

Title	Transcutaneous bilirubinometry for the screening of hyperbilirubinemia in neonates ≥ 35 weeks' gestation
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Aim

- To assess the safety and accuracy of transcutaneous bilirubin (TcB) testing in identifying significant hyperbilirubinemia among neonates of at least 35 weeks' gestation in acute care and community settings.
- To assess the impact of universal TcB screening on patient management and clinical outcomes.
- To assess the cost implications or cost-effectiveness of TcB and total serum bilirubin (TSB) testing.

Conclusions and results

Safety and efficacy/effectiveness

Thirty-nine primary studies met the pre-specified inclusion criteria. Thirty-four studies examined the correlation/agreement between TcB and TSB values and the accuracy of TcB tests in predicting clinically significant hyperbilirubinemia. The other five studies reported the clinical outcomes of implementing TcB in screening programs for neonatal hyperbilirubinemia.

Overall, the methodological quality of the 34 screening accuracy studies was low. The TcB testing devices were safe, with very few procedure-related adverse events reported. Evidence from 34 studies indicated strong agreement between TcB and TSB measurements (correlation coefficient range 0.75 to 0.95). However, TcB did not agree well with TSB at high TSB values (e.g. TSB >15 mg/dL), and TcB could under- or overestimate TSB levels by more than 3 mg/dL.

Nonetheless, when using appropriate cut-off values, TcB accurately detected infants with clinically significant hyperbilirubinemia and predicted which infants will develop clinically significant hyperbilirubinemia during their first week of life. A TcB cut-off of ≥ 75 th percentile at 48 to 72 hours of age (pre-discharge) was a good predictor of TSB of ≥ 95 th percentile. Limited evidence suggested that TcB, or the combination of TcB and visual assessment, was more effective than visual assessment alone for detecting neonates with clinically significant hyperbilirubinemia. Of the five studies reporting on clinical outcomes, four found that systematic TcB screening reduced unnecessary TSB testing, without increasing the incidence of neonatal hyperbilirubinemia. The other study found that while TcB testing did not decrease the number of TSB tests, it did reduce the number of readmissions for hyperbilirubinemia.

No direct evidence was available on changes in the incidence of acute or chronic encephalopathy (including kernicterus). Economic outcomes

Three costing studies found that TSB testing referred by a TcB screen reduced health service use, compared with TSB testing referred by visual assessment, but did not necessarily result in net cost savings. One of the studies reported that TcB screening reduced the incidence of hyperbilirubinemia and the need for TSB testing and phototherapy, and lowered the age of the child at readmission for phototherapy, but earlier and more frequent contacts with public health nurses were required. The single cost-effectiveness study estimated that the cost per case of kernicterus prevented was higher with pre-discharge TcB testing than with TSB.

Recommendations

TcB testing cannot replace TSB, but it is a valid and safe tool for determining the need for a confirmatory TSB test. Implementation of a TcB screening program reduced the number of TSB tests performed, without increasing the incidence of significant neonatal hyperbilirubinemia. However, it is uncertain whether TcB screening is cost-effective.

Several factors should be considered when implementing a universal TcB screening program, including: the availability and cost of TcB devices; the need to develop a local TcB nomogram; the selection of appropriate TcB cutoff values; the need for additional quality assurance protocols; the personnel training requirements; and the impact on demand for community resources.

Methods

Please refer to the full report for details of the methods.

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