Original Research Article

Dengue: experience from a tertiary care centre in Northern Karnataka, India

Mohammad A. Waheed*

Department of General Medicine, ESIC Medical College, Gulbarga, Karnataka, India

*Correspondence:
Dr. Mohammad A. Waheed,
E-mail: drwaheedgulbarga@rediffmail.com

ABSTRACT

Background: Epidemiology of dengue infection is evolving, and research gap exists in the region. The clinical features, laboratory parameters, complications and treatment outcomes of patients diagnosed of dengue infection at a tertiary care centre were analysed in the present study.

Methods: More than 12 years old patients, presenting with features suggestive of acute febrile illness were subjected to detailed history taking and thorough clinical examination. All the suspected cases were further evaluated with complete blood count, liver function test, kidney function test, along with ultrasonography of abdomen. Blood samples were tested for dengue antibodies (IgG and IgM) by hemagglutination inhibition method for confirmation of the diagnosis. The clinical course was closely monitored during hospital stay and complications and deaths, if any, were noted.

Results: Total 140 patients were studied. Fever (100%), headache (80%) and myalgia (73.6%) were the commonest symptoms. Thrombocytopenia (136, 97.1%) was the commonest hematological finding, while severe thrombocytopenia (<50,000/cu. mm) was observed in 38 (27.1%) cases. Hepatomegaly (61, 43.6%), splenomegaly (42, 30.0%), ascites (54, 38.6%), pleural effusion and gall bladder edema (18, 12.9% each) were the commonest findings on ultrasonography. Shock and ARDS were the major complications.

Conclusions: Dengue remains an important public health problem even at a tertiary care centre and strong suspicion is needed in adult patients with acute febrile illness. The management should focus on averting shock and ARDS, which would help in larger aim of reduction in mortality.

Keywords: Clinical features, Complications, Dengue, Profile

INTRODUCTION

Dengue, an arboviral infection transmitted by Aedes aegypti and Aedes albopictus mosquitoes, is a global public health problem of multiple immense and immediate concerns, with 2.5 billion people at risk and an annual range of 50 to 390 million infections.[1-3] Climate change, expansion of dengue vectors to new geographic regions, increasing human movement across borders, global trade, and urban migration have all contributed to the change in scope and scale of dengue fever.[2,4-5]

Closer look at India tells us that, it's notable 13th rank in world tourism share (receipts) in 2018, the increasing role in global economy, and gross under-reportage of dengue cases poses an overall gloomy picture.[6-8] Although dengue has been notifiable in India since 1996, the disease's impact has been underestimated because of

insufficient information.[8-9] Estimates of the average annual number of cases vary widely from the 20,474 officially reported cases to an annual 33 million apparent cases.[2]

Trends in recent decades indicate that larger and more frequent dengue outbreaks are occurring, with geographic expansion to new states, and spread of dengue to peri-urban and rural areas, in addition to increased case severity and deaths, and progression to hyper-endemicity.[10] Although dengue has been largely endemic as an entity in this region (Northern Karnataka), studies enquiring into its epidemiology from this part of country are limited.[11,12] With this research gap in mind, the present study was conducted to study clinical features, laboratory parameters, complications and treatment outcomes of patients diagnosed of dengue infection at a tertiary care government centre.

METHODS

The present prospective, observational study was conducted at tertiary care hospital in Northern Karnataka over the period of two years (August 2016 to July 2018).

All the patients aged more than 12 years old, presenting with features suggestive of acute febrile illness during the study period constituted the study population. All such patients were subjected to detailed history taking and thorough clinical examination for differentiation and clinical diagnosis.

All the suspected cases were further evaluated with blood investigations like complete blood count with platelets (CBC), liver function test (LFT), kidney function test (KFT), along with ultrasonography of abdomen. Thrombocytopenia was operationally defined as platelet count <1.5 Lakh/cu.mm, severe thrombocytopenia as platelet count <50000 Lakh/cu.mm and leukopenia as total leucocyte count (TLC) <4000/cu.mm. The patients were subjected to additional tests like IgM antibodies for leptospirosis, blood smear for malaria, blood culture,

urine culture, d-dimer, partial thromboplastin time, endoscopy, etc., as and when necessitated by clinical suspicion, and all the patients confirmed to have diagnoses other than dengue were excluded from the study, along with those unwilling to consent.

