*Revista Española de Cardiología*

*Salterain-González N, et al. Results of heart retransplantation: subanalysis of the Spanish Heart Transplant Registry*

**SUPPLEMENTARY DATA**

**Table 1 of the supplementary data**

Baseline characteristics of the study population by indication for retransplant

| | Acute rejection (n = 16) | Cardiac allograft vasculopathy (n = 73) | Primary graft failure (n = 41) | Unspecific graft failure (n = 43) | P |
|---|---|---|---|---|---|
| **Recipient** | | | | | |
| Age at HT, y | 50.0 [45.0-57.0] | 53.0 [44.5-58.0] | 52.0 [42.0-59.0] | 52.0 [40.0-60.0] | .99 |
| Sex, female | 2 (12.5) | 11 (15.1) | 12 (29.3) | 11 (25.6) | .21 |
| Weight, kg | 71.4 [64.7-79.7] | 72.1 [65.2-81.6] | 64.1 [56.0-73.1] | 70.0 [60.0-79.0] | .01 |
| Renal dysfunction | 7 (43.8) | 39 (53.4) | 13 (31.7) | 22 (51.2) | .14 |
| Pulmonary vascular resistance, Wood units | 2.1 [1.3-3.5] | 1.8 [1.1-2.4] | 2.2 [1.4-3.4] | 1.8 [1.2-2.6] | .08 |
| Infection prior to HT | 3 (18.8) | 5 (6.8) | 9 (22.0) | 7 (16.3) | .12 |
| Diabetes prior to HT | 6 (37.5) | 17 (23.3) | 2 (4.9) | 8 (18.6) | .02 |
| COPD pre-HT | 3 (18.8) | 0 (0,0) | 5 (12.2) | 5 (11.6) | .01 |
| Hypertension | 7 (43.8) | 37 (50.7) | 15 (36.6) | 14 (32.6) | .23 |

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| | | | | | |
|---|---|---|---|---|---|
| *Cytomegalovirus serology (+)* | 14 (87.5) | 66 (90.4) | 31 (75.6) | 39 (90.7) | .12 |
| *Peripheral vascular disease* | 2 (12.5) | 7 (9.6) | 3 (7.3) | 2 (4.7) | .72 |
| *Mechanical ventilation pre-HT* | 3 (18.8) | 5 (6.8) | 38 (92.7) | 6 (14.0) | < .001 |
| *Circulatory support pre-HT* | | | | | < .001 |
| None | 11 (68.8) | 61 (83.6) | 5 (12.2) | 38 (88.4) | |
| IABP | 4 (25.0) | 10 (13.7) | 26 (63.4) | 3 (7.0) | |
| ECMO | 0 (0.0) | 1 (1.4) | 3 (7.3) | 1 (2.3) | |
| VAD | 1 (6.3) | 1 (1.4) | 7 (17.1) | 1 (2.3) | |
| *Neoplasia pre-HT* | 1 (6.3) | 4 (5.5) | 2 (4.9) | 3 (7.0) | .98 |
| **Donor** | | | | | |
| *Age, y* | 30.3 [20.5-42.4] | 34.0 [24.5-45.0] | 33.1 [21.0-40.6] | 35.0 [27.6-48.0] | .27 |
| *Sex, female* | 11 (68.8) | 52 (71.2) | 30 (72.3) | 28 (65.1) | .86 |
| *Weight, kg* | 71.1 [64.5-79.3] | 73.1 [65.0-80.0] | 70.0 [61.6-77.4] | 70.0 [64.4-82.1] | .67 |
| *Cause of death* | | | | | .06 |
| Traumatic | 8 (50.0) | 32 (43.8) | 21 (51.2) | 10 (23.3) | |
| Stroke | 2 (12.5) | 23 (31.5) | 14 (31.4) | 20 (46.5) | |

