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Validation of Herpes Zoster Diagnosis Code in the Electronic Medical Record: A Retrospective, Multicenter Study

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Dear Editor:

Health insurance claims or electronic databases have the strength of generalizability using large populations and are useful to easily assess epidemiological data. There have been numerous population-based studies regarding herpes zoster (HZ)[1-5]. Most previous studies have used disease code for the definition of HZ. However, definition using disease code of claim data could be inaccurate compared with the diagnosis from the medical chart. For example, Kimm et al.[6] reported that the accuracy of acute myocardial infarction diagnosis using disease code was only 71.4%. Studies regarding validation of HZ disease code for diagnosis is scarce. The reported positive predictive values (PPV) of International Classification of Diseases, 9th revision (ICD-9) code 053 for HZ ranged from 80% to 96%[7-10]. However, to our knowledge, no study regarding validation of HZ diagnosis was done in Korea. We hypothesized that definition using disease code only in Korea could be less accurate than reported ones, and operative definition using disease code and medication record could be more accurate. The aim of this study was to compare the accuracy of two definitions, definitions using disease code only and our suggested operative definition, for the diagnosis of HZ in the electronic medical records.

Study patients were drawn from five affiliated hospitals of The Catholic University of Korea. We extracted all medical records with ICD-10 B02 code (HZ) as the primary diagnosis in 2013. Both ambulatory and inpatient databases were used for patient selection. We identified 3,941 patients with B02 code. We excluded patients with primary diagnosis of HZ in 2012 to avoid attributing cases. After exclusion, 3,373 patients with B02 code remained. Among these patients, 500 (100 for each hospital) patients with B02 code were randomly selected. Each randomly selected patient was classified as a definite, possible, or false-positive case of HZ by medical record review by two dermatologists independently. Definite and possible cases of HZ were defined using the same method of Klompas et al.[7]. Postherpetic neuralgia (PHN) was defined as diagnosis made one month after the initial diagnosis of HZ. We proposed an operative definition for identifying HZ of (1) one or more primary diagnoses of HZ, and (2) prescription with oral antiviral medication for HZ (acyclovir, valacyclovir, or famciclovir) for five or more days or one or more treatments with intravenous acyclovir. The minimal duration of antiviral medication was defined to exclude cases of recurrent orofacial herpes simplex. The PPV of HZ was presented with 95% confidence intervals (CIs) for the two criteria: 1) primary diagnosis of HZ, and 2) our suggested operative definition of HZ. This study was approved by the Institutional Review Board of The Catholic University of Korea (XC16RIMI0032).

Table 1 shows the comparison of PPV for HZ between definitions using disease code only and our suggested op-

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Table 1. Comparison of PPVs for HZ between definitions using disease code only and our suggested operative definition

	Reviewed case	Definite HZ case	Possible HZ case	False-positive HZ case	PPV of definite cases	PPV of definite or possible cases
Primary diagnosis of HZ (ICD-10 B02)	500	378	53	69	75.6 (71.8～79.4)	86.2 (83.2～89.2)
Suggested operative definition of HZ	397	365	30	2	91.9 (89.3～94.6)	99.5 (98.8～100)

Values are presented as number only or odds ratio (95% confidence interval). PPVs: positive predictive values, HZ: herpes zoster, ICD-10: International Classification of Diseases, 10th revision.

erative definition. The PPV of primary diagnosis of HZ for definite or possible HZ was 86.2% (95% CI, 83.2%～89.2%). Among 500 patients, the number of patients fulfilling the suggested operative definition of HZ was 397. The PPV of operative definition of HZ for definite or possible HZ was 99.5% (95% CI, 98.8%～100%). In the group of primary HZ cases, 69 false positive cases were identified. Among false positives, 42 PHN cases were identified. Other 16 cases had been previously diagnosed with HZ, and diagnosis code of HZ was maintained. Other causes included other neurological diseases (n=4), herpes simplex (n=3), and unknown (n=4). Our suggested operative definition of HZ did not include 36 patients with definite or possible cases. Of these, 19 cases were excluded due to short duration of antiviral medication, 6 cases were not prescribed oral antiviral medication due to delayed visit, and other causes included uncertain diagnosis (n=1), poor medical condition (n=1), and unknown (n=9).