The blood samples were tested for dengue antibodies (IgG and IgM) by the hemagglutination inhibition method for confirmation of the diagnosis. Patient's requirement for hospitalisation was decided majorly on the basis of hemodynamic status and standard management protocols recommended under National Vector Borne Disease Control Programme (NVBDCP) were followed, along with individualisation of treatment in certain cases.[13] Clinical course of the patient was closely monitored during hospital stay and complications, if any, were duly noted. The final outcome in each case was also recorded in the form of discharge/death etc.

The study was approved by the institutional ethics committee prior to commencement and all the patients gave written informed consent for participation. Associations were studied using chi-square test or Fisher exact test for categorical variables and Mann-Whitney U test for continuous variables. $P<0.05$ was considered to be statistically significant. All the statistical calculations were conducted using SPSS (version 19).

RESULTS

The study population consisted of 358 patients of acute febrile illness; of which a total sample of 140 dengue positive patients was considered for final analysis, after due exclusions. On an average, four out of five participants reported during monsoon and post monsoon months (August-November).

Of the total participants, 80 (57.1%) were males and 60 (42.9%) were females. Majority of the participants were observed to belong to younger age groups, with half of them being 30 years of age or younger and only 1 participant more than 60 years of age (Table 1).

Table 1: Age and gender distribution of participants (n=140).

Age Group	Males	Females	Total
12-20 Years	19 (13.6%)	14 (10.0%)	33 (23.6%)
21-30 Years	20 (14.3%)	17 (12.1%)	37 (26.4 %)
31-40 Years	16 (11.4%)	14 (10.0%)	30 (21.4%)
41-50 Years	15 (10.7%)	12 (8.6%)	27 (19.3%)
51-60 Years	9 (6.4%)	3 (2.1%)	12 (8.6%)
>60 Years	1 (0.7%)	0 (0.0%)	1 (0.7%)
Total	80 (57.1%)	60 (42.9%)	140 (100%)

Analysis of the clinical presentation of cases revealed fever (100%), headache (80%) and myalgia (73.6%) to be

the commonest symptoms. Twenty-six (18.6%) patients had sore throat, while itching was reported by 18 (12.9%)

patients. Thrombocytopenia was the commonest haematological finding, noted in as many as 136 (97.1%) patients, while severe thrombocytopenia (<50,000/cu. mm) was observed in 38 (27.1%) cases. The average platelet count was 40,000/cu.mm. Fifty-eight (41.4%) patients were leucopenic. Deranged liver functions were observed as raised SGOT in 112 (80.0%), raised SGPT in 58 (41.4%) patients and raised serum bilirubin (>2.0 mg/dl) in 21 (15.0%). Raised Serum creatinine (>1.5 mg/dl) was noted in 10 (7.1%) patients. Hepatomegaly was noted in 61 (43.6%), splenomegaly in 42 (30.0%), ascites in 54 (38.6%) and pleural effusion and edema of the wall of gall bladder in 18 (12.9%) patients each on ultrasonography (Table 2).

Table 2: Clinical, laboratory and sonographic findings of participants (n=140).

Clinical features	No (%)	Laboratory findings	No (%)	Sonographic findings	No (%)
Fever	140 (100%)	Thrombocytopenia	136 (97.1%)	Hepatomegaly	61 (43.6%)
Headache	112 (80.0%)	Severe Thrombocytopenia	38 (27.1%)	Ascites	54 (38.6%)
Myalgia	103 (73.6%)	Severe thrombocytopenia with bleed	16 (11.4%)	Splenomegaly	42 (30.0%)
Sore throat	26 (18.6%)	Leukopenia	58 (41.4%)	Pleural effusion	18 (12.9%)
Jaundice	24 (17.1%)	SGOT	112 (80.0%)		
Petechiae	21 (15.0%)	SGPT	58 (41.4%)		
Abdominal pain	19 (13.6%)	Serum bilirubin >2.0 mg/dl	21 (15.0%)		
Itching	18 (12.9%)				
Vomiting	16 (11.4%)			Oedematous gall bladder	18 (12.9%)
Unconsciousness	14 (10.0%)	Serum creatinine >1.5 mg/dl	10 (7.1%)		
Seizure	12 (8.9%)				
G.I. bleed	10 (7.1%)				
Diarrhoea	9 (6.4%)				

As for serious complications, 6 (4.2%) patients developed shock, 3 (2.1%) patients had acute respiratory distress syndrome (ARDS), while 2 (1.4%) cases were complicated by myocarditis. All the patients studied were discharged after satisfactory improvement in clinical condition.

