

HOLLOW BODY AXIAL BLOOD PUMP USED AS IMPLANTABLE CARDIAC ASSIST DEVICE



Keywords: Mechanical circulatory support, hollow body axial rotary pump

Background

Heart transplantation in patients with end-stage heart failure is limited by availability of donor hearts at the right time for the right patient. Each year more than 100,000 patients in the western world could potentially benefit from a heart transplantation or treatment with a mechanical cardiac assistance device. Long waiting lists for transplantation are caused by growing number of patients waiting to be transplanted. Up to 10,000 patients get on a waiting list for transplantation annually, and slightly over 3,000 are transplanted every year. Annually, almost 30 % of the patients on waiting lists die before an appropriate donor heart can be found. Cardiac assist devices are life-saving for those patients who would not survive without urgent transplantation with a suitable donor heart. This procedure is called “Bridging to Transplantation”. Current devices are different types of blood pumps to support the failing heart to maintain circulation. Such systems can be implanted completely intracorporeal, making an out-patient treatment possible until an appropriate donor organ is available.

Advantages

In general, rotary assist devices are pumps which transport blood by a massive rotor with blades transporting blood in either centrifugal or axial direction, surrounded by stators and/or flow diffusers. Rotors of conventional pumps are massive parts within the bloodstream which induce a heavy resistance to blood cells increasing impact rate and shear stress, leading to hemolysis and thrombus formation. By using a hollow-body rotor, the transporting effect of the rotor blades is maintained. However, the resistance to blood-flow is reduced.

Applications

- Use as a cardiac assist device (uni- / biventricular) for bridging to transplantation in patients with acute or chronic end-stage heart failure.
- Reduction of thromboembolic events by new design, reduced stroke risk.
- Improved *physiological control strategies for prolonged use*, i.e. the new pump can help to live a more “normal” life.
- Option of *implantation with minimally invasive surgery*; less risk and lower costs.

IP-Position

Owner: University Hospital Basel
Status: Patent pending
Licensing/sale conditions: Technology is available on an exclusive or non-exclusive basis.
Collaboration: optional

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