BIOCHEMICAL, HEMATOLOGICAL AND CLINICAL CHARACTERISTICS OF PATIENTS WITH DENGUE FEVER IN HAYATABAD MEDICAL COMPLEX PESHAWAR, KPK, PAKISTAN

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Abstract

Objective: To see the biochemical, hematological and clinlcalfeatures of dengue fever patients seen in Hayatabad medical complex Peshawar.

Introduction: Globally the dengue fever in humans has become a major health related problem. About 50 million infections worldwide occur that is expected to increase. There is significant disease burden in people living in urban and semi urban areas of many tropical and subtropical countries. In areas of world where the disease is endemic, the dengue fever is the major cause of hospital admissions.Population of Pakistan is prone to large epidemics of diseases that are caused by water and vectors because of poor vaccination, urbanization, pollutions, adulterations, a large number of refugees, poor sanitation practices and unsafe drinking water.

Methodology: It was a descriptive cross sectional study in which 100 clinically suspected and laboratory confirmed cases of dengue fever were included. Data were collected through a structured questionnaire with prior consent from the patients. Age, gender, demographic information along with clinical features and result of biochemical tests were recorded. The collected data were analyzed in SPSS version 21.0 for windows. Mean $\pm$ SD were calculated for numerical variables like age. Frequency and Percentages were calculated for categorical variables like gender.

Results:The mean age of participants in this study was 31 years with standard deviation of 15. Of the total number of dengue fever patients in the study, 67% were male and 43% were female. The mean fever spike was 39.5 ^{o}C. Bodyaches, vomiting, headache and nausea were common symptoms in addition to fever. Anorexia, backache and eye pain were other clinical features. Biochemically high ALT was found in 39 % , anemia was present in 17% , thrombocytopenia in 62 % , leucopenia in 27 %, neutropenia in 25 %, lymphocytosis and lymphopenia in 14 % and 36 % respectively.

Conclusions:Main biochemical features of dengue fever are raised ALT, low platelets, neutrophil and lymphocyte count. In regions where the dengue fever is prevalent any patient with fever and low platelet count must be thoroughly investigated for dengue fever.

Key Words:Dengue fever, thrombocytopenia, biochemical features, cross sectional study.

INTRODUCTION

Pakistan has seen many natural disasters like floods, torrential rains and earthquakes in the past few years. These calamities put the health status of general peoples at risk in addition to damaging the local infrastructure. So the population of Pakistan is prone to large epidemics of many diseases that are caused by water and vectors because of poor vaccination, urbanization, pollutions, adulterations, a large number of refugees, poor sanitation practices and unsafe drinking water.[1]

Globally the dengue fever in humans has become a major health related problem. [2]About 50 million infections worldwide occur that is expected to increase. There is significant disease burden in people living in urban and semi urban areas of many tropical[3,4] and subtropical countries. In areas of world where the disease is endemic, the dengue fever is the major cause of hospital admissions.

The first major outbreak of dengue fever was reported in Karachi in 1994 – 95 in Pakistan. [5]After that the dengue epidemic was documented by many studies in different areas of Pakistan. The pattern of dengue virus transmission after monsoon period in big cities of Pakistan like Lahore, Peshawar, Karachi and Islamabad has become worst in past few years and floods made the problem more adversely affected.[6,7]

Dengue fever is a vector borne viral disease. It is transmitted to human beings through the bites of infected female mosquitoes called “yellow fever mosquito, AedesAegypti”. This vector is prevalent in tropical and subtropical areas of world. Its breeding place is stored stagnant waters including both outdoor and indoor containers, roof gutters, rock holes, tanks, water coolers, jars, drums, pots, buckets, flower vases, plant saucers, discarded bottles, used tyres and all those places where rain water can collect or can be stored.[8, 9]

Dengue virus is a single stranded RNA enveloped

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virus. It belongs to family "Flaviviridae" genus flavivirus. It has five different serologic subtypes, DENV1, DENV2, DENV3& DENV4. These serotypes are genetically different from one another and this is reason that no affective vaccine can be developed against them. [10, 11] The infections caused by dengue virus has a broad spectrum that ranges from mild flu like illness and typical dengue fever to very critical conditions like dengue hemorrhagic fever and dengue shock syndrome.

There is no permanent cure for this disease and only supportive care in the form of medication for relieving fever, bodyaches, oral or intravenous fluids, oxygen and platelet transfusion in hospital in case of bleeding and severe thrombocytopenia. As there is no affective vaccine against this disease in Pakistan so the measures for controlling the breeding of vector responsible for this condition is the only way to stop the dengue virus transmission in area.[12, 13]

MATERIALS & METHODS

This study was done in Hayatabad medical complex a tertiary care hospital of Peshawar KPK.It was a descriptive cross sectional study in which 100 clinically suspected and laboratory confirmed casesof dengue fever were included. Data were collected through a structured questionnaire with prior consent from the patients. Age, gender, demographic information along with clinical features and result of biochemical tests were recorded.The collected data were analyzed in SPSS version 21.0 for windows. Mean $\pm$ SD were calculated for numerical variables like age. Frequency and Percentages were calculated for categorical variables like gender. All results were presented in the form of tables.

