**Supplementary Table S1**  Clinical characteristics were compared according to pulsatile bioprosthetic total artificial heart (C-TAH) regulation mode using Mann–Whitney–Wilcoxon test

<table>
<thead>
<tr>
<th></th>
<th>Total population (n = 7)</th>
<th>C-TAH in autoregulated mode (n = 5)</th>
<th>C-TAH in manual mode (n = 2)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y), mean (±SD)</td>
<td>59 (13.4)</td>
<td>54.40 (14.64)</td>
<td>70.50 (3.54)</td>
<td>0.204</td>
</tr>
<tr>
<td>Height (cm), mean (±SD)</td>
<td>180.6 (5.8)</td>
<td>179.60 (6.58)</td>
<td>183.00 (4.24)</td>
<td>0.540</td>
</tr>
<tr>
<td>Weight (kg), mean (±SD)</td>
<td>83.4 (15.4)</td>
<td>89.78 (12.01)</td>
<td>67.50 (12.02)</td>
<td>0.077</td>
</tr>
<tr>
<td>BSA (m²), mean (±SD)</td>
<td>2.04 (0.2)</td>
<td>2.12 (0.18)</td>
<td>1.88 (0.11)</td>
<td>0.142</td>
</tr>
<tr>
<td>INTERMACS profile</td>
<td></td>
<td></td>
<td></td>
<td>0.030</td>
</tr>
<tr>
<td>2</td>
<td>2 (28.6%)</td>
<td>0 (0.0)</td>
<td>2 (100.0)</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>4 (57.2%)</td>
<td>4 (80.0)</td>
<td>0 (0.0)</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>1 (14.2%)</td>
<td>1 (20.0)</td>
<td>0 (0.0)</td>
<td>–</td>
</tr>
<tr>
<td>Dilated idiopathic cardiomyopathy</td>
<td>5 (71.4%)</td>
<td>5 (100.0)</td>
<td>0 (0.0)</td>
<td>0.085</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>6 (85.7%)</td>
<td>5 (100.0)</td>
<td>2 (100.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>4 (57.2%)</td>
<td>3 (60.0)</td>
<td>0 (0.0)</td>
<td>0.546</td>
</tr>
<tr>
<td>Valvulopathy</td>
<td>2 (28.6%)</td>
<td>2 (40.0)</td>
<td>0 (0.0)</td>
<td>0.895</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1 (14.2%)</td>
<td>1 (20.0)</td>
<td>0 (0.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Arterial hypertension</td>
<td>3 (42.8%)</td>
<td>1 (20.0)</td>
<td>2 (100.0)</td>
<td>0.277</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>2 (28.6%)</td>
<td>0 (0.0)</td>
<td>1 (50.0)</td>
<td>0.608</td>
</tr>
<tr>
<td>Peripheral arteriopathy</td>
<td>1 (14.2%)</td>
<td>0 (0.0)</td>
<td>1 (50.0)</td>
<td>0.608</td>
</tr>
<tr>
<td>Adrenal insufficiency</td>
<td>1 (14.2%)</td>
<td>0 (0.0)</td>
<td>1 (50.0)</td>
<td>0.608</td>
</tr>
<tr>
<td>Cardiac amyloidosis</td>
<td>1 (14.2%)</td>
<td>0 (0.0)</td>
<td>1 (50.0)</td>
<td>0.608</td>
</tr>
<tr>
<td>Lower limb edema</td>
<td>1 (14.2%)</td>
<td>1 (20.0)</td>
<td>0 (0.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Stroke</td>
<td>1 (14.2%)</td>
<td>1 (20.0)</td>
<td>0 (0.0)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Abbreviations: BSA, body surface area; C-TAH, Carmat bioprosthetic total artificial heart; SD, standard deviation.
### Supplementary Table S2  Patients’ treatment before and after CTAH implantation

