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Establishment of Reference Ranges for Ferritin in Neonates, Infants, Children and Adolescents

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Summary: Ferritin was determined in the sera of 631 healthy neonates, infants, children and adolescents (age range 5 days to 18 years), using the IMx from Abbott Laboratories. The applied test was a microparticle enzyme immunoassay (MEIA). The proband collective was divided into 9 age groups, and each group into males and females. In accordance with the recommendations of the International Federation of Clinical Chemistry, the 95% scatter range was taken as the reference range. Only a few reference groups showed a normal *Gauss*ian distribution. In addition to the 50th percentile, the 2.5th and 97.5th percentile were calculated for all reference groups, and the minimal and maximal values were also reported. Significantly different reference ranges were found for males and females in the age group 16–18 years. The U-test of *Mann & Whitney* was used to test for significant differences between individual reference groups. Groups showing no significant differences were combined, and the corresponding reference ranges for serum ferritin were then calculated.

Introduction

The serum concentration of ferritin in healthy individuals and in patients with iron deficiency or iron overload is directly related to the quantity of iron stored in the reticulohistiocyte system. Whereas low serum concentrations of ferritin are always indicative of an iron deficiency, elevated concentrations can occur for a variety of reasons. Thus, although elevated concentrations often indicate an excessive iron intake, they are also caused by liver disease, chronic inflammation and malignancies (1).

In industrialized countries, iron deficiency is the commonest dietary problem. Apart from pregnant women, blood donors and haemodialysis patients, other groups particularly at risk are infants and adolescents (2–5).

Determination of the serum ferritin concentration is a dependable method for the early detection of iron deficiency (6–8). The first response to a decrease in the iron stores of the body is a fall in the serum concentration of ferritin. In more advanced deficiency states, the percentage saturation of the circulating ferritin and the concentration of serum iron are also decreased (1).

The aim of the investigation was:

1) to determine the reference ranges for serum ferritin in healthy neonates, infants, children and adolescents;
2) to test for significant sex differences in serum ferritin concentration within the reference groups;
3) to test for significant differences in serum ferritin concentration between the reference groups.

Materials and Methods

Ferritin was determined in the sera of 631 healthy neonates, infants, children and adolescents (age range 5 days to 18 years). In the course of routine screening for hypothyreosis venous blood was taken from 5-day-old neonates. For all other probands blood samples were taken after written consent was obtained from their parents, who were informed as to the purpose of the tests. The Ethics Commission of the Medical