Introduction:
Contrast-enhanced MR imaging is a safe and efficient diagnostic method for abdominal pathologies [1]. However, there is a group of patients with relative or absolute contraindications for MR contrast agents, mainly due to renal insufficiency and allergies, and there is a need for strategies to perform imaging in these patients properly. Usually abdominal MR examinations are performed with MR contrast agents since their increase in diagnostic accuracy and confidence has been proven in various publications. MR imaging provides strategies for evaluation of different soft tissue components apart from the mechanism of increased vascularity and increased contrast extravasation in solid tissue tumors. These methods include evaluation of signal intensities in different weighted sequences, chemical-shift imaging, spectral or inversion recovery fat-saturation strategies and diffusion weighted imaging (DWI).

Lecture Content:
In this lecture basic principles of tissue characterisation with non contrast MRI are shown. The combined use of different techniques to characterize diffuse or focal disease in upper abdominal organs is presented with various cases. These cases include steatosis hepatis, hemochromatosis, fibrosis as well as fat-containing liver lesions, hemangioma, liver metastases, adrenal adenoma and pancreatic carcinoma. In a second step the ability to work with non-contrast enhanced MRI for different clinical settings are demonstrated. These settings include follow-up of patients with known malignant lesions (Figure 1), primary staging (Figure 2) and characterization of unclear lesions.

Learning Objectives:
• How to manages patients with contraindications for MR contrast agents
• How to design a protocol for non-contrast abdominal MRI
• Learn about the abilities and limitations of non-contrast abdominal MRI

Figure 1: The size of lesions can be appreciated in many cases also with plain MRI. The presented example shows a plain T1w 3D GRE sequence prior and after chemotherapy in a patient with colorectal cancer.

Figure 2: One aspect of abdominal imaging is detection of pathologies. The following example shows a black-blood EPI DWI with b=50 s/mm² compared to a Gd-enhanced 3D GRE fs in pv phase. Note the excellent detection of even small metastases [2].

Literature: