Comparative analysis of bio chemical profile of complications in patients with acute febrile illness

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Abstract
Background: The objective of this study was to compare bio chemical and clinical profile and to outcome of acute febrile illness complication in patients of tertiary care hospital during pre-winter season. **Methods:** it's an observational and prospective study done in a Teerthanker medical college Moradabad, India. During the period of august 2018 to Nov 2018, patients admitted with complicated acute febrile illness were included. Patients were compared on the basis of demography, bio chemical profile of complication. **Results:** total of 275 patients were enrolled in which 186(66.8%) were males and larger proportion of the study comprises of cases with age group below 35yrs. On examination, mostly patients complained 0f generalized body ache (86.9%), headache (78.4%), nausea vomiting (72.4%), abdomen pain (52%), dark colored urine (36.2%), and dyspnoea (33.1%), loose stools (28.1%) and altered Sensorium (8.%). Significantly associated clinical sign were pedal edema 14.5% (P=0.001), icterus 20.7 % (P=0.0001) and tachypnea 19.4% (P=0.001). commonest complication of dengue at presentation was shock (70.9%) later on by hepatic (67.5%) and hematology (65%) derangements, that of malaria was acute renal failure (3.4%), followed by respiratory distress (22.3%). Overall mortality in Dengue was 7(3.8%), malaria 15(32.6%), Hepatitis E 2(50%). **Conclusion:** study shows similar spectrum clinical features, although there is diversity of etiology and causes that demonstrates the diagnosis complexity and thus treatment of acute febrile illness.so study of biochemical profile of complication in febrile illnesses will be a help to decrease morbidity and mortality because of post monsoon illnesses by early diagnosis and prompt treatment. Dengue and malaria emerges as the commonest causes and main killers because of respiratory and renal involvements.
Key Word: acute febrile illness, bio chemical profile, complications.

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INTRODUCTION

Acute febrile illness (AFI) is coined as when a patient presents with temperature of 38°C or more, or if there is history of pyrexia that remains for 3–7 days without any localization. Fever is most common clinical symptom of different infectious diseases in tropical areas like India In India, there is constant climate changes during monsoon and pre winter season that leads to occurrence of numerous infectious health hazards resulting in diseases occurrence and transmission., India and similarly other developing countries with limited resource, are experiencing lots of health effects because of climate variation, and diseases like mosquito borne such as dengue and malaria water transmitted diseases such as enteric fever cholera leptospirosis,.[1]A in Moradabad city and adjoining areas of western U.P acute febrile illnesses, during pre-winters (august -November), increase to such epidemic proportions with high morbidity and mortality in the patients during this time.[2] These acute illness

malaria dengue scrub typhus enteric fever and leptospirosis cause distinctive mortality and high burden of health expenses of the state 3 more over there is significantly good numbers of mixed infections with the previously described causative agents, some causes remains unidentified others still remain unidentified Mostly patient of AFI presents complication such decreased urine and acute kidney injury, acute hepatitis, decreased platelets and bleeding manifestation, breathlessness ARDS hemoptysis sometimes myocarditis, and so on. So proper management of illness and algorithm to manage complication it is very necessary to know the pathogen epidemiologically and its bio chemical and clinic profile. So we studied epidemiology and detailed data of prewinter diseases in over past 3-4 years interestingly we noticed similar pattern in our study (Figure 1).more over there is marked increased in mortality because of secondary organ involvement. We also noticed the increased referral to our institution as being a tertiary level health care in recent years. We studied clinical symptoms, signs and analyzed the laboratory profile of the patients who presented to institute with secondary organ involvement like hematological pulmonary hepatic renal and neurological complications .thus our research study aimed at finding out clinical symptom specific sign and bio chemical and demographical factors, That can actually be alarming for physician before occurrence of certain complications. This will support in reduction of mortally which occurred in this season by referral and proper management.

