

CORRELATION OF PLASMA COLOR INDEX WITH SERUM BILIRUBIN IN NEONATAL HYPERBILIRUBINEMIA

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ABSTRACT

In this study, a simple method was evaluated for serum bilirubin estimation in neonates. The color of plasma was compared with various dilutions of potassium dichromate. Readings were then compared with serum bilirubin levels obtained by diazo reaction. The coefficient of correlation ($r = 0.7947$) between the two was statistically significant. It is concluded that the color index provides reliable estimates of serum bilirubin levels.

Key words: Neonatal, Color index, Serum bilirubin, Hyperbilirubinemia.

Hyperbilirubinemia is one of the most common problems encountered in the neonatal period. Repeated serum bilirubin estimations are required in this condition. The serum bilirubin estimation by Malloy Evelyn(1) method is time consuming, requires more blood and results vary from laboratory to laboratory(2).

Yamanouchi *et al.*(3) devised a noninvasive technique in 1980 using the transcutaneous bilirubinometer. They studied Japanese term infants and found a good correlation between the new transcutaneous technique and serum bilirubin level. Several later studies(3-5) found that there were many factors such as phototherapy, exchange transfusion, color of the skin and gestation age which affected readings by this new technique. Narang *et al.*(6) showed a fairly good correlation $r = 0.942$ between transcutaneous bilirubinometry and determination of serum bilirubin. Various other workers reported a good correlation between serum bilirubin and transcutaneous bilirubin reading(3,7,8). Guha *et al.* reported a better correlation with filter paper index than jaundice meter(9). The present study evaluates the relationship between color index(10) and serum bilirubin.

Material and Methods

Fifty infants (42 term and 8 preterm) admitted in children ward were studied over a period of six months. Their weights varied from 1.2 to 3.5 kg and age from birth to 10 days. Maximum infants were affected with icterus on 3rd day. Two different techniques were used for evaluating the jaundiced infant.

Three ml blood from femoral vein was collected by aseptic technique. The serum was separated and bilirubin estimation was done by Diazo method. To ensure quality control, a known standard was used. Blood

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Received for publication March 5, 1991;

Accepted January 2, 1992

was collected from heel prick in a heparinized capillary and centrifuged for 5 minutes. This plasma color was compared with different dilutions of potassium dichromate.

One in 10000 solution of potassium dichromate is taken as color index one. Two gram of potassium dichromate was weighed on a sensitive balance and was dissolved in distilled water and the final volume was made to 100 ml. This was equal to color index 200. Further dilutions were made as shown in *Table*.

The color index and serum bilirubin were done simultaneously for uniformity of results. Bilirubin estimation and color index were carried out within 30 minutes of collection of sample. More than one sample was taken in some cases, and in all 83 samples were analysed. The values of serum bilirubin and colour index were plotted on X axis and Y axis on a graph paper and the coefficient of correlation was calculated.

TABLE —*Preparation of Solutions of Different Color Index*

Potassium dichromate solution (ml)	Distilled water	Color index
20	0	200
18	2	180
16	4	160
14	6	140
12	8	120
11	9	110
10	10	100
9	11	90
8	12	80
7	13	70
6	14	60
5	15	50
4	16	40
2	18	20

Results

It was observed that all the values are clustered around the regression line equally on both sides. The color index was divided by 5.2 to get the serum bilirubin value. The mean serum bilirubin in all infants was 14.91 ± 4.67 while the range was 5 to 27 mg/dl.

The mean color index was 77.76 ± 22.91 and the range was 40-140. The coefficient of correlation, r was 0.7947, which is statistically significant (*Fig.*).

Discussion

Serum bilirubin determination by using a color index is a simple screening method to gauge the severity of jaundice. In contrast to color index, the results of transcutaneous bilirubinometry are affected by color of skin, phototherapy and exchange transfusion(4-7). Perspex icterometer(11) matches well with the transcutaneous bilirubinometry. The device may, however, underestimate the value in dark skin babies. Malloy and Evelyn(1) is the conventional standard technique but requires a large quantity of blood and is more laborious. Micromodification(12) of Malloy and Evelyn technique (1) are available but require costly equipment. The automated method(13,14) gives results 10% lower than the manual technique.

