

Oral Manifestation of Chikungunya and Dengue Fever.

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Abstract

Once considered diseases that were found in isolated pockets of rural India and the African subcontinent, chikungunya and dengue outbreaks currently affect thousands of individuals all over the world since the past decade. These diseases are debilitating and if inadequately treated increases the chance of mortality. Recurrent epidemics of chikungunya and dengue, which are Aedes mosquito-borne viral diseases, represent a significant health problem in over a hundred tropical countries. With the re-emergence of the chikungunya virus (CHIKV) and dengue virus (DENV), cases have also been reported in parts of Europe and other parts of the Asian subcontinent.

The objective of this review is to educate dental practitioners on the oral manifestations of both chikungunya and dengue which may help in the diagnosis and management of these viral diseases .

Keywords: Chikungunya fever, dengue fever, Oral manifestations

EPIDEMIOLOGY

Chikungunya fever is endemic and epidemic to Asia since 2005. Chikungunya epidemics have been reported from several parts of country. It was first reported from Tanganyika in 1952(1,2). In India, several outbreaks of chikungunya fever have been reported with the first outbreak being in Calcutta in 1963(3). The disease re-emerged in India after a gap of 32 years in 2005(4,5,6) with the country experiencing more than 13 lakh infected patients(7,8). An increase in globalization could be a contributory factor which has facilitated the introduction of the virus to other endemic areas(9). Dengue, however is the most common arthropod-transmitted disease seen and is common in more than 110 countries(10). Affecting nearly 528 million people in a year(11,12) the disease is most commonly found in urban environments (13). In recent decades, dengue fever which was once confined to Southeast Asia has now spread globally (13). The increase in the disease has been attributed to rapid urbanization, global warming and growth in population(11).

PATHOGENESIS

The chikungunya fever is transmitted through the bite of the *Aedes aegyptii* mosquito with *A. albopictus* also emerging as another principal vector (6,14) with the bite of the female mosquito is considered infective. The virus causing chikungunya is an alphavirus belonging to the family Togaviridae. The genome is a linear, positive sense RNA, approx 11.6kb-11.8kb with a capsid diameter of 60-70nm and a phospholipid envelope (15,16). The molecular pathogenesis of chikungunya bears a large similarity to the Ross River virus that also causes polyarthrits and cutaneous manifestations as seen in chikungunya (17). A cell-mediated immune response (CMI) where CD8+T cells are inactive has been suspected to cause this chronic disease. Toxic chemokines are reported to be the cause for tissue/cell destruction (16) with an antibody-dependent enhancement mechanism (ADE) similar to the dengue virus (18). Unlike dengue, there is no evidence of transovarial transmission of chikungunya.

Vertical maternal-fetal transmission has been reported in pregnant women affected with chikungunya infection (19). The dengue virus belongs to the genus flavivirus of the Flaviviridae family with 4 serotypes of the dengue virus(DENV1-4). There are various hypothesis regarding the etiopathogenesis are as follow:

1. The vector mosquito *Aedes aegypti* becomes infected when they feed on human blood during the first few days of viraemia in the human host. The virus passes from the mosquito's intestinal tract to the salivary gland after an extrinsic period resulting in infection (20,21).
In the skin, the dengue virus infects mature dendritic cells through non-specific ICAM3 (22). The infected dendritic cell matures and migrates to the lymph node where they present the viral antigen to T cells, initiating a cellular and humoral response(23). Thus viral replication occurs primarily in macrophages and dendritic cells in skin(24).
2. The DEN-V enters the host organism via the skin when the infected mosquito takes its blood (25)
3. The humoral, cellular and innate immune response is induced only by interaction of virus with the host cell.(25)

