



Surgical Complications of Suspected Chikungunya

KEYWORDS

Chikungunya , 2006, Complications, Mortality .

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ABSTRACT BACKGROUND

Chikungunya fever is a viral disease transmitted to humans by infected *Aedes*, *Culex* and *Mansonia* mosquitoes and manifested by high fever, joint pain with or without swelling and rash. It is an acute self-limiting febrile disease. This prospective study shows high mortality in patients with history of chikungunya once surgical complication occurs.

METHODS

All patients admitted to department of Surgery, Sheth Vadilal Sarabhai General Hospital with history of Chikungunya fever between period August 2006 to November 2006. All of them are suspected Chikungunya fever cases. Most of them presented in Emergency during above mentioned period.

RESULTS

Total 57 patients had history of chikungunya fever admitted with various surgical complications—Cellulitis: 24 patients, Peptic perforation: 11 patients, Injection Abscess: 09 patients, Acute gastritis: 06 patients, Jejunal perforation: 05 patients, Gastrointestinal bleeding: 02 patients. Mean age for complication was 46.8 years, S.D ± 1.7 years, 68.4% complications were in age group 30 to 50 years, which is economically productive age group. Complications in descending order were cellulitis (42.1%), peptic perforation (19.3%), injection abscess (15.8%), acute gastritis (10.5%), jejunal perforation (8.8%) and Gastrointestinal bleeding (3.5%).

Complications were higher in males (84.2%) than in females (15.8%). Mortality was high between the age group 30 to 50 years. Total case fatality rate was 31.58%. Jejunal perforation case fatality rate: 100%. Injection abscess: 44.4%, peptic perforation: 36.4% and cellulitis: 20.8%. Patients with acute gastritis and Gastrointestinal bleeding had no mortality.

CONCLUSION

To conclude chikungunya complications and mortality were not only due to irrational therapy and injudicious use of medicines but virulence of virus might also be responsible. In our study, out of 57 cases of suspected Chikungunya, 18 patients expired due to surgical complications causing 31.58% mortality.

- 1) The key finding to chikungunya outbreak investigation was a high attack rate, particularly among adults and females.
- 2) The explosive nature of the outbreak with high attack rates might be due to the absence of herd immunity to the central/east African genotype of the CHIK virus isolated in India and other countries in Indian Ocean region.
- 3) In addition to classical manifestations of Chikungunya infection, severe infections requiring hospitalization were reported during outbreaks in India 2006.
- 4) Patients who present with surgical complications of probable causes of chikungunya shows high mortality.

INTRODUCTION

The disease was first described in 1955 by Marion Robinson and W.H.R. Lumsden following outbreak in 1952 on the Makonde Plateau, along the border between Tanganyika and Mozambique. According to Lumsden initial in 1955 report term 'chikungunya' is derived from Makonde Root verb 'Kungunyala', meaning that which bends up". This refers to the stooped up posture adopted by the patient as a result of the arthritic symptoms. The first Chikungunya virus (CHIKV) outbreaks in India occurred in 1963 in Kolkata city and it spread to Southern part of country by 1964. The last reported outbreak of CHIKV in India was in Barsi in 1973. Recently CHIKV epidemic was reported from December 2005 to November 2006 in several states of India.³

CHIKV is a member of the genus alphavirus in the family

Togaviridae. The vector for this disease is *Aedes* mosquito (Sps. aegypti). Chikungunya fever is a viral disease transmitted to humans by bites of infected *Aedes*, *Culex*, *Mansonia* mosquito. *Aedes Aegyptis* and *Aedes albopictus* are two most important vectors in human beings.⁴

CHIKV fever patients has incubation period of 2-12 days, then there is sudden onset of flu like symptoms, severe headache, chills, fever, arthralgia or arthritis, conjunctival suffusion and mild photophobia, nausea and vomiting. Some patients have incapacitating joint pain or arthritis which may last for weeks or months. ICD 10 code is A92.0.^{5,6}

Complications & deaths in CHIKV are thought to be mainly due to irrational therapy along with inappropriate & pro-

long use of antibiotic, analgesics & steroids. The aim of this prospective study was to determine the outcome in patients with history of chikungunya fever with surgical complications.

