

AbstractID: 8115 Title: Image-guided intervention based on registration between C-arm projection and cone-beam reprojection of reconstructed volume

Purpose: To provide an image-guided manipulation of the catheter introduction during intervention procedure by registering the C-arm projection image with the cone-beam reprojection image of a reconstructed volume that was generated previously by a volume CT (64-slice CT or flat-panel-based cone-beam CT). **Method and Material:** First, reconstruct a volume for the interventional region by volume CT scanning and reconstruction, i.e., generate an angiographic volume; Second, perform volume segmentation to segment 3D blood vessels; Third, capture the C-arm projection image during catheter introduction; Fourth, calculate the cone-beam reprojection image on the angiographic volume, and adjust the reprojection parameters based on the matching or coregistration with the C-arm image; Finally, perform 3D display of the segmented vessels where vessel segments are colored as indications of the catheter position. **Results:** The angiographic volume for the interventional region is reconstructed from a 64-slice CT scanner or from a cone-beam CT scanner. The volume segmentation is based on voxel value and vessel tree structure knowledge. The 2D image registration between the C-arm image and the cone-beam reprojection image of the angiographic volume requires a trial-and-error process by adjusting the reprojection geometric settings. The 3D vessels are displayed by fast isosurface or volume rendering. **Conclusions:** By reprojecting a reconstructed angiographic volume and co-registering the projection image with the C-arm projection image, the catheter in the 3D blood vessels can be visualized by 3D rendering, which provides a 3D intuitive image-based guidance for the intervention procedure.