

Chikungunya Viral Infection Requiring Intensive Care – Experience in a Tertiary Care Hospital in Bangladesh

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Abstract

Background: Chikungunya fever is a benign self-limiting viral illness. Although it is considered as a non-fatal disease but in elderly patients who have co-morbidities can present with atypical life threatening clinical manifestations which may cause significant morbidity and mortality. The Aim of this study is to observe atypical presentations, various complications and outcome of chikungunya fever.

Methods: This was a cross sectional observational study was carried out on 23 adult patients with chikungunya fever from 1st June to 31st July of 2017 in the Department of Critical Care Medicine of BIRDEM General Hospital, Dhaka, Bangladesh.

Results: Total 23 patients were included in this study, male 83% and female 17%. From indoor 17(73.9%) patients got admitted in ICU, 3(13%) patients came directly from home and 3(13%) patients from another hospitals. Most of the patients were elderly having co-morbidities like diabetes, Hypertension, IHD and CKD. COPD and CVD were also present in a few numbers of patients. Most of the patients had fever, arthralgia and headache but respiratory distress (73.9%), altered mental status (56.5%), vomiting (21.7%), diarrhoea (17.3%) and low urine output (17.3%) are the causes of ICU admission. Major Organ involvement of the study subjects were respiratory system (52.1%), renal system (47.8%), CVS (34.7%) and nervous system (34.7%). Among 23, 16(70%) patients improved and 4(17%) patients died in ICU.

Conclusion: This study highlights that though chikungunya fever is considered as a benign non-fatal disease it can produce life threatening clinical manifestations and serious complications requiring Intensive Care particularly in elderly comorbid patients and can cause high mortality.

Key words: Chikungunya fever; Intensive Care Unit.

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Introduction

Chikungunya virus (CHIKV) is a mosquito-transmitted alphavirus that belongs to the Togaviridae family.¹ It causes chikungunya fever (CHIK fever), a febrile illness associated with severe arthralgia and rash.²⁻⁵ *Aedes aegypti*, *Aedes albopictus* commonly involved in the transmission, although *Culex* has also been reported for the transmission in some cases.^{1,6,7} Usual symptoms of CHIKV infection include high fever, rigors, headache, photophobia and a petechial or maculopapular rash. In addition, most infected individuals complain of severe joint pain that is often incapacitating and a painful inguinal lymphadenopathy was also reported in some cases.⁸ The illness is usually self-limiting and resolves with time. Supportive care with rest is indicated during the acute joint symptoms.^{8,9} Infective persons should be protected from further mosquito exposure so that they cannot contribute to the transmission cycle.¹⁰ For diagnosis, monitoring, detection and genotyping of

CHIKV, conventional reverse transcription-polymerase chain reaction (RT-PCR) methods have been used in the 1st week of illness. Anti-CHIKV antibodies can be detected in patients shortly after symptom onset, usually after 5 days for IgM and a few days later for IgG.^{8,11} The virus was first reported in 1952 in Tanzania. The virus is geographically distributed in Africa, Southeast Asia and India. Sporadic cases are regularly reported from different countries in the affected regions.¹² During December 2008, an investigation team from the Institute of Epidemiology, Disease Control and Research (IEDCR) and International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) investigated and detected the first outbreak of chikungunya fever in the Rajshahi and Chapianawabganj districts of Bangladesh.¹³

Though it is thought to be a benign non-fatal self-limiting viral illness atypical presentations of CHIKV infection can involve almost every organ system. Several life threatening extra-articular manifestations reported in the literature involve the nervous system¹⁴⁻¹⁶ and the eye¹⁷; alterations in the gastrointestinal tract, liver, kidney, muscles, mucous membranes and skin and hematologic cells have been evidenced as well as in hemostasis and coagulation processes. Cardiovascular compromise is worthy of mentioning because of its usually fatal outcomes. Infection can lead to cardiovascular manifestations, but in addition, patients with existing cardiovascular disease can deteriorate quickly, worsening the short-term prognosis; fatal outcomes seen in patients with diabetes, lupus; or neurological, renal, pulmonary and cardiovascular insufficiency.¹⁸⁻²⁰ And the aim of this study was to highlight life threatening manifestations, complications and probable outcome of chikungunya fever in intensive care unit (ICU).

