

An Observation on Natural History of Liver Diseases in Nagasaki

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INTRODUCTION

In Northern Kyushu including Nagasaki prefecture, chronic liver diseases, e. g. cirrhosis and cancer are hyperendemic. Considering high prevalence of hepatitis B virus (HBV) infection in this area,¹⁾ the observation of natural history of HBV infection and related disorders: the progress from viral infection to hepatitis, cirrhosis and/or liver cancer, may be necessary for understanding of the endemics of liver diseases. The aim of this study is to examine regional differences and relationships between the prevalences of HBV infection and mortalities from related liver disorders, among selected districts in Nagasaki prefecture.

MATERIALS AND METHODS

Several towns (district) were arbitrarily selected from each of 13 Nagasaki prefectural health center areas. In 1983, total of 6,605 sera were collected at the health examination for adult (mainly over 40 years of age) in each district, and hepatitis B surface antigen (HBs Ag) and anti-HBs antibody (anti-HBs) were detected by reserved passive hemagglutination (RPHA) and passive hemagglutination (PHA) methods, respectively²⁾. From mortality records from 1978 to 1982, standardized mortality ratios (SMR) of liver diseases in each district were calculated by the age structure of population in 1980 as a standard.

RESULTS

Epidemics of HBV Infection (Table 1)

The HBsAg carrier rate in whole districts was 2.45% (162/6605), which was higher than that of blood donors in all Japan (under 2.0%)³⁾. Moreover, there were significant differences of carrier rates among the districts; the highest was 6.4% in Arikawa and the lowest was 0.6% in Iki. It is mentioned that except of Iki, the rates in islands, especially in Gotoh islands (Arikawa and Fukue) were higher than those in mainlands.

The carrier rate of anti-HBs in whole districts was 24.2% (1599/6605) and rates were less varied among districts than those of HBsAg: ranged from 35.0% (Iki) to 18.9% (Nagasaki). The tendency of higher rate in islands was also observed in anti-HBs and then, epidemics of HBV infection have been significantly high in islands including Iki which was low rate in HBAg.

Table 1. The Carrier Rates (%) of HBsAg and Anti-HBs in Selected Districts in Nagasaki (1983).

DISTRICT	HBsAg			Anti-HBs			HBsAg+Anti-HBs		
	M	F	T	M	F	T	M	F	T
NAGASAKI(M)	1.9	1.8	1.9	19.2	18.7	18.9	21.1	20.0	21.4
OHSETO(M)	1.9	2.5	5.6	25.9	28.1	27.1	27.5	30.6	32.7
ISAHAYA(M)	2.3	2.3	2.3	20.7	23.3	22.3	23.0	25.6	24.6
OBAMA(M)	1.9	3.2	2.5	36.2	22.6	29.5	38.1	25.8	32.0
SHIMABARA(M)	1.2	0.8	1.0	23.3	19.7	21.1	24.5	20.5	22.1
OHMURA(M)	0.7	2.0	1.6	24.1	21.1	22.1	24.8	23.1	23.7
HIRADO(M. I)	1.6	3.2	2.5	20.8	28.1	25.0	22.4	31.3	27.5
YOSHII(M)	0.9	1.9	1.6	23.9	24.8	24.5	24.8	26.7	25.1
MATUURA(M)	1.5	1.7	1.6	18.0	28.4	23.5	19.5	30.1	25.1
FUKUE(I)	4.1	4.2	4.2	32.8	27.5	29.6	36.9	31.7	33.8
ARIKAWA(I)	6.4	6.3	6.4	26.5	32.2	29.1	32.9	38.5	35.5
IKI(I)	1.5	0	0.6	24.6	41.1	35.0	26.1	41.1	35.6
IZUHARA(I)	3.9	3.0	3.4	24.6	34.9	32.8	28.5	37.9	36.2
ALL DISTRICTS	2.4	2.5	2.5	23.5	24.8	24.2	26.2	27.3	26.7

M: Male, F: Female, T: Total, (M): Mainland, (I): Island

Epidemics of Liver diseases (Table 2)

Liver diseases are highly endemic in Nagasaki area, as indicating higher SMRs than all Japan (SMR=100); 105.5, 120.4, 141.3 and 117.7 were from viral hepatitis, cirrhosis, cancer and other liver diseases, respectively. Great variations among districts in SMRs of viral hepatitis and other liver diseases may have been caused by less frequencies of fatal cases in small populations. The SMRs from cirrhosis and /or cancer were generally higher in islands, especially in Gotoh, but some districts in mainland had high SMRs, such as Yoshii in cirrhosis (240.2) and Ohseto in cancer (185.7).