Criteria for Chikungunya

Clinical Criteria : Acute onset of fever >38 degree C and severe arthralgia /arthritis not explained by any other medical conditions.

Epidemiological criteria :Residing or having visited epidemic areas,having reported transmission within 15 days prior to the onset of symptoms.

Laboratory criteria : At least one of the following tests in the acute phase

-Virus culture, isolation

-presence of viral RNA by RT-PCR

-presence of virus specific IgM antibodies in single serum sample collected in acute or convalescent stage.

-four fold increase in IgG antibody values in sample collected at least three weeks apart

-On this basis cases are Categorized as :

Possible Case : a patient meeting clinical criteria

Probable Case : a patient meeting both clinical and epidemiological criteria

Confirmed case : a patient meeting the laboratory criteria irrespective of the clinical presentation

From February 2006 to 10 October 2006, the WHO Regional Office for South-East Asia has reported 151 districts in 8 states/provinces of India affected by chikungunya fever (see below). The affected states are Andhra Pradesh, Andaman & Nicobar Islands, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Madhya Pradesh, Kerala and Delhi. More than 1.25 million suspected cases have been reported from the country, which 752,245 were from Karnataka and 258,998 from Maharashtra provinces. In some areas reported attack rates have reached 45%.

Problems with current diagnostic modalities for CHIKV

The gold standards of CHIKV diagnosis is culture and isolation. Yet, virus isolation requires facilities and skills. Highly sensitive and specific PCR assays for CHIKV diagnosis have been described, but the reagents and equipment are too costly for widespread use.

PATIENTS AND METHODS

Selection of Patients :

All the patients are suspected cases of chikungunya who received treatment in private hospital and have presented with surgical complications at our department, when chikungunya epidemic was ongoing in Ahmedabad, India (during August 2006 to November 2006). Most of the patients have presented in emergency. According to criteria mentioned on previous page, all are probable causes of Chikungunya.

The Government of India has reported 1.3 million suspected chikungunya cases in 12 States of India. Out of these only 14,727 samples were sent for testing and 1725

of them were confirmed cases of CHIKV. This could be a gross underestimate because India has only two virus testing public facilities, as on November 2006.⁷ Out of 207 samples sent from our hospital 15 confirmed cases CHIKV found, samples were not sent from surgery wards.

We have done a prospective study of 57 patients between August 2006 to November 2006 at Vadilal Sarabhai General Hospital, Department of General Surgery, Ahmedabad, India.

Following surgical complications were observed during August 06 to November 2006 at Vadilal Sarabhai General Hospital.

1) Cellulitis	: 24 patients
2) Peptic perforation	: 11 patients
3) Injection Abscess	: 09 patients
4) Acute gastritis	: 06 patients
5) Jejunal Perforation	: 05 patients
6) Gastrointestinal bleeding	: 02 patients

Results:

Total 57 patients presented to department of General Surgery who received treatment of chikungunya elsewhere during the period of August 2006 to November 2006. Total 57 patients had history of chikungunya fever admitted with various surgical complications-Cellulitis: 24 patients, Peptic perforation :11 patients, Injection Abscess:09 patients, Acute gastritis :06 patients, Jejunal perforation:05 patients, Gastrointestinal bleeding:02 patients.(figure 1)

Out of 57 patients, 49 were male and 8 were female patients. Patients were between age 25 to 78 years. Mean age of complication was 46.8 years with SD \pm 1.7 years. (figure 2)

Complications were higher in males(84.2 %) then in females (15.8 %).(figure 3)

1) Cellulitis :

Total 24 patients. Commonest complication (42.1%). 20 male patients & 4 female patients were there, all of them were between 30 – 50 years age group. Out of 24, 22 were lower limb cellulitis & 2 were upper limb cellulites. 15 patients had high total count..

Out of 24 patients, 5 patients were managed conservatively with limb elevation, antibiotics and analgesics. Rest 19 patients underwent operative intervention. Repeated debridement for wound preparation followed by split thickness skin graft.

