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Rotavirus Vaccine RIX4414 (Rotarix™)

A Viewpoint by David I. Bernstein

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Rotavirus infections are the most common cause of hospitalization due to gastroenteritis in the developed countries of the world and account for over 40% of deaths due to gastroenteritis worldwide; over 600 000 deaths per year. Therefore, rotavirus has been a major target for vaccine development. Despite the withdrawal of Rotashield®[1], two other rotavirus vaccines have been developed and are available in various parts of the world. Rotarix™ is available now in the EU, most of Latin America, and several other countries.

The original virus 89-12 from which Rotarix™ was developed was isolated from a subject in a trial of an earlier rotavirus vaccine that proved ineffective. Investigators of that trial demonstrated that infection with 89-12-like viruses provided protection from subsequent rotavirus disease and infection.[1] Therefore, they set out to develop a live oral vaccine by attenuating the virus by multiple passages in tissue culture. This led to the development of Rotarix™. Rotarix™ is administered orally in a two-dose schedule beginning at ≥6 weeks of age with an interval of at least 4 weeks. Dosing must be complete by 24 weeks of age.

The basis for developing a monovalent human G1P[8] vaccine was to protect against the most common rotavirus serotypes. Protection of over 85% has now been seen with serotypes that share either the P (VP7) or G (VP4) proteins.[2] Protection is likely due to neutralizing antibody generated to the shared proteins, but could also be provided by non-neutralizing antibodies or cross-reactive T cells.[3] Thus, there is also protection against G2P[4] rotavirus strains that do not share either the G or P proteins with the vaccine virus. The use of a human isolate was also thought to have advantages over the use of animal rotavirus strains or reassortants derived from those strains.

Rotarix™ (GlaxoSmithKline) has undergone extensive clinical trials as part of a global effort. In studies of over 70 000 children, the vaccine was safe and was not associated with intussusception.[2] Unlike Rotashield™, it also does not induce fever. Rotarix™ may have an advantage over the other rotavirus vaccine currently available in the US and some other countries, as only two doses are required to provide protection compared with three for RotaTeq®. Manufacturing a single strain vaccine should also be simpler than manufacturing five strains for the pentavalent RotaTeq® vaccine.

Both Rotarix™ and RotaTeq® show great promise for providing protection against severe rotavirus disease in the least developed countries of the world where most of the mortality is seen. Trials in these countries are needed so that the full potential of these vaccines to benefit mankind can be achieved. ▲

References

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3. Ward RL. Possible mechanisms of protection elicited by candidate rotavirus vaccines as determined with the adult mouse model. Viral Immunol 2003; 16 (1): 17-24

1 The use of trade names is for product identification purposes only and does not imply endorsement.