Difference of Subtypes of Hepatitis B Surface Antigen between Asymptomatic Carriers and Patients with Chronic Liver Diseases

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NAKAMURA, S., TAKEZAWA, Y. and MAEDA, T. *Difference of Subtypes of Hepatitis B Surface Antigen between Asymptomatic Carriers and Patients with Chronic Liver Diseases.* Tohoku J. exp. Med., 1980, 132 (3), 367-368 — Subtypes of hepatitis B surface antigen (HBsAg) were studied in 20 asymptomatic HBsAg carriers and 18 HBsAg-seropositive patients with chronic hepatitis or liver cirrhosis. Among them 25 were university students. In the male university students, subtype *adw* was found to be significantly higher in asymptomatic HBsAg carriers than in patients with chronic hepatitis ($p=0.04$). The difference in subtypes of HBsAg between male asymptomatic carriers and male patients with liver disease was further confirmed by the combined results of university students and other subjects ($p=0.007$). — subtypes of hepatitis B surface antigen; asymptomatic hepatitis B surface antigen carrier; chronic hepatitis; liver cirrhosis; university students

In Japan the view is widely held currently that chronic hepatitis B develops in adolescence mostly from asymptomatic hepatitis B surface antigen (HBsAg) carrier state (Suzuki 1977). Difference of subtypes of HBsAg between asymptomatic HBsAg carriers and patients with chronic hepatitis or liver cirrhosis has not been noted, though the difference of subtypes between patients with acute hepatitis B and asymptomatic HBsAg carriers was pointed out (Kojima et al. 1975). We recently found a significant difference of subtypes of HBsAg between asymptomatic HBsAg carriers and patients with chronic liver diseases in university students. This was confirmed by further studies in other carriers and patients visiting the hospitals. The results will be described in the present report.

Subtypes of HBsAg were studied in 20 asymptomatic HBsAg carriers and in 18 HBsAg-seropositive patients with chronic hepatitis or liver cirrhosis. Among them 19 asymptomatic carriers and 6 patients with chronic hepatitis were university students. HBsAg was determined by the reversed passive hemagglutination method (Germain et al. 1973), and subtypes of HBsAg by the passive hemagglutination inhibition method (Imai et al. 1974). Statistical significance was tested by Fischer's direct calculation method of probability.

In the male university students, 57% of the asymptomatic carriers had subtype *adw* and 43% *adr* (Table 1), while all the male patients with chronic hepatitis B had subtype *adr*. A significant difference was found between male asymptomatic carriers and male patients with chronic hepatitis B ($p=0.04$).

The combined results of university students and other subjects are shown in Table 2. Among the male asymptomatic carriers, 60% had subtype *adw* and 40% *adr*, while 8% of the seropositive male patients with chronic hepatitis or liver cirrhosis showed subtype *adw* and 92% *adr*. The difference between male asymptomatic carriers and patients with liver

TABLE 1. *Subtypes of HBsAg in university students*

Sex	Diagnosis	<i>adw</i>	<i>adr</i>
M	Asymptomatic carrier	8 (57%)*	6 (43%)*
M	Chronic hepatitis	0 (0%)*	5 (100%)*
F	Asymptomatic carrier	2 (40%)	3 (60%)
F	Chronic hepatitis	1	0
M+F	Asymptomatic carrier	10 (53%)	9 (47%)
M+F	Chronic hepatitis	1 (17%)	5 (83%)

* The difference between male asymptomatic carriers and male patients with chronic hepatitis is statistically significant ($p=0.04$).

TABLE 2. *Subtypes of HBsAg in university students and other subjects*

Sex	Diagnosis	<i>adw</i>	<i>adr</i>
M	Asymptomatic carrier	9 (60%)	6 (40%)
M	Chronic hepatitis or cirrhosis	1 (8%)*	11 (92%)*
F	Asymptomatic carrier	2 (40%)	3 (60%)
F	Chronic hepatitis or cirrhosis	4 (67%)	2 (33%)
M+F	Asymptomatic carrier	11 (55%)	9 (45%)
M+F	Chronic hepatitis or cirrhosis	5 (28%)	13 (72%)

* The differences from male asymptomatic carriers and from female patients with chronic hepatitis or liver cirrhosis are both statistically significant ($p=0.007$ and $p=0.02$).

diseases was statistically significant ($p=0.007$). In females such a tendency was not observed. In the female patients with chronic liver diseases, 67% had subtype *adw* and 33% *adr*, showing a significant difference from the male patients with chronic liver diseases ($p=0.02$).

In Japan south to north gradient of *r* and reciprocal gradient of *w* in asymptomatic carriers was noted (Yamashita et al. 1975). Geographical difference of subtypes of HBsAg in chronic liver diseases, however, was not evident; the *adw*: *adr* ratio in asymptomatic carriers in Gifu, Tokyo, and Niigata was 1:9, 3:7, and 4:6, respectively, while the ratio in chronic hepatitis and liver cirrhosis in these areas was all about 2:8 (Kojima et al. 1975; Oda et al. 1975). It may not be fortuitous that significant difference of subtypes of HBsAg between male asymptomatic carriers and male patients with chronic liver diseases was shown in the northern city, Sendai.

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References

- 1) Germain, K.H., Sturdivant, S.K. & Rightsel, W.A. (1973) Evaluation of a red cell agglutination test for detection of Australia antigen (HBsAg). *Appl. Microbiol.*, **25**, 524-527.
- 2) Imai, M., Yamashita, Y., Miyakawa, Y. & Mayumi, M. (1974) Hemagglutination inhibition assay of the common determinants and subspecificities of Australia antigen. *Immunology*, **27**, 871-878.
- 3) Kojima, M., Kametani, M. & Fukuta, N. (1975) Subtypes of hepatitis B surface antigen and epidemiology. *Sogo Rinsho*, **24**, 2346-2453. (Japanese)
- 4) Oda, T., Suzuki, H. & Mitamura, K. (1975) Clinical study of Australia antigen. *J. Jap. med. Ass.*, **73**, 182-190. (Japanese)
- 5) Suzuki, H. (1977) Hepatitis B. *Rinsho Seijinbyo*, **7**, 13-19. (Japanese)
- 6) Yamashita, Y., Kurashina, S., Miyakawa, Y. & Mayumi, M. (1975) South-to-north gradient in distribution of the determinant of hepatitis B surface antigen in Japan. *J. Infect. Dis.*, **131**, 567-569.