Prevalence of HCV Antibodies in haemodialysis patients in El-Beheira governorate (Sector B)

Thesis

Submitted for partial fulfillment of master degree in internal medicine

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Cairo 2012

Summary

HCV infection still remains a major health problem that can cause substantial liver related morbidity and mortality in patients with ESRD.

The prevalence of hepatitis C virus (HCV) infection is estimated to be 2% worldwide, Egypt has the largest epidemic of hepatitis C virus (HCV) in the world with 14.7% of the population are infected with HCV.

The prevalence of anti-HCV positivity among dialysis patients varies in different countries from (3%-75% worldwide), unfortunately Egypt also is considered one of the countries with the highest prevalence.

This work is a part of project aiming to survey about HCV among HD patients, assessing its prevalence, seroconversion and study risk factors associated with HCV seroconversion among hemodialysis patients in Egypt. This project is modulated by the ***nephrology department, Ain Shams University.***

This study was conducted upon 800 ESRD patients on regular HD sessions attending 9 different HD units in El Behira governorate sector B, districts included in this study were Markaz Badr city, Gharb Elnoubaria city, Kom Hamada city,Eldelengat city,Shobrakhit city, Al Mahmoudia city,Wadi Alnatroun city, Rasheed city and Hosh Eisa city.

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All patients were evaluated using a questionnaire form for assessment of risk factors claimed to be responsible for HCV seroconvergence among HD patients such as; age by years, gender, duration of hemodialysis, previous blood transfusion, previous surgery, isolation procedures in the centers, dialysis in other centers (switching

Acknowledgement

First and foremost, I always feel indebted to "**Allah**" the most beneficent and merciful who helped me to finish this work. Also to my family for their support and kind encouragement.

I would like to express my deepest gratitude to ***professor Doctor: Osama Mahmoud Mohammed*** Assistant professor of Internal Medicine and Nephrology Ain Shams University, for his sincere help, guidance and faithful assistance. I learned a lot from his valuable remarks and scientific guidance.

I feel greatly indebted to ***Dr. Yasser Mahmoud El shahawi*** Lecturer of Internal Medicine & Nephrology ; *A*in Shams University for his valuable encouragement, advice, support and endless cooperation .

It is a pleasure to express my deep gratitude to ***Dr. Dawlat Hussein*** Lecturer of Internal Medicine & Nephrology; Ain Shams University for her advice, kindness and continuous help to achieve this work.

Finally, I must thank my parents, my friends and my colleagues who supported me a lot and gave me encouragement and help through the whole work.

Emad Darwish

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List of Abbreviations

ALT	Alanine Aminotransferases
AVF	Arterio-Venous Fistula
AVG	Arterio-Venous Graft
CDC	Center for Diseases Control and Prevention
CKD	Chronic kidney disease
DM	Diabetes mellitus
DOPPS	Dialysis outcomes and practice patterns study
EDHS	Egyptian Demographic Health Survey
EIAs	Enzyme immunoassays
ELISA	Enzyme Linked Immunosorbent Assay
EPO	Erythropoietin
ESRD	End stage renal disease
ETR	End of treatment response
EVR	Early virologic response
FDA	Food & Drug Administration
FEp	Fisher Exact test
HBs Ag	Hepatitis B surface antigen
HBV	Hepatitis B Virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C Virus
HCW	Health care workers
HD	Hemodialysis
HDV	Hepatitis D Virus
HGF	Hepatocyte growth factor

HIV	Human Immunodeficiency Virus
HTN	Hypertention
INFs	Interferons
KDIGO	Kidney Disease Improving Global Outcome
NAT	Nucleic acid tests
NHANES	National Health and Nutrition Examination Survey
NS	Non structural
OR	Odds ratio
ORF	Open reading frame
PCR	Polymerase Chain Reaction
PTDM	Post transplant diabetes mellitus
RIBA	Recombinant immunoblot assay
RNA	Ribo Nucleic Acid
RT	Renal transplant
RT-PCR	Reverse-transcription PCR
SD	Standard deviation
SLE	Systemic Lupus Erythromatosis
SVR	Sustained virologic response
TMA	Transcription-mediated amplification
UTR	Untranslated regions
WHO	World Health Organization
x2	Chi square

