

Clinical influences of an inhalation of volcanic ash from the massive eruption of Mt. Shinmoedake in patients with obstructive lung disease

Yasuji Arimura¹, Akihiro Sakamoto¹, Chikara Fukuyama², Arisa Sano¹, Nobuhiro Matsumoto¹,
Masamitsu Nakazato¹

¹Department of Neurology, Respiriology, Endocrinology and Metabolism, University of Miyazaki Hospital, Japan, ²Department of Respiriology, Medicalcity-Tobu Hospital, Miyazaki, Japan

E-mail: yasuji@fc.miyazaki-u.ac.jp

Background and objective:

It is controversial whether an inhalation of volcanic ash influences the control of chronic respiratory disease. We evaluated physiological effects of an inhalation of the volcanic ash in patients with obstructive lung disease, during the 2011 massive eruption of Mt. Shinmoedake, which is in the south part of the Kyushu island, Japan.

Methods:

The study was conducted as a cross-sectional analysis in adult patients with obstructive lung disease who lives in the foot area of Mt. Shinmoedake, and the far area from the volcano. All participants, who visited the enrolled medical institution on the day of the survey, filled out a self-reported questionnaire concerning about respiratory symptoms, CES-D, which measures depressive symptoms, SF-8, which measures quality of life (QOL), and patients' characteristics such as address, sex, age, smoking status, and the average daily time of outdoor activity after the eruption. Spirometry was performed after the questionnaire. The enrolled patients were classified into two groups, which are the high or low ash exposed group, according to the average time of daily outdoor activity after the eruption. Clinical or physiological parameters were compared between both groups.

Results:

One hundred-one patients (78 patients in the foot area and 23 patients in the far area) participated in this study. Forty-six patients (45.5%) experienced exacerbation of any one of the respiratory symptoms after the explosive volcanic eruption. In particular, approximately 30% of the participants complained of exacerbation of cough. No statistical differences of the respiratory symptoms were observed between the foot and far area, and the low and high exposed group. In the foot area, CES-D score was significantly higher in low exposed group than the high exposed group (mean±SD: 14.3±10.3 vs. 9.9±7.7, respectively). There were no significant differences of the summary score of SF-8 and the pulmonary function test between the high and low exposed group. Furthermore, there were no remarkable differences of all parameters between the foot and far area.

Conclusions:

The worsening respiratory symptoms after explosive volcanic eruption were observed in about half of the patients with obstructive lung disease. However, the statistically significant association between the extent of the exposure of volcanic ash and respiratory symptoms, QOL scores and the results of the pulmonary function test was not clear.