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Study of Respiratory Manifestation in Dengue fever in Maharashtra Population

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Abstract

Background: Dengue fever usually presents as an acute febrile illness with thrombocytopenia and hemorrhagic complications. Thrombocytopenia can directly cause spontaneous bleeding in any organ, including the lung, in dengue patients; hence, pulmonary pathology is observed in fatal cases.

Method: 60 patients aged between 18 to 65 years with confirmed dengue (RT-PCR for dengue) were studied.

Elisa performed a CBC, hematocrit, liver profile, renal profile, and arterial blood gases, as well as stereological tests for IgM, IgG, and antibodies. Chest x-ray PA views CT scans (if necessary) were carried out.

Results: Dengue fever patients who developed respiratory manifestations had 60 (100%) fever, 60 (100%) dyspnoea, 58 (96.6%) body pain, 8 (13.3%) vomiting, 53 (88.3%) headache, 39 (65%) retro orbital pain, 5 (8.3%) drowsiness, 55 (91.6%) shock, 32 (53.3%) cough, 34 (56.6%) hemoptysis, and 26 (43.3%) bleeding from other sites. Co-morbidities included chronic chest pain cardiac disease and renal disease and hepatic disease type-II DM in both DHF and DSS patients Thoracic presentations of ARDS, pulmonary haemorrhage, bilateral haemorrhage, and pleural effusion were observed in both DHF and DSS patients.

Conclusion: In the present pragmatic study, it is confirmed that, though respiratory manifestations were not common among general dengue patients, but in severe dengue cases or fatal cases. The majority of fatalities were due to ARDS, pulmonary haemorrhage, pleural effusion, or bilateral pneumonia.

Keywords: Acute Respiratory disease syndrome (ARDC), Dengue haemorrhagic Fever (DHF), Dengue shock syndrome (DSS), RT-PCR for dengue

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Introduction

Dengue is an important tropical arboviral infection. It is classified as an important mosquito-borne disease. Dengue usually presents as an acute febrile illness with thrombocytopenia and hemorrhagic complications [(1)]. Respiratory manifestations were observed in dengue fever. It is reported that the magnitude of pulmonary pathology is high in fatal cases of dengue hemorrhagic fever in India and abroad [(2)]. It involved lung disease: diffuse alveolar damage, non-cardiogenic pulmonary edoema, thromboembolism, bronchopneumonia, pnemonitis, and intraalveolar haemorrhage. Respiratory failure was the cause of death in many patients [(3)]. In fatal cases of dengue fever, there is pleural effusion due to plasma leakage. Thrombocytopenia can directly cause spontaneous bleeding in any organ, including the lung in dengue patients. The pathophysiology of respiratory manifestations in dengue fever is still not conclusive because respiratory distress syndrome is the most serious disease because it involves acute pancreatitis and myocarditis [(4);] hence, an attempt was made to evaluate the various clinical manifestations of dengue fever in connection with respiratory diseases.

Material and Method

60 (sixty) dengue infected patients admitted to the Prakash Institute of Medical Sciences and Research Centre were studied.

Inclusive Criteria: dengue virus confirmed by RT-PCR for dengue virus The patients above the age of 18 who had given written consent for admission and treatment were selected for the study.

Exclusion criteria: Patients under the age of 18 who are not ready to be admitted for treatment and patients with compromised immune systems were excluded from the study.

Method: Every patient undergoes a clinical history and physical examination as per the protocol of the WHO [(5)].

Haematological examination included CBC haematocrit, liver profile, renal profile, and arterial blood gases, serological test IgM and IgG antibodies by Elisa (J. Mitra and Co. Pvt. Ltd.), RT-PCR for Dengue virus chest x-ray, PA view, and CT scan as necessary.

The duration of the study was from January 2021 to February 2023.

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Statistical analysis: Various clinical manifestations and various co-morbidities were compared for DHF, DSS and classified by percentage. The statistical analysis was carried out in SPSS software. The ratio of males to females was 2:1.

