

Tiger mosquito – generated devastation in the biosphere!!!

Mosquitoes are one of the most treacherous parasites causing unparalleled human suffering surpassing other parasites by a colossal edge. Over 1 million people worldwide expire from mosquito-borne diseases every year. A mosquito's bite can trigger much more than an itchy red bump. Mosquitoes not only carry diseases but they also act as host for plethora of viruses and parasites that affect the human beings as well as animals. For instance, a mosquito that bites an infected human or animal can pick up a virus along with the blood meal.

Asian tiger mosquito also called *Aedes albopictus*, can survive in a broad range of climate and is an aggressive biter that feeds primarily during the day and has a broad host range including man, domestic and wild animals, and birds.

The latest disease which is likely to take an epidemic place, Zika, is also a viral disease due to tiger mosquito. Zika, a relatively unknown infection spreading primarily due to *Aedes* mosquito, is a threatening disease which is currently established in Africa and is spreading robustly to America, Asia, as well as to the Pacific regions. Zika virus was first identified in Uganda in 1947 in Rhesus Monkey and was subsequently identified in humans in 1952 in Uganda and Republic of Tanzania.

The first documented outbreak of Zika virus in the South Pacific occurred on Yap Island in the Federated States of Micronesia in 2007. In October 2013, French Polynesia reported a large outbreak which then spread to other Pacific Islands. This mosquito-borne disease is a serious threat; it is usually so mild and difficult to be undetectable in adults, yet it has been followed by a surge in babies born with underdeveloped heads, a condition called microcephaly.

The World Health Organization has declared that the outbreak of Zika and congenital malformations and neurological disorders in newborns, believed to be connected to the virus, is a global public health emergency. Since the current outbreak began in Brazil in May 2015, nearly 1.5 million



people are reported to have been affected. As of January 23, 4180 suspected cases of microcephaly had been reported in Brazil. There have also been cases of Guillain-Barré syndrome, a condition in which the immune system attacks the nervous system, sometimes resulting in paralysis. A causal relationship between Zika virus and microcephaly is yet to be established, but it is strongly suspected as the virus has been found in the placenta and amniotic fluid of infected mothers and in the brains of fetuses and newborns. As the virus spreads in Latin America and the Caribbean, it has become difficult to estimate the true scale of the epidemic. The Zika virus has the potential to spread wherever the *Aedes aegypti* mosquito that transmits the infection is found and where people lack natural immunity against it.

Dental unit water lines (DUWLs) provide a favorable and conducive environment for biofilm formation. Water at the tubing walls is stagnant, allowing mosquitoes and bacteria to adhere, multiply, and colonize the tubing surfaces. It has been established that water used in dental treatment has high microbial counts, typically ranging from 10^4 to $>10^6$ CFU/ml. a number of studies addressing dental unit water supply contamination have confirmed that the high bacterial count is due to the shedding of biofilm bacteria from the lumen surface of dental waterline tubing into treatment water. Results of some epidemiologic studies show that contamination of DUWL can be dangerous in patients with immunodeficiency or other immune system problems; it can be true for pregnant women, elderly, graft recipients, or even smokers. Dental personnel have been shown to have altered nasal flora, with colonization of *Pseudomonas*

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spp. consistent with those found in their dental units. In one of the unbelievable episode reported in 2011, a healthy 82-year-old woman died from irreversible septic shock after acquiring legionnaire's disease (*Legionella pneumophila*). It was claimed that the infection resulted due to contaminated water from dental unit.

The problem stems from the design of the water pipelines that feed the dental tools. Underneath the chair and tied to all the equipment visible in the office are tubes that hold the water used in procedures. When the gadgets are not in use, the water gets collected inside the tubing and stagnates. The small number of environmental bacteria naturally found in the water quickly multiply and clings to the walls of the tubing. When the equipment is used again, the bacteria can be flushed into the mouths of patients. Therefore, the likelihood of the spread of this callous disease via *Aedes* mosquito, breeding in the stagnant dental water pipelines, can be implicated in the near future.

The current natural immunity against the virus in the Indian population is not known. And since the *Aedes*, the vector for both the dengue and Zika viruses, is widespread in India, aggressive mosquito control measures are needed. India's pitiable mosquito control measures are highlighted every dengue season—the number of reported cases doubled from 40,571 in 2014 to 84,391 in 2015 (up to November 2015). Besides the Delhi-based National Centre for Disease Control and the Pune-based National Institute of Virology, which are equipped to confirm Zika diagnoses, regional laboratories could assist in testing. Surveillance for case clusters and newborns with typical symptoms needs to be activated.

Fighting Zika will not be easy. A vaccine or effective treatment is still a long way off. There are no rapid and reliable diagnostic tests either. All this is likely to change as the WHO's declaration galvanizes international response to improve surveillance, detect infections, and study the causal link between Zika infection and microcephaly and Guillain–Barré syndrome. As such, there is no direct evidence available that mosquitoes, as a vector, can cause any oral disease or immune compromise the oral ecosystem. However, we have to take care of our own environment, especially water pipelines if leaking, stagnant water in pipelines, water coolers, AC's, etc., which can be source of breeding for such mosquitoes, thus compromising the oral and overall health of not only the oral healthcare provider but also the precious patients.



S. G. DAMLE
Editor-in-Chief,
Contemporary Clinical Dentistry
E-mail: journalccd@gmail.com

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