



Study of Lipid Profile in Anaemia

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Key words: Anaemia, iron deficiency anemia, haematocrit, non iron deficiency anaemia, haemoglobin, cell disease

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Page No.: 288-291

Volume: 11, Issue 6, 2016

ISSN: 1816-3319

International Journal of Tropical Medicine

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Abstract: Anaemia is very common disease in our country. It may be defined as, decrease in the total red cell mass. The objective of the study is to compare the lipid profile of patients with iron deficiency anaemia with non-iron deficiency anaemia. This study was prospective observational cross-sectional comparative study. The present study was conducted with the number of 200 patients and over a period of 18 months (October, 2014 to March, 2016). Females were more than males in both the groups. Easy fatigability was most common presenting complaints followed by headache, general body ache and shortness of breath and swelling of feet in both the groups. In both the group pallor and platonychia were most common. To conclude in iron deficiency anaemia lipid profile was deranged.

INTRODUCTION

Anaemia may be defined as, decrease in the total red cell mass. Anaemia is defined by the World Health Organization as a reduction of haematocrit value below the normal limits or anaemia is considered to exist in adults whose haemoglobin levels are lower than 13 g dL^{-1} (males) or 12 g L^{-1} (females) (Allen and Allen, 1982). Anaemia is a major health problem in the world. According to estimated data at least 20% of the world population is affected by anaemia. It is commonly found in women between the age group of 15 and 44 years. Iron deficiency is the cause of majority of the cases. In India, 30% adult males, 45% adult females, 80% pregnant females and 60% children have iron deficiency. Oxygen carrying capacity of blood is reduced by it and thereby reduces the arteriovenous oxygen difference (Guyton and Hall, 2000). Iron Deficiency Anaemia (IDA) is common disorder in our country (Alvares *et al.*, 2000; Uberoi *et al.*, 1972; Patel and Mehta, 1969). Dyslipidaemia is prevalent in India, irrelevant to socio-economic status (Laws *et al.*, 1994; Malhotra *et al.*, 2003). IDA and dyslipidemias were reported in the same

individuals according to some studies. It was also observed in some experimental animals (Au and Schilling, 1986; Sherman, 1979). Young infants and adolescent girls are commonly affected by Iron deficiency anaemia (Tanzer *et al.*, 2001). Increased risk of coronary heart disease was related to high body iron stores according to an epidemiological study (Ece *et al.*, 1999; Salonen *et al.*, 1992). Studies have shown that risk factors for myocardial infarction are low serum iron-binding capacity and high serum iron concentrations (Magnusson *et al.*, 1994; Morrison *et al.*, 1994). In animals associations have been found between lipoprotein concentrations, serum lipid levels and dietary iron intake (Bristow-Craig *et al.*, 1994; Cunnane and McAdoo, 1987).

Aim and objectives: To study the lipid profile in patients with iron deficiency anaemia and non-iron deficiency anaemia.

Literature review: Anaemia is a blood disorder. Blood is an important component that heart constantly pumps with the help of veins and arteries throughout the body.

When something goes wrong in blood, it can affect health and quality of life. The causes of anaemia can be acquired or inherited. Acquired means the condition develop after the birth. Inherited means parents passed the gene for the condition. Sometimes the cause of anaemia is unknown. Rifkind and Galein (1967) indicated that splenectomy lead to a doubling of the cholesterol value in a patient with microspherocytosis and that vitamin B12 therapy in a patient with pernicious anaemia was associated with a rise in serum cholesterol (Rifkind and Gale, 1967, 1968).

After vitamin B12 and folic-acid therapy, there was a parallel increase in haematocrit and cholesterol in patients with megaloblastic anaemia. After splenectomy plasma cholesterol and haematocrit increased in patients with hereditary spherocytosis. The haematocrit and plasma cholesterol levels in patients with sickle cell disease were low before treatment and increased after treatment and after transfusion in aplastic anaemia (Choi *et al.*, 2001). A study by Tanzer *et al.* (2001) on lipid profile in iron deficiency anaemia observed that higher level of total cholesterol, triglyceride, VLDL in iron deficient participants.

MATERIALS AND METHODS

This cross-sectional study of lipid profile of iron deficiency anaemia and non-iron deficiency anaemia was conducted at Krishna Hospital and Medical Research Centre, a tertiary care hospital and teaching Institute in Maharashtra. The present study was conducted over a period of 18 months (October, 2014 to March, 2016). Patients admitted in medicine wards of the tertiary care hospital with diagnosis of anaemia and who fulfil the inclusion criteria were enrolled in the study.

Data collection: A total 200 patients who were admitted with diagnosis of anaemia were divided in two groups. Preformed structure was given to the patients like medical and other past history and patients were divided in to two groups.

Group A: Study participants with iron deficiency anaemia selected by simple random sampling fulfilling above inclusion and exclusion criteria.

Group B: Study participants without iron deficiency anaemia selected with age and sex matched healthy participants.

Results of demographic, clinical and biochemical characteristics were expressed as range, mean and median. For qualitative data Chi-square test and for comparison student unpaired t-test was used.