Transcutaneous bilirubinometry is non-invasive technique. With this method various workers have found coefficient of correlation ranging from 0.88 to 0.942(6-8). The results of the present study are comparable with those reported by other workers using the transcutaneous bilirubinometry. However, this technique is simple and does not require any sophisticated instrument. It therefore, can be used as a reliable screening procedure for hyperbilirubinemia.

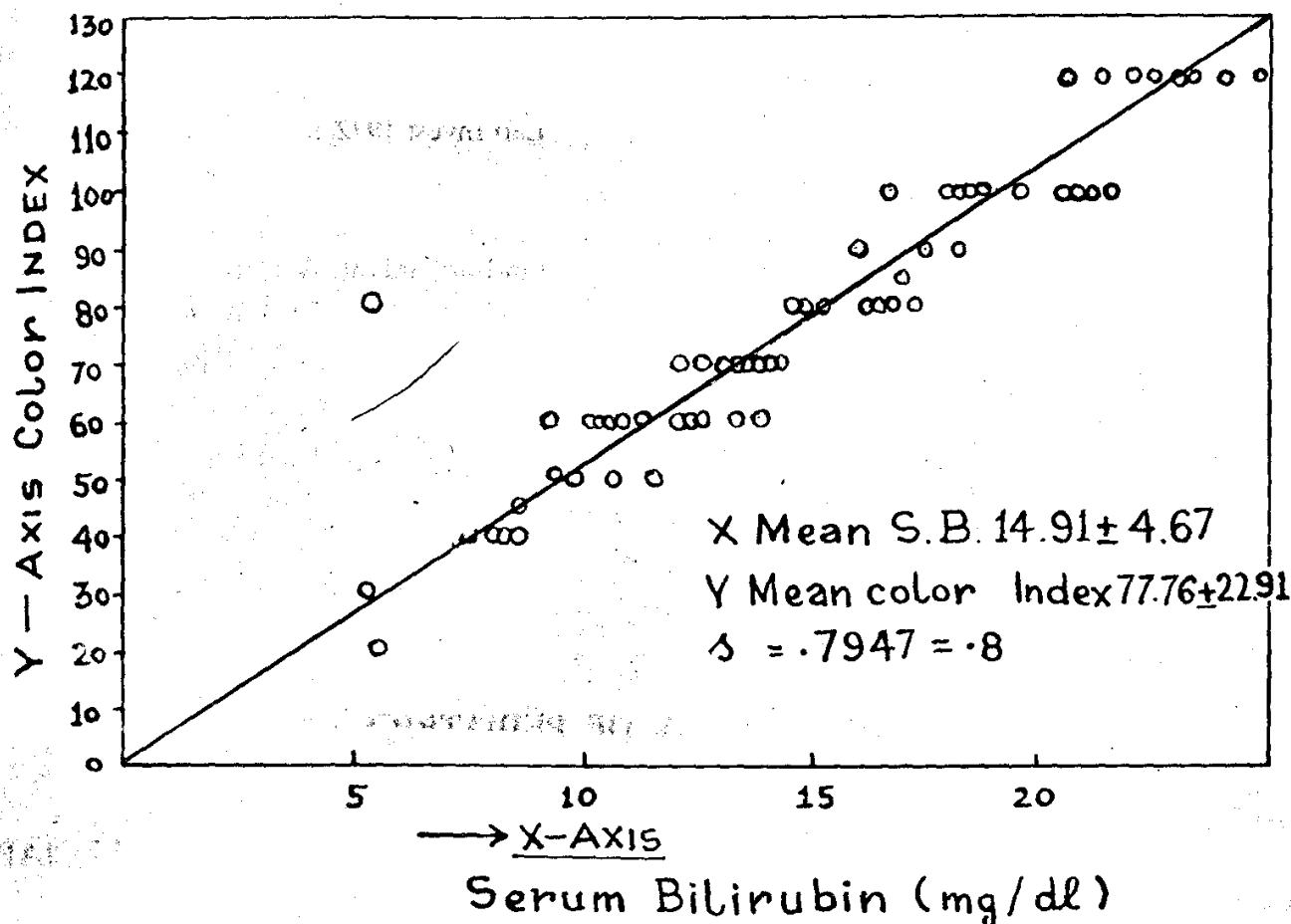


Fig. Correlation of color index with serum bilirubin.

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NOTES AND NEWS

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