Mahidol University
Faculty of Medicine
Ramathibodi Hospital

COMPARISON BETWEEN TRANSCUTANEOUS BILIRUBINOMETRY AND MEASUREMENT OF JAUNDICE BY DIGITAL PHOTOGRAPHY IN NEONATES

Background: Neonatal jaundice or is a common medical problem in newborns. Serum billirubin level is the gold standard for identifying neonates with increased risk of severe hyperbilirubinemia, but the procedure needs venipuncture which is painful and may result in skin infection of the newborns. Equipment for transcutaneous bilirubin level measurement (TCB) is effective to screen for neonatal hyperbilirubinemia but the equipment was very expensive. Digital photography and evaluation by computer program was reported to be useful for screening of neonatal jaundice.

Objective: To study the correlation between serum microbilirubin level (SMB), transcutaneous bilirubinometry (TCB) and digital photo graphic yellow level (DPYL) in evaluation of neonatal jaundice.

Material and Method: This research was a quasi-experimental study. 42 newborns in Ramathibodi Hospital. Serum microbilirubin levels and TCB at the chests of the newborns were determined at more than 24 hours after birth. Digital photographs was taken at the chests of the newborns and were analyzed by using Photoshop® computer program to determine the yellowish level of neonatal skin. The results of 3 methods were compared. Statistics for data analysis were frequency, percentage, mean and standard deviation. Chi-square test, Fisher's exact test and linear regression analysis were used for hypothesis testing with the significant level at $p < 0.05$.

Results: The mean serum microbilirubin level was 12.07±1.649 mg/dl. There was a good correlation between SMB and TCB (R2=0.761), between SMB and DPYL (R2=0.766) and between TCB and DPYL (R2=0.935).

Conclusion: Yellow level (DPYL) estimation correlated well with SMB and TCB. Digital photographic can be used to determine the jaundice level in newborns and can be used as a screening test for neonatal jaundice especially in places where resoures are limited.

Keywords: Serum microbilirubin level (SMB), transcutaneous bilirubinometry (TCB) and digital photo graphic yellow level (DPYL).

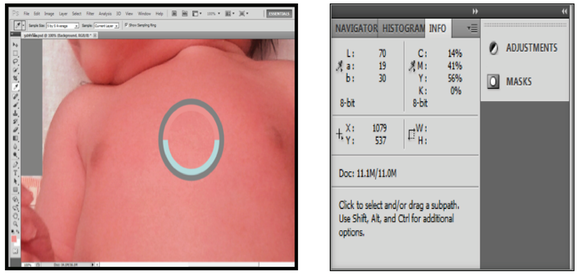

Figure 1 TcdB measurement of yellow levels by Y-M at Lighting =70%

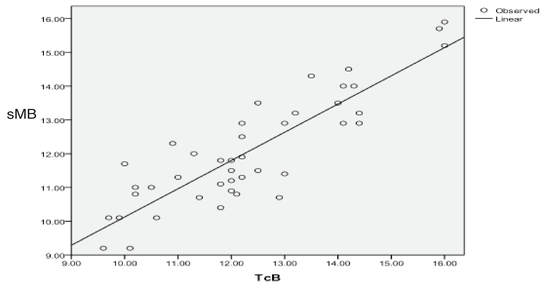

Figure 2 Scatter plots between microbiirubin (sMB) and transcutaneous bilirubinometry (TcB) (n=42).The regression equation is sMB =1.762+ 0.836 (TcB) with R2 = 0.761, p-value < 0.05

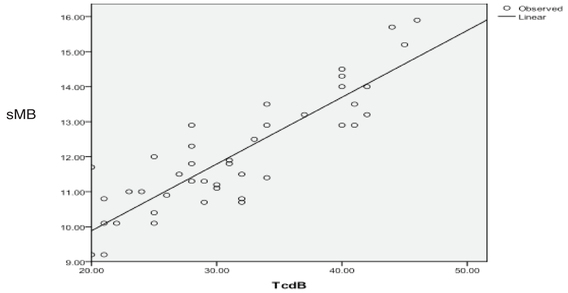

Figure 3 Scatter plots between microbiirubin (sMB) and transcutaneous bilirubin measurement by digital photography (TcdB) (n=42).The regression equation is sMB 6.073+0.191 (TcdB) with R2 = 0.766, p-value < 0.05.

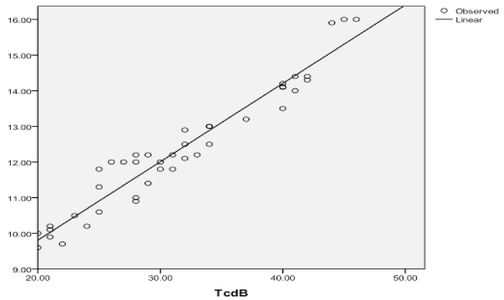

Figure 4 Scatter plots between transcutaneous transcutaneous bilirubinometry (TcB) and transcutaneous bilirubin measurement by digital photography (TcdB) (n=42).The regression equation is TcB=5.414+0.22 (TcdB) with R2 = 0.935, p-value < 0.05

Corresponding author: Sophaphan Ploungbunmee, M.Sc.
Address: Department of Obstetrics and Gynecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University Bangkok 10400, Thailand.