Purpose/Introduction:
In the past decades, the number of people with obesity and type 2 diabetes mellitus increased enormously. It is expected that the prevalence of obesity and type 2 diabetes mellitus will reach pandemic proportions in the next decade. Recently, the concept of the ‘metabolic syndrome’ was introduced. The two major underlying risk factors for the metabolic syndrome are obesity and insulin resistance. Exacerbating factors are physical inactivity, advancing age, and endocrine and genetic factors. The spectrum of the metabolic syndrome ranges from obesity with borderline risk factors to type 2 diabetes with cardiovascular complications. Imaging of the metabolic syndrome is an emerging clinical approach for comprehensive risk assessment.

Subjects and Methods:
In the overview lecture, an overview will be given of imaging modalities for non-invasive evaluation of the metabolic syndrome. Techniques that will be discussed are MR imaging, MR spectroscopy and CT.

Results:
A patient specific risk assessment for the metabolic syndrome may be possible based on the evaluation of the patient’s adipose tissue. It has been proven that regional fat distribution is more important for understanding the pathogenesis of obesity related disease than merely studying total body adipose tissue. Therefore, a non-invasive non-ionizing methodology is needed for assessment of fat distribution in the whole body. MR imaging and MR spectroscopy techniques seem ideal candidates for evaluation of total body fat distribution.

Discussion/Conclusion:
Total body fat distribution may also be used to determine if obese subjects are at increased risk for developing type 2 diabetes. In this situation, more intensive lifestyle intervention can be advised and monitored. Furthermore, fat distribution patterns in patients who already developed type 2 diabetes can potentially be used to identify patients who might benefit from extensive lifestyle intervention. In a previous study it was shown that prolonged caloric restriction in obese type 2 diabetes patients decreases BMI and improves gluoregulation. These effects were associated with a decrease in myocardial fat content and improved heart function. It was also shown that MR measured myocardial fat stores are flexible and amendable to therapeutic intervention by caloric restriction. Therefore, MR techniques offer unique possibilities for monitoring effects of new dietary strategies. Future research can be aimed at developing alternative imaging approaches for analysis of total body fat distribution. A good candidate imaging approach might be the use of three-point chemical shift encoding MR imaging.

References: