Evaluation of three dimensional segmental myocardial motion using cardiac magnetic resonance

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Background: Cardiovascular disease is one of the leading causes of morbidity and mortality worldwide. Assessment of global and regional cardiac wall motion represents an important part of the evaluation of cardiac disease and ventricular function. The study aims to provide a brief overview of cardiovascular magnetic resonance techniques used for quantification of global and regional myocardial wall motion.
Content: Quantification of myocardial wall motion using various parameters such as radial, circumferential and longitudinal velocities, strain and strain rate, torsion and torsion rate demonstrated a high sensitivity for revealing even subtle functional alterations in myocardial wall motion and holds great potential for detecting a variety of cardiac diseases in their early stage. The presentation discusses commonly used techniques for this purpose such as myocardial tagging by magnetization saturation, strain encoded (SENC) imaging, phase-contrast velocity encoding (VENC) or tissue phase mapping, displacement-encoding with stimulated echoes (DENSE) and 3D cine DENSE tissue tracking methods, etc. The underlying principles of each technique, main advantages and disadvantages as well as their potential clinical applications are also discussed.
Conclusions: Recent advances in cardiovascular magnetic resonance have allowed the development of a variety of techniques for accurate quantification of global and regional myocardial wall motion that can facilitate the diagnosis and management of cardiac diseases.
Key words: cardiovascular magnetic resonance, displacement-encoding with stimulated echoes (DENSE), MR tissue tagging, phase-contrast velocity encoding (VENC), tissue phase mapping, strain encoded (SENC) imaging.

Cardiac remodeling and correlation between anthropometric parameters and epicardial adipose tissue in children with metabolic syndrome

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Background: Epicardial adipose tissue (EAT) is an active endocrine organ located at the surface of the heart and playing an important role in the development and progression of cardiovascular pathology.
Material and methods: The study included a group of 22 children with metabolic syndrome (MS) and a group of 38 children with pre-MS. The diagnosis of MS was established according to the International Diabetes Federation (IDF) consensus definition of metabolic syndrome in children and adolescents (IDF, 2007). Anthropometric parameters and echocardiographic results were studied in detail and correlated. The study was approved by the Scientific Research Ethics Committee. An informed consent was obtained for all participants included in the study.
Results: EAT thickness measured by echocardiography was 5,73±1,53mm in MS *vs* 3,87±1,25mm in pre-MS ($p < 0,05$). Furthermore, EAT thickness demonstrated a strong correlation with abdominal index, abdominal-gluteal index, body mass index, left ventricular mass index, left ventricular hypertrophy and abnormal geometric changes of the left ventricle related to ventricular remodeling. At the same time, EAT thickness showed no distinct correlation with abdominal circumference, gluteal circumference and left ventricular mass in both groups.
Conclusions: Epicardial adipose tissue represents an indirect, safe, accessible marker of visceral adiposity assessment. The study results also demonstrate a direct correlation between increased epicardial adipose tissue and abnormal left ventricular parameters as well as ventricular remodeling.
Key words: children, metabolic syndrome, epicardial adipose tissue, cardiac remodeling.