Culture and sensitivity report of cellulites staphylococcus aureus, streptococcus pyogenase and pseudomonas aeruginosa.

Out of 24 patients, 5 patients expired causing 20.8% mortality. Expired patients had septicemia leading to multi organ dysfunction syndrome.

2) Peptic Perforation :

Total 11 patients. All male patients between 30 to 50 years. All patients had history of taking treatment of CHIKV

for 7 days to 1 month. All patients presented with acute abdominal pain with vomiting & tachycardia. Emergency exploratory laprotomy and suturing of perforation with omentopexy done in all cases.

Per operative site of perforation found similar to that which occurs in peptic ulcer disease perforation. Out of 11, 4 patients expired causing 36.4% mortality.

3) Injection Abscess :

Total 9 patients, all of them were male. 8 patients were less than 30 years & 1 patient – 45 years of age. Interval between injection taken & presentation to hospital varied from 2 to 20 days. Unusual extension at local area found which is not usually a case.

Incision and drainage and repeated dressings done in 1 patient. Incision and drainage and secondary suturing done in 2 patients. Incision and drainage, repeated debridement followed by split thickness skin graft in 2 patients along with other medical management.

Cultural & sensitivity report of injection abscess showed : Klebsiella ,E coli, Staphylococcus, Streptococcus and pseudomonas aeruginosa.

Out of 9 patients , 4 patients expired causing 44.4% mortality. All patients had low platelet count and acute renal failure.

4) Acute gastritis :

Total 6 patients required indoor treatment , 3 male & 3 female patients. Three patients were between 30 to 50 years & 3 patients 50 to 70 years. All patients were managed conservatively with no mortality.

5) Jejunal Perforation :

Total 5 patients, 4 male & 1 female . 4 patients were between 50 to 70 years & 1 more than 70 years. All patients had similar complaints of Acute abdominal pain, fever, vomiting, joint pain and breathlessness. History of taking treatment of CHIKV for period 7 to 50 days.

On examination :

- All patients had toxic look, tachypnoea, tachycardia, hypotension. Tenderness was present over abdomen but no guarding or rigidity.

- On investigation high total count, altered renal function test, liver function test.

X-Ray: All patients had faint free gas under diaphragm. Ultrasonography was showing free fluid in abdomen.

Jejunal perforation repair was done in 1 patient. Rest all underwent resection anastomosis with feeding jejunostomy.

Per-operative findings :

- Moderate to gross bilious peritonitis. Perforation was found 10-15 cm from duodenojejunal junction on mesenteric border. As perforation was covered with mesenteric fat, if not positively looked for - can be missed. All patients expired causing 100 % mortality. 2 patients developed foecal fistula and died. 3 patients put on mechanical ventilator support, ultimately succumbed. Average survival was 2 days and maximum up to 7 days. Cause of death were - septicemia following peritonitis with respiratory complication. 2 patients had acute respiratory distress syndrome.

HISTOPATHOLOGY EXAMINATION REPORT of resected jejunal segment : small intestinal mucosal ulceration and necrosis. Acute inflammatory cell infiltrate in submucosa with lymphocytes & plasma cells in to lamina propria along with vascular congestion & oedema. Periserosal acute inflammatory cell infiltrate with granulation tissue proliferation & necrosis extending into surrounding adipose tissue along with granularomatous tissue proliferation.

6) Gastro Intestinal Bleeding :

Total 2 patients, 1 male & 1 female. 1 between 50 to 70 years & 1 more than 70 years. Treatment for acid peptic disease was given & treated successfully conservatively.

Total case fatality rate of complications of chikungunya was 31.58 %. Mortality rate in the cases of jejunal perforation was 100 % followed by injection abscess 44.4 %, peptic perforation 36.4 % and cellulites 20.8 %. Patients with acute gastritis and Gastro intestinal bleeding had no mortality (Table 1) . Mortality was high between 30 to 50 years (56.6 %) which was higher in males (72.3 %) than in females (27.7 %), (Table 2).

