Rate of the detection of anti-hepatitis B core antibody (Anti-HBc) among blood donors negative for hepatitis B surface antigen (HBsAg)

Thesis
Submitted for partial fulfillment of
The Master Degree in Microbiology and Immunology

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2011

بسم الله الرحمن الرحيم

﴿قَالُوا سُبْحَانَكَ لا عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ﴾

صدق الله العظيم

البقرة/ آية (٣٢)

Acknowledgment

First and foremost, I am very grateful to Allah, the most Gracious, and the most Merciful, who granted me the ability to perform this thesis.

Any attempt to describe the contributions of Professor Doctor / ***Mouchira Fayek Helmy*** *Professor of Microbiology and Immunology, Faculty of Medicine, Ain Shams University, would be partial and inadequate; her support and supervision contributed a lot to the final shape of this work.*

I would like to express my deepest gratitude and sincere thanks to Professor Doctor / ***Nehal Abd El-Hamid Deraz*** *Professor of Microbiology and Immunology, Faculty of Medicine, Ain Shams University; I appreciate very much her wisdom, understanding and most valuable support.*

*No word can ever express my profound gratitude and my ultimate thanks to Doctor / **Mona Hamed Elshokry**, Assistant Professor of Microbiology and Immunology, Faculty of Medicine, Ain Shams University, for her skillful participation, continuous advice, and for her efforts in assisting me throughout the whole work.*

*My deepest gratitude and lots of thanks goes to Major General (Med.)/ **Wael Ahmed Abd El-Hamid** the Head of the Central Laboratories at Kobry El-koba Armed Forces Hospital for his invaluable administrative assistance, for being generous with his time, effort, encouraging and guiding me all through this work; I am also indebted to the **Staff Members of The Virology Department** of the Armed Forces Central Laboratory for their confidence and support.*

Waleed Anter Ali

2011

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List of Abbreviations

ADV……..*ADEFOVIR DIPIVOXIL*
AFP……. *ALFA FETO PROTEIN*
ALT…… *ALANINE AMINOTRANSFERASE*
Anti-HBc…… *ANTIBODY TO HEPATITIS B CORE ANTIGEN*
Anti-HBe…….. *ANTIBODY TO HEPATITIS B "E" ANTIGEN*
Anti-HBs……..*ANTIBODY TO HEPATITIS B SURFACE ANTIGEN*
Anti-HBx…….. *ANTIBODY TO HEPATITIS B "X" ANTIGEN*
ASSLD…….. *AMERICAN ASSOCIATION FOR THE STUDY OF LIVER DISEASE*
AST ……..*ASPARTATE AMINOTRANSFERASE*
Au…….*AUSTRALIA ANTIGEN*
bp ……..*BASE PAIR*
cccDNA……..*COVALENTLY CLOSED CIRCULAR DNA*
dATP ……..*DEOXYADENOSINE TRIPHOSPHATE*
DNA…… *DEOXYRIBONUCLEIC ACID*
EASL …….. *EUROPEAN ASSOCIATION FOR THE STUDY OF LIVER*
ELISA……..*ENZYME-LINKED IMMUNOSORBENT ASSAY*
ETV……..*ENTECAVER*
GSHV…….. *GROUND SQUIRREL HEPATITIS VIRUS*
HAV……..*HEPATITIS A VIRUS*
HBcAg…….. *HEPATITIS B CORE ANTIGEN*
HBeAg.....*HEPATITIS B EARLY ANTIGEN*
HBIG……..*HEPATITIS B SPECIFIC IMMUNOGLOBULIN*
HBsAg…….. *HEPATITIS B SURFACE ANTIGEN*
HBV .....*HEPATITIS B VIRUS*
HBxAg…….. *HEPATITIS B "X" ANTIGEN*
HCC ……..*HEPATOCELLULAR CARCINOMA*
HCV ……..*HEPATITIS C VIRUS*
HDV ……..*HEPATITIS DELTA VIRUS*

