

Reticulocyte hemoglobin measurement--comparison of two methods in the diagnosis of iron-restricted erythropoiesis.

Thomas L, Franck S, Messinger M, Linssen J, Thomé M, Thomas C.

Department of Laboratory Medicine, Krankenhaus Nordwest, Frankfurt am Main, Germany

The aims of this study were to diagnose iron-restricted erythropoiesis (functional iron deficiency) in patients with classic iron deficiency (ID), anemia of chronic disease (ACD) and the combined state of ID/ACD with the use of two hematological methods for the measurement of reticulocyte hemoglobinization. In comparison, the biochemical markers of iron status were determined. We studied 474 anemic patients admitted to hospital with a broad spectrum of diseases. We measured indicators of reticulocyte hemoglobinization. CHr was determined on an Advia 120 hematology analyzer. A Sysmex XE-2100 hematology analyzer was used to determine RET-Y, the forward scatter of fluorescence-labeled reticulocytes, which can also be expressed as the reticulocyte hemoglobin equivalent (RET-H(e)), as well as RBC-Y, the forward scatter of fluorescence-labeled erythrocytes, which can be expressed as the erythrocyte hemoglobin equivalent. Ferritin, soluble transferrin receptor (sTfR) and the sTfR/log ferritin ratio (sTfR-F index) were used as biochemical markers. The comparison of RET-Y with CHr demonstrated an excellent curvilinear relationship between the two parameters. The normal reference range for Ret-Y was 1630-1860 arbitrary units (AU); mathematical transformation to RET-H(e) gave a range of 28.2-35.7 pg. Correlations of biochemical iron markers with RET-H(e) were as weak as with CHr in patients with ACD and acute phase response. In a diagnostic plot to identify iron status, RET-H(e) could replace CHr without any loss of sensitivity or specificity. Patient mismatch analysis between RET-H(e) and CHr in the diagnostic plot demonstrated agreement for 449 of 474 patients (94.4%). Patient specific anemia mismatches were 2.9-6.2%. According to our results, the indicators of reticulocyte hemoglobinization, RET-H(e) and CHr, measure the same phenomenon. RET-H(e) is as valuable as CHr for the diagnosis of iron-restricted erythropoiesis. The combination of RET-H(e) and the sTfR-F index in a diagnostic plot offers an attractive tool for the evaluation of iron status and identification of the progression of ID.

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