Methods

This cross-sectional study was carried out on 23 adult patients with chikungunya fever from 1st June to 31st July of 2017 in the Department of Critical Care Medicine of BIRDEM General Hospital, Dhaka, Bangladesh, a tertiary care hospital. All patients were confirmed chikungunya cases either by RT-PCR or IgM antibody from serum or cerebrospinal fluid. One patient had chikungunya and dengue co-infection. The data were collected using a semi-structured proforma. Statistical analysis is done by SPSS version 22.0.

Results

Total 23 patients were included in this study, male 19(83%) and female (17%). From indoor 17(73.9%) patients got admitted in ICU, 3(13%) patients came directly from home and 3(13%) patients from another hospitals.

Table I . Age distribution of the patients (n=23)

Age	Patient	Percentage (%)
20-30	0	0
31-40	1	4.3
41-50	1	4.3
51-60	4	17.3
61-70	5	21.7
71-80	9	39.1
81-90	3	13

Table II. Comorbidities of the study subjects (n=23)

Comorbidities	Patient	Percentage (%)
DM	22	96
HTN	14	61
IHD	8	35
CKD	4	17
COPD	3	13
CVD	2	9

Table III. Clinical features of study subjects (n=23)

Clinical features	Frequency	Percentage
Fever	23	100.0
Joint pain	9	39.1
Rash	5	21.7
Headache	10	43.4
Myalgia	11	47.8
Pruritus	1	4.3
Low urine output	4	17.3
Oedema	2	8.7
Altered Mental status	13	56.5
Respiratory distress	17	73.9
Chest pain	1	4.3
Cough	4	17.3
Vomiting	5	21.7
Diarrhea	4	17.3
Bleeding	0	0
Eye congestion	0	0

Table IV. Causes of ICU admission of the study subjects related to chikungunya (Most of the patients had more than one organ involvement during ICU admission). (n=23)

Organ involvement	Number of patients	Percentage
Nervous System (Meningoencephalitis , GBS)	8	34.7%
Respiratory System(Pneumonia)	12	52.1%
CVS (Myocarditis, Hypotension)	8	34.7%
Renal System (AKI)	11	47.8%

Table V. Blood count of study subjects

INV parameters	Level	n=23	Mean
Leucocytes (/mm ³)	<4000	3 (13.0%)	10033.9±4315.8
	4000-11000	15(65.2%)	
	>11000	5 (21.7%)	
Lymphocyte (%)	<20%	21 (91.3%)	11.6±8.3
	20-50%	2(8.7%)	
	>50%	0	
Platelet (/mm ³)	<150000	10 (43.4%)	190260.9±128688.2
	150000-450000	12 (52.1%)	
	>450000	1 (4.3%)	

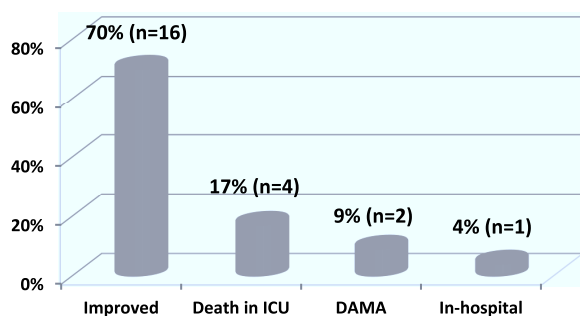
Table VI. Other laboratory parameters of the patients

