TITLE: Hemoglobinometer for Monitoring of Iron Status, Iron Deficiency and Iron Deficiency Anemia: Clinical Effectiveness

DATE: 29 June 2010

RESEARCH QUESTION:

What is the clinical effectiveness of using a hemoglobinometer for point of care monitoring of iron status, iron deficiency, and iron deficiency anemia?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 6, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between January 1, 2000 and June 18, 2010. Filters were applied to limit the retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, and guidelines. Internet links were provided, where available.

RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Twenty non-randomized studies were identified in the literature search. No relevant health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, evidence-based guidelines, or safety data were identified pertaining to the clinical effectiveness of using a hemoglobinometer for point of care monitoring of iron status, iron deficiency, or iron deficiency anemia. Additional potentially relevant articles are located in the appendix.
OVERALL SUMMARY OF FINDINGS:

It was reported in numerous studies that the HemoCue hemoglobinometer was effective and practical for estimating hemoglobin concentrations.\textsuperscript{11,16,17,18,19,20} This was evident when measurements were taken from capillary\textsuperscript{11} and venous\textsuperscript{1} samples, when used with small sample volumes in neonatal units,\textsuperscript{17} when compared to conventional Coulter counters\textsuperscript{18} on the first postoperative night following major joint arthroplasty,\textsuperscript{18} and when compared to the Coulter STK-S in chronic hemodialysis patients.\textsuperscript{19} Authors from a different study also indicated the reliability of the HemoCue Plasma/Low HB photometer when laboratory facilities were limited\textsuperscript{20} while another study demonstrated the improved accuracy of the HemoCue compared to the Hemoglobin Colour Scale (HCS) in estimating hemoglobin measurements.\textsuperscript{16} The authors of the latter study also advised that such devices be used over the HCS for general use, provided they are available.\textsuperscript{16} The HemoCue 301 (modified from the original HemoCue) was reported as simple, reliable, more cost-effective (compared to the original HemoCue), and effective in adverse climates when screening for anemia in blood donors.\textsuperscript{4} HemoCue-B appeared to be a good method for initially diagnosing anemia as it provided precise and accurate point-of-care hemoglobin measurements upon comparison with the reference cell counter Pentra 120 Retic (ABX).\textsuperscript{7}

Cautionary notes were also reported regarding the use of the HemoCue and other portable hemoglobinometers.\textsuperscript{1,3,6,11,19} In contrast to Paddle (2002),\textsuperscript{16} Sawant (2007)\textsuperscript{5} reported that the HemoCue was not as effective as the HCS for assessing hemoglobin concentrations in blood donors. It was also noted in one study that further validation of Hemocue was required to ascertain its effectiveness in determining iron deficiency anemia in a community setting.\textsuperscript{13} Authors from a third study concluded that caution is required when basing therapeutic decisions upon capillary hemoglobin measurements using the HemoCue alone, particularly in patients with gastrointestinal bleeding.\textsuperscript{6} Other authors recommended that portable hemoglobin photometers should not be used for determining hemoglobin concentrations in pregnant women living in high altitude areas.\textsuperscript{2} The increased need for proper training and proficiency when testing using capillary samples was also reported.\textsuperscript{1,3,11,19}

Two additional studies reported on the performance of Hemocue compared with other methods, but these citations did not contain abstracts.\textsuperscript{14,15}

Two studies reported that hemoglobinometers other than the Hemocue showed promise in assessing hemoglobin concentrations.\textsuperscript{8,12} The pulse hemoglobinometer was reported to provide clinically acceptable noninvasive hemoglobin measurements when adding additional factors (such as the DC805, DC940/DC1300) that took into account light scattering in red blood cells.\textsuperscript{8} A noninvasive hemoglobin monitoring device (Ast-Hb from Japan) was also determined to be useful for continuous hemoglobin monitoring.\textsuperscript{12} The authors of a third study concluded that the inexpensive and simple photometric device (DHT) was not effective for critical hemoglobin measurements, especially in transfusion services.\textsuperscript{10}
REFERENCES SUMMARIZED:

Health technology assessments
No literature identified.

Systematic reviews and meta-analyses
No literature identified.

Randomized controlled trials
No literature identified.

Non-randomized studies


Guidelines and recommendations
No literature identified.
APPENDIX – FURTHER INFORMATION:

Review articles


Note: See 5 Results and Discussion


Additional references
