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THE PREVALENCE RATE OF CARDIAC INCIDENTS AMONG THE PATIENTS ADMITTED WITH DENGUE FEVER AT LAHORE GENERAL HOSPITAL, PAKISTAN

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ABSTRACT

Background: As dengue fever continues to afflict millions worldwide, emerging evidence suggests a worrying link between this tropical disease and cardiac incidents

Objective: To determine the frequency of various cardiac events in patients admitted with dengue fever at Lahore General Hospital, Pakistan.

Materials and Methods: The dengue virus infection was serologically confirmed using the NS1 viral antigen detection method. Prior to being assigned to a sample or having their data used in a study, every patient gave their informed consent. When the patient was admitted or discharged, the researcher documented the ECG and echocardiographic examination in addition to taking the patient's history and confirming the existence of risk factors including diabetes and hypertension.

Results: The electrocardiographic evaluation showed that 91 patients (58%) had normal ECGs, 04 patients (2.52%) had broad QRS complexes, 09 patients (5.73%) had diffuse T-wave inversions, 02 patients (1.27%) had low-voltage QRS complexes, and 12 patients (7.64%) had non-specific ST segment changes. In addition, 09 patients (5.73%), 24 patients (15.28%), and 06 patients (3.82%) had sinus bradycardia documented. After an echocardiographic evaluation, all 157 patients (100%) had normal left ventricular ejection fraction, 5 patients (3.18%) had diastolic dysfunction in the left ventricle, and only 4 patients (2.55%) developed pericardial effusion. Neither patient had global hypokinesia nor any new valvular lesions.

Conclusion: It has been noted that dengue fever frequently results in cardiac involvement of any severity. In order to provide effective and timely care, all patients who arrive at the hospital with a dengue virus infection must be examined for any potential cardiac involvement.

Keywords: Cardiac incidents, Dengue fever, Dengue patients

Introduction

Dengue fever, a mosquito-borne viral illness, has been increasingly recognized as a potential trigger for cardiac complications (Wichmann et al., 2011). Studies have reported a significant association

between dengue infection and cardiac manifestations, including myocarditis, pericarditis, and arrhythmias (Lee et al., 2018). However, the prevalence of cardiac incidents among dengue patients in Pakistan remains poorly understood.

According to a systematic review of 22 studies, cardiac complications occur in approximately 10% of dengue patients, with a higher risk among older adults and those with underlying cardiovascular disease (Martínez-González et al., 2020). A study conducted in India found that 15% of dengue patients developed cardiac complications, including left ventricular dysfunction and atrial fibrillation (Kumar et al., 2019). However, there is a scarcity of research on the cardiac manifestations of dengue fever in Pakistani populations.

Lahore General Hospital, a tertiary care hospital in Pakistan, receives a high volume of dengue patients, especially during peak transmission seasons (Javed et al., 2019). A previous study conducted at this hospital reported a high incidence of dengue fever among patients presenting with acute febrile illness (Shah et al., 2018). However, there is a lack of research on the cardiac complications of dengue fever in this population.

This study aims to investigate the prevalence rate of cardiac incidents among patients admitted with dengue fever at Lahore General Hospital, Pakistan. By exploring the relationship between dengue infection and cardiac complications, this research endeavors to contribute to the existing body of knowledge, ultimately guiding evidence-based practices and policies to mitigate the cardiac burden of dengue fever in Pakistan and similar healthcare settings worldwide (WHO, 2019).

Materials and Methods

On 157 dengue fever patients with serological confirmation, just one center prospectively study of observation was carried out, admitted in General hospital, Lahore between February to November 2023. NS1 viral antigen detection method was used for serologic confirmation of dengue virus infection. Patients with any prior cardiac, pulmonary or thyroid disease, active malignancy, age <18 years and >60 years and use of medications like beta agonists, beta blockers, Calcium channel blockers, digoxin and theophylline or its derivatives were excluded from the study.

Patients from the Department of Cardiology at General Hospital, Lahore who presented with Dengue fever and met the inclusion criteria were included in the research. Prior to conducting the research, approval from an institutional ethical review committee was sought. All patients gave their informed permission before being assigned to a sample or having their data used in research. Brief history of demographic data (age and residence status) was taken. The researchers took the history and confirmed the presence of risk factors like hypertension and diabetes and along with that ECG and echocardiographic evaluation of all the patients at the time of admission and discharge were recorded. With “SPSS Version 25”, data analysis was carried out. Age's average and standard deviation were computed while frequency for categorical variables such as gender, diabetes and hypertension.

Results

After screening 325 people who showed clinical indications of dengue fever, 168 people were ruled out of the study, leaving only 157 patients who had an infection with the dengue virus. 89 (56.69%) of the 157 patients who were chosen were men, and 68 (43.31%) were women. Twelve patients (7.64%) had hypertension, whereas eight individuals (5.09%) had diabetes. The study population's mean age was 48.48 ± 6.9 years, as shown in Table 1.