METHODS

It is a observational prospective study conducted in Teerthanker Mahaveer medical college Moradabad during period of august to November in 2018. Patients age more than 13 yrs. who presented with complaints of fever with complications admitted to emergency department or general wards ICU, and were ready to give consent are enrolled for study. Patients whose complaints and lab profile do not match with acute fibril illness were excluded, thorough details of history Details of history and results of a were taken and enter was made on standard sheet. Base line investigations like complete haemogram hepatic and kidney function and specific test to make the diagnosis was to detect malarial parasites thin and thick films was performed, enzyme- linked immunosorbent assay Dengue NS1 IGM and IgG test were done confirmed by ELISA, enteric fever blood culture and rising titre of widal Hepatitis A/E: IgM Hepatitis A/E positive e with and other organism specific teats were done patients were followed up during stay in hospital8for development of complication and outcomes were observed in terms of death Statistical analysis was done with SPSS Software (version 21.0, Chicago, USA). Mean (SD) or median (range) for the continuous variables and t-test or Mann–Whitney test was used to test the significance. Different category markers were observed in ratio and Chi-square test or Fisher was used to differentiate dichotomous observation.). For all tests, a two-sided P = 0.05 or less was considered statistically significant.

OBSERVATIONS

Number of patient who got admitted to Teerthanker Mahaveer Medical College with the diagnosis of acute febrile illness with complications during the period of august 2018 to nov2018. Was 275 out of 2764 total case presented, so estimated prevalence of complications studied was 30.02%. Among 275 cases enrolled 181 diagnosed with dengue, 45 with enteric fever 37 cases were of malaria and 4 as hepatitis E while cases studied 9 cases were attributed to mixed infection. Among cases Males were 189 (68.8%) were more commonly involved than females86 (31.2%) patients with age 35 years or below 209 (76.4 %) (P < 0.000). Mean age of presentation was 28 years with SD of ±12.51 for males and 31years for females with SD of ±14.21. Complication presentation was more of from lower and middle socio economic class (43% and 46%) ache (85.9%), headache (77.4%), vomiting (73.4%), abdominal pain (50%), high colored urine (34.2%), breathlessness (32.1%), and loose motion (25.1%) and altered Sensorium (8.8%). Most of patients were associated with generalized body ache 86.9% followed by headache (78.9%) and dyspnoea (32%), some of the patients reported symptoms which were associated with high chances of complications like dark colored urine (P=0.00), loose stools (P=0.002), body rash (P=0.0036), dyspnoea (P=0.002), seizures (P=0.019) and altered Sensorium (P=0.001). (Table1). Some signs like moderate ascites (p: 0.0030 pedal edema (P=0.001), jaundice (P=0.0002) and tachypnea (P =0.001) were associated with poor outcome than other usual signs (Table 2).We studied lab reports s (Table 3) that signifies as some cases of mild to moderate mild to moderate anemia was frequent but mostly had hemoglobin of >12 gm% (44.1%).platelet counts were 70000mm3,and above usually while 20.4% patients had platelet count less than 10000. Serum liver transaminases was found elevated and some patients have degree of pre renal impairment Chi-square test was applied, and discovered complications That that had significant association associated were neurological involvement (CNS) in (P=0.027), ARDS (P=0.037), acute kidney injury (P =0. 00 03) and shock (P=0.02). And hematological (p=0.002) while hepatology involvement was less significantly associated with complications (Table 4). Shock (71.9%) followed by liver

involvement (66.7%) were the commonest complication of dengue fever while derangement in hematological indices were (65 %) that CNS (29.4%) respiratory 15%, l it was renal failure (14.9%) were the main complication of malaria. Multi organ involvement of 3 or more commonest finding 119(43 .75%) after that followed by 2 organs in 63(22.18%) (Figure 2). In terms of outcomes Dengue had mortality was 12 (5.8 %),malaria 8(7.6%),

enteric 2(5.6%), Hepatitis E 2(50%), hypovolemic or hemorrhagic shock and bleeding manifestation was main mortality causes in dengue, , acute respiratory distress syndrome (ARDS) and acute kidney injury (AKI) in malaria fulminant hepatic failure and disseminated intravascular coagulopathy were the causes for mortality in hepatitis E.
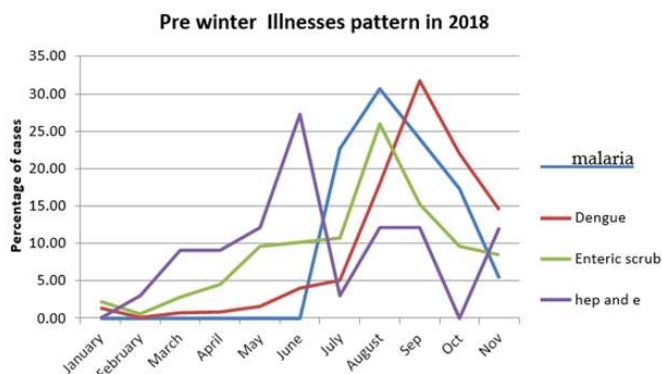

