



PROGNOSTIC SIGNIFICANCE OF DIABETES IN DENGUE FEVER WITH POLYSEROSITIS

Sumesh Raj¹, Manojan .K.K², Rajan G. V³

¹Dip Diabetology, Professor Of Internal Medicine, Sree Gokulam Medical College, Trivandrum, India

² Professor Of Internal Medicine, Sree Gokulam Medical College, Trivandrum, India

³ Former Professor Of Internal Medicine, Govt. Medical College, Trivandrum, India

Corresponding Author: Prof. Sumesh Raj, Remya, Pazhaya Road, Medical College Po, Trivandrum, Kerala, India,
Email- drsumeshraj@yahoo.com

ABSTRACT

Background: Diabetes mellitus is well known to exacerbate infections both bacterial and viral but its effect on the severity of viral infection has not been well studied. Presence of polyserositis is an indicator of the severity of dengue virus infection. This study investigates the prognostic significance of diabetes in dengue fever with polyserositis.

Methods: The study was conducted among 161 Dengue fever patients with polyserositis over a period of 12 months as a case control study. Non diabetic patients having dengue fever with polyserositis were taken as controls. We studied the impact of hyperglycaemia on the prognosis of these patients.

Results: 49 percent of patients with diabetes had fasting plasma glucose greater than 200mg %. 42 % of diabetic patients had elevated HbA1C. 18.4% patients with uncontrolled diabetes developed dengue shock syndrome when compared to 8.2% of controls. The mortality rate was 3.42% in diabetic patients with polyserositis who developed Dengue shock syndrome when compared to 1.27% in controls.

Conclusion : Presence of hyperglycemia in diabetic dengue patients with polyserositis is associated with a poorer outcome independent of the severity of other complications like thrombocytopenia.

Keywords: polyserositis, diabetes, dengue

INTRODUCTION

Diabetes mellitus is well known to increase a person's susceptibility to infection. It has been found to have detrimental effects on the immune system, including decreased chemotaxis, leukocyte adherence, and phagocytosis¹. Individuals with diabetes tend to have higher morbidity and mortality from both bacterial and viral infections. Identification of comorbidities like diabetes associated with a severe presentation of dengue is of high relevance, because timely treatment is the most important intervention to avert complications and death².

Dengue virus, a mosquito-borne human viral pathogen, has been an important public health problem in tropical and subtropical countries³. The severity of dengue infection ranges from nonspecific, self-limiting dengue fever to life-threatening dengue hemorrhagic fever and dengue shock syndrome. Thrombocytopenia is one of the most important clinical features in dengue disease. Polyserositis and transaminitis are other important but less common manifestations of the disease⁵.

For the past decade, Kerala, the southern most state of India has witnessed a seasonal increase in dengue outbreaks. Apart from thrombocytopenia, polyserositis is increasingly seen in severe dengue infections. both ascites and pleural effusion are being much commonly demonstrated in severe dengue fevers needing hospital admission.

In this retrospective study, we analyzed clinical data from dengue-infected patients to investigate potential link between diabetes and the severity of thrombocytopenia.

MATERIALS AND METHODS

The study was conducted among 161 Dengue fever patients with polyserositis who were admitted in internal medicine department of various hospitals in South Kerala. 74 of these patients had diabetes and the rest were non diabetic. The study was conducted over a period of 12 months from June 2015 to May 2016. The study was conducted as a case control study. Non diabetic patients having dengue fever with polyserositis were taken as controls.

We studied the impact of hyperglycaemia on the prognosis of these patients.

The following data was collected for each patient: age, sex, history of diabetes and its duration, presence of other comorbidities, height and weight and blood pressure. The patients were investigated for fasting blood sugar, HbA1C, blood cell count, hematocrit, platelet count, renal and liver function tests, dengue NS1 antigen or IgM Dengue. X ray chest and ultrasonography of abdomen was done to detect the presence of pleural effusion and ascites respectively as part of polyserositis. Daily measurements of platelet count and hematocrit were made.

Dengue shock syndrome was diagnosed if the patient presented hypotension or narrowing of the pulse pressure to less than 20 mmHg with clinical signs of shock. Hypotension was defined as systolic blood pressure below 80 mmHg.

RESULTS

A total of 161 patients diagnosed with dengue fever with polyserositis were studied. 74 of these patients had type 2 diabetes mellitus. The mean duration of diabetes was 10.6 ± 6.4 years. 49 percent of patients with diabetes had fasting plasma glucose greater than 200mg %. 42 % of diabetic patients had elevated HbA1C. 18.4% patients with uncontrolled diabetes developed dengue shock syndrome when compared to 8.2% of controls. This was considered statistically significant ($p < 0.02$). The mortality rate was 3.42% in diabetic patients with polyserositis who developed Dengue shock syndrome when compared to 1.27% in controls.

DISCUSSION

In patients with diabetes, more severe forms of dengue fever are seen. Uncontrolled diabetes can increase the mortality and morbidity caused by serious infections, lowering the host's defense mechanisms by impairing phagocytosis and intracellular killing of microorganisms¹¹.

The pathophysiology behind diabetes leading to a worse outcome is not well understood. Numerous studies have suggested that diabetes mellitus can result in immune and endothelial dysfunction¹².

Pang et al. have also shown that diabetes with hypertension increased the risk of Dengue haemorrhagic fever⁶.

A hospital-based study in South India on patients admitted for acute dengue infection between 2005 and 2008 showed information on co-morbidities⁴. The prevalence of DM in controls was 2.5% compared to 40% in cases. DM was a strong predictor of mortality in bivariate analysis in this study. The limitations of this study as also the studies quoted here, include the fact that the modifying effect of Diabetes on different dengue serotypes could not be differentiated^{9,10}.

The third space fluid shift leading to pleural/pericardial effusion or ascites, manifesting as polyserositis is an important clinical manifestation in dengue with severe clinical symptoms, which is a consequence of endothelial dysfunction resulting in hemoconcentration, hypotension and shock^{7,8}.

In the present study, patients with diabetes had a higher proportion of DSS and significantly lower platelet counts, suggesting that diabetes may predispose them to a more severe dengue infection especially in the presence of polyserositis. Elevated fasting plasma glucose as well as HbA1C was associated with an increased incidence of dengue shock syndrome and graver prognosis.

CONCLUSION

Presence of hyperglycemia in diabetic dengue patients with polyserositis is associated with a poorer outcome independent of the severity of other complications like thrombocytopenia.

The increasing global prevalence of both dengue and diabetes affirms the need for further studies in this direction. Confirmation of dengue infection and detecting its complications as early as possible in diabetes patients is the need of the hour. The presence of hyperglycemia in diabetic patients with dengue warrants closer observation for glycemic control to diminish the risk for a severe clinical presentation of dengue.

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