

Seroprevalence of hepatitis C and risk factors in haemodialysis patients in Guilan, Islamic Republic of Iran

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معدّل الانتشار المصلي لالتهاب الكبد «سي»، وعوامل اختطاره لدى مرضى الدّيال الدموي (الغسيل الكلوي) في منطقة غيلان بجمهورية إيران الإسلامية
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الخلاصة: قمنا بتقييم معدّل انتشار العدوى بفيروس التهاب الكبد «سي» وعوامل الاختطار المصاحبة له لدى 298 من مرضى الدّيال الدموي (الغسيل الكلوي) في سبع من وحدات الدّيال في منطقة غيلان. وتم فحص عينات مصلية لاكتشاف أضرار هذا الفيروس باستخدام الجيل الثاني من المقايسة الامتصاصية المناعية للإنزيم المرتبط، وتم تأكيد الإيجابية باستخدام مقايسة اللطخة المناعية immunoblot. وكان معدّل الانتشار العام 24.8% (المجال 9%-40%، 95%، CI: 19.9-29.7). وقد جاءت نتائج الفحوصات إيجابية لدى ثمانين بالمئة من المشاركين في هذه الدراسة، كما تأكدت إيجابية هذه النتائج لدى 74% من المشاركين وذلك باستخدام مقايسة اللطخة المناعية. وكان طول فترة الدّيال، ووجود سابقة مرضية من رفض الكلية المزروعة أمرين يُعتدّ بهما إحصائياً من حيث ارتباطهما بالعدوى بفيروس التهاب الكبد «سي». في حين لم يمكن إثبات أيّ ارتباط مع العمر أو الجنس أو لنقل دم في السابق. ونظراً لاحتمال أن يكون للسراية للمستشفوية nosocomial دور في انتشار العدوى بفيروس التهاب الكبد «سي» في وحدات الدّيال الدموي، فمن الواجب استخدام نظام ديابلي منفصل للمرضى الذين ثبتت إيجابيتهم المصلية لفيروس التهاب الكبد «سي».

ABSTRACT We assessed the prevalence of hepatitis C virus (HCV) infection and associated risk factors for all 298 haemodialysis patients in 7 dialysis units in Guilan province. Serum samples were screened for anti-HCV antibodies using a second generation enzyme-linked immunosorbent assay. Positive samples were confirmed by immunoblot assay. Overall prevalence was 24.8% (range: 9%–40%; 95% CI: 19.9–29.7); 80 patients tested positive and 74 were confirmed positive by immunoblot assay. Length of time on dialysis and history of rejected kidney transplant were statistically significantly associated with HCV infection. Age, sex and previous blood transfusion were not associated. Nosocomial transmission may play a role in the spread of HCV in haemodialysis units. A separate dialysis system should be used for seropositive HCV patients.

Séroprévalence de l'hépatite C et facteurs de risque chez les patients hémodialysés à Guilan (République islamique d'Iran)

RÉSUMÉ Nous avons évalué la prévalence de l'infection par le virus de l'hépatite C (VHC) et les facteurs de risque associés pour l'ensemble des 298 patients hémodialysés dans sept unités de dialyse de la province de Guilan. Des échantillons de sérum ont fait l'objet d'une recherche d'anticorps anti-VHC utilisant un test immuno-enzymatique de deuxième génération. Les échantillons positifs ont été confirmés par test d'immunotransfert. La prévalence globale s'élevait à 24,8 % (fourchette : 9 % - 40 % ; IC 95 % : 19,9-29,7). Quarante-vingt participants ont eu un test positif et 74 ont été confirmés positifs par test d'immunotransfert. Il y avait une association statistiquement significative entre la durée sous dialyse et les antécédents de rejet de greffe de rein, et l'infection par le VHC. Il n'y avait pas d'association avec l'âge, le sexe et les transfusions sanguines précédentes. La transmission nosocomiale peut jouer un rôle dans la propagation du VHC dans les unités de dialyse. Un système de dialyse séparé devrait être utilisé pour les patients séropositifs au VHC.

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Introduction

Hepatitis C virus (HCV) accounts for over 85% of transfusion-associated hepatitis cases. The chance of the infection progressing to a chronic state is more than 50%, leading to cirrhosis or hepatocellular carcinoma in 25% [1,2].

Although there are only a few regions in the world for which data on the prevalence of this virus are available, it is estimated that more 170 million persons are infected worldwide. In industrialized nations, HCV prevalence is typically 1%–2% in the general population and < 0.5% in blood donors [3].

Haemodialysis patients are more vulnerable to HCV infection than others because of history of blood transfusion, frequent injections, partial immunosuppression and history of kidney transplant [4]. The duration of haemodialysis treatment and nosocomial HCV transmission have also been suggested as contributing factors [5–9]. The prevalence of HCV antibodies (anti-HCV) in dialysis patients has been reported to range from 20.0% to 81.6% in previous studies [10–18]. In the Islamic Republic of Iran, studies have shown that haemodialysis patients have high anti-HCV prevalence, ranging from 24.7% to 40.0% [19–22].