<table>
<thead>
<tr>
<th>Class</th>
<th>Drugs</th>
<th>Before implantation</th>
<th>&lt; 3 mo</th>
<th>Between 3 and 6 mo</th>
<th>&gt; 6 mo</th>
<th>Auto-regulated mode (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manual mode (n = 2)</td>
<td>Auto-regulated mode (n = 5)</td>
<td>Manual mode (n = 2)</td>
<td>Auto-regulated mode (n = 5)</td>
<td>Manual mode (n = 2)</td>
<td>Auto-regulated mode (n = 5)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Amiodarone</td>
<td>1 (50%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Amlodipine</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Atorvastatine</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Bisoprolol</td>
<td>0 (0%)</td>
<td>2 (40%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Digoxine</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Diosmin</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Dobutamine</td>
<td>2 (100%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Eplérénone</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Ivabradine</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Lercanidipine</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Losartan</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Metformin and linagliptin</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Milrinone</td>
<td>0 (0%)</td>
<td>3 (60%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Noradrénaline</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Perindopril</td>
<td>0 (0%)</td>
<td>2 (40%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Ramipril</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (50%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Sildenafil</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>20 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Valsartan</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Furosemide</td>
<td>1 (50%)</td>
<td>3 (60%)</td>
<td>2 (100%)</td>
<td>3 (60%)</td>
<td>2 (100%)</td>
</tr>
<tr>
<td></td>
<td>Hydrochlorothiazide</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Spironolactone</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
<td>2 (100%)</td>
<td>5 (100%)</td>
<td>2 (100%)</td>
</tr>
<tr>
<td></td>
<td>Torasemide</td>
<td>0 (0%)</td>
<td>2 (40%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Anti-infectious</td>
<td>Ciprofloxacin</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Fluconazole</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Imipenem and cilastatin</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Metronidazole</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td>Oxacillin</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Téicoplanine</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (50%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Tetracycline</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Abbreviation: CTAH, Carmat bioprosthetic total artificial heart.
Supplementary Table S3  Linear regression with period of time as an outcome for plasma creatinine, sE-selectin, sEndoglin, and sEPCR

<table>
<thead>
<tr>
<th>Patients implanted with C-TAH in manual mode</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression β coefficients</td>
<td>95% CI</td>
<td>p-Value</td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.007</td>
<td>0.0009</td>
<td>0.014</td>
<td>0.04</td>
</tr>
<tr>
<td>sE-selectin</td>
<td>-6.785e-05</td>
<td>-0.0003</td>
<td>0.0002</td>
<td>0.63</td>
</tr>
<tr>
<td>sEndoglin</td>
<td>0.044</td>
<td>0.008</td>
<td>0.080</td>
<td>0.01</td>
</tr>
<tr>
<td>sEPCR</td>
<td>0.010</td>
<td>0.003</td>
<td>0.018</td>
<td>0.007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients implanted with C-TAH in autoregulated mode</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression β coefficients</td>
<td>95% CI</td>
<td>p-Value</td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>-0.003</td>
<td>-0.013</td>
<td>0.007</td>
<td>0.51</td>
</tr>
<tr>
<td>sE-selectin</td>
<td>-9.805e-05</td>
<td>-0.0003</td>
<td>0.0001</td>
<td>0.35</td>
</tr>
<tr>
<td>sEndoglin</td>
<td>-0.003</td>
<td>-0.021</td>
<td>0.014</td>
<td>0.7</td>
</tr>
<tr>
<td>sEPCR</td>
<td>0.0008</td>
<td>-0.002</td>
<td>0.003</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; C-TAH, Carmat bioprosthetic total artificial heart; sEndoglin, soluble endoglin; sEPCR, soluble endothelial protein C receptor; sE-selectin, soluble E-selectin.

