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Iron Supplementation on Plasma Lipid Levels versus Pregnant Anemic Women

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Women tend to have substantially lower iron stores, thus more vulnerable to iron deficiency when iron intake is lowered or need increases. [1,2]. Iron deficiency is an independent risk factor for onset of coronary artery disease and an atherogenic lipid profile and enhanced oxidative stress [3]. Despite the great deal of information available on the hematological and biochemical changes in iron deficient anemic women, very limited studies have been carried out to investigate the lipid profiles in women with iron deficiency. According to Choi., *et al*. [4], lipid levels in patients with iron deficiency anemia were shown be directly linked to the level of iron. Blood haemoglobin levels correlated significantly with serum cholesterol concentrations. These results were contradicted by a study done by Tanzer., *et al*. [5], entailing higher serum total triglyceride, total cholesterol, and VLDL levels in iron deficient patients than in healthy controls. A study revealed that triglyceride, total HDL and LDL cholesterol levels having been higher during pregnancy except LDL-cholesterol that remained constant [6]. Serum triglyceride, total cholesterol LDL-c levels increased gradually as pregnancy proceeded except HDL-c level did not change significantly during pregnancy [6]. Never-the-less, along these notions and objectives, a recent study revealed noteworthy changes in iron status, oxidative stress and lipid levels in response to iron deficiency and iron supplementation in pregnant anemic women [7].

Pregnancy normally induces significant metabolic changes. The concentrations of lipids, lipoproteins and apolipoproteins in the plasma increase noticeably during pregnancy, predominantly affected by maternal hormonal alterations such as rise in insulin, progesterone, 17-β estradiol and human placental lactogen [7]. There are a few reports that the iron doses used for correcting iron deficiency anemia may further increase the level of lipid peroxidation products, principally consequent to increased bioavailability of elemental free iron in gastrointestinal mucosal cells of the subjects [8-10]. The concentration of total lipid, total cholesterol and phospholipid were found to be significantly decreased in pregnant anemic women [7]. The reduction of lipids may be correlated with probable iron deficiency anemia induced increased lipid peroxidation, showing resemblance to the data reported earlier in pre-eclampsic pregnant women [11], recommending that an excess of ROS in iron deficient patients leads to the oxidative degradation of RBC lipids consequential to decreased level of lipids in these patients. The RBC is a source of oxygen-related radicals in iron deficiency anemia (IDA). However, in IDA, RBCs produces greater quantities of $O_2^{\cdot -}$, H_2O_2 and OH° as compared to that by normal RBC [12]. Triglycerides have been reported to be elevated in iron deficient anemic women as compared with the controls and further increased after oral iron treatment [7]. The increase in serum TG may be due to hypoactivity of lipoprotein lipase in blood vessels that breaks up TG. The concentration of HDL was found to be reduced following iron deficiency anemia and after iron supplementation [7]. Recent reports indicate that cytotoxicity induced by LDL and VLDL

can result from lipoprotein oxidation. Ultimately indicated by the relative amount of MDA equivalents or thiobarbituric acid-reacting substances (TBARS) residing on the lipoprotein [13].

Contrary the data of Salonen., *et al*. [14], which would suggest that persons with iron deficiency should not be treated with supplements due to possible adverse events, the outcome of investigation carried out by Tiwari., *et al*. [7-13] showed that measures of oxidative stress were affected by a therapeutic dose of iron in women with low iron status, thus LPO, LDL and VLDL increasing maximum in control and mild than remaining groups because less iron utilization in these groups due to different individual requirements facilitating the enhanced oxidative stress. Iron status was improved as shown by an increase in ferritin. most reliable marker of iron status.

Lastly, oral iron therapy is the most widely prescribed treatment for iron deficiency anemia. However, oral iron supplementation may also lead to various health problems. The monitoring of these physiological variations is essential for the diagnosis of liver diseases during pregnancy. Tiwari., *et al*. [13] precisely monitored blood index values and liver function parameters. Hemoglobin (Hb), total protein (TP), iron (Fe), albumin, lipid peroxidation (LPx), aspartate transaminase (AST) and alanine transaminase (ALT) and alkaline phosphatase (ALP) levels were observed to be increased significantly after treatments. Furthermore, gamma-glutamyl transpeptidase (GGT) was found to decrease in pre and posttreated subjects. Treatment with iron and folic acid although has remarkable efficacy for Hb and body iron stores although for the cost of increasing the associated compartment of total bilirubin, AST and ALT concomitant with decreased GGT levels.

Conclusions

In brief, this compilation concludes that a therapeutic dose of iron has an impact on events of oxidative stress in spite of upgraded iron status in subjects getting the supplement as measured by a significant raise in ferritin, and hemoglobin with change in lipid profiles and lipoproteins, though the support to a likely relationship between iron status and lipoproteins oxidation is exaggerated consequently. Also, liver function tests are suggested to be monitored at regular and specific intervals during the course of pregnancy.

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