We demonstrated that the PPV of primary diagnosis of HZ for definite or possible HZ was 86.2%. This result indicates that a substantial proportion of patients in the reported population-based studies using diagnosis code for definition of HZ might not be cases of HZ. Klompas et al.[7] reported that PPV of primary diagnosis for HZ was 95% for definite or possible cases, where the same criteria were used for definition of HZ. We speculated that this difference might be due to the study population, insurance policies, or system for diagnosis code. The PPV of our suggested operative definition was 99.5%, which was much higher than that using diagnosis code only. Our suggested operative definition did not include 36 HZ cases (8.3% of definite or possible HZ cases), most commonly due to antiviral treatment shorter than 5 days. Because antiviral therapy for 7 days is recommended in immunocompetent patients with HZ, we could not exclude the possibility that some patients might have been prescribed in other hospitals. Our suggested operative definition has a possibility that HZ patients treated with symptomatic therapy without antiviral medication could not be included. The most common cause of false positivity using primary diagnosis of HZ was PHN. Since patients with PHN did not require antiviral medication, they might be excluded by our operative definition. Therefore, the PPV of our operative definition was much higher than that of primary diagnosis of HZ.

This study has two limitations. First, sensitivity, specificity, and negative predictive value were not investigated. Second, the study population was drawn from patients of referred university hospitals and did not include patients from primary care clinics.

In conclusion, this study demonstrated that our operative definition using both diagnosis code and medication history had much higher PPV for HZ than a definition using diagnosis code only. Thus, we recommend that authors of further epidemiological studies using medical claim databases in Korea had better consider adopting our suggested operative definition of HZ rather than disease code only.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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A Case of Primary Cutaneous Aggressive Epidermotropic CD8+ Cytotoxic T-Cell Lymphoma

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Dear Editor:

Primary cutaneous aggressive epidermotropic CD8+ cytotoxic T-cell lymphoma (pCAE-CD8+CTCL) is an aggressively proliferating cutaneous lymphoma expressing CD8+ cytotoxic phenotype[1].

A 61-year-old man presented with extensively diffuse erythematous plaques on the trunk, upper extremities, and face which had central necrosis with oozing and crust formation (Fig. 1). He was originally suffering from mild psoriasis treated with topical agents intermittently, but he complained that his skin problems suddenly evolved to the current pattern a year ago. He denied any previous or family history of skin cancers. Histopathologic examination

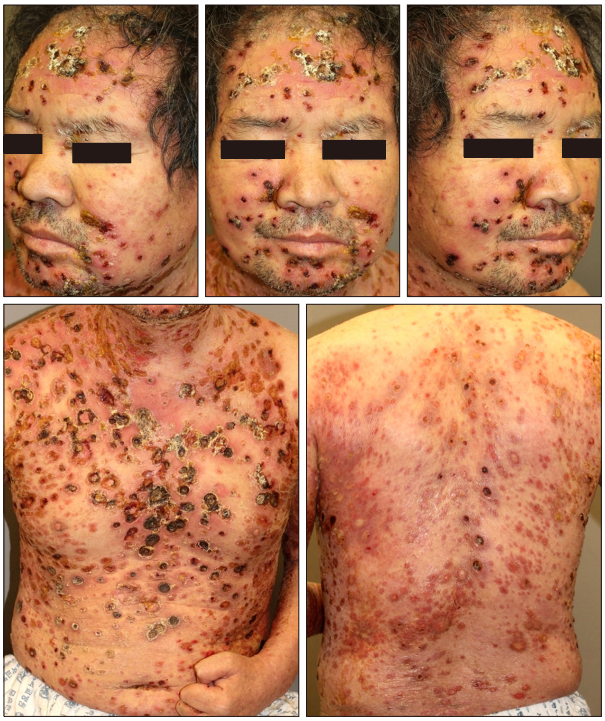

Fig. 1. Widespread eruption of erythematous plaques, and papulonodular lesions involving central ulcers on upper body and face.

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