



Original Article

A Correlative Study of Dengue Fever and Cardiac Enzymes

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Introduction

Dengue is mosquito-borne viral infection caused by Flavivirus and transmitted by vector Aedes Aegypti. It is acute, infectious and self-limiting illness which has variable clinical manifestations ranging from asymptomatic to shock or death. The involvement of heart in dengue fever is not uncommon and usually it is transient, self-limiting and benign in nature. The exact mechanisms of involvement of heart not clear, although it is thought that there are several mechanisms such as direct viral invasion or immune mediated response through activation of complement system, ischemia, lactic acidosis may role in pathogenesis of viral myocarditis and cardiac dysfunction. Various studies have been documented that dengue fever can lead to elevation of Cardiac markers.

Aim and Objectives

1. To study the correlation between Dengue fever and its effect on Cardiac function through Cardiac Markers changes.
2. To find conclusive evidence of correlation between cardiac markers and dengue associated cardiac dysfunction.

Materials and Methods

The study was a prospective observational study conducted at MGM Medical College and Hospital, Navi Mumbai.

100 patients fulfilling the inclusion and exclusion criteria were enrolled in the study.

The study was conducted in November 2015 to November 2017 for a period of 3 years.

Inclusion Criteria

- 1) Patient age 16 to 60.
- 2) Patient must be Dengue IgM or NS1 or both positive
- 3) Negative for Malarial Parasite on Peripheral smear or Rapid Antigen Test

Exclusion Criteria

- 1) All patients with pre-existing cardiac disease
- 2) Patients with co-infection of malaria or leptospirosis
- 3) All patients on beta-blockers, Digoxin, Amiodarone, Anti-Neoplastic Drugs or similar drugs known to alter cardiac function.
- 4) Patients with other systemic diseases like Anemia, CKD or Sepsis.

Materials

Study Design: Prospective observational study

Study Population: Patients admitted in MGM Hospital & OPD patients with diagnosis of Dengue.

Duration: The study will be performed for a period of 3 years from November 2015 to November 2017.

Setting: Department of Medicine, MGM Medical College Hospital, Kamothe.

Methods

Patients admitted in our hospital with diagnosed Dengue will be enrolled.

Dengue

Table 1A: Dengue serotype distribution

| | Reactive | | NR | | Total | |
|------|----------|---------|-------|---------|-------|---------|
| | Count | Row N % | Count | Row N % | Count | Row N % |
| NS1 | 83 | 83.0% | 17 | 17.0% | 100 | 100.0% |
| IgM | 23 | 23.2% | 76 | 76.8% | 99 | 100.0% |
| Both | 7 | 7.0% | 93 | 93.0% | 100 | 100.0% |

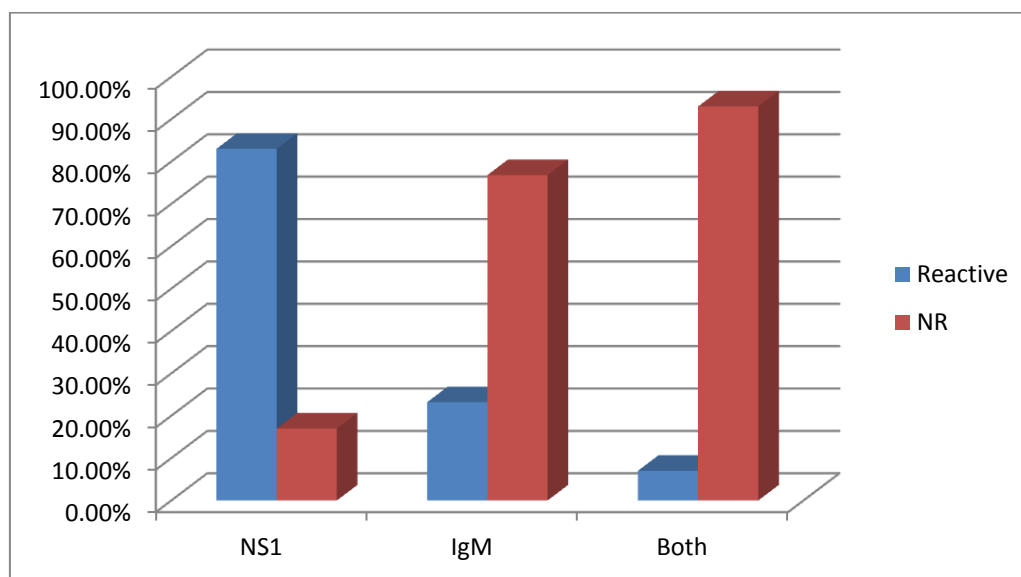


Chart 1 A: Dengue serotypes distribution (NS1, IgM, Both)

- Our study included patients who were NS1 antigen, IgM and both positive.
- Out of 100 patients 87 were NS1 positive (87%), 23 were IgM positive (23%) and 7 patients were positive (7%) for both NS1 as well as for IgM.

