



PT AND aPTT PARAMETERS IN DIABETES MELLITUS PATIENTS

Haematology

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ABSTRACT

Background: Diabetes mellitus is a metabolic disorder characterised by hyperglycemia accompanied with the biochemical alterations in carbohydrate, protein and lipid metabolism. Epidemiological data suggest that number of diabetics are increasing rapidly in India and worldwide. Recently, 62 million Indian people are diabetics and it is predicted that number will reach up to 79.4 million by year 2030. Procoagulant state is seen in these individuals due to abnormalities in several plasma proteins in blood coagulation. So that these patients are at increased risk of thrombotic events. PT and aPTT is used to assess coagulation system. The purpose of the study was to incorporate coagulation screening as a routine investigation for better management of diabetic patients. **Aims and Objectives:** To investigate changes in PT and aPTT in diabetics. To incorporate coagulation screening as a routine investigations for better management of diabetic patients. **Methodology:** The present study was comparative cross sectional study. Total 100 participants were selected based on inclusion and exclusion criteria. Out of them 50 are diabetics and 50 are nondiabetics. Detailed history was taken. Participants undergone routine general physical examination. After overnight fasting investigation for fasting, postprandial blood glucose and HbA1c, PT, aPTT were done. **Results:** Mean Fasting Blood glucose level in diabetics and nondiabetics was 199.62mg/dl and 88.22mg/dl, Mean PT level in diabetics and nondiabetics was 13.2s and 14.52s, Mean aPTT level in diabetics and nondiabetics was 26.67s and 29.9s respectively. **Statistical Analysis:** P value of FBS was <0.0001 that was significant. P value of PT and aPTT was <0.0001 that was significant. **Conclusion:** The present study observed a significant association between diabetes mellitus and coagulation parameters. So that coagulation parameters should be closely monitored to prevent various complications such as atherosclerosis, stroke.

KEYWORDS

Diabetes Mellitus ,Glycosylated Haemoglobin ,PT, aPTT

INTRODUCTION

Epidemiological data suggest that number of diabetics are increasing rapidly in india and worldwide.¹⁻⁴ Recently, 62 million indian people are diabetics and it is predicted that number will reach up to 79.4 million by year 2030.¹⁻⁴ Diabetes mellitus is a metabolic disorder characterised by hyperglycemia accompanied with the biochemical alterations in carbohydrate, protein and lipid metabolism.⁵ Type ii diabetes mellitus is due to destruction of Beta - cell which can leads to decreased insulin secretion.⁶ Procoagulant state is seen in these individuals due to abnormalities in several plasma proteins in blood coagulation.^{7,8} Clotting factors are elevated and decreased level of protein C and protein S suggesting coagulation abnormality observed in DM.⁹ So that these patients are at increased risk of thrombotic events. Hypercoagulability state is responsible for atherosclerosis and cardiovascular complications in diabetes mellitus.¹⁰ PT and aPTT were used to assess coagulation system. PT is the marker of extrinsic pathway activation and aPTT is the marker of intrinsic pathway activation.¹¹

Aims and Objectives

- To investigate changes in PT and aPTT in diabetics.
- To incorporate coagulation screening as a routine investigations for better management of diabetic patients.

MATERIALS AND METHODS

This comparative cross sectional study was conducted at civil hospital, ahmedabad. Total 100 subjects who had age group of 30 -60 years were selected based on inclusion and exclusion criteria. Out of them 50 were diabetics and 50 were nondiabetics.

Inclusion Criteria

- Subject who had diagnosis of diabetes mellitus
- Subject who had symptoms of diabetes mellitus
- Non hypertensive healthy, non diabetic subjects

Exclusion Criteria

- Subjects on warfarin or heparin therapy
- Subjects with history of liver dysfunction
- Subjects with personal history of alcohol addiction or cigarette smoking
- Hypertensive subjects
- Subjects on anticoagulant therapy
- Subjects with inherited coagulation disorder

- Pregnant female

Procedure

Prior informed consent was taken from all subjects. Detailed history regarding duration and treatment of diabetes mellitus was taken. On day of examination after overnight fasting investigation for fasting, postprandial blood glucose and HbA1c, PT, aPTT were done. Participants undergone routine general physical examination.

RESULTS

Mean fasting blood glucose in diabetics was 199.62 mg/dl and in nondiabetics was 88.22 mg/dl.