Observation and Results

Table-1: Clinical manifestations of dengue patients who developed respiratory manifestations

60 (100%) fever, 60 (100%) dyspnoea, 8 (13.3%) vomiting, 58 (96.6%) body pain, 53 (88.3%) headache, 39 (65%) retro orbital pain, 5 (8.3%) drowsiness, 55 (91.6%) shock, 32 (53.3%) cough, 34 (56.6%) hemoptysis, and 26 (43.3%) bleeding from other sites.

Table-2: Comparison of co-morbidities in dengue patients with chest pain – 11 (24.4%) in DHF, 5 (33.3%) in DSS, Cardiac diseases – 8 (17.7%) in DHF, 2 (13.3%) in DSS, Renal disease – 3 (6.6%) in DHF, 1 (6.6%) in DSS, Hepatic disease – 3 (6.6%) in DHF, 1 (6.6%) in DSS, Diabetic – 5 (11.1%) in DHF, 3 (20%) in DSS

Table-3: Comparison of thoracic presentations in DHF and DSS patients – ARDS – 9 (20%) in DHF, 9 (60%) in DSS, pulmonary haemorrhage: 10 (22.2%) in DHF, 1 (6.6%) in DSS, Bilateral pneumonia – 5 (11.1%) in DHF, 1 (6.6%) in DSS, Pleural effusion – 17 (37.7%) in DHF, 6 (40%) in DSS

Discussion

The present study examines the respiratory manifestations of dengue fever in the Maharashtra population. The clinical presentations were 60 (100%) fever, 60 (100%) dyspnea, 8 (13.3%) vomiting, 58 (96.6%) body pain, 53 (88.3%) headache, 39 (65%) retroorbital pain, 5 (8.3%) drowsiness, 55 (91.6%) shock, 32 (53.3%) cough, 34 (56.6%) hemoptysis, and 26 (43.3%) bleeding from other sites (Table-1). In the comparison of comorbidity in dengue patients, DHD and DSS were chromic chest diseases. 11 (24.4%) in DHF, 5 (33.3%) in DSS, and cordial disease 8 (17.7%) in DHF, 2 (13.3%) in DSS, and renal disease 3 (6.6%) in DHF, 1 (6.6%) in DSS, and hepatic disease 3 (6.6%) in DHF, and 1 (6.6%) in DSS, (Table-2). Comparison of thoracic presentations in DHF and DSS were ARDS 9 (20%) in DHF, 9 (60%) in DSS, pulmonary hemorrhagic 10 (22.2%) in DHF, 1 (6.6%) in DSS, and bilateral pneumonia 5 (11.1%) in DHF, 1 (6.6%) in DSS, and pleural effusion 17 (37.7%) in DHF, and 6 (40%) in DSS (Table-3). These findings are more or less in agreement with previous studies [(6)(7)(8)].

It is reported that, plasma leakage during dengue infection can be the cause of lung problems in dengue [(9)] Pulmonary haemorrhage is a severe lung disease in lung disease. It is

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not common, but serious. It can be detected early by a lung CT scan. The pattern is usually diffuse alveolar haemorrhage [10] Pleural effusion is a sign of severe dengue hemorrhagic fever and dengue shock. In the same severe cases, hemothorax was also observed, and the use of intercostal drainage placement was useful for management. Fluid replacement therapy and body fluid balancing must be administered to such patients [11]. Pneumonia was observed during the superimposed bacterial infection. Staphylococcus aureus and melioidosis are the two common bacteria, and proper antibiotics are required to combat such infections. Pulmonary oedema was also observed in dengue. The pathophysiology was the same as in cases of pleural effusion. It is reported that pulmonary oedema could be due to excess fluid therapy. Pulmonary oedema may be associated with myocarditis, sometimes iatrogenic. Sometime after platelet transfusion, ARDS is often associated with acute pancreatitis and myocarditis.

Respiratory complications occur in severe stages of DHF and DSS when the dengue virus antigen is found in the alveolar living tissue of the lung, which causes an increased permeability of the alveolar capillary membrane and results in ARDS, as part of bleeding in all body orifices due to decreased platelet count, or as a secondary infection in cases of pnemonitis, where plasma leakage results in hemoconcentrations and hypoalbuminemia, so plural effusions and ascites can be detected.

