A 52-year-old patient suffering from an extensive acute myocardial infarction of the left ventricle with a residual ejection fraction of 15% developed a rapidly progressive terminal heart insufficiency with low cardiac output syndrome and severe dyspnea. To bridge the time gap until transplantation, a new type of left ventricular assist device (DeBakey VAD) was implanted. The patient could be extubated 3 hours after surgery and returned to the regular ward on postoperative day 4 after an uncomplicated recovery.

The DeBakey VAD is a small (3.5-cm diameter and 76-mm length), axial-flow blood pump with a titanium alloy for total intracorporal implantation (Figure 1), which has already been successfully implanted in a few patients. Currently, our experience includes 3 patients.

To assess the correct position of the system and the cannulas and to exclude thrombotic material in the unloaded left ventricle or in the pump, a contrast-enhanced multislice spiral CT study was performed 1 week after surgery.

Parameters for the CT study were as follows: multislice spiral computed tomogram (VolumeZoom, Siemens) with a collimation of 2.5 mm and a rotation time of 0.5 seconds. During IV bolus application of an iodine contrast material (2 mL/s; 200 mg iodine/mL; 420 mg iodine/kg body wt), the study was performed during a 20-second single breath-hold. The whole heart, the thoracic aorta, and the complete system were covered. The imaging data were visualized in axial orientation and multidimensional reformatted free angulated views.

Multislice spiral CT (Figure 2) clearly shows the correct position of the pump, with the inlet cannulas being centered in the middle of the left ventricle facing the aortic valve to minimize suction to the myocardium. No kinking of the outflow graft and no ventricular or system-related thrombus is visible.

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References
Figure 1. Multislice CT data set with 1-mm collimation in multi-planar reconstruction of pump system, which includes titanium pump with adjacent inlet cannula and connector for outflow graft. Wire to control unit can be seen (w). Pump itself consists of flow straightener (a), inducer/impeller (b), and diffuser (c). These components are fully embedded in a hermetically sealed titanium flow tube. Pump is driven by motor stator (m) contained in stator shell (ms). Inducer/impeller has 6 blades with 8 magnets hermetically sealed in each blade. Pump is attached to titanium inlet cannula that has to be placed into left ventricle. A graft has to be connected to pump outlet and anastomosed to aorta ascendens.

Figure 2. Contrast-enhanced multislice spiral CT with 2.5-mm collimation of thorax. Data set, which was acquired in 20 seconds during suspended respiration, was reconstructed by use of a 3D surface-rendering technique. It shows DeBakey VAD well positioned with inlet cannulas centered in middle of left ventricle. Anastomosis to aorta ascendens can be appreciated. Doppler device, which controls flow, can be seen in middle of outflow graft. There is no kinking of outflow graft, and a ventricular or system-related thrombus can be excluded.
Multislice Spiral CT Follow-Up of a Patient With Implanted DeBakey Ventricular Assist Device
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