Summary: The intrafamilial clustering of hepatitis A virus infections (HAV) in families with an index case of sporadic hepatitis A was studied. Four hundred and three family members (84.3%) of 113 children with acute hepatitis A admitted to the Paediatric Department of the West Attica Hospital were included in the study. Epidemiological data and serum samples were collected within 1 week after the patient's admittance to the hospital. Enzyme-immunoassays were used to detect recent or past HAV infections. The attack rate of HAV infections in susceptible family members was found to be similar in susceptible fathers (16.6%, 1/6), mothers (23.5%, 4/17) and siblings (18.1%, 37/204). The infected family members belonged to 22 families. The attack rate was found to be higher in families with a lower immunity level, while the social class was not found to play an important role. The administration of ISG prevented further spread of hepatitis A among those susceptible. Our data suggest that immunoglobulin for HAV prevention should be given not only to children but also to parents and other adult family members in areas with a low prevalence of anti-HAV among adults.

Introduction

Specific tests for hepatitis A virus (HAV) infection have clarified several epidemiological characteristics of the disease. Thus it was demonstrated that in poor areas with low sanitary conditions, the prevalence of anti-HAV is high even among preschool children [1]. Recently a decrease of HAV spread has been observed in most developed countries because of the improved socioeconomic and sanitary conditions [2, 3, 4]. As a result the anti-HAV prevalence in the younger age groups decreased and most adults are presently susceptible. Thus an increase of the relative frequency of clinical [5] hepatitis A in adults has been observed [6]. It is necessary therefore to reconsider our strategies to combat the disease [7].

In this paper we present data on the intrafamilial clustering of HAV infection showing the need for changing the strategies for its prevention.

Patients and Methods

We studied the family members of children with hepatitis A hospitalized in the Paediatric Department of West Attica Hospital, Athens, Greece.

All children admitted to the Paediatric Department with clinical diagnosis of acute hepatitis were tested for serologic markers of HAV and HBV infection within 4 days after their admission to the hospital. Children positive for IgM anti-HAV without markers of recent HBV, HCV, EBV or CMV infection were considered as acute hepatitis A patients.

Although sanitary and other hygienic conditions have improved during recent years, sporadic cases of hepatitis A occur in various areas of Greece and especially in those with lower socioeconomic levels. It is obvious that this activity is maintained mainly by person to person contact. The studied hepatitis A cases were derived from various regions of Athens and vicinities outside Athens. They were collected over a period of more than 2 years and no connection was found between them, thus we believe that these were sporadic cases.

Of the total of 154 children diagnosed as acute hepatitis cases from August 1986 to October 1988, 113 (73.4%) were classified as hepatitis A. Their age ranged from 3 to 14 years; 66 (58.4%) were males and 47 (41.6%) females. Most of them (65.6%) belonged to the lowest social class since the socioeconomic level of the catchment area of the hospital is relatively low and homogenous.

All family members of the 113 children with acute hepatitis A were asked to participate in the study. After informed consent epidemiological data and serum samples were collected within 1 week after admittance to the hospital of the index cases. None of the examined family members reported a history of recent clinical or subclinical viral hepatitis. Table 1 shows that almost all mothers (91.7%), 81.2% of the fathers and 82.9% of the siblings were examined.
Table 2: Attack rate of HAV infection in relatives of children with acute hepatitis A.

<table>
<thead>
<tr>
<th>Relationship to index case</th>
<th>No. examined</th>
<th>Immunes</th>
<th>Susceptibles</th>
<th>No. infected</th>
<th>Attack rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fathers</td>
<td>78</td>
<td>72</td>
<td>6</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Mothers</td>
<td>88</td>
<td>71</td>
<td>17</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>Siblings</td>
<td>237</td>
<td>33</td>
<td>204</td>
<td>37</td>
<td>15.6</td>
</tr>
</tbody>
</table>

The siblings were tested. The age of parents ranged from 20-45 years old (mean value 27.4 years) and of siblings from 2 to 13 years (mean value 10 years). To all 185 non infected family members susceptible to HAV, ISG was administered within 3-4 days after their first examinations. They were clinically followed up for 1 month. Serum samples were drawn from 89 (48.4%) of them.

Results

The prevalence of past HAV infection was considerably higher in fathers (92.3%) and mothers (80.7%) than in siblings (13.9%) (Table 2). Recent HAV infection was detected in 42 of the examined family members. The frequency was found to be higher in siblings (15.6%) than in fathers (1.3%) or mothers (4.5%). In contrast the attack rate among susceptibles was similar in fathers (16.6%, 1/6) mothers (23.5%, 4/17) and siblings (18.1%, 37/204).

Eight (21.6%) cases among siblings became icteric during the follow up period and they were hospitalized. Jaundice did not develop in any of the five infected parents; however all of them had above 2x elevated transaminase levels. No other clinical hepatitis was observed during the follow up period and 1 month later no seroconversion developed in any of the studied family members who were susceptible to HAV during their first examination.

The 42 diagnosed cases with recent HAV infection belonged to a total of 22 families. In eight families (8.3%) one infected member was detected, in nine families (9.4%) two infected members, in four families (4.2%) three and in one family (1.0%) four recently infected persons were found (Table 3).

More infections per family were observed in families with the lowest prevalence rate, while in families without infected members a higher frequency of past HAV infection was found (Table 3).

Intrafamilial clustering occurred at a similar rate in the various social class categories of the families (Table 4).

Discussion

HAV in developing countries is mainly transmitted through contaminated water and food, while in developed countries travelling to endemic areas remains one of the main sources of infection. Most infections are transmitted person to person. Intrafamilial spread is of great importance mainly for children and thus passive immunization is recommended for their protection [7].

During the last decades a substantial decline of HAV spread was observed in the European region. In Greece anti-HAV prevalence among army recruits declined from 69% in 1977 to 17.5% in 1990 and in France from nearly 50% in 1978 to 20% in 1990 [6].

As a result of the high susceptibility of adults the relative frequency of acute hepatitis A in adults increased [5]. In parallel, although epidemics are rare, a considerable increase of the attack rate especially among school children has been observed, since the prevalence of anti-HAV among them is very low [8].

In the present study all index cases were sporadic from various areas and had no obvious relations among them. The exact time the family members were infected cannot be determined.