Original Research Article

Indian Journal of Emergency Medicine
Volume 5 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijem.2395.311X.5119.3

Mortality Audit of Febrile Cases Admitted in a Tertiary Care Hospital in Eastern India

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Received on 11.01.2019,
Accepted on 02.02.2019

Abstract

Background: Frequent outbreaks of dengue, malaria, typhoid, and influenza are very common in India, especially during the monsoon season. This study aimed at analyzing the cause and outcome of such febrile cases admitted in a tertiary care private hospital of Kolkata, India. *Methods:* An audit of patients (N=840) admitted to the hospital with fever was carried out from June to November, 2017 and were studied for diagnosis and clinical outcome. Data were collected, analyzed and documented using Microsoft Office Excel 2007 version. *Results:* Dengue was the most common infection accounting for 78.3% of all cases, followed by Influenza (8.2%) and Scrub typhus (6.5%). A total of 14 deaths occurred during the outbreak; mortality was higher among females (57.1%) and in patients with scrub typhus (8.3%). *Discussion:* This study confirms the need of including scrub typhus screening test in the fever panel. Studies assessing the prevalence and outcomes of scrub typhus must be done in Indian hospitals to understand the morbidity and mortality patterns better.

Keywords: Febrile; mortality; India; scrub typhus; Fever Panel; audit.

Introduction

Every year, India witnesses several outbreaks of tropical infections such as dengue, malaria, typhoid, influenza and other diseases. In case of death the diagnosis given may be misleading because of incomplete work up of such patients which may lead to incorrect diagnosis as many of the reports are based on clinical judgment. The first record of un-proven dengue epidemic dates back to the year of 1780 in Chennai and the first proven epidemic of dengue infection dates back to the year 1963–1964 in the eastern Indian city of Kolkata and rest of the eastern India. The first report of dengue hemorrhagic fever epidemic was reported in 1996 from the Northern region of the country [1]. All these facts led us to believe that dengue is the most prevalent infection especially during the monsoons. Common symptoms of most of these infections include fever, chills, rigors, rashes, headache, myalgia and delirium [2]. The current study was conducted to understand the real prevalence and outcome associated with the febrile cases and to have an idea as to the causes of the deaths in such patients.

Methods

Study Design

A retrospective audit was carried out from June 2017 to November 2017 in a tertiary care hospital in Kolkata, Eastern India. The study sample consisted of all the patients admitted into the hospital with acute febrile condition.

Data Collection

Infection control nurses collected data as a part of fever audit. The following data were collected:

- Patient's initials
- Patient's unique hospital id no
- Patient's age

- Patient's sex
- Patient's address
- Patient's diagnosis with Laboratory Reports
- Date of admission
- Signs and symptoms
- Final clinical outcome

A data collection form was used to collect the above information for the study. All admitted fever cases were analyzed.

Data Analysis

Microsoft Office Excel 2007 was used for documentation and analysis of data from the data collection forms.

Results

A total of 840 febrile cases were admitted to the hospital during the study tenure, of which only 742 could be diagnosed with a particular disease. A total of 14 deaths were observed during the study and investigations performed related to those cases revealed Dengue Shock Syndrome as the leading cause of death. Figure 1 depicts that dengue (78.3%; n= 581) was the major cause of infection among the diagnosed febrile cases followed by influenza [including H1N1] (8.2%; n= 61) and scrub typhus (6.5%; n= 48). A total of 98 patients were encountered were definitive diagnosis could not be made and the exact cause remained obscure. Table 1 demonstrates that 434 (58.5%) males and

