Correspondence

Vaccine-associated paralytic poliomyelitis in a pre-vaccinated infant

To the editor

I carefully read the article by Kakish et al[1] on the vaccine-associated paralytic poliomyelitis (VAPP) in a pre-vaccinated infant. Since its introduction more than 4 decades ago, the oral polio vaccine (OPV) has globally proved to be effective in controlling poliomyelitis, particularly in developing countries. However, concerns regarding its safety are breeding with the increasing reports of VAPP in many countries. I have the following comments regarding that issue. The quantitative serum immunoglobulin electrophoresis of the studied infant was normal. However, studies have shown that immunodeficiency might be a risk factor in predisposing children to acquire VAPP after exposure to OPV, either as vaccine recipients, or through close contact with recent recipients. In one study, investigating the immune status of patients with VAPP revealed that changes in the content of serum immunoglobulin were the most frequent.[2] In another study, signs of immunodeficiency (decrease of T and B lymphocytes counts, impaired synthesis of immunoglobulin, defects of phagocytosis, and decrease of blood natural killer [NK] number) were revealed in these patients.[3]

Overall, the reported prevalence of VAPP cases in countries adopting mass vaccination programme with OPV is still low. The reported overall risk includes one case per 183,000 OPV doses in Romania,[4] one case per 1.5-2.2 million doses in Latin America,[5] one case per 4.1-4.6 million doses in India,[6] one case per 10.67 million doses in Brazil,[7] one case per 745,000 doses in Belarus,[8] one case per 1.6 million doses in Russian Federation,[9] and one case per 2 million doses in Japan.[10] In Iraq, no case of VAPP has been reported. I think the prevalence of VAPP worldwide in the current time does not reach a critical level, therefore, it does not justify substituting OPV by an inactivated polio vaccine (IPV).

The economic impact of switching from OPV to IPV is not always cost-effective. For instance, changing to an IPV-based schedule in Australia would prevent 0.395 VAPP cases annually. The change would incur incrementally, annual costs of $19.5 million ($49.3 million per VAPP case prevented), and $6.7 million ($17 million per VAPP case prevented) for the IPV component in a combination vaccine.[11] In South Africa, the use of OPV in the routine vaccination services was predicted to result in 2.96 VAPP cases in the 2005 cohort. The cost-effectiveness of the different IPV alternatives varies between US$ 740,000 and US$ 7.2 million per VAPP case averted.[12] Therefore, more precise estimates of VAPP incidence, and IPV price are needed. Poor cost-effectiveness will make the decision about switching from OPV to IPV in the childhood vaccination schedule cumbersome, particularly in developing countries.

Any protocol to change the vaccination schedule of poliomyelitis from OPV to IPV should not be attempted, unless poliomyelitis is globally and completely eradicated; a task that was not yet achieved with sporadic cases of poliomyelitis still reported from time and time despite the slogan adopted by the World Health Organization (WHO) to completely and globally eradicate poliomyelitis by the year 2000.

The role of routine vaccination against poliomyelitis for the post-eradication era remains an important issue for policy decision-makers. The core post-eradication vaccination issues include the risk/benefits of continued OPV use, the extent of OPV replacement with IPV, possible strategies for discontinuing OPV, and the potential for development and licensure of a safe and effective replacement for OPV.[13] Four potential vaccination scenarios can be constructed: stop all polio vaccination, continue with current vaccination policies (OPV, IPV, or sequential schedule), discontinue OPV but continue IPV universally, or discontinue OPV but continue IPV in selected countries.[14] Extensive research on the decision to evaluate changing OPV to IPV are needed, considering their immunological, epidemiological, ecological, and financial spectra. Such decisions should be country-specific. To ensure successful transition from OPV to IPV, 2 elements must be considered, namely, the actual prevalence of both poliomyelitis and VAPP, and the health resources of that country.

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Reply from the Author

First, we would like to thank Professor Al-Mendalawi for his interest in our paper,[1] and for his valuable remarks. We do agree with Dr. Al-Mendalawi's comprehensive remarks on the VAAP in terms of reported global prevalences', the relevant issues for changing strategies from OPV to IPV immunization practice, and its economic impact.

The risk of VAAP among OPV recipients, and the non-immune contact is similar. It is a rare occurrence, and our report was meant to underscore the fact that, VAAP is clinically identical to that caused by the wild virus, both among oral vaccine recipients, and among non-immunized household contacts with the vaccines. The base line investigation, and a short-term clinical follow up revealed, that our case was immunologically normal with permanent neurological sequelae. A number of earlier reported VAAP cases were in fact among the immunocompetent recipient of OPV.[15] The discontinuation of the use of OPV has shown a complete elimination of VAPP, and has resulted in the adoption of IPV to be used exclusively in the USA. However, any attempts to reduce VAPP through changes in vaccine protocol need to be reviewed with thorough regional clinical, and epidemiological knowledge, including HIV prevalence status among younger children in a region. Accordingly, we do agree that any decision in this regard needs to be country specific.

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Related topics

Kakish KS, Al-Dhaheri WS, Uduman SA. Vaccine - associated paralytic poliomyelitis in a pre-vaccinated infant. *Saudi Med J* 2008; 29: 1057-1058.

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