SYSTEMIC MANIFESTATION OF CHIKUNGUNYA AND DENGUE FEVER

Chikungunya fever affects all the age groups from neonatal to old age with the incubation period of 3-12 days. The onset usually begins with sudden fever, headache, abdominal pain and constipation (4,15,16). In about 33% of patients, arthritis have been noted (5) with some studies documenting that the viral infection can even cause initiation of rheumatoid arthritis (26). Dermatological manifestations have been noted in about 40-50% cases seen as a morbilliform rash developing with fever(27,28), hypermelanosis, hyperpigmentation, bullae, exfoliative dermatitis, erythema nodosum, generalized erythema and maculopapular rashes(27). Acute intertigo like lesion and ulcers have also been noted such as ulcerations that occur

after the onset of fever(16). In a study conducted, in Nagpur a total of 300 patients with chikungunya fever were evaluated over 7months; 16.3% of patients had a neurological manifestation such as myelopathy, encephalitis, peripheral neuropathy and myopathy(29). A rare manifestation that was noted was flaccid paralysis in a patient with chikungunya fever(30).

Unlike dengue, severe hemorrhagic manifestation is not noted in chikungunya fever. Dengue fever in human causes a spectrum of illness from febrile to fatal disease (31). According to World Health Organization, the dengue virus (DENV) causes three clinical syndromes: dengue fever; dengue hemorrhagic fever and dengue shock syndrome (24). The incubation period varies from 3-14days most often being 4-7days (32,33). The disease is characterized with a sudden onset of fever, frontal headache, muscle and joint pain and skin rashes (11). The mild phase of dengue includes fever, generalized pain, nausea, vomiting and occasionally petechiae (34,35). In the severe phase, with the resolution of fever there is fluid accumulation in the chest, abdominal cavity as well as decreased blood supply to vital organs(35).

ORAL MANIFESTATION

A study conducted by Riyaz et al in Kerala, India concluded that out of 162 patients with cutaneous manifestations of chikungunya, 22 (13.64%) patients had oral mucosal involvement in form of multiple aphthae, erosions and cheilitis (36). In another comprehensive study performed by Katti et al in Karnataka, India found that out of 181 patients suffering from chikungunya disease, 56(54.32%) patients had pain in the gingiva, 56(54.32%) patients had mucopyrosis, 56(54.32%) patients had bleeding from the gingiva, 32(29.1%) patients had difficulty in chewing and swallowing, 22(21.34%) had halitosis, 18(17.46%) patients had ulceration, 12(11.64%) patients suffered from trismus, 10(9.7%) patients suffered from excessive salivation and distaste and 1(0.97%) patients had mobile teeth(37). Suryawanshi et al conducted a study in Maharashtra, India with 116 patients affected with chikungunya fever where 12(13.8%) patients presented with lymphadenopathy(38). Another study observed that 95% of patients with chikungunya presented with oral manifestations in the form of oral ulcerations and erythema. Females seems to be more affected than males and severe signs and symptoms were found in patients older than 50years as compare to those who were younger than 20years. (39). In dengue fever, the oral mucosal involvement was seen to be in 15-30% of patients in a study conducted in Punjab, India(40).The mucosal manifestations noted in dengue fever are small vesicles on the soft palate, erythema and crusting of lips and tongue(41). Another study observed that the most common oral manifestation reported was gingival bleeding(42). Other reported oral manifestations include oral mucosal involvement such as hemorrhagic plaques on both buccal mucosa in 15% of patients with dengue (43). Patients with dengue hemorrhagic fever also presented with enlarged and inflamed tonsils and xerostomia(44).

PREVENTION

There is no specific anti-viral drug or vaccination for both chikungunya and dengue fever(11,45). Protection includes prevention against contact with the infected mosquito and other preventive measures such as spraying insecticide should be initiated in areas endemic to the disease. There is no specific treatment but the use of NSAID to provide palliative relief from symptoms such as fever and pain are given for patients with chikungunya fever (45).

In patients suffering from dengue fever, proper fluid balance is important and blood transfusion is initiated if severe symptoms exist (46).

CONCLUSION

The oral cavity is the gateway of systemic health and condition of an individual. Chikungunya fever and dengue fever are progressively emerging as global diseases. Educating the public on vector control measures such as spraying insecticides, and other preventive measures should be emphasized. It is challenging to monitor these infections as it continues to undetected due to late diagnosis of the disease and its eventual evolution into an epidemic. As dental professionals, the identification of oral presentation of these infections can aid in the confirmatory diagnosis and effective management of the disease.

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