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Editorial: New Concepts in Cardiac Imaging

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New Concepts in Cardiac Imaging

R. Haberl

Cardiac imaging plays an evolving role: interventional procedures increase in number and are the methods of choice in the majority of cases with obstructive coronary disease. Optimal image quality is mandatory for the evaluation of the type and severity of coronary stenosis and to assess the post-procedural results. Thinner catheters are beneficial for the patient and to reduce the risk of bleeding, however, it is much harder to achieve adequate image quality by injecting through a very thin catheter. Thus, the radiographic contrast material is a major factor in obtaining optimal coronary angiograms. Kevin Harrison reports in this issue about four different contrast media agents using *in-vitro* models to simulate coronary vessels. It turned out that the mean video density was directly related to the iodine concentration of the agents being used. This data and previous reports indicate that an increase in iodine concentration provides a significantly better image quality in clinical coronary angiography. Rainer Schraeder gives an overview of ten randomized studies comparing the effects of non-ionic versus ionic contrast media in interventional cardiology. It turned out that there is no correlation between major adverse cardiac events after PTCA and the type of contrast medium. Non-ionic contrast media reduce the risk of adverse drug reaction; they do not have any thrombogenic potential.

So, evolution of contrast media significantly contributes to image quality and the risk of adverse events is low.

This is especially helpful in non-invasive CT-angiography, because high doses (120–150 ml) are needed. Modern Multislice Computed Tomographs (MSCT) are able to visualize native coronary arteries and bypasses with increasingly good image quality. Kopp et al. nicely show the advantages of MSCT in spiral mode with half-second rotation. Retrospective gating allows choosing of an optimal trigger period for the reconstruction of individual coronary arteries. Already now there is a clinical value to exclude coronary stenosis in patients without significant calcification. The limitations include motion artefacts, if heart rate is >70 bpm, respiratory movement and severe calcification (score > 800). The sensitivity to detect severe stenosis is in the range of 90 %, however, this may be too low in a life threatening condition. Until now it was not possible to look into the coronary stent, neither to evaluate submillimeter vessels (peripheral segments of the coronary tree, area beyond the insertion of coronary bypasses etc.). Future developments (16-slice scanner) will allow acquiring of submillimeter images at even higher scan rates.

So, does non-invasive CT-angiography replace cardiac catheterization at this moment? Not yet, although the number of diagnostic invasive procedures may be reduced by this non-invasive approach. Thereby it will be possible to focus on patients with a high risk of significant high-grade stenosis, who may profit from catheter interventions or cardiac surgery.

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