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The hyperlipoproteinaemia are disturbances of lipid transport that result from abnormalities in synthesis or degradation of plasma lipoprotein. The clinical importance of elevated plasma lipoprotein level derives from the ability to cause life threatening diseases, atherosclerosis and premature atherosclerosis is by far the leading cause of death in developed and industrialized countries, both above and below age 65. A number of conditions and habits are found more frequently in individuals who develop atherosclerosis than in general population. These factors are termed risk factors. Both hypercholesterolaemia and hypertriglyceridaemia appears to be important risk factor for atherosclerosis. It has been concluded with various studies that plasma cholesterol is influenced by dietary factors along with genetic factors. Attention was directed towards the high blood cholesterol level in population habitually consuming high cholesterol and high fat diet (Connor et al, 1961; Steiner, 1962). The basic premise is that elevated plasma cholesterol and triglyceride concentration can be reduced by appropriate diet modification. Study However above concept is derived mainly from the study of fasting plasma cholesterol and triglyceride level.
Nature of organism also plays an important role in determining cholesterol content of plasma (Quintao et al, 1971). Hence, different individuals ingesting similar diet exhibits different level of cholesterol/laemia. It would seem desirable to study post-prandial lipid profile to find out different response and proneness to atherosclerosis.

The present study comprised of 30 healthy volunteers and 28 patients. Biochemical studies performed in each of them included:

1. Estimation of total and free plasma cholesterol and plasma triglyceride level initially and after cholesterol/fat ingestion.

2. Lipoprotein pattern initially and after cholesterol/fat test meal.

**Healthy Cases. - Total and Free Plasma Cholesterol:**

Analysis of cases revealed the mean total plasma cholesterol 201.9 ± 50.5 mg% (range 130 - 352 mg.) for mean age 41 years. In Indian series largest control group reported in literature available to us is that of Mathur et al (1960) and next largest group being that of Dutta's (1967) who reported mean total plasma cholesterol 182.2 ± 18.2 mg% and 192.8 ± 38.2 mg% respectively for persons above 40 years of age. Our mean values of total cholesterol in various age groups closely resembles to those of Tyagi (1971).
In present study we observed rise in plasma cholesterol level as age advances. Our findings are in accordance with those of Fredrickson and Levy (1972), Dutta et al, (1967) and Brody and Carlson (1962).

Though males were having higher values for plasma total and free cholesterol than females, but statistically difference was non-significant. Similar reports about sex relationship with plasma cholesterol have been made by Johnson et al (1965), Dutta (1967) and Tyagi (1971). However Brody and Carlson (1962) reported significant difference between sexes.

Analysis of cases reflected a significant correlation between body built and plasma cholesterol. Stamler et al (1962) reporting 3 epidemiological studies of 2,159 men and 754 women, also expressed the similar view which was supported by Hartman et al (1962) and Bierenbaum et al (1963).

Present series of cases could not establish any significant relationship of dietetic habit with plasma cholesterol and thus supporting the work of Connor and Connor (1972), Leuer et al (1975) and Kummerow et al (1977). This may be ascribed to the fact that plasma cholesterol is not only influenced with diet but also, various metabolic and genetic factors as emphasized by above authors. On the contrary,
Walden et al (1964), Simons et al (1968) and Raymond and Olive (1968) demonstrated significant difference in plasma cholesterol between vegetarian and non-vegetarian.

When cases were analysed, our study disclosed insignificant difference for plasma cholesterol among the persons of different activity status (occupation). Our findings are in conformity with Malhotra (1962) who compared age matched physically active sweepers in India with sedentary blood donors and found lack of correlation. Similar reports were published by Roskamm (1964) and Taylor et al (1960). However Brunner et al (1962) in a study of 500 members of Israel Kibbutism, reported that average value for serum cholesterol are significantly higher in sedentary workers than in members engaged in both high and heavy manual work.

In present study, effect of smoking could not observed as smokers and non-smokers were having the same plasma cholesterol levels. Our results are in favour of Acheson and Jessop (1961), Konttinen and Rajasalmi (1963), where as Spain and Nathan (1961) have found higher mean plasma cholesterol level in smokers than non-smokers, perhaps this discrepancy should be attributed to their different dietary habits (Mustard and Murphy, 1963).
Alcoholics were having significant higher plasma cholesterol level than non-alcoholics, which might be because of its ready energy source and property of spare food energy. A study of Adelson and Keys (1962) revealed that persons with low cholesterol levels had the lower intake of alcohol while persons with high level of cholesterol had more intake of alcohol. Amatuzio and Hay (1958), also showed that ethanol significantly increased serum cholesterol concentration especially in hyperlipidaemic individuals.

**Plasma Triglyceride:**

Mean plasma triglyceride level of present series was $98.7 \pm 34.0$ mg% (range 56 - 192 mg%) for mean age of 41 years. Above figures observed in study are comparable to Gossian et al (1967) and Dutta (1967) for healthy group above 40 years of age.

Males were having generally higher plasma triglyceride level than females but difference was non-significant. Similar results were published by Schaffer and Nechemias (1965), Fredrickson et al (1967) Carlson and Lindstedt (1969).