The aim of this study was to assess the prevalence of HCV infection in a haemodialysis population in Guilan, in northern Islamic Republic of Iran, and to determine possible risk factors for HCV infection in this population.

Methods

Guilan province is in the north of the Islamic Republic of Iran and has a population of 2 200 000. It has 14 cities, half of which have dialysis units. Our study was carried out in all 7 dialysis units in Guilan between

March and April 2001. All chronic haemodialysis patients ($n = 298$) were interviewed to collect data on risk factors for HCV infection. No patients refused to participate. A form was used to collect data on age, sex, length of time on haemodialysis, previous blood transfusion, intravenous drug abuse and history of kidney transplant. The interviews were conducted by the physicians on our team.

Blood samples were collected from all patients and sera were screened by standard techniques using a commercial second generation enzyme-linked immunosorbent assay kit (CAPTIA, Trinity Biotech, Bray, Ireland) for the presence of anti-HCV antibodies. Positive samples were retested for confirmation using a commercial immunoblot assay kit (INNOGENETICS® Ghent, Belgium). All techniques were carried out according to the manufacturer's instructions.

Prevalence and 95% confidence intervals (95% CI) were calculated. Chi-squared test or chi-squared for trend test was performed to evaluate risk factors associated with HCV infection. Statistical significance was assessed at the 0.05 probability level in all analyses. Statistical analysis was performed using *Epi-Info*, version 6.0.

Results

The study population ranged in age from 13 to 85 years (mean 52.2 years); 156 were male (52.3%) and 142 were female (47.7%).

Using enzyme-linked immunosorbent assay, 80 of the 298 haemodialysis patients were seropositive, and 74 (92.5%) were subsequently confirmed positive by immunoblot assay resulting in an anti-HCV prevalence of 24.8% (95% CI: 19.9–29.7). The prevalence of HCV ranged from 9.0% to

40.0% among the 7 haemodialysis units (Table 1). None of the seropositive patients had a history of blood transfusion before haemodialysis or intravenous drug abuse. Thirty-five male and 39 female participants were seropositive, but the relationship between sex and seropositivity was not significant ($P > 0.05$). The relationships between length of time on haemodialysis and history of rejected kidney transplant and seropositivity were statistically significant (Tables 2 and 3).

Of 11 patients who had previous kidney transplants, 7 were HCV seropositive ($P = 0.006$). Of the 3 patients who had tattooing, all were HCV seropositive. Only 1 of the 298 participants was seropositive before the onset of haemodialysis.

Discussion

Our study showed that the prevalence of HCV infection in haemodialysis patients from Guilan province is higher than that of blood donors (0.5%) from the same region [23]. This demonstrates that HCV infection is a significant problem in this population.

Table 1 Prevalence of hepatitis C virus (HCV) infection in seven haemodialysis units in Guilan, 2001

Unit	No. of patients	HCV positive		95% CI
		No.	%	
A	46	15	32.6	19.1–46.1
B	40	6	15.0	4.1–25.9
C	17	3	17.6	8.4–26.8
D	136	34	25.0	17.7–32.2
E	12	4	33.3	6.7–59.9
F	22	2	9.1	–
G	25	10	40.0	20.8–59.2
Total	298	74	24.8	19.9–29.7

CI = confidence interval.

Table 2 Prevalence of hepatitis C virus (HCV) infection according to length of time on haemodialysis in haemodialysis patients in Guilan, 2001

Time on haemodialysis (months)	No. patients	HCV positive	
		No.	%
< 12	105	2	1.9
12–23	67	10	14.9
24–35	25	7	28.0
36–47	23	9	39.1
≥ 48	78	46	59.0

χ^2 test, $P < 0.0001$.

Previous studies have indicated that the duration of dialysis treatment is clearly correlated with HCV seropositivity [4,7,8,19–22]. This is in agreement with the results of this study and is indicative of nosocomial transmission of HCV.

The relationship between HCV infection and renal rejection is unknown, but many studies shown a relationship [14,17,20], and 7 of the 11 patients in our study who had a history of rejected kidney transplant were HCV seropositive. Reports from the early 1990s (shortly after the introduction of diagnostic testing for HCV) suggested that the course of hepatitis C was unaffected

Table 3 Association between history of rejected kidney transplant and hepatitis C virus (HCV) seropositivity among haemodialysis patients in Guilan, 2001

History of rejected kidney transplant	HCV antibody	
	Positive No.	Negative No.
Yes	7	4
No	67	220

χ^2 test, $P = 0.006$.

ed by renal transplant procedures. More recent data, however, indicate that renal transplant recipients with HCV infection have a diminished survival rate that is related to progression of liver disease. During the recovery period after solid organ grafting in a recipient infected with HCV, the viral mass in the liver and circulation rises 10-fold under the influence of corticosteroids [24,25].

These data emphasize the need for stricter adherence to infection control measures in dialysis units. Measures which should be considered include prevention of

patient-to-patient contamination, the non-reuse of dialysers, and separate haemodialysis systems for HCV seropositive patients. The data also reinforce the importance of serological screening at the onset of dialysis treatment and at regular intervals thereafter to identify all HCV-infected patients.

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