Acquired diseases of the aorta and peripheral arteries are common. In vascular disease the vascular surgeon has do decide about the best treatment modality for the patient. The diagnostic workup of patients with cardiovascular disease is frequently challenging, and requires a multimodality approach to appropriately determine management. Depending on the presenting symptoms and their acuity, noninvasive diagnostic imaging strategies can include radiography, ultrasonography, computed tomography, and magnetic resonance imaging.

Conservative treatment, open surgery, endovascular treatment or a combined open and endovascular approach is one main decision that has to be made.

There is a need for an accurate and reliable method for assessment of the aortic and peripheral vasculature. Digital subtraction angiography (DSA) still serves as the reference standard for all vascular imaging techniques. However, because of the absence of ionizing radiation, the use of non-nephrotoxic contrast agents or even non contrast-enhanced sequences and the large toolbox of available techniques for high-resolution static and dynamic imaging Magnetic Resonance Angiography (MRA) constitute an excellent non-invasive alternative.

Evaluation of blood flow and the morphology of vessel wall, plaques and thrombus is of great impact for a diagnostic tool in the clinical work-up of a patient with complaints of peripheral atherosclerosis.

Different acquisition schemes and contrast agent application protocols as well as different types of data sampling for static, dynamic, contrast- and non contrast-enhanced imaging enable to tailor each exam to a specific question and patient respectively.

Acute aortic syndrome, which includes aortic dissection, intramural hematoma, and penetrating atherosclerotic ulcer, are life-threatening conditions that require rapid and accurate diagnosis. Dynamic information about flow and organ perfusion is one of the main issues in aortic dissection. Morphological details of the aortic wall (thrombus, hematoma, calcification) are very important to get the right judgment for further treatments.

In peripheral arterial occlusive disease angiography is of great impact in depiction of significant stenosis and occlusions especially in lower extremity

arteries. However, accurate diagnosis by detection, grading and characterization of atherosclerotic lesions are essential prerequisites for a positive outcome of treatment. Both treatment planning as well as follow-up can benefit using contrast-enhanced MR angiography with higher spatial resolution and image quality including time-resolved imaging.