Role of Smoking as a Risk Factor in East Asian Patients with Crohn's Disease

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See "Underestimation of Smoking Rates in an East Asian Population with Crohn's Disease" by Sung Wook Hwang, et al. on page 73, Vol. 11, No. 1, 2017

Although the etiology of inflammatory bowel disease (IBD) is not clearly understood, a combination of genetic, immunological, microbial, and environmental factors is thought to affect the disease.^{1,2} Currently, smoking appears to be the most closely related environmental factor for IBD. However, the effect of smoking is different for ulcerative colitis (UC) and Crohn's disease (CD). Smoking increases the risk of CD by 2-fold and is correlated with a worse trajectory, increasing the risk of surgery. After remission, smokers have a higher risk of recurrence compared with nonsmokers.^{3,4} On the contrary, smoking reduces the risk of UC and patients who are currently smoking have a milder disease course while there is also a higher frequency of flares after quitting smoking. The mechanism of how smoking causes these effects on IBD remains unclear. In one study, blood mononuclear cells of smokers with CD and UC exhibited different chemokine and cytokine responses to oxidative stress, explaining its dual role in the pathogenesis of these two diseases.⁵

However, the results of previous Asian studies imply that unlike Western populations, smoking may have a different role in development of CD in Asia.^{2,6} A recent epidemiological study in Asia-Pacific suggested that smoking was not associated with an increased risk for Asians with CD, with a similar smoking prevalence (11% and 11%) in the CD cases and matched controls.² A previous study in Korea, despite its small size, also did not show any increased risk of CD from smoking.⁶

The effects of smoking on individual patients may be the result of the interaction of genetic and various environmental factors including types of cigarettes and smoking methods.² Key genetic mutations associated with IBD in Western populations are not frequently observed in Asian IBD patients.³ The male

Asian population has a high smoking prevalence and has a significantly lower CD incidence than Western countries. These findings imply that although smoking is an important risk factor for CD, it may not be sufficient to affect the incidence of IBD.³

Another reason is that CD patients in East Asian studies have a considerably lower smoking prevalence compared to the general population. In particular, CD patients in East Asia are often younger compared to Western countries, and this may account for the lower smoking rates in patients.³ While the difference in the smoking rate based on gender is negligible in Western populations, the difference is extreme in Korea with 43.1% of men compared with only 5.7% of women. Furthermore, the rate rapidly increases from 9.2% in the adolescent group to 22.5% in the young adult group (19 to 29 years old).⁷ These trends are similar in other East Asian countries. However, it has been recently suggested that the smoking rates, especially in women and adolescents in East Asia may be underestimated. A study in Korean adult populations, the self-reported smoking rates were 44.7% and 5.9% for men and women, respectively, but the cotinine-verified smoking rates were 50.0% and 13.9%, respectively.⁸ Similarly, in a study in the Chinese adolescent population, the self-reported smoking rates were 13.6% and 5.2% for boys and girls, respectively, but the actual estimated rates using parent reporting were 18.3% and 14.2%, respectively.⁹ The Confucian culture in Asia prohibiting young people and women from smoking in public may have caused them to hide the fact, thereby yielding underestimated rates in many studies.

In this issue of *Gut and Liver*, Hwang *et al.*¹⁰ made a new attempt to re-evaluate the smoking of 1,437 Korean CD patients

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by prospectively asking them about their smoking status at the time of the diagnosis to investigate if the self-reported smoking rates in their previous study were underestimated. The importance of information on smoking history for CD was explained to the patients, and the survey was performed in the absence of the parents or spouse. Current smokers were defined as patients who had smoking experience within 6 months of CD diagnosis and had smoked at least 100 cigarettes throughout their life. After the re-evaluation, the number of current smokers at the time of diagnosis increased from 388 (27.0%) to 445 (31.0%), indicating that 12.8% of the current smokers hid their smoking status. The number of smokers who hid their smoking status at diagnosis was significantly higher in women (29.7%, 11/37) than in men (11.3%, 46/408) ($p < 0.005$), and also significantly higher in patients younger than 18 years old (56.4%, 22/39) than in patients older than 18 years old (8.6%, 35/406). Therefore, it was concluded that female and young Korean CD patients were more reluctant to share their smoking history at diagnosis.

This study showed the importance of taking accurate smoking histories in Asian CD patients. Nevertheless, because the outcomes were entirely dependent on the patients' responses, there is the possibility of recall bias. The re-interview was performed a median interval of 6 years after the initial diagnosis, and therefore the patients may not accurately remember the amount and duration of their smoking before the diagnosis. Thus, finding out if the patients intentionally hid the fact at diagnosis could further support the conclusions of this study.

Based on this study, smoking rates in young and female patients in previous East Asian CD studies may be inaccurate. Therefore, the authors proposed that the suggestion that smoking was not a risk factor for CD in East Asians should be made with caution. Although it is meaningful, there is another point to consider. Even if pediatric-onset CD adolescent patients smoke, they have a relatively shorter exposure to smoking compared to adult-onset CD patients, and other factors such as genetic makeup can have a greater effect on the etiology of the disease. Therefore, the authors' assumption still needs additional research.

Despite these limitations, this study suggests that clinicians should be cautious while evaluating social histories such as smoking in young and female patients in East Asia. In order to validate that smoking is not a risk factor in East Asian CD patients, a future large-scale epidemiological study that takes this sociocultural background into consideration is necessary.

CONFLICTS OF INTEREST

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

REFERENCES

1. Raffals LE, Chang EB. Navigating the microbial basis of inflammatory bowel diseases: seeing the light at the end of the tunnel. *Gut Liver* 2016;10:502-508.
2. Ng SC, Tang W, Leong RW, et al. Environmental risk factors in inflammatory bowel disease: a population-based case-control study in Asia-Pacific. *Gut* 2015;64:1063-1071.
3. Ng WK, Wong SH, Ng SC. Changing epidemiological trends of inflammatory bowel disease in Asia. *Intest Res* 2016;14:111-119.
4. Birrenbach T, Böcker U. Inflammatory bowel disease and smoking: a review of epidemiology, pathophysiology, and therapeutic implications. *Inflamm Bowel Dis* 2004;10:848-859.
5. Bergeron V, Grondin V, Rajca S, et al. Current smoking differentially affects blood mononuclear cells from patients with Crohn's disease and ulcerative colitis: relevance to its adverse role in the disease. *Inflamm Bowel Dis* 2012;18:1101-1111.
6. Jang JY, Kim HJ, Jung JH, et al. The role of smoking as a risk factor in inflammatory bowel diseases: single center study in Korea. *Korean J Gastroenterol* 2006;47:198-204.
7. Centers for Disease Control & Prevention. Health behaviors and chronic disease statistics in 2016 [Internet]. Cheongju: Centers for Disease Control & Prevention; c2016 [cited 2016 Oct 16]. Available from: <http://www.cdc.go.kr/CDC/contents/CdcKrContentLink.jsp?fid=60&cid=70948&ctype=8>.
8. Jung-Choi KH, Khang YH, Cho HJ. Hidden female smokers in Asia: a comparison of self-reported with cotinine-verified smoking prevalence rates in representative national data from an Asian population. *Tob Control* 2012;21:536-542.
9. Ma J, Zhu J, Li N, et al. Severe and differential underestimation of self-reported smoking prevalence in Chinese adolescents. *Int J Behav Med* 2014;21:662-666.
10. Hwang SW, Seo H, Kim GU, et al. Underestimation of smoking rates in an East Asian population with Crohn's disease. *Gut Liver* 2017;11:73-78.