| | | | | | |
|---|---|---|---|---|---|
| Others | 6 (37.5) | 18 (24.7) | 6 (14.6) | 13 (30.2) | |
| *Recipient male/donor female* | 4 (25.0) | 16 (21.9) | 5 (12.2) | 8 (18.6) | .63 |
| *Recipient/donor weight ratio* | 1.0 [0.9-1.1] | 1.0 [0.9-1.1] | 0.9 [0.8-1.1] | 1.0 [0.8-1.1] | .24 |
| **Surgical procedure** | | | | | |
| *HT era* | | | | | < .001 |
| 1984-1999 | 11 (69.0) | 18 (25.0) | 24 (59.0) | 12 (28.0) | |
| 2000-2018 | 5 (31.0) | 55 (75.0) | 17 (41.0) | 31 (72.0) | |
| **Cold ischemia time, h** | | | | | .78 |
| *Bicaval surgical technique* | 3 (18.8) | 23 (31.5) | 5 (12.2) | 19 (44.2) | < .01 |
| *Time to retransplant, y* | 0.6 [0.3-1.2] | 9.1 [5.7-13.1] | 0.01 [0.0-0.02] | 9.0 [1.7-12.8] | < .001 |
| *Induction therapy* | 8 (50.0) | 47 (64.4) | 22 (53.7) | 34 (79.1) | .06 |

COPD, chronic obstructive pulmonary disease; ECMO, extracorporeal membrane oxygenator; HT, heart transplant; IABP, intra-aortic balloon pump; VAD, ventricular assist device.

The data are expressed as No. (%) or median [interquartile range].

## Table 2 of the supplementary data

Univariable logistic regression analysis (imputed population) for the association with retransplant

| Variable | Odds ratio | 95%CI | P |
|---|---|---|---|
| **Recipient** | | | |
| Age, y | 0.98 | 0.97-0.99 | < .001 |
| Sex, female | 1.06 | 0.73-1.54 | .75 |
| Weight, kg | 1.00 | 0.98-1.01 | .59 |
| Renal dysfunction | 4.05 | 2.94- 5.56 | < .001 |
| Pulmonary vascular resistance, Wood units | 0.88 | 0.75-1.03 | .10 |
| Infection pre-HT | 1.38 | 0.87-2.21 | .15 |
| Diabetes pre-HT | 1.27 | 0.86-1.89 | .23 |
| COPD pre-HT | 0.62 | 0.33-1.16 | .13 |
| Hypertension pre-HT | 1.69 | 1.23-2.33 | < .001 |
| Cytomegalovirus serology (+) | 1.44 | 0.90-2.29 | .12 |
| Peripheral vascular disease | 1.40 | 0.78-2.50 | .21 |
| Mechanical ventilation pre-HT | 3.27 | 2.33-4.59 | < .001 |

| | | | |
|---|---|---|---|
| *Circulatory support pre-HT* | | | .01 |
| None | 1 | | |
| IABP | 2.48 | 1.73-3.55 | < .001 |
| ECMO | 1.01 | 0.41-2.59 | .98 |
| VAD | 1.20 | 0.62-2.31 | .58 |
| *Neoplasia pre-HT* | 0.59 | 0.29-1.19 | .14 |
| **Donor** | | | |
| *Age, y* | 0.99 | 0.98-1.00 | .19 |
| *Sex, female* | 0.92 | 0.64-1.31 | .63 |
| *Weight, kg* | 0.99 | 0.98-1.00 | .12 |
| *Cause of death* | | | .46 |
| Traumatic | 1 | | |
| Stroke | 0.91 | 0.64-1.30 | .62 |
| Other | 1.18 | 0.80-1.73 | .40 |
| *Recipient male/donor female* | 0.86 | 0.54-1.38 | .52 |
| *Recipient/donor weight ratio* | 1.00 | 0.99-1.01 | .47 |

| Surgical procedure | | | |
|---|---|---|---|
| *HT era* | | | |
| 1987-2002 | 1 | | |
| 2000-2018 | 0.95 | 0.70-1.30 | .76 |
| *Cold ischemia time, h* | 1.16 | 1.01-1.34 | .04 |
| *Bicaval surgical technique* | 0.52 | 0.37-0.72 | < .001 |
| *Induction therapy* | 0.56 | 0.41-0.76 | < .001 |

COPD, chronic obstructive pulmonary disease; ECMO, extracorporeal membrane oxygenator; HT, heart transplant; IABP, intra-aortic balloon pump; VAD, ventricular assist device.

