



Association of Hepatitis B Virus Infection and Psoriasis

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Dear Editor:

Psoriasis is a chronic inflammatory disease involving complex abnormalities of epithelial growth and differentiation related to biochemical and immune responses¹. Based on recent studies evaluating the relationships between psoriasis and systemic diseases, such as cardiovascular disease and metabolic syndrome, psoriasis has been accepted as a systemic inflammatory disease². Moreover, since use of therapeutic drugs, such as T-cell-related immunosuppressants and biologics, interest in the link between psoriasis and infectious diseases has increased. Among infectious diseases, hepatitis B virus (HBV) is the cause of chronic liver disease in 60% to 70% of cases in Korea³. HBV is an important cause of hepatic cancer. As both psoriasis and viral hepatitis share the common characteristics of chronic inflammation and immune response, it has been hypothesized that HBV may trigger or aggravate psoriasis.

We analyzed prevalence of HBV infection and psoriasis and the relationship between them by patients who visited the Department of Dermatology at the National Medical Center in South Korea from September 2012 to March 2015. This study was approved by the National Medical Center Institutional Review Board (IRB no. H-1608-069-007). We evaluated the laboratory results of patients with psoriasis (psoriasis group) or other dermatologic disease (control group). Data on age, sex, and diagnosis was provided by the hospital's computer database. Patients with established diagnosis of HBV or positive HBV surface antigen (HBsAg) were regarded as HBV+. For patients with

psoriasis, data on age at onset, family history of psoriasis, and severity of psoriasis according to the Physicians' Global Assessment at the first visit were obtained by a manual search of each medical record. Statistical analyses were performed using IBM SPSS Statistics ver. 22.0 (IBM Co., Armonk, NY, USA).

A total of 224 patients (125 men, 99 women) with psoriasis and 345 (203 men, 142 women) with other dermatologic disease were evaluated for HBV infection. The 4 patients of 244 psoriasis patients was diagnosis on HBV and other 4 patients of psoriasis group were positive of HBsAg test. Therefore, HBV infection of psoriasis group was 8 patients. The prevalence of HBV infection in the psoriasis and control groups was 3.6% (8/224) and 2.0% (7/345), respectively. Prevalence was slightly higher in the psoriasis group than in the control group, but the difference was not significant ($p=0.262$).

Among the 224 patients with psoriasis, there was a male predominance. However, there was no significant difference in prevalence of HBV infection between men (7/125, 5.6%) and women (1/99, 1.0%) ($p=0.080$). After patients

Table 1. Comparison of patients with psoriasis with or without hepatitis B virus (HBV) infection

| Variable | HBV+ (n=8) | HBV- (n=216) | p -value |
|-----------------------------|------------|--------------|------------|
| Sex | | | 0.080 |
| Male | 7 (5.6) | 118 (94.4) | |
| Female | 1 (1.0) | 98 (99.0) | |
| Age at onset (yr) | | | 0.713 |
| <40 | 6 (4.3) | 135 (95.7) | |
| ≥40 | 2 (2.4) | 81 (97.6) | |
| Family history of psoriasis | | | 0.663 |
| + | 2 (4.4) | 43 (95.6) | |
| - | 6 (3.4) | 173 (96.6) | |
| Severity of psoriasis | | | 0.182 |
| Mild | 3 (7.0) | 40 (93.0) | |
| Moderate to severe | 5 (2.8) | 176 (97.2) | |

Values are presented as number (%).

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Table 2. Association between psoriasis and hepatitis B virus infection among international studies

| Study | Author | | | | |
|--------------------|----------------------------|--------------------------|---------------------------|---------------------------|--------------------------------|
| | Kanada et al. ⁸ | Tsai et al. ⁵ | Cohen et al. ⁹ | Ahmad et al. ⁷ | Guadagnino et al. ⁴ |
| Country | USA | Taiwan | Israel | India | Italy |
| Publication (year) | 2013 | 2011 | 2010 | 2005 | 1982 |
| No. of patients | 162 | 51,800 | 12,502 | 50 | 81 |
| Association | – | + | – | – | + |

with psoriasis were stratified by age (<40 or ≥40 years), younger patients showed higher prevalence of HBV infection than older patients did. The difference was not significant ($p=0.713$). Patients with psoriasis were stratified by severity of psoriasis. Patients with mild psoriasis (3/43, 7.0%) showed higher prevalence of HBV infection than those with moderate to severe psoriasis (5/181, 2.8%). The association between HBV infection and severity of psoriasis was not significant ($p=0.182$) (Table 1).

