Differential diagnostic values of serum transferrin receptor, serum ferritin and related parameters in patients with various causes of anaemia

This study involved 147 subjects, divided into 4 groups: 50 healthy controls, 54 patients with iron deficiency anaemia (IDA); 34 with anemia of chronic disorders (ACD) and 9 with thalassemia. Serum transferrin receptor (sTfR), ferritin, total iron-binding capacity (TIBC), unbound iron-binding capacity (UIBC) and complete blood count were measured in all subjects. In 17 patients with IDA, serum ferritin, sTfR, and hemoglobin were rechecked after iron therapy. sTfR could differentiate patients with IDA from healthy subjects and those with ACD. Serum ferritin was better at distinguishing IDA from other causes of anaemia, and was more sensitive to sTfR in indicating the iron repletion in patients with IDA after iron therapy.

Soluble serum transferrin receptor (sTfR) has been introduced as a new tool for diagnosing iron depletion. It is applied mainly to distinguish iron deficiency anaemia (IDA) from the anemia of chronic disorders (ACD), and is a sensitive index of iron deficiency during pregnancy. In the present study, we tried to compare the differential diagnostic values of sTfR, serum ferritin and other related parameters in different anemic diseases. Four groups of subjects were enrolled. Group A was formed of 50 healthy controls; 35 were male. Group B included 54 patients with IDA, diagnosed either by absence of iron stain in the marrow or a serum ferritin <20 μg/L in females and <40 μg/L in males; 14 of this group were male. Group C included 34 patients with ACD diagnosed according to Bentley's criteria,7 with C-reactive protein >2.0±2.78 mg/dL (normal range: <0.5 mg/dL); 12 were male. Most of them had collagen disease, 8 had malignancy and 8 had chronic infection. Group D included 9 patients with α- or β-thalassemia trait diagnosed by hemoglobin electrophoresis and hemoglobin (Hb) F staining; 4 were male. In Group B, 17 patients treated with oral iron were consecutively selected in order to monitor the changes of hemoglobin, transferrin saturation after iron repletion. The correlation between the change of serum ferritin and sTfR (r= -0.371, p = 0.129) was not significant. Positive and negative correlations were found between serum ferritin and hemoglobin as well as between sTfR and hemoglobin, respectively (r= 0.673 and -0.554; p = 0.002 and 0.017, respectively). Serum ferritin changed more and faster than sTfR after iron repletion.

In the present study, mean sTfR was highest in the patients with IDA, and was significantly higher in patients with IDA than in those with ACD and healthy subjects. Thus, it could be used to distinguish IDA from ACD as reported by others. However, sTfR was not significantly different between IDA and thalassemia, and thus could not distinguish IDA from anemias other than ACD. Serum ferritin could distinguish IDA from other non-IDA anemic patients, but it made no significant discrimination among the patients without IDA. In 17 patients with IDA treated with oral iron, there was no correlation between the change of sTfR after iron repletion. The change of sTfR did not occur so rapidly as the increase of serum ferritin after iron repletion. This is compatible with the results of another study. Serum ferritin should be better than sTfR in indicating iron repletion after iron therapy in patients with IDA.

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