Low hemoglobin was defined as hemoglobin level less than 10 gms/dl, thrombocytopenia as platelet count less than 150,000 cells/mm^3, leucopenia as white blood cells count less than 4000 cells/mm^3, neutropenia as neutrophils less than 40 %, lymphocytosis as lymphocyte count more than 45 %, lymphopenia as less than 20 %.

Similarly hypernatremia was defined as serum sodium > 150 meq/l, hyponatremia< 135 meq/l, hyperkalemia as serum potassium as > 5meq/l, hypokalemia as < 3.5 meq/l, high seum urea as >45 mgs/dl, high serum creatinine as > 1.2 mgs/dl, hyperglycemia as serum sugar > 160 mgs/dl, hypoglycemia as < 80 mgs/dl and raised ALT as > 50 iu/l.

RESULTS

The mean age of participants in this study was 31 years with standard deviation of 15. Of the total number of dengue fever patients in the study, 67% were male and 43% were female.(Table 1) The mean fever spike was 39.5 °C. Bodyaches, vomiting, headache and nausea were common symptoms in addition to fever. Anorexia, backache and eye pain were other clinical features. (Table 1)

Biochemically anemia was present in 17% , thrombocytopenia in 67 % , leucopenia in 27 %, neutropenia in 25 %, lymphocytosis and lymphopenia in 14 % and 36 % respectively. (Table 2)

Likewise results of serum electrolyte, ALT, urea and creatinine were also tabulated. (Table 2)

Table 1: Clinical features of patients with dengue fever.

Characteristics	Frequency
Age	31 +15
Male	67 %
Female	33%
Fever	100 %
Bodyaches	65%
Backaches	40%
Nausea	13%
Eye pain	6%

Table 1: Laboratory findings of the dengue fever patients (n = 100).

Tests	n = tests ordered	Test positive	%
Thrombocytopenia	100	62	62
Low haemoglobin	100	17	17
Leucopenia	100	27	27
Neutropenia	100	25	25
Lymphocytosis	100	14	14
Lymphopenia	100	36	36
High ALT	100	39	39
High serum urea	67	6	9
High serum creat nine	67	9	13
Hypernatremia	50	1	2
Hyponatremia	50	15	30
Hyperkalemia	50	1	2
Hypokalemia	50	7	14
Hyperglycemia	25	6	24
Hypoglycemia	25	1	4

DISCUSSION

The dengue fever virus is now considered endemic in Pakistan because of its circulation throughout the year with the post monsoon period that is October and November is its peak incidence period.[14]This period is very suitable for the survival and propagation of

dengue fever vector. Seasonal variations play a major role in the spread of vector borne diseases like malaria and dengue fever in the south Asian region particularly around monsoon period when there is enough raining, daily increase in temperature upto 30 ^{0}C and high humidity. Such conditions are favorable for the breeding of mosquitoes.

A decrease in median age has been observed for dengue fever and younger age groups seem to be more vulnerable.[15]In all age groups male predominance has been seenthat is also reported by earlier studies. The reason for this difference might be full body covering and indoor stay in females and of course male preference in seeking medical health care.[16, 17]However some studies did not report such gender difference. [18]

The main symptom in patients with dengue fever is high grade fever and the same observed in the current study too. This was in accordance to the two former studies in Pakistan.[7, 14]The second most common symptom is severe bodyaches that is present in more than 50 % of cases in the current study. And because of this association of bodyaches, pain in joints and bones with fever it is also called “breakbone fever”.

Among the biochemical features of dengue fever patients in the current study, the leading ones are thrombocytopenia and raised ALT.Low platelet count or thrombocytopenia is the commonest finding in dengue fever and used currently as a criteria for the diagnosis of dengue hemorrhagic fever. In comparison with the current study regarding the thrombocytopenia (62%) that is higher than the studies done in Indonesia[19] (8.6%), in Sri Lanka[20] (48%), in Bangladesh[21] (54%) and lower than the studies done in India[22] (70%), Cuba[23] (78%) and in Pakistan[24] (92%).

Other biochemical changes although variable in various parts of world but show some similarities like lymphocytosis, neutropenia, leucopenia and lymphopenia were also seen in the current study.

CONCLUSION

Main biochemical features of dengue fever are raised ALT, low platelets, neutrophil and lymphocyte count.

In regions where the dengue fever is prevalent any patient with fever, bodyaches and low platelet count must be thoroughly investigated for dengue fever.

