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RE-EMERGENCE OF EBOLA VIRAL INFECTION IN WEST AFRICA

B. O. OGUNBANJO

MB. BS., Dip. Ven., FMCPath, FWACP, FAATM.

Faculty of Medicine and Health Sciences, UCSI University, Kuala Lumpur Malaysia

Correspondence author: babatundeoogunbanjo@yahoo.com

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The epidemic and pandemic outbreaks of infectious diseases is not a new phenomenon in the history of man. The bubonic plague in the 14th Century that ravaged several parts of Europe and Asia is one such example, and so also the highly contagious Influenza viral outbreak in the early part of the 20th Century. Man is still battling with the scourge of AIDS. The perennial concern especially in the tropical African countries has been the emerging and re-emerging zoonotic infectious diseases such as Lassa fever, Marburg viral disease, Chikungunya and the deadly Ebola viral disease (EVD) that surfaced again in West Africa in early 2014.

The Ebola virus is an RNA virus belonging to the Family Filoviridae and genus Ebolavirus. There are five genetically distinct strains in the Family, named after the countries of identification: Zaire type (ZEBOV); Sudan (SEBOV); Cote-d'Ivoire (CEBOV); Bundibugyo (BEBOV) and Reston (REBOV). ZEBOV is recognized as the deadliest, first identified in 1976, along with the SEBOV about the same time [1]. REBOV has been identified as causing disease only in non-human primates. Other outbreaks had occurred between 1980 and 1993 including Gabon, Uganda and Ivory Coast; and now having the current outbreaks in the West African sub-region. It is believed that the Ebola virus (EBOV) was most likely transmitted initially from animals such as bats and non-human primates through hunting and collection of sick or dead wild animals, as well as during handling or consumption of uncooked bush meat - a practice that is rampant in African countries especially in the rural areas [1]. The fruit bats are a popular source of forest meat for humans and are prepared by hand, to be dried, smoked and \or cooked. Handling or consumption of forest fruits contaminated with bat saliva or faeces is also a possible mode of

transmission. The disruption of the ecosystem resulting from extensive afforestation, and economic activities such as hunting might have provided direct as well as indirect contact between humans and natural reservoir of the EBOV. There have also been reports of a high prevalence of EBOV antibodies in humans in some areas of the affected communities of Central Africa, without any history of a previous outbreak. This is believed might be an outcome of exposure to yet unknown less pathogenic or non-pathogenic variants of the EBOV. Field studies and epidemiological surveys have also demonstrated the absence of clinical signs in the fruit bats that are known to be the natural reservoir hosts of the virus [1].

Essentially Ebola is a zoonotic, with human transmission that is responsible for epidemic outbreaks occurring through bodily contacts, or indirectly with contaminated surfaces. Fortunately no transmission is yet associated with air or water, although the possibility of a mutated strain having such characteristics has been highlighted. EBOV spreading through the air under carefully controlled laboratory conditions has been demonstrated [2]. However, no such transmission has been linked to humans, for the implication of that – globally is frightening. There is the need, therefore, to contain the current epidemic and limit its geographical spread. The world community is aware of this and is responding fairly well, for the on-going Ebola epidemic far surpasses the total number of all previous outbreaks combined [3]. It is not only an African problem; it's potentially a global world problem, as communities are linked together by land air and sea. The current outbreak started in early 2014 in Guinea and has spread to neighbouring countries, thereby becoming the largest Ebola outbreak in history and the first of its kind in West Africa [3]. Unfortunately EBOV infection may mimic many other tropical diseases such as malaria, typhoid, more so at its initial phase of presentation. As a result of the rarity of the EVD in most parts of Africa, laboratory investigations are usually oriented towards the more common endemic pathogens in those areas. Yet early laboratory confirmation of suspected cases is essential to implement appropriate control measures. As a class-4 pathogen, EBOV culture requires a maximum containment facility, which is beyond the reach of most of the affected countries. The affected as well as the vulnerable countries in Africa have dysfunctional health care system a consequence of fragile political and socioeconomic situations. A case in point is that of Liberia and Sierra Leone, countries that had emerged not long ago from bloody civil wars, with near collapse of infrastructure and economic activities. Unfortunately the much needed educated professionals have migrated out.

The human body response to EBOV involves both the inflammatory as well as the adaptive systems. Unlike the other enveloped viruses, EBOV does not exhibit any high degree of

variability in its attempt to evade the host immunity. The most important weapons of the EBOV are its Glycoprotein (GP) and the VP35 components which cause the alteration of the target cell function resulting in cytotoxic effects on macrophages and the endothelial cell function [4]. This disrupts inflammatory cell function and the integrity of the vasculature. The VP35 goes to the extent of binding to the RNA thereby hiding it from the innate immune system preventing the body from producing the immune signaling molecules known as interferons, which normally help attract and induce specialized immune cells to boost its adaptive immune response.

The main objective of treatment is to provide an optimal care to the patient with maximum protection of the medical and the nursing staff. EBOV is a potential biological weapon, and therefore of utmost and urgent importance to develop a candidate vaccine that confers interspecies cross-protection against the various species. So also is the need to develop and make available to the community effective antiviral drugs for therapeutic purpose. Currently, there is no available specific therapy with demonstrable efficacy in the treatment of Ebola infection, especially the Ebola haemorrhagic fever (EHF), and there are no commercially available vaccines. A recombinant human monoclonal antibody directed against the envelop GP of the EBOV has been shown to possess neutralizing activity [5]. Such may be useful in vaccine production or as a passive prophylactic against the virus. There are several trials ongoing concurrently and in different countries. Hopefully by the middle of 2015 the conquest of EBOLA will be over.

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