

Newly Diagnosed Diabetes Mellitus in Patients with Dengue Fever Admitted in Teaching Hospital of Lahore

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ABSTRACT

Aim: To see the occurrence of diabetes mellitus among diagnosed patients of dengue fever.

Study design: Observational study

Place & duration of study: Department of Medicine Ghurki trust teaching hospital, Lahore from 15th Oct 2012 to 14th Nov 2012.

Methods: Analysis included data of 100 patients. All patients included in the study were suffering from fever, had Igm antibody against dengue and platelet count of less than 100. Patients having Igm antibody negative or platelet count greater than 100 were excluded from the study. All patients were checked for fasting blood glucose levels and those previously diagnosed with diabetes mellitus were also excluded from the study. Chi square test was applied and p value < 0.05 was accepted as significant

Results: A total of 100 patients were included in the study. Age of the patients, ranged from 15 Years to 85 years with a mean of 34.5±14.5. Haemoglobin range was 4.8 to 20.9, mean 14.5±2.27, PCV range was 15 to 53, mean 40.2±4.66. Platelets were from 8 to 238, mean 39.75±3.28. 67% of patients were normglycemic while 33% had diabetes mellitus.

Conclusion: There is significant association between Dengue fever and Diabetes Mellitus. It is mainly seen in middle to elderly patients with Dengue.

Keywords: Diabetes mellitus, dengue fever, hyperglycemia

INTRODUCTION

Dengue fever is the most common mosquito borne viral disease in the world. It is an illness caused by infection with a virus transmitted by the Aedes mosquito. There are four serotypes of this virus, Den1, Den 2, Den 3 and Den 4, that can infect humans. Infection with one type gives lifelong immunity to that type, but only short term immunity to the other. Subsequent infection with a different type^{1,2} increases the risk of severe complications. The initial reaction of infected cell is to produce interferon, a cytokine that raises a number of defenses against viral infection through the innate immune system.

Some serotypes of dengue virus appear to have mechanism, to slow down this process¹. The aim of this study was to determine the relationship between co-morbid conditions, like diabetes mellitus in individuals suffering from dengue fever. It has been suggested that some pre existing chronic diseases such as diabetes increases the risk of progression to severe form of dengue^{3,4}.

Current knowledge about the pathophysiology of dengue fever suggests amplification of the immune

response due to the presence of heterotypic antibodies against a serotype of dengue virus at the time of new infection^{5,3}. The inflammation hypothesis is consistent also with the increased risk with diabetes. Type 2 diabetes, a metabolic disorder of adults that reduces the use of glucose by the organism, changes the anatomical and physiological integrity of the endothelium due to a permanent inflammatory condition caused by activation of T-lymphocytes. This process leads to release of pro-inflammatory cytokine such as gamma interferon (IFN) and TNF. These cytokines are known to have a fundamental role in one of the main phenomena for complicated dengue fever, the third space fluid shift which is a consequence of endothelial dysfunction and results in haemoconcentration, hypotension and shock. It would appear that triggering endothelial dysfunction may be the biological mechanism by which diabetes increases the severity of dengue fever, by increasing the intrinsic permeability of the endothelial surface of the host who has been previously infected by another serotype, permitting the occurrence of fluid shift.

This study describes the finding of newly diagnosed Type 2 diabetes mellitus in patients who were diagnosed with dengue fever.

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METHODS

Chi-Square test was applied to the data of 100 patients. P –value <0.05 was considered significant.

