

Hepatitis B prevalence in two Maltese sub-populations

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ABSTRACT: Hepatitis B surface antigen was measured by enzyme immunoassay in a random sample of 1258 healthy pregnant women attending the ante-natal clinics of St. Luke's Hospital, Malta and Gozo General Hospital, Gozo, and 364 intravenous drug users attending the detoxification centre, SLH. Eight of the pregnant women and ten of the drug addicts were positive for the surface antigen, accounting for a prevalence of 6/1000 and 30/1000 for each cohort, respectively. This would be consistent with low/intermediate prevalence rate in accordance with WHO criteria.

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Introduction

Hepatitis B is an important cause of acute and chronic infection of the liver with a long incubation period of approximately 2-4 months^{1,2}. Hepatocellular damage is mediated by the cellular immune response of the host to the hepatocytes³. Persistence of the virus occurs in about 10% of adults and in as many as 90% of infants due to their underdeveloped immune system⁴. The hepatitis B carrier state is defined as the presence of hepatitis B surface antigen (HBsAg) in the serum for more than six months^{1,5}. There are approximately 200 million carriers worldwide, who provide a reservoir for the disease, and who have an increased risk of cirrhosis and hepatocellular carcinoma^{1,4,5}.

There is a spectrum of disease from subclinical infection to an acute icteric illness^{1,2}. The virus is primarily transmitted via the parenteral route, thus placing intra-venous drug abusers at risk. In addition, the infection may be transmitted sexually, perinatally and possibly, by close contact due to non-sexual exchange of body fluids^{3,6}.

The only previous work on hepatitis B, known to the authors, to have been carried out in Malta, was a study on Maltese blood donors⁷. In this study, blood donors constituted two sub-populations: one largely composed of relatives of hospital patients who required blood, while the other consisted essentially of voluntary donors many of whom were already screened and therefore selectively tending to be negative. The prevalence of hepatitis in the first group was reported as 2.8% and in the latter, as 0.6%. The author of that study commented that both results may be overestimates because the ELISA method then used may have given a relatively high false positive rate and no further confirmatory tests were done. The author recommended a further study with confirmatory tests.

Aims

The aim of our study was to determine the prevalence of hepatitis B surface antigen within the sub-populations of pregnant women and intra-venous drug abusers. Although pregnant women are a selected population, they are likely to represent a healthy cohort within the general population, whereas, intravenous drug abusers represent a high risk group. It is probable therefore, that the results obtained would indicate that the approximate overall prevalence within the general Maltese population would lie within this range.

Materials & Methods

Serum samples were collected from pregnant women who were routinely screened for hepatitis B over a period of two years (January 1992 to December 1993). One thousand, two hundred and fifty-eight pregnant women aged 14 to 56 years (median of 29 years) were selected at random from those attending the "booking visit" at ante-natal clinics, St. Luke's Hospital (SLH), Malta and Gozo General Hospital (GGH), Gozo. St. Luke's Hospital is the only general hospital in Malta and the majority of births in Malta take place in this hospital. Hence, the random population chosen during the booking visit was considered representative of the population of pregnant women in Malta.

In addition, 364 newly admitted drug addicts aged 16 to 52 years (median: 25) attending the detoxification centre, SLH, Malta within this two year recruitment period were tested anonymously for the presence of HBsAg. The prevalence of intra-venous drug abusers at the time of the study was unknown. However, according to unpublished figures (SEDQA) the estimated prevalence today, is about 600. Therefore, given the probability that there were less cases then, the

number investigated (364) is a fair representative sample.

An enzyme immuno assay, (Auszyme® Abbott Laboratories) was used to detect HBsAg levels in concentrations of $\geq 0.1\text{ng/ml}$ ⁶. A positive EIA reaction was repeated and if the repeat test was also positive a confirmatory neutralization test was carried out. Student's t-test was used to determine significant association or difference between the age of seropositive and seronegative individuals within both cohorts.

