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Original Article

Internal Medicine Section

A Study of Etiological Pattern in an Epidemic of Acute Febrile Illness during Monsoon in a Tertiary Health Care Institute of Uttarakhand, India

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ABSTRACT

Background: Many parts of India are endemic for the dengue, malaria, typhoid and scrub typhus infections. The relative contribution of these illnesses in an outbreak of acute febrile illness is not known in this region.

Objective: The present study was conducted to find out the etiological pattern in an epidemic of acute febrile illness in Uttarakhand during the monsoon period. The study also focuses on concurrent infections and tries to find out the mortality outcomes.

Materials and Methods: A retrospective study of four months was conducted on 1141 patients who presented with fever, and were suspected to have dengue, malaria, typhoid or scrub typhus. Patients of 12-years of age or above were included in the study. Serological tests for dengue, malaria, typhoid and scrub typhus were performed. Slides for malaria parasite were examined. In case of enteric fever only culture positive cases were included in the study.

Result: Among the 1141 febrile patients dengue was detected in 812(71.2 %), malaria in 146(12.8%), typhoid in 92(8.1%) and scrub typhus in 69(6.0%) cases. Mixed infection was noted in 22(1.9%).
Conclusion: Maximum (71.2 %) cases of fever were caused by dengue but significant number (32.3%) of patients suffered from malaria typhoid and scrub typhus. Many (1.9%) suffered from concurrent and multiple infections.

Keywords: Dengue, Epidemic, Malaria, Scrub typhus Typhoid

INTRODUCTION

Fever is a common presenting symptom in developing countries. During the rainy season it becomes the commonest presenting symptom in our hospital. Epidemics of acute febrile illness have been causing major concerns in India [1,2]. Dengue, malaria, typhoid and scrub typhus have been reported in such epidemics. Every year during and after the rainy season an epidemic of acute febrile illness is witnessed in Uttarakhand but the relative contribution of various etiological agents remains unknown. There is no published data on this topic from this region.

MATERIALS AND METHODS

This retrospective study was conducted at Sri Mahant Indiresh hospital and Sri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India. The hospital is a tertiary referral centre of Uttarakhand where the patients reach not only from Dehradun but also from the neighboring districts and bordering states. The study period was of five months, ranging from July 2013 to November 2013. Patients of 12-years age or above, presenting with acute febrile illness, who tested positive for dengue serology, malaria antigen or slide test, *salmonella typhi* or paratyphi and scrub typhus were included in the study. All such admitted patients underwent detailed history and examination. Dengue infection was diagnosed using a commercial ELISA NS 1 antigen test and IgM antibody. Only culture proven cases of enteric fever were included in the study. Serology positive but culture negative cases were considered as clinically diagnosed typhoid and were excluded from the study. Malaria was confirmed on the basis of positive slide test or positive antigen. Patients with positive IgM antibody against *O. tsutsugamushi* in their serum were diagnosed as scrub typhus. Patients suffering from more than one infective etiology were considered as mixed infection.

RESULTS

A total of 1141 patients were found to be suffering from acute febrile illness. 618(54.2%) were male and 523(45.8%) were female . Male female ratio was 1:2 [Table/Fig-1]. 1006(88.2%) patients reported from September to November [Table/Fig-2]. Dengue was detected in 812(71.2 %), malaria in 146(12.8%), typhoid in 92(8.1%), and scrub typhus in 69(6.0%) cases. Mixed infection was noted in 22(1.9%) [Table/Fig-3,4]. Out of these 9(0.79%) had dengue with malaria, 5(0.44%) had dengue with scrubtyphus, 3(0.26%) had

Age group	Male	Female	Total
12-20	140(12.3%)	118(10.3%)	258 (22.6%)
21-30	163(14.3%)	128(11.2%)	291(25.5%)
31-40	131(11.5%)	105(9.2%)	236 (20.7%)
41-50	112(9.8%)	102(8.6%)	214(18.8%)
51-60	53(4.7%)	51(2.1%)	104(9.1%)
61-70	14(1.2%)	13(1.1%)	27(2.4%)
70-80	5(0.4%)	6(0.6)	11(1.0%)
Total	618(54.2%)	523(45.8%)	1141 (100 %)

[Table/Fig-1]: Age and sex wise distribution of febrile patients

Month	No. (%)
July	42(3.7%)
August	93(8.2%)
September	280(24.5%)
October	386(33.8%)
November	340(29.8%)
Total	1141(100.0%)
70-80	5(0.4%)
Total	618(54.2%)