Pre winter Illnesses pattern in 2018

Table 1: Symptoms of patients with acute febrile illness (n=275)

Symptoms	Dengue (N=181)	Malaria (N=37)	Enteric fever (N=45)	Mixed infection (N=9)	Hepatitis E (N=3)	Total	P value
Head ache	142 (79.3)	1 27 (74.7)	35 (75.9)	6 (76.4)	1 (33)	210 (78.4)	0.63
Generalized Body ache	169 (86.4)	26 (77.8)	40 (88.1)	5(76)	2 (66)	242(86.9)	0.53
dark colored urine	53 (28.8)	12 (34.1)	26 (56.8)	3 (42)	2 (66)	96 (36.2)	0.004
Abdomen pain	92 (49.9)	18 (49.80)	25 (52.2)	4(42.8)	1 (33)	140 (52)	0.99
loose stools	49 (27.5)	6 (19.3)	6(19.2)	4 (42.5)	3 (100)	69 (25.1)	0.017
Body Rash	48 (27.1)	7(15.9)	6 18.7)	2 (25.5)	0	63 (21.5)	0.003
nose/mouth bleed	18 (9.5)	8 (5.9)	8(16.6)	3 (42)	0	37 (12.2)	0.40
dyspnoea	47 (28.4)	19 (49.2)	28 (52.2)	2 (25.3)	0	88 (32.1)	0.001
Decreased urine	26 (15.6)	7(15.7)	12 (26.7)	1 (14)	0	46 (16.6)	0.36
seizures	5(2.9	0	2 (4.4)	2 (16.3)	2 (66)	11(3.9)	0.0019
Altered Sensorium	6(4.4)	8 (12.1)	6 (14.4)	4 (47.9)	2 (66)	26(8.9)	0.0010
Nausea/Vomiting	142(78.9)	26 (58.3)	28 (63.4)	7 (79)	3 (100)	200 (72.4)	0.052

Percentages in parenthesis

Table 2: Signs of patients with complicated febrile illnesses (N =276)

Sign	Dengue (N=181)	Malaria (N=37)	Enteric fever (N=45)	Mixed infection (N=9)	Hepatitis E (N=3)	Total	P value
Moderate Ascites	16 (8.5)	5 (12.1)	2 (5.5)	0	0	23(8.3)	0.003
Rapid weak pulse	64 (35.3)	10 (29)	15 (31.4)	1 (12.5)	2 (50)	92 (29)	0.54
Hepatomegaly	18(9.7)	5 (6.7)	9 (19.2)	0	0	32 (11.6)	0.35
Splenomegaly	8 (4.4.)	3 (6.7)	5(9.9)	0	0	16(5.80)	0.60
limb edema	15 (8.7)	12 (28.8)	12 (27.6)	1 (12.5)	0	40 (14.5)	0.002
Purpura	15 (7.8)	0	2 (3.2)	0	0	17 (6.1)	0.28
Coma	13 (7.2)	5 (15.7)	9 (28.7)	1 (12.5)	0	28 (10.6)	0.09
Icterus	17 (9.3)	5 (15.7)	28 (62)	2 (25)	3 (75)	57 (20.7)	0.0001
Tachypnea	24 (13.7)	12 (32.4)	14 (36.8)	3 (26)	0	51 (19.2)	0.001

Table 3: Laboratory investigations of patients with complicated febrile illness (n=275)