Discussion

Sheth Vadilal Sarabhai Hospital is tertiary care referral centre in Ahmedabad, India. The Patients from lower socio-economic class are main beneficiaries. Daily wage earners could not afford prolonged economic loss. Patients received prolonged antibiotics, NSAIDs & Steroids From Nearby family physicians or even unqualified medical practitioners for symptoms of fever with arthralgia.

PEPTIC PERFORATION AND JEJUNAL PERFORATION.

Injudicious use of medicines can cause peptic perforation & jejunal perforation. NSAIDs & Steroids are known to cause peptic perforation, jejunal perforation rarely reported. On reviewing literature – A patient of Ankylosing spondylitis taking indomethacin- NSAID for prolonged period had small bowel perforation, another case report of virus responsible for jejunal perforation in immunocompromised patient is also there.^{8,9} In our study jejunal perforation patients had 100% mortality. On X-ray abdomen erect, surprisingly all patients had faint free gas shadow. In all cases site of perforation was similar – 10-15cm from duodenojejunal junction.

CELLULITES - Unusual extension & severity of cellulites need further study & explanation of pathophysiology.

INJECTION ABSCESS - We have observed unusual rise in the incidence of injection abscess during chikungunya epidemic. It was found that quacks were not following proper aseptic precautions while giving intramuscular injections to the patients. Injections given were Diclofenac, steroids, chloroquine with probably a single syringe. Per operative finding of extensive involvement of tissues in case of injection abscess along with myonecrosis which would have caused Acute Tubular necrosis . Mortality rate was 44.4 % in patients admitted with injection abscess, which was unusually high.

ACUTE GASTRITIS - Number of outdoor patients of acid peptic disease increased to almost double during epidemic. All indoor patients for acute gastritis recovered well with conservative management.

GASTROINTESTINAL BLEEDING - In CHIKV gastrointestinal bleeding have been reported from India¹⁰. Injudicious use of drugs can cause erosions in gastric epithelium lead-

ing to upper Gastrointestinal bleeding . All patients with gastrointestinal bleeding were treated conservatively.

In another study done from Ahmedabad, (Emerging Infectious Disease journal, No. 3 ,March 2008), mortality rates in 2006 were compared with those in 2002–2005 for Ahmedabad (population 3.8 million). A total of 2,944 excess deaths occurred during the chikungunya epidemic (August–November 2006) when compared with the average number of deaths in the same months during the previous 4 years.

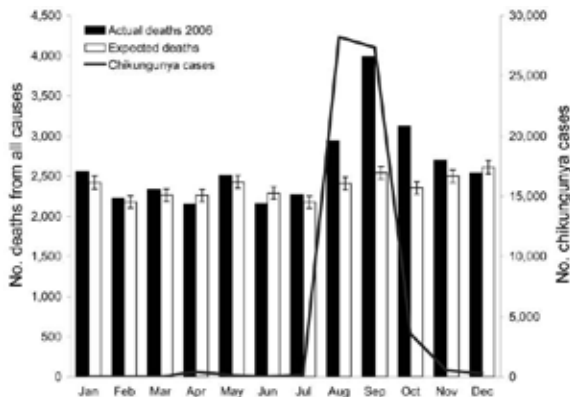


Figure. Monthly chikungunya cases, expected deaths, and reported deaths, Ahmedabad, India, 2006.

Monthly chikungunya cases, deaths, and mortality rates in August, September, October, November in Ahmedabad, India, 2002–2005 and 2006*

MONTH	CHIKUNGUNYA CASES IN 2006	MORTALITY RATE /10000 IN 2002-2005	MORTALITY RATE/10000 IN 2006	%CHANGE IN MORTALITY RATE
AUGUST	28233	6.08	7.42	+22.09
SEPTEMBER	27360	6.40	10.05	+56.96
OCTOBER	3555	5.92	7.85	+32.51
NOVEMBER	539	6.27	6.77	+7.90

Summary :

Scientist of National institute of virology in Pune, India reported that the outbreaks that occurred in 1963 and 1973 were genetically characterized by Asian genotype. However recent outbreak has been identified as belonging to the African genotype ¹¹. The strain of virus in the Indian ocean and Indian subcontinent were also found to be from the same group. This raises the possibility of connection between two outbreak , a mutation in CHIKV which enable them to have improved ability to invade mosquito cell and replicate which could explain the unusually severe case ¹²

Also, The recent spread of previously neglected CHIKV is an example of the globalization of infectious disease. Thus there is importance of understanding the dynamics of CHIKV infection, its immune response and the type and quality of antigen used in the designs of diagnostic assays. As CHIKV is a new focus of intense research, it is hoped that advances in diagnostics will benefit to all those at risk, specially the developing countries.

