

# Aortic Valve Implantation

## Supported by syngo DynaCT Cardiac and new segmentation and guidance software\*

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\*WIP. The information about this product is preliminary. The product is under development and not commercially available in the U.S., and its future availability cannot be ensured.

### Patient history

A 52-year-old female

### Diagnosis

Patient with high-grade aortic valve stenosis (EOA: 0.5 cm<sup>2</sup>, pmax: 91 mm Hg, pmean: 48 mm Hg) was scheduled for transfemoral catheter valve implantation because of a highly increased operative risk (EURO Score 28%, STS Score 11.9%) due to the following comorbidities: pulmonary hypertension (p systolic: 65 mm Hg), severe chronic restrictive pulmonary disease, scleroderma, renal insufficiency (creatinine: 5 mg/ml), and chronic dialysis. She has undergone previous interventional ASD closure. In addition, a mild mitral and tricuspid valve insufficiency were diagnosed.

### Treatment

The procedure was performed under general anesthesia to assure stable hemodynamics and to avoid patient movement during valve implantation. syngo DynaCT Cardiac images were

acquired during cardiac arrest with adenosine (1mg/kg). Contrast dilution 1:5 (Imeron 300 Schering, Germany) was injected into the aortic root via a pigtail catheter. The contrast agent remains in the aortic root during cardiac arrest and syngo DynaCT Cardiac imaging.

The new segmentation software based on the syngo platform automatically segments the aortic root in only a few seconds (Fig. 1). Furthermore, it detects and marks the coronaries and hinge points of the aortic cusps. The hinge points are connected and appear as a red oval ring 1 cm below the aortic valve. Guided by an overlay of the 3D segmentation results on the real-time fluoroscopic images, the C-arm can be placed in a position orthogonal to the aortic valve plane (Fig. 2).

For preparation of the annular landing zone a balloon valvuloplasty (22 mm) of the stenotic aortic valve was performed under rapid ventricular pacing at 180 beats/min.

Under fluoroscopy control, the prosthe-

sis (CoreValve 26 mm), crimped on the delivery catheter, is placed in the aortic annulus. Positioning was confirmed by angiography and 3D overlay (Fig. 3). Implantation height was adjusted considering the hinge point oval ring. Intraoperative echocardiography and angiography revealed good valve position and no relevant aortic insufficiency. The patient had an uneventful post-operative course and was discharged on the seventh post-operative day in good clinical condition.

In summary, the new automatic syngo based software facilitates catheter valve positioning and deployment by exact C-arm adjustment orthogonally to the aortic valve plane. The automatic detection and marking of the coronaries may prevent coronary flow impairment by the device. Thus, it improves accuracy of catheter valve implantation procedures.

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**1** Correct marker detection in three orthogonal planes (green: right coronary artery, blue: left main stem, red: hinge points of the aortic cusps); right lower image: 3D volume rendering.

**2** C-arm adjustment according to the computed red ring which should be visualized as a line for orthogonal view of the aortic valve plane.

**3** From left to right: stepwise CoreValve deployment with overlay of 2D fluoroscopy real-time image and automatic 3D aortic volume rendering achieved by the new syngo based software.

