

A Valve-Carrying Stent for Minimally Invasive or Interventional Treatment of the Tricuspid Valve

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Objectives: In recent years, multiple percutaneous approaches for treatment of heart valve disease have been introduced. Nevertheless transcatheter treatment of tricuspid valve disease has nearly been neglected. Our aim was to investigate a new approach to anchor a biological heart valve orthotopically in tricuspid position. A new stentvalve with an anchoring mechanism in the superior v.cava (SVC) was evaluated in the animal.

Methods: After obtaining a silicon-mould from the porcine RA, a vascular endoprosthesis carrying a commercially available stentless valve were custommade redesigned. The endoprosthesis was properly curved to fit the SVC and the tricuspid annulus (TA). Fenestrations were integrated to allow blood-flow from inferior v.cava (IVC) and the sinus coronarius (SC). In 6 female pigs, under cardiopulmonary bypass (CPB), the right atrium was incised and the compressed new device implanted. Once the device was positioned, expansion was allowed. Echocardiographic and radiological examinations were performed as well as an autopsy.

Results: All animals except for one (ventricular fibrillation due to hypothermia) were successfully weaned from CPB. The device properly adapted to the SVC, the RA and the TA. Correct position and function of the valve-prosthesis was demonstrated by echocardiography although overall visualization was difficult. Therefore a CT-examination was performed in 2 animals. Autopsy revealed proper positioning of our new device without major trauma to surrounding structures.

Conclusions: Our investigations demonstrate the feasibility of an orthotopical interventional treatment of the tricuspid valve by the use of our new stentvalve with an anchoring mechanism in the SVC.