

Chikungunya Outbreak in Dhaka: Lessons for Bangladesh

Chikungunya virus (CHIKV) was first identified in 1952-53 at the Makonde plateau in the southern part of Tanzania (previous Tanzanyika). *Chikungunya* is a Makonde word means 'that which bends up' - bending posture of the individuals infected with virus.¹ Chikungunya virus belongs to the genus *Alfavirus*, of the *Togoviridae* family which has 12 kb positive-sense RNA genome that envelopes 4 non-structured protein NSP1-4 with five structural proteins (C, E3, E2, 6K, E1).² CHIKV is transmitted by the mosquito *Aedes aegypti* or *A albopictus* which also cause dengue (and Zika). The virus was spread to Asia in 1954 to the Phillipines. Currently three distinct genetic linkage were identified- West African, the East Central Southern African lineage, and Asian lineage.³

The classic clinical presentation of abrupt high fever (>39°C) with severe arthralgia-myalgia and exantheme of maculopapular rash having no feature of severe bleeding, absence of hypotension/shock and thrombocytopenia distinguishes it from dengue (Table).

Table*Clinical features in Chikungunya fever.⁴*

| Common | Infrequent | Rare in adults but seen sometimes in children |
|------------|------------------------|---|
| Fever | Rash | Photophobia |
| Arthralgia | Stomatitis | Retro-orbital pain |
| Backache | Oral ulcers | Vomiting |
| Headache | Hyperpigmentation | Diarrhoea |
| | Exfoliative dermatitis | Meningeal syndrome |
| | | Acute encephalopathy |

Most of the patients of Chikungunya infection are symptomatic, has three phases of illness- acute, subacute and chronic course. Joint pain and swelling with severe morning stiffness having symmetrical involvement, involving mostly distal joints. Synovitis or periarticular swelling are present in 32-95 % patients, even may have large joint effusion, improves in 1 month, in 15% some persistent joint pain and swelling-morning stiffness may remain more than 3 years.⁵

There are three hypotheses for prolonged course-persistence of infectious virus, persistence of virus nucleic acid which could trigger persistent immunopathology, triggering of persistent immune activation in certain individuals after the infectious virus have been cleared.⁵

High risk groups are neonates, elderly and immunocompromised persons. Deaths may be rarely due to fulminant hepatitis, myocarditis, encephalitis/encephalopathy, seizure, multiorgan involvement.⁶ The increased virulence in the recent outbreak in Bangladesh and in other countries might be due to mutation in the envelop glycoprotein 'gain of fitness adaptation for dissemination by *A albopictus* and ability to adapt and replicate in this vector'.⁷

Confirmatory test of PCR is not readily available, treatment is symptomatic, and there is no vaccine for prevention.

Outbreak of CHIK virus infection happened earlier in Bangladesh: first outbreak in Rajshahi and Chapainawabganj 2008 affecting 39 patients, outbreak in 2011 in Dohar, Dhaka affecting 196 patients.^{8,9} Sporadic cases occurred 2013, 2014, and 2015 in Dhaka with a big outbreaks in December 2016. Case reports were earlier made on four patients of CHIK virus infection from Bangladesh.¹⁰ In 2017 a large number of febrile illness with joint involvement were reported from different areas of Dhaka city which prompted the Directorate General of Health Services, Ministry of Health and Family Welfare, GOB to investigate the vector, cases and confirmed the Chikungunya outbreak in Dhaka. Subsequently limited number of cases were also reported from a number of districts outside Dhaka. A large number of media reports, editorial, TV talks happened. The government quickly responded by arranging creation of public and professional awareness, vector control measures and management of patients.¹¹ Public health system in urban areas in Bangladesh is relatively weak, care is provided by different health care

providers and organizations in a fragmented manner. We have limited capacity of surveillance system and facility for confirming the causes of viral illness. Institute of Epidemiology Disease Control and Research (IEDCR), Dhaka, Bangladesh investigated all the previous and present outbreak of Chikungunya. In the present outbreak 1248 cases of febrile illness with suspected CHIK virus infection since the outbreak were tested, out of which 939 were found to be PCR positive from 9th April to 9th August 2017.¹² Professional societies also came forward to train the members and the public on relevant issues. There is no systematic follow up of the cases although a proportion of patients developed persistent joint pain for prolonged period causing restricted activity. Around 30% patients had joint pain for more than a month during 2011 outbreak. In Dhaka 10,264 patients received treatment in different hospitals due to joint pain after suspected CHIK virus infection since 12 May 2017. There was no report of death by CHIK virus infection from the government reports but from the private sector few deaths were described in patients with other additional health problems.

During the re-emergence of Chikungunya virus infection in India in 13 states after more than 32 years of first report caused more than 1.5 million cases with some deaths for example 11 in Gujrat out of 225 confirmed cases, 74 deaths in Kerala (not confirmed in many cases by independent review by the central government).¹³

Despite low case fatality the disease is associated with substantial health burden and economic loss to the affected population having prolonged disability in some patients.

It is essential to conduct detailed investigation of the outbreak with documentation of cases. IEDCR and DGHS, GOB did an excellent job in case and vector investigation, detected *Aedes albopictus* in all rural outbreaks and in Dhaka *A. aegypti* are predominant vector with few *A. albopictus* (Unpublished data, Disease Control Unit, DGHS, Dhaka, Bangladesh). For future prevention we need to have an Integrated Vector Control Management Plan for strict vector control all along not during such an outbreak only, to have a good surveillance (patient and vector) which is considered to be one of the important pillars of public health for vector borne diseases, and effective community education.¹⁴ WHO Global Vector Control Response for 2017-2030 'aims to reduce the burden and threat of vector-borne diseases

through effective, locally adapted and sustainable vector control'. Chikungunya outbreak in Dhaka signifies the necessity of improving public health capacity of Bangladesh for the control of vector borne diseases.

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