“The use of PET/MRI hybrid imaging in complex diagnostic-clinical assessment of patients diagnosed with pulmonary arterial hypertension”

In our pilot study (2016-2017), we performed PET/MRI hybrid scans in twenty-one patients with pulmonary arterial hypertension (PAH) and confirmed that impaired right ventricle (RV) function, assessed in magnetic resonance imaging (MRI) and right heart catheterization, is in a strong relationship with increased myocytes’ glucose uptake visualized by positron emission tomography (PET).

The aim of the study is to determine the role of PET/MRI hybrid imaging in diagnostic and therapeutic processes in patients with pulmonary arterial hypertension. Ongoing PAH-targeted treatment and disease progression may have an impact on cardiomyocytes’ metabolic changes and be reflected in PET/MRI parameters.

Within a period of the next years we plan to conduct PET/MRI scans in patients enrolled to the initial study (30-months after the first scans) and to relate PET/MRI results not only to baseline results but also to clinical course of the disease presented in standard diagnostic, laboratory and functional tests usually performed during routine PAH patients’ hospitalizations e.g. to echocardiography parameters, cardiopulmonary test, 6-min walk test distance, blood tests results.

With a use of PET-MRI hybrid system we will analyze changes in glucose metabolism (standard uptake value of right and left ventricles) and MRI parameters. We will focus on patients who had PAH exacerbation during follow-up period and compare these results to stable patients. We will also compare PET/MRI results in patients without specific therapy (during first PET/MRI scans) to results of patients previously receiving PAH therapy.

Basing on our results of pilot study, more advanced state of disease was associated with increased glucose metabolism in PET. PET/MRI hybrid could provide useful information about right ventricle hemodynamic and metabolic function in patients with pulmonary arterial hypertension, however its role in diagnostic or prognostic assessment requires further investigations. Better knowledge about significance of cardiac metabolism and its alterations may be an important step in developing potential therapies based on metabolic modulations as well as prognostic values of several PET/MRI parameters might identify the group of patients that need early escalation of therapy or even an earlier qualification to lung transplant.