RESULTS AND DISCUSSION

In present study, the mean and standard deviation of age group 18-30 years was (36.73±12.32) years, mean and

Table 1: Mean and standard deviation of age group of iron deficiency and non-iron deficiency anaemia

Age groups (Years)	Mean and SD
18-30	36.73 (±12.32)
31-45	37.26 (±12.52)
46-60	37.76 (±12.72)
>60	37.59 (±12.90)

Iron deficiency anaemia (Mean 37; SD±12); Non iron deficiency anaemia (Mean 38;SD±13); Not statistically significant

Table 2: Distribution of study participants according to age

Age group (Years)	IDA n = 100	Non-IDA n = 100	Total n = 200 (%)
18-30	31	30	61 (30.5)
31-45	47	46	93 (46.5)
46-60	15	16	31 (15.5)
>60	07	08	15 (7.5)
Total	100	100	200 (100)

X² = 0.1261; df = 03; Iron deficiency anaemia (Mean 37; SD±12); Non iron deficiency anaemia (Mean 38; SD±13); Not statistically significant

Table 3: Distribution of study participants according to gender

Gender	IDA n = 100	Non-IDA n = 100	Total n = 200 (%)
Male	31	30	61 (30.5)
Female	69	70	139 (69.5)
Total	100	100	200 (100)

X² = 0.023; df = 01

standard deviation of age group 31-45 years was (37.26±12.52), 46-60 years was (37.76±12.72) and more than 60 was (37.59±12.90) (Table 1).

In present study, age wise distribution of study participants with maximum number of participants were from age between 31-45 years total 93 (47 (IDA) and 46 (NIDA)) in number followed by 18-30 years total 61 (31 (IDA) and 30 (NIDA)). Number of study participants from age group 46-60 were 31 (15 (IDA) and 16 (NIDA)) and in the age group of >60 were total of 15 (Table 2).

In present study total numbers of female participants were 139 (69.5%) (69 (IDA) and 70 (NIDA)) were more than male participants 61(30.5%) (31 (IDA) and 30 (NIDA)), in both the groups (Table 3).

In present study, chief complaints of study participants in both the groups were easy fatigability, headache, bodyache, shortness of breath, swelling of feet, neck pain in which easy fatigability 106 (53%) was most common presenting complaint followed by headache 86 (43%), general body ache 66 (33%), shortness of breath 54 (27%) and swelling of feet 41 (20.5%). Of total 100 participants 19 (9.5%) were asymptomatic and 6 (3%) were presented with syncope and 27 (13.5%) were having neck pain. The difference was not statistically significant (Table 4).

In the present study, study participants presented with clinical signs such as pallor, platonychia, koilonychia, cheliosis, glossitis and hemic murmur. In which maximum number of study participants were having pallor 192 (96%) as clinical sign (100 in IDA and 92 in

Table 4: Distribution of study participants according to presenting complaints

Presenting complaints	IDA n = 100	Non-IDA n = 100	Total (%) n = 200
Easy fatigability	54	52	106 (53)
Headache	42	44	86 (43)
General body ache	38	28	66 (33)
Shortness of breath	30	24	54 (27)
Swelling of feet	30	11	41 (20.5)
Neck pain	15	12	27 (13.5)
Asymptomatic	07	12	19 (9.5)
Syncopal attacks	04	02	06 (3)

Table 5: Distribution of study participants according to clinical signs

Clinical signs	IDA n = 100	NIDA n = 100	Total (%) n = 200
Pallor	100	92	192 (96)
Platonychia	49	45	94 (47)
Koilonychia	22	25	47 (23.5)
Cheliosis	10	12	22 (11)
Glossitis	32	33	65 (32.5)
Hemic murmur	22	19	41 (20.5)

NIDA) followed by platonychia 94 (47%), koilonychia 47 (23.5%), cheliosis 22 (11%) and glossitis 65 (32.5%). Hemic murmur was found in total of 41(20.5%) participants, in which 22 participants in IDA and 19 in NIDA (Table 5).

The observations made in 100 cases of iron deficiency anaemia and 100 cases of non-iron deficiency anaemia who were admitted in the medicine wards of tertiary care hospital with diagnosis of anaemia.

In the present study, maximum numbers of study participants were from the age group of 31-45 years in both the groups. Mean and standard deviation of age in IDA group was (36.98±12.41) years and in NIDA group was (37.55±12.67) years. Nandyalal *et al.* (2013) reported the same finding as present study. The study by Antappanavar *et al.* (2014) were having mean age was (28.9 ± 6.82) years.

Nandyala *et al.* (2013) noted that on presentation 54 cases had easy fatigability, 42 had headache, 18 had neck pain, 28 had generalized body ache, 26 had shortness of breath, 10 had swelling of feet and 4 cases had syncopal attack while 12 cases were asymptomatic. In the present study, most common clinical sign was pallor (100% (IDA) and 92% (NIDA)), platonychia (49% (IDA) and 45% (NIDA)), koilonychia (22% (IDA) and 25% (NIDA)), Cheliosis (10% (IDA) and 12% (NIDA)) and glossitis (32% (IDA) and 33% (NIDA)). The 22% of the study participants in IDA group and 19% in NIDA group were having hemic murmur. Nandyala *et al.* (2013) observed the similar clinical signs in their study on IDA and lipid profile (Antappanavar *et al.*, 2014). The present study found that iron deficiency anaemia was significantly associated with abnormal lipid profile.

CONCLUSION

Iron deficiency is the world's most widespread nutritional disorder, regardless of age, gender and socioeconomic status, affecting both industrialized and developing countries. The present study shows that there is correlation between low serum iron levels and increased triglyceride, LDL levels which can lead to other severe conditions like coronary artery disease and liver diseases. Early detection and treatment of iron deficiency anaemia can prevent development of dyslipidemia and coronary artery diseases. Since, hyperlipidemia is recognized as a risk factor in the development of coronary artery diseases, all nutritional influences on the serum lipid concentrations assume considerable importance.

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