### Supplementary Table 1: Preoperative baseline characteristics of patients undergoing transthoracic device closure of VSD.

| Characteristics                          | Pre-propensity matching | Post-propensity matching |
|------------------------------------------|-------------------------|--------------------------|
|                                          | LPMS        | LAMT        | P-value | LPMS        | LAMT        | P-value |
| Sample size (n)                          |            |            |         |            |            |         |
| Age, years                               | 1–5        | 2–21       | <0.001  | 1–4        | 3–4        | 0.068   |
| F/M                                      | 41/39      | 36/40      | 0.628   | 14/19      | 16/17      | 0.621   |
| Weight, kg                               | 8.375–17.625 | 11.750–49.250 | <0.001 | 9–15      | 12–16      | 0.073   |
| Clinical manifestations                   |            |            |         |            |            |         |
| Pneumonia                                | 22 (27.5)  | 16 (21.1)  | 0.348   | 7 (21.2)   | 7 (21.2)   | 1.000   |
| Cardiac function                         |            |            |         |            |            |         |
| I                                        | 63 (78.8)  | 68 (89.5)  |         | 27 (81.8)  | 31 (93.9)  |         |
| II                                       | 16 (20.0)  | 8 (10.5)   | 0.098   | 6 (18.2)   | 2 (6.1)    | 0.137   |
| III                                      | 1 (1.25)   | 0          |         | 0          | 0          |         |
| IV                                       | 0          | 0          |         | 0          | 0          |         |
| Associated with ASD                      | 16 (20.0)  | 8 (10.5)   | 0.101   | 5 (11.9)   | 4 (12.1)   | 1.000   |
| Arrhythmia                               | 3 (3.8)    | 2 (2.6)    | 1.000   | 0          | 1 (2.4)    | 1.000   |
| Echocardiographic data                   |            |            |         |            |            |         |
| Defect size, mm                          | 5.016 ± 2.895 | 4.336 ± 1.681 | 0.073  | 3.645 ± 1.208 | 3.797 ± 1.665 | 0.674  |
| EF, %                                    | 69.125 ± 2.995 | 68.513 ± 3.096 | 0.212  | 69.7 ± 2.7   | 69.4 ± 1.9  | 0.562   |
| Tricuspid regurgitation                  |            |            |         |            |            |         |
| No                                       | 41 (51.5)  | 32 (42.1)  |         | 19 (57.6)  | 16 (48.5)  |         |
| Mild                                     | 34 (42.5)  | 43 (56.6)  |         | 12 (36.4)  | 17 (51.5)  | 0.228   |
| Moderate                                 | 5 (6.3)    | 1 (1.3)    |         | 2 (6.1)    | 0          |         |
| Condition                                  | 0.527  | 76 (95.0) | 70 (92.1) | 32 (97.0) | 32 (97.0) | 1.000  |
|-------------------------------------------|--------|-----------|-----------|-----------|-----------|--------|
| Aortic regurgitation                      |        | No        | Mild      |           |           |        |
|                                           |        | 76 (95.0) | 70 (92.1) | 32 (97.0) | 32 (97.0) |        |
|                                           |        | Mild      |           |           |           |        |
|                                           |        | 4 (5.0)   | 6 (7.9)   | 1 (3.0)   | 1 (3.0)   |        |
| Pulmonary arterial hypertension           | 0.562  | No        | Mild      | Moderate  | Severe    |        |
|                                           |        | 62 (77.5) | 7 (8.8)   | 8 (10.0)  | 3 (3.8)   |        |
|                                           |        | 64 (84.2) | 7 (9.2)   | 4 (5.3)   | 4 (5.3)   |        |
|                                           |        |           | 32 (97.0) |           | 0         |        |
|                                           |        |           | 29 (87.8) |           | 2 (6.1)   |        |
|                                           |        |           |           | 0         | 2 (6.1)   |        |
|                                           |        |           |           |           | 0         |        |
| Anatomic classifications of VSD           | 0.141  | Intracristal type | Membranous aneurysm type | Muscular type | Perimembranous type |        |
|                                           |        | 2 (2.5)   | 14 (17.5) | 3 (3.8)   | 61 (76.3) |        |
|                                           |        | 4 (5.3)   | 23 (30.3) | 1 (1.3)   | 48 (63.2) |        |
|                                           |        |           | 6 (18.2)  | 0         | 26 (78.8) |        |
|                                           |        |           | 6 (18.2)  | 1 (3.0)   | 25 (75.8) |        |

