# CHAPTER VII

# S U M M A R Y

## SUMMARY

The present studies on human subjects were conducted on 164 well controlled diabetics treated either by diet or oral drugs (such as tolbutamide, chlorpropamide, combination of phenformin and chlorpropamide and phenformin alone) with the duration of treatment being minimum one year and maximum five years. The findings of lipid profile and history of cardiovascular complications indicate the beneficial effect of diet treatment over the treatment with oral hypoglycaemic drugs.

Serum phospholipids were significantly higher than the normal group in case of phenformin group and the group taking combination of phenformin and chlorpropamide ($P < 0.05$ and $P < 0.005$ respectively). Serum triglycerides levels differed markedly in some of the groups. Freshly detected group, the tolbutamide group, the chlorpropamide group and the group taking combination of phenformin and chlorpropamide showed statistically significant difference when compared with the normal group ($P < 0.05$, $P < 0.01$, $P < 0.01$ and $P < 0.01$ respectively) whereas the diet controlled group and the phenformin group did not show any significant difference when

compared with the normal group. When compared with the diet controlled group, tolbutamide and chlorpropamide group showed significantly higher levels of serum triglycerides than the diet group ($P < 0.001$ and $P < 0.001$ respectively). The group taking combination of chlorpropamide and phenformin also showed higher levels of serum triglycerides than the diet controlled group ($P < 0.001$). When compared with tolbutamide group, phenformin group showed significantly lower levels of triglycerides ($P < 0.05$).

The chlorpropamide group and the combination group showed no significant difference when compared with tolbutamide group.

The freshly detected group and the tolbutamide treated patients showed significantly higher cholesterol as compared to the normal group ($P < 0.001$ and $P < 0.005$) whereas only tolbutamide group showed significantly higher serum cholesterol levels when compared with the diet controlled group ($P < 0.001$). The tolbutamide group also showed significantly higher cholesterol levels as compared to the phenformin group ($P < 0.001$).

The type II and the type IV lipoprotein patterns were found to be more common in diabetes as a whole.

Higher incidence of type II abnormality was found in the freshly detected, the tolbutamide group and the group receiving chlorpropamide and phenformin.

In the experimental study on rabbits, treated with insulin or tolbutamide with and without cholesterol, no significant change was found in blood sugar and serum proteins at the end of 3 months. The tolbutamide group showed significantly higher serum cholesterol levels at the end of experiment ($P < 0.005$) whereas insulin treated group showed significant decrease at the end of experiments ($P < 0.025$). Serum phospholipids increased in all groups except control group. Final levels of serum cholesterol were significantly higher in the group III (tolbutamide treated) than in the group II ($P < 0.001$) whereas in cholesterol fed groups, the insulin treated group showed higher cholesterol levels than the control i.e. group IV ($P < 0.005$) as well as the tolbutamide group ($P < 0.005$).

Final serum phospholipids levels were significantly higher in insulin treated and tolbutamide group than the control group ($P < 0.005$ and $P < 0.001$ respectively).

The tolbutamide group also showed significantly higher levels of serum phospholipids than the insulin group ($P < 0.001$).

In cholesterol fed animals the insulin group and the tolbutamide group had significantly higher levels as compared to controls ($P < 0.001$ and $P < 0.05$ respectively). The insulin group had significantly higher levels of phospholipids than the tolbutamide group ($P < 0.005$).

There was no significant change in the liver weights and liver total lipids in all the groups except in the insulin group which showed significantly higher liver weight and liver total lipids ($P < 0.05$ and $P < 0.025$). Free cholesterol in liver was significantly higher in the tolbutamide group than in the control group ($P < 0.025$). In cholesterol fed animals also the tolbutamide group showed higher free cholesterol in liver than the control group fed cholesterol ($P < 0.001$). There was no significant difference in liver total cholesterol, phospholipids and triglycerides in all the groups.

Total lipid and total cholesterol levels of aorta were significantly higher in the insulin group than in the control group ($P < 0.05$ and $P < 0.01$ respectively). Cholesterol fed group did not show any difference.

Enzyme study showed no difference in G-6-P-D, pyruvate kinase, citrate cleavage, SGOT and lactic dehydrogenase activity in the liver in any of the groups. Difference in malic enzyme activity was significant ($P < 0.01$) in case of the insulin as compared to the tolbutamide group. Insulin group showed higher activity of SGPT as compared to control group as well as tolbutamide group ($P < 0.01$ and $P < 0.005$ respectively). Cholesterol fed group did not show any difference.

Histopathological examination indicates slight fatty infiltration in liver and kidney of both drug treated groups. Lesions are suggestive of lipemic state. Amongst cholesterol fed groups the atherogenic effect of cholesterol was more pronounced with both insulin and tolbutamide as judged from the extent of area involved by the lesions. The atheromatous lesion shows lipid infiltration, hyalinisation ulceration and fibrin deposition. Lipemic changes in the liver and myocardium seem to be more marked in the tolbutamide groups whereas lesions in the aorta are of greater severity in the insulin treated group.

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