Summary and Conclusion

The pathophysiology of respiratory disease in dengue fever is still not conclusive because there are many possible causes. Thrombocytopenia can directly cause spontaneous bleeding in any organ, including the lungs, and co-morbidities in patients affected by dengue will enhance the respiratory manifestations. It can lead to DHF and DSS, which are serious presentations. Early access to medical aid can minimise the morbidity and mortality of such patients.

Limitation of the study: Owing to the tertiary location of the research centre, the small number of patients, and the lack of the latest technologies, we have limited findings and results.

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- No Conflict of Interest
- Self Funding

Table – 1
Clinical of dengue patients who developed respiratory manifestation

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Total No. of Patients: 60

Sl. No	Clinical presentation	No. of patients (60)	Percentage (%)
1	Fever	60	100
2	Vomiting	8	13.3
3	Body pain	58	96.6
4	Headache	53	88.3
5	Retro orbital pain	39	65
6	Drowsiness	5	8.3
7	Shock	55	91.6
8	Cough	32	53.3
9	Haemoptysis	34	56.6
10	Dyspnoea	60	100
11	Bleeding froth other sites	26	43.3

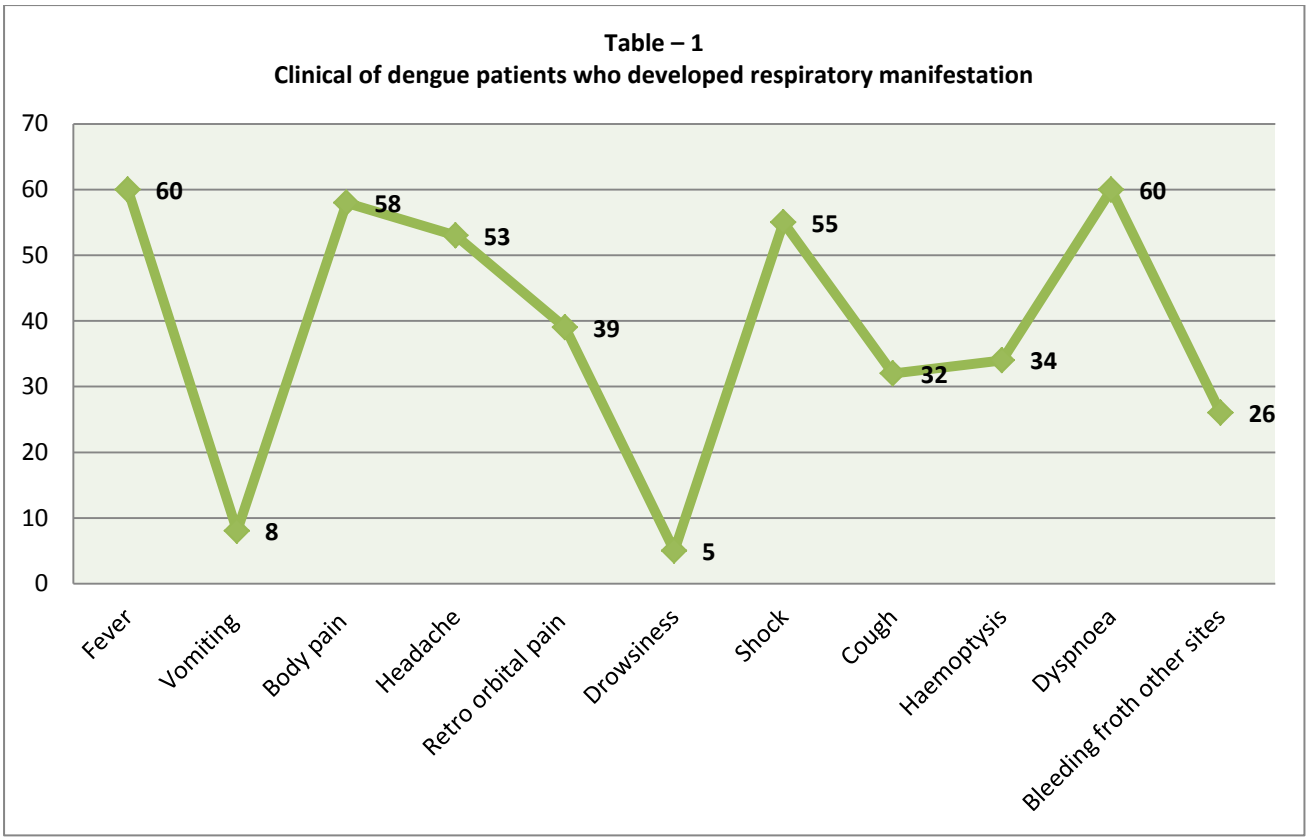

Table – 2

Comparison of Co-morbidities in dengue patients

Total No. of Patients: 60

Co morbidity	DHF Number (45)	Percentage	DSS No not (15)	Percentage
Chronic chest disease	11	24.4	5	33.3
Cardiac disease	8	17.7	2	13.3
Renal disease	3	6.6	1	6.6

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Hepatic disease	3	6.6	1	6.6
Diabetic Mellitus	5	11.11	3	20