DISCUSSION

A total of 140 participants were analysed with respect to various parameters of dengue infection in this prospective observational study over the period of 2 years.

Expectedly, more than 80% cases occurred during monsoon and post-monsoon months (August-November). This in accordance with the reported patterns of dengue transmission and logical as well, as dengue is a vector borne disease transmitted via mosquitoes which proliferate during these months. The seasonal trend so observed is also in line with previous studies.[2,3,10,11,14-16]

Of the total participants, the highest number of cases belonged to the age group 12-30 years and males significantly outnumbered the females, much like observations of Bandyopadhyay et al, Gupta et al and Chakravarti et al, among others.[15-17] Sarkar et al, however, did observe it to be more common in the paediatric age group of 0-10 years, an irrelevant finding, since that age group was not included as a part of present study.

The clinical presentation of dengue with fever (100%), headache (80%) and myalgia (73.6%) as the commonest symptoms in the present study was similar to a Puerto Rican study dedicated to symptomology in dengue, as well as a study closer home from North India.[18,19] Rest of the symptomology was unremarkable, except the incidence of petechiae which was observed in 21 (15.0%) cases. This finding sits well with the other finding of severe thrombocytopenia (platelet count <50,000/cu. mm) observed in 38 (27.1%) patients and 16 (11.4%) patients having severe thrombocytopenia with bleed. Thrombocytopenia in dengue is related to oxidative stress.[20] Rashes in the form of petechiae are said to be observed with severe thrombocytopenia (as defined in the present study).[21] Among other lab findings, leucopenia was observed in 58 (41.4%) patients. Leukopenia in dengue is common and transient and may be caused by virus-induced destruction or temporary inhibition of myeloid progenitor cells.[22] Liver dysfunction is a common feature of dengue and rise in SGOT is commoner and higher than that in SGPT.[23,24] This was corroborated in the present study. Acute kidney injury is uncommon but well recognized complication of dengue fever.[25] Raised Serum creatinine was noted in 10 (7.1%) patients in the present study. Hepatomegaly,

splenomegaly, ascites, pleural effusion, pericardial effusion, and gall bladder wall edema are not uncommon but usually mild in dengue, and ultrasonography is better from diagnostic point of view.[26,27] Hepatomegaly, ascites and splenomegaly were the commonest sonographic findings in the present study, in agreement with previous evidence.[27,28] No case of pericardial effusion was noted though. Shock, ARDS and myocarditis were the major complications observed in the study, a finding fairly corroborative of previous research into complications of dengue.[28,29]

CONCLUSION

In conclusion, dengue is an important public health problem of significant proportion with significant morbidity even at a tertiary care centre. The fact that dengue is observed to mostly affect patients in productive age group necessitates strong suspicion in adult patients with acute febrile illness. The management should focus on averting shock and ARDS, which would help in larger aim of reduction in mortality.

