

First applications of a novel system for hypothermic temperature-controlled allograft preservation in Heart Transplantation

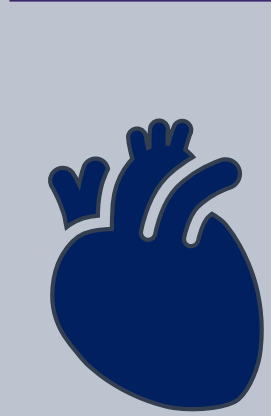
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Background

Cold static graft preservation remains a cornerstone in both donation after brain death (DBD) and controlled donation after circulatory death (c-DCD) heart transplantation (HTx), particularly when in situ graft viability must be assessed via thoraco-abdominal normothermic regional perfusion (TA-NRP). We evaluated a **novel temperature-controlled static cold storage system** that offers real-time temperature and shock monitoring, GPS tracking, and Bluetooth connectivity. The system utilizes certified phase change materials (PCM) **to maintain a consistent graft temperature between 4–8°C for up to 36 hours**, avoiding direct ice contact and minimizing hypothermic injury, in accordance with international guidelines.

Methods

-  **Nine donors** (7 males, 2 females; mean age 41.3 ± 16.7 years) were accepted for transplantation, including two c-DCDs evaluated via TA-NRP. **All grafts were preserved and transported using the novel system.**
-  Post-transplant assessments included **clinical evaluation**, **laboratory biomarkers** (NT-proBNP, lactate, CK-MB, troponin I), **imaging** (echocardiography), **invasive hemodynamics** (right heart catheterization), and **histological analysis**.



