

VECTA — VIRTUAL ENDOSCOPIC CT-ANGIOGRAPHY

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PURPOSE: The technique of choice for precise imaging of intra-cranial and extra-cranial blood vessels is intra-arterial contrast angiography. However, in clinical practice exact interpretation of the exact vessel situation may be difficult due to superposition of adjacent vessels. Especially, in case of aneurysms the size and the position of the neck must be known for interventional procedures. If coiling with an expensive platinum helix is intended, knowledge about the size of the whole aneurysm allows better estimation of the required material.

MATERIALS: After obtaining the image data with a spiral CT scanner all visualization was performed with TIVOR a tool for volume rendering based on 3D texture mapping. It allows interactive and intuitive manipulation of the orientation of clipping planes and the viewing direction which is most helpful for understanding the vessel situation. In order to determine the size of the aneurysm and the size of its neck an approach was developed which is based on visual adjustment of geometric objects and voxel counting.

RESULTS: So far, ten patients with cerebrovascular aneurysms were examined and treated. After restricting the data volume to the essential structures, color and opacity values were adjusted allowing segmentation of the important vessel situation (Figure 1). Additionally, this allows endoscopic views (Figure 2) of intracranial vessels.

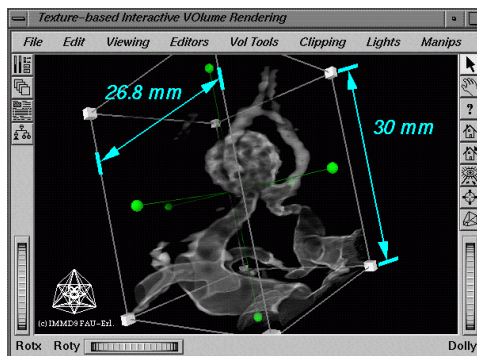


Figure 1: Aneurysm



Figure 2: Endoscopic view

For further operation planning selected snapshots and video recordings of the interactive visualization were transferred to the clinic. Including both scanning and visualization the whole procedure was performed within 20 minutes.

CONCLUSION: The results obtained within this project show that interactive volume rendering of CTA data helps to optimally prepare cerebrovascular interventions. Above all, interventionally working radiologists and surgeons get a better understanding of the vessel situation especially in difficult cases. Additionally, the expensive material needed for coiling procedures could be estimated more precisely.