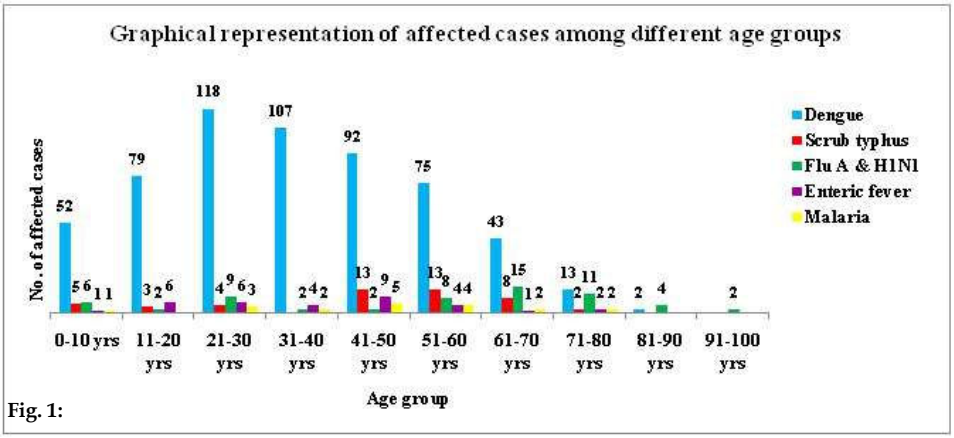

Fig. 1:

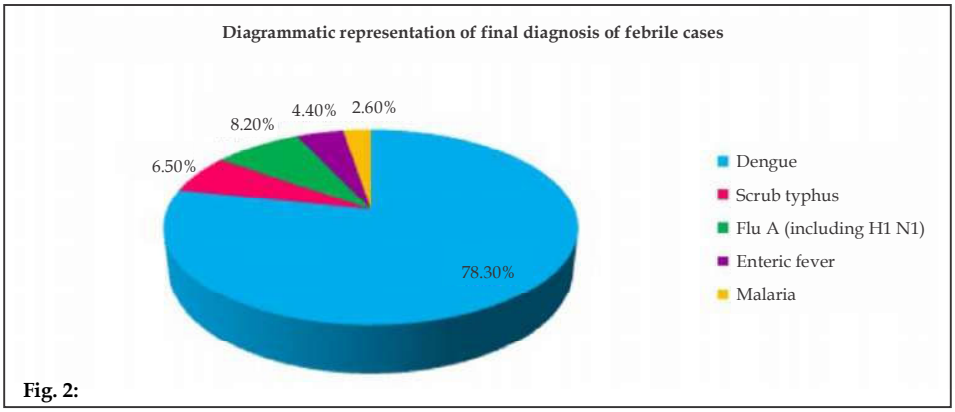

Fig. 2:

Table 1: Sex distribution among diagnosed febrile cases

Disease	Male	Female
Dengue	339	242
Scrub typhus	31	17
Flu A (including H1N1)	35	26
Enteric fever	13	20
Malaria	16	3

308 (41.5%) females were affected. The age-wise distribution of 581 dengue, 48 scrub typhus, 61 flu A (including H1N1), 33 enteric fever and 19 malaria affected patients is demonstrated in Figure 2. Dengue affected patients (n=225) mainly belonged to two age groups (21–30 years and 31–40 years) but majority of scrub typhus affected cases (n=26) were from middle to old age patients. (41-60 years). It is observed that maximum number of (n=34) Flu (including H1N1) cases were noted in older adults above 50 years. The incidence of Malaria was similar to scrub typhus with respect to the affected age groups and all the 9 patients were infected with *Plasmodium vivax (P. vivax)* species. Both the cases of *P. falciparum* species were above 70 years old. Patients with enteric fever belonged to the age category 41–50 years.

Incidences of co-infection observed during the study are depicted in Table 2. Table 3 depicts that mortality occurred more commonly in females (57.1%). It was found that deaths due to scrub typhus and flu occurred mostly in patients who were aged above 60 years. The maximum number of death cases resided in 24 Parganas districts (suburbs of Kolkata city) followed by Kolkata city. It was observed that even though the number of dengue fever was largest, the mortality rate was highest (i.e. 8.3%) among the scrub typhus affected patients. Multi-organ failure was the common cause of death (Table 3). Table 3 also depicts that maximum death cases were seen in the month of October 2017 (n=6).The diagnostic tests carried out for the patients are shown in Table 4.