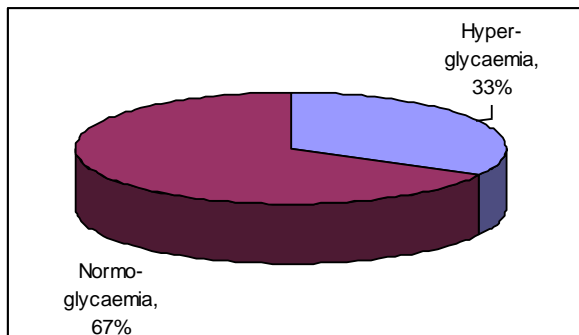
RESULTS

A total of 100 patients were included in the study. Age of the patients ranged from 15 years to 85 years with a mean of 34.5±14. Haemoglobin range was 4.8 to 20.9 mean 14.5±2.27, PCV range was 15 to 53., mean 40.2±4.66 and platelets were from 8 to 238 with mean of 39.75±3.28. 67% of patients were normoglycemic, while 33% had hyperglycemia. Among the age group 15-30 years, 0(0%) had hyperglycemia, while 49(100%) were normoglycemic. From 31-45 years, 13(48%) had hyperglycemia while 14(52%) had normoglycemia, 46-60 years 17(81%) had hyperglycemia while 4(19%) had normoglycemia and those >61 years, all included, 3(100%) had hyperglycemia while none had normoglycemia. P-value was 0.00, that is statistically significant. Among the gender, 22(30%) of the males were hyperglycemic while 51(70%) were normoglycemic and 11(41%) females had hyperglycemia while 16(59%) were normoglycemic. P value was 317, that is not statistically significant.

Table 2: Pts glycaemic status according to age and gender

Variables	Hyperglycaemia	Normoglycaemia
Age group (P=0.00)		
15-30	0(0%)	49(100%)
31-45	13(48%)	14(52%)
46-60	17(81%)	4(19%)
> 61	3(100%)	0(0%)
Gender (P= 317)		
Male	22(30%)	51(70%)
Female	11(41%)	16(59%)

Fig. 1: Frequency of hyperglycemia among dengue patients



DISCUSSION

Dengue virus presently threatens half of the world population and is a major public health problem in many tropical countries of the world. In Pakistan, first

dengue outbreak was reported in Karachi, during 1994 and sporadic cases occurred in coming years. Economic and security related migration, 2004 onwards introduced the virus in Lahore.

Type 2 diabetes mellitus is a growing epidemic in South Asia with a higher prevalence. As compared to other ethnicities around the world Pakistan was ranked amongst top 10 countries of the world with the highest number of people with diabetes in 2004 and estimated 14.5 million Pakistani will have diabetes by the year 2025.

Co-presentation between dengue and diabetes can be expected. The author hereby assesses the effect of glycosylation process in poor glycaemic control cases on the course of dengue infection⁶. During the dengue haemorrhagic fever epidemic in Cuba in 1981, some individual risk factors for the development of the severe picture or the fatal outcome of the disease were identified. The presence of chronic disease such as diabetes mellitus was additional risk factor contributing to the development of dengue haemorrhagic fever⁷. Among 133 studied dengue patients 28(21.1%) had diabetes while 72(54.1%) had impaired glucose tolerance. The study demonstrated that glucose intolerance is frequently associated with dengue fever in its early course. These findings may warrant for avoidance of dextrose infusions as fluid replacement in dengue fever⁸. Co-morbidities like diabetes with dengue infection were seen in 60% deceased cases indicating the reasons for high dengue related complications and death⁹. A study from Singapore reported that out of every 27 deaths due to dengue, 21 had a co-morbid illness¹⁰. Another study reported that dengue patients with diabetes are 2.5 times more at risk of developing Dengue Haemorrhagic Fever¹¹. Similarly a study published in Journal of Infection Public Health, in 2014 showed that mortality in dengue was higher in those patients with co-morbid diseases such as diabetes¹². All the studies mentioned, showed a link between dengue fever and diabetes, while some also showed that the prognosis worsened when patients with dengue developed diabetes. Our study also showed the association between dengue and diabetes, in addition to the increased incidence of diabetes among middle to elderly patients with dengue.

Recommendation: We recommend further clinical studies to define new protocols on the evolution of dengue infections in patients with diabetes and appropriate medical management.

CONCLUSION

A significant association between Dengue fever and Diabetes was found. Cross immunological and

pathophysiological studies based on the association between diabetes and dengue fever are urgently needed to investigate the intricate mechanism controlling severe forms of dengue.

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