However, Brody and Carlson (1962) demonstrated significant difference between sexes.

Analysis of cases revealed non-significant difference in plasma triglyceride level among different

When subjects were studied in relation to dietetic habit, present study disclosed that diet has no significant role on plasma triglyceride level. On contrary, Simon's et al (1978), Oyama (1967) and Walden et al (1964) reported significant difference in plasma triglyceride between vegetarians and non-vegetarians. Above discrepancy between our and their studies may be attributed to occasional intake of non-vegetarian diet in Indian population than western society. However, precise relationship further needs elucidation in two population (Indians and Westerns).

Non-significant difference in plasma triglyceride among the different groups of activity status reflected a lack of correlation. Our findings are in conformity with those of Heyden (1967), Cooper et al (1966) and Providoli (1966).

Similarly, no effect of smoking could be demonstrated upon plasma triglyceride in our series. Heyden (1967) too could not subscribe to a visible long term effect of smoking on serum triglyceride level.
Alcoholics revealed significantly higher plasma triglyceride level than non-alcoholics. Similar results were made by Talbott and Keating (1962) and Lieber et al (1963).

**Plasma Lipoproteins:**

Analysis of healthy subjects revealed abnormal lipoprotein pattern in 4 cases which is too small to comment any relationship with general particulars.

Over all study of plasma cholesterol, triglyceride level and lipoprotein pattern disclosed that 4 cases (13.3%) were suffering with hyperlipoproteinaemia (Type IV = 10.0%, Type IIa = 3.3%). No case of Type I, Type IIb, Type III and Type V hyperlipoproteinaemia was found in present study. A similar figures was reported by Wood et al (1972) in a study of 1,118 healthy cases. Where as Laren et al (1971) reported some what higher incidence (21.2%) of hyperlipoproteinaemia and lower figure (7.6%) by Hedstrand et al (1976). All above investigators reported Type IV hyperlipoproteinaemia as the commonest abnormal lipoprotein pattern in healthy subjects.

**Diseased Cases.**

To study effect of cholesterol/fat ingestion, 28 patients were selected of those diseases which were
usually associated with hyperlipoproteinaemia. In present study diabetic, chronic renal failure and ischaemic heart disease patients were 35.7%, 32.1% and 32.1% respectively.

The mean total and free plasma cholesterol and plasma triglyceride levels of diabetes, chronic renal failure and ischaemic heart disease were higher than healthy group. Above well known facts have been reported by several workers for diabetes (Gupta et al, 1979; Viswanathan et al, 1975 and Schonfeld et al, 1974), chronic renal failure (Gokal et al, 1978 and Chopra et al, 1971) and ischaemic heart disease (Chandra et al, 1980; Patterson and Slack, 1972).

Study of lipoprotein pattern disclosed 11 cases (39.2%) of hyperlipoproteinaemia in diseased group. We observed higher incidence of hyperlipoproteinaemia in diabetes (30.0%), chronic renal failure (55.5%) and ischaemic heart disease (33.3%) than healthy group (13.3%).

Abnormal lipoprotein pattern was detected in 3 diabetics (30.0%) and Type IV was the commonest (Type IV = 20% and Type IIa = 10%). Similar finding was published by Schonfeld et al (1974) while Gupta et al (1980) and Viswanathan (1975) reported higher incidence of hyperlipoproteinaemia 51.8% and 51.2% respectively.
In all above studies most common hyperlipoproteinaemia was Type IV.

In present series of 10 chronic renal failure patients, 55.5% were having hyperlipoproteinaemia (Type IV = 33.3%; Type IIa = 11.1% and Type IIb = 11.1%). Our findings closely resembles to those of Ponticelli et al (1978) who reported 54% lipoprotein abnormality (Type IV = 30%, Type IIa = 12% and Type IIb = 12%) in a study of 76 patients. Similarly Chopra et al (1971) observed 52% hyperlipoproteinaemia and little higher incidence (65.0%) was observed by Gokal et al (1978).

We also reported higher incidence of hyperlipoproteinaemia (Type IV = 22.2% and Type IIb = 11.1%), in ischaemic heart disease and the commonest type of hyperlipoproteinaemia was Type IV. Our findings are in accordance to Chandra et al (1980) and Patterson and Slack (1972) who reported 47% and 55% hyperlipoproteinaemia respectively and Type IV as the commonest pattern in ischaemic heart disease.

A little discrepancy between our findings and other studies in above diseases may be explained in term of small groups of patients.
Effect of Cholesterol / Fat ingestion upon Total and Free Plasma Cholesterol:

Insignificant difference between fasting and post prandial plasma cholesterol (total and free) revealed that diet has no effect either immediate (8 hours) or late (5 days) upon plasma cholesterol. There was variable differences between fasting and post prandial values as some individuals showed marked fluctuations while others showed more or less constant plasma cholesterol level throughout the study. The ratio of total and free plasma cholesterol also remained unaltered after cholesterol/fat ingestion. There was no set pattern of post prandial change in plasma cholesterol.

