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MO11 | Screening and Epidemiology

MO11.02: Validation of electronic nose exhaled breath VOC profile in discriminating between subjects with early stage lung cancer and healthy ever smokers.

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Background:

Early diagnosis of lung cancer is associated with a better survival. The measurement of volatile organic compounds (VOCs) in exhaled breath using an electronic nose may prove to be a novel, effective and simple technique for screening and diagnosing lung cancer. The aim was to test the validity of the VOC profile in discriminating subjects with early stage lung cancer (I and II) (ESLC) from healthy ever smokers (HS).

Methods:

243 subjects: 54 ESLC and 189 HS provided a breath sample after tidally breathing through an inspiratory port filter for 5 minutes. It was analysed using a 32 sensor Cyranose 320 (Smiths Detection). Subjects were divided into training (n=159) and independent test set (n=84) groups. Canonical discrimination analyses were performed to determine significance of difference between subject groups and calculate cross validated accuracy (CVV) of the groups using leave one out classification method. Area under the curve (AUC) of Receiver Operating Characteristic Curves were also determined (SPSS V17.0).

Results:

Validation of the training VOC profile model using an independent test group showed 79% accuracy (p=0.001) in distinguishing ESLC (n=20) from HS (n=64). (AUC 0.933). There was no significant difference in age, lung function and smoking history between the training and test groups.

Conclusion:

Exhaled breath VOC profile model to discriminate between ESLC subjects and HS was validated in an independent group with a high accuracy. A clinically high sensitivity of the VOC profile model to discriminate between ESLC and HS can be achieved by selecting an appropriate cut point. The cyranose has potential to be a clinically useful diagnostic and screening tool for early stage lung cancer.