Results

Of the 1258 pregnant women tested, eight were found to be positive for the surface antigen resulting in a prevalence of HBsAg of 6 per 1000 women within this cohort. There was no significant difference between the ages of the seropositive and seronegative women.

Ten of the 364 drug abusers were positive for HBsAg indicating an approximate prevalence of 30/1000. There was a significant difference between the mean age of the seropositive (32.4 years) and seronegative (26.41 years) drug addicts at $P < 0.025\%$.

Discussion

Malta is an island nation with a population of approximately 360,000. It is geographically surrounded by areas of intermediate endemicity carrier rates, including southern Italy, Northern Africa and the Middle East. WHO considers an intermediate prevalence rate to lie between 2 - 7%⁸ and so by applying a prevalence of approximately 4% to Malta, it would be expected that 14,400 persons would be carriers of this infection.

In order to carry out a comprehensive evaluation of the entire Maltese population, the use of invasive serological techniques would have rendered such a study extremely difficult. For this reason the subpopulations of pregnant women and drug addicts were chosen.

Pregnant Women Population

The prevalence of 6/1000 with hepatitis B antigen positivity in this cohort was low compared with the higher rates present in neighbouring countries. This study population sample was large enough for this rate to be considered a valid representation of that of all pregnant women attending St. Luke's Hospital and therefore on the island. Perinatal transmission of HBV represents one of the most efficient modes of hepatitis B transmission and approximately 90% of HBeAg carrier mothers infect their infants in this way⁹. As a result, 85 to 90% of infected infants will themselves become chronic carriers probably as a result of their immature immune system which is unable to eliminate the surface antigens^{5,9,10}. Serological studies involving women of child bearing age are a useful scientific guide for the estimation of risk of infection to infants by perinatal transmission⁸. In this study, eight previously undetected HBsAg positive women were identified and their offspring were immunized within 48 hours of birth, thereby preventing future complications related to the infection^{9,11}.

Indeed the administration, concurrently, of immunoglobulin (HBIG) preparation and the vaccine to

infants of HBsAg positive mothers, within 48 hours and not later than 7 days of birth, prevents the development of carrier states in all but 5% of such exposed infants^{3,4,9,11}. A second dose of the vaccine is then administered at 1-2 months of age, and a third at 6-18 months of age¹¹. The aim of immunization is the protection against HBsAg carrier status and thus reduction of carcinoma associated with the chronic infection.

Drug Abuse Population

This study has shown that an approximate 30/1000 drug addicts in Malta were positive for the surface antigen. This value is considerably higher than the prevalence of HBsAg shown within the cohort of pregnant women, and confirms the high risk of this infection in drug abusers in Malta¹². However, when compared with the prevalence of HBsAg of 38% within a similar addict population in Stockholm¹³, the prevalence in Malta was approximately 3%. Due to the fact that information regarding drug addicts is withheld to preserve anonymity, it was not possible to trace data about exposure to other risk factors. For this reason it was assumed that these persons contracted the infection as a result of their lifestyle involving drug abuse.

The mean age of seropositive drug addicts was significantly greater than that of their seronegative counterparts. Recently, the detoxification centre in Malta has provided patients with free syringes so as to avoid the sharing of contaminated equipment, thereby reducing the spread of infection. Also a public education programme about hepatitis B and its modes of transmission has resulted in an increased awareness of the risks associated with this lifestyle. Older drug abusers may have been exposed to these risk factors for a longer period of time as compared to younger persons, and as in other countries with a low to intermediate prevalence carrier population, hepatitis B infection increases with age. However, as the study only looked at addicts attending the detoxification centre at SLH, it may not be representative of the drug abusing population on the island as a whole.

Conclusion

These two serological studies have provided prevalence rates of two extremes of the Maltese population. It may be assumed that the overall prevalence lies somewhere between the rate for pregnant women and that of the sub-population of drug addicts. From this, one may assume that the overall population prevalence rate lies between 1% and 3% which is a low or low-intermediate endemicity rate as set by WHO.

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