Mitral valve assessment based on MSCT imaging yields useful information regarding mitral valve anatomy and function

Two- and three-dimensional transesophageal echocardiography are the mainstay imaging techniques used in mitral valve repair or replacement. However, the high spatial resolution of Multi-Slice Computed Tomography (MDCT) permits accurate assessment of the anatomy, geometry and spatial relationships of the mitral valve complex and thus provides important information for selecting candidates for these therapies [1]. This white paper explains the pre-procedural assessment of the mitral valve based on MSCT to better surgical, minimal invasive or percutaneous intervention.

Multi-slice Computed Tomography imaging

Pre-procedural imaging of the anatomy of the mitral valve and its spatial relationships is crucial to select the most appropriate device or prosthesis and to plan the intervention [1, 2]. MSCT imaging provides 3-dimensional volumetric data sets allowing unlimited plane reconstructions. Obtaining the appropriate views to assess the mitral valve based on MSCT can be challenging.

The solution – Dedicated Mitral Analysis workflow

The dedicated Mitral Analysis workflow in 3mensio Structural Heart displays the views needed for an accurate and complete evaluation of the mitral valve and surrounding structures.

SIZE, SHAPE AND DYNAMICS OF THE MITRAL VALVE ANNULUS

Long and Short Axis views (MPR and VR) along a line from the mitral valve to the apex of the left ventricle are displayed. The Long Axis views can be rotated around this line allowing very fast and easy assessment of the different structures like papillary muscles, aortic root, aortic valve, atrium and left appendage.

The mitral annulus can be annotated on the Long Axis views. A clear view of the mitral valve fish mount can be displayed by scrolling the centerline of the annulus annotation.
Based on the annulus annotation the dimensions of the mitral valve annulus are calculated.

The annulus can be annotated in multiple phases allowing a dynamic assessment of the valve.

**CALCIFICATION OF THE MITRAL VALVE ANNULUS**

A calcification view in the shape of a Hockey Puck, which is free rotatable, allows viewing of the annulus in all directions for assessment of the location and amount of calcification.

**ASSESSMENT OF DELIVERY OF THE DEVICE**

Prepare for challenges concerning the access route by evaluating the path of a device. A simulated catheter path can be created (Figure 4) and views perpendicular to the catheter can be displayed by moving along the yellow catheter path.

Also the angle between the aortic root and mitral valve orientation can be determined.

This allows an assessment of the delivery of a device to the mitral valve for transcatheter interventions.

**OPTIMAL C-ARM PROJECTION**

Fluoroscopic/angiographic-like images can be created based on CTA images providing suggestive C-arm angles for specific views. It can help determine appropriate c-arm angles to perform procedures and understand viewing angles without extra contrast or X-ray exposure.
Conclusion

The dedicated workflow for the aortic root in 3mensio Structural Heart has already proven its added value in pre-procedural planning for aortic valve replacement and repair procedures [3], [4], [5], [6]. Like for the aortic valve there is a need for easy assessment of the Mitral Valve. Clinical relevancy has been shown that MSCT in conjunction with other non-invasive imaging can provide an adequate assessment of the Mitral Valve anatomy and its surrounding structures [1], [2]. The more information that can be gathered prior to an intervention, the better an intervention can be performed, whether this is a surgical, minimal invasive or percutaneous intervention.

References


