
PREVALENCE OF HEPATITIS VIRUS INFECTIONS
IN ALBANIAN REFUGEES

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A sample of 393 Albanian refugees, including both children and adults, was tested for serological HAV, HBV, HDV and HCV markers. A high prevalence of infection with both the hepatitis A and B viruses was found, while HDV and HCV infections were uncommon. The overall prevalence of anti-HAV was 96%; it was very high in children 0-10 years, suggesting that HAV infection is largely acquired during childhood and that poor ambient conditions influence the spreading of this viral infection.

One or more serological markers of HBV infection were found in 295 Albanians (75%), confirming the endemic nature of this virus in the Albanian community. The overall prevalence of HBsAg was 19%, and the carrier rate was higher in males than in females. The high HBsAg prevalence among children suggests that HBV infection is usually acquired in early childhood.

The serological data obtained in the Albanian sample examined clearly indicate the urgent need for measures to reduce the incidence of HAV and HBV infections and to avoid the further spread of HDV and HCV infections.

Finally, the high prevalence of type B hepatitis indicates the necessity of vaccination against HBV for all risk groups and for all children at birth.

INTRODUCTION

Infection with hepatitis A, B, C and D virus is common in most parts of the world (2, 4, 11). In particular, worldwide distribution of HBV infection (2, 5) has been defined more precisely on the basis of the prevalence of HBsAg, that is, countries with a low rate (< 2% - USA, Western Europe, Australia, New Zealand), an intermediate rate (2%-7% - Eastern and Southern Europe, Central Asia, Japan, Israel, South America) and high endemicity (8%-15% - Southeast

Asia, China, Africa, Pacific Islands, Arctic). Information pertaining to the exact diffusion of viral hepatitis in Eastern Europe, however, is still scarce. Recently, a massive migration of Albanian refugees to Italy provided the opportunity to study the prevalence of hepatitis viruses in Albania. The first mass migration occurred in March 1991 when, over a two day period, more than 23,000 Albanians arrived in Apulia (Southern Italy) by sea due to the proximity of Italy to the Albanian coast. A simple emergency surveillance system was established within days of their arrival to monitor health problems and prevent outbreaks of infectious diseases (3). Subsequently, as

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part of this epidemiologic surveillance, a sample of 393 Albanian refugees, including both adults and children, was tested for serological markers of common viral infections (14). Here we present the preliminary results obtained by testing this Albanian population for serological markers of hepatitis B virus (HBV), hepatitis Delta (HDV), hepatitis C virus (HCV) and hepatitis A (HAV) infections. Although through personal experiences the prevalence of hepatitis B and A have been reported to be very high in Albania (6, 13), no scientific data concerning the actual spread of these infections are available. In addition, no data are available at present concerning the diffusion of HDV and HCV infections in this country.

MATERIALS AND METHODS

A total of 393 apparently healthy Albanians were examined, 81 females and 312 males, ranging from one to 46 years old (average age = 20 years). They were recruited from 4 different refugee camps in Apulia, which provided for people coming from different areas around the towns of Valona, Tirana and Durazzo. The appropriateness of the sample was evaluated through the use of the formula $N_f = N(1 + N/N_x)$. Subjects were stratified into four age groups: I) 1-10 years = 80; II) 11-20 years = 122; III) 21-30 years = 125; IV) > 30 years = 66. Blood sampling was carried out during the first two months of stay in Apulia; sera were stored at -20°C and subsequently screened for antibodies to HAV (anti-HAV), hepatitis B surface antigen (HBsAg), antibodies to hepatitis B surface antigen (anti-HBs) and antibodies to hepatitis core antigen (anti-HBc). HBsAg-positive subjects were also tested for hepatitis B e antigen (HBeAg) and its antibody (anti-HBe) and for the presence of antibodies to hepatitis Delta virus (anti-HDV).

Serological markers of HBV and HDV were evaluated using enzyme immunoassays (Sorin Biomedica, Saluggia, VC, Italy). The presence of serum antibodies to HCV (anti-HCV) was investigated by the 2nd generation HCV antibody ELISA Test System (Ortho Diagnostic Systems, MI, Italy).

RESULTS

Of the 393 Albanians tested, 376 (96%) were seropositive for anti-HAV. The prevalence of antibody was 81% among children below the age of ten, increased to 98% in 11-20 year olds, and was 100% among subjects over the age of 20 (Table 1).

Seventy-five Albanians (19%) were found to be HBsAg positive, 68 were male and 7 female, with a carrier rate of 22% and 9%, respectively (Table 2). The prevalence of HBsAg was almost the same for males in each of the age groups, while among females a negative trend in the frequency of HBsAg was observed with increasing age (Table 2). No difference

in the prevalence rate of HBsAg was observed in different geographical areas.

