Serum transferrin receptor concentrations in young women

A Rangan, G Blight, C Binns

School of Public Health, Curtin University of Technology, Perth, WA 6001

Serum transferrin receptor (sTfR) is a new assay for measuring iron status. Previous studies have suggested that it is a sensitive, single indicator of early tissue iron deficiency (ID) which is less invasive than the 'gold standard', bone marrow examination (1, 2, 3). The concentration of sTfR increases rapidly once storage iron is depleted (2).

The aim of this study was firstly, to document the concentrations of sTfR in an Australian population of young women and, secondly, to determine the sensitivity and specificity of this assay, compared to standard laboratory indices of iron status.

Two hundred and one female volunteers aged 15-30 years participated in this study. The standard parameters of iron status obtained were haemoglobin (Hb), transferrin saturation (TS) and serum ferritin (SF). Serum transferrin receptor levels were analysed using a commercial kit (R&D Systems, Minneapolis). In order to determine the normal range of sTfR, a reference population was selected by excluding all individuals with laboratory evidence of iron deficiency or ESR >20. The upper limit of the 95 percentile range from this reference population was used to determine the sensitivities and specificities of sTfR. Iron deficiency was defined as SF <12 µg/L and TS <16% and iron deficiency anaemia as Hb <12 g/L, SF <12 µg/L and TS <16%.

The distribution of sTfR for all subjects was positively skewed with a median of 1.50 µg/mL and a 95 percentile range of 0.96 - 3.86 µg/mL. Subjects with ID anaemia (IDA) had a mean sTfR concentration that was 2.4 times higher than that of iron replete subjects (3.45 vs 1.42 µg/mL). The reference range for iron replete subjects who had normal ESR (n = 138) was 0.94 - 2.26 µg/mL.

The sensitivity of sTfR was highest for subjects with ID and IDA. The specificity was also high, ranging from 95% to 98%.

	Sensitivity %	Specificity %	Efficiency %
SF <12 µg/L	52	98	92
TS<16%	32	97	84
Hb<12.0 g/L	47	96	91
SF<12 and TS<16	73	97	92
Hb<12 and SF<12 and TS<16	89	95	92

These results suggest that sTfR using this particular commercial kit may be a useful indicator of moderate to severe ID. However, sTfR was less effective in detecting the early stages of ID (SF <12).

1. Skikne BS, Flowers CH, Cook JD. Serum transferrin receptor: a quantitative measure of tissue iron deficiency. Blood 1990;75:1870-6.
2. Ferguson BJ, Skikne BS, Simpson KM, Baynes RD, Cook JD. Serum transferrin receptor distinguishes the anemia of chronic disease from iron deficiency anemia. J Lab Clin Med 1992;119:385-90.
3. Cook JD, Skikne BS, Baynes RD. Serum transferrin receptor. Annu Rev Med 1993; 44:63-74.