Current Research: Integrative Medicine

(ISSN: 2529-797X)

Mixed ipv-opv scheduling to help eradicate vaccine-associated paralytic poliomyelitis
High altitude illness – preventative travel advice for parents

[1]*Dr Ahmad Ehsan Rabani* , [1]*HBS - Medical and Dental College, Islamabad, Pakistan,* [2]*Dr Fazal-e-Rabi Subhani* , [2]*The Rotunda Hospital, Parnell Square E, Rotunda, Dublin*
[3]*Dr Fazal-i-Akbar Danish* , [3]*Altnagelvin Area Hospital, Londonderry BT47 6SB*

Introduction:

Following the launch of Global Polio Eradication Initiative (GPEI) in 1988, the annual global incidence of polio has dramatically reduced from >350,000 cases in 1988 to 37 cases in 2019. Poliovirus vaccines are currently available in two forms: inactivated poliovirus vaccine (IPV) given as an intramuscular (IM) injection and oral poliovirus vaccine (OPV). Since IPV is highly effective & doesn't cause vaccine-associated paralytic poliomyelitis (VAPP), it is the only vaccine recommended by United States centres for Disease Control & Prevention (CDC) for routine immunization in US. In fact, IPV is the preferred vaccine in most upper- & middle-income countries of the world. Unlike IPV, rare cases of VAPP have been reported in OPV recipients & their contacts due to reversion of vaccine-derived attenuated viral strain to neurovirulence strain. Despite these reports, over years OPV has remained the preferred vaccine for the developing countries owing to its low cost, ease of administration by non-medical workers, & induction of mucosal immunity.

Method:

A comprehensive search of PubMed & EMBASE from their inceptions to November 2019 was made using 3 search items: polio Eradication; vaccine-associated paralytic poliomyelitis; mixed IPV-OPV schedule. The search items were combined using the Boolean operator. A further search was made of the WHO GPEI, US CDC, & ClinicalTrials.gov with no language restriction.

Results:

In current OPV-using countries, an estimated 306-490 VAPP cases have been reported. The overall risk is about 1 case per 900,000 vaccines. This risk is exuberantly high (2 per 1000 vaccines) in individuals with B-cell immunodeficiency (OPV is thus contraindicated in immunodeficient individuals). Normal OPV recipient infants continue to shed OPV viruses for as long as 6-8 weeks after administration. In endemic places with inadequate vaccine coverage, the OPV viruses may consequently start to spread in the community.

Unfortunately, these so-called circulating vaccine-derived polioviruses (cVDPV) may lose their attenuating mutations, become virulent & may cause VAPP not only in the endemic areas but also in the adjoining nonendemic areas due to low population immunity. In fact, >20 countries have experienced reintroduction of polio from endemic areas in this way.

Conclusion:

Since high burden of enteric pathogens can reduce the efficacy of OPV to <20% in some endemic areas, many children in these areas who have already received multiple OPV doses may remain susceptible to polio. IPV on the other hand results in higher dose-for-dose seroconversion rates than OPV even in the low-income settings. OPV must therefore be replaced or complemented with IPV in low-income endemic areas to realise the goal of global polio eradication. A good example would be China where administration of IPV at 2 months of age in a mixed IPV-OPV schedule has resulted in VAPP elimination. Mixed IPV-OPV schedule has also shown seroconversion rates of >98% to type 1 & type 3 and 68-73% to type 2 in Indian & Latin American trials.