Hemoglobin	N (%)
<4 g%	2 (0.5)
4-7.9 g%	10 (3.6)
8-10.9 g%	60 (22.6)
11-13 g%	82 (31.2)
>13 g%	120 (42.1)
Platelet count	N (%)
<10,000	57 (20.2)
10,000-30,000	65 (23.2)
31,000-70,000	95 (12.2)
71,000-90,000	65 (23.2)
>90000	29 (10.2)
kidney function test	Average (Range)
BUN	26.5219 (4.10 – 195)
Serum creatinine	1.9007 (0.45 – 16.60)
hepatic function test	Average (Range)
SGOT (AST)	297 (5-5002)
SGPT (ALT)	158 (5-2777)

Table 4: Percentage of complications in febrile illnesses (n =275)

Disease	CNS involvement	Hepatitis	Respiratory distress	Renal failure	Hematological derangement	Shock/dehydration
Dengue (N=181)	7 (36.3)	144 (66.7)	70 (62.1)	27 (36.1)	162 (65.7)	130 (71.9)
Malaria (N=37)	6(25.4)	26 (12.6)	18 (15.9)	11(14.5)	36 (14.52)	26 (14.7)
Enteric fever (N=45)	5 (29.4)	37 (16.7)	24 (21.7)	32 (44.9)	38 (15.4)	24 (12.5)
Mixed Infection (N=9)	0	6 (2.5)	2 (1.6)	1 (2.17)	7 (2.8)	5 (2.6)
Hepatitis E (N=3)	1 (5.9)	3 (1.6)	0	1 (1.7)	5 (2.6)	4 (2.6)
Total	17 (2.3)	216 (29.2)	114 (15)	72 (8.9)	248 (20.6)	189 (26.4)
P Value	0.027	0.35	0.037	0.0003	0.028	0.03

Table 5: Correlation of organ system involvement with outcome

| Organ		Discharged	Expired	Total	P- value
Nervous system	yes	15(5.8)	4 (12.5)	19 (6.1)	0.232
	No	236 (96.4)	20 (86.5)	256 (93.8)	
Gastrointestinal system	Yes	190 (75.4)	23 (91.3)	213 (76.9)	0.053
	No	61 (24.6)	1 (6.7)	62 (21.1)	
Respiratory system	Yes	92 (37.4)	22 (81.4)	114 (40.6)	0.001
	No	159 (64.6)	2 (18.2)	161 (59.4)	
Excretory system	Yes	56 (21)	18 (72.1)	74 (26.8)	0.001
	No	195 (78.7)	6 (25.9)	201 (73.2)	
Hematological derangement	Yes	220 (88.2)	22 (91.9)	242 (88.2)	0.054
	No	31 (12.2)	2 (8.7)	33 (11.9)	
Shock/Sepsis	Yes	171 (68.5)	13(46.2)	184 (64.9)	0.025
	no	80 (31.5)	11 (52.3)	91 (32.1)	
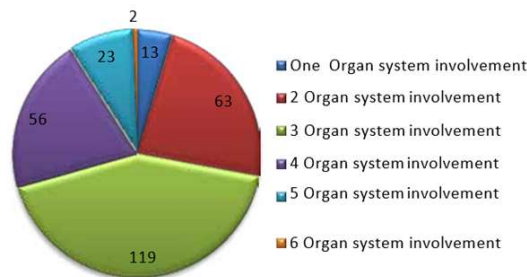
Figure 2: Frequency of affection of organ system in febrile illness

