

Prevalence and risk factors of hepatitis C virus among hemodialysis patients in hemodialysis center

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ABSTRACT

Patients in chronic hemodialysis are at exposed at high risk of infection by the virus of hepatitis C. The aim of this study is to determinate the prevalence of the hepatitis C virus (HCV) at the hemodialysis and the evaluation of their risk factors. This work is a multicenter (5centers) and ambispective study, we included 551 hemodialysis chronic patients; 291 women and 260 men (sex-ratio MEN/WOMEN = 0.9). The prevalence of the hepatitis C virus (HCV) at this population is 32.3%; who varies from one center to another: (4% to 66%). There's a strong correlation between the prevalence of the infection by the HVC and the seniority of dialysis. However, we can't show correlation between blood transfusion and the prevalence of HVC. Regular tracking and measurements respect of hygiene must be instituted in the hemodialysis centers in order to decrease the prevalence of the HVC. © 2014 Trade Science Inc. - INDIA

KEYWORDS

Hemodialysis;
Prevalence;
Risk factors;
Hepatitis C virus;
Dialysis.

INTRODUCTION

The infection with the hepatitis C virus is a major cause of chronic hepatitis, cirrhosis of the liver and carcinoma hepatocellular.

The Genome of the virus was characterized for the first time in 1989 starting from the serum of a subject presenting post-transfusional chronic hepatitis non-A non-B^[1].

Persistence of the virus in the liver leads to chronic

hepatitis in 80% of infected patients, may led to active hepatitis with a rise of transaminases. Generally in this stage of the infections is asymptomatic; a chronic hepatitis can lead to cirrhosis (20%) or liver cancer 1%^[2-4].

In Morocco the seroprevalence of the HVC at the general population is estimated at 1, 58%^[5].

Patients undergoing hemodialysis are a population at high risk of infection with hepatitis virus C and are associated with greater mortality^[6].

The natural history of infection by the virus hepatitis

C among hemodialysis patients is difficult to be evaluated: in this population the infection by the hepatitis virus C is rather mild to moderate, otherwise this more important than at patients untreated by hemodialysis^[7]. The hepatic lesions are less frequent among these patients such lesions can be explained by an altered immune status, and a weaker viral load probably due to successive dialysis and the retention of the viral particles on the surface of the dialysis membranes^[8].

Increased risk of mortality in hemodialysis patients with antibodies anti-HCV + could be partially linked to underlying hepatic pathology^[9].

The present work is a multicentric transverse epidemiological study is; realized in order to determine the prevalence of the viral hepatitis C at the hemodialysis (five centers of hemodialysis) and to evaluate the risk factors of transmission.

MATERIELS AND METHODS

The main aim of this study is to determinate the prevalence of the hepatitis virus C at the hemodialysis, and the secondary objective is to evaluate of the risk factors of the viral hepatitis C at the hemodialysis.

Population

It is ambispéctive, multicentric study: conducted since March 2010 until August 2013.

The patients included in this study are all of them having a chronic renal failure treated by hemodialysis in 5 centers of hemodialysis: (three public centers of hemodialysis, one center managed by an association and one private center) in Casablanca City.

After establishment of an individual performed questionnaire, consent must be signed by patients concerned by this survey.

TABLE 1 : Description of hemodialysis centers.

CENTER	1	2	3	4	5	TOTAL
Number of room	2	2	1	3	3	
Number of doctors	10	3	3	1	2	
Number of nursers	12	10	6	5	7	
Number of assiatant of nurses	4	4	3	3	5	
Number of patients	136	91	48	110	166	551

This questionnaire is used to collect clinical data: age, gender, duration of dialysis, previous status of Hepatitis B surface antigen (HBsAg), transaminase, history of injection of intravenous, having received blood and/or blood products, unsafe sexual practice, history of tattooing, body piercing, surgery and dental care were also recorded. Epidemiologic Parameters: socio demographic (age, sex, marital status, economic status... Method of dialysis (seniority of dialysis, duration of hemodialysis per week, frequency per week).

After the collection of blood in hemodialysis patients (approximately 5 ml was collected), samples were placed in EDTA tubes.

These tubes are transported to the laboratory of Molecular biology at PASTEUR INSTITUTE in storage conditions and sterilizations bags office.

