Short Report

Increased prevalence of HCV antibodies in dialyzed Ashkenazi Jews—a possible ethnic predisposition

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Abstract

Background. The prevalence of hepatitis C (HCV) antibodies in dialysis patients is considerably higher than that found among healthy blood donors. This increased seroprevalence has been correlated to increased duration of dialysis, mode of dialysis and to the number of blood transfusions administered. However, factors other than nosocomial ones also seem to play a part in disease transmission. The role of the patient's ethnic origin, possibly reflecting on his/her genetic makeup has received scant attention. In this study, HCV seroprevalence in our dialysis population, which consists of three major ethnic subgroups (Ashkenazi Jews, Sephardi Jews and Arabs), was examined.

Methods and results. Altogether HCV seropositivity was determined in 120 dialysed patients—65 males/55 females (76 hemodialysis, 44 CAPD), using second generation ELISA confirmed by RIBA-2. Mean age was 59.7 ± 15.7 (range 16-86 years). Patients had to have been on dialysis for a minimum of 3 months (mean duration 45.2 ± 44.5 months). Patients whose end-stage renal disease was due to diabetic nephropathy (DN) or those who had previously been transplanted (TP) were considered as separate groups and compared to the group as a whole. Of the 120 patients, there were 49 Ashkenazi Jews (40.8%), 57 Sephardi Jews (47.5%) and 14 Arabs (11.7%). Overall HCV prevalence was 21.7% (26/120) with a significantly greater prevalence in HD compared to CAPD (30.3 vs. 6.8%, P < 0.01). Respective values for Ashkenazi Jews, Sephardi Jews and Arabs were 30.6, 15.8, and 14.3% (P < 0.01, Ashkenazi Jews vs. Sephardi Jews and Arabs). DN had a lower 3.7% while TP had a higher 46.1% prevalence compared to the group as a whole (P < 0.01). In general, the increased frequency of anti HCV antibodies was significantly correlated to the duration of dialysis and the number of blood transfusions administered. This, however, was not the case in the greater prevalence of HCV found in Ashkenazi Jews compared to Sephardi Jews and Arabs which was independent of the above factors and the mode of dialysis.

Conclusion. Our results showing increased HCV seropositivity in Ashkenazi Jews compared to Sephardi Jews and Arabs, suggest that ethnic factors might predispose to HCV transmission and infectivity.

Key words: Key words: Ashkenazi Jews; dialysis; HCV prevalence; ethnic predisposition

Introduction

The prevalence rate of anti HCV antibodies varies greatly between different countries and different dialysis centers. In the UK, the rate has been reported to be as low as 1% [1], compared to 5.5% in Germany [2], 17% in Japan (range 0–53%) [3], 20% in Spain [4], 30% in Venezuela [5] and 68% (range 15–95%) in Saudi Arabia [6]. Duration of dialysis and blood transfusions have generally been acknowledged as the major risk factor for HCV transmission [7]. However, some investigators found no correlation between blood transfusions and HCV positivity [8,9]. Despite an estimated size of 35 nm (far in excess of the maximum 7 nm allowable filtration of the dialysis membrane), leakage of hepatitis C viral moiety through dialysis membranes has been shown to occur [10]. Whether this constitutes a source of transmission in the dialysis unit needs further assessment. The requirement for strict adherence to universal infection precautionary techniques within the dialysis unit is emphasized by all [7]. Other factors, as yet unidentified, may, however, be involved in HCV infection. The issue of the patient’s ethnic origin has to a large extent been overlooked. Anti-HCV is more prevalent among the general population of certain nationalities, e.g. Egyptians 13.6% [11] and Yemenites 6% [12] compared to 0.5% in Israel [13] and 1.5% in Saudi Arabia [6]. Significant differences in seroprevalence have also been documented in subjects > 40 years in three ethnic groups (Baka pygmies 6%, Fangs 30%, and Boulos 44%) living in a rural...
forest area in Cameroon [14]. Since our dialysis population consists of three distinct groups HCV seropositivity was determined in order to ascertain whether ethnic origin is an additional risk factor to HCV infection.