We could not demonstrate any difference in the response of cholesterol/fat test meal on plasma cholesterol level in healthy and diseased cases as well as in subjects having normolipoproteinaemia or hyperlipoproteinaemia. Our findings corroborates with those of Kummerow et al (1977), Olefsky et al (1976), Heyden (1967) and Schilling (1964) who also could not find any immediate effect of meal upon plasma cholesterol. All above studies were carried out not only for 24 hours or less, but also, only in healthy subjects.

The follow-up study for 21 days of cholesterol/fat test meal, available with us is only that of
Biggs et al (1952) who observed the effect with tritium labeled cholesterol and measured total and free plasma cholesterol levels at 6 hours, 1 day, 3rd day, 5th day and upto 21 days at few days interval, demonstrated similar observations.

There are many conflicting reports in literature concerning stability of plasma cholesterol level with or without ingestion of food. Boyd (1935) found only slight variation in an individual during 24 hours regardless of food intake. On the other hand, Page and Moinuddin (1962), Bruger and Somach (1932), Mc. Eachern and Glimor (1932) reported 10%, 8% and 40 mg/dL fluctuations in plasma cholesterol during 24 hours independent of food intake. Inter-individual variation was 3 times more than intra-individual variation.

Under homeostatic mechanism of plasma cholesterol, Battathiry and Siperstein (1963) and Fuzivara et al (1965) strongly suggested that cholesterogenesis in human is regulated through the feed-back mechanism mediated by Beta hydroxy Beta methyl glutaryl co-enzyme A reductase (H M G COA reductase). After 24 hours of cholesterol feeding neither the enzyme protein nor activity was detectable, indicating the enzyme synthesis was resuppressed. Nearly 50% of body cholesterol synthesis can be suppressed by dietary
cholesterol (Biss and Mikkelson, 1968). Later on Quintao et al, (1971) demonstrated the variable feedback mechanism in human and stressed particular response of an individual in determining the cholesterol content of plasma.

With a acute cholesterol/fat load variable amount (25%50%) of cholesterol is absorbed (Borgstrom, 1969; Quintao et al, 1971). It reaches the peak in blood within 24 - 36 hours and approximately 9.2 to 19.2% of orally administered tritium labeled cholesterol was demonstrated in circulating blood 2 days after feeding by Bigg's et al (1952). Yet we could not demonstrate either significant effect or any set pattern of plasma cholesterol change after cholesterol/fat ingestion.

Reason for above finding may be explained in term of intra and inter-individual fluctuations in plasma cholesterol and variable response (due to variable feedback mechanism and variable degree of absorption) which make difficult to demonstrate statistically significant effect of dietary cholesterol upon plasma cholesterol level. Above view corroborates to the judgement of Keys et al (1956). Particular response of an individual which is variable from person to person (Quintao et al, 1971), can only be observed with C\textsuperscript{14} labelled cholesterol study. Merely plasma cholesterol estimation after
test meal is not likely to help to find out the particular response of an individual due to physiological intra-individual variation.

In present study both healthy and diseased cases as well as subjects having normolipoproteinaemia or hyperlipoproteinaemia showed similar effect of dietary cholesterol upon plasma cholesterol.

**Plasma Triglyceride:**

There was significant rise in plasma triglyceride level after cholesterol/fat ingestion and peak is reached near about at 4 hours. It was followed by continuous decline at 8 hours and 3rd day. Plasma triglyceride level reached to fasting level within 3rd day of test meal. Our findings are in accordance with those of Olefsky et al (1976), Beaumont et al (1970), Castelli et al (1963), Havel (1957). Similar observations were reported by Angerwall (1964) and Van Eck et al (1952). Analysis of present study revealed that rise was more in diseased than healthy cases and in subjects having hyperlipoproteinaemia than normolipoproteinaemia. Higher rise in diseased cases than healthy cases may be attributed to high fasting plasma triglyceride level in diseased cases. Our findings are in favour of those of Olefsky et al (1976), Beaumont et al (1970) and Nestel (1964) who also observed that rise is directly related to fasting plasma triglyceride level.
Lipoproteins:

After test meal there was chylomicronaemia as revealed with the presence of creamy layer in post prandial sample at 4 hours, in all cases (healthy and diseased). Presence of creamy layer in few cases at 8 hours indicating that chylomicronaemia cleared rapidly. On paper electrophoresis, most of cases showed remarkable increase in density of pre-beta band (Pre-B) at 4 hours but majority revealed at 8 hours after test meal. The lipoprotein pattern at 3rd day and 5th day were similar to fasting pattern. There was no difference in density of beta (B) and alpha (α) band between fasting and post prandial plasma samples in any case. Interpretation of above observations clearly reflects that test meal was followed by chylomicronaemia, later on rise in very low density lipoprotein (Pre-B) and no change in low density lipoprotein (B) and high density lipoprotein (HDL band). Similar view was expressed by Olefsky et al (1976), Beaumont et al (1970), Redgrave and Carlson (1979) and Havel (1959). Above pattern of response was detected more in diseased than healthy cases and subjects having hyperlipoproteinaemia than normolipoproteinaemia.

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