
SERUM FERRITIN LEVEL BY RIA AMONG ANEMIC AND NON ANEMIC PEDIATRIC SUBJECTS

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ABSTRACT

Ferritin is a family of iron-storage proteins that are found in animals, plants, fungi and bacteria. Presently, serum ferritin is used as a laboratory test for monitoring of iron status of the patient. It is recommended as a tool for monitoring of patient with hematological diseases. Here, we reported our study concerning serum ferritin at different hemoglobin level. Thirty subjects were included in this study. The ferritin in this study was performed by radioimmunoassay method (RIA) at the Nuclear Medicine Division, Department of Radiology, Faculty of Medicine, Chulalongkorn University. According to our study, 8 subjects were classified as anemic group and 22 subjects were classified as non anemic group. The average serum ferritin level for the whole subjects, the anemic group and non anemic group were 1912.47 ± 1734.97 ng/ml, 1559.81 ± 1557.33 ng/ml, and 2040.71 ± 1812.15 ng/ml, respectively. Of interest, there was a significant different between the average serum ferritin between anemic and non anemic group ($p = 0.46$). Therefore, we can repeatedly state the importance of serum ferritin determination in hematology study.

INTRODUCTION

Ferritin is a family of iron-storage proteins that are found in animals, plants, fungi and bacteria. As far as we know, ferritin does not contribute to the magnetization of sediments, but it does provide an excellent example of the biomimetic approach to synthesizing small magnetic particles. Natural ferritin is produced by a BOB process and consists of a spherical protein shell with a external diameter of 12 nm surrounding a cavity with an internal diameter of 9 nm containing an iron oxy-hydroxide core.¹

They form hollow, spherical particles in which 2000 to 4500 iron atoms can be stored as iron(III) (i.e. Fe^{3+} ions). Depending on the organism, ferritin particles are roughly 8-12 nm

in diameter, with several channels that appear to mediate iron transport to and from the interior. All ferritins are composed of 24 apoferritin monomers which associate to form a spherical particle. In mammalian cells, two types of ferritin monomers have been characterized (H and L types), which differ in the presence of certain residues that function to reduce ferric iron or facilitate mineralization of the particle with iron. Bacteria, including eubacteria and archaeobacteria, have two types of ferritins: heme-containing bacterioferritins and heme-free ferritins. The structure of these molecules is very similar to those of animals and plants.

Presently, serum ferritin is used as a

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laboratory test for monitoring of iron status of the patient. It is recommended as a tool for monitoring of patient with hematological diseases. Here, we reported our study concerning serum ferritin of pediatric subjects at different hemoglobin level.

MATERIALS AND METHODS
SUBJECTS

Thirty subjects were included in this study. All subjects were asked to supply their informed consent before the study. All research protocols followed in this study are in accordance with the guideline of the local Ethical Committee (Faculty of Medicine, Chulalongkorn University).

Non - fasting blood specimens were collected from pediatric subjects by the antecubital venipuncture. 5 ml of clotted blood was collected from each subject and sent to the Central Laboratory, King Chulalongkorn Memorial Hospital, Bangkok, Thailand. Collection of sample was performed between 8.00 - 10.00 a.m.. Sera were used for the laboratory analysis. No hemolytic, icteric and lipemic specimen was included.

LABORATORY ANALYSIS

The ferritin in this study was performed by radioimmunoassay method (RIA) at the Nuclear Medicine Division, Department of Radiology, Faculty of Medicine, Chulalongkorn

University. All analysis was performed according to the routine quality control at room temperature.

STATISTICAL ANALYSIS

The ferritin results were divided into two groups. The first group was the anemic group (Hb < 10 g/dL or Hct < 30 %). The second group was the non-anemic group (Hb ≥ 10 g/dL or Hct ≥ 30 %). The correlation between ferritin and hemoglobin for the whole case and for each group was then studied. Comparing between group was performed by Unpaired T-test at statistical significant level p = 0.05. Expected range was calculated by 95 % confidence interval analysis. SPSS for Window was used for statistical calculation in this study.

