CORRESPONDENCE

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Risk of hepatitis B virus-related hepatocellular carcinoma development is much higher in Koreans than in Taiwanese

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Hepatocellular carcinoma (HCC) caused by chronic hepatitis B virus (HBV) infection is a major health problem in Asian people [1]. We herein report an interesting finding that large difference exists even between two Asian countries in terms of HBV-related HCC occurrence. We found that incidence of HBV-related HCCs is more than twice in Koreans than in Taiwanese in spite of similar risk factors between two countries.

Using data from large-scale surveys of HCC incidence and viral hepatitis prevalence, we calculated the incidence of HBV-related HCC in the two countries [2]. In total, 798,125 Korean people (40 to 79 years of age) were hepatitis B surface antigen (HBsAg)-positive in 2005, and 10,456 HCCs were recorded in the same age group. Among them, 7,560 (72.3%) were HBV-related HCCs. The annual incidence of HCC was 947 per 100,000 persons with HBV infection (Fig. 1). This was equivalent to one HCC occurrence for every 106 persons with HBV infection per year. From 2005 to 2011, the annual incidence of HBV-related HCC in Korea did not change; the average incidence was 906 per 100,000 persons with HBV infection (0.91%/year). In Taiwan, 1,096,944 persons (40 to 79 years of age) were HBsAg-positive in 2002, and 6,390 new HCC cases were reported in the same age group. Among them, 4,147 (64.9%) were HBV-related HCCs. The annual incidence was 378 per 100,000 persons with HBV infection in Taiwan (Supplementary Table 1) [3-15].

Because different demographic characteristics and HCC detection rate might affect incidence of HBV-related HCC, we confined our analysis to young age group (40 to 49 years). Not only incidence but mortality from HBV-related HCC was investigated. The incidence was 495 and 155 per 100,000 persons with HBV infection in Korea and Taiwan, respectively. The mortality was also largely different, 434 and 136 per 100,000 persons with HBV infection in Korea and Taiwan, respectively.

This marked difference in HCC incidence prompted us to conduct an identical analysis among hepatitis C virus (HCV)-positive patients (Supplementary Table 2) [2,10-12,14,16-18]. Population data, prevalence of chronic hepatitis C, and annual number of HCV-related HCC cases (40 to 79 years of age) were acquired from publicly available data. Interestingly, the annual incidence of HCV-related HCC was similar in the two countries: 570 and 519 per 100,000 persons with HCV infection in Korea and Taiwan, respectively (Fig. 1). Based on this finding, we postulate that viral factors, rather than host or environ-

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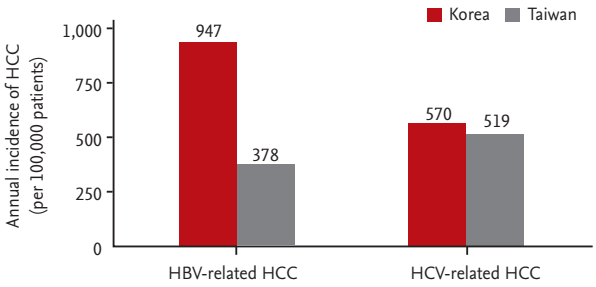

Figure 1. Annual incidence of hepatocellular carcinoma (HCC) in patients with chronic viral hepatitis B or C. Data were obtained from national cancer reports and large-scale prevalence studies of viral hepatitis in Korea and Taiwan. The annual incidence of hepatitis B virus (HBV) (or hepatitis C virus [HCV]) -related HCC per 100,000 persons with HBV (or HCV) infection is shown.

mental factors, may play a major role in the marked difference in development of HBV-related HCC between the two countries.

The majority of Asians infected with HBV have genotype B or C virus, which is associated with vertical transmission. Korea is a racially homogenous country in which all HBVs are genotype C, whereas genotype B is the most prevalent in Taiwan [19]. Genotype C HBV is associated with higher serum viral load, delayed hepatitis B e antigen seroconversion, and a higher risk of disease progression to liver cirrhosis or HCC than those of the other genotypes [20,21]. Although unknown host or environmental factors may exist, viral factors, particularly genotype C virus, might have a critical role in HCC development among Korean patients.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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Supplementary Table 1. Annual incidence of HBV-related HCC among HBsAg positive persons in Korea and Taiwan

Korea	Year	2005	2007	2008	2009	2010	2011
	Population (40–79 years) [3-8]	18,969,207	20,134,718	20,773,695	21,436,385	22,071,724	22,706,738
	HBsAg prevalence, % [9]	4.21	4.58	4.31	3.88	3.68	4.20
	HBV(+) population	798,125	922,191	896,258	831,270	812,725	952,891
	Liver cancer [3-8]	13,509	13,454	14,117	14,387	14,279	14,687
	HCC [10]	10,456	10,413	10,927	11,136	11,052	11,368
	HBV-related HCC [11]	7,560	7,529	7,900	8,051	7,991	8,219
	Incidence of HBV-related HCC (per 100,000 HBsAg positive persons)	947.2	816.4	881.4	968.5	983.2	862.5
Taiwan	Year	2002					
	Population (40–79 years) [12]	8,265,666					
	HBsAg prevalence, % [13]	13.27					
	HBV(+) population	1,096,944					
	Liver cancer [14]	7,630					
	HCC [14]	6,390					
	HBV-related HCC [15]	4,147					
	Incidence of HBV-related HCC (per 100,000 HBsAg positive persons)	378.1					

HBV, hepatitis B virus; HCC, hepatocellular carcinoma; HBsAg, hepatitis B surface antigen.

Supplementary Table 2. Annual incidence of HCV-related HCC among HCV-positive persons in Korea and Taiwan

Korea	Year	2012
	Population (40–79 years) [16]	23,313,951
	Anti-HCV(+) prevalence, % [17]	0.94
	HCV(+) population	220,298
	Liver cancer [16]	14,485
	HCC [10]	11,211
	HCV-related HCC [11]	1,256
	Incidence of HCV-related HCC (per 100,000 HCV positive persons)	570.0
Taiwan	Year	2002
	Population (40–79 years) [12]	8,265,666
	Anti-HCV(+) prevalence, % [18]	4.18
	HCV(+) population	345,755
	Liver cancer [14]	7,630
	HCC [14]	6,390
	HCV-related HCC [2]	1,796
	Incidence of HCV-related HCC (per 100,000 HCV positive persons)	519.3

HCV, hepatitis C virus; HCC, hepatocellular carcinoma.

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