Immune Response After Hepatitis B Vaccination

Essay

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By

Intesar Suliman Ahmed Al-Menhali

M.B.B.Ch. – Misr University for science & technology

Under Supervision of

Prof. Dr./ Mohsen Maher

Professor of Internal Medicine and Gastroenterology

Faculty of Medicine – Ain Shams University

Dr./ Hatem Abd Al-Tef

Assistant Professor of Internal Medicine and Gastroenterology

Faculty of Medicine – Ain Shams University

Faculty of Medicine

Ain Shams University

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بسم الله الرحمن الرحيم

"يَرْفعِ اللّهُ الَذينَ آمَنُوا مِنْكُمْ
والَذِينَ أوتُوا العِلّمَ دَرَجَاتٍ
واللّهُ بِمَا تَعْمَلُونَ خَبِير"

صدق الله العظيم

سورة البقرة الآية(32)

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قال تعالى: (وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ)

[سورة النور: آية 105] صدق الله العظيم

إلى كل من ساهم فى إخراج رسالتى إلى النور، وقد قال رب العزة فى حديثه القدسى (لم يشكرني من لم يشكر من أجريت على يده نعمتي) والشكر واجب إلى الله سبحانه وتعالى ثم إلى والدتى ووالدى أصحاب الفضل على ودعواتهم لى وتشجيعهم ودعمهم الدائم لى كما أوجه الشكر إلى أخوانى وأخواتى والشكر واجب إلى الشيخة فاطمة بنت مبارك على الدعم الدائم بارك الله لنا فيها.

والشكر واجب لسعادة سفير الدولة لدى مصر ودعمه الدائم وتشجيعه المستمر.

كذلك الشكر الجزيل لسعادة المستشار أحمد المنهالى لما قدمه لنا وما سيقدمه لدعم الطالبات والعلم والمعرفة لما فيه خدمة الوطن والشكر واجب لسعادة الملحق الثقافى السابق د/ فاطمة العامرى وذلك لدعمها المستمر للطلبة.

والشكر واجب لسعادة الملحق بالإنابة أ/ على الشميلى ووقوفه بجانب الطالبات والطالبات ومساعدته الدائمة لهم وتسهيل كل الصعاب لإنهاء رسالتهم فى خدمة الوطن شكراً لتوفير لنا كل الإمكانيات وكذلك كل من ساهم من السفارة فى ظهور رسالتى إلى النور وأشكر كل من وقف معى ومساندتى فى كل الصعاب التى واجهتها فى رسالتى.

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List of Abbreviations

3TC.....3'-thiacytidine

AIDS.....Acquired immunodeficiency syndrome

ALT.....Alanin aminotransferase

ART .....Antiretroviral therapy

CDC.....Centers for disease control

CTLs.....Cytotoxic T lymphocytes

DNA.....Deoxyribonucleic acid

EIA .....Enzyme linked immmunoassays

ELISA.....Enzyme-linked immunosorbent assay

FDA .....Food and drug administration

FTC.....Federal trade commission

HBcAg .....Hepatitis B core antigen

HBeA.....Hepatitis B e antigen

HBIG .....Hepatitis B immune globulin

HBsAg+ .....Hepatitis B surface antigen+

HBV.....Hepatitis B virus

HCC.....Hepatitis cellular carcinoma

HCV.....Hepatitis C virus

HCWs .....Health care workers

HIV.....HIV Human immunodeficiency virus

IDV .....Integrated data viewer

IFN .....Interferon

IgA.....Immunoglobulin A

IgG.....Immunoglobulin G

IgM .....Immunoglobulin M

MEIA.....Microparticle enzyme immunoassay

MS .....Multiple sclerosis

MSM.....Methyl sulfonyl methane

NACI .....National advisory committee on immunization

NAs.....Nucleoside/ nucleotide analogues

NRTIS .....Nucleoside/nucleotide reverse transcript-ase inhibitors

PCR .....Polymerase Caín reaction

PEG .....Polyethylene glycol

RCT .....Randomized controlled trial

SIDS .....Sudden infant death syndrome

STD .....Sexually transmitted disease

TDF .....Tenofovir disoproxi fumarate

ULN.....Upper limit of normal

VSD .....Vaccine safety data

WHO.....World health organization

Introduction

Hepatitis B virus causes inflammation of liver. The virus spreads through contact with infected body fluids, such as through sexual intercourse, open cuts or scratches, or from mother to baby at birth. Most people do not realize that they have been infected until chronic inflammation causes complications, such as liver as scarring or cancer. A hepatitis B vaccine can boost the body's immune response to the virus and help protect against infection. The vaccine is recommended for people at high risk for infection. Some research show that the vaccine protect against infection for up to 10 years. It is not known whether the protection lasts longer than 10 years. The hepatitis B vaccine protected most participants from infection and all participants from complications of infection for at least 15 years. People and might benefit from booster doses of vaccine *(Mcmahon et al., 2005).*