Table 1: showing different demographic variables

Variables	Total (n=325)
Mean Age (years)	**48.48 ± 6.9**
Male	**89(56.69%)**
Female	**68 (43.31%)**
Hypertension	**12 (7.64%)**
Diabetes	**08(5.09%)**

The results of the electrocardiographic assessment showed that 91 patients (58%) had normal ECGs, 04 patients (2.52%) had broad QRS complexes, 09 patients (5.73%) had diffuse T-wave inversions, 02 patients (1.27%) had low-voltage QRS complexes, and 12 patients (7.64%) had non-specific ST segment changes. Nine patients (5.73%), 24 patients (15.28%) had sinus tachycardia, and six patients (3.82%) had atrial fibrillation [Table 2].

Table 2: showing various ECG patterns in dengue patients

ECG Findings	Number of Patients (n=157)	Percentage (%)
Normal Electrocardiogram	91	58
Broad 'QRS' Complex	04	2.52
Diffuse 'T' Wave Inversion	09	5.73
Low Voltage 'QRS' Complex	02	1.27
Non-Specific 'ST' Segment Changes	12	7.64
Sinus Bradycardia	09	5.73
Sinus Tachycardia	24	15.28
Atrial fibrillation	06	3.82

Upon echocardiographic evaluation, 157 patients (100%) had normal left ventricular ejection fraction, 05 patients (3.18%) had diastolic dysfunction in the left ventricle, and only 04 patients (2.55%) developed pericardial effusion. Global hypokinesia and new valvular lesions were not present in either patient [Table 3].

Table 3: showing the distribution of various echo findings in dengue patients

Distribution of ECHO Findings	No. of Patients (n=157)	Percentage %
Diastolic Dysfunction	5	3.18
Global Hypokinesia	0	0.0
LVEF % (Normal)	157	99.9
Pericardial Effusion	4	2.55
New valvular lesions	0	0.0

Discussion

The present study examined the demographics and comorbidities of 157 patients infected with the dengue virus. Consistent with previous research (Guha-Sapir & Schimmer, 2015), our findings indicate a higher proportion of male patients (56.69%) than female patients (43.31%). This gender disparity may be attributed to various factors, including occupational and recreational activities that increase exposure to mosquito vectors (Eisen & Lozano-Fuentes, 2009).

Regarding comorbidities, our study revealed that 7.64% of patients had hypertension, which is comparable to the prevalence reported in a study conducted in Brazil (dos Santos et al., 2017). Additionally, 5.09% of patients had diabetes, which is lower than the prevalence reported in a study conducted in Malaysia (Ong et al., 2017). These findings highlight the importance of considering the presence of comorbidities in dengue patients, as they may impact disease severity and treatment outcomes (Martinez et al., 2018).

The electrocardiographic (ECG) assessment of 157 patients with dengue virus infection revealed a range of findings, with 91 patients (58%) exhibiting normal ECGs. This is consistent with previous research that suggests dengue fever typically does not affect the cardiovascular system (Wong et al., 2017). However, the presence of abnormal ECG findings in 66 patients (42%) warrants attention.

The occurrence of broad QRS complexes in 4 patients (2.52%) and diffuse T-wave inversions in 9 patients (5.73%) may indicate cardiac involvement, which is a rare but potentially life-threatening complication of dengue fever (Kularatne et al., 2013). The presence of low-voltage QRS complexes

in 2 patients (1.27%) and non-specific ST segment changes in 12 patients (7.64%) may also suggest cardiac dysfunction (Martinez et al., 2018).

Regarding rhythm disturbances, sinus tachycardia was observed in 24 patients (15.28%), which is consistent with previous research that suggests dengue fever can cause sympathetic nervous system activation (Lopez-Vega et al., 2018). Atrial fibrillation was noted in 6 patients (3.82%), which is a rare finding in dengue fever patients (Gupta et al., 2017).

These findings highlight the importance of ECG assessment in dengue patients, particularly those with severe or prolonged illness. Further research is needed to elucidate the mechanisms underlying cardiac involvement in dengue fever and to inform management strategies for affected patients.

The echocardiographic evaluation of 157 patients with dengue virus infection revealed a predominantly normal cardiac profile, with all patients (100%) exhibiting normal left ventricular ejection fraction (LVEF). This finding is consistent with previous research that suggests dengue fever typically does not affect systolic function (Wong et al., 2017).

However, the presence of diastolic dysfunction in the left ventricle in 5 patients (3.18%) warrants attention. Diastolic dysfunction has been reported in previous studies as a subtle cardiac manifestation of dengue fever (Kumar et al., 2018). This finding may indicate subclinical cardiac involvement and highlights the importance of echocardiographic evaluation in dengue patients.

Pericardial effusion, a rare but potentially life-threatening complication of dengue fever, was observed in only 4 patients (2.55%). This finding is consistent with previous research that suggests pericardial effusion is a rare cardiac manifestation of dengue fever (Gupta et al., 2017).

These findings suggest that cardiac involvement in dengue fever is relatively rare and typically mild. However, the presence of diastolic dysfunction and pericardial effusion in a small proportion of patients highlights the importance of cardiac evaluation in severe or prolonged dengue illness. Further research is needed to elucidate the mechanisms underlying cardiac involvement in dengue fever and to inform management strategies for affected patients.

Conclusion

It has been noted that dengue fever frequently results in cardiac involvement of any severity. In order to provide effective and timely care, patients with dengue virus infections who visit hospitals should be checked for any potential cardiac involvement.

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