Spectropathology of adrenal gland – is this possible?

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The adrenal glands are paired, small endocrine organs located in the retroperitoneum on the kidney surface. They consist of cortex and medulla which differ in their development and function. Nowadays, when the image diagnostic methods develop rapidly, and they are easy accessible, the number of detected adrenal gland neoplastic lesions constantly increase. The chirurgical intervention might be done due to oncological (when the imaging examinations suggest the neoplastic lesion) or endocrinological (when the hormonal activity of tumor was confirmed) indications [1]. Although imaging and hormonal studies give a basic knowledge of the tumor nature, the final diagnosis after adrenalecetomy is based on the histopathological examination. Classification of adrenal tumors due to their potential malice is based on multivariate evaluation systems based on morphological, clinical and biochemical features, as well as on the evaluation of the tumor proliferative activity using Ki-67. Nevertheless none of the proposed methods for the differentiation between the benign and malignant tumors is not ideal and fully objective. Therefore it is reasonable to undertake research aimed at finding the complementary methods which could be helpful in differentiating the pathological alterations within the adrenals. The literature reviews shows that it is possible to support diagnosis by comparing the composition of biomolecular and elemental of healthy and pathologically altered tissues. Nowadays the Fourier Transformed Infrared spectroscopy is regarded as a promising complementary diagnostic method [2].

The presented studies are the continuation of research towards the possibility of using FTIR spectroscopy for the biomolecular characterization of the adrenal gland. The preliminary studies have been done for archival, fresh-frozen tissue samples. The results showed the clear difference between the biomolecular pattern for the lesion derived from adrenal cortex and adrenal medulla as well as between malignant and benign adrenal cortex lesion.

The next step of the investigations is the attempt to use formalin fixed and paraffin embedded (FFPE) tissue samples which constitute a valuable source of clinical material for retrospective studies [3]. It is particularly important in case of studies of the rare samples as it is in case of malignant lesion of adrenal gland. The aim of presented study is the answer of two questions. First – is it possible to use deparaffinised adrenal samples for FTIR measurements, second – is it possible to differentiate the pathological alterations on the basis of obtained results.

The studies were carried out at the Faculty of Physics and Applied Computer Science at the AGH University of Science and Technology in Krakow in co-operation with the Department of Pathomorphology, Collegium Medicum, Jagiellonian University in Krakow.

Keywords: FTIR spectroscopy; adrenal gland; adrenal cortical carcinoma; adrenal cortical adenoma; FFPE samples

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References