Hypothermic oxygenated perfusion of the donor heart in heart transplantation: the short-term outcome from a randomised, controlled, open-label, multicentre clinical trial

Authors

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Summary

This international, multicenter, randomized, controlled trial is the first to compare HOPE to the current gold standard, SCS in donor heart preservation. The primary outcome was time-to-first-event of a composite of either cardiac related death, moderate or severe primary graft dysfunction (PGD) of the left ventricle or primary graft dysfunction of the right ventricle, acute cellular rejection ≥2R or graft failure within 30 days after transplantation.

A total of 229 patients were enrolled across 15 investigational sites in 8 European countries between November 2019 and May 2023. The primary analysis population included 204 transplanted patients. All donor hearts preserved with HOPE were deemed transplantable after perfusion.
The incidence of primary endpoint events was 19 (19%) in the HOPE group and 31 (30%) in the SCS group, corresponding to a risk reduction of 44%, (HR, 0.56; 95% CI, 0.32 to 0.99; log-rank, p=0.059). After adjustment for trial site effects the risk reduction was 49% (HR, 0.51, 95% CI, 0.28 - 0.91; log-rank, p=0.022).

The primary endpoint events were unevenly distributed in time and the proportional hazards assumption for the Cox regression was therefore violated (p=0.016). This necessitated separation of the composite primary end point events. The result demonstrated significantly fewer PGD events in the HOPE group (11%, n = 11) compared to the SCS group (28%, n = 29), (RR 0.39; 95% CI, 0.20 to 0.73, p=0.0025) corresponding to a risk reduction of 61%. No significant differences were observed for the remaining components of the primary endpoint, (HR, 1.04; 95% CI, 0.41 to 2.62, p=0.93).

Serious adverse events (SAE) occurred in 65.0% (158 events) of the patients in the HOPE group vs. 69.6% (222 events) in the SCS group. Major adverse cardiac transplant events was reported in 17.8% (n=18) and 32.0% (n=33) subjects in the HOPE and SCS arm respectively (RR 0.56, 95% CI 0.34 -0.92).

The 44% risk reduction in the primary endpoint associated with HOPE indicates a clinically meaningful benefit. Post-transplant complications, measured as major adverse cardiac transplant events, were also significantly reduced. Analysis of secondary outcomes confirms that HOPE was beneficial in reducing primary graft dysfunction.

In summary the results show that HOPE is effective, safe and feasible.

Reference

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Citations

"HOPE could expand the pool of donor hearts to include organs currently considered suboptimal because of donor age and medical history thereby increasing the number of utilized donor hearts and thereby transplantations."

"...ischemia-reperfusion injury caused by SCS can be mitigated and transplant outcome improved if donor hearts are preserved using HOPE."

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The XVIVO Heart Technology is not regulatory approved on any market and its safety and efficacy has not been established.

The XVIVO Heart Technology is not commercially available.