REFERENCES

1. Beatty ME, Beutels P, Meltzer MI, Shepard DS, Hombach J, Hutubessy R, et al. Health economics of dengue: a systematic literature review and expert panel's assessment. Am J Trop Med Hygiene. 2011;84(3):473-88.
2. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504.
3. Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. Trends Microbiol. 2002;10(2):100-3.
4. Rochlin I, Ninivaggi DV, Hutchinson ML, Farajollahi A. Climate change and range expansion of the Asian tiger mosquito (Aedes albopictus) in Northeastern USA: implications for public health practitioners. PloS One. 2013;8(4):e60874.
5. Wilder-Smith A, Gubler DJ. Geographic expansion of dengue: the impact of international travel. Med Clin North America. 2008;92(6):1377-90.
6. Ministry of Tourism, 2019. India Tourism Statistics at a Glance, 2018. Available at: http://www.tourism.gov.in/market-research-and-statistics. Accessed May 30, 2019.
7. World Bank, 2019. India Overview. Available at: http://www.worldbank.org/en/country/india/overview. Accessed May 30, 2019.
8. Kakkar M. Dengue fever is massively under-reported in India, hampering our response. BMJ. 2012;345:e8574.
9. Halasa YA, Dogra V, Arora N, Tyagi BK, Nandand D, Sheparda DS. Overcoming data limitations: design of a multi-component study for estimating the economic burden of dengue in India. Dengue. 2011;35:1.
10. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. Transactions of the Royal Soc Trop Med Hygiene. 2012;106(5):273-82.
11. Fazal F, Biradar S. Clinical and laboratory profile of dengue fever. J Evidence Based Med Healthcare. 2013;2(9):1136-47.
12. Gouthami M. Impact of pharmacist provided knowledge on dengue among selected school children. Int J Res Hosp Clin Pharm. 2018;1(1):1-10.
13. Government of India. Directorate of National Vector Borne Disease Control Programme 2008. Guidelines for clinical management of Dengue Fever, Dengue Hemorrhagic Fever and Dengue Shock Syndrome. Available at https://www.nvbdcp.gov.in/Doc/Clinical%20Guidelines.pdf. Accessed June 1, 2019.
14. Reiter P. Climate change and mosquito-borne disease. Environmental Health Perspectives. 2001;109(suppl 1):141-61.
15. Bandyopadhyay B, Bhattacharyya I, Adhikary S. A comprehensive study on the 2012 dengue fever outbreak in Kolkata, India. Virol J. 2013;2(1):13.
16. Gupta E, Dar L, Kapoor G, Broor S. The changing epidemiology of dengue in Delhi, India. Virol J. 2006;3(1):92.
17. Chakravarti A, Kumaria R. Eco-epidemiological analysis of dengue infection during an outbreak of dengue fever, India. Virol J. 2005;2(1):32.
18. Cobra C, Rigau-Pérez JG, Kuno G, Vomdam V. Symptoms of dengue fever in relation to host immunologic response and virus serotype, Puerto Rico, 1990-1991. Am J Epidemiol. 1995;142(11):1204-11.
19. Karoli R, Fatima J, Siddiqi Z, Kazmi KI, Sultania AR. Clinical profile of dengue infection at a teaching hospital in North India. J Infect Developing Countries. 2012;6(07):551-4.
20. Soundravally R, Sankar P, Bobby Z, Hoti SL. Oxidative stress in severe dengue viral infection: association of thrombocytopenia with lipid peroxidation. Platelets. 2008;19(6):447-54.
21. Thomas EA, John M, Bhatia A. Cutaneous manifestations of dengue viral infection in Punjab (north India). Int J Dermatol. 2007;46(7):715-9.
22. Lin SF, Liu HW, Chang CS, Yen JH, Chen TP. Hematological aspects of dengue fever. Gaoxiong yi xue ke xue za zhi=Kaohsiung J Med Sci. 1989;5(1):12-6.
23. Parkash O, Almas A, Jafri SW, Hamid S, Akhtar J, Alishah H. Severity of acute hepatitis and its outcome in patients with dengue fever in a tertiary

care hospital Karachi, Pakistan (South Asia). BMC gastroenterology. 2010;10(1):43.

24. Itha S, Kashyap R, Krishnani N, Saraswat VA, Choudhri G, Aggarwal R. Profile of liver involvement in dengue viral infection. National Med J India. 2005;18(3):127-30.

25. Lee K, Liu JW, Yang KD. Clinical characteristics, risk factors, and outcomes in adults experiencing dengue hemorrhagic fever complicated with acute renal failure. Am J Trop Med Hygiene. 2009;80(4):651-5.

26. Motla M, Manaktala S, Gupta V, Aggarwal M, Bhoi SK, Aggarwal P, Goel A. Sonographic evidence of ascites, pleura-pericardial effusion and gallbladder wall edema for dengue fever. Prehospital Disaster Med. 2011;26(5):335-41.

27. Venkata Sai PM, Dev B, Krishnan R. Role of ultrasound in dengue fever. British J Radiol. 2005;78(929):416-8.

28. Rodriguez-Tan RS, Weir MR. Dengue: a review. Texas Med. 1998;94(10):53-9.

29. Kamath SR, Ranjit S. Clinical features, complications and atypical manifestations of children with severe forms of dengue hemorrhagic fever in South India. Indian J Pediatr. 2006;73(10):889-95.