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A COMPARATIVE STUDY ON SERUM FERRITIN LEVELS IN IHD PATIENTS VERSUS HEALTHY SUBJECTS

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Abstract:
The development of coronary heart disease (IHD) is associated with increased iron stores in the body. The incidence of coronary artery disease (CHD) in pre-menopausal women was associated with lower body iron stores in the first group compared to men of the same age and postmenopausal women.
Aim: *To compare serum ferritin in healthy individuals and patients with Ischemic heart disease.*
Place and Duration: *In the Cardiology department of Benazir Bhutto Hospital Rawalpindi for one year duration from January 2019 to January 2020.*
Methods: *137 people were enrolled in the study, 47 healthy people without IHD history and 90 patients with IHD. We compared serum ferritin levels in healthy men and men with IHD, IHD in healthy premenopausal and premenopausal women with IHD and in healthy postmenopausal and postmenopausal women with IHD were evaluated for serum ferritin levels.*
Results: *Serum ferritin levels in IHD patients were significantly higher than in healthy controls in all three groups. In addition, serum ferritin levels in IHD patients suggest an increase in iron stores.*
Conclusion: *Iron stores are higher in patients with ischemic heart disease than in healthy people.*
Key words: *Acute myocardial infarction, ischemic heart disease, ischemic heart disease,*

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INTRODUCTION:

Sullivan proposed the iron hypothesis in 1981. He associated the development of IHD to higher body iron stores[1-2]. The low incidence of CHD in premenopausal women compared to women of the same age and postmenopausal women was associated with lower body iron stores in the first group[3-4]. Many epidemiological studies have been conducted to assess the iron hypothesis, and serum ferritin is the most commonly used indicator of iron status in these studies. However, inconsistent results have appeared in epidemiological studies linking iron status and CVD risk, and there are supportive and non-supportive studies[5-6]. The aim of this study was to compare serum ferritin in healthy individuals and patients with IHD. To minimize differences due to factors such as gender and menopause, we compared serum ferritin levels in healthy men and men in IC, healthy premenopausal women and IC men, healthy postmenopausal women, and women with postmenopausal IHD[7-8].

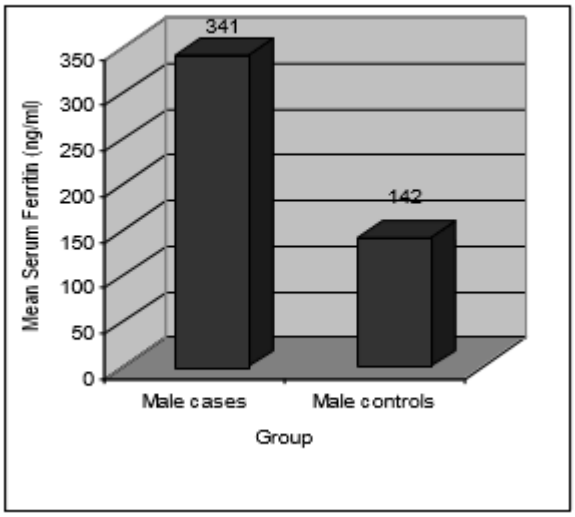
MATERIALS AND METHODS:

This analytical cross-sectional study conducted at Benazir Bhutto Hospital Rawalpindi, in the cardiology department for one year duration from January 2019 to January 2020. The study included 137 people, 47 healthy people (40-60 years, both sexes) and 90 patients with IC (40-60 years, both sexes) without IHD history. Ninety patients (during the first 48 hours of AMI) who were diagnosed with acute myocardial infarction presenting themselves in different wards were selected as patients. The diagnosis of AMI was based on a typical history, changes suggestive of ECG and cardiac biomarkers in serum. A group of 42 healthy subjects without IHD in the interview was selected as a control group. Subjects from each group were enrolled in the study upon arrival, and were then classified by sex and menopause status. Because ferritin is an acute phase protein and can be elevated in acute and chronic inflammation, malignancies and severe liver disease, patients with these conditions are excluded. Selected topics were informed about the study and consent was obtained. The corresponding data has been registered in proforma. Venous blood samples were taken overnight after fasting (i.e., after 12-14 hours of fasting) between 8:00 a.m. and 09:00 because biphasic circadian rhythm was reported for serum ferritin, samples were almost always taken at the same time in the morning. Blood was allowed to clot and the serum was separated by centrifugation. Serum was transferred to labeled aliquots and stored at -200 ° C. Ferritin enzyme immunoassay kit (BIOCHECK, INC.) Was used to quantify ferritin concentration in serum samples. We compared serum ferritin levels of healthy men and male patients with IHD, healthy premenopausal women and premenopausal women with IHD, healthy postmenopausal women and postmenopausal women with IHD. Data were entered and analyzed using SPSS (16.0). An independent t-test was used to observe differences in group means. A p value <0.05 was considered statistically significant.