To conclude the role of virulence of CHIKV (African strain) in causing severity of complication & unusual clinical presentation can not be denied along with injudicious use of drugs & some irrational medical practice.

TABLE 1
Mortality Profile

Sr. No.	Complication	CFR	Recovery	Death	Total
1	Cellulitis	20.8%	19	05	24
2	Peptic Perforation	36.4%	07	04	11
3	Injection abscess	44.4%	05	04	09
4	Acute gastritis	0	06	-	06
5	Jejunal perforation	100%	-	05	05
6	G I Bleed	0	02	-	02
Total		31.58%	39	18	57

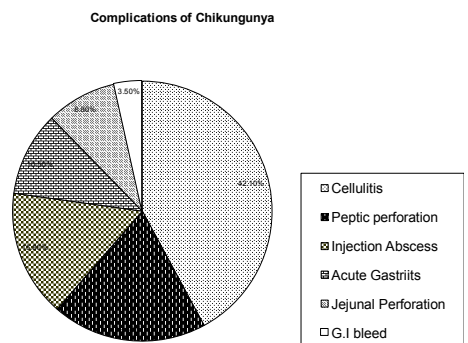
Total Case Fatality Rate is 31.58%, highest in jejunal perforation 100% followed by injection abscess 44.4%, peptic perforation 36.4% and cellulites 20.8%.

TABLE 2
MORTALITY ACCORDING TO AGE & SEX

Age	Male	Female	Total
<30	03	-	03(6.7%)
30 to 50	06	04	10(56.6%)
50 to 70	04	-	04(21.1%)
>70	0	01	01(5.6%)
TOTAL	13(72.3%)	5(27.7%)	18(100%)

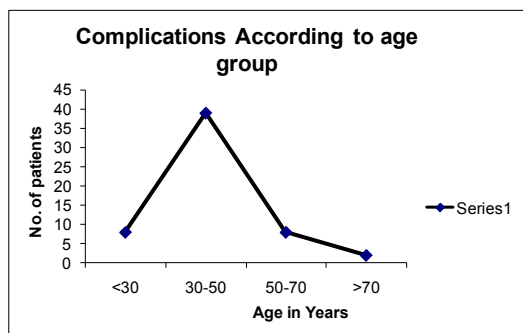
Mortality in surgical complications of chikungunya was high between the age group 30-50 years (56.6%), higher in males(72.3%) than in females(27.7%).

FIGURE 1



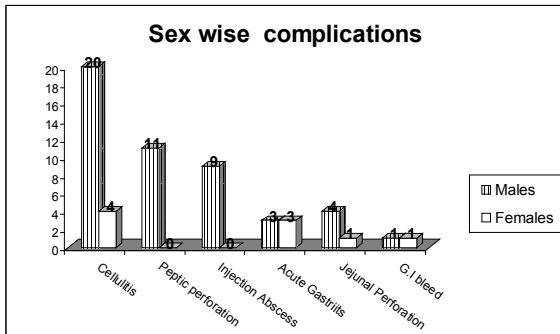
Complications in descending order were cellulitis(42.1 %), peptic perforation (19.3 %), injection abscess(15.8 %), acute gastritis(10.5 %), jejunal perforation(8.8 %) and Gastrointestinal bleeding (3.5 %)

FIGURE 2



Majority of complications were in age group of 30 to 50 years. Mean age 46.8 years, S.D. \pm 1.7 years.

FIGURE 3



COMPLICATIONS are higher in males(84.2%) than in females(15.8%).

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