

## Pattern of Lipid Abnormalities in Indian Air Force Personnel and its Association with various Clinical Abnormalities

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*A total of 39 subjects (Indian Air Force Officers), who reported to this Establishment for medical evaluation during the period January 1986 to June 1988, were found to have high lipid levels. Out of these, 20 were ground duty officers and 19 were aircrew. Type II (Combined type IIa and IIb) and type IV were the commonest hyperlipoproteinaemia detected. Eleven cases out of the total 39 were found to have Ischaemic heart disease. The type of hyperlipoproteinaemia prevalent in aircrew was not significantly different from that of ground duty officers ( $P > 0.05$ ). Correlation with other associated risk factors like age, obesity, smoking, hypertension, glucose intolerance, hypothyroidism etc. has been attempted.*

**Keywords :** Coronary risk factors, HDL, cholesterol and its esters, IHD.

The lipids of the blood form a heterogenous group which includes phospholipids (such as lecithin), cholesterol and its esters, neutral fat (glyceryl triesters), free fatty acids, carotenoids, Vitamin A and Vitamin E. They are carried in the blood as spherical macromolecular complexes termed lipoproteins, where an inner core of hydrophobic lipids (triglycerides and cholesteryl esters) is encased by a membrane of unimolecular thickness consisting of various proteins (apolipoproteins, or simply apoproteins) in association with hydrophilic lipids (free cholesterol and phospholipids).

Hyperlipoproteinaemia constitutes the major risk factor for development of ischaemic heart disease<sup>1</sup>. Two major groups of hyperlipoproteinaemia are recognised : primary (genetic) and secondary hyperlipoproteinaemia. The World Health Organisation (WHO) classification<sup>2</sup> is based on lipoprotein electrophoresis and is widely used.

Recent publication of a report of an extensive prospective study sponsored by the WHO<sup>3</sup> on the lowering of blood cholesterol in primary prevention of ischaemic heart disease has evoked considerable interest. The reduction of very high plasma cholesterol concentration (above 7 mmol/litre) reduces the risk of ischaemic heart disease<sup>4</sup>.

The strong statistical relation of hyperlipidaemia to atherosclerotic heart disease<sup>5</sup> and the hope of developing measures for its control has led to research into plasma lipoprotein structure, composition and metabolism<sup>4</sup>.

The high density lipoprotein (HDL) is now being incorporated as a protective factor in coronary heart disease<sup>6</sup>.

### Material and Methods

The study was undertaken at Air Force Central Medical Establishment between January 1986 and June 1988 to study the lipoprotein pattern in cases who showed raised levels of cholesterol or triglyceride. A total of 39 cases were studied. The age varied from 26 to 48 years and all were males.

Blood sample was collected after 12 hours of fasting. Serum was subjected to visual inspection test<sup>7</sup> and also cholesterol, triglycerides and HDL cholesterol were assayed by enzymatic methods<sup>8-10</sup>. Lipoprotein fractions were studied using standard electrophoresis procedure (Beckman).

All the above cases were subjected to detailed clinical examination. The cases showing cardiac abnormalities were subjected to Treadmill test, Echocardiography, Holter's monitoring, MUGA and Coronary angiographic studies as applicable in each case.

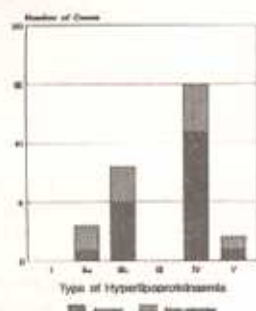
### Observation and Results

We evaluated 39 subjects who showed high level of lipids (cholesterol or triglycerides) initially. Out of these, 20 were ground duty officers and 19 aircrew. Five cases were overweight (10 to 20%), 6 were smokers (15 to 20 cigarettes/day), 5 had essential hypertension, 5 impaired glucose tolerance, 6 were diabetics, one had clinical diagnosis of hypothyroidism and one showed xanthelasma both eyelids. Twenty seven

cases showed ECG abnormalities. Out of these, 16 had non-specific ECG abnormality and 11 showed exercise induced ischaemia.

Fig. 1 shows component bar chart depicting the type of hyperlipoproteinaemia (as per classification by WHO<sup>2</sup>) seen in 28 cases.

Fig. 1 Type of Hyperlipoproteinaemia (As per WHO classification) n = 28



Out of 28 cases, three were of the type IIa, eight of IIb, fifteen of type IV and two cases were of type V.

Student 't' test was applied to assess the significance in the differences between the types of hyperlipoproteinaemia detected in aircrew with that of ground duty officers. It was found to be insignificant ( $p > 0.05$ ).

### Discussion

Hyperlipidaemic states contribute to the risk of ischaemic heart disease. Numerous studies have amply established an association between coronary artery disease (CAD) and abnormal levels of serum lipids<sup>1,11,12,13,14</sup>. Dyslipoproteinaemia (hyper or hypolipoproteinaemia) is a group of disorders characterized by quantitative and/or qualitative abnormalities of plasma lipoproteins. Hyperlipoproteinaemia may be recognised as primary (genetic) or secondary. Abnormal plasma lipoproteins are associated with diabetes mellitus, hypothyroidism, nephrotic syndrome, obstructive biliary disease, pancreatitis, alcoholism, dysglobulinemia, non-nephrotic renal failure, glycogen storage disease and others<sup>15</sup>.

Prospective studies<sup>1,16,17</sup> have confirmed the role of hypercholesterolaemia, hypertension and smoking as independent risk factors for CAD.

Lewis et al<sup>18</sup> reported type II pattern (IIa & IIb together) and type IV hyperlipoproteinaemia in IHD cases in 40% and 30% of patients respectively. We detected hyperlipoproteinaemia type II (combined IIa & IIb) in 40% and type IV in 53%. Amongst the type II, 11% were type IIa and 29% of type IIb. In our study, 7% cases belonged to type V.

Adaval et al<sup>19</sup> showed gradual increase in plasma cholesterol levels with increase in age. In our study of 11 cases where only cholesterol estimation was done, we found that cholesterol levels were much higher than the range for that age group.

Overweight is known to be associated with hyperlipoproteinaemia<sup>20</sup>. In our study one obese patient showed high cholesterol level, however, full lipid profile was not done in this case. Smokers are known to carry higher morbidity and mortality from CAD as compared to non smokers<sup>21</sup>. In our study, out of six smokers, one had CAD (multivessel disease), four showed non-specific ECG abnormality and one had no heart ailment.

We found that five cases with hypertension showed IIa (one) and IIb (one) type IV hyperlipoproteinaemia (four) and one showed higher cholesterol level. One case had xanthelasma of both eyelids and was diagnosed as IHD (multivessel disease). Lipid profile showed type IIa hyperlipoproteinaemia.

Out of 11 cases with CAD, three had type IIa, two had IIb and six cases had type IV hyperlipoproteinaemia. Sixteen cases showed nonspecific ECG changes and amongst this group hyperlipoproteinaemia detected was, 4 cases of type IIb, 5 cases of type IV and two cases of type V. In the other 5 cases, only higher cholesterol was detected.

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