### Supplementary Table 1  Baseline characteristics according to type of minimally invasive approach

|                | Hemisternotomy *(N = 105)* | Right anterior thoracotomy *(N = 59)* | p-Value |
|----------------|-----------------------------|--------------------------------------|---------|
| Age (y)        | 69.4 ± 7.5                  | 64.5 ± 12.2                          | 0.006   |
| Male           | 79 (75.2%)                  | 42 (71.2%)                           | 0.57    |
| Body surface area (m²) | 2.0 ± 0.2                   | 2.0 ± 0.2                            | 0.53    |
| Body mass index (kg/m²) | 29.3 ± 5.2                  | 29.4 ± 5.4                           | 0.86    |
| NYHA class III/IV | 43 (41.0%)                  | 16 (27.1%)                           | 0.08    |
| STS risk of mortality (%) | 1.6 ± 1.2                   | 1.2 ± 0.7                            | 0.023   |
| Diabetes       | 26 (24.8%)                  | 12 (20.3%)                           | 0.52    |
| Hypertension   | 77 (73.3%)                  | 40 (67.8%)                           | 0.45    |
| Peripheral vascular disease | 6 (5.7%)                   | 0 (0.0%)                             | 0.09    |
| Renal dysfunction/ insufficiency | 16 (15.2%)                 | 3 (5.1%)                             | 0.07    |
| Stroke/CVA     | 1 (1.0%)                    | 0 (0.0%)                             | >0.99   |
| Chronic obstructive lung disease | 14 (13.3%)                 | 5 (8.5%)                             | 0.35    |
| Coronary artery disease | 27 (25.7%)                 | 11 (18.6%)                           | 0.30    |
| Left ventricular hypertrophy | 65 (61.9%)               | 19 (32.2%)                           | <0.001  |
| Percutaneous coronary intervention | 8 (7.6%)                   | 6 (10.2%)                            | 0.57    |
| Atrial fibrillation | 9 (8.6%)                  | 3 (5.1%)                             | 0.54    |

Abbreviations: CVA, cerebrovascular accident; NYHA, New York Heart Association; STS, Society of Thoracic Surgeons.
Categorical characteristics are expressed as number (percentage) and continuous characteristics as mean ± standard deviation.

### Supplementary Table 2  Procedural characteristics and early outcomes according to type of minimally invasive approach

|                   | Hemisternotomy *(N = 105)* | Right anterior thoracotomy *(N = 59)* | p-Value |
|-------------------|-----------------------------|--------------------------------------|---------|
| Total cardiopulmonary bypass time | 94.4 ± 31.5                | 101.0 ± 23.9                         | 0.13    |
| Total aortic cross-clamp time      | 69.7 ± 23.1                | 72.8 ± 18.4                          | 0.39    |
| Use of Cor-Knot    | 13 (12.4%)                 | 36 (61.0%)                           | <0.001  |
| Primary indication |                             |                                      | 0.017   |
| Aortic stenosis    | 91 (86.7%)                 | 41 (69.5%)                           |         |
| Aortic regurgitation | 3 (2.9%)                  | 7 (11.9%)                            |         |
| Mixed              | 11 (10.5%)                 | 0 (0.0%)                             |         |
| Concomitant procedures |                              |                                      |         |
| CABG               | 0 (0.0%)                   | 0 (0.0%)                             |         |
| Ascending aorta repair | 0 (0.0%)                 | 0 (0.0%)                             |         |
| Left atrial appendage closure | 0 (0.0%)                | 0 (0.0%)                             |         |
| Other              | 0 (0.0%)                   | 0 (0.0%)                             |         |
| Valve size (mm)    | 23.3 ± 2.0                 | 23.2 ± 2.3                           | 0.62    |
| 17 mm              | 0 (0.0%)                   | 0 (0.0%)                             |         |
| 19 mm              | 4 (3.8%)                   | 4 (6.8%)                             |         |
| 21 mm              | 21 (20.0%)                 | 16 (27.1%)                           |         |
| 23 mm              | 44 (41.9%)                 | 17 (28.8%)                           |         |
| 25 mm              | 25 (23.8%)                 | 15 (25.4%)                           |         |
| 27 mm              | 11 (10.5%)                 | 7 (11.9%)                            |         |
| 29 mm              | 0 (0.0%)                   | 0 (0.0%)                             |         |
### Supplementary Table 2 (Continued)

