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**Post-Transplant Metabolomics Profiles in Patients Undergoing Lung Transplantation**

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**Purpose:** Optimal nutrition is recognized as an essential component to successful outcomes for post procedure recovery after a major cardio-thoracic procedure. We developed a unique multi-modal rehabilitation program that combines physical therapy protocol with neuromuscular electric stimulation (NMES) and protein supplementation to achieve improved functional outcomes for advanced lung disease patients requiring transplantation

**Methods:** The patients were randomized to either the treatment arm (n=5) or usual care (n=6) 72 hours after the transplant. Both groups of patients underwent an initial global assessment of functional capabilities and blood metabolomic profile evaluation 72 hours post-transplantation. Patients in the treatment arm received additional physical therapy plus NMES (10 days) and nutrition supplementation with essential amino acids (3 times/day) during hospital recovery. Follow up metabolomic profile analysis was performed on 14 days and 3-month post-transplant plasma samples.

**Results:** Compared to the standard of care group, the treatment group decreased average time of intubation (1.6 vs 2.16 days), decreased average ICU length of stay (5.80 vs 8.67 days) and decreased average hospital length of stay (16.8 vs 19.5 days). The treatment group had increased

hypotaurine levels indicating a cytoprotective anti-oxidant effect against free radicals and tissue damage. Preliminary results comparing hypotaurine levels at 72 hours, 14 days and 3 month in the treatment group (T-72 hr T-14 days, T-3 months) compared to control group (C-72 hr C-14 days, C-3 months) are presented in figure 1.

**Conclusion:** Defining the role of metabolomics in post-transplant monitoring is still in its early stages. We intend to use the data obtained from this pilot study to develop a larger, randomized interventional trial evaluating the effects of an intense multimodal rehabilitation program on improving post-operative outcomes and defining blood biomarkers of muscle atrophy during ICU stay after lung transplantation.

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**Austrian Analysis of the GUARDIAN Registry: Heart Transplant Effects in Europe from the Global Pandemic**

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**Purpose:** During the global COVID-19 pandemic heart transplantation in Europe was affected due to difficulty traveling internationally and greater delays associated with crossing borders. During a similar time frame our center also adopted the Paragonix SherpaPak Cardiac Transport System (SHRP) for regular use rather than conventional ice storage (ICE). This study aims to compare heart transplant baseline characteristics and outcomes for the 18 months prior to the global pandemic with the 18 months since the pandemic began.

**Methods:** The Global Utilization And Registry Database for Improved heart preservation (GUARDIAN) study is a retrospective, multi-institutional registry. We analyzed patients transplanted in Austria pre-pandemic, from 1 SEP 2018 to 1 MAR 2020 (PRE), with patients transplanted during the pandemic, from 1 MAR 2020 to 1 SEP 2021 (C19).

**Results:** 83 patients (42 PRE, 41 C19) met these criteria to be included in the analysis. The PRE cohort utilized donor organs from statistically longer travel distances (PRE=323 v C19=179 miles, p=0.02). Despite the shorter travel distances, ischemic times were same (PRE=195 v C19=189 min, p=0.60), likely indicating the additional burdens for traveling across borders. During the PRE period the SHRP was only used for marginal cases and in the C19 period it was adopted for regular use. The proportion of cases utilizing SHRP was statistically higher in the C19 cohort (PRE=19% v C19=80%, p<0.001). The PRE cohort showed numerically higher rates of newly placed ECMO post-transplant (16.1% v 11.8% p=0.18), incidence of PGD (16.7% v 4.9%, p=0.08), incidence of severe PGD (4.8% v 2.4%, p=0.57), and rates of the use of cardioversion intra-operatively to start the donor heart (19.0% v 9.8%, p=0.32) for PRE v C19 respectively. In-hospital survival was similar (92.9% v 90.2%, p=0.67).

**Conclusion:** The global COVID-19 pandemic caused a substantial impact on the access to donor hearts in Europe due to the ability to travel internationally. Despite this limitation on donor heart access, we saw trends towards improved outcomes in this period compared to the pre-pandemic period. This period was also highly correlated with the implementation of the Paragonix SherpaPak Cardiac Transport System as a preservation method which may have helped mitigate some of the negative effects of reduced donor access.

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**UK National DCD Heart Transplant Program - First Year Experience**

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