RESULTS

According to our study, 8 subjects (26.67%) were classified as anemic group and 22 subjects (73.33 %) were classified as non anemic group. The average serum ferritin level for the whole subjects, the anemic group and non anemic group were 1912. 47 ± 1734.97 ng/ml, 1559.81 ± 1557.33 ng/ml, and 2040.71 ± 1812.15 ng/ml, respectively (Table 1). Of interest, there was a significant different between the average serum ferritin between anemic and non anemic group (p = 0.46).

Table 1 Serum ferritin among our subjects.

Group	Average (ng/ml)	SD (ng/ml)
The whole subjects	1912.47	1734.97
● Non anemic (n = 22)	2040.71	1812.15
● Anemic (n = 8)	1559.81	1557.33

DISCUSSION

Ferritin is a widely used test in the present day. This test is measured to assess the amount of iron, which is important for red blood cell production, in the body. Ferritin is an iron binding protein that stores iron intracellularly in the liver. Translation of ferritin mRNA is regulated so that ferritin is only made when free iron is present, needing sequestration.¹⁻³ As ferritin is the major iron storage protein, the serum ferritin level is directly proportional to the amount of iron stored in the body. It can be an indicator of total body iron stores and the most reliable indicator other than bone marrow. Nevertheless, it can be an acute phase reactant.⁴

Generally, the normal range of serum ferritin among pediatric subject was 0 - 2000 ng/ml. According to this study, the average serum ferritin level among the healthy non anemic group was 2040.71 ± 1812.15 ng/ml. The expected range of our pediatric subjects was 0 – 1962.52 ng/ml. This range was similar to the reference value of general population in the text.⁴ Concerning the average serum ferritin level in each group, the (Figure 1). Therefore, we can repeatedly state the importance of serum ferritin determination in hematology study. However, some problems due to the few subjects in this preliminary report can be the limitation in generalization of this study.

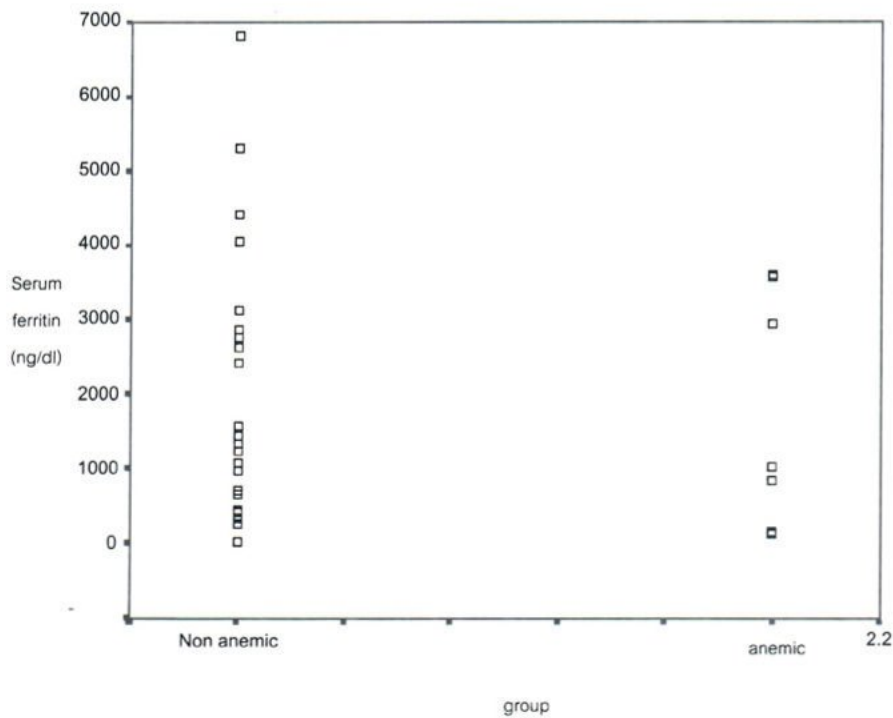


Fig. 1. Serum ferritin of the subjects

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