| Early outcomes<sup>a,b</sup> | Hemisternotomy | Right anterior thoracotomy | p-Value |
|-------------------------------|----------------|---------------------------|---------|
| (N = 105)                     | (N = 59)       |                           |         |
| All-cause mortality           | 1.0% (0.1–6.6%) | 0.0% (NA) | 0.45 |
| (n = 1)                       | (n = 0)        |                           |         |
| Thromboembolism               | 1.0% (0.1–6.6%) | 3.4% (0.9–12.9%) | 0.26 |
| (n = 1)                       | (n = 2)        |                           |         |
| Major hemorrhage<sup>c</sup>  | 1.0% (0.1–6.6%) | 0.0% (NA) | 0.45 |
| (n = 1)                       | (n = 0)        |                           |         |
| Major paravalvular leak       | 0.0% (NA)      | 0.0% (NA) | 0.45 |
| (n = 0)                       | (n = 0)        |                           |         |
| Endocarditis                  | 0.0% (NA)      | 0.0% (NA) | 0.45 |
| (n = 0)                       | (n = 0)        |                           |         |
| Nonstructural valve dysfunction| 0.0% (NA)      | 0.0% (NA) | 0.45 |
| (n = 0)                       | (n = 0)        |                           |         |
| Reintervention                | 1.0% (0.1–6.6%) | 0.0% (NA) | 0.45 |
| (n = 1)                       | (n = 0)        |                           |         |
| Permanent pacemaker implantation| 3.8% (1.4–9.8%) | 1.7% (0.2–11.4%) | 0.46 |
| (n = 4)                       | (n = 1)        |                           |         |

Abbreviation: CABG, coronary artery bypass grafting; NA, not available.
Categorical characteristics are expressed as number (percentage) and continuous characteristics as mean ± standard deviation.
<sup>a</sup>Data are the Kaplan–Meier event rate, 95% confidence interval, and number of patients with an event.
<sup>b</sup>p-Value from log-rank test through 30 days.
<sup>c</sup>Only anticoagulated-related hemorrhage events included.

### Supplementary Table 3 Summary of adverse events according to type of minimally invasive approach at 3 years follow-up<sup>a</sup>

|                | Hemisternotomy | Right anterior thoracotomy | p-Value<sup>b</sup> |
|----------------|----------------|---------------------------|---------------------|
| (N = 105)      | (N = 59)       |                           |                     |
| All-cause mortality | 4.9% (2.1–11.5%) | 1.7% (0.2–11.4%) | 0.31 |
| (n = 5)        | (n = 1)        |                           |                     |
| Cardiac-related mortality | 3.9% (1.5–10.1%) | 1.7% (0.2–11.4%) | 0.44 |
| (n = 4)        | (n = 1)        |                           |                     |
| Valve-related mortality | 1.0% (0.1–7.0%)  | 1.7% (0.2–11.4%)  | 0.71 |
| (n = 1)        | (n = 1)        |                           |                     |
| Thromboembolism | 1.9% (0.5–7.5%) | 7.0% (2.7–17.6%) | 0.18 |
| (n = 2)        | (n = 4)        |                           |                     |
| Valve thrombosis | 0.0% (NA)     | 0.0% (NA) | 0.36 |
| (n = 0)        | (n = 0)        |                           |                     |
| Major hemorrhage<sup>c</sup> | 7.3% (3.5–14.7%) | 3.5% (0.9–13.2%) | 0.36 |
| (n = 7)        | (n = 2)        |                           |                     |
| Major paravalvular leak | 0.0% (NA)     | 0.0% (NA) | 0.36 |
| (n = 0)        | (n = 0)        |                           |                     |
| Endocarditis   | 3.1% (1.0–9.2%) | 3.4% (0.9–12.9%) | 0.89 |
| (n = 3)        | (n = 2)        |                           |                     |
| Nonstructural valve dysfunction | 0.0% (NA)     | 0.0% (NA) | 0.89 |
| (n = 0)        | (n = 0)        |                           |                     |
| Reintervention | 3.0% (1.0–9.0%) | 3.4% (0.9–12.9%) | 0.89 |
| (n = 3)        | (n = 2)        |                           |                     |
| Explant        | 3.0% (1.0–9.0%) | 3.4% (0.9–12.9%) | 0.89 |
| (n = 3)        | (n = 2)        |                           |                     |

Abbreviation: NA, not available.
<sup>a</sup>Data are the Kaplan–Meier event rate, 95% confidence interval, and number of patients with an event.
<sup>b</sup>p-Value from log-rank test through 3 years.
<sup>c</sup>Only anticoagulated-related hemorrhage events included.
# Supplementary Table 4 Baseline characteristics according to the use of Cor-Knot