## Table 3 of the supplementary data

Univariable parametric regression analysis with Weibull distribution for posttransplant mortality in retransplant compared with the no retransplantation population (imputed population)

| Variable | Hazard ratio | 95%CI | P |
|---|---|---|---|
| Re-HT | 1.81 | 1.53-2.15 | < .001 |
| **Recipient** | | | |
| Age, y | 1.01 | 1.01-1.02 | < .001 |
| Sex, female | 0.88 | 0.81-0.95 | .001 |
| Weight, kg | 1.00 | 1.00-1.00 | .28 |
| Renal dysfunction | 1.34 | 1.24-1.44 | < .001 |
| Pulmonary vascular resistance, Wood units | 1.04 | 1.02-1.06 | < .001 |
| Infection pre-HT | 1.10 | 1.00-1.22 | .05 |
| Diabetes pre-HT | 1.19 | 1.10-1.29 | < .001 |
| COPD pre-HT | 1.12 | 1.02-1.23 | .01 |
| Hypertension pre-HT | 1.11 | 1.04-1.19 | .001 |
| Cytomegalovirus serology (+) | 1.10 | 1.01-1.20 | .02 |

| | | | |
|---|---|---|---|
| *Peripheral vascular disease* | 1.26 | 1.12-1.41 | < .001 |
| *Mechanical ventilation pre-HT* | 1.31 | 1.19-1.43 | < .001 |
| *Circulatory support pre-HT* | | | .95 |
| None | 1 | | |
| IABP | 0.99 | 0.90-1.09 | .88 |
| ECMO | 1.08 | 0.89-1.31 | .45 |
| VAD | 0.98 | 0.83-1.15 | .78 |
| *Cardiac surgery pre-HT* | 1.25 | 1.17-1.34 | < .001 |
| *Neoplasia pre-HT* | 1.16 | 0.99-1.38 | .07 |
| **Donor** | | | |
| *Age, y* | 1.00 | 1.00-1.00 | .68 |
| *Sex, female* | 1.03 | 0.96-1.10 | .44 |
| *Weight, kg* | 0.99 | 0.99-1.00 | < .001 |
| *Cause of death* | | | .85 |
| Traumatic | 1 | | |
| Stroke | 0.98 | 0.92-1.05 | .54 |

| | | | |
|---|---|---|---|
| Other | 1.00 | 0.93-1.09 | .90 |
| *Recipient male/donor female* | 1.14 | 1.06-1.23 | < .001 |
| *Recipient/donor weight ratio* | 1.00 | 1.00-1.00 | < .001 |
| **Surgical procedure** | | | |
| *HT era* | | | |
| 1987-2002 | 1 | | |
| 2000-2018 | 0.64 | 0.60-0.68 | < .001 |
| *Cold ischemia time, h* | 0.99 | 0.96-1.02 | .54 |
| *Bicaval surgical technique* | 0.81 | 0.76-0.86 | < .001 |
| *Induction therapy* | 0.28 | 0.58- 0.66 | < .001 |

COPD, chronic obstructive pulmonary disease; ECMO, extracorporeal membrane oxygenator; HT, heart transplant; IABP, intra-aortic balloon pump; VAD, ventricular assist device.

**Table 4 of the supplementary data**

Missing values

| Variable | N | Percentage |
|---|---|---|
| Recipient age | 0 | 0.0 |
| Recipient sex | 0 | 0.0 |
| Recipient weight | 171 | 2.3 |
| Renal dysfunction | 365 | 4.8 |
| Pulmonary vascular resistance | 1331 | 17.5 |
| Infection pre-HT | 260 | 3.4 |
| Diabetes pre-HT | 288 | 3.8 |
| COPD pre-HT | 460 | 6.1 |
| Hypertension pre-HT | 399 | 5.3 |
| Cytomegalovirus serology (+) | 566 | 7.5 |
| Peripheral vascular disease | 295 | 3.9 |
| Mechanical ventilation pre-HT | 251 | 3.3 |
| Circulatory support pre-HT | 237 | 3.1 |

| | | |
|---|---|---|
| Cardiac surgery pre-HT | 244 | 3.2 |
| Neoplasia pre-HT | 338 | 4.5 |
| Donor age, y | 109 | 1.4 |
| Donor sex | 167 | 2.2 |
| Donor weight, kg | 276 | 3.6 |
| Donor cause of death | 0 | 0.0 |
| Recipient male/donor female | 167 | 2.2 |
| Recipient/donor weight ratio | 392 | 5.2 |
| HT era | 0 | 0.0 |
| Surgical technique | 142 | 1.9 |
| Cold ischemia time, h | 177 | 2.3 |
| Induction therapy | 6 | 0.1 |
| Total missing values | 6641 | 3.6 |
| Cases with missing values | 2381 | 31.4 |

COPD, chronic obstructive pulmonary disease; HT, heart transplant.