Comparing Transcutaneous to Serum Bilirubin after Phototherapy in the Outpatient Setting

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ABSTRAST

For neonates who have undergone phototherapy for hyperbilirubinemia current protocol calls for serum bilirubin measurements (TSB). There have been limited studies on the accuracy of transcutaneous bilirubinometry(TCB) after phototherapy in the outpatient setting. We investigated whether transcutaneous bilirubin can be used safely after phototherapy. This retrospective study included 36 neonates who underwent phototherapy and subsequently returned to the pediatric clinic. Results showed a mean TSB of 11.8 +/- 2.5 versus mean TCB was 12.1 +/- 2.8 , and the absolute difference of the means was 0.4. We concluded that the TCB can be used in the outpatient setting safely allowing for a quicker and painless method.

BACKGROUND

Neonatal hyperbilirubinemia is common amongst newborns, occurring in up to 60% and evaluating the severity is crucial to its management.[1] Although the gold standard of measuring bilirubin has been taking serum samples, transcutaneous bilirubinometry was introduced as a noninvasive method to provide easy, safe, and convenient way to evaluate the severity of hyperbilirubinemia.[2]

It has been established that prior to phototherapy transcutaneous bilirubin (TCB) is clinically equivalent to serum bilirubin (TSB).[3] Phototherapy (PT), however, has been reported to adversely affect the correlation between TCB and TSB and prior studies have discouraged its use once PT was initiated.[4]

Inpatient studies have shown higher correlation between TCB and TSB with increasing post PT hours and it is estimated that the blanching effects of PT wear off around 24 hrs. Currently, few studies have investigated the accuracy of using TCB after PT in the outpatient setting. Our goal is to determine whether outpatient physicians can safely rely on TCB , allowing for a painless and time saving alternative to TSB.

OBJECTIVES

The purpose of this study is to compare TCB to TSB measurements after phototherapy for healthy infants with neonatal jaundice following up in the outpatient setting.

METHODS

This retrospective study included healthy neonates who received inpatient PT and followed up at the Pediatric Clinic at Maricopa Medical Center. Each neonate who was treated with PT obtained both TCB and TSB measurement. TCB measurements were made on the forehead with Bili Check and recorded by nursing staff, while all blood samples for TSB were run in the main hospital.

Using EHR, we recorded ;
- PT start and stop time
- hours after PT
- age in days
- TCB and TSB while in clinic
- gestational age
- birth weight
- race/ethnicity
- Coombs test results

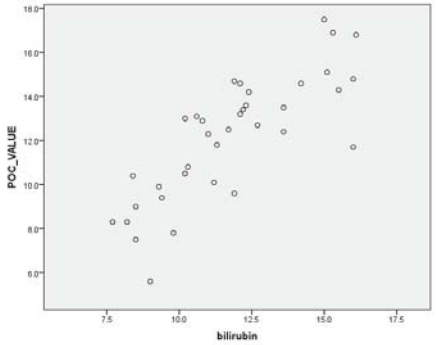
We excluded any infants with noted skin discolorations (eg. Nevi, hemangiomas on the face), or any infants who required intensive care.

RESULTS

From October 2013-April 2015, 67 healthy infants had been seen in the Pediatric Clinic who had received PT in our hospital, only 36 (54%) had complete data to be included in the study.

Table 1. Patient Demographics

Sex	53% female	47% male
Delivery Method	83% Vaginal Births	17 % Cesarean section
Gestational Age	89% ≥ 37 weeks	11% 35-36 weeks
Ethnicity	66% Hispanic	36% Other



Graph 1. Serum vs transcutaneous bilirubin r=0.8.

Table 2 Results	Value
Mean length of PT	23 hrs (range 9-41)
Mean length from end of PT to outpatient visit	47 hrs (range 19-102)
Mean serum bili	11.78 +/- 2.5
Mean transcutaneous bili	12.13 +/- 2.8
Absolute difference of bili	0.4, (range 0- 4.3) p = 0.22

75% of infants had absolute difference of ≤ 2.
Only 8% of infants returned < 24 hours after receiving PT, all had absolute difference of <2.

DISCUSSION AND CONCLUSIONS

The absolute difference between mean TSB and TCB in healthy outpatient newborns who received inpatient PT was 0.4 and is clinically insignificant. The correlation between TSB and TCB is seen after 1-2 days post PT, where our average time to return was 47 hrs. We conclude that for the outpatient physician, TCB can be used post PT, which facilitates faster, more convenient, and painless follow up visits.

This replacement of TSB by TCB can have a large impact in the outpatient setting, especially in the rural and underserved communities. A portion of those who did not qualify for the study had originally received a TCB and had no laboratory follow up.

A limitation of this study included the population size. Having a larger population size would have allowed us substratify the data further and compare gender, ethnicity, coombs test in more detail.

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References

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