African Journal of Pharmacology and Therapeutics Vol. 1 No. 4: MVVR-K2 Symposium 2012
Open Access available at http://journals.uonbi.ac.ke/ajpt

Abstract

Genotypic Characterization of Resistance to Neuraminidase Inhibitors amongst Influenza A viruses that circulated in Kenya from 2008 to 2011

Meshack O. Wadegu *, Wallace D. Bulimo, Rachel A. Achilla, Janet M. Majanja, Silvanus O. Mukunzi, Finnley Osuna, Josphat Mwangi, Julia W. Mwangi, Janet N. Muthoni, Stephen Ocholla, James O. Njiri, Benjamin H. Opot, and Eyako K. Wurapa

_____

* **Corresponding author:** Department of Emerging Infectious Diseases, US Army Medical Research Unit (USAMRU) - Kenya, P.O. Box 606-00621 Nairobi, Kenya; **Tel:** +254-72-62143566, **Email:** info@usamrukenya.org

Background: Vaccines and antivirals are the mainstay for mitigation and clinical management of influenza infections. However, due to the ever changing antigenic profile, vaccine formulations are revised every year to keep them efficacious. Neuraminidase (NA) inhibitors, mainly oseltamivir and zanamivir, function both as prophylactic and treatment agents. In neuraminidase inhibition, inhibitor molecules mimic NA's natural substrate and bind to the active site, preventing NA from cleaving host cell receptors and releasing new virus. Currently there exists no data on antiviral susceptibility profile of influenza A isolates circulating within the Eastern African region. Here we characterized the antiviral susceptibility of the 2008-2011 influenza A viruses circulating in Kenya.

Methodology: Nasopharyngeal swab specimen from consenting outpatients of ages greater than or equal to two months were obtained and transported under the cold chain to the National Influenza Center (NIC) and screened by real-time RT-PCR using primers targeted at the matrix, and hemagglutinin genes of influenza A subtypes. Positive specimens were inoculated onto MDCK monolayers to isolate virus. RNA was extracted from virus isolates followed by PCR amplification of NA gene segments using gene-specific primers. Nucleotide sequencing of the NA amplicons was carried out using the BigDye chemistry prior to analyses using a suite of bioinformatics tools.

Results: 836 influenza A viruses were isolated. 108 (13%) isolates were analyzed for susceptibility to NA inhibitors. 64% (7/11) of the 2008 seasonal influenza A/H1N1 isolates depicted oseltamivir resistant marker H275Y while all 33 influenza A/H3N2 isolates had H at position 275 hence were sensitive to oseltamivir. Similarly, genetic analysis of the A(H1N1)pdm09 strains in 2009 showed that all had H275 hence sensitive to oseltamivir. The same pattern was duplicated in 2 of the pandemic influenza A/ H1N1 isolates analyzed in the year 2010. Thus all A(H1N1)pdm09 isolated were sensitive to oseltamivir. In 2011 we isolated 14 isolates belonging to influenza A/H3N2 subtype. All these had H 275 in the NA protein implying sensitivity to oseltamivir. Overall, our genotypic data demonstrate that there was oseltamivir resistance in seasonal influenza A (H1N1) viruses isolated in Kenya in 2008-2009.

Conclusion: Our study shows that seasonal influenza A/H1N1 was displaced in 2010 and 2011 after introduction influenza A(H1N1)pdm09 which has since replaced the previous seasonal influenza A/H1N1.

Key words: Characterization, Resistance, Neuraminidase Inhibitors, Influenza A, Kenya

Received: November, 2012
Published: December, 2012

 ISSN 2303-9841