to check for rebound hyperbilirubinemia. So, we can decrease the laboratory and nurses charges, the time of hospital admission and money cost.

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## Keywords

Total Serum Bilirubin: TSB

## Introduction

Many pediatricians continue to order bilirubin level measurement after phototherapy discontinuation; this practice lengthens hospital stays and increases laboratory and nurses, charges.

Our aim is to determine whether statistically and clinically a significant increase in the bilirubin level occurs within 24 hours after the discontinuation of phototherapy in preterm and term infants whether hemolysis is the cause or not.

## Methods

Our study was a retrospective chart review for newborns who received phototherapy for hyperbilirubinemia, and was managed at the nursery of Prince Hashem Bin Al-Hussein Hospital during the period between July 2000 and July 2002.

Newborns regardless of weight, gestational age and sex were included in this study; Coomb's test was done for all of them. TSB level was measured within 24 hours of treatment discontinuation, comparison was done between the results and the p values were calculated.

## Results

Data were completed for 136 newborns admitted to nursery between the first day and two weeks, 79 (58%) were girls and 57 (42%) were boys. The causes are ABO incompatibility, Rh incompatibility, sepsis, prematurity with hyaline membrane disease among others. They were categorized according to the weight into three groups.

Table 1: Weight of the patients.

Weight in gm	Number of patients	The percentage %
<1000	10	7.4
1000-2000	32	23.5
>2000	94	69.1
Total	136	100

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The mean time interval in the hours between the discontinuation of phototherapy and the measurement of TSB level was 20±4 hours.

The mean level for TSB was calculated in mg/dl at discontinuation and at rebound. A p value <0.05 was considered statistically significant. 22 patients had a +ve Coomb's test result because of either ABO or Rh incompatibility.

**Table 2: The difference in Bilirubin levels.**

Weight in gm	Number of patients	Bilirubin level in mg/dl at		Delta, P value
		termination	rebound	
<1000	10	4.2	4.7	+0.6 p=.2
1000-2000	32	7.2	7.5	+0.3 p=.4
>2000	94	11.9	11.2	-0.7 p=.01
total	136			-0.3 p=.3

**Table 3: Bilirubin levels at termination of phototherapy and rebound by weight categories in newborns with positive Coomb's test results.**

Weight GP	Termination level	Rebound level	The difference P value
<2000(n=3)	7.4	8.4	+1.1 p=0.05
>2000(n=19)	11.8	10.8	-1.0 p=0.04
Total=22	11.6	10.8	-0.8 p=0.06

**Discussion**

The goal of hyperbilirubinemia treatment is to avoid bilirubin concentration that may result in kernicterus. Phototherapy remains an effective therapeutic intervention that decreases bilirubin concentration.<sup>1</sup>

It acts on unconjugated bilirubin to a depth of 2 mm from the epidermis. It changes the bilirubin through structural

photoisomerization into water-soluble lumirubin that is excreted in the urine.<sup>2</sup>

The fall in bilirubin level is proportionately greater in the skin than in the serum (3a). Therefore, the infants receiving phototherapy should have as much skin as possible exposed to the lights.

More intense phototherapy may be achieved by using multiple sources of phototherapy; double or triple phototherapy is recommended to optimize the skin surface exposed and, therefore, the efficacy of phototherapy.<sup>4,5</sup>

Specific guidelines for the initiation of phototherapy have been found for hyperbilirubinemia in term and preterm neonates.<sup>6</sup>

Age in days	Total serum bilirubin in mg/dl
Full term more than one day	More than 14
Preterm less than 5 days	More than 10
Healthy preterm more than 5 days	More than 12

Intensive phototherapy has been used in the treatment of infants who required phototherapy for hyperbilirubinemia.<sup>7</sup> With this modality of treatment, there is a concern about rebound in serum bilirubin level after discontinuation. This concern has led some physicians to re-measure serum bilirubin level, despite the American Academy of Pediatrics recommendation that infants not to be kept in hospital for determination of repeat bilirubin level after discontinuing phototherapy.<sup>7</sup>

Maisels and Kring determined the incidence for rebound hyperbilirubinemia after stopping phototherapy; in addition, they compared rebound in the group of infants who received phototherapy during their birth hospitalization with rebound in those who were treated after discharge and readmission to the hospital. And they concluded that it is not necessary to keep infants in the hospital to check for rebound serum bilirubin levels in infants treated with phototherapy. And they do recommend repeated serum bilirubin checks 24 hours after discharge only if phototherapy was stopped at higher levels adopted in this study.<sup>8</sup>

A previous study has examined TSB level on the discontinuation of phototherapy in newborns of Israeli infants, no infant in that study required reinstatement of phototherapy.<sup>9</sup>

Another study done in Saudi Arabia on only healthy term infants and they found that rebound of bilirubin after termination of phototherapy is minimal.<sup>10</sup>

The results of this study support our hypothesis about the absence of the need for a delay in hospital discharge in order to do a routine measurement of TSB after the discontinuation of phototherapy, in term and near term infants (>2000gm ) who have completed their management. This adds unjustified laboratory and personnel expense and nurses load, and prolongs the hospital stay for babies who are otherwise ready for discharge. Also, it directs our vision for further studies about hyperbilirubinemia in very low birth weight below 2000gm.