DHF = Dengue Haemorrhagic Fever

DSS = Dengue Shock Syndrome

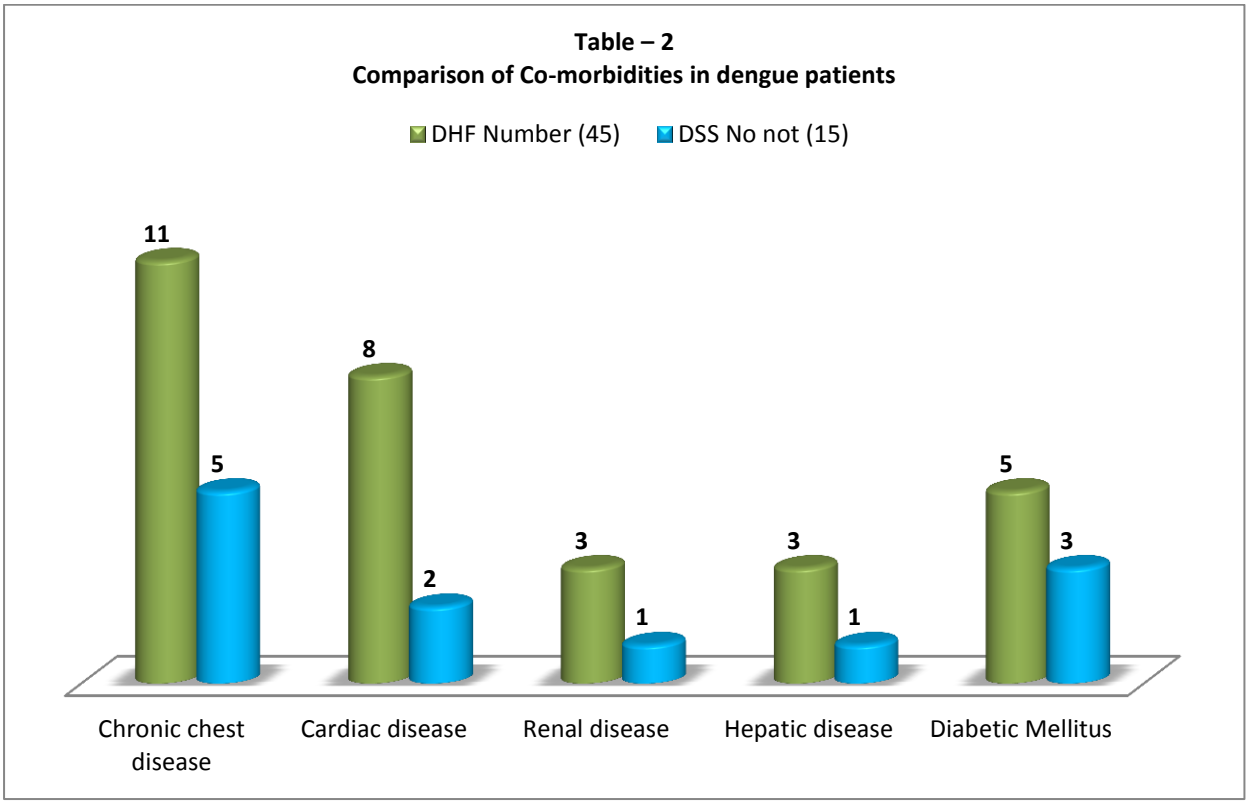

Table – 3

Comparison of thoracic presentation of DHF and DSS

Thoracic presentation	**DHF No. of patients 45**	**Percentage (%)**	**DSS No. of patients 15**	**Percentage (%)**
ARDS	9	20	9	60
Pulmonary Haemorrhagic	10	22.2	1	6.6
