Utility of Recombinant Hepatitis B Vaccine in Pre-liver Transplant Candidates

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Abstract

Background: A recombinant, adjuvanted Hepatitis B (HBV) vaccine (HepB-CpG) was approved by the FDA in 2017. Initial FDA data showed greater immunogenicity than comparable recombinant HBV vaccines.[1] Moreover, it requires only two doses over four weeks instead of three doses over six months, so there is a time advantage to HepB-CpG, which is advantageous in pre-liver transplant candidates, given their limited time before transplantation.[2] The efficacy in this population is unknown, so we investigated this subject. This study aims to explore the efficacy of HepB-CpG in pre-liver transplant candidates, as there is currently no data on this subject.

Methods: This study was a retrospective review of pre-liver transplant candidates greater than 18 years old at Memorial Hermann Hospital in Houston, TX, who received at least two doses of HepB-CpG. Patients were identified from our pre-liver transplant database. Patient characteristics were collected at the time of the first dose. Vaccine efficacy was measured by anti-Hepatitis B surface antibody titers (≥10mIU/mL) at least four weeks after completion of the series. Patients who received only one dose or did not have any post-vaccine titers were excluded from the analysis.

Results: A total of 78 potential eligible patients were identified. After exclusion due to various reasons, a total of 27 patients were eligible for our study. Data are summarized in Table 1. Briefly, our patients were Hispanic dominant (59.3%). The median MELD score was 18, and a significant number of patients (48.1%) had underlying malignancy. The cause of cirrhosis was mainly due to alcoholic and non-alcoholic steatohepatitis (NASH). Only 13 patients (48.1%) showed seroconversion after their second dose of HepB-CpG. Moreover, of the five patients receiving immunosuppressive drugs, only one patient (20%) responded to the vaccine.

Conclusion: Despite administration of HepB-CpG, less than 50% of pre-liver transplant candidates showed seroconversion. Furthermore, only one cirrhotic patient on immunosuppressive drugs responded to the vaccine. Our results illustrate the need for a better strategy to improve immunogenicity among this patient population. Larger studies are warranted to confirm the findings.

Introduction

- Immunization against Hepatitis B virus (HBV) is an important part of the workup for patients undergoing liver transplant
- Traditionally, the HBV vaccine is a 3-dose series given over a span of 6 months. The new HepB-CpG vaccine, however, requires only two doses over one month, providing a time advantage that could be vital for patients in need of a liver transplant
- Additionally, Hep-CpG showed greater immunogenicity than comparable HBV vaccines. Its efficacy has not been studied in pre-liver transplant patients, however
- The purpose of this study was to explore the efficacy of the HepB-CpG vaccine in liver-transplant candidates and provide data on whether or not this vaccine can be a viable alternative to traditional recombinant HBV vaccines

Methods

Retrospective review of pre and post-liver transplant patients who received two doses of the Hep-CpG

- Data obtained from the electronic medical record, from 6/2019 to 1/2022
- Solid Organ Transplant Program at Memorial Hermann Hospital, Texas Medical Center, in Houston, TX

Inclusion Criteria

- All patients age 18 or older who were evaluated for liver transplant and received at least two doses of the HepB-CpG vaccine with follow-up Hepatitis B surface antibody

Exclusion Criteria

- Patients who did not receive two doses of the vaccine or did not have post-vaccine serological titers

Results

Table. Characteristics of Pre-Liver Transplant Candidates Who Had Serological Evaluation after Two Doses of Conjugated Hepatitis B Vaccine

Age, median (IQR)	62 (57-67)
Sex (Male)	15 (55.6%)
Ethnicity/Race	
Hispanic	16 (59.3%)
White	8 (29.6%)
Afircan-American	1 (3.7%)
Asian	1 (3.7%)
Other	1 (3.7%)
Types of Liver Diseases	
Alcoholic Cirrhosis	10 (37.0%)
Autoimmune	3 (11.1%)
NASH	12 (44.4%)
Chronic Hepatitis C	1 (3.7%)
Other	1 (3.7%)
MELD Score	18 (13-19.5)
Comorbidities	
Cerebrovacular Diseases	3 (11.1%)
Congestive Heart Failure	1 (3.7%)
Peripheral Vascular Disease	2 (7.4%)
Chronic Liver Disease	27 (100.0%)
Moderate-to-severe Kidney Disease	1 (3.7%)
Diabetes Mellitus	14 (51.9%)
Malignancy	13 (48.1%)
Hepatocellular Carcinoma	11 (40.7%)
HIV/AIDS	0 (0.0%)
Immunosuppresants	
Tacrolimus	2 (7.4%)
Mycophenolate mofetil	1 (3.7%)
Prednisone	2 (7.4%)
Previous Hep B Vaccines other than HepB-CpG	4 (14.8%)
Response	
Seroconversion	13 (48.1%)
Titer range for seroconverted patients, Median (IQR)	128 (39-497)

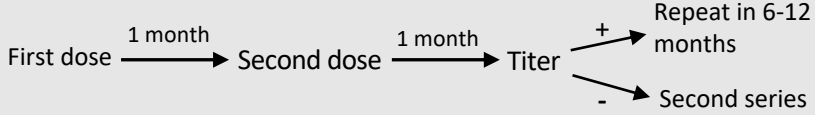
Abbreviations: HIV/AIDS: Human immunodeficiency virus/acquired immunodeficiency syndrome, MELD: Model for end-stage liver disease, NASH: Non-alcoholic steatohepatitis, IQR: inter-quartile range

Conclusions

- Of the 27 patients who met the inclusion criteria, only 13 showed seroconversion (HBsAb > 10 mLU/mL) 4 weeks after their second dose, indicating the need for a better strategy to improve immunogenicity in this population
- We had 5 patients with autoimmune hepatitis who were on immunosuppressive drugs at the time of vaccination. Of these five, only one showed seroconversion, so patients with autoimmune hepatitis may require a more robust immunization strategy
- Of the 78 patients identified for the study, only 27 met the inclusion criteria. The remaining 49 either did not receive a second dose of the vaccine or did not have post-vaccine titers

Next Steps

- Our first step is to expand this study to include more patients. This involves working closely with our transplant team to increase the number of patients receiving the vaccine and making sure those patients are followed up to measure their response
- We have also created a strategy to improve immunogenicity among this patient population, which is summarized here:



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