REFERENCES

1. Jahan F. Dengue Fever in Pakistan. Asia Pac Fam Med 2011 10(1): 1.
2. Dengue Fever World Health Organization Fact Sheet No. 117. 2009.
3. Gyawali N, Bradbury RS, Taylor-Robinson AW. The epidemiology of dengue infection: harnessing past experience and current knowledge to support implementation of future control strategies. J Vector Borne Dis. 2016 53: 293-304.
4. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, et al. The global distribution and burden of dengue. Nature. 2013 496: 504-507.
5. Chan YC, Salahuddin NI, Khan J, Tan HC, Seah CL, Li J, et al. dengue haemorrhagic fever outbreak in Karachi, Pakistan, 1994. Trans R Soc Trop Med Hyg 1995; 89: 619-2.
6. Hakim ST, Saleem M, Nadeem SG. An experience with dengue fever in Pakistan: An Expanding Problem. Ibnosina J Med BS 2011; 3(1): 3-8.
7. Khan E, Kisat M, Khan N, Nasir A, Ayub S, Hasan R. Demographic and clinical Features of Dengue Fever in Pakistan from 2003-2007: A Retrospective Cross Sectional Study. PloS ONE 2010; 5(9): e 12505.
8. Islam R, Salahuddin M, Ayubi MS, Hossain T, Majumder A, et al. Dengue epidemiology and pathogenesis: images of the future viewed through a mirror of the past. Virol Sin 2015 30: 326-343.
9. Getachew D, Tekie H, Gebre-Michael T, Balkew M, Mesfin A. Breeding sites of Aedesaegypti: potential dengue vectors in Dire Dawa, East Ethiopia. InterdiscipPerspect Infect Dis 2015: 706276
10. Jamil B, Hasan R, Zafar A, Bewley K, Chamberlain J, Mioulet V, Rowlands M, Hewson R. Dengue virus serotype 3, Karachi, Pakistan. Emerg Infect Dis 2007; 13(1): 182-83.
11. Bushra J. Dengue virus serotype 3, Karachi, Pakistan. Emerg Infect Dis 2007; 13(1).
12. Achee NL, Gould F, Perkins TA, Reiner RC, Morrison AC, et al. (2015) A critical assessment of vector control for dengue prevention. PLoSNegl Trop Dis 9: e0003655.
13. World Health Organization (2017) Dengue Control.
14. Ummar R, Faheem M, Riaz MN, Kanwal N, Jeved F, Zaidi NS, et al. Dengue fever in Indian sub-continent: an overview. J Infect DevCtries 2011; 5: 239-47.
15. Syed M, Saleem T, Sueda UR, Habib M, Zahid R, Bashir A, et al. Knowledge, attitudes and practices regarding dengue fever among adults of high and low socioeconomic groups. J Pak Med Assoc. 2010 Mar; 60(3): 243-7
16. Tahir Z, Hafeez S, Chaudry A. Spatial and seasonal variation of dengue fever in Lahore 2008. Biomedica 2010; 26: 166-72.
17. Guha-sapir D, Schimmer B. Dengue Fever: New paradigms for a changing epidemiology. Emerg Themes Epidemiol 2005; 2: 1.
18. Doke PP. Investigation report of an epidemic of dengue fever. Indian J Community Med 1991; 16: 119-25.
19. Kalayanarooj S, Vaughn DW, Nimmannitya S, Green S, Suntayakorn S, Kunentrasai N, et al. Early clinical and laboratory indicators of acute dengue illness. J

Infect Dis 1997; 176: 313-21.

20. Samsi TK, Wulur H, Sugianto D, Bartz CR, Tan R, Sie A. Some clinical and epidemiological observations on virologically confirmed dengue hemorrahgic fever. PediatrIndones 1990; 30: 293-303.

21. Lucas GN, Amerasinghe A, Sriranganathan S. Dengue haemorrhagic fever in Sri Lanka. Indian J Pediatr 2000; 67: 503-4.

22. Ahmed FA, Mahmood CB, Das SJ, Hoque SM, Zaman R, Hasan MS. Dengue and DHF in children during the 2000 outbreak in Chittagong, Bangladesh. Dengue Bull 2001; 25:33 - 40.

23. Srivastava VK, Suri S, Bhasin A, Srivastava L, Bharadwaj M. An epidemic of dengue haemorrhagic fever and dengue shock syndrome in Delhi: a clinical study. Ann Trop Paediatr 1990; 10: 329-34.

24. Munir MA, Alam SE, Khan ZU, Saeed Q, Arif A, Iqbal R, Saqib MA, Qureshi H.Dengue fever in patients admitted in tertiary care hospitals in Pakistan.J Pak Med Assoc. 2014 May;64(5):553-9.