### RöKo INT 103.1

**Forget catheters: the role of CTA of the coronaries**

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**Kurzfassung:** This lecture will provide an overview about the role of coronary CT angiography (CCTA) in the evaluation of patients with atypical chest pain based on the state-of-the-art CT technology. Due to very high negative predictive value of CCTA to identify significant coronary stenosis, CCTA has a potential to reduce unnecessary catheterizations in patients with possible stable angina and acute coronary syndrome. In contrast, CCTA alone has moderate specificity which may increase downstream testing (i.e., lack of functional information). To offset the drawback, recent techniques such as noninvasive fractional flow reserve (CT-FFR) and CT stress myocardial perfusion imaging have been developed. In this regard, the lecture will discuss what the additive roles of these techniques are. The lecture will also cover limitations of CCTA to explain why we can’t completely forget about catheters just yet, even though there has been remarkable progress in the latest CT technology.

### RöKo INT 103.2

**MRI of the heart: basics for beginners**

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**Kurzfassung:** Cardiac magnetic resonance imaging (MRI) has emerged as a highly reproducible and accurate imaging methodology for evaluating a wide variety of congenital and acquired heart diseases, including cardiac masses, myocardial ischemia or infraction, cardiomyopathies, valvular disease, coronary artery disease, pericardial disease, and complex congenital anomalies. The high soft-tissue contrast, availability of a large FOV, multiplanar acquisition capability, and lack of ionizing radiation are particularly appealing features of cardiac MRI.

Of course, there are certain technical challenges unique to cardiac MRI. Most notably is the rapid and complex motion of the heart and pulsatility of the great vessels due to normal contractility. Moreover, numerous pulse sequences have been applied to cardiac MRI. To select the optimal protocol and to interpret cardiac MRI studies, the radiologist should understand the basic pulse sequences. In addition, the radiologist interpreting cardiac MRI studies should be familiar with basic cardiac anatomy and standard imaging planes.

Additionally, using delayed gadolinium enhancement cardiac MRI can depict areas of overt scar or fibrosis. As a consequence, myocardial late gadolinium enhancement (LGE) imaging is an an integral part of a myocardial viability study and has already been demonstrated to provide additional insights into conditions associated with deposition of fibrosis such as myocardial infarction, hypertrophic or dilated cardiomyopathy, as well as acute inflammatory myocarditis or other rarer cardiomyopathies. Hence LGE imaging can be used as a risk-stratification tool in ischemic as well as non-ischemic cardiac diseases.

**Lernziele:** To become familiar with basic cardiac anatomy, pulse sequences, standard imaging planes and potential clinical applications.
Screening for lung cancer? What is the current status?

Kurzfassung: Lung cancer is among the most frequent cancers worldwide with a mean 5-year survival below 20%. Smoking is the leading risk factor. In the past, chest radiography and sputum have been investigated as screening tools, but negative results were obtained from randomized trials. In the following, randomized controlled trials were initiated to prove that CT screening is capable to reduce lung cancer mortality in heavy smokers. The largest trial, the “National Lung Screening Trial” in the U.S. with 53454 participants (55-74 years old), demonstrated a significant reduction of lung cancer mortality in the CT arm. This was not confirmed by the final results from some smaller European trials. Together with ongoing trials 37000 subjects are enrolled in Europe. Pooled mortality data will be available in 2016. The overall evidence for CT lung screening is still weak, e.g. with regard to age range, gender, ethnicity, smoking habits.

Measures to increase pretest probability such as additional risk factors have to be implemented and risk models should be used. False positive screen results, complications during further work-up and radiation exposure need to be reduced. The relevance of the overdiagnosis bias as well as the adequate intervals of CT screening have to be determined.

Future CT lung screening has to be embedded in a comprehensive program with smoking cessation counselling and clear definitions of screening intervals, protocol, positive screens and appropriate work-up, as well as certification of interdisciplinary screening centres. On top of this the scope should be extended beyond the detection of nodules to a comprehensive risk assessment of smokers, including among others emphysema, obstructive airway disease, vascular disease.

Lernziele: To learn about the limited evidence for lung cancer screening using CT
To understand the specific German regulatory requirements for CT screening
To appreciate the suggestions for comprehensive screening for smoking-induced diseases