These samples were centrifuged and the plasma obtained is the biological material to be used. The plasmas that will not be used immediately aliquot and stored at -20 degrees Celsius.

The plasma obtained will be used in:

1. Determination of transaminases.
2. Search of ANTIHVC antibodies (sero status) by an enzyme linked immunosorbent assay (ELISA) testing third generation. If the test is positive a second test must be performed, (Abbott HCV EIA3.0 Abbott Diagnostics)
3. Research RNA virus hepatitis C by polymerase chain reaction (Real Time PCR: Genome Diagnostics for detecting HCV nucleic acid).

All procedures were followed in accordance with the current revision of the declaration of Helsinki, approved by the ethics committee of the Pasteur Institute of Morocco.

Statistical analyses were performed by using EPI INFO software; A level of $p < 0.05$ was used to indicate statistical significance.

RESULTS

This study included 551 chronic hemodialysis patients including 291 women and 260 men (sex - ratio MALE / FEMALE 0.9. +).

The age group varied from 8 to 90 years with mean age of 48, 98 ± 17, 28 years.

Prevalence

Among the 551 patients treated by hemodialysis,

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TABLE 2 : Distribution of hemodialysis patients by sex and age

CENTER	1	2	3	4	5	TOTAL
Men	65	45	19	49	83	261
Women	71	46	29	61	83	290
Total	136	91	48	110	166	551
Sex-ratio m/w	0.91	0.97	0.65	0.8	1	0.9
Maximumage	90	86	89	83	87	90
Minimumage	19	8	12	24	23	8
Median age	43,78+13,69	40,78+15,1	51,12+17,21	56,29+17,65	52,12+17,99	48,98+17,28
Ageaverage	42	38	51	57	54	48

TABLE 3 : The frequency of seropositivity of hvc among hemodialysis

	HVC +	HVC -	TOTAL of PATIENTS	PREVAL ENCE
Center 1	90	46	136	66,1%
Center 2	39	52	91	42,8%
Center 3	12	36	48	25%
Center 4	30	80	110	27,2%
Center 5	7	159	166	4,2%
Total	178	373	551	32,3%

research OF anti HCV antibody is positive for 178 all of them, then the prevalence is 32.3%.

This work show us that prevalence varies for one center to another from 4,2 % to 66,1 %

The feature of center number 5: it's about a new center managed by an association that accepts patients newly diagnosed for kidney failure, they are very demanding on terms of hygiene measures, which explains the very low prevalence.

In this study except center five, there is a high prevalence of hepatitis C in this n hemodialysis Moroccan population.

Risk factors

Duration of dialysis

We performed two groups: the first one corresponds to HCV positive patients whom serology revealed antibodies anti-HCV presence; the second one with a negative HCV group correspond to patients with negative antibodies HCV serology.

There is a relationship between the occurrence of hepatitis C and the number years spent in hemodialysis. The frequency of hepatitis viral C in hemodialysis patients is proportional to the duration of dialysis. We indeed found that prevalence increases with duration of dialysis: it goes from 9.57% in the group who is treated

TABLE 4 : Prevalence of HCV antibodies according the duration of dialysis

Duration of dialysis	HVC-	HVC+	TOTAL	Fréqu ency	P
0 à 5 years	274	29	303	9,57%	0,00000001
6 à 10 years	78	43	121	35,5%	0,38
10 à 20 years	21	92	113	81,41%	0,00000001
+ 20 years	0	14	14	100%	0,00000001
TOTAL	373	178	551		0,00000001

with dialysis for 0-5years, to 100% in the group treated with the dialysis for over 20 years, so confirms that duration of dialysis is a risk factor of dialysis.

Blood transfusion

The difference between two groups was not significant: the number of transfusions and the number of red cells did not affect HCV status.

TABLE 5 : Prevalence of HCV antibodies according of the number of transfusions

Red blood celespackage number	HVC+	HVC-	TOTAL	PREVA LENCE	P
0 to 5	79	214	293	26%	S
6 to 10	65	104	169	38%	S
11 to 20	23	23	62	37%	NS
20years and plus	11	16	27	40%	NS

Transaminases

The transaminases activity are not constant markers infection with hepatitis C biological abnormalities (increased aminotransferase activity) seems to be less frequent (about 33%) in patients kidney failure than in the general population of patients with chronic HCV infection (75%)^[10].