|                     | Cor-Knot     | No Cor-Knot  | p-Value |
|---------------------|--------------|--------------|---------|
|                     | (N = 49)     | (N = 115)    |         |
| Age (y)             | 66.5 ± 11.5  | 68.1 ± 8.8   | 0.39    |
| Male                | 32 (65.3%)   | 89 (77.4%)   | 0.11    |
| Body surface area (m²) | 2.0 ± 0.3   | 2.0 ± 0.2    | 0.65    |
| Body mass index (kg/m²) | 30.5 ± 6.1  | 28.8 ± 4.8   | 0.09    |
| NYHA class III/IV   | 12 (24.5%)   | 47 (40.9%)   | 0.045   |
| STS risk of mortality (%) | 1.4 ± 0.8   | 1.4 ± 1.2    | 0.74    |
| Diabetes            | 13 (26.5%)   | 25 (21.7%)   | 0.51    |
| Hypertension        | 36 (73.5%)   | 81 (70.4%)   | 0.69    |
| Peripheral vascular disease | 0 (0.0%)   | 6 (5.2%)     | 0.18    |
| Renal dysfunction/ insufficiency | 4 (8.2%)   | 15 (13.0%)   | 0.44    |
| Stroke/CVA          | 0 (0.0%)     | 1 (0.9%)     | >0.99   |
| Chronic obstructive lung disease | 4 (8.2%)   | 15 (13.0%)   | 0.44    |
| Coronary artery disease | 13 (26.5%) | 25 (21.7%)   | 0.51    |
| Left ventricular hypertrophy | 21 (42.9%) | 63 (54.8%)   | 0.16    |
| Percutaneous coronary intervention | 7 (14.3%) | 7 (6.1%)     | 0.09    |
| Atrial fibrillation | 3 (6.1%)     | 9 (7.8%)     | >0.99   |

Abbreviations: CVA, cerebrovascular accident; NYHA, New York Heart Association; STS, Society of Thoracic Surgeons. Categorical characteristics are expressed as number (percentage) and continuous characteristics as mean ± standard deviation.

# Supplementary Table 5 Procedural characteristics and early outcomes according to the use of Cor-Knot

|                     | Cor-Knot     | No Cor-Knot  | p-Value |
|---------------------|--------------|--------------|---------|
|                     | (N = 49)     | (N = 115)    |         |
| Total cardiopulmonary bypass time | 97.0 ± 23.5  | 96.7 ± 31.2  | 0.94    |
| Total aortic cross-clamp time      | 70.2 ± 17.9  | 71.1 ± 23.0  | 0.80    |
| Primary indication               |              |              | 0.07    |
| Aortic stenosis                 | 35 (71.4%)   | 97 (84.3%)   |         |
| Aortic regurgitation            | 6 (12.2%)    | 4 (3.5%)     |         |
| Mixed                           | 8 (16.3%)    | 14 (12.2%)   | <0.001  |
| Minimally invasive approach     |              |              |         |
| Right anterior thoracotomy      | 36 (73.5%)   | 23 (20.0%)   |         |
| Hemisternotomy                  | 13 (26.5%)   | 92 (80.0%)   |         |
| Valve size (mm)                 |              |              | 0.69    |
| 17 mm                           | 0 (0.0%)     | 0 (0.0%)     |         |
| 19 mm                           | 4 (8.2%)     | 4 (3.5%)     |         |
| 21 mm                           | 13 (26.5%)   | 24 (20.9%)   |         |
| 23 mm                           | 13 (2.5%)    | 48 (41.7%)   |         |
| 25 mm                           | 13 (2.5%)    | 27 (23.5%)   |         |
| 27 mm                           | 6 (12.2%)    | 12 (10.4%)   |         |
| 29 mm                           | 0 (0.0%)     | 0 (0.0%)     |         |
| Early outcomes<sup>a,b</sup>    |              |              |         |
| All-cause mortality            | 0.0% (NA)    | 0.9% (0.1–6.0%) | 0.51    |

<sup>a</sup> All-cause mortality of patients with coronary artery disease at 30 days; <sup>b</sup> All-cause mortality of patients with atrial fibrillation at 30 days.
## Supplementary Table 5 (Continued)

|                          | Cor-Knot  | No Cor-Knot | p-Value |
|--------------------------|-----------|-------------|---------|
|                          | (N = 49)  | (N = 115)   |         |
| Thromboembolism          | 4.1% (1.0–15.3%) | 0.9% (0.1–6.0%) | 0.17    |
|                          | (n = 2)   | (n = 1)     |         |
| Major hemorrhage<sup>c</sup> | 0.0% (NA) | 0.9% (0.1–6.1%) | 0.51    |
|                          | (n = 0)   | (n = 1)     |         |
| Major paravalvular leak  | 0.0% (NA) | 0.0% (NA)   |         |
|                          | (n = 0)   | (n = 0)     |         |
| Endocarditis             | 0.0% (NA) | 0.0% (NA)   |         |
|                          | (n = 0)   | (n = 0)     |         |
| Nonstructural valve dysfunction | 0.0% (NA) | 0.0% (NA)   |         |
|                          | (n = 0)   | (n = 0)     |         |
| Reintervention           | 0.0% (NA) | 0.9% (0.1–6.0%) | 0.52    |
|                          | (n = 0)   | (n = 1)     |         |

Abbreviation: NA, not available. Categorical characteristics are expressed as number (percentage) and continuous characteristics as mean ± standard deviation.

<sup>a</sup>Data are the Kaplan–Meier event rate, 95% confidence interval, and number of patients with an event.

<sup>b</sup>p-Value from log-rank test through 30 days.

<sup>c</sup>Only anticoagulated-related hemorrhage events included.