**Supplementary Table 1: Clinical characteristics of admission and perioperative data** **of VSR patients (N=9)**

|  |  |  |  |
| --- | --- | --- | --- |
| SurCOP(N=9) | | SurCOP (N=9) | |
| Characteristics on admission |  | **Preoperative characteristics** |  | |
| Age (years), mean (SD) | 61 ± 6.5 | NYHA class, n (%) |  | |
| Male sex, n (%) | 8 (88.9) | II | 1 (11.1) | |
| Killip class, n (%) |  | III | 1 (11.1) | |
| I-II | 3 (33.3) | IV | 7 (77.8) | |
| III-IV | 6 (66.7) | Preoperative hemodynamic instability | 9 (100) | |
| AMI to VSR time, (days) | 3.0 [2.0-5.0] | Preoperative inotropes, n (%) | 9 (100) | |
| Size of main VSR, (mm) | 15.0 [14.5-20.0] | Preoperative IABP, n (%) | 6 | |
| VSR location, n (%) |  | Preoperative ECMO, n (%) | 1 | |
| Apical | 5 (55.6) | Preoperative IABP+ECMO, n (%) | 1 | |
| Anterior | 2 (22.2) | Preoperative CAG | 9 (100) | |
| Inferior | 2 (22.2) | Negative | 1 (11.1) | |
| Hemodynamic instability, n (%) | 7 (77.8) | LAD | 6 (66.7) | |
| STEMI | 8 (88.9) | RCA | 2 (22.2) | |
| Thrombolysis outside | 1 (11.1) | LCX | 0 | |
| Comorbidities, n (%) |  | Infarct territory |  | |
| Smoking (Current /Former) | 4 (44.4) | Anterior | 7 (77.8) | |
| Drinking (Current /Former) | 3 (33.3) | Inferior | 2 (22.2) | |
| Hypertension | 5 (55.6) | Preoperative PCI, n (%) | 2 (22.2) | |
| Diabetes mellitus | 4 (44.4) | AMI to CAG time, (days) | 15.0 [4.0 – 21.5] | |
| History of MI | 0 | AMI to operation time, (days) | 14.0 [10.0 – 15.5] | |
| History of stroke/TIA | 1 (11.1) | VSR to operation time, (days) | 10.0 [8.0 - 13.0] | |
| Established hyperlipidemia\* | 1 (1.1) | **Intraoperative characteristics** |  | |
| Examinations |  | Ventricular aneurysm resection, n (%) | 5 (55.6) | |
| Heart rate, (b.p.m.) | 99.0 ± 16.6 | Concomitant CABG, n (%) | 5 (55.6) | |
| SBP, (mmHg) | 102.9 ± 14.8 | Concomitant valve repair, n (%) | 1 (11.1) | |
| DBP, (mmHg) | 66.7 ± 9.6 | Red blood cell transfusion, n (%) | 9 (100) | |
| LVEF, (%) | 53.6 ± 6.7 | Operation failure, n (%) | 0 | |
| NT-pro BNP, (pg/mL) | 5841.0 [3896.0-14596.5] | **Postoperative characteristics** |  | |
| CK-MB, (mmol/L) | 23.0 [17.0-48.0] | Postoperative IABP, n (%) | 3 (33.3) | |
| CTnI, (mmol/L) | 8.24 [4.01-29.9] | Postoperative CRRT, n (%) | 2 (22.2) | |
| Hemoglobin, (g/L) | 125.9 ± 18.9 | Residual VSR, n (%) | 0 | |
| WBC, (103/μL) | 13.1 [11.3-16.99] | Postoperative hemolysis, n (%) | 0 | |
| Creatinine, (µmol/L) | 129.0 [97.5-168.8] | Postoperative Pneumonia, n (%) | 4 (44.4) | |
| eGFR, (mL/min/1.73 m2) | 52.8 ± 29.6 | Length of ICU stays, (days) | 10.0 [6.25 - 19.0] | |
| LDH, (mmol/L) | 890.0 [581.0-1839.5] | 30-day mortality, n (%) | 1/9 (11.1%) | |
|  |  | Overall mortality, n (%) | 2/9 (22.2%) | |