Supplementary Table S4  Level of endothelial/angiogenic biomarkers according to C-TAH mode before implantation

<table>
<thead>
<tr>
<th>Before C-TAH implantation ng/ml [mean (±SD)]</th>
<th>Autoregulated mode (n = 5)</th>
<th>Manual mode (n = 2)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>sE-selectin</td>
<td>5905.40 (1004.57)</td>
<td>7638.75 (433.10)</td>
<td>0.07</td>
</tr>
<tr>
<td>sEndoglin</td>
<td>82.10 (15.78)</td>
<td>52.50 (2.12)</td>
<td>0.06</td>
</tr>
<tr>
<td>sEPCR</td>
<td>160.91 (84.60)</td>
<td>111.85 (26.66)</td>
<td>0.48</td>
</tr>
<tr>
<td>Angiopoietin-1</td>
<td>345.10 (372.85)</td>
<td>74.75 (35.00)</td>
<td>0.38</td>
</tr>
<tr>
<td>Angiopoietin-2</td>
<td>958.90 (468.57)</td>
<td>367.00 (128.69)</td>
<td>0.15</td>
</tr>
<tr>
<td>VEGF-A</td>
<td>40.00 (3.74)</td>
<td>45.00 (8.49)</td>
<td>0.29</td>
</tr>
<tr>
<td>VEGF-R2</td>
<td>760.00 (243.52)</td>
<td>795.75 (126.93)</td>
<td>0.86</td>
</tr>
<tr>
<td>SDF1-α</td>
<td>154.00 (59.46)</td>
<td>142.00 (94.75)</td>
<td>0.84</td>
</tr>
<tr>
<td>c-Kit</td>
<td>673.00 (404.54)</td>
<td>353.25 (41.37)</td>
<td>0.34</td>
</tr>
<tr>
<td>Soluble thrombomodulin</td>
<td>3078.35 (497.64)</td>
<td>7373.35 (2672.51)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Abbreviations: C-TAH, Carmat bioprosthetic total artificial heart; SD, standard deviation; SDF1-α, stromal cell-derived factor 1-α; sEndoglin, soluble endoglin; sEPCR, soluble endothelial protein C receptor; sE-selectin, soluble E-selectin; VEGF-A, vascular endothelial growth factor A; VEGF-R2, vascular endothelial growth factor receptor 2.
Supplementary Table S5  Linear regression for the relationship between endothelial/angiogenic biomarkers levels and creatinine level

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Linear regression model with creatinine</td>
<td>Linear regression model with creatinine</td>
</tr>
<tr>
<td></td>
<td>Regression β coefficients</td>
<td>95% CI</td>
</tr>
<tr>
<td>sE-selectin</td>
<td>0.01</td>
<td>–0.02</td>
</tr>
<tr>
<td>sEndoglin</td>
<td>–0.53</td>
<td>–1.35</td>
</tr>
<tr>
<td>sEPCR</td>
<td>–0.05</td>
<td>–0.30</td>
</tr>
<tr>
<td>Angiopoietin-1</td>
<td>0.01</td>
<td>–0.20</td>
</tr>
<tr>
<td>Angiopoietin-2</td>
<td>0.02</td>
<td>–0.02</td>
</tr>
<tr>
<td>VEGF-A</td>
<td>0.62</td>
<td>–1.08</td>
</tr>
<tr>
<td>VEGFR-2</td>
<td>–0.04</td>
<td>–0.12</td>
</tr>
<tr>
<td>SDF1-α</td>
<td>–0.01</td>
<td>–0.15</td>
</tr>
<tr>
<td>c-Kit</td>
<td>–0.05</td>
<td>–0.13</td>
</tr>
<tr>
<td>Soluble thrombomodulin</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; CTAH, Carmed bioprosthetic total artificial heart; SDF1-α, stromal cell-derived factor 1-α; sEndoglin, soluble endoglin; sEPCR, soluble endothelial protein C receptor; sE-selectin, soluble E-selectin; VEGF-A, vascular endothelial growth factor A; VEGFR2, vascular endothelial growth factor receptor 2.

Note: We set up two linear regression mixed models: Model 1: adjusted on the mode of CTAH; Model 2: adjusted on the mode of CTAH and protein level.