The majority of HBsAg carriers were anti-HBe-positive, and only 4/13 (31%) in the 0-10 age group were HBeAg-positive (Table 3).

Among the 318 HBsAg-negative subjects, 125 had both anti-HBc and anti-HBs, 74 were anti-HBc-positive and 21 had only anti-HBs (Table 4). Age-specific prevalence rates demonstrated a correlation of exposure with increasing age (Table 4).

Among the 75 HBsAg carriers, only one, in the 0-10 age group, had detectable levels of anti-HDV (1%).

Anti-HCV were found in 6 subjects (1.5%). The range in age of anti-HCV-positive persons (5 males and 1 female) was from 14 to 24 years.

TABLE 1. - Prevalence rate for anti-HAV, by age.

Anti-HAV+ subjects	Age group (yrs)				Total n = 393
	0-10 n = 80	11-20 n = 122	21-30 n = 125	> 30 n = 66	
no.	65	120	125	66	376
%	81	98	100	100	96

TABLE 2. - Prevalence rate for HBsAg by age and sex in 393 Albanian refugees.

Age group (yrs)	HBsAg +						
	no.	male		female		total	
		no.	%	no.	%		no.
0-10	80	9/ 44	20	4/36	11	13/ 80	16
11-20	122	22/107	21	2/15	13	24/122	20
21-30	125	24/105	23	1/20	5	25/125	20
> 30	66	13/ 56	23	0/10	0	13/ 66	20
Total	393	68/312	23	7/81	9	75/393	19

TABLE 3. - HBe status in 75 HBsAg carriers by age.

HBeAg status	Age group (yrs)				Total n = 75
	0-10 n = 13	11-20 n = 24	21-30 n = 25	> 30 n = 13	
HBeAg+	4 (31%)	5 (21%)	1 (4%)	1 (8%)	11 (15%)
anti-HBe+	6 (46%)	17 (71%)	21 (84%)	10 (77%)	54 (72%)
HBeAg-/ anti-HBe-	3 (23%)	2 (8%)	3 (12%)	2 (15%)	10 (13%)

TABLE 4. - Age in specific prevalence of anti-HBs and anti-HBc in 318 HBsAg-negative Albanian refugees.

Age group (yrs)	no.	anti-HBs+ anti-HBc+		anti-HBc only		anti-HBs only		any markers negative	
		no.	%	no.	%	no.	%	no.	%
1-10	67	14	21	21	31	1	1	31	46
11-20	98	52	53	14	14	4	4	28	29
21-30	100	37	37	23	23	11	11	29	29
> 30	53	22	42	16	30	5	9	10	19
Total	318	125	39	74	23	21	7	98	31

DISCUSSION

In this study, the prevalence of hepatitis virus infections was evaluated in a sample of Albanian refugees in Southern Italy. The Albanians who arrived in Italy were mostly composed of subjects from the lower socio-economic classes, and therefore may not represent a random sample of the general population. However, the large number of subjects enrolled from different geographic areas (mountain, rural and metropolitan areas), provides important information on hepatitis virus infection in Albania, even if the results obtained in this study remain to be confirmed.

We found a very high prevalence of hepatitis A and B virus infections, while HDV and HCV infections seem to be rare. The overall prevalence of anti-HAV was 96%. It was very-high in the first decade of life (81%), and rose to 100% by the third decade of life, suggesting that hepatitis A infection is largely acquired during childhood and that the ambient conditions (hygienic conditions, sources of water supply, etc.) influence the spread of this viral infection, as in other developing countries of the world (2).

The presence of one or more serological markers of HBV infection in 295 Albanians (75%), confirms the endemic nature of this virus in the Albanian community. We found an unexpectedly high HBsAg prevalence (19%), comparable to that found in African and East Asian hyperendemic areas (1, 15). The high rate of infection (16%) in children aged 1 to 10 years suggests that HBV infection is usually acquired early in life, as observed in countries with high endemicity of HBV infection. Maternal-infant transmission, from HBsAg-positive mothers to their babies, may be an important factor leading to the spread of HBV during childhood; HBsAg screening in pregnant women could confirm this possibility. Alternatively, HBV infection may be acquired from other infectious family members, or outside the family. An important mode of secondary transmission of HBV could be obligatory vaccination campaigns because of the lack of disposable syringes and needles. The highest carrier rate was observed among males but the difference in

overall rate was marked; 22% among males and 9% among females. These significant differences, most evident in the oldest age group, may be due to the small number of females in the study population, but may also reflect a major risk of males contracting HBV infection and becoming chronic carriers.