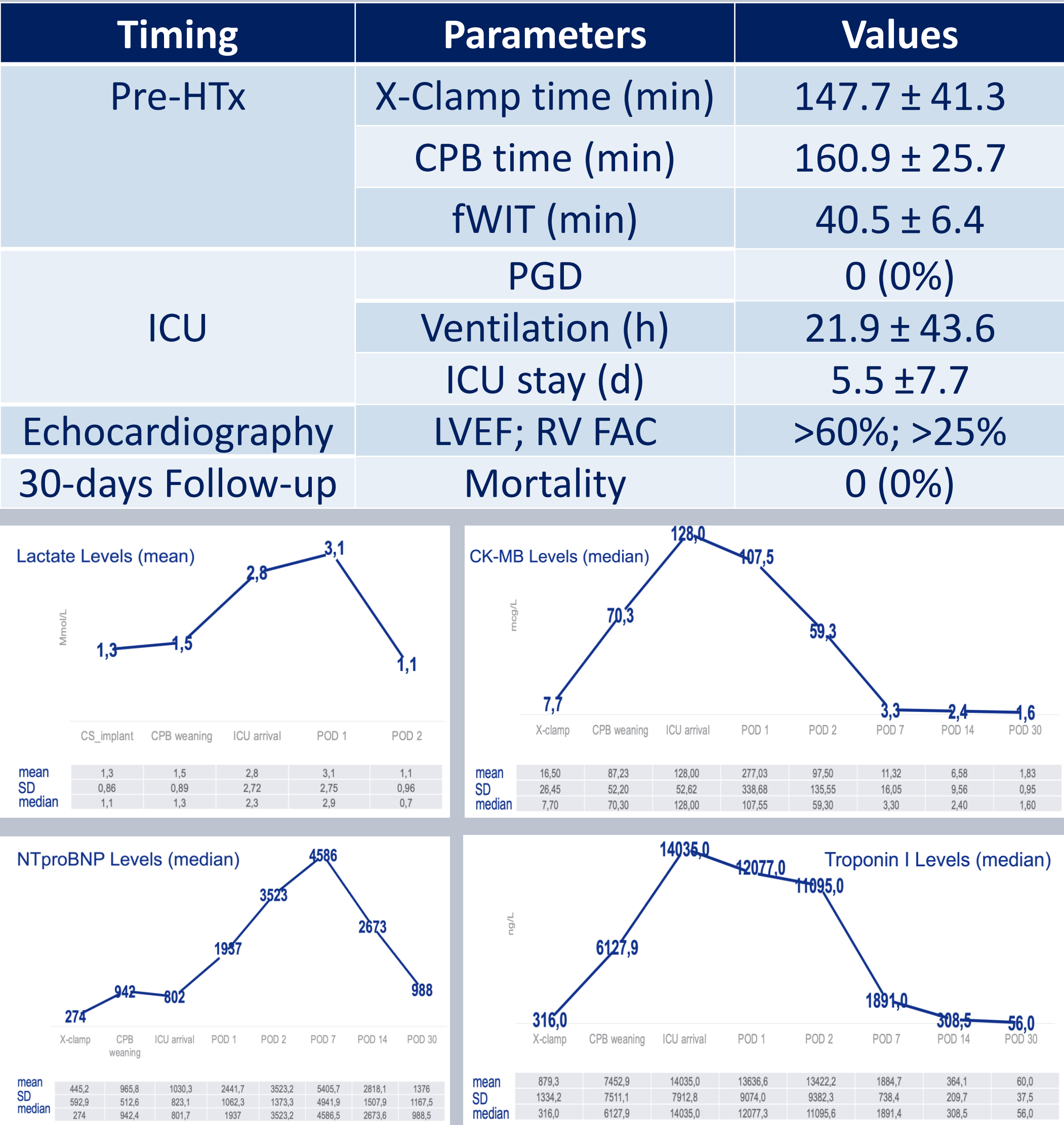
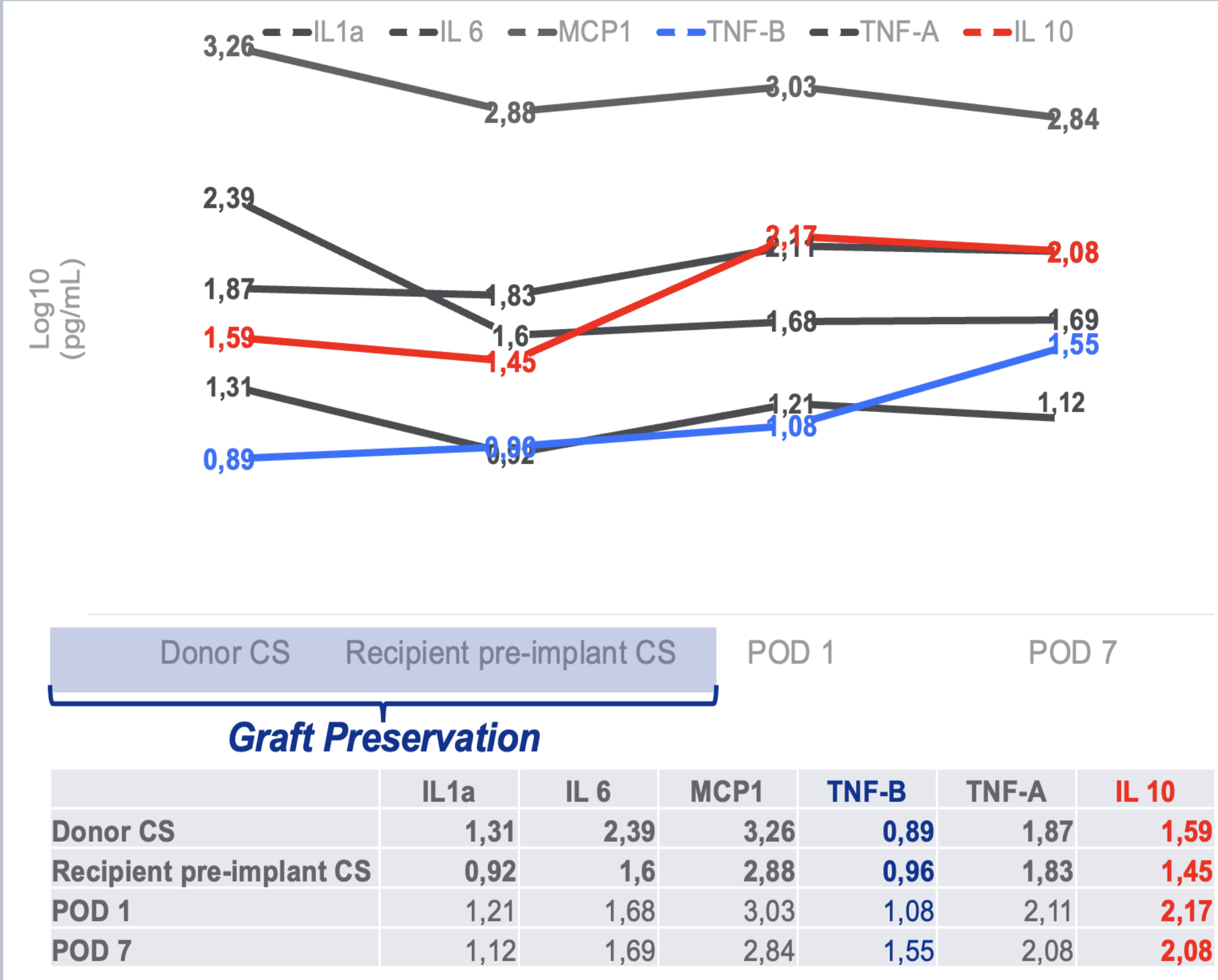
Results

 **All grafts were transplanted**



Recipients characteristics
Age: 45.8 ± 16 years
1 Re-Tx; 5 Urgent Listings

Cytokines Levels (mean)



Conclusions

Temperature-controlled static preservation appears safe and effective, with encouraging outcomes in terms of PGD prevention, hemodynamic stability, and early recovery. The system's usability and cost-effectiveness support broader clinical adoption. Larger multicenter studies are warranted to confirm its value in varied procurement scenarios.