

Volatile Organic Compound in Exhaled Breath of Idiopathic Pulmonary Fibrosis using Ion Mobility Spectrometer

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Background:

It is known that a characteristic volatile organic compound (VOC) exists in exhaled breath of the patients with lung cancer. Analysis of VOC in the exhaled breath has been reported by gas chromatography or multi-capillary column/ion mobility spectrometer (MCC/IMS). Since the measurement of the VOC using MCC/IMS is the noninvasive test, we can analyze VOC even if the patients have limited pulmonary function. In respiratory diseases, it has been reported that there is a peak of VOC peculiar to the diseases such as sarcoidosis and COPD, however, there is no report of idiopathic pulmonary fibrosis (IPF).

Aim:

In order to seek the peak of VOC which is characteristic in idiopathic pulmonary fibrosis, we compare the difference between the patients of IPF and the healthy subjects by measuring the VOC included in the exhaled breath using MCC/IMS.

Method:

We measured VOC in the exhaled breath of 40 IPF patients in our hospital and 55 healthy subjects by using MCC/IMS.

Results:

We detected 85 points for the peaks of VOC from the both groups. Comparing these peaks, significant difference of the peak intensity was provided in five points. The five peaks were shown at peak (p)2, p5, p10, p18 and p67, which may indicate p-Cymol, 3-Hydroxy-2-Butanon, Isopren, Ethylbenzol, Butanal, respectively. These peaks were novel as the disease marker, except Isopren which is analyzed as the other disease marker. There was a positive correlation between p2 and KL-6, and negative correlations between p2 and VC, p5 and PaO₂, p18 and DLCO/VA.

Conclusions:

There were five peaks that was characteristic in IPF. It was considered that measurement of VOC using MCC/IMS might be applied in the diagnosis of IPF.