RESULTS:

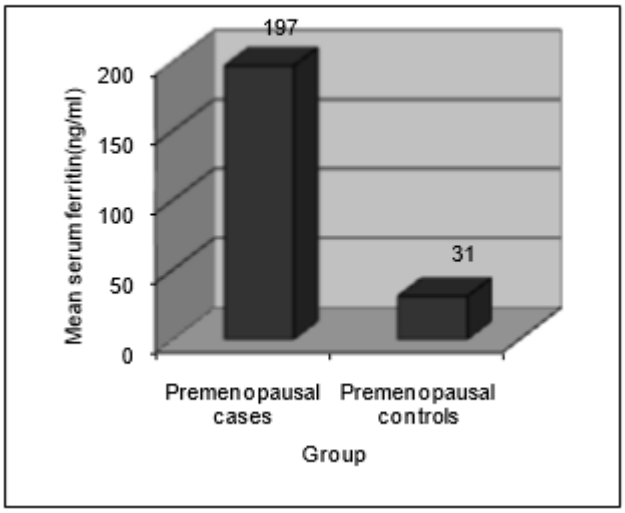
Of the 90 patients with IHD, 63 (70%) were men and 27 (30%) were women. Of the 47 controls, 18 (38%) were men and 29 (62%) were women. Of the 27 women with IHD, 19 (70%) were post-menopausal and 08 (30%) were pre-menopausal. Of the 29 women in the control group, 12 (41%) were postmenopausal and 17 (59%) were premenopausal. The serum ferritin concentration range in men with IHD and men in the control group was 24-1054 ng / ml and 01-736 ng / ml, respectively. A significant difference was observed between the serum ferritin concentration of men with IHD and men from the control group (340.56 ± 266.95 compared with 142.17 ± 181.09 ng / ml, p <0.05), which shows that men with IHD have an average serum ferritin higher than men from the control group (Fig. 1).

Fig. 1: Differences in serum ferritin of male IHD patients and male controls



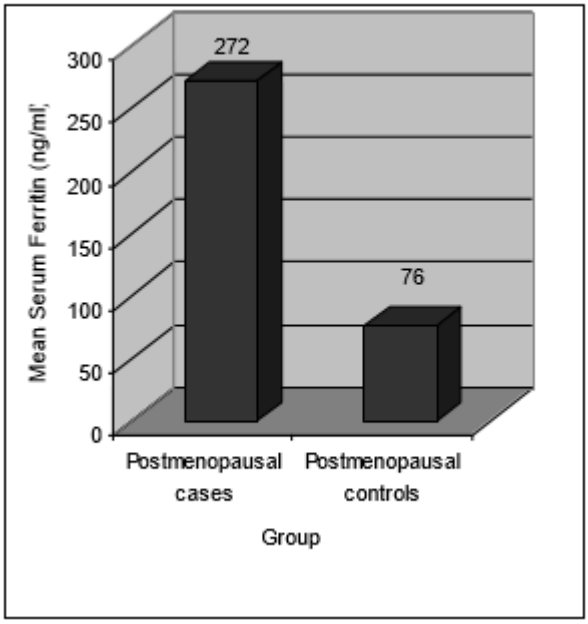
The serum ferritin concentration range in pre-menopausal patients with IHD and pre-menopausal patients was 56-478 ng / ml and 02-180 ng / ml, respectively. A significant difference was observed between the serum ferritin concentration in premenopausal patients with IHD and the premenopausal control group (197.25 ± 143.30 vs. 30.59 ± 50.74 ng / ml, $p < 0.05$), which shows that in pre-menopausal IHD patients, mean serum ferritin is higher than in the pre-menopausal control group (Fig. 2).

Fig. 2: Differences in serum ferritin of premenopausal IHD patients and premenopausal controls



The serum ferritin concentration range in postmenopausal IHD and postmenopausal control patients was 36-802 ng / ml and 05-476 ng / ml, respectively. A significant difference was also observed between serum ferritin levels in postmenopausal patients with IHD and postmenopausal control (271.63 ± 243.45 vs. 75.50 ± 128.64 ng / ml, $p < 0.05$), which shows that in postmenopausal patients with IHD the average serum ferritin is higher than in the postmenopausal control group (Fig. 3)

Fig. 3: Differences in serum ferritin of postmenopausal IHD patients and postmenopausal controls



DISCUSSION:

Ferritin is a ready source of iron for the major iron storage compound and metabolic requirements. It is a large multimeric protein found in almost all body cells[9-10]. The highest concentrations are found in the reticuloendothelial cells of the spleen, liver and bone marrow, and liver parenchymal cells. Initially, ferritin was an intracellular protein that could not be measured in serum. In 1972, a sensitive radioimmunoassay for ferritin was developed, which proved to be a normal component of serum7. The concentration of low content of ferritin in the blood is closely related to the amount of iron stores in the body. Serum ferritin is a measurable, non-invasive indicator of body iron stores and is an increase of 65 mg in the body. Iron stores reflect a 1 µg / L3.9 increase in serum ferritin. The reference range for serum ferritin is 10-120 ug / L for women and 20-250 ug / L for men[11-12]. High iron reserves were found. Serum ferritin was> 300 µg / L in men and> 200 µg / L in women. The average serum ferritin was higher in men with IC than in control men. Similarly, patients with premenopausal IHD had higher mean serum ferritin than premenopausal controls. In addition, post-menopausal IHD patients had serum ferritin higher than those in the postmenopausal control group. The mean serum ferritin concentration in men with IHD was> 300 µg / L, indicating a high iron level, while the mean serum ferritin concentration in the control group was in the normal range[13]. The average serum ferritin concentration in pre-menopausal IHD patients was very close to the iron overload cut-off recommended by Fleming et al. The mean ferritin concentration in premenopausal control serum was within normal limits. In addition, the average serum ferritin concentration in postmenopausal IHD patients was> 200 µg / L, suggesting a high iron level, and the average serum ferritin concentration in postmenopausal women was within normal limits. These findings show that relative iron depletion protects against IHD and confirms the hypothesis that Sullivan's development of IHD may be associated with the purchase of iron stores in the body. In addition, our results are consistent with Salonen's findings and Klipstein-Grobusch et al reported that higher serum ferritin levels are associated with an increased risk of MI[14]. Kiechl et al. In addition, by reporting that men and women with iron deficiency are a low-risk group, people with leading iron stores face a high risk of carotid atherosclerosis[15].

CONCLUSION:

We concluded that IHD patients had higher iron stores than healthy controls, as indicated by higher serum ferritin.

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