Patients will be evaluated on the basis of:

- History of illness
- Clinical examination
- Relevant investigations
- Treatment given
- Response to treatment

Observation and Result

The present study was conducted in MGM Hospital, Navi Mumbai within span of 3 years and involved total 100 patients of dengue fever.

Cardiac Marker

Table 2 B: Distribution of cardiac markers in dengue fever

| | Present | | Absent | |
|--------|---------|---------|--------|---------|
| | Count | Row N % | Count | Row N % |
| CPK-MB | 34 | 34.0% | 66 | 66.0% |
| TRO-T | 33 | 33.0% | 67 | 67.0% |

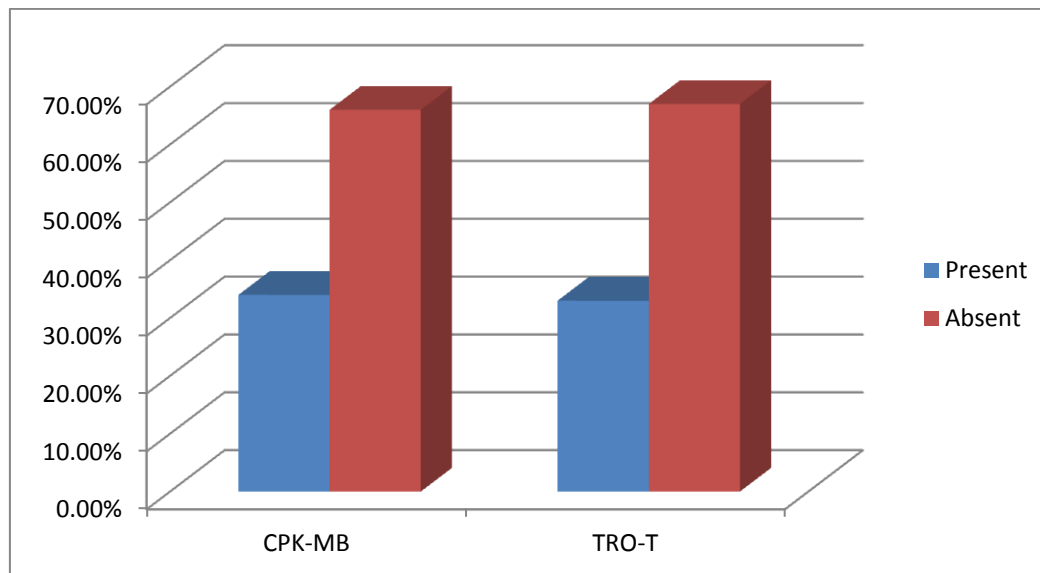


Chart 2 B: Distribution of cardiac markers in dengue fever

➤ We also studied involvement of cardiac markers in case of dengue myocarditis, which showed out of 100 dengue positive patients 67 patients showed raised both cardiac markers i.e. CPK-MB in 34 and Trop-T in 33 patients.

➤ p-value for the chi-square test greater than that of 0.05 for indicates no significant association between the respective parameters; while as p-value less than that of 0.05 indicates significant association (values marked in bold are significant).

