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ORIGINAL ARTICLE

DO THE LIPID LEVELS CHANGE IN ANAEMIA?

***¹Jino Vincent, ²R.Umarani, ³K.Baburaj**

^{*1}Postgraduate, Department of Medicine, RMMCH, Chidambaram-608002, Tamilnadu, India

²Professor of Medicine, Department of Medicine, RMMCH, Chidambaram-608002, Tamilnadu, India

³Reader of Medicine, Department of Medicine, RMMCH, Chidambaram-608002, Tamilnadu, India

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ABSTRACT

Serum lipid levels are correlated with the risk of atherosclerosis, which causes coronary artery disease, cerebrovascular disease and peripheral vascular disease, which are important causes of mortality and morbidity worldwide.¹ Anaemia has been reported to have a beneficial effect on the lipid profile. The decrease in serum cholesterol is not due to a specific lowering of any of the serum lipoprotein families.² Hypocholesterolemia is caused by a proportional reduction in all the major lipoprotein families.

Keywords: Anaemia, Lipid sub-fractions, hypocholesterolemia, severity.

1. INTRODUCTION

Anaemia is a common disorder in India. Although it may be due to various causes, nutritional deficiency is most commonly responsible (Braunwald et al., 2001; Albert et al., 1987; DeMaeyer and Adiels-Tegman, 1985). Anaemia has been reported to have a beneficial effect on the lipid profile. The exact mechanism by which anaemia causes a fall in serum lipids is not known. The simplest explanation is a dilution effect (the increased volume of serum in anaemia carrying the same total load of cholesterol).

Mechanisms for hypocholesterolemia in anaemia:

1. Decreased production and absorption (Dessu et al., 1992)
2. Increased excretion (Juliusson et al., 1995)
3. Re-distribution (Westerman, 1975)

Decreased oxygenation of blood in anaemia might affect lipid absorption, transport, and synthesis. Low oxygenation coupled with spontaneous oxygen radical production, with increased catabolism of modified lipoproteins by macrophage scavenger receptors, may also contribute to hypocholesterolemia in anaemic patients. Correction of anaemia is associated with a rise in serum lipids.

2. METHODOLOGY

The study was undertaken in Department of Medicine in Rajah Muthiah Medical College Hospital in 100 cases to find out the quantitative changes in each lipid sub fraction in anemic cases and also to correlate changes in lipid sub fractions with respect to increasing severity of anaemia. Objectives of the study was to study the demographic characteristics and clinical features in cases with anaemia, and to correlate the extent of changes, if any, in the various lipid sub fractions with the severity of anaemia.

Inclusion criteria were

- 1) All proven cases of anaemia in the age group 18-40.
- 2) Men: Hb < 13 gm%, Women: Hb < 12 gm% anaemia cut-off criteria as published by a WHO study group on nutritional anaemia.

3. RESULTS

Majority of the cases were middle aged (30-60). The youngest case was 14 years old. The oldest was 75 years old. There was no significant difference in sex distribution. Out of 100 cases who were included in this study, 40 cases had dimorphic anaemia (DM) according to peripheral smear, 25 cases had microcytic hypochromic anaemia (MH), 18 cases had normocytic hypochromic anaemia (NH) and 10 cases had a normocytic normochromic blood picture (NN). The most common presenting symptom was easy fatigability, which was present in 51 cases. The next common symptoms were

**Corresponding author: Dr. Jino Vincent, Postgraduate, Department of Medicine, RMMCH, Chidambaram-608002, Tamilnadu, India*

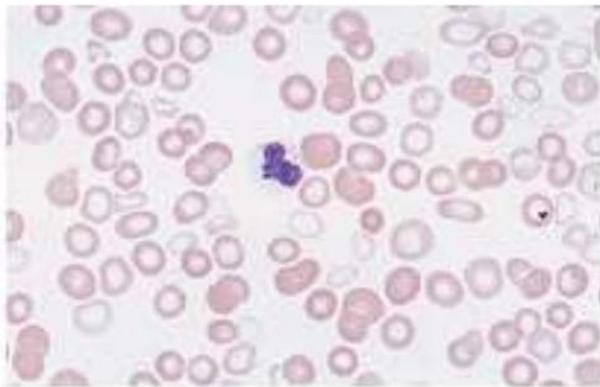
dyspnoea (29 cases), palpitations (27 cases) and giddiness (24 cases). Other symptoms were loss of appetite (9 cases), fever (7 cases), weight loss (5 cases), angina, dysphagia, jaundice and menorrhagia (3 cases each), bony pain and bleeding (1 case) each.

The mean pulse rate was 85.4/ minute in cases. The mean pulse rate was significantly increased (89.3/ minute) in cases with haemoglobin less than 6 gm/dl. There was no significant difference in mean blood pressure in the different types of anaemia. The mean body mass index was 21.5 kg/m² in cases.