Pneumonia (Bilateral)	5	11.11	1	6.6
Pleural Effusion	17	37.7	6	40

ARDS = Acute Respiratory disease Syndrome

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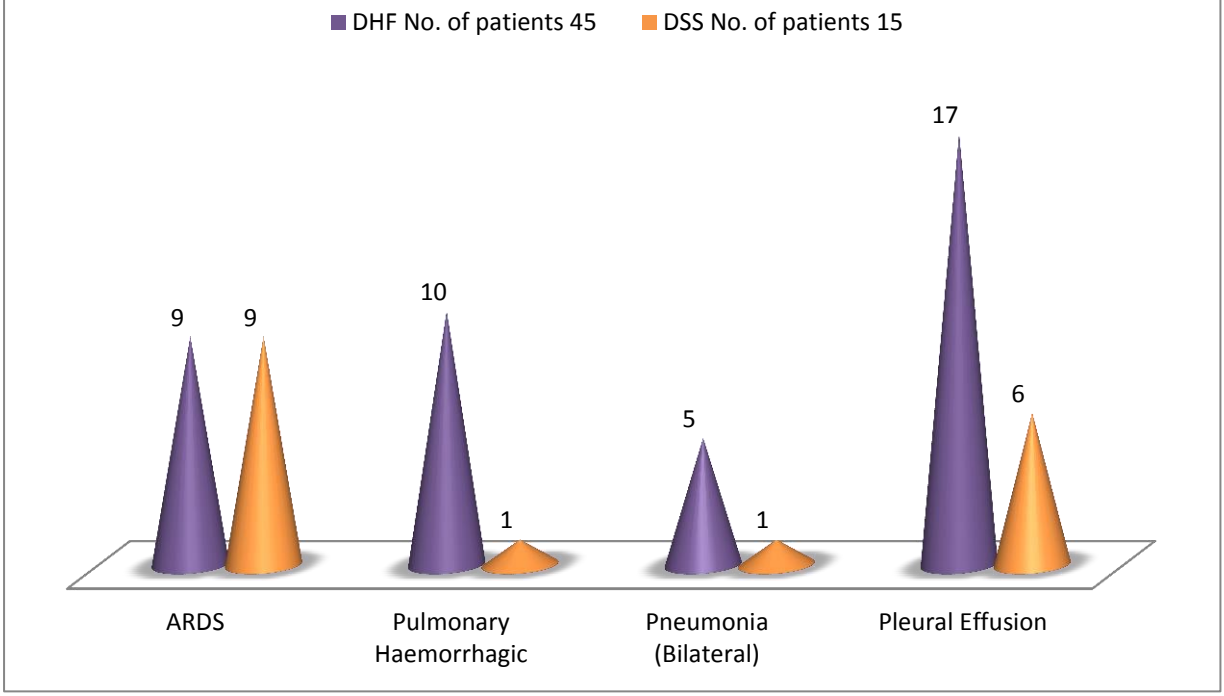
Table – 3
Comparison of thoracic presentation of DHF and DSS



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