

Thoracic Computed Tomography Imaging in Dengue Fever: A Tertiary Experience in South Indian Population

Aniruddha P Rangari¹, Meghanaa Jayakumar², Mario Jose Rodriguez³

ABSTRACT

Introduction: Dengue fever is one of the most common acute vector-borne viral illnesses affecting mankind. Despite an abundance of case material world-wide, cross-sectional lung-imaging data in patients with dengue is scarce. The aim of the study was to detect and evaluate the thoracic CT findings in dengue fever.

Material and methods: Chest CT findings of 30 patients with dengue fever in a 6 month period from July to December 2017 were studied.

Results: The commonest chest CT findings were pleural effusion (n=20), atelectasis (n=14), ground-glass opacification (n=6), patchy consolidation (n=4), air space nodules (n=3), interstitial thickening (n=3) and pericardial effusion (n=1).

Conclusion: CT thorax is a good modality for evaluation of dengue patients with respiratory complaints. Frequently detected findings on chest CT included pleural effusion, atelectasis and ground-glass opacification.

Keywords: Viral Fever, Pleural Effusion, GGO

assessed for their symptomatology, clinical findings and relevant lab parameters.

Cases were classified according to the 2009 WHO guidelines⁵ as DF, dengue with warning signs, or severe dengue. Warning signs were abdominal pain/tenderness, persistent vomiting, fluid accumulation (pleural effusion [PE] or ascites), mucosal bleeding, liver enlargement, and increased hematocrit. The criteria for severe dengue were: severe plasma leakage; severe bleeding; severe organ involvement, comprising hepatic injury and/or renal impairment; and/or impaired consciousness. The dengue fever group comprised patients with no warning sign or criterion.

Helical noncontrast CT exams of both chest and abdomen were obtained by standard protocols. The images were reviewed on lung, bone and mediastinal windows.

The presence of ground-glass opacity (GGO), consolidation, air space nodules, interlobular septal thickening, and peribronchovascular interstitial thickening were recorded based on the recommendations of the Nomenclature Committee of the Fleischner Society⁶. The presence of pleural effusion and atelectasis also were recorded.

STATISTICAL ANALYSIS

The data obtained was checked and entered into Microsoft Excel. The basic statistical analysis was done by SPSS Software Version 16. The level of significance was estimated with 95% confidence interval with 'p' value <0.05.

RESULTS

The study population comprised 10 (33.3%) females and 20 (66.7%) males aged 17–94 years (mean, 52.3 years). DF was diagnosed in 12/30 patients (7 males, 5 females) and warning signs or SD (W/SD) were diagnosed in 18/30 patients (10 males, 8 females).

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INTRODUCTION

Dengue is a mosquito-borne infection that in recent years has become a major international public health problem, especially in the tropical and sub-tropical regions¹. In India, as of August 2017, more than 36,635 cases of dengue fever were reported according to figures released by the National Vector-Borne Disease Control Programme.

The endothelium is the primary target of immunopathological mechanisms in dengue and DHF. The hallmark is increased vascular permeability and consequent dysfunctional bleeding. These mechanisms can explain varied systemic involvement². Dengue virus antigen has been found in alveolar lining cells of the lung³. Increased permeability of the alveolar-capillary membrane results in oedema in the alveoli and interstitial spaces.

Thoracic manifestations such as pleural effusion, pneumonitis, pulmonary haemorrhage and ARDS have been reported in dengue infections⁴ However, there is a paucity of clinical literature detailing CT features of dengue fever in an Indian context. The authors have attempted to demonstrate the spectrum of CT findings in the thorax in patients with dengue.

MATERIAL AND METHODS

After obtaining ethical clearance, 30 Dengue seropositive patients presenting to Department of Radiodiagnosis in a tertiary hospital setting in a semi-urban location in Kerala, India over a 6-month period from July 2017 to December 2017 were included in the study. Patients were initially

