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Title: Plasma DNA concentration and integrity measurement for NSCLC diagnostics and radical therapy effectiveness monitoring

Dr. Adam 8955 Szpechcinski szpechu@gmail.com [1], Prof. Joanna 8963 Chorostowska-Wynimko j.chorostowska@igichp.edu.pl MD [1], Dr. Wlodzimierz 8964 Kupis w.kupis@igichp.edu.pl MD [2], Dr. Krystyna 8966 Maszkowska-Kopij krystynakopij@gmail.com MD [3], Dr. Jolanta 8970 Zaleska j.zaleska@igichp.edu.pl MD [4], Dr. Elzbieta 8976 Radzikowska e.radzikowska@igichp.edu.pl MD [4], Dr. Elzbieta 8983 Puscinska e.puscinska@igichp.edu.pl MD [5], Prof. Pawel 8986 Sliwinski p.sliwinski@igichp.edu.pl MD [6], Prof. Tadeusz 8988 Orlowski t.orlowski@igichp.edu.pl MD [2] and Prof. Kazimierz 8989 Roszkowski-Sliz k.roszkowski@igichp.edu.pl MD [4]. [1] Laboratory of Molecular Diagnostics and Immunology, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland ; [2] Department of Thoracic Surgery, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland ; [3] Outpatient Clinic, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland ; [4] Department of Lung Diseases, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland ; [5] Department of Lung Diseases, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland and [6] Department of Diagnosis and Treatment of Respiratory Failure, National Institute of Tuberculosis and Lung Diseases, Warsaw, Poland .

Body: Plasma DNA concentration and integrity index (DII) were measured by real-time PCR in 60 NSCLC patients (stage I-IIIA), 100 patients with chronic respiratory inflammation (COPD, sarcoidosis, asthma) and control groups comprising 10 orthopedic patients and 40 healthy volunteers. NSCLC patients (8.0 ng/ml) presented significantly higher plasma DNA levels than patients with chronic respiratory inflammation (3.4 ng/ml), orthopedic patients (3.0 ng/ml) and healthy controls (2.3 ng/ml; $p<0.0000$). The cut-off point of >2.8 ng/ml provided 90% sensitivity and 80.5% specificity in discriminating NSCLC from healthy individuals (AUC=0.90), while 56% specificity and 90% sensitivity in distinguishing NSCLC from any non-NSCLC subjects (AUC=0.80; $p<0.0001$). The plasma DII was significantly higher in resectable NSCLC (3.1) and chronic respiratory inflammation (3.7) than healthy controls (1.0; $p=0.0000$). Resected NSCLC (68.7 ng/ml, $p<0.0000$) and orthopedic patients (28.4 ng/ml, $p<0.0015$) presented comparable plasma DNA dynamics after the surgery. During 3-6 month follow-up plasma DNA level were significantly reduced in relapse-free NSCLC patients (2.8 ng/ml), while in relapsed subjects were higher than at baseline. The plasma DNA quantification, though insufficient for routine NSCLC detection, was still superior to diagnostic accuracy of conventional serological markers. Significant differences in DII values were associated with up-regulation of apoptosis and/or necrosis. Increased post-surgical plasma DNA concentration was due to the tissue trauma but not to the malignancy. Long-term post-operative plasma DNA follow-up might prove promising in monitoring of radical NSCLC therapy.