

# Vaccine-associated paralytic poliomyelitis

Margaret A Burgess, Peter B McIntyre

National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS), Royal Alexandra Hospital for Children, PO Box 3515, Westmead, New South Wales, 2141

## The World Health Organization's polio eradication program

In the wake of the World Health Organization's (WHO) program to eradicate poliomyelitis globally by the end of the year 2000 (in 1997 only 5,186 cases were reported world-wide), attention has focussed on the importance of good surveillance of acute flaccid paralysis, which is essential for a country to qualify for being declared polio-free, and on the occurrence of vaccine-associated paralytic poliomyelitis (VAPP).<sup>1,2</sup>

## VAPP in New Zealand

In June 1998, a 4 month old boy in New Zealand was notified with acute flaccid paralysis which had commenced 2 weeks after he received his second dose of oral polio vaccine.<sup>3</sup> Sabin oral polio vaccine virus type 3 was isolated from his stool. His clinical course fitted the case definition for VAPP; 'acute flaccid paralysis in a vaccine recipient 7-30 days after receiving oral polio vaccine (OPV), with no sensory or cognitive loss and with paralysis still present 60 days after the onset of symptoms.'

## VAPP in Australia

Local transmission of wild polio virus in Australia probably ceased in 1962. The last case of polio due to wild virus was reported in 1977 in a young child who acquired the infection abroad (M. Kennett, personal communication). A second case, attributed to wild virus infection in 1978, is currently being reviewed (M. Kennett, personal communication),<sup>4</sup> and one case previously suspected as being due to wild virus in 1986 has been reclassified as Sabin-like with wild type characteristics.<sup>5</sup> Another case of probable VAPP was reported in 1995 in the healthy unvaccinated mother of a recently vaccinated infant.<sup>6,7</sup>

It is likely that the incidence of VAPP in Australia is similar to the incidence in the United States of America (USA). We should therefore expect about 1 case in every 2.4 million doses distributed (1 case in every 6.2 million doses in recipients of the vaccine and 1 case in 7.6 million doses for contacts of recipients). The expected overall rate associated with a first dose of the vaccine is 1 in 750,000 doses distributed.<sup>8</sup>

Australia should therefore be detecting in about 1 case every 3 years, as each year 250,000 infants receive a first dose and over 1 million doses are administered. Why then are we not detecting cases at this rate? The most likely reason is that the cases are either not recognised or not reported. This demonstrates a deficit in our surveillance system as notification is mandatory in each State and Territory. In addition, active surveillance of acute flaccid paralysis in persons under the age of 16 years is in place through the Australian Paediatric Surveillance Unit (APSU)

and no case of VAPP was reported in the 3 years 1995 to 1997.<sup>2</sup> However, as the only way to confirm VAPP is to examine appropriate stool specimens, and as only 24% of the cases of AFP notified to the APSU had these examinations, cases of VAPP may be being overlooked (R. D'Souza, personal communication).<sup>2</sup> An alternative, but unlikely, explanation for our lack of notified cases could be that the vaccine available in Australia has a lower incidence of VAPP.

## Reintroduction of inactivated polio vaccine in the United States of America

Because of concern about the 8-10 cases of VAPP reported each year in the USA, in 1997 the Advisory Committee on Immunisation Practices (ACIP) recommended adoption of a sequential schedule of inactivated polio vaccine (IPV) and OPV, with either all IPV or all OPV as acceptable alternatives.<sup>8</sup> The preferred schedule for healthy children was for the first two doses to be IPV and the later two doses OPV. The advantages of the sequential schedule were considered to be a potential halving of the incidence of VAPP, and postponement of administration of OPV until an age when most immunodeficient children will have been diagnosed and excluded from this risk, but with retention of the benefits of mucosal immunity from OPV for the healthy children. The disadvantages of the sequential schedule are the complexity of the schedule, the increased number of injections required at each immunisation visit for young infants, and the very much greater cost of the IPV than OPV in countries such as Australia, compared with the USA.

Over the past two years the USA has embraced the use of IPV.<sup>1</sup> In 1997, 29% of all polio vaccine doses distributed were IPV. Now the American Academy of Pediatrics has revised its recommendation to strongly favour the sequential or all IPV options while continuing to recommend the use of OPV to control the spread of any wild type outbreak.<sup>1</sup> Denmark has successfully used a similar sequential schedule since 1968.

## The World Health Organization's position on OPV

The WHO strongly supports the use of OPV to achieve global eradication of poliomyelitis, especially in countries with continued or recent circulation of wild type poliovirus.<sup>9</sup> This recommendation is endorsed by the authorities in the USA and Europe including those who routinely use IPV.<sup>10-12</sup>

## Conclusions

Every case of VAPP represents a personal tragedy and a public health dilemma. Australia must continue to strengthen surveillance of AFP to obtain a reliable

estimate of the incidence of VAPP and to ensure that we reach the WHO minimum reporting rate of 1 case per 100,000 children under 16 years (our current rate is 0.7<sup>2</sup>) required for certification. In preparation for combination vaccines containing IPV becoming available the feasibility and costs of changing the Australian schedule are in the process of being reviewed, bearing in mind that once polio is eradicated within a few years (possibly as early as 2007), polio vaccination will no longer be necessary. A vaccine containing diphtheria, tetanus, pertussis, Hib and IPV is already available in Canada.<sup>13</sup>

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