

Seroprevalence of hepatitis A in Maltese adults

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ABSTRACT: *Objectives:* To determine the seroprevalence of hepatitis A virus (HAV) within the adult population of Malta. *Methods:* Serum from blood coincidentally taken for non-acute investigations in patients aged 20 - 85 visiting St. Luke's Hospital over a three month period in 1996 (n = 320) was retrieved and tested for anti-HAV antibodies by Enzyme Immunoassay (Abbott, USA). *Results:* Seroprevalence levels of anti-HAV antibody in Maltese adults fall into a pattern normally associated with low to intermediate prevalence countries. *Conclusions:* 1. There is a statistically significant difference ($p < 0.001$) in hepatitis A seroprevalence between the 31-40 and 41-50 age groups which is not apparent between any other age groups. 2. Seroprevalence rates in the under 40's are comparable with studies performed in other European countries in the Mediterranean and would therefore indicate that travellers to Malta are at no greater risk of this infection than with these destinations. 3. Hepatitis A vaccination is recommended for Maltese travellers visiting intermediate or highly endemic areas, including countries especially in Eastern Europe, the Middle East, Asia, Africa, Central and South America. 4. Serological screening for hepatitis A antibodies prior to vaccination appears to be cost-effective in individuals over 40 years of age.

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Introduction

Viral hepatitis is a relatively common human infection which has been known since antiquity¹. To-date, the viral hepatitis alphabet includes five well-defined viruses, A to E with two others, F and G being also studied as further candidates^{2,3}. Hepatitis A (HAV) is a highly contagious virus that attacks the liver. It is the seventh most commonly reported infectious disease in the United States (following gonorrhoea, chickenpox, syphilis, AIDS, salmonellosis, and shigellosis). Worldwide, there are an estimated 1.4 million cases annually.

HAV is a 27 nm icosahedral non-enveloped RNA virus with characteristics of the picorna group of viruses. Originally, it was classified as Enterovirus 72, but recently it has been renamed as Heparna virus because of differences noted when compared with other enteroviruses. The laboratory diagnosis of acute hepatitis A infection usually rests on the demonstration of anti-HAV IgM antibodies in the serum of suspected patients. The monitoring of liver enzymes also helps. Anti-HAV total antibody tests, many of which do not discriminate between the different antibody classes, are usually employed to determine immunity against hepatitis A and for epidemiological studies.

The clinical picture of hepatitis A infection varies from sub-clinical infections to severe cases with or without

jaundice. Most cases, especially in young children, are sub-clinical. The duration of illness also varies but most patients recover in three weeks. The incubation period ranges from 20 to 50 days, which means that infectious patients, such as food-handlers or children, can spread the disease well before they are aware of the infection. Most patients recover within three weeks, although some have prolonged or relapsing symptoms for up to six months⁴.

Epidemiology

Hepatitis A virus is transmitted by the fecal-oral route, through close person-to-person contact, or by ingesting contaminated food or water. Factors which predispose to Hepatitis A transmission include lack of safe drinking water, inadequate sewage disposal systems, overcrowding, and low socioeconomic and education levels.

In developed countries, people potentially susceptible to hepatitis A are predominantly those who travel to less developed areas of the world where hepatitis A is common. These areas include Africa, Asia (except Japan), the Mediterranean basin, Eastern Europe, the Middle East, Central and South America, Mexico and parts of the Caribbean. Other risk groups include individuals who engage in high-risk sexual activity, haemophiliacs and other recipients of therapeutic blood

products, youngsters in child-care facilities, food-handlers, healthcare workers who treat patients infected with the virus, institutionalized persons and their carers, laboratory workers who handle live hepatitis A virus and sewage disposal personnel. Historically, the most common preventive method has been immune globulin administration, which is effective for about three to six months. There are now inactivated vaccines that provide longer-term protection. These vaccines are typically administered as one initial dose followed by a booster in about 6 to 18 months.

World-wide epidemiological studies show a three zone model. The introduction of tests for the serological markers of hepatitis A infection in the last few years has increased the accuracy of epidemiological data. Testing for anti-HAV antibodies reveals evidence of past infection and world-wide sero-epidemiological studies confirm a three zone model for hepatitis A endemicity:

The first zone comprises high and hyper-endemic areas which are normally found in developing countries in tropical regions (30 - 100 clinical cases / year per 100,000 population). Because of the high prevalence of the virus and associated poor standards of hygiene, exposure occurs predominantly during childhood and immunity develops in early life⁵.