INV parameters	Level	n=23	Mean
Na(mmol/l)	<136	16(69.5%)	129.8±8.8
	136-148	7(30.4%)	
	>148	0	
K(mmol/l)	<3.5	7(30.4%)	4.0±0.8
	3.5-5.2	13(56.5%)	
	>5.2	3(13%)	
Ca(mg/dl)	<8.4	22(95.6%)	7.5±0.7
	8.4-10.4	1(4.3%)	
	>10.4	0	
Aspartate transaminase (U/L)	<37	8(34.8%)	203.6±411.5
	>37	15(65.2%)	
Alanine transaminase (U/L)	<40	9(39.1%)	94.0±132.8
	>40	14(60.8%)	
Urea(mg/dl)	10-45	13(56.5%)	70.6±66.4
	>45	10(43.4%)	
S Cr.(mg/dl)	0.6-1.3	13(56.5%)	2.7±2.9
	>1.3	10(43.4%)	

Table VII. CPK and LDH of the patients

INV parameters	Level	Frequency	Mean
CPK (U/L)n=14	<210	5(35.7%)	3358.3±7061.7
	>210	9(64.2%)	
LDH (U/L)n=10	230-460	3(30%)	4098.7±9659.9
	>460	7(70%)	

CPK- Creatine phosphokinase LDH- Lactate dehydrogenase

**Figure 1.** Outcome of the patients

Among 23 patients 2(9%) patients took discharge against medical advice (DAMA) due to financial constrain. One patient's treatment was ongoing in ICU till date.

Duration of fever of the patients before ICU Admission was 5 ± 2.26 day. Duration of ICU stay of 23 patients was 7 ± 3 days.

Patients who died in ICU, all of them {4(100%)} had respiratory involvement, 3(75%) patients had cardiac involvement, 2(50%) patients had neurological involvement and 2(50%) patients had renal involvement. All of them were mechanically ventilated but 3(75%) patients got inotrope support and 1(25%) patient got renal replacement therapy. Cause of death in 1 patient was septic and cardiogenic shock, 1 patient died due to cardiogenic shock only, 1 patient died due to septic shock with Acute kidney injury due to Rhabdomyolysis and 1 patient died due to meningoencephalitis.

Discussion

Despite the involvement of many countries during the recent CHIKV outbreaks, there are few published studies on fatal cases. In this study majority of the affected patients were male. This finding is similar to another study where (69%) were males and(31%) were females.²¹

Most of the affected patients were elderly patients having multiple comorbidities in this study which is almost similar in other study.²² Another study differs from this, where maximum cases were in the age group of 21-35 years (63%) having no comorbidities were reported.

Regarding clinical features, like this study other studies also showed that, apart from common presenting features like fever, arthralgia or arthritis, headache and myalgia, atypical manifestations like cardiac, neurological, renal, respiratory features can be present in Chikungunya patients and most of them required intensive care management.²²⁻²⁴ Though the guidelines say that diarrhea and vomiting are more common in children but this study revealed that a good number of adult patients had these symptoms as well which we can find in other study also.^{25,26}

In this study lymphopenia was more frequent that is about 91% and thrombocytopenia was less and that is 43%. This is similar with other study where lymphopenia was 87% and thrombocytopenia was 37%.²⁵

Some studies showed hypocalcaemia in chikungunya patients²⁵ but apart from hypocalcaemia, hyponatraemia is also found common in this study irrespective of diarrhea and vomiting.

Among the organ involvement respiratory involvement was more frequent (52%) followed by renal involvement (47%). Cardiovascular and neurological involvement were 34% each. This result is similar with another study²² but differ from other studies where cardiovascular (54%) followed by neurological (37%) involvement²⁰ or neurological involvement was more frequent.²⁷

Mortality was 10% in one study where cardiac complications were common²⁰ and another study showed mortality is 48% in patients admitted in intensive care unit.²⁷ This study showed 17% mortality. Outcome

with neurological involvement was good in another study¹⁵ which was similar with our study because in our study only 1 patient died due to neurological involvement. Sepsis, cardiac and renal involvements were common in expired patients.^{20,22,23}

This was a single center study involving only one Intensive Care Unit. So no comparison with other Intensive Care Units of Bangladesh is possible through this study. Further larger multi-center study is warranted.

Conclusion

Though chikungunya virus infection is thought to be a benign disease it may be life threatening in elderly patients having comorbidities. It can lead to neurologic, renal, hepatic, respiratory and myocardial complications and high mortality rate.

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Conflict of interest: Nothing to declare.

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