

SUPPLEMENTARY MATERIALS

Effects of Sex, Age, and Height to Imaging-Based Metrics

Analysis of covariance (ANCOVA) tests of quantitative computed tomography (QCT) variables were performed with four exploratory variables, i.e., race, sex, height, and age (Supplementary Tables 1 and 2). The interactions between variables were not significant so that the exploratory variables were considered to be independent in ANCOVA tests. We found that QCT variables, especially structural variables, were significantly correlated with sex, age, and height. The adjusted p value for race suggests that QCT imaging variables were significantly different between Whites and Koreans. The confounding effect of sex, age, height led to perform subgrouping analyses by controlling sex, age, and height distributions.

CT Examination Protocol

The data on smoking history and intensity and chest CT of Koreans from Chonbuk National University Hospital (CNUH) were retrospectively reviewed by two thoracic radiologists (with 7 and 18 years' experience). The CT images of Whites at multicenter studies of Severe Asthma Research Program (SARP) and SubPopulations and Intermediate Outcome Measures In chronic obstructive pulmonary disease Study (SPIROMICS) supported by the National Institutes of Health were collected. One, 3, and 4 different CT scanner models and scanning protocols respectively were used by CNUH, SARP, and SPIROMICS at the same rotation times (0.5 second), peak kilovoltage (120 kVp), and inspiratory maneuver (total lung capacity), and protocol settings such as expiratory maneuvers of functional residual capacity (FRC) for CNUH and SARP, and residual volume (RV) for SPIROMICS. The protocols used under CNUH, SARP, and SPIROMICS are shown in Supplementary Table 3 (1, 2).

Comparison of Imaging Protocols between SARP and SPIROMICS

White subjects at two different multi-projects of SARP and SPIROMICS were retrospectively collected. The imaging protocols of SARP and SPIROMICS were similar (2); however, the expiratory measurements were different between the two projects: FRC for SARP, and RV for SPIROMICS. The air volume at expiration ($V_{\text{airr Exp}}$) of 43 subjects from SPIROMICS was expected to have smaller volume than that of 27 subjects from SARP; however, the mean value of $V_{\text{airr Exp}}$ for subjects of SPIROMICS was greater than that for those of SARP, without statistical difference (Supplementary Table 4). Nevertheless, this difference is not likely to have affected the analysis conducted in our study to compare features between Koreans and Whites.

References

1. Choi S, Hoffman EA, Wenzel SE, Tawhai MH, Yin Y, Castro M, et al. Registration-based assessment of regional lung function via volumetric CT images of normal subjects vs. severe asthmatics. *J Appl Physiol* 2013;115:730-742
2. Sieren JP, Newell JD Jr, Barr RG, Bleecker ER, Burnette N, Carretta EE, et al.; SPIROMICS Research Group. SPIROMICS protocol for multicenter quantitative computed tomography to phenotype the lungs. *Am J Respir Crit Care Med* 2016;194:794-806