Table 2. The Standardized Mortality Ratios of Liver Diseases (1979–1983).

DISTRICT	Viral	Liver	Liver	Other Liver
	Hepatitis	Cirrhosis	Cancer	Diseases
NAGASAKI(M)	53.7	121.4	119.7	153.9
OHSETO(M)	101.9	107.5	185.7	88.7
ISAHAYA(M)	0	104.6	85.0	213.9
OBAMA(M)	0	94.7	119.1	258.2
SHIMABARA(M)	241.7	44.8	96.6	89.1
OHMURA(M)	97.0	77.9	99.4	140.5
HIRADO(M, I)	92.2	116.8	136.5	106.1
YOSHII(M)	267.7	240.2	178.0	102.7
MATSUURA(M)	211.4	130.8	99.5	163.6
FUKUE(I)	0	138.1	157.1	111.5
ARIKAWA(I)	0	125.0	196.4	188.8
IKI(I)	210.6	111.0	85.2	0
IZUHARA(I)	256.8	128.1	93.8	254.7
ALL DISTRICTS	113.4	104.3	135.9	147.9
ALL NAGASAKI	105.0	120.4	141.3	111.7

(M), (I): same in Tab. 1

Relationships among HBV infestation and Liver diseases (Fig. 1)

For estimating the contribution of HBV infection to natural history of liver diseases, simple correlation analyses were carried out; the highest coefficient was found between HBs Ag carrier rate and SMR of liver cancer ($r=0.667$), and the next was between SMRs of

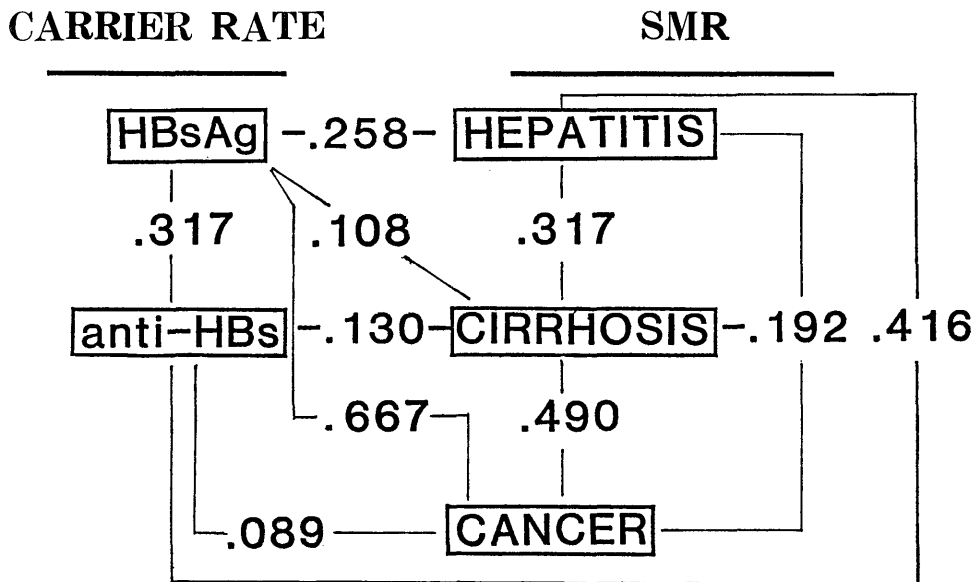


Fig. 1. Relationships among Carrier Rates of HBV markers and Standardized Mortality Ratios (SMR) in Selected Districts (n=13).

cirrhosis and cancer ($r=0.490$). On the other hand, correlations of anti-HBs against both SMRs from cancer and cirrhosis were quite low ($r=0.108$ and $r=0.089$, respectively).

DISCUSSION

From geographical distributions of prevalences of HBsAg and anti-HBs, it is obvious that though Nagasaki generally belongs to hyperepidemic area of HBV, there are great variations in the extent of infestation among local communities. High prevalences in islands, especially in Gotoh suggest that island-ecosystems in western part of Japan have particular settings for HBV infection. Our findings on the relationships of prevalence of HBsAg to liver diseases have confirmed in population base that the persistent infection of HBV is one of high risk factors for liver cancer, which have been proposed by experimental and clinical studies⁴⁾⁵⁾. However, as far as our this preliminary study, we cannot reveal direct factors which contribute the progress of natural history of HBV infection and liver diseases, and further studies are necessary to clear the effects of human ecological setting on the viral-host relationship.

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