Table 2: Co-infection among diagnosed febrile cases

	Case 1	Case 2	Case 3
Scrub typhus	+	+	+
Dengue fever	+	+	
Brucellosis			+

Table 3: Epidemiological data and cause of death of mortality cases

Case No.	Month	Age	Sex	Location	Diagnosis	Test Result	Cause of Death
1	July	47	F	Midnapur (W)	Dengue	NS1 +ve	DSS, multi organ failure
2	August	65	M	24 Pgs (N)	Dengue	NS1 +ve	Cardiac arrest
3	September	53	M	24 Pgs (N)	Dengue	Both IgM & IgG +ve	Cardiac arrest
4	September	62	F	24 Pgs(S)	Dengue	NS1 +ve	DSS, multi organ failure, diabetes, asthma, respiratory failure
5	September/ October	37	M	24 Pgs(S)	Dengue	Both IgM & IgG +ve	DSS, multi organ failure, jaundice, thrombocytopenia
6	October	78	F	Kolkata	Dengue	NS1 +ve	Sepsis, multi organ failure
7	October	72	F	Kolkata	Dengue	NS1 +ve	Sepsis, multi organ failure, diabetes ketoacidosis, HTN, DM
8	October	49	M	Nadia	Dengue	NS1 +ve	Sepsis, multi organ failure, diabetes ketoacidosis, HTN, DM
9	November	35	F	Kolkata	Dengue	NS1 +ve	Cardiac arrest, DSS
10	August	52	M	24 Pgs(N)	Scrub typhus	IgM +ve	Sepsis, multi organ failure
11	September	64	F	Kolkata	Scrub typhus	IgM +ve	Multi organ dysfunction/failure with secondary sepsis on a background of Type II DM
12	October	42	F	Burdwan	Scrub typhus	IgM +ve	Multi organ failure, septic shock
13	October	61	F	24 Pgs(S)	Scrub typhus	IgM +ve	Sepsis, multi organ failure
14	August/ September	76	M	Midnapur(E)	Flu	Flu A +ve, H1N1 not detected	Septic shock due to left lung pneumonia, HTN

Table 4: Diagnostic test conducted in the study

Suspected Disease	Test parameters		
Dengue	NS1 Antigen	IgM Antibody	IgG Antibody
Scrub typhus	IgM Antibody		
Malaria	Dual Antigen	Malaria Parasite	
Enteric fever	Widal		
Influenza (Flu A, Flu A H1N1, Flu B)	Real-time PCR		