DISCUSSION

This was a observational study conducted to discover the bio chemical and clinical profile of complication of acute febrile illness during pre-winter season between the august 2018 to November 2018. total of 1012 patients of acute infectious causes were admitted during this period out of which 275 patient had some complication .these patients got selected and enrolled for study patients were divided further on age group basis as less than 35, 35 to 54 and 55 yrs and male (68.8%) below 35 years presents as the biggest proportion among cases with total 65%(120) of dengue, 32(78.4%) of enteric, and 31 (72.4%) of malaria cases. Abhilash KP also did the same results *et al* where male cases were predominating was seen in enteric (86.5% male while 12.4 % in females), while in malaria (84.6% male to that of females 15.2%), Also in dengue (there was 57.1% males while. 43.2%)most of the case were younger than 40 yrs.[4] Mittal G *et al* (65.2%) studied that most of acute infectious undifferentiated illness were males. [5] probable explanation may be higher exposure to mosquito and disease transmission. [6,7] There is increase in number of infectious illness and the trend remain progresses in early winters., dengue (66.9%) and malaria (25%) and enteric fever were predominate in post monsoon and early winters. Our study reports similar results to those found in other tropic countries of developing countries[9].9 In fact, nearly half of the global burden of dengue is borne by the Southeast Asian countries of India, Indonesia, Myanmar, and Thailand.[10] The majority of the cases of dengue, malaria enteric fever were reported during the monsoon and pre winter seasons, in relation with the reported outline of disease progression.[5,11] However, we found no significant seasonal variation in Hepatitis E and . In relation to our study, an increased incidence of enteric fever during the monsoon season was found by Sharma *et al* and Mallakar in Assam, India and Owaies *et al* in Pakistan.[12,13] Clinically, these common febrile illnesses were not only presented with pyrexia but difficulty in breathing, pain abdomen, loose stools, skin rash, hemoptysis,, generalized body ache and Icterus were commonly presenting complaints.[14] I blood investigation featured that their hemoglobin level decreased below normal while CBC came out to be normal in most of the patients, and 67% of the patients had thrombocytopenia with platelet count lower than 85,000 mm3. These patients have mild to moderate renal impairment mostly pre renal indices with derangement of hepatic function showing average SGOT and SGPTT levels ranging between 300 and 175.[14,15] Many times there was presence of more than one serological test occurs positive like enteric and dengue fever., mostly due to cross reactivity or mixed infection seen in 9(3.9%) of cases out of total. Physicians need to be aware of the high rate of these phenomena and hence be cautious in making an etiological diagnosis purely based on serological tests. These tests are of little utility early in the course of AFI but can be useful to establish the etiology during outbreaks and for patients who present after several days of onset of illness.[4] comparable with study by S Bajpai in 2008 when case fatality rate of acute febrile illness during monsoon was 7.23% of the 160 patients in our institution2 and ARDS and AKI were amongst most common complications responsible for deaths .When outcome of patients in our study was studied in relation to organ system affection; involvement of respiratory system in the form of ARDS (P <0.001), excretory system in the form of AKI (P<0.001) and shock (P=0.025) were significantly associated with mortality (Table) this study has certain limitation. Many important causative agents like scrub typhus, spotted fever, hanta virus, and chikungunya virus) were not tested routinely, and broader battery of serologic testing could not be applied because of financial constraints.
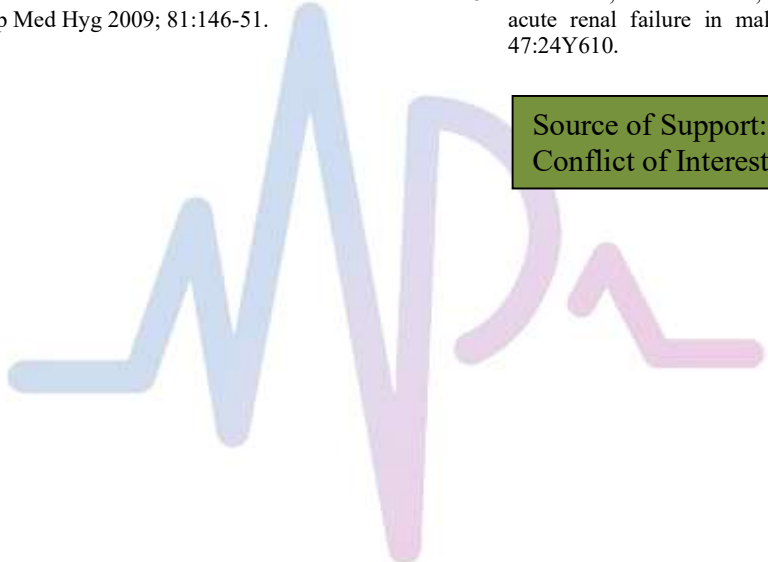
CONCLUSION

This study provides of comparative analysis of bio chemical clinical profile of the infectious diseases occur post monsoon and early winter will helf physician to have better knowledge of complication profile and their outcome, so it will provide a significant role in reducing mortality and morbid by early referral to a tertiary center and prompt management of disease and impending complications.

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