[Table/Fig-2]: Month wise distribution of febrile patients

Disease	No. (%)
Dengue	812(71.2%)
Malaria	146(12.8%)
Typhoid	92(8.1%)
Scrub typhus	69(6.0%)
Mixed infections	22(1.9%)
Total	1141

[Table/Fig-3]: Etiological pattern of febrile patients

Disease	No. (%)
Dengue +Malaria	9(0.79%)
Dengue + Scrub typhus	5(0.44%)
Dengue+ typhoid	3(0.26%)
Malaria+ Scrub typhus	1(0.09%)
Dengue +Malaria +typhoid	1(0.09%)
Dengue +typhoid+ Scrub typhus	1(0.09%)
Malaria + Typhoid	1(0.09%)
Typhoid + Scrub typhus	1(0.09%)
Total	22(1.9%)

[Table/Fig-4]: Breakup of mixed infection

Age group	Total	Improved	Mortality
12-20	258 (22.6%)	256(22.4%)	2(0.2%)
21-30	291(25.5%)	288(25.2%)	3(0.3%)
31-40	236 (20.7%)	233(20.4%)	3(0.3%)
41-50	214(18.8%)	210(18.4%)	4(0.4%)
51-60	104(9.1%)	100(8.8%)	4(0.4%)
61-70	27(2.4%)	25(2.2%)	2(0.2%)
70-80	11(1.0%)	10(0.9%)	1(0.1%)
Total	1141 (100 %)	1122(98.3%)	19(1.7%)

[Table/Fig-5]: Agewise mortality

Disease	Total	Mortality
Dengue	812(71.2%)	12(1.1%)
Malaria	146(12.8%)	3(0.26%)
Typhoid	92(8.1%)	2(0.18%)
Scrub typhus	69(6.0%)	1(0.09%)
Mixed infections	22(1.9%)	1(0.09%)
Total	1141 (100%)	19(1.7%)

[Table/Fig-6]: Diseasewise mortality

dengue and typhoid. 1(0.09%) patient was found to be each in the category of malaria with scrub typhus, dengue with malaria and typhoid, dengue with typhoid and Scrub typhus, malaria with typhoid, typhoid with scrub typhus. Ninteen (1.7%) patients died. Maximum mortality was caused by dengue12(1.1%) followed by malaria 3(0.26%) and 2(0.18%). 1(0.09%) patient died by scrub typhus and another 1(0.09%) by mixed infection. One person who died of mixed infection was suffering from dengue with malaria [Table/Fig-5,6].

DISCUSSION

Males were more commonly suffering from fever. This may be due to their easy exposure to mosquitoes and mites because of their outdoor activities. Maximum number of cases were noted from September to November. Mixed infections are not uncommon in the tropics [3]. Monsoon period is a convenient time for mosquitoes to breed and infected mites to thrive. Drinking water also gets easily contaminated during this period. All these lead to clustering of dengue, malaria, typhoid and scrub typhus. Scrub typhus and leptospirosis have been reported in around 10%–20% cases of acute febrile illness in South east Asia [4-7].

Dengue, malaria, scrub typhus, typhoid and leptospirosis have been identified as major causes of acute undifferentiated febrile illness inThailand, Malaysia, and Nepal [8-12]. One third of all cases of acute undifferentiated non-malarial fever in Vietnam are caused by dengue [13]. In a similar study from Karnataka, 100 patients of acute febrile illness were diagnosed with: scrub typhus (33%); dengue (25%); enteric fever (14%); malaria (8.0%) [14]. Only culture positive cases were considered as enteric fever because false positive widal test is well known in cases of malaria and dengue [15,16].

Concurrent infections with more than one etiological agent can result in an illness with overlapping symptoms, resulting in a situation where the diagnosis and management of such a patient could be challenging [17-20]. The symptoms of dengue may mimic other diseases such as malaria and scrub typhus which are also prevalent in areas where dengue is endemic [21]. The similarity in symptoms between these infections may complicate the diagnosis of acute fever. Patients presenting with acute febrile illness should not be automatically assumed to have mono infection alone. The clinician should look for other causes of fever especially if atypical presentations arouse suspicion of other possible etiologies.

CONCLUSION

Maximum patients suffered from dengue in this epidemic of Uttarakhand making it primarily a dengue epidemic. Other infections in order of frequency were malaria, typhoid and scrub typhus. Significant numbers of patients were found to be suffering from various combinations of these infections. There is a need of greater awareness among clinicians for the possibility of co infections in a patients presenting with acute febrile illness.

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