Hochschulbibliographie

Dokumenttyp: journal article

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Titel des Beitrags: MR-based assessment of body fat distribution and characteristics.

Abstract: The assessment of body fat distribution and characteristics using magnetic resonance (MR) methods has recently gained significant attention as it further extends our pathophysiological understanding of diseases including obesity, metabolic syndrome, or type 2 diabetes mellitus, and allows more detailed insights into treatment response and effects of lifestyle interventions. Therefore, the purpose of this study was to review the current literature on MR-based assessment of body fat distribution and characteristics. PubMed search was performed to identify relevant studies on the assessment of body fat distribution and characteristics using MR methods. T1-, T2-weighted MR Imaging (MRI), Magnetic Resonance Spectroscopy (MRS), and chemical shift-encoding based water-fat MRI have been successfully used for the assessment of body fat distribution and characteristics. The relationship of insulin resistance and serum lipids with abdominal adipose tissue (i.e. subcutaneous and visceral adipose tissue), liver, muscle, and bone marrow fat content have been extensively investigated and may help to understand the underlying pathophysiological mechanisms and the multifaceted obese phenotype. MR methods have also been used to monitor changes of body fat distribution and characteristics after interventions (e.g. diet or physical activity) and revealed distinct, adipose
tissue-specific properties. Lastly, chemical shift-encoding based water-fat MRI can detect brown adipose tissue which is currently the focus of intense research as a potential treatment target for obesity. In conclusion, MR methods reliably allow the assessment of body fat distribution and characteristics. Irrespective of the promising findings based on these MR methods the clinical usefulness remains to be established.