

Mechanical circulatory support in advanced heart failure

Patient selection, treatment strategies and outcomes

Akademisk avhandling

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av

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Avhandlingen baseras på följande delarbeten:

- I. Bartfay S-E, Dellgren G, Hallhagen S, Wählander H, Dahlberg P, Redfors B, Ekelund J, Karason K. Durable circulatory support with a paracorporeal device as an option for pediatric and adult heart failure patients
The Journal of Thoracic and Cardiovascular Surgery 2021 Apr;161(4):1453-1464.e4.
- II. Bartfay S-E, Dellgren G, Lidén H, Holmberg M, Gäbel J, Redfors B, Bech-Hanssen O, Karason K. Are biventricular assist devices underused as a bridge to heart transplantation in patients with a high risk of postimplant right ventricular failure?
The Journal of Thoracic and Cardiovascular Surgery 2017 Feb;153(2):360-367.e1
- III. Bartfay S-E, Kolsrud O, Wessman P, Dellgren G, Karason K. The trajectory of renal function following mechanical circulatory support and subsequent heart transplantation.
ESC Heart Failure 2022 Aug;9(4):2464-2473
- IV. Bartfay S-E, Bobbio E, Esmaily S, Bergh N, Holgersson J, Dellgren G, Bollano E, Karason K. Heart transplantation in patients bridged with mechanical circulatory support: outcome comparison with matched medically managed controls.
In manuscript

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ABSTRACT

Background: Heart transplantation (HTx) remains the major treatment option for selected patients with end-stage heart failure. In hemodynamically unstable patients, or when there is a considerable risk of deterioration or death during the waiting time for transplantation, treatment with mechanical circulatory support (MCS) can be lifesaving. Durable MCS usually involves either a left ventricular assist device (LVAD) or a biventricular assist device (BiVAD) and can be either fully implantable or paracorporeal. Optimizing patient selection and the choice of pump strategy may lead to fewer complications and better patient outcomes.

Aims: (I) To investigate patients receiving a paracorporeal ‘EXCOR’ pump due to ineligibility for implantable MCS and to study their outcomes and pump-related complications. (II) To study adult patients receiving an EXCOR BiVAD as a bridge to transplantation and to compare them with contemporary LVAD recipients. (III) To investigate the effect of durable MCS treatment and consequent HTx on renal function. (IV) To compare post-transplantation outcomes between patients treated with or without durable MCS as a bridge to HTx.

Methods: Papers I–II are based on a local registry covering all patients who received durable MCS at Sahlgrenska University Hospital. Papers III–IV are based on the Transplant Registry at Sahlgrenska University Hospital. Data from these registries were analyzed retrospectively.

Results: (I) Treatment with paracorporeal ‘EXCOR’ pumps resulted in high survival in both children and adults. Safety was acceptable, but thromboembolism, mechanical pump problems and infections were the most significant complications. (II) Furthermore, survival was comparable between adult contemporary LVAD and BiVAD patients, although the latter were in a hemodynamically more compromised state at baseline. (III) Treatment with durable MCS led to an improvement in measured glomerular filtration rate (mGFR). After HTx, mGFR tended to decline again, but in some subgroups of patients a steady improvement in mGFR was seen. (IV) No differences were observed in graft survival, biopsy-proven rejections or renal function compared with HTx patients not bridged with MCS.

Conclusions: Durable MCS devices of different types can achieve good long-term outcomes as a bridge to transplantation. The results, especially in BiVAD patients, were similar to or better than those previously described. Treatment with durable MCS can be used to stabilize renal function before HTx and was not associated with worse post-HTx outcomes.

Keywords: Mechanical circulatory support, left ventricular assist device (LVAD), biventricular assist device (BiVAD), heart transplantation, advanced heart failure, cardiorenal syndrome, glomerular filtration rate