HCV infection leads to an increase in transaminases. However, dialysis patients, the transaminases level

is lower than what is observed in the general population^[11].

DISCUSSION

Whatever the country, the prevalence of anti-HCV antibodies in hemodialysis is higher than in the general population^[12,13].

In MOROCCO the prevalence is about 1.58 % among blood donors^[5].

The results of this study show that the prevalence of HCV infection was 32,3% in patients on hemodialysis, however this prevalence varies from one center to another (from 4% up 66%).

Our figures show that is a similarity with other studies carried in various centers in MOROCCO: the prevalence of HCV is 54, 1%, CHU IBN SINA^[14], a research team at Fes estimated prevalence of 35.5 %^[15], when a prevalence is 76 % in CHU IBN ROCHD in Casablanca city^[16]; One team Research worked in the same subject found that average prevalence is 68.3% in 5 centers in Casablanca city^[17]. The prevalence of viral hepatitis C varies from one country to another and even from one center to another^[18] with extremes ranging in Europe from 3% in the UNITED KINGDOM and GERMANY to 23 % in ITALY and SPAIN. In emerging countries the value prevalence is higher: 46,7 % in BRASIL^[9]; in INDONESIA is 80.1%^[20]; In MALI is 19.7%^[21]; in INDIA the prevalence ranged from 12.1 % to 45.2 %^[22,23]; in JORDANIE the prevalence is 34.6 %^[24].

In developed countries The prevalence of anti-HCV antibody among hemodialysis patients ranges from 8-36 % in NORTH AMERICA, 39% in SOUTH AMERICA, in EUROPE, 1-31 %, 17-51 % and 1-10 % in ASIA in NEW ZEALAND AND AUSTRALIA^[25].

Publications concerning nosocomial transmission of hepatitis C viral refer to three types of causes:

1. The first one is the blood transfusion: but now it is exonerated by the use of erythropoietin and also with the serological detection VHC in blood donors^[26].
2. The second one is the failure of transmission universal hygiene precautions. Nosocomial transmission of hepatitis C virus (HCV) to hemodialysis patients Strongly Suspected in epidemiological stud-

ies, Has been recently unequivocally demonstrated by molecular virology reports. Potential Transmission Mechanisms include staff hands, dialysis monitors, and equipment items shared between patients^[26].

3. The third one is related to the duration of dialysis. most studies conclude that the duration of dialysis is closely related to a positive anti HCV rate^[27-29] because these patients are often anemic, require prolonged vascular access, have high possibility of exposure to infected patients and contaminated equipment, and cross contamination from the dialysis circuits^[30]

Except the time spent on dialysis (specific to the dialysis techniques), other risk factors are similar to those of the general population because of: securing the blood, and the erythropoietin use in ordre to limitate transfusions, and respect for universal hygiene measures^[31]

Since the control of contamination by blood transfusion; transmission nosocomial blood is not the major source of transmission HCV patients' hemodialysis. Historically, hemodialysis were frequently infected with HCV during blood transfusions during the administration of products or when blood transplants^[32]

The main mode of transmission is now the non-transfusion nosocomial transmission probably related to vascular access repeated constitutes both a gateway to the source of infection and spread in bleeding

CONCLUSION

Over the last decade hepatitis C has become an emerging disease in MOROCCO, with à socio-economic impact.

Hemodialysis patients are at increased risk of infection because of their immunodeficiency and their exposure to various nosocomial microorganisms. The prevalence of chronic carriers of HCV+antibodies in hemodialysis is 32%. The hepatitis C virus is most often transmitted through percutaneous exposure to infected blood. It is less transmissible than hepatitis B and survives on less an inert surface.

Risk factors for infection with hcv in hemodialysis patients is caused by abnormality of blood transfusion in the past years but right now the main cause is duration dialysis. The introduction of screening of blood

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products for hepatitis C (antibody and PCR research) and the use of erythropoietin for the treatment of renal anemia, have greatly reduced the incidence hepatitis C in dialysis 33.

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