

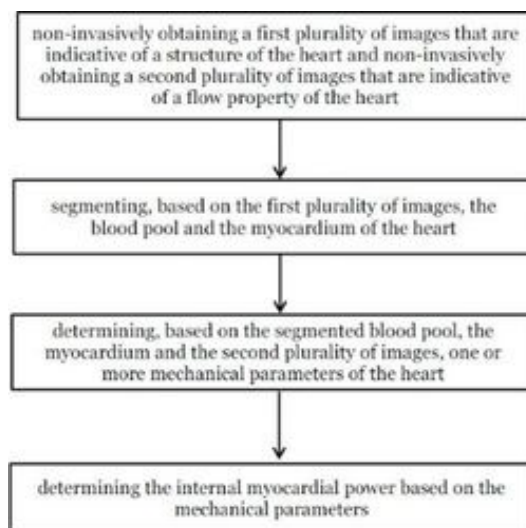
## Technology Offer

# Non-invasive measurement of myocardial power

Reference Number 32-00056

### Challenge

In heart disease pressure-volume overload conditions trigger cardiac remodeling which can lead to hypertrophy, heart failure and arrhythmias with risk for sudden cardiac death. However, there is large variability how patients deal with overload. Furthermore, neither the onset of clinical symptoms nor the degree of hypertrophy (chamber size, wall thickness) is directly related to the degree of external load on the heart. Therefore, energetic approaches for evaluating the actual myocardial performance are becoming increasingly of interest. In the following, an innovative measurement and evaluation method of the internal myocardial power and heart efficiencies are presented to support the early diagnosis and treatment of heart disease:



Measurement and determination of myocardial power and efficiency.

### Technology

The non-invasive measurement and determination of the internal myocardial power is based on the evaluation of MR images of the heart anatomy and blood flow, including mechanical parameters of the heart. The internal myocardial power (IMP) determined by this proprietary technology is based on a volume of the myocardial wall volume  $V_{wall}$ , a wall stress  $s_{wall}$  and a contraction time  $t_{cs}$  of the ventricle by the equation:  $IMP = (V_{wall} \times s_{wall}) \div t_{cs}$ . Based on the IMP the external myocardial efficiency and the circulatory efficiency can be computed, so that with this new tool and dataset the diagnosis and treatment of heart diseases are supported in an early stage.

### Commercial Opportunity

The patent protected technology is available for in-licensing. Further clinical validation can be realized in cooperation with an experienced university clinic in Germany.

### Development Status

The technology has been clinically evaluated based on 80 patient data sets.

### Patent Situation

A priority claiming European patent application has been filed in February 2018, followed by a PCT application within the priority year, see WO2019162461.

### Further Reading

Sci Rep. 2019 Nov 11;9(1):16407. doi: 10.1038/s41598-019-52909-9.

Surrogates for myocardial power and power efficiency in patients with aortic valve disease.

Lee CB, Goubergrits L, Fernandes JF, Nordmeyer S, Knosalla C, Berger F, Falk V, Kuehne T, Kelm M.