## References

1. Pediatrics & Child Health. Reference No.FN98-02 Approach to the management of hyperbilirubinemia in term newborn infants. 1999; 4(2):161-164.
2. Vogl TP. Phototherapy of neonatal hyperbilirubinemia: bilirubin in unexposed area of the skin. J Pediatric 1974; 85:707-10.
3. Rubaltelli FF, Carli M. The effect of light on cutaneous bilirubin. Biol Neonate. 1971; 18:457-62.
4. Fetus and Newborn Committee, Canadian Paediatric Society. Use of phototherapy for neonatal hyperbilirubinemia. Can Med Assoc J 1986; 134:1237-45.
5. Ennever JF. Blue light, green light, white light, more light, treatment of neonatal jaundice. Clin Perinatal 1990; 17:467-81.
6. Aetna, Clinical Policy Bullitins, Number: 0332, Neonatal Hyperbilirubinemia.
7. American Family Physician, Rebound bilirubin Level Following Intensive Phototherapy. 2002.
8. Maisels MJ, Kring E. Rebound in serum bilirubin levels following intensive phototherapy. Arch Pediatric Adolesc Med. 2002; 156:669-72.
9. Lazar L, Litwin A, Merlob P. Phototherapy for neonatal nonhemolytic hyperbilirubinemia. Analysis of rebound and indication for discontinuing phototherapy. Clin Pediatr. 1993; 32: 264- 267.
10. Saad A. AL-Saedi. Saudi Medical Journal. November 2002.
11. Maisels MJ, Gifford KL, Antle CE, Lieb GR. Jaundice in the Healthy newborn infant: A new approach to an old problem. Pediatrics. 1988; 81: 505- 511.
12. Wennberg RP. Bilirubin recommendation present problems: New guidelines simplistic and untested. Pediatrics. 1992; 89:821- 822.
13. Behrman RE, ed. Nelsons text book of Pediatrics. 16<sup>th</sup> Edition. Philadelphia, Pa: W. B. Saunder. 2000: 513-519.
14. American Academy of Pediatrics. Practice parameter: Management of hyperbilirubinemia the healthy term Newborn. Pediatrics. 1994; 94: 558- 65.
15. Brown AK, Seidman DS, Stevenson DK. Jaundice in the healthy term neonats: Do we need levels or new approach Pediatrics. 1992; 89: 827-828.
16. Porter ML, Dennis BL Hyperbilirubinemia in the term newborn. Am Fam Physician. 2002: 606.
17. Gartner LM, et al. Paediatric patterns in neonatal hyperbilirubinemia. Pediatrics. 1998; 101.
18. Seidman DS, Stevensons DK Ergaz Z, et al. Hospital readmission due to neonatal hyperbilirubinemia. Pediatrics. 1995; 95(4 pt 1):727- 729.

## ارتفاع اليرقان المضاد لإيقاف العلاج بالضوء عند الأطفال حديثي الولادة

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### الملخص

#### الهدف:

حتى نقرر هل توجد حاجة ملحة لإجراء قياس مخبري لنسبة اليرقان في الدم بعد إيقاف العلاج بالضوء.

### النتيجة:

لقد وجد أن مستوى اليرقان بالدم في اليوم التالي لإيقاف العلاج مساوي له أو أقل منه عند الإيقاف، ولا يوجد فرق بين الأطفال بحسب مجموعات أوزانهم.

### الطريقة:

أجريت دراسة استعادية في قسم الخداج في مستشفى الأمير هاشم بن الحسين العسكري، وقد تم الحصول على المعلومات من خلال مراجعة السجلات الطبية ل 136 طفل حديثي الولادة، الذين تلقوا العلاج بالضوء لمعالجة ارتفاع يرقان الدم الناتج عن أسباب مختلفة مثل عدم توافق في زمرة الدم أو العامل الريزيبي، وتجرثم الدم والجفاف، وقد تم قياس درجة اليرقان مخبرياً قبل العلاج بالضوء وبعد الانتهاء من العلاج.

### الخلاصة:

لا داعي لإعادة فحص اليرقان في الدم بعد إيقاف العلاج بالضوء في حديثي الولادة للبحث عن ارتفاع مضاد في نسبته، وبذلك نقل العباء المادي والجهد المبذول من قبل الممرضات والمختبرات، وكما نقل مدة بقاء المريض في المستشفى.