Introduction

Hepatitis C is the most common cause of chronic viral liver disease in haemodialysis patients (***Hinrichsen H et al.,2002***)**.** Hemodialysis (HD) patients have an increased risk of exposure to hepatitis C virus (HCV). The relevance of HCV infection in HD patients is due to the documented increased risk of death due to chronic liver disease in these patients, particularly after kidney transplantation **(*Nemati E et al.,2009*).**

The natural course of hepatitis C in haemodialysis patients is not well understood. It seems to differ from that in other HCV patients (***Simon N et al.,1994*).** Liver function tests are close to or near normal in many cases (***Guh JY et al.,1995***), but the mortality of HCV infected haemodialysis patients seems to be enhanced compared with HCV negative haemodialysis patients in preliminary studies**,** Thus patients with HCV on chronic haemodialysis are at increased risk of death, which suggests that the focus should be directed more to identification and prevention of hepatitis C infection in haemodialysis`patients (***Stehman-Breen CO et al.,1998*)**.

The prevalence of HCV infection among HD patients varies from country to country and from one center to another. The reported prevalence of HCV infection among dialysis patients in developed countries ranges from 3.6 to 20% (***Jadoul M et al.,2004***). it is much higher in developing countries (***jaiswal SK et al.,2002***).The prevalence of anti-HCV among dialysis patients was 8.4% in the United States (2000), 43.9% in Saudi Arabia (2001), 30% in India (2002), and 41% in Turkey (2001) (***Tokars JI et al.,2002***).

Several risk factors are suggested to be related to HCV dissemination in HD centers. Repeated blood transfusions, shared dialysis machines,

surgery, nosocomial route and multi-dose drug vials are the major suggested routes for spread of HCV infection in HD unit (***Nobakht Haghighi A et al.,2001***). Partial immunosuppression found in HD patients, resulting in a poor antibody response, may play a role in increasing liability of them to acquire the infection through uncommon ways.

The extensive use of recombinant erythropoietin to correct renal anemia in haemodialysis patients resulted in a significant reduction in blood transfusions. However, previous studies have shown that de novo infections in single haemodialysis units may still occur in the absence of other parenteral risk factors (***Fabrizi F et al.,1998***).

HCV viraemia (HCV-RNA) has been routinely detected by polymerase chain reaction (PCR) (***Gretch D et al.,1995***).In 1993, ***Bukh*** and colleagues were the first to describe the fact that HCV viraemia can occur without detection of HCV antibodies. This has been confirmed by several authors in small patient populations(***Seeling R et al.,1994***). Most epidemiological studies in haemodialysis patients have been performed using serological testing of hepatitis C antibodies only (***Fabrizi F et al.,1993***).Several prevalence studies of hepatitis C have been undertaken. There is a wide range in HCV antibody positivity and HCV viraemia within the studies, ranging from 1% up to 91%.

Aim of The Work

The aim of this work was to study the prevalence of HCV antibodies among HD patients in El Behira governorate sector B.

Chapter 1
Natural history of Hepatitis C Virus

Hepatitis C virus remains a large health care burden to the world. Incidence rates across the world fluctuate and are difficult to be calculated given the asymptomatic, often latent nature of the disease prior to clinical presentation. Prevalence rates across the world have changed as well with more countries aware of transfusion-related hepatitis C and more and more evidence supporting intravenous drug use as the leading risk factor of spread of the virus ***(Miller and Abu- Raddad, 2010).***

The natural history of HCV infection in the general population after 15-20 years evolution (from transmission) are as follow:

(1)Chronic hepatitis is observed in ~60%of cases.

(2)Overt liver cirrhosis will develop in ~30% of chronic hepatitis subgroup,giving an overall figure of ~18%.

