Respiratory PCR detects influenza after intranasal live-attenuated influenza vaccination

From 2013 an annual nasal live-attenuated influenza vaccine (LAIV—Fluenz) is available for all children in the UK aged 2 and 3 years and other 'at-risk' children, as part of the National Health Service (NHS) childhood vaccination programme.[1 2] The vaccine contains reassortant influenza viruses; two influenza A viruses (H1N1 and H3N2) and one influenza B virus,[3] and has previously been used in children in the USA.

A 2-year-old child presented with respiratory symptoms. PCR assay of nasopharyngeal swab was strongly positive for Rhinovirus (Cycle Threshold, CT 21) and weakly positive for Influenza B (CT 37.6). Further questioning revealed that the child had received the intranasal influenza vaccine 10 days previously. Due to the difference in CT values and detection of an alternative virus (Rhinovirus), a diagnosis of Rhinovirus bronchiolitis was made and the weak Influenza B positivity was attributed to the intranasal vaccine.

Immunocompetent children vaccinated with LAIV can shed vaccine viruses for up to 3 weeks (mean duration: 7.6 days); maximal shedding occurs within 2 days of vaccination. Shedding is in lower amounts than with wild-type influenza viruses. Rarely, shed vaccine viruses can be transmitted from vaccine recipients to unvaccinated persons; however, serious illness has not been reported.[4]

Both wild-type and live-attenuated vaccine virus strains are detected by laboratory respiratory PCR assay. Wild-type and vaccine virus strains could be distinguished by genome sequencing; however, the low copy number of shed vaccine virus precludes this approach. In this case, a clinical decision must be made as to whether the influenza virus is the cause of disease or a consequence of vaccination. This will influence decisions about treating with antivirals.

As LAIV is introduced into UK clinical practice, this is a useful reminder to take care in interpreting respiratory PCR results in recently vaccinated children, highlighting the need for a precise vaccination history.

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