Data are expressed as mean ± standard deviation or n (%). LAMT: Left anterior minithoracotomy; LPMS: Lower partial median sternotomy; VSD: Ventricular septal defect.
Supplementary Table 2: Procedural details and early postoperative results of patients undergoing transthoracic device closure of VSD with two methods.

| Procedural details and early postoperative results | Pre-propensity matching | Post-propensity matching | P-value | Pre-propensity matching | Post-propensity matching | P-value |
|---------------------------------------------------|-------------------------|--------------------------|---------|-------------------------|--------------------------|---------|
|                                                   | LPMS | LAMT |       | LPMS | LAMT |       |
| Sample size (n)                                   | 80   | 76   | –     | 33   | 33   | –     |
| Closure of ASD                                    | 11 (13.8) | 4 (5.3) | 0.127 | 3 (9.1) | 1 (3.0) | 0.613 |
| Shedding of occluder                              | 1 (1.25) | 0 | 1.000 | 0 (0.0) | 0 (0.0) | 1.000 |
| Intracardiac operation time, min                  | 8.588 ± 4.133 | 9.987 ± 5.805 | 0.087 | 8.061 ± 4.138 | 9.061 ± 5.607 | 0.413 |
| Incision and suture time, min                     | 57.263 ± 15.117 | 40.355 ± 8.322 | <0.001 | 57.576 ± 14.031 | 41.030 ± 8.991 | <0.001 |
| Hospital stay time, days                          | 14.550 ± 7.890 | 11.829 ± 5.335 | 0.012 | 13.515 ± 6.006 | 11.758 ± 5.472 | 0.219 |
| Hospitalization cost, RMB yuan                    | 49,527 ± 24,673 | 49,316 ± 15,203 | 0.949 | 44,093 ± 13,568 | 48,809 ± 14,462 | 0.177 |
| Operative success                                 | 75 (93.8) | 73 (96.1) | 0.720 | 32 (97.0) | 31 (93.9) | 1.000 |
| C/E                                               | 528.01 | 513.17 | – | 454.57 | 519.80 | – |
| ICER (ΔC/ΔE)                                      | –91.74 | – | – | –1521.29 | – | – |
| Arrhythmia after surgery                          |        |        |      |        |        |      |
| CAB                                               | 1 (1.3) | 1 (1.3) | 1.000 | 1 (3.0) | 1 (3.0) | 1.000 |
| NCAB                                              | 6 (7.5) | 2 (2.6) | 0.278 | 3 (9.1) | 1 (3.0) | 0.613 |
| Tricuspid regurgitation                           |        |        |      |        |        |      |
| No                                                | 41 (51.3) | 44 (57.9) | 18 (54.5) | 19 (57.6) |        |      |
| Mild                                              | 32 (40.0) | 32 (42.1) | 0.624 | 15 (45.5) | 14 (42.4) | 1.000 |
| Tolerable                                        | 2 (2.5) | 0 | 0 | 0 | 0 |    |
| Aortic regurgitation                              |        |        |      |        |        |      |
| No                                                | 73 (91.3) | 75 (98.7) | 30 (90.9) | 31 (93.9) |        |      |
| Mild                                              | 7 (8.7) | 1 (1.3) | 3 (9.1) | 2 (6.1) |        |      |
| Residual shunt hospitalization                    | 6 (7.5) | 0 | 0.029 | 1 (3.0) | 0 | 1.000 |
| Residual shunt 3 months                           | 1 (1.3) | 0 | 1.000 | 0 | 0 | 1.000 |

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