



Acute Encephalitis Syndrome and its alleged litchi (*Litchi Chinensis*) connection—A review and status

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ABSTRACT

In recent times, Acute Encephalitis Syndrome (AES), an unexplained mysterious disease is affecting people, especially young children below the age of 15 years in few Asian countries. Several hypothesis and causal factors are being suspected and studied by the researchers. Despite the stringent efforts, the causal agent of AES has not been identified till date and researchers all over the world are striving to find out the cause and remedy of this fatal disease. The concurrence of the AES, in temporal dimensions in most of the places and spatial dimension in few cases with the seasonal maturity of litchi (*Litchi Chinensis* Sonn.) fruits has occasioned in the fruit being associated and judged as a possible causal agent of AES. However, the delicious litchi fruit has been consumed since centuries and thus the alleged association wants critical examination and investigation. The symptoms of the AES disease point towards a viral etiology, and several of the enteroviruses are known to cause encephalitis. This review article is an attempt to present the various supposed causal factors of AES, the critical gaps that question the association between the litchi fruits and AES and some of the serious misgivings to refute the suspected association between the consumption of litchi fruits and AES.

Key words: Acute Encephalitis Syndrome (AES), Blood sugar, Litchi, α -methylenecyclopropylglycine (MCPG), Virus

Litchi (*Litchi chinensis* Sonn.) is a subtropical fruit belonging to the family Sapindaceae, having its origin in Kwangtung and Fukien regions of South China. It is a non-climacteric fruit which attains maximum edible quality only after complete ripening. The fruit possesses high commercial value due to its pleasantly flavoured juicy aril, delicate taste, high nutritional value and attractive exterior pericarp (Table 1). It is proclaimed as the “queen of fruits” due to its unique delectable taste and striking appearance. The major litchi growing countries in the world are China, India, Brazil, Malaysia, Thailand, Vietnam, Myanmar, Mauritius, South Africa, Australia, New Zealand, Madagascar and Taiwan (Singh *et al.* 2012). Among them, China and India together account for about 91% of the world’s total litchi production which is primarily marketed in the nearby regions due to its highly perishable nature and postharvest pericarp browning (Singh *et al.* 2012).

In recent years, the acute encephalitis syndrome (AES) has acquired major public health importance due to its epidemic nature and high mortality rate (Dinesh *et al.* 2013, Laserson 2013, Shrivastava *et al.* 2015). The symptoms include acute onset of fever with change in mental status

that may lead to disorientation, coma, or inability to talk and seizures (Dinesh *et al.* 2013, Bandyopadhyay *et al.* 2015). This may happen to a person of any age at any time of the year however, the children are particularly vulnerable. It primarily affects young children of age below 15 years (mostly in age group 2-5 years), largely belonging to rural and poor socio-economic background. It has been reported that onset of AES occurs primarily during early morning hours after several hours of fasting, which points to a metabolic disease. Further, hypoglycaemia in the early morning hours indicates inhibited gluconeogenesis and malnutrition, which is associated with depleted glycogen/ glucose store in the liver (John and Das 2014). Well-nourished children are not affected since their glycogen/ glucose store in the liver is sufficient to maintain normal glucose levels and presumably gluconeogenesis is not triggered (John and Das 2014). The first AES outbreak investigation was conducted in Eastern India in 1973. However, the first epidemic of AES appeared in 2011 in North Bihar (Dinesh *et al.* 2013). It has been reported from Vietnam and Bangladesh as well (John and Das 2014).

In general, AES occurs as annual seasonal outbreaks during the months of April-July, affecting hundreds of children with 40-60% mortality (John and Das 2014). Several studies explored different possibilities of its causal agents. In the earlier studies by different teams, Japanese encephalitis, a bat virus, mosquitoes or bed bug bite,

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