SUMMARY AND CONCLUSION

CHAPTER-V

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Glycoproteins are proteins that have oligosaccharide chains covalently attached to their polypeptide backbones. Almost all the plasma proteins of humans, except albumin, are glycoproteins. Glycoproteins have characteristic sugar components.

The term protein-bound carbohydrate and serum glycoproteins are equivalent. So the amount of protein -bound carbohydrate in serum is a direct measure of the serum glycoproteins.

The level of these glycoproteins is maintained within a narrow range in health, it is elevated in many pathological conditions.

In diabetes mellitus the defect is an absolute or relative lack of insulin or decreased response of tissues to it. This leads to abnormalities of metabolism. Since the glucose plays a central role in the formation of the

monosaccharide components of glycoproteins, the biosynthesis of these compounds is of particular interest in diabetes, since it would seem reasonable that significant alterations in glucose metabolism could be related in the synthesis of carbohydrate containing proteins. The precise nature of the protein-bound carbohydrate abnormality and its relation to diabetic complications and 'central' are still not clear. The present study is thus undertaken with the main emphasis on diabetes mellitus patients and in those patients who have developed cardiac, renal, hypertensive and neuromuscular complications.

Totally 180 subjects are studied, comprising of normal subjects and patients. The patients are divided into five groups. In all subjects the levels of protein-bound hexose, protein-bound sialic acid, protein-bound fucose, protein-bound hexosamine and fasting blood sugar are studied.

The methods used for all these estimations are standard, reproducible methods feasible in our laboratory.

In diabetic patients, the levels of blood sugar and protein-bound hexose are significantly higher as compared to the normal subjects. The protein-bound sialic acid level, though lower than that in normal subjects. shows no significant difference. The levels of protein-bound fucose and protein-bound hexosamine are found to be significantly elevated as compared with the normal subjects.

In diabetic patients with cardiac complications the blood sugar level is found to be significantly higher as compared to the normal subject. The protein-bound hexose and protein-bound sialic acid levels did not show any significant difference. The levels of protein-bound fucose and protein-bound hexosamines are significantly elevated.

In diabetic patients with renal complications, the blood sugar level is significantly raised. The protein-bound hexose and protein-bound sialic acid levels did not show any significant differences. The levels of protein-bound fucose and protein-bound hexosamine are significantly elevated.

In diabetic patients with hypertension, the blood sugar level is significantly higher. The protein-bound hexose and protein-bound sialic acid levels

though higher than in normal subjects, are statistically insignificant. The protein-bound fucose and protein-bound hexosamine levels are significantly higher as compared to the normal subjects.

In diabetic patients with neuromuscular disorders, the blood sugar levels are significantly higher. The protein-bound hexose levels are statistically insignificant. The levels of protein-bound sialic acid, protein-bound fucose and protein-bound hexosamine are significantly elevated.

The total protein-bound carbohydrate levels in all diabetic patients and in all patients with different complications are elevated.

From the present study, it is observed that as the glycemic level is brought under control the levels of protein-bound hexose decreases. In all patients with diabetes and with cardiac, renal and hypertension complications, the protein-bound sialic acid is either low or it overlaps with that in the normal subjects. But the level of protein-bound sialic acid is significantly raised in neuromuscular complication patients.

The protein-bound fucose level is significantly raised in all the diabetics and in all patients with different complications studied.

Other important observation is the significant high level of protein-bound hexosamines, observed in all the diabetics and in all diabetics with various complications, studied.

In conclusion, it can be stated that as the glycemic level is controlled the protein-bound hexose level decreases, indicating short term changes in glycoproteins.

The low levels or insignificant levels of protein-bound sialic acid is attributed to the change in activity of neuraminidase. Since the sialic acids, in membranes act as cellular markers, it probably affects the insulin action at membrane receptor level and result into the derangement of metabolic processes. This finally may lead to various complications.

The generalized increase in protein-bound hexosamine level suggests a possible route in utilization of excess glucose.