



Transcutaneous bilirubinometry: important method in the evaluation of newborns with hyperbilirubinemia

Dear Editor,

It was with great interest that I read the short communication entitled "Comparison of transcutaneous and plasma bilirubin measurement" through Bilicheck[®], by Leite MG, Granato VA, Facchini FP and Marba ST, published in *Jornal de Pediatria*.¹

Transcutaneous rather than plasma bilirubin "measurement" is certainly the most appropriate way to avoid unnecessary blood sampling, since jaundice is usually the most frequent finding among newborn infants.

In 1993, we published an article entitled "Transcutaneous bilirubinometry: important method in the evaluation of newborns with hyperbilirubinemia" in *Arquivos Brasileiros de Medicina*,² available from LILACS and probably the first Brazilian research study into this topic. In 1982, the research study carried out at Universidade Federal do Rio de Janeiro served as my Master's thesis. In that study, we used the Minolta[®] bilirubin meter, the most modern device available back then.

Our study, which included 210 full-term Caucasian newborn infants with no other findings but jaundice, showed a good correlation between transcutaneous bilirubin "measurement" and serum bilirubin levels ($r = 0.894$), with a negative predictive value of 98%, thus indicating that this method is an excellent way to avoid plasma bilirubin measurement. However, even though limitations such as preterm birth, skin color, and previous exposure of newborn infants to phototherapy or exchange transfusion did not render the method inappropriate, they cast some doubt on its cost-benefit ratio.

Studies involving Bilicheck[®] have shown great improvement when the device is used without any influence from gestational age, skin color, etc, allowing for its widespread use among jaundiced newborn infants.^{3,4} Nevertheless, when spectrophotometric principles are used, the correlation produced by each device varies, thereby exposing some limitations.

If we take into account the advantage of not having to perform venipuncture in newborn infants, a procedure that may require further punctures and result in infection and pain, the use of devices that avoid that is of paramount importance. Therefore, the use of Bilicheck[®] or of other similar devices is

time-saving and prevents any complications that may arise from venipuncture.

Given the cost of Bilicheck[®], which is around US\$ 10,500 (based on public bids, 2006), and the cost of plasma bilirubin measurement, which is around US\$ 3, the nursery should perform at least around 9.7 assessments of hyperbilirubinemia a day (around 292 a month or 3,500 measurements a year). So, the advantages of purchasing this device must be carefully weighed, since the calculations used in the study were roughly made, without assessing any other related parameters, such as possible maintenance and depreciation costs as well as indirect costs.

In our setting, expenses on other essential materials in extremely busy nurseries may render the use of such devices unfeasible.

Twenty-five years after the publication of our research study into this topic, we are still in doubt about the actual need of devices just like Bilicheck[®]. This is not at all associated with its benefits, but with its costs instead.

References

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Autors' reply

Dear Editor,

We read with interest the letter sent by Prof. Adauto in which he commented on our article. With regard to transcutaneous bilirubin measurement, we totally agree that it is practical to use, provides more readily available results, is painless, facilitates the collection of samples, and reduces the

loss of blood volume and the risk of infectious complications. We also agree, as stated in our article, that this type of device is available at a prohibitive cost in our setting.

Bilicheck[®], which is more accurate comparatively to older devices, eliminates the need of numerous invasive measurements. Its operating cost is high if it is used according to the manufacturer's instructions. According to the manufacturer's instructions, calibration tips (Bilical) should be replaced after each measurement. We repeated measurements without replacing the calibration tips in at least 15 measurements and found out that the coefficient of variation remains practically the same.¹ Thus, the use of Bilicheck[®] without the replacement of calibration tips significantly reduces costs. Furthermore, the device proved quite robust and required only the replacement of two lamps and batteries after 7 years of use at Universidade Estadual de Campinas (Unicamp).

Recently, Bilicheck[®] has been manufactured by another company (Respironics[®], Murrysville, PA, USA), and its purchasing price has been lowered by nearly 30% (US\$ 2,760.00 for Bilicheck and US\$ 1.98 for each Bilical – FOB price).

Currently, the growing trend towards hospital discharge at 48 hours or even less than that makes newborn infants experience the often higher levels of bilirubin in the first week of life at home. The follow-up of these infants is often postponed to 2 weeks or later, placing them, in some cases, at risk for severe hyperbilirubinemia for long periods, thereby contributing to the reemergence of kernicterus, as already observed in the United States and in Europe.²

The American Academy of Pediatrics has recommended that every newborn infant be assessed as to bilirubin levels before hospital discharge and that based on these levels they be referred for reassessment on the first days after discharge.³ We believe Brazilian pediatric associations will soon adopt this procedure as well. This will certainly lead to a remarkable increase in laboratory bilirubin measurements and therefore the use of transcutaneous devices may be more economically feasible. We do hope that in the near future the price of these devices will go further down and that more financial resources will be allocated to neonatal care.

References

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