(3) Liver cancer will be the ultimate consequence in ~15% of cirrhosis subgroup with an overall figure of 2-3% in infected individuals (***Berthous et al., 2000***) **.**

Summarizing these data on natural history of HCV infection (Figure 1), only a small proportion of patients with chronic hepatitis develop cirrhosis, and of these, a minority progress to decompensation, HCC, transplantation, or death.

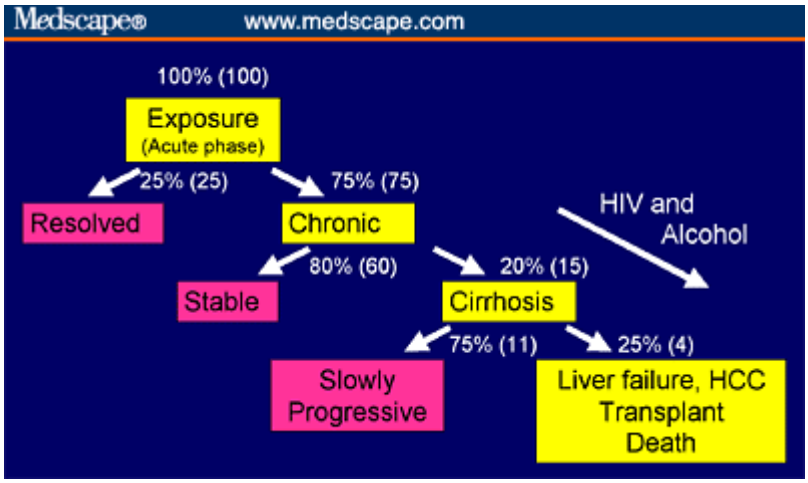

***Figure 1**. Natural history of HCV infection*.

In recent years, after the identification of hepatitis C virus (HCV) in 1989 **(*Choo et al., 1989*)** and the introduction of diagnostic tests which able to detect antibodies against HCV. The prevalence of anti-HCV antibodies in maintenance hemodialysis patients varies widely from country to country and center to center, with reported rates ranging from 0 to 95% **(*Huang, 2002*).**

Therefore, hepatitis C virus (HCV) infection is the most common cause of chronic liver disease in hemodialysis patients (***Espinosa et al., 2001).***

The prevalence of HCV infection varies throughout the world, with the highest number of infection reported in Egypt .Overall prevalence of antibodies against HCV in the general population is around 15-20%. The risk factor for HCV transmission that specifically sets Egypt apart from other countries is the past history of parentral antischistosomal therapy **(*Frank et al., 2000).***

HCV is a leading cause of liver cirrhosis and cancer, and Egypt has possibly the highest HCV prevalence worldwide. The effective number of HCV infections in Egypt underwent rapid exponential growth between 1930 and 1955.The timing and speed of this spread provides quantitative genetic evidence that the Egyptian HCV epidemic was initiated and propagated by extensive anti-schistosomiasis injection campaigns. Although the results show that HCV transmission has already decreased, HCV is likely to remain prevalent in Egypt for several decades (***Pybus et al., 2003).***

HCV related mortality in Egypt is expected at least to double in the next 20 years. The use of antiviral therapies can lower these predications. Efficient prevention policies are needed to avoid these predictions being exceeded **(*Deuffic-Burban et al., 2006*).**

The sero prevalence of antibodies to HCV in Egypt was 23.4% and 27.4% in urban and rural areas respectively, with an overall prevalence (25.8%). This reflects prior HCV infection but not necessarily a current liver disease. The prevalence of HCV in Egypt is higher among males than females and increased sharply with age,(from 4.8% in those <20 years old to 41.9% in older ages ≥40 years). Those who were not educated and farmers had a significantly high prevalence .The significant predictors of HCV infections were previous parentral therapy for schistosomiasis, among those over 20 years of age ,blood transfusion, invasive procedures(surgery and endoscopy),and use of contaminated syringes and needles.Also, shaving at community barbers. Exposures not significantly related to HCV seropositivity were gender , sutures or intravenous and urinary catheterization ,water pipe "goza" smoking in group **(*El-Sadawy et al .,2004).***