### Subjects and methods

Meir Hospital is a regional teaching hospital, affiliated to the University of Tel Aviv, serving a mixed Jewish and Arab population of approximately 400,000 subjects. Our dialysis population consists of Ashkenazi Jews (AJ)—Jews of central and eastern European origin; Sephardi Jews (SJ)—of North African and Middle East origin; and of Arabs (A). Patients dialyzed for a minimum of three months (both on hemodialysis [HD] and continuous ambulatory peritoneal dialysis [CAPD]) were examined for the presence of anti-HCV antibodies. None of the patients were known to have been intravenous drug abusers. Haemodialysis was routinely performed for 4–5 h, thrice weekly, using either cuprophane or polysulfone dialysers with a bicarbonate solution of standard composition. Isolation of patients and/or machines of patients with hepatitis C was not practised. Artificial kidneys were not reused.

Serum samples were tested for anti HCV using a second generation Abbott HCV enzyme linked immunosorbent assay (ELISA) test system which detects antibodies against the following four proteins of the HCV genome: c-200, c-22-3, HC-34 and HC-31 (MEIA, Abbott Laboratories, IL, USA). ELISA positive samples were then tested using a second generation recombinant immunoblot (RIBA 2, HCV Chiron Co. and Ortho Diagnostic System). Sera reacting with two or more of the four RIBA antigens were considered positive.

Patients whose end-stage renal disease was due to diabetic nephropathy (DN) or who had undergone a previous transplant (TP) were considered as separate groups and compared to the group as a whole.

### Statistical analysis

Data was analysed using the SPSS software. Student’s t-test, χ² and Mann–Whitney tests were used as appropriate. Results are presented as the mean ± SD.

### Results

A total of 120 patients (76 HD, 44 CAPD) were tested. AJ, SJ, and A constituted respectively 49 (40.8%), 57 (47.5%), and 14 (11.7%) of the total. The distribution of patients according to mode of dialysis (either HD or CAPD) was similar in these groups. Demographic data, duration of dialysis, number of blood transfusions, and HCV seroprevalence for the different groups are given in Table 1. Overall HCV prevalence rate was 21.7%. HD had a significantly higher rate than CAPD (30.3% vs. 6.8%), P<0.01. HCV positivity was significantly greater in AJ compared to SJ and A (30.6 vs. 15.8, and 14.3%, respectively), P<0.01. Duration of dialysis and number of blood transfusions did not differ significantly between these ethnic subgroups.

The DN group had a lower rate of anti-HCV while the TP group demonstrated a higher rate compared to the overall prevalence rate (3.7 and 46.1 vs. 21.7%, P<0.01). Concomitantly, DN had the lowest duration of dialysis (20.8 ± 18.9 months) and received only 6.2 ± 11.1 blood transfusions whereas the TP group had been dialysed for the longest period of time (83.2 ± 56.6 months) and received the largest number of blood transfusions (26.3 ± 26.8).

### Discussion

Our overall HCV prevalence of 21.7% fits within ‘middle of the road’ rates encountered in Western

### Table 1. Demographic data, duration of dialysis, number of blood transfusions and HCV prevalence in the different groups