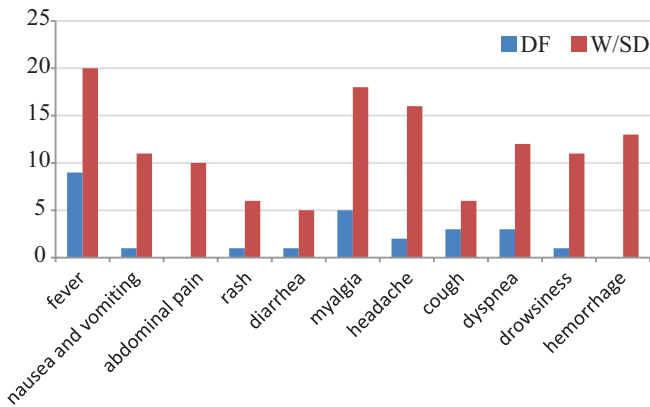


Figure-1: Frequency of symptoms in study population

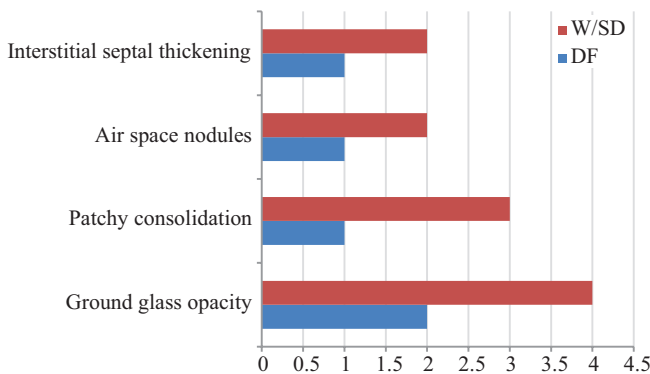


Figure-2: Distribution of parenchymal findings

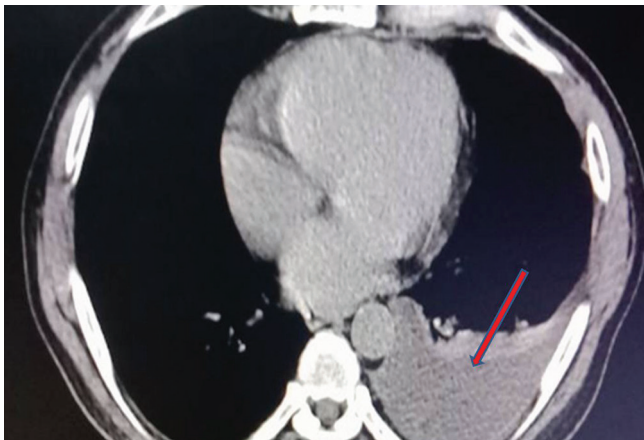


Figure-3: Left sided pleural effusion and partial atelectasis in a patient of dengue fever with warning signs

The most common clinical feature observed in this series was fever (in 29 [96.67%] patients) [Figure 1].

PE was detected in 20 (66.7%) patients (7 with DF, 13 with W/SD). It was bilateral in 16 cases and unilateral (right-sided in 3 and left sided in 1) in 4 cases.

Lung parenchymal involvement was bilateral in 11 patients (4 with DF, 7 with W/SD). The most common finding was GGO (6 patients); followed by consolidation (4 patients). Airspace nodules and interlobular septal thickening were observed in 3 patients each and pericardial effusion in 1 patient with W/SD [Figure 2].

Chest CT findings were normal in 9/30 (30%) patients and abnormal in 21/30 (70%) patients (7 with DF, 14 with W/SD). 16 of 21 patients with abnormal chest CT findings (5

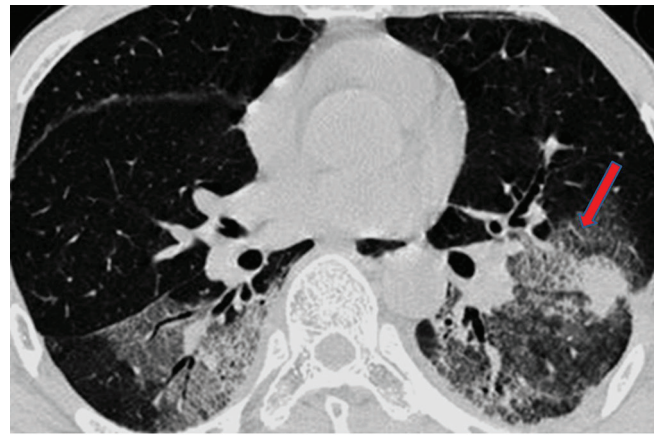


Figure-4: Ground-glass opacities (red arrow) with intralobular interstitial thickening in both lower lobes.



Figure-5: Patchy consolidation in right middle lobe

with DF, 11 with W/SD) had parenchymal abnormalities. PE was the sole finding in 14/21 patients (figure-3,4,5).

DISCUSSION

Dengue is an acute arthropod borne febrile viral disease caused by flavivirus. Endemic in more than 100 countries, it threatens the health of 40% of the world's population and has become a major International Public Health concern in recent years⁷. An estimated 50 million dengue infections occur each year with 5,000,000 cases of DHF and at least 12,000 deaths annually.

Though not very common, pleural effusion and lung parenchymal abnormalities have been reported in patients with dengue fever⁸

A study conducted by Wang et al.⁹ reported that pleural effusion (54.7%) was the most common abnormal chest radiographic findings in patients with dengue.

In the present study, pleural effusion (n=20) was the most common chest finding in dengue fever. A study of Chinese patients by Tianli Hu et al.¹⁰ also reached a similar conclusion. Ground glass opacification was the most common parenchymal finding in the current study. This was in concordance with the study conducted by Rodrigues et al on lung in dengue.¹¹

Rodrigues RS et al in their study also remarked that the presence of severe findings should lead physicians to consider other diagnostic possibilities. Extensive lung parenchymal

changes were not observed even in severe disease in the present study.

The limitation of this study was the relatively small study population and short duration.

CONCLUSION

Dengue fever is a serious viral infection with multisystemic involvement affecting a large population worldwide. CT thorax can detect most of the findings in dengue fever patients presenting with chest pathology and is thus a useful modality in overall management of these patients.

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