Discussion

The most important finding in this study was that of higher mortality in patients with scrub typhus which indicates the need of early diagnosis and instituting early therapeutic intervention to treat this potentially curable disease [3]. In this study, majority of the admitted patients belonged to the rural/sub-urban areas of 24 Parganas, a suburban area around Kolkata city. It was found that out of 840 febrile patients, only 742 (88.3%) were diagnosed with a causative agent. Scrub typhus presents with diverse manifestations and variable severity. The usual symptoms of scrub typhus are similar to dengue, malaria and typhoid with fever being the major and most common symptom. An increase in reporting of scrub typhus cases was noticed in Kolkata during the study tenure. Many (6.5%; n=48) scrub typhus cases were encountered and a high mortality rate (8.3%) was observed. Out of all the observed deaths, 5 were reported due to scrub typhus. Febrile conditions can be caused by mixed pathogens as shown by a study conducted by Sivarajan et al in the state of Meghalaya in North Eastern India [4]. Our study maintains parity with this finding as 3 co-infection cases were encountered among the diagnosed cases. The audit revealed that majority of the patients who died belonged to the rural areas having dense shrubby vegetations where the vector thrives [5]. According to the WHO, Scrub typhus is probably one of the most underdiagnosed and underreported febrile illnesses requiring hospitalization in the Indian subcontinent region [6,7]. Our findings reconfirm the fact that rickettsial diseases such as scrub typhus are re-emerging in the Indian subcontinent with a more varied geographical distribution [8-12]. Although this rickettsial infection is quite commonly observed in India, scrub typhus still remains one of the most important neglected zoonoses of public health importance in this country. In published literature high mortality has been recorded (up to 50% of the cases) usually because of conditions like: late antibiotic administration and other associated comorbidites affecting the patient along with the virulence of the strain of organism responsible for the infection [6]. It is known that this disease infects people throughout the year in the tropical countries but clustering of cases is noticed during the monsoon months from July to November [7,13]. This study revealed that majority of deaths were due to multiple-organ failure, thus having a similarity with the findings observed in studies conducted by Vivekanandan et al. and George M. Varghese et al. [14 15]. Diagnosis of this infection remains a challenge because of its long list of manifestations which often overlaps with other infections commonly found in these areas [2]. Serology is the cornerstone for diagnosis, usually based on measurement of presence of IgM antibody. In primary infection, a IgM antibody titer is obtained as it gives a positive result for the infection usually by the end of 1st week [16]. This particular test was conducted for detection of scrub typhus cases in this study as well. Even though this test is not very sensitive, it is used because of its low cost and its specificity in positive cases [14]. In India, nearly half the cases of scrub typhus reported a presence of a black eschar which is an indicator of this disease but none of the scrub typhus cases studied in our audit had presence of any eschar. This finding is similar to some studies reported earlier from India [13,14,17,18]. Looking at this fact, it seems that the absence of an eschar is quite common in South-East Asian population and patients not presenting an eschar should not be omitted for diagnosis of scrub typhus [14,15,18-21]. Rapid and unplanned urbanization appears to be the main reason behind current outbreak of dengue in Eastern India. In this study, we found a huge number (78.3%; n=581) of patients infected with dengue fever. Case fatality rate of dengue in this study was found to be very low (1.5%) but that of scrub typhus was much higher (8.3%; n=4). We also found that although the number of dengue fever cases reported has shown a steady rise, the mortality has reduced. In studies conducted by SK Mahajan et al., it was observed that the scrub typhus infection affected children and there were reports of hearing loss in patient population [20,21] None of these were reported in our study. The most important finding in this study was that of high mortality rate of scrub typhus which indicated towards the compulsion of early diagnosis and inclusion of diagnostic test of this disease among the fever panel tests for the early disease identification of febrile patients. It is known that measures to prevent bites of chigger mites are feasible and people at risk specially those residing in rural areas should be aware of these measures [19]. Like all other studies our study had limitations like study being uni-centric in nature and its retrospective design. However, this is the largest number of febrile cases being analyzed in the city of Kolkata and Eastern India for assessing the associated morbidity and mortality, which is definitely strength of the current study. The data collection was performed in a systematic manner by infection control staff trained on the audit format which is strength.

Conclusion

This study emphasizes the need for inclusion of specific scrub typhus detection test into the hospital fever panel which is lacking in Hospital currently and increased sensitization of physicians for suspecting scrub typhus illness in febrile patients. The number of deaths due to this disease appears to be low at first glance, but considering the numbers of those exposed and/or infected and those who died from it paints an entirely different picture. Almost all tropical infections often share the identical symptoms during the initial phase of infection. Greater awareness of scrub typhus among the doctors of primary, secondary and tertiary care levels and better availability of diagnostic facilities in the Indian healthcare system are needed. Also, presence of reliable tests is required in patients presenting febrile condition to avoid the delay in diagnosis and subsequent treatment. This study reiterates the fact that physicians should be more familiar about the disease so that cases can be diagnosed early thus avoiding serious complications and reducing the mortality rate. Such mortality audits should be regularly conducted in cases of febrile outbreaks so that necessary measures adopted can be reviewed and modified, if required. The incidence of scrub typhus in the Indian subcontinent can only be reduced by the cumulative effects of increased physician awareness about disease presentation, better diagnostic capabilities and regular reporting.

Acknowledgement

We would like to acknowledge the support of all the clinicians, and nursing staffs of Peerless Hospitex Hospital & Research Center Limited for providing us the information utilized in this study.

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