Comparison of Cardiac markers against NS1

| | | NS1 | | | |
|--------|-----|----------|------------|-------|------------|
| | | Reactive | | NR | |
| | | Count | Column N % | Count | Column N % |
| CPK-MB | Yes | 28 | 33.7% | 6 | 35.3% |
| | No | 55 | 66.3% | 11 | 64.7% |
| TRO-T | Yes | 27 | 32.5% | 6 | 35.3% |
| | No | 56 | 67.5% | 11 | 64.7% |

Comparison of cardiac markers with IgM

| | | IgM | | | |
|--------|-----|----------|------------|-------|------------|
| | | Reactive | | NR | |
| | | Count | Column N % | Count | Column N % |
| CPK-MB | Yes | 10 | 43.5% | 24 | 31.6% |
| | No | 13 | 56.5% | 52 | 68.4% |
| TRO-T | Yes | 10 | 43.5% | 23 | 30.3% |
| | No | 13 | 56.5% | 53 | 69.7% |

Chi square Results

| | | NS1 |
|--------|------------|------|
| CPK-MB | Chi-square | .015 |
| | d.f. | 1 |
| | p-value | .902 |
| TRO-T | Chi-square | .049 |
| | d.f. | 1 |
| | p-value | .825 |

Chi- square result

| | | IgM |
|--------|------------|-------|
| CPK-MB | Chi-square | 1.109 |
| | d.f. | 1 |
| | p-value | .292 |
| TRO-T | Chi-square | 1.388 |
| | d.f. | 1 |
| | p-value | .239 |

➤ In our observational study, we also included the comparison of cardiac marker changes with specific dengue antigens i.e. NS1

➤ Total 83 patients of NS1 antigen, 28 (33.7%) patients were showing raised CPK-MB, 27 (32.5%) were positive for TROP-T.

➤ Our study showed 10(43.5%) were showing raised CPK-MB, 10 (43.5%) were positive for TROP-T in IgM positive patients.

➤ p-value for the chi-square test greater than that of 0.05 for indicates no significant

association between the respective parameters; while as p-value less than that of 0.05 indicates significant association (values marked in bold are significant).

Comparison against Both

| | | Both | | | |
|--------|-----|----------|------------|-------|------------|
| | | Reactive | | NR | |
| | | Count | Column N % | Count | Column N % |
| CPK-MB | Yes | 5 | 71.4% | 29 | 31.2% |
| | No | 2 | 28.6% | 64 | 68.8% |
| TRO-T | Yes | 5 | 71.4% | 28 | 30.1% |
| | No | 2 | 28.6% | 65 | 69.9% |

Chi Square result

| | | Both |
|--------|------------|--------------|
| CPK-MB | Chi-square | 4.699 |
| | d.f. | 1 |
| | p-value | .030* |
| TRO-T | Chi-square | 5.027 |
| | d.f. | 1 |
| | p-value | .025* |

- We also compared cardiac marker changes with Patients who are positive for Both(NS1 and IgM).
- 5 (71.4%) were showing raised CPK-MB, 5 (71.4%) were showing raised TROP-T,4(57.1%) .
- p-value for the chi-square test greater than that of 0.05 for indicates no significant association between the respective parameters; while as p-value less than that of 0.05 indicates significant association (**values marked in bold are significant**).

Discussion

In our study we studied NS1 antigen, IgM and both .Out of 100 patients 87 were NS1 positive (87%), 23 were IgM positive (23%) and 7 patients were positive (7%) for both NS1 as well as for IgM, which shows almost similar results of study by S.Sheetal et al in Kerala, which was showing out of 100 dengue positive patients 79 were NS1 antigen positive and 21 were IgM positive. We also studied involvement of cardiac markers in

case of dengue myocarditis, which showed out of 100 dengue positive patients 67 patients showed raised both cardiac markers i.e. Cpk-MB in 34 (34%) and Trop-T in 33 (33%) patients. The study conducted by Prakash et al showed 5(26.3%) had Troponin T positivity and 11 (57.9%) had CK-MB positivity in dengue positive patients. Salgado et al study showed raised levels of CPK-MB in 6 patients with myocarditis out of 102 total dengue positive individuals. We also studied comparison of Cardiac markers with different serotypes of dengue, which showed significant association with raised cardiac markers i.e. CPK-MB (p value 0.30), TROP-T (p value 0.25)

Conclusion

Dengue is a serious problem in the tropics. Cardiac involvement is worrisome for both the clinician and patient. Asymptomatic myocarditis appears to be common in dengue, and spontaneous uneventful recovery is the norm. Patients manifest with a variety of clinical features suggesting cardiac involvement, many of which overlap with other complications of the condition. From our study we can conclude that, the affection of cardiac markers in dengue is not uncommon but still, Further studies are needed to establish the relationship between the serotype, gender, antigenicity and cardiac involvement and also to establish the exact pathophysiology of cardiac involvement.