Serum samples from 133 persons who were positive only for antibody to hepatitis B core antigen (anti-HBC) by enzyme immunoassay (EIA) were retested for seromarkers of hepatitis B virus (HBV) by radio-immunoassay and for HBV DNA by polymerase

chain reaction analysis. All persons were subsequently vaccinated with hepatitis B vaccine. HBV DNA was found in only five persons, four of whom remained positive during retesting. Most persons had a primary antibody response with three doses of hepatitis B vaccine. Evidence of HBV DNA was not detected in 96% of persons with isolated anti-HBC by EIA *(Eduardo et al., 1998)*.

The duration of protection afforded by hepatitis B vaccination is unknown, hepatitis B vaccination strongly protected against infection for at least 15 years in all age groups. Antibody level decreased the most among persons immunized at 4 years of age or younger. Although administration of hepatitis B vaccine for infants is routine practice in many countries, we do not know whether the protection that this vaccine offers lasts beyond 10 years. Such information is essential to develop policies about booster vaccination *(Brian et al., 2005)*.

Antibody titre higher than 100 IU/L is necessary to maintain the antibody level 1 year later and that HCV infection may reduce the effectiveness of hepatitis B vaccine in hemodialysis patients *(Juan et al., 1996)*.

Seroconversion rate after HBV vaccination of Pakistan HCWs was similar to that reported in western and neighboring population. HCWs with reduced immune response to HBV vaccine in a high disease prevent population are at great risk. Therefore, it is crucial to check post-vaccination HBs Ab in all HCWs. This strategy will ensure safety at work by reducing nosocomial transmission and will have a cost effective impact at an individual as well as at national level, which is very much desired in a resource limited country *(Mohammad-Zeeshan et al., 2007)*.

Hepatitis B infection is a serious public health problem worldwide. It has been shown that the level of antibody to hepatitis B surface antigen (anti-HBs) decrease after vaccination. The main objective of this study was to assess the level of anti-HBs among children after primary vaccination against hepatitis B virus (HBV) in Teharan and Iran. The HBs Ab titre may decrease over time after vaccination. Finally, along with prevention and control strategies, ongoing investigation and monitoring of antibody level against HBV in children and other age ranges is recommended *(Zali et al., 1996)*.

Observational evidence suggesting that vaccination of infants against HBV offers long-term protection is abundant. Serologic surveys provide evidence that universal vaccination of infants. Vaccination of infants can offer excellent protection into adolescence. Improvements in hygiene practices in hospitals and the community may be responsible for part of the decline in the incidence of HBV infection. Observational studies in British, Columbia, Quebec, Catalonia and Spain suggests that universal vaccination of preadolescent or adolescent children reduces the incidence of HBV during adolescence *(Christopher et al, 2007).*

Aim of the Work

The aim of this work is to review recent studies that clarify the serum level of antibodies after hepatitis B vaccinations.

Liver

The liver is a vital organ present in vertebrates and some other animals. It has a wide range of functions, including detoxification, protein synthesis, and production of biochemicals necessary for digestion. The liver dialysis techniques can be used in short term *(David et al., 1993)*.

This organ plays a major role in metabolism and has a number of functions in the body, including glycogen storage, decomposition of red blood cells, plasma protein synthesis, hormone production, and detoxification. It lies below the diaphragm in the abdominal-pelvic region of the abdomen *(Chales et al., 1993)*.

It produces bile, an alkaline compound which aids in digestion via the emulsification of lipids. The liver's highly specialized tissues regulate a wide variety of high-volume biochemical reactions, including the synthesis and breakdown of small and complex molecules, many of which are necessary for normal vital functions *(Maton et al., 1993)*.