Subjects	N	FBS(mg/dl)
Diabetics	50	199.62
Non diabetics	50	88.22

Subjects	N	Mean PT	SD	T-test	P value
Diabetics	50	13.2	1.004	6.493	<0.00001s
Non diabetics	50	14.51	1.022		

Subjects	N	Mean aPTT	SD	T -test	P value
Diabetics	50	26.67	3.675	5.917	<0.00001s
Non diabetics	50	29.82	0.846		

Mean prothrombin level in diabetics was 13.2s and in non diabetics was 14.51s and there was significant difference in prothrombin time among diabetics and non diabetics. Here, prothrombin time was reduced in diabetics as compared to non diabetics.

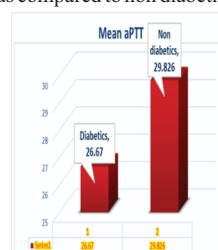


Figure : Mean aPTT in Diabetics and Non-diabetics

Mean aPTT level in diabetics was 26.67s and in non diabetics was 29.82s and there was significant difference in activated partial thromboplastin time among diabetics and non diabetics. Here, aPTT was reduced in diabetics as compared to non diabetics.

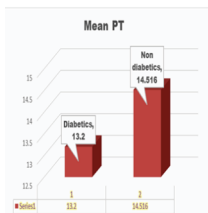


Figure : Mean PT in Diabetics and Non-diabetics

DISCUSSION

In this study, Mean PT and aPTT in diabetics was 13.2s and 26.67s respectively where as Mean PT and aPTT in non diabetics was 14.51s and 29.82s respectively. So, here aPTT was 29.82s respectively. So, here aPTT was more shortened than PT in diabetics as compared with non diabetics. Because high glucose level for longer time leads to glycation of cellular protein which affects their functioning property of clotting mechanism.¹² Study conducted by Fayeza et al¹³ and Sunita Dhule et al⁹ concluded that PT was shortened in diabetics that was also seen in our study. Study conducted by Acang and Jalil¹⁴ concluded that there was decreased aPTT in diabetics that was also seen in our study.

CONCLUSION

The present study observed a significant association between diabetes mellitus and coagulation parameters. So that coagulation parameters should be closely monitored to prevent various complications such as atherosclerosis, stroke.

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REFERENCES

- Joshi SR, Parikh RM. India - Diabetes capital of the world: Now heading towards hypertension. *J Assoc Physicians India*. 2007;55:323-4.
- Kumar A, Goel MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control: Key issues. *Australas Med J*. 2013;6(10):524-31.
- Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care*. 2004;27(5):1047-53.
- Whiting DR, Guariguata L, Weil C, Shaw J. IDF diabetes atlas: Global estimates of the prevalence of diabetes for 2011 and 2030. *Diabetes Res Clin Pract*. 2011;94(3):311-21.
- Jabeen F, Rizvi HA, Aziz F, Wasti AZ. Hyperglycemic induced variations in Hematological Indices in Type 2 Diabetics. *Int J Adv Res*. 2013;1:322-34.
- American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2014;37(S1):S81-90.
- Carmassi F, Morale M, Puccetti R, De Negri F, Monzani F, Navakesi R. Coagulation and fibrinolytic system impairment in insulin dependent diabetes mellitus. *Thromb Res*. 1992;67:643-54.
- Madan R, Gupta B, Saluja S, Kansra UC, Tripathi BK, Guliani BP. Coagulation Profile in Diabetes and its Association with Diabetic Microvascular Complications. *JAPI*.
- Dhule S, Gawali S. Platelet aggregation and clotting time in type 2 diabetic male. *Nat J Physiol. Pharm Pharmacol*. 2014;4:96-8.
- Carr ME. Diabetes mellitus: a hypercoagulable state. *J Diabetes Complications*. 2001;15(1):44-54.
- Demirtune R, Duman D, Basar M, Teomete M, Garip T. The relationship between glycemic control and platelet activity in type 2 diabetes mellitus. *J Diabetes Complications*. 2009;23:89-94.
- Selvin E, Steffes MW, Zhu H, et al. Glycated hemoglobin, diabetes, and cardiovascular risk in nondiabetic adults. *Eng J Med*. 2010;362:800-11.
- Karim F, Akter Q, A, Jahan S, Khanom A, Haque S, Yeasmin T, Siddika T, Sinha S. *J Bangladesh Soc Physiol*. 2015;10:26-9.
- Acang N, Jalil FD. Hypercoagulation in diabetes mellitus. *South-east Asian J Trop Med Public Health*. 1993;24:263-6.