Some previous studies have implied that patients with psoriasis have higher prevalence of HBV infection than the general population. For example, Guadagnino et al.⁴ showed higher risk of HBV infection in patients with chronic psoriasis or eczema in Naples, Italy (9.8% vs. 4.3%). Prevalence of HBV was 4% to 18% in the general Italian population, indicating an HBV-rich environment. Therefore, they considered that the virus could easily penetrate through microlesions in skin affected by psoriasis⁴. In another report in Taiwan, patients with psoriasis were reported to have high prevalence of both hepatitis B and C⁵. Because hepatitis B and C are prevalent in the overall population of Taiwan⁶, patients with psoriasis should be tested for hepatitis, as systemic treatment may increase the detection rate of hepatitis and explain the association between psoriasis and high prevalence of hepatitis. On the other hand, recent studies in India⁷, the United States⁸, and Israel⁹ revealed that psoriasis was not significantly associated with increased HBV infection (Table 2)^{4,5,7-9}. Therefore, susceptibility to HBV infection may be different among patients with varying severity of psoriasis.

This study analyzed prevalence of HBV infection in Korean patients with psoriasis or other dermatologic disease. However, there was no significant difference in the prevalence of HBV infection between the control group and the psoriasis group (odds ratio, 1.788; 95% confidence interval, 0.639 ~ 5.003; $p=0.262$). The prevalence of HBV infection was relatively low in both groups. This result was likely influenced by the National Immunization Program initiated in 1995 and the Hepatitis B Perinatal Transmission Prevention Program initiated in 2002 in Korea³. Although the rate of HBV infection in Korea was 6.6% to

8.6% in the 1980s¹⁰, the rate decreased to 2.98% in 2010 after implementation of these programs^{3,10}.

We assessed several factors in psoriasis patients with or without HBV infection. However, sex, age at onset, family history of psoriasis, and severity of psoriasis showed no association with prevalence of HBV infection. We speculated that patients with psoriasis are susceptible to HBV or that HBV aggravates psoriasis, because both psoriasis and HBV are associated with chronic inflammation. Nonetheless, psoriasis and HBV infection showed no significant association.

This study has some limitations. First, the number of patients with concurrent diagnoses of psoriasis and HBV infection was relatively small. In addition, because the HBV in all patients was inactive, we could not compare severity of psoriasis before and after treatment for HBV infection. In psoriasis treatment, viral epidemiology will become more important as use of immunosuppressant agents and biologics increases. Thus, in Korea, which has a high prevalence of HBV infection, large-scale multicenter studies on the association between psoriasis and HBV infection will be important for implementing psoriasis treatment strategies. In conclusion, this is the first study to investigate the epidemiologic association between psoriasis and HBV infection in Korea. This study did not find a significantly high prevalence of HBV infection in patients with psoriasis. Therefore, it appears that HBV infection is not associated with psoriasis in Korea. However, a larger population-based study may help to clarify the findings of this study.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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Tattoo Granuloma Restricted to Red Dyes

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Dear Editor:

A tattoo is as forms of visual art, which entails insertion of an ink design into the skin. Although there have been reports on allergic reactions caused by tattoos of almost every color, the most common reactions are those caused by red tattoos. Here we describe a case restricted to reactions to red portion in colored tattoos.

A 34-year-old man presented with a 4-month history of elevating plaques restricted to red tattoo portions of the tat-

too on the right thigh. These skin lesions were firm and well-demarcated. The remainder of the tattoo was unaffected (Fig. 1A). The patient had been tattooed 10 years ago without any complication since then. Recently, however, he felt itching sensation and induration confined to red-tattooed area. Histopathologic finding revealed granulomatous response with Swiss-cheese pattern and scattered exogenous tattoo pigments (Fig. 1B, C). To figure out tattoo component, biopsy specimen was analyzed via

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