BMI was significantly decreased (20.9 kg/m²) in cases with haemoglobin less than 6 gm/dl. The mean hematocrit was 22.6±1.5 % in cases with hemoglobin less than 6 gms/dl, which was significantly lower than hematocrit in cases with 6-9 gms/dl of hemoglobin (24.9±2.3) and 9 gms/dl (27.7±3.6). The mean serum cholesterol levels was 132.2 mg/dl.

The effect of anaemia on the total cholesterol levels was very large. The mean serum HDL levels was 31.0 g/dl. The effect of anaemia on the HDL levels was large. The mean serum LDL levels was 79.7 mg/dl. The mean serum VLDL levels was 21.6 mg/dl. The mean serum triglyceride levels was 108.1 mg/dl. The mean total cholesterol / HDL ratio was 4.4. The mean LDL/ HDL was 2.6.

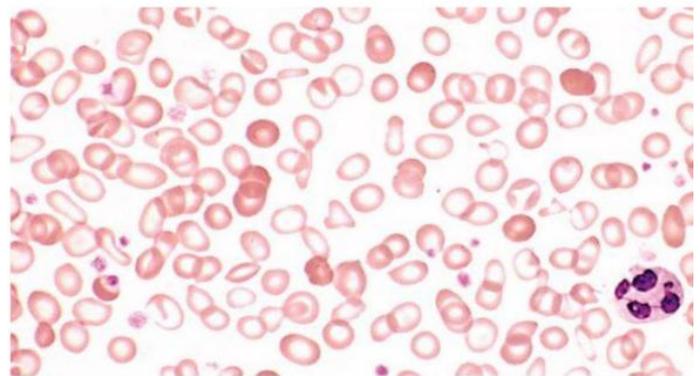
DIMORPHIC ANAEMIA



SARANYA 61/F 699110

MICROCYTIC HYPOCHROMIC ANAEMIA

SANKARI 22/F 689702



Anaemia Severity and Lipid Levels

Lipid Profile (mean ± SD)	Hb < 6 gm/dl (n=23)	Hb 6-9 gm/dl (n=40)	Hb > 9 gm/dl (n=37)	P value (ANOVA)
TC	106.0 ± 21.3	127.5 ± 22.5	153.7 ± 23.6	P<0.01**
HDL	26.3 ± 6.2	30.4 ± 6.4	34.5 ± 5.2	P<0.01**
LDL	61.0 ± 19.3	75.6 ± 21.5	95.8 ± 22.0	P<0.01**
VLDL	18.9 ± 7.4	21.6 ± 5.5	23.3 ± 5.9	P<0.01**
TG	94.4 ± 36.7	108.1 ± 27.9	116.5 ± 28.8	P<0.01**
TC/HDL	4.1 ± 0.7	4.4 ± 0.9	4.5 ± 0.7	P<0.05**K
LDL/HDL	2.4 ± 0.7	2.6 ± 0.7	2.8 ± 0.7	P<0.01**K
NON HDL	80 ± 16.2	91.2 ± 17.2	122.5 ± 19.2	P<0.01**K

* Significant at 5%. ** Significant at 1%. K - Kruskal Wallies Test

4.DISCUSSION

Anaemic cases younger than 50 years were more likely to have more severe anaemia, as compared to cases older than 50 years. Dimorphic anaemia was the most commonly seen type of anaemia in this study. Microcytic hypochromic anaemia was the second most common. Cases commonly presented with non specific symptoms of anaemia, such as fatigue, dyspnoea, palpitations and giddiness.

Vegetarians were more likely to have more severe anaemia and to have dimorphic anaemia. The mean total cholesterol was found to be lower in anaemic cases. The decrease in mean serum cholesterol was not due to a specific lowering of any of the serum lipoprotein families.

Hypocholesterolemia was caused by a reduction in all the major lipoprotein families, including mean HDL, LDL, VLDL and triglycerides. There was a very large decrease in mean total cholesterol and LDL levels, and a large decrease in mean HDL levels, resulting in a mild fall in mean TC/HDL and LDL/HDL ratios. Lipoprotein (a) had no correlation with type or severity of anaemia.

5.CONCLUSION

Anaemia is associated with significant hypocholesterolemia, with lowering in all lipid subfractions (Rifkind and Gale,1970).The extent of hypocholesterolemia is proportional to the severity of anaemia. The type of anaemia has no effect on the hypocholesterolemia seen in anaemia (Rifkind and Gale,1968). Further studies are required to study the long term effect of anaemia on the risk of developing atherosclerosis, and to study the long term effect of treatment of anaemia on lipid levels and cardiovascular morbidity and mortality.

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