<table>
<thead>
<tr>
<th>Number (%)</th>
<th>Age: years (range)</th>
<th>Sex: male/female</th>
<th>Duration of dialysis, month (mean ± SD, range)</th>
<th>Blood transfusions (mean ± SD)</th>
<th>HCV (%) seroprevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>120 (100)</td>
<td>59.7 ± 15.7</td>
<td>65 (54.2%)</td>
<td>45 ± 44.5</td>
<td>13.6 ± 18.7</td>
</tr>
<tr>
<td>HD</td>
<td>74 (61.7)</td>
<td>57.3 ± 14.9</td>
<td>42 (36.7%)</td>
<td>57.8 ± 50.5</td>
<td>18.3 ± 21.8*</td>
</tr>
<tr>
<td>CAPD</td>
<td>46 (38.3)</td>
<td>63.4 ± 16.3</td>
<td>23 (50%)</td>
<td>24.9 ± 20.3</td>
<td>5.9 ± 7.5</td>
</tr>
<tr>
<td>Ashkenazi</td>
<td>49 (40.8)</td>
<td>59.9 ± 16.4</td>
<td>27 (55.1%)</td>
<td>46.6 ± 49.9</td>
<td>13.2 ± 19.9</td>
</tr>
<tr>
<td>Sephardi</td>
<td>57 (47.5)</td>
<td>60.1 ± 15.3</td>
<td>30 (52.6%)</td>
<td>42.1 ± 38.7</td>
<td>13.8 ± 17.6</td>
</tr>
<tr>
<td>Arabs</td>
<td>14 (11.7)</td>
<td>57.4 ± 15.9</td>
<td>8 (57.1%)</td>
<td>53.0 ± 48.4</td>
<td>13.9 ± 19.7</td>
</tr>
<tr>
<td>Diabetic</td>
<td>27 (22.5)</td>
<td>66.2 ± 10.2</td>
<td>16 (59.2%)</td>
<td>20.8 ± 18.9</td>
<td>6.2 ± 11.1</td>
</tr>
<tr>
<td>nephropathy</td>
<td>13 (10.8)</td>
<td>43.3 ± 14.6</td>
<td>9 (69.2%)</td>
<td>83.2 ± 56.6</td>
<td>26.3 ± 26.8</td>
</tr>
</tbody>
</table>

* P<0.05, for details, see text.
countries. The increased positivity in HD compared to CAPD is also in keeping with the literature [15]. The lower prevalence in patients with diabetic nephropathy and the higher one in transplanted patients, compared to the overall rate, are most probably a reflection of the time spent on dialysis and the number of blood transfusions administered, rather than any specific factors pertaining to diabetes or transplantation per se. Uniquely, we found Ashkenazi Jews to be more predisposed to anti-HCV than either Sephardi Jews and Arabs, despite the fact that all were dialysed within the same unit under similar conditions. The type of dialysis performed cannot be held accountable for this finding since patients in these ethnic subgroups were similarly distributed among HD and CAPD. Notably, while duration of dialysis and the number of blood transfusions received were shown to be the major risk factors for anti-HCV for all groups, the increased prevalence of anti-HCV in Ashkenazi Jews compared to Sephardi Jews and Arabs was independent of these factors. In contrast to the decreased HCV positivity in Sephardi Jews, is the higher prevalence of HBsAg reported to occur among these patients [16].

The general population of certain nationalities (Egyptians 13.6% and Yemenites 6%) has been documented as having a higher HCV prevalence rate [11,12]. Whether these higher rates are due to local cultural habits and/or environmental conditions, are questions which have not yet been addressed. Significant differences in rates have been reported in subjects aged 40 years and above in three ethnic groups living in a rural forest area in Cameroon (Baka pygmies 6%, Fangs 30%, and Boulous 44%) [14]. Again, no adequate epidemiological studies have been performed in order to ascertain the reasons responsible for these markedly divergent rates. However, assuming similar living conditions, other factors must be sought for as an explanation. These might be cultural or ethnic. Our finding of an increased HCV prevalence amongst our dialysed Ashkenazi Jews reinforces this view. Although cultural differences certainly do exist between Ashkenazi, Sephardi Jews, and Arabs, all these patients enjoy a modern and similar mode of living. Furthermore, both on a regional and national scale, the health services accorded our dialysed patients are by and large, the same. We cannot, therefore, envisage any way in which either cultural or sociological factors or local medical services might affect HCV positivity.

Supportive of this assumption are the similar prevalence rates among Sephardi Jews and Arabs. Our data thus seem to imply an ethnic predisposition to HCV infectivity. Ethnic origin, reflecting a patient's genetic makeup, might thus constitute an additional risk factor to HCV infection. Unquestionably, however, further large scale studies are needed to corroborate this point.

References


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