Infarct Exclusion Repair of Post-MI Ventricular Septal Rupture Using a Hybrid Patch and Septal Occluder Device Compared to Patch Alone

Introduction: We sought to enhance the infarct exclusion with patch technique for post-myocardial infarction (MI) ventricular septal defect (VSD) by incorporating a nitinol-mesh septal occluder device to provide a scaffold for the damaged septal wall. Here, we compare outcomes of post-MI VSD patients repaired using a patch only or hybrid technique with a patch and catheter-based septal occluder device. Methods: We reviewed patients undergoing post-MI VSD repair at our institution from 2013-2021. All VSDs were approached via right or left ventriculotomy and had infarct exclusion with patch. Hybrid repair patients also had a catheter-based septal occluder device delivered surgically under direct vision (Figure 1). Clinical outcomes and echocardiograms were assessed. Results: Over this period, 23 patients had post-MI VSD repair; 10 patients (4 female; age 69.4±7.3 yrs) received hybrid repair and 13 patients (4 female; age 64.3±5.5 yrs) received patch only. Pre-operative IABPs were placed for shock in 90% of hybrid and 92% of patch only patients (P=0.85). Time to surgery was similar between groups (hybrid: 147.7±281.0 hrs; patch only: 198.2±241.4 hrs; P=0.65). CABG was performed in 70% of hybrid and 53% of patch only patients (P=0.43) and valve repair/replacement in 40% and 38%, respectively (P=0.94). CPB time (hybrid: 220.8±73.8 mins; patch only: 128.7±44 mins; P=0.39) and cross-clamp time (hybrid: 196.2±55.8 mins; patch only: 105.8±29.5 mins; P=0.18) were similar. VSD size was comparable between groups (hybrid: 18±5.8mm; patch only: 17±4.6mm; P=0.66). In the hybrid cohort, average septal occluder device size was 25.4±5.4mm. Preoperative LVEF (hybrid: 44.5±9.6%; patch only: 46.1±5.7%; P=0.91) and postoperative LVEF (hybrid: 45±11.9%; patch only: 43.1±13%; P=0.52) were similar. Severe postoperative RV function worsened or persisted in 10% of hybrid and 54% of patch only patients (P=0.029). Permanent pacemaker placement was 0% in hybrid and 38% in patch only patients (P=0.026). There was no intraoperative mortality and postoperative ECMO was used in 21% of patients. Survival to hospital discharge in both cohorts was 70% (P=0.96) and 1-year survival was 50% in the hybrid and 46% in the patch only patients (P=0.85). Conclusions: Post-MI VSD repair with a patch and septal occluder device had comparable short-term outcomes to patch alone repair. RV function may be enhanced with the addition of a septal occluder device to the infarct exclusion with patch technique.

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Figure 1. Hybrid post-MI VSD repair technique showing (a) inferior wall VSD, (b) direct deployment of septal occluder device, (c) infarct exclusion with bovine pericardial patch, (d) closure of ventriculotomy with Teflon felt.