Typically asymptomatic but with robust antibody formation: Children's unique humoral immune response to SARS-CoV-2.

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Background: Long-term persistence of antibodies against SARS-CoV-2, particularly the SARS-CoV-2 Spike Trimer, determines individual protection against infection and potentially viral spread. The quality of children's natural humoral immune response following SARSCoV-2 infection is yet incompletely understood but crucial to guide pediatric SARS-CoV-2 vaccination programs.

Methods: In this prospective observational multi-center cohort study, followed 328 households, consisting of 548 children and 717 adults, with at least one member with a previous laboratory-confirmed SARS-CoV-2 infection. The serological response was assessed at 3-4 months and 11-12 months after infection using a bead-based multiplex immunoassay for 23 human coronavirus antigens including SARS-CoV-2 and its Variants of Concern (VOC) and endemic human coronaviruses (HCoVs), and additionally by three commercial SARS-CoV-2 antibody assays.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet

Children's unique & robust humoral immune response to SARS-CoV-2.

Results: Overall, 33.76% of SARS-CoV-2 exposed children and 57.88% adults were seropositive. Children were five times more likely to have seroconverted without symptoms compared to adults. Despite the frequently asymptomatic course of infection, children had higher specific antibody levels, and their antibodies persisted longer than in adults (96.22% vs 82.89% still seropositive 11-12 months post infection). Of note, symptomatic and asymptomatic infections induced similar humoral responses in all age groups. In symptomatic children, only dysgeusia was found as diagnostic indicator of COVID-19. SARSCoV-2 infections occurred independent of HCoV serostatus. Antibody binding responses to VOCs were similar in children and adults, with reduced binding for the Beta variant in both groups.

Conclusion: The long-term humoral immune response to SARS-CoV-2 infection in children is robust and may provide long-term protection even after asymptomatic infection.

EXPERT COMMENT

1.To date, knowledge of children's immune response to infection with SARS-CoV-2 remains incomplete. As with other viral infections, immune control of SARS-CoV-2 is achieved through a concerted interplay of humoral and cellular immunity. Neutralizing antibodies in children are of particular interest in this context, given their role in blocking virus entry into cells by inhibiting the interaction between the viral receptor binding domain (RBD) within the S-glycoprotein and the ACE2 receptor.

2.As the humoral immunity against SARS-CoV-2 is now increasingly accepted as the central correlate of protection, improving our incomplete understanding in children is of considerable value for public health and vaccination strategies.

3.Although children mostly show mild or even asymptomatic clinical courses following SARS-CoV-2 infection, they mount a strong and enduring humoral immune response which strongly argues for sustained protection after infection, and might inform the design of vaccination strategies for SARS-CoV-2 convalescent children.

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With warm regards,

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Reference

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