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ORIGINAL ARTICLE

Antibody persistence following meningococcal C conjugate vaccination in children and adolescents infected with human immunodeficiency virus☆

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Meningococcal vaccine;
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Abstract
Objective: HIV-infected individuals (HIVI) are threatened by meningococcal infection and presented lower response to vaccines. Data are scarce on long-term persistence of human serum bactericidal antibody (hSBA) after a meningococcal C conjugate (MCC) vaccine in HIVI youth; the authors aimed to describe this persistence in HIVI.
Methods: HIVI and HIV uninfected individuals (HIVU), aged 2–18 years, CD4 >15% were recruited. Seroprotection (hSBA ≥1:4) at baseline and at 12–18 months after immunization was evaluated and the association of the different factors with the long-term persistence was calculated using logistic regression.
Results: A total of 145 HIVI, 50 HIVU were recruited and immunized, and their median age was 11 years (median age in HIVI group was 12 years, and 10 years in HIVU group, p-value = 0.02). 85 HIVI (44%) had undetectable viral load (UVL). Seroprotection rate was 27.2%: 24.1% in HIVI and 36% in HIVU 12–18 months after immunization (p = 0.14). Baseline immunity (odds ratio [OR] = 70.70, 95% CI: 65.2–766.6); UVL at entry (OR: 2.87, 95% CI: 0.96–8.62) and lower family income (OR: 0.09, 95% CI: 0.01–0.69) were associated with seroprotection among HIVI.

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Conclusion: Seroprotection at 12–18 months after single dose of MCC was low for both groups, and higher among individuals who presented baseline immunity. Among HIVI, vaccine should be administered after UVL is achieved.

PALAVRAS-CHAVE
Vacina meningocócica;
Imunologia;
Vacinas conjugadas;
HIV;
Crianças;
Brasil

Persistência de anticorpos seguida de vacina conjugada meningocócica C em crianças e adolescentes infectados por vírus da imunodeficiência humana

Resumo

Objetivo: As pessoas infectadas pelo HIV (HIVI) estão sujeitas a infecção meningocócica e apresentam menor resposta a vacinas. São escassos os dados a respeito da persistência de longo prazo do anticorpo bactericida no soro humano (hSBA) após vacina conjugada meningocócica C (MCC) em HIVI jovens, e visamos descrever essa persistência em HIVI.
Métodos: Foram recrutadas pessoas HIVI e pessoas não infectadas por HIV (HIVU), com idades entre 2 e 18 anos, CD4 > 15%. A seroproteção (hSBA $\geq$ 1:4) basal aos 12–18 meses após a imunização foi avaliada e a associação dos diferentes fatores com a persistência de longo prazo foi calculada utilizando a regressão logística.
Resultados: 145 HIVI e 50 HIVU foram recrutados e imunizados e sua idade média foi determinada em 11 anos (a idade média no grupo HIVI foi 12 anos e no grupo HIVU foi 10 anos, valor de p = 0.02). 85 HIVI (44%) apresentaram carga viral indetectável (CVI). A taxa de seroproteção foi 27.2%: 24.1% no grupo HIVI e 36% no grupo HIVU 12-18 meses após imunização (p = 0.14). A imunidade basal [razão de chance (RC) = 7070, IC: 65,2–7666]; CVI no momento da participação (RC: 2,87, IC de 95%: 0,96-8,62) e renda familiar mais baixa (RC: 0,09, IC de 95%: 0,01-0,69) foram associadas a seroproteção entre as pessoas HIVI.
Conclusão: A seroproteção aos 12-18 meses após única dose de MCC mostrou-se baixa em ambos os grupos e mais elevada entre as pessoas que apresentaram imunidade basal. Entre as pessoas HIVI, as vacinas devem ser administradas após a CVI ser atingida.

Introduction

Meningococcal disease (MD) is an important cause of septicemia and meningitis, and a major public health challenge worldwide.[1,2] People living with human immunodeficiency virus (HIV) infection have an increased risk for MD. Studies have demonstrated a five to ten times higher risk of MD among HIV-infected (HIVI) children and almost tenfold higher among adolescents and adults when compared with HIV-uninfected individuals (HIVU).[3,4] Furthermore, HIVI children and adolescents have lower vaccine response rates despite being on combination antiretroviral therapy (cART).[5–7] Vaccine-induced antibodies also may wane more quickly in persons with HIV than in healthy individuals, indicating that immune reconstitution was not sufficient to ensure long-term protection and highlighting the importance of evaluating long-term immunogenicity to meningococcal vaccines and factors that may be associated with a better response.[8,9]

The persistence of antibodies after meningococcal serogroup C (MCC) conjugate vaccines has been studied in many high-risk populations with different degrees of immunosuppression, but there are few studies in HIVI.[10–12]

The aims of this study were: (1) to assess the persistence of serum bactericidal antibody against MCC, using human complement (hSBA) in HIVI children and adolescents, 12–18 months after a single dose of MCC, and compared with HIVU participants; and (2) to evaluate factors associated with antibody persistence.

Materials and methods

Study design and population

This was a prospective cohort study of HIVI and HIVU children and adolescents followed at the Instituto de Puericultura e Pediatria Martagão Gesteira (IPPMG), a pediatric hospital of the Universidade Federal do Rio de Janeiro, reference center for HIV care in Rio de Janeiro, Brazil, from February 2011 to December 2012. They were recruited at the clinic's waiting room.

Eligibility criteria were: individuals aged 2–18 years who had not received any previous MCC vaccine, had not received a live vaccine within 4 weeks before entry, and were not scheduled to receive other vaccines within 2 weeks. For the HIVI group, additional eligibility criteria were HIV infection (defined as two reactive anti-HIV tests in children >2 years old), absence of World Health Organization clinical stages 3 or 4 HIV clinical disease at entry, and CD4+ T-lymphocyte cell (CD4) count at or above 350 cell/mm^3 and/or 15% at study