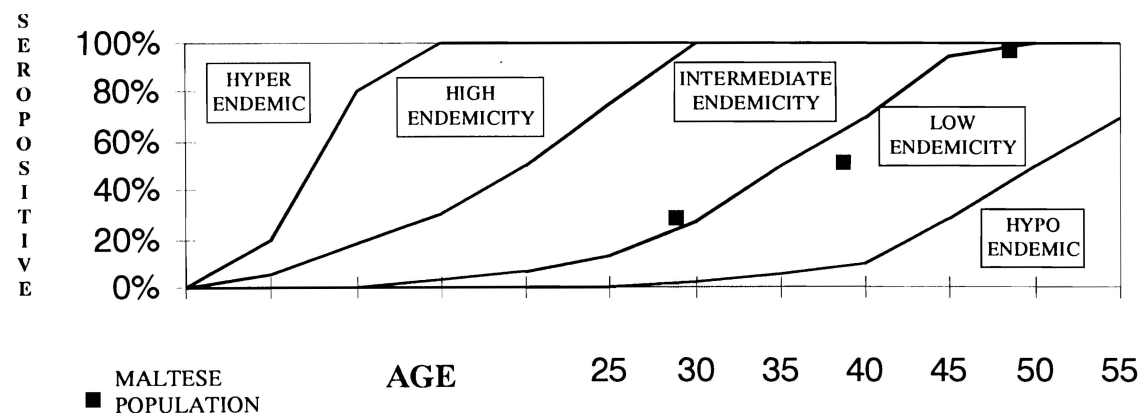
Areas of intermediate endemicity, which make up the second zone, are seen in some developing countries where standards of hygiene have improved rapidly in recent years (20 - 30 clinical cases / year per 100,000 population). In this zone, the age at which anti-HAV antibodies are detected is shifting towards a higher age⁶.

In the highly developed countries such as those in Northern Europe especially Scandinavia, a third zone of low or even hypo-endemicity is recognised with 0 - 15 clinical cases / year per 100,000 population. These countries have a very high standard of hygiene and public health. Exposure to hepatitis A virus therefore occurs only occasionally. Individuals in this zone are susceptible to infection because of low levels of circulating HAV and therefore progressive waning of immunity year after year⁷.

Methods

Subjects (n=320) were recruited from patients aged 20-85 who visited the hospital over a three month period in 1996 according to population, age and sex distribution. Expatriates and travellers having spent more than three months in a tropical country were excluded

Fig 1 - Hepatitis A seroprevalence in Maltese adults



from the study. Sera from these individuals were tested for the detection of total antibody to Hepatitis A virus by an enzyme immunoassay (Havab, Abbott Laboratories). Statistical analysis was performed using the Epi-Info version 6 software programme.

Results

Table 1 depicts the seroprevalence of anti-hepatitis A antibodies found in the population studied according to age bracket. There is a significant increase ($p < 0.001$) in hepatitis A seroprevalence between the 31 - 40 and 41 - 50 age groups which is not apparent between any other age groups. Seroprevalence levels of anti-HAV antibody found in Maltese adults fall into a pattern normally associated with low to intermediate prevalence countries (Fig 1).

Table 1 - Hepatitis A, seroprevalence according to age groups.

Age cohort	n	Seroprevalence
< 30	62	22.4%
31 - 40	65	41.4%
41 - 50	59	96.3%
51 - 60	64	94.2%
> 60	70	98.9%

Discussion

The Mediterranean littoral is regarded as a high risk region for infection with the hepatitis A virus. It is, however, the case that during the past decades the countries of this region have made major strides forward in improving their standard of hygiene through considerable civil engineering projects aimed at guaranteeing safe water supply and sewage disposal. This has been accompanied to a large extent by greater awareness of food hygiene. As a result, the prevalence of food and water borne illness has decreased markedly and infections such as cholera, typhoid and hepatitis have dropped to levels at par with those found in more northern countries of the region. It would be interesting to postulate that the change in hepatitis A seroprevalence

evident between individuals in their 30's and those in their 40's coincides with major alterations in potable water supply which occurred in Malta in the 60's and 70's.

The seroprevalence patterns established in this study would place Malta as a location of low risk for hepatitis A. This conclusion is also corroborated by the reported incidence of this infection in this country (Table 2). In fact, other than in three years where the yearly figures were raised as a result of localized outbreaks, the incidence of hepatitis A has consistently been below 1 case per 100,000 population.

Our study would seem to indicate that the transmission of hepatitis A occurs at a lower level than in other European countries of the Mediterranean. In fact, Christofidou and colleagues found seroprevalence levels of 77.5% in young adults in their 30's in south western Greece⁸ whilst Fernandez-Quintairos and colleagues, who performed a similar investigation in north western Spain describe seroprevalence levels of more than 80% by the age of thirty⁹ (Table 3). This would indicate that travellers to Malta are at no greater risk of hepatitis A than in other Mediterranean destinations, or for that matter in their country of origin.

Conclusion

Hepatitis A remains the most common travel acquired infection with an incidence of 1.6 cases per 1000 travellers per month of travel. Three factors are crucial: the country of origin, the country of travel and the duration of stay. Travel from countries of low endemicity to others falling in the high or hyper-endemicity brackets is universally regarded as the most significant risk factor. Our data would thus indicate that Maltese travellers below 40 years of age visiting high-risk areas especially in Eastern Europe, the Middle East, Asia, Africa, South and Central America are at risk of hepatitis A and vaccination is recommended.

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Table 2 - Hepatitis A notifications in Malta (1990 - 1998).

Year	Individual cases			outbreak cases
	Total	Residents	Non-residents	
1990	6	6	0	0
1991	3	3	0	0
1992	14	14	0	0
1993	3	2	1	0
1994	3	2	1	0
1995	4	2	2	0
1996	9	8	1	6
1997	3	2	1	0
1998	9	7	2	8

Source: Notifiable Infectious Diseases Reports
- Department of Public Health, Malta

Table 3 - Hepatitis A seroprevalence by age 30 in selected Mediterranean countries.

Study	Seroprevalence
Borg & Portelli (Malta)	22.4%
Fernandez et al ⁸ (N.W. Spain)	80.0%
Christofidou et al ⁹ (S.W. Greece)	77.5%

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