Most of the subjects found positive for HBsAg carriers had anti-HBe antibodies in the serum. The presence of anti-HBe is usually associated with absence or low levels of viral replication and infectivity, and characterizes the "healthy" HBsAg carrier state (9). Alternatively, in chronic anti-HBe carriers with liver disease, the absence of HBeAg may be due to infection with HBV pre-C mutants (12). Further clinical and virological evaluation of these carriers in future studies are necessary to clarify this point.

Among HBsAg-positive Albanians, only 1% had serological evidence of HDV infection. Similarly, HCV infection seems to be uncommon, detected in only 1.5% of the Albanians tested. The low seropositivity rate for HDV and HCV infection can be possibly attributed to the isolation in which Albania has existed for many years. In fact, neighbouring countries, like Greece and Italy, have an elevated HDV infection rate (7, 10). If this is the case, one can expect an increased spread of HDV and HCV infection within the next few years due to more frequent contacts with other populations.

The serological data obtained in the Albanian sample examined clearly indicate the urgent need for measures to reduce the incidence of HAV and HBV infections as well as to avoid the further spread of HDV and HCV infections and other blood-borne viruses, such as the human immunodeficiency virus, which was not found among the Albanian refugees tested (8).

To obtain these goals, we feel that help from European countries should be mainly directed towards a specific educational campaign illustrating the use of simple and inexpensive hygienic measures. In addition, basic medical equipment (needles, syringes, surgical gloves) must be supplied. Finally, if further seroepidemiological studies confirm the high

prevalence of type B hepatitis, a program of vaccination against HBV of all risk groups and of all children at birth should be undertaken.

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REFERENCES

1. *Ayoola E.A.* (1988): Viral hepatitis in Africa. *In: Viral hepatitis and liver disease*, pp. 161-169.
2. *Deinhardt F.* and *Gust I.D.* (1982): Viral hepatitis - *Bull. World Health Organization* 60: 661-691.
3. *Greco D., Squarcione S., Germinario C., Lo Caputo S., Binkin N.* and *Panatta M.* (1993): Health response to a large and rapid influx of Albanian refugees in Southern Italy - *Disasters* 17: 61-69.
4. *Lemon S.M.* (1985): Type A viral hepatitis: new developments in an old disease - *N. Engl. J. Med.* 313: 1059-1067.
5. *Margolis H.S., Alter M.J.* and *Hadler S.C.* (1991): Hepatitis B: evolving epidemiology and implications for control. *In: Seminars in liver disease*, 11: 84-92.
6. *Offerthaus L.* (1991): Albania: a plundered country - *Lancet* 338: 44-45 (letter).
7. *Ponzetto A., Forzani B., Parravicini P.P., Hele C., Zanetti A.* and *Rizzetto M.* (1985): Epidemiology of hepatitis delta virus (HDV) infection - *Eur. J. Epidemiol.* 1: 257-263.
8. *Quarto M., Germinario C., Lo Caputo S., Troiano T., Fontana A., Squarcione S.* and *Greco D.* (1991): Assenza di infezione da HIV in una popolazione albanese immigrata ad alta prevalenza di HBV - *GIAIDS* 2: 232-233.
9. *Realdi G., Alberti A., Rugge M., Bortolotti F., Rigoli A.M., Tremolada F.* and *Ruol A.* (1980): Seroconversion from hepatitis B e antigen to anti-HBe in chronic hepatitis B virus infection - *Gastroenterology* 79: 195-199.
10. *Rizzetto M.* (1989): Hepatitis δ virus (HDV) infection and disease - *Res. Clin. Lab.* 19: 11-26.
11. *Rizzetto M., Ponzetto A.* and *Forzani I.* (1990): Hepatitis delta virus as a global health problem - *Vaccine* 8: 510-514.
12. *Santantonio T., Jung M.C., Miska S., Pastore G., Pape G.R., Will H.* (1991): Prevalence and type of pre-C HBV mutants in anti-HBe positive carriers with chronic liver disease in a highly endemic area - *Virology* 183: 840-844.
13. *Spencer R.C.* (1991): Albania, a plundered country - *Lancet* 338: 1018-1019 (letter).
14. *Squarcione S., Germinario C., Iandolo E., Lo Caputo S., Bergamini F., Profeta M.L., Greco D., Quarto M.* and *Barbuti S.* (1992): Seroimmunity to poliomyelitis in an Albanian immigrant population - *Vaccine*, 10: 853-856.
15. *Sung J.L.* and *Asian Regional Study Group* (1990): Hepatitis B virus eradication strategy for Asia - *Vaccine* 8: S96-S99.