\* Established dyslipidemia: patients were established diagnose of hyperlipidemia before admission. VSR (ventricular septal rupture), AMI (Acute myocardial infarction), STEMI (ST-segment elevated myocardial infarction), TIA (transient ischemic attack), SBP (systolic blood pressure), DBP (diastolic blood pressure), LVEF (left ventricular eject fraction), NT-pro BNP (N-terminal pro-b-type natriuretic peptide), CK-MB(creatine kinase MB), CTNI (cardiac troponin I), WBC (white blood cell), eGFR (estimated glomerular filtration rate), LDH (lactate dehydrogenase), NYHA (New York Heart Association), IABP (intra-aortic balloon pump), ECMO (Extracorporeal membrane oxygenation), CAG (coronary angiography), LAD (left anterior descending coronary), RCA (right coronary artery), LCX (left circumflex coronary artery), PCI (percutaneous coronary intervention), CABG (coronary artery bypass surgery), CRRT (continuous renal replacement therapy), ICU (intensive care unit)

**Supplementary Table 2: Individual characteristics of VSR patients receiving SurCOP**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient  No. | Date of operation | AMI to operation (days) | Age | Sex | VSR location | Main VSR size  (mm) | Culprit artery | Revascularization therapy | NYHA classification | Hemodynamic instability pre-operation | PDA occluder size | Concomitant Operation, complication,  post-operation support | ICU stays  (days) | 30-day  survival | Survival time  (days) | Survival at last follow-up | Cause of death |
| 1 | 2017-08-28 | 14 | 65 | M | Apical | 20.0 | LAD | - | IV | Y | 24/26 | Ventricular aneurysm resection, IABP, CRRT | 19.0 | N | 7.0 | N | Abdominal haemorrhage\* |
| 2 | 2017-12-17 | 10 | 60 | F | Anterior | 14.0 | LAD | CABG | II | Y | 20/22 |  | 19.0 | Y | 611.0 | Y |  |
| 3 | 2018-01-10 | 15 | 54 | M | Apical | 20.0 | LAD | - | IV | Y | 18/20 | Ventricular aneurysm resection | 9.0 | Y | 587.0 | Y |  |
| 4 | 2018-03-24 | 12 | 64 | M | Posterior | 20.0 | RCA | CABG | III | Y | 24/26 |  | 3.0 | Y | 514.0 | Y |  |
| 5 | 2018-07-07 | 9 | 71 | M | Anterior | 15.0 | LAD | CABG | IV | Y | 16/18 | Ventricular aneurysm resection, IABP, CRRT | 11.0 | Y | 44.0 | N | Hemorrhagic stroke# |
| 6 | 2018-12-21 | 16 | 64 | M | Apical | 18.0 | - | - | IV | Y | 24/26 | Ventricular aneurysm resection | 6.0 | Y | 272.0 | Y |  |
| 7 | 2019-02-14 | 28 | 69 | M | Apical | 15.0 | LAD | PCI | IV | Y | 20/22 | Tricuspid annuloplasty | 21.0 | Y | 187.0 | Y |  |
| 8 | 2019-02-26 | 10 | 57 | M | Posterior | 15.0 | RCA | PCI+CABG | IV | Y | 20/22 | IABP | - | Y | 175.0 | Y |  |
| 9 | 2019-05-16 | 15 | 52 | M | Apical | 18.0 | LAD | CABG | IV | Y | 24/26 | Ventricular aneurysm resection | 7.0 | Y | 96.0 | Y |  |

VSR (ventricular septal rupture), SurCOP (surgical repair combining occluder and patch), M(male), F(female), LAD (left anterior descending coronary), RCA (right coronary artery), PCI (percutaneous coronary intervention), CABG (coronary artery bypass grafting), NYHA (New York Heart Association), Y (yes), N (no), IABP (intra-aortic balloon pump), CRRT (continuous renal replacement therapy), ICU (intensive care unit), Abdominal haemorrhage\*: confirmed by laparotomy; Hemorrhagic stroke#: confirmed by a head computer tomography examination. Survival time was calculated from the day after VSR operation till the last follow-up (August 20, 2019)

**Supplementary Figure 1:**

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**Kaplan–Meier survival analysis for long-term survival rate after VSR was diagnosed (SurCOP(N=9) VS Conservative therapy(N=54)).**

VSR (ventricular septal rupture), SurCOP (surgical repair combining occluder and patch).