

Predictors of Successful Response to Hepatitis A Vaccine in HIV-infected Persons

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Abstract

Background: Hepatitis A infection remains a health risk for HIV-infected persons. While the inactivated hepatitis A virus (HAV) vaccine affords protection to immunocompetent persons > 95% of the time, rates of developing protective antibody in HIV+ persons range from 9 to 94%. The effect of HIV viremia on HAV vaccine response has not previously been reported.

Methods: In this retrospective cohort study of a 906-patient HIV clinic, HIV-infected patients who had received HAV vaccine were identified. Medical records were reviewed for demographics, number of vaccine doses, CD4+ T-cell nadir and count at time of vaccination, HIV viral load at time of vaccination, and antiretroviral therapy at time of vaccination. HIV viral load at time of vaccination, and antiretroviral therapy at time of vaccination. For continuous and dichotomous variables, t-test and χ^2 were used, respectively. Univariate and multivariate analysis by logistic regression were used to determine factors which predicted a successful immune response (reactive HAV antibody) after HAV vaccination.

Results: Of the 906 patients, 189 (21%) had evidence of prior HAV infection and 362 (40%) had received at least 1 dose of HAV vaccine; 235 had IgG antibody data before and after vaccination. Of these, 112 (48%) developed a reactive antibody response after vaccination. Only HIV viral load < 1000 copies/mL was predictive of successful antibody response. The median HIV viral load in the responders was < 400 copies/mL and the median viral load in non-responders was 1846 copies/mL. The table shows the differences between the vaccinees who developed a reactive HAV antibody (responders) and those who did not.

Conclusions: Suppression of HIV replication at time of HAV vaccination is associated with an increased likelihood of developing a protective antibody response in HIV-infected persons. Neither nadir CD4+ T-cell count nor the value at time of vaccination predicted antibody response. These results suggest the significance of control of viral replication at time of HAV vaccination. The low rate of HAV vaccination response (48%) suggests the importance of developing new approaches to vaccination in HIV-infected persons.

Background

Despite the introduction of HAV vaccine in 1991, HAV infection remains a health risk for HIV-infected persons. In a review of the HOPS cohort, Tedaldi et al reported that only 167 of 716 subjects (23.3%) who were eligible for HAV vaccine received at least 1 dose (1). The factors related to this poor adherence to the ACIP guidelines remain unclear(2). While the inactivated HAV vaccine affords protection to virtually 100% of HIV sero-negative adults, the response in HIV-infected persons has been reported to be much lower with the rate of protection varying from 9 to 94% (3-5). Additionally, lower CD4 cell counts were associated with poorer response rates for HAV vaccine. These studies showed no effect of HAV vaccine on the plasma HIV RNA level. The effect of HIV viremia on HAV vaccine response has not been previously reported.

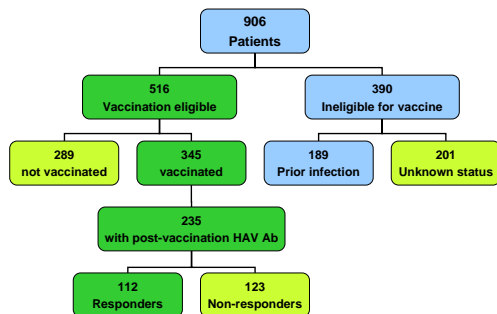
Methods

A retrospective chart review of a 906-patient HIV clinic was performed. HIV-infected patients who had received HAV vaccine were identified.

Medical records were reviewed for demographics, number of vaccine doses, CD4+ T-cell nadir and count at time of vaccination, HIV viral load at time of vaccination, and antiretroviral therapy at time of vaccination.

For continuous and dichotomous variables, t-test and χ^2 were used, respectively. Non-parametric tests were used, when data was not normally distributed. Univariate and multivariate analysis by logistic regression were used to determine factors which predicted a successful immune response (reactive HAV antibody) after HAV vaccination. The data set was analyzed using Microsoft Excel and the SPSS software package (Version 12.0 for Windows; SPSS/ Systat, Chicago, IL)

Results



Of the 906 medical records were reviewed, 189 subjects (21%) had evidence of prior HAV infection, 91 (10%) had unknown HAV status, 281 patients (31%) were neither vaccinated nor had evidence of prior infection, and 345 (38%) had received at least 1 dose of HAV vaccine (HAVRIX, 1440 EIU).

Results

The differences between the patients who received vaccination and those who were eligible but did not receive vaccination are in Table 1.

Table 1: Characteristics Associated with HAV Vaccine Receipt.

Basic Characteristics	Vaccinated (n= 345)	Eligible for vaccination (n=281)	p Value
Gender			
Female	118 (34%)	122 (43%)	0.018
Male	227 (66%)	159 (57%)	
Race			
Caucasian	113 (32%)	103 (37%)	NS
AA	230 (67%)	175 (62%)	
Hispanic	2 (0.6%)	3 (1%)	
Mean age (years)	40.5 ± 9.6	37.4 ± 9.2	<0.001
Mean nadir CD4 count (cells/ μ L)	245 (0 - 1508)	150 (0 - 1362)	0.001
Positive HCV Ab	28 (8%)	21 (7.5%)	NS

Table 2: Factors Related to HAV Vaccine Response.

	Responders n = 112	Non-responders n = 123	p Value
African American	78 (70%)	80 (65%)	0.74
Female	38 (34%)	36 (24%)	0.44
Mean age (years)	38.2 ± 9.6	37.4 ± 9.6	0.50
Received 2 injections	75 (66%)	76 (62%)	0.42
Median CD4 nadir (range)	234 (0 to 1150)	212 (0 to 994)	0.07
Median CD4 at Vax#1 (range)	438 (5 to 1701)	397 (0 to 1224)	0.08
CD4 count at Vax#1 < 200 (n=43)	20 (47%)	23 (53%)	0.157
200 - 499 (n=101)	41 (41%)	60 (59%)	
> 500 (n=84)	46 (55%)	38 (45%)	
Viral load < 1000 copies/mL at Vax#1	73 (65%)	56 (46%)	0.002
Viral load < 400 copies/mL at Vax#1	107 (48%)	118 (52%)	0.023

Conclusions

Suppression of HIV replication at time of HAV vaccination is associated with an increased likelihood of developing a protective antibody response in HIV-infected persons.

Neither nadir CD4+ T-cell count nor the value at time of vaccination predicted antibody response.

These results suggest the significance of control of viral replication at time of HAV vaccination.

The low rate of HAV vaccination response (48%) suggests the importance of developing alternative approaches to vaccination in HIV infected persons.

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