HIV ……..……***HUMAN IMMUNODEFICIENCY VIRUS***
IFN- α ……..…….. ***INTERFERON ALFA***
IFN- β ……...……. ***INTERFERON BETA***
IFN- ω …….. ***INTERFERON OMEGA***
IFN- γ …….…….. ***INTERFERON GAMMA***
IFN- λ …….……..……. ***INTERFERON LAMBDA***
INR …….…..…….……... ***INTERNATIONAL NORMALIZED RATIO***
LAM……..…….…...***LAMIVUDINE***
LdT……..… ***TELBIVUDINE***
MU…….……..…….. ***MILLION UNITS***
ORFs…….……...…… ***OPEN READING FRAME***
PCR…….……***POLYMERASE CHAIN REACTION***
PEG-IFN ……..……...……..……..……..……..***PEGYLATED INTERFERON***
POL …….. ……..…..…..……***POLYMERASE***
PT ……..……. ***PROTHROMBIN TIME***
RT……..……...…… ***REVERSE TRANSCRIPTASE***
RT-PCR ……..... ***REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION***
TDF……...……..… ***TENOFOVIR DISOPROXIL FUMARATE***
ULN…….……..***UPPER LIMIT OF NORMAL***
WHO……...……..… ***WORLD HEALTH ORGANIZATION***
WHV…….……...… ***WOODCHUCK HEPATITIS VIRUS***

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INTRODUCTION

Hepatitis B virus (HBV) is a hepatotropic Deoxy-nucleic acid (DNA) virus belonging to the genus Orthohepadnavirus, family Hepadnaviridae ***(Tiollais et al., 1985).***

The virus infects only human and some other non-human primates. It is transmitted mainly by infectious blood, serum or plasma. Once inside the host, HBV is transported through the blood stream to the liver, which is the primary site of infection ***(Korba et al., 1989; Uemoto et al., 1998).***

Hepatitis B surface antigen (HBsAg) is the first marker to appear in the circulation prior to biochemical evidence of liver damage or the onset of jaundice. Hepatitis B core antibody (anti-HBc) is detectable 2-4 weeks after the appearance of the surface antigen; it persists throughout the infection and after recovery ***(Harrison et al., 2000).***

It was demonstrated that in some individuals negative for HBsAg and positive for anti-HBc, HBV continue to replicate which may explain why some

blood derivatives, negative for HBsAg but positive anti-HBc, are able to transmit the infection, both after transfusion and after transplantation of organs ***(Ben-Ayed et al., 2001).***

Isolated anti hepatitis B core (anti-HBc), which is defined as positive Anti-HBc with undetectable HBsAg and Hepatitis B Surface antibody (anti-HBs), may occur in any of several situations: (i) a false-positive Anti hepatitis B core antigen (anti-HBc) result; (ii) low levels of HBV replication inside the hepatocyte, without detectable production of HBsAg; (iii) the window phase of acute HBV infection; (iv) the loss of anti-HBs with time or failure to develope antibody response against the antigen after infection; or (v) the presence of a vaccine escape mutant, not detected by most of the currently available HBsAg detection tests ***(Al-Mekhaizeem et al.,2001; Behzad-Behbahani et al.,2006).***

AIM OF THE WORK

The aim of this work is to detect Anti-HBc among blood donors negative for HBsAg in order to evaluate the safety of this blood.

REVIEW OF LITERATURE

HISTORY OF HEPATITIS B VIRUS

Hepatitis is a general term meaning inflammation of the liver and can be caused by a variety of different viruses such as hepatitis A, B, C, D and E. Since the development of jaundice as a characteristic feature of liver disease, a correct diagnosis can only be made by testing patients' sera for the presence of specific anti-viral antigens or antibodies ***(Robinson, 1995; Mahoney and Kane, 1999; Hollinger and Liang, 2001).***

The existence of a parenterally transmitted form of hepatitis was documented by Lurman ***(MacCallum, 1947).*** He reported the development of jaundice in 15% of 1,289 shipyard workers in Bremen, 2 to 8 months after they had received smallpox vaccine prepared from human "lymph". Subsequent outbreaks of hepatitis were eventually traced to the use of improperly sterilized syringes and needles among patients who required parenteral inoculations and among those receiving tattoos ***(Hasegawa et al., 1991; Fourrier et al., 1999).***

In 1937, it was reported from England that approximately 40% of 109 individuals receiving inoculations of a single batch of human measles convalescent serum developed jaundice after incubation periods of up to 114 days. This was followed by an outbreak in British troops given filtered human mumps convalescent plasma ***(Beeson et al., 1944).*** These clinical entities were grouped together as "homologous serum jaundice" ***(Merril et al., 1972).*** In 1937, Findlay and MacCallum described cases of jaundice occurring 2 to 7 months after inoculation of volunteers with an attenuated strain of yellow fever vaccine prepared with the addition of human serum to stabilize the product ***(Findlay and MacCallum, 1938).*** Human serum was subsequently implicated as the vehicle of transmission. It was also observed that the incubation period of parenterally transmitted hepatitis was much longer than that described for infectious hepatitis. It is assumed that these outbreaks were caused by HBV infection, but a hepatitis C virus (HCV) etiology also cannot be excluded ***(Franco et al., 1992).***