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Diagnostic Value of Exhaled Breath Analysis in Esophageal Cancer
(呼気分析を用いた食道癌スクリーニングの有用性)

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Abstract

Esophageal cancer is an increasingly common cancer with a poor prognosis. At present, diagnosis of esophageal cancer very often happens late in the course of the disease since inexpensive, non-invasive and sufficiently sensitive and specific screening methods are not available. An early non-invasive diagnosis of esophageal cancer would improve prognosis and enlarge treatment options. Analysis of exhaled breath would be an ideal diagnostic method, since it is non-invasive and totally painless.

Patients suffering from esophageal cancer at different stages and under treatment with different regimens (median age 66.0 years and an age range of 40-83 years) were recruited. We also collected samples from healthy volunteers. Exhaled breath samples were collected in Tedlar Gas Sampling bags (Sigma-Aldrich Japan), and analyzed by gas chromatography mass spectrometry (GC-MS). Before collection of breath, all bags were thoroughly cleaned to remove any residual contaminants by flushing with nitrogen gas.

There were differences in the breath volatile organic compounds (VOCs) in patients with esophageal squamous cell carcinoma and healthy controls. It was possible to distinguish between the two groups the results of principal component analysis (PCA) plots.

Exhaled breath analysis is expected to become a future non-invasive esophageal cancer screening method. We will continue to consider increasing the number of samples and evaluate compounds released from different cancer stage.