Robotic Advanced Hybrid Coronary Revascularization: Outcomes with Two Internal Thoracic Artery Grafts and Stents

Objective:
Advanced hybrid coronary revascularization (AHCR) is defined by the integration of sternal sparing multivessel CABG and PCI in patients with CAD. It has been described mainly using a robotic totally endoscopic (TECAB) approach with bilateral internal thoracic artery grafts. We sought to review our AHCR experience over an 8-year period using robotic TECAB and PCI.

Methods:
Between 8/2013 to 9/2021 627 patients underwent robotic TECAB at our institution. Of the 273 TECAB patients assigned to a hybrid revascularization strategy, 144 patients received bilateral internal thoracic artery (BITA) grafts and are the subject of this review. Patients underwent PCI with drug-eluting stents before or after TECAB, which was performed using a robotic beating heart approach. We retrospectively reviewed early and midterm outcomes up to 7 years in this cohort of intention-to-treat AHCR patients.

Results:
Mean age was 65+10 years and 21 patients (15%) were female. Mean STS PROM was 1.29+1.61. 24 patients (17%) had >70% left-main disease, and 135 patients (94%) had triple-vessel disease. Mean operative time was 311+54 minutes, and mean hospital LOS was 2.8+1.1 days. All patients had bilateral internal thoracic artery grafts and the total number of grafts was 308. TECAB x2 occurred in 125 patients (87%), TECABx3 occurred in 18 patients (12.5%) and one patient had TECABx4. Mean number of vessels bypassed per patient was 2.14+0.4; mean number of vessels stented was 1.2+0.5. The RCA was stented in 75% of patients, the Circumflex artery in 19% and the Ramus/Diagonal branch in 4%. Left main was stented in 2%.
TECAB first was planned in 127 patients (88%), and PCI first in 17 patients (12%). In the TECAB first group, 6 patients had an unsuccessful attempt at PCI; 7 patients declined PCI after TECAB; and 14 patients did not undergo PCI because of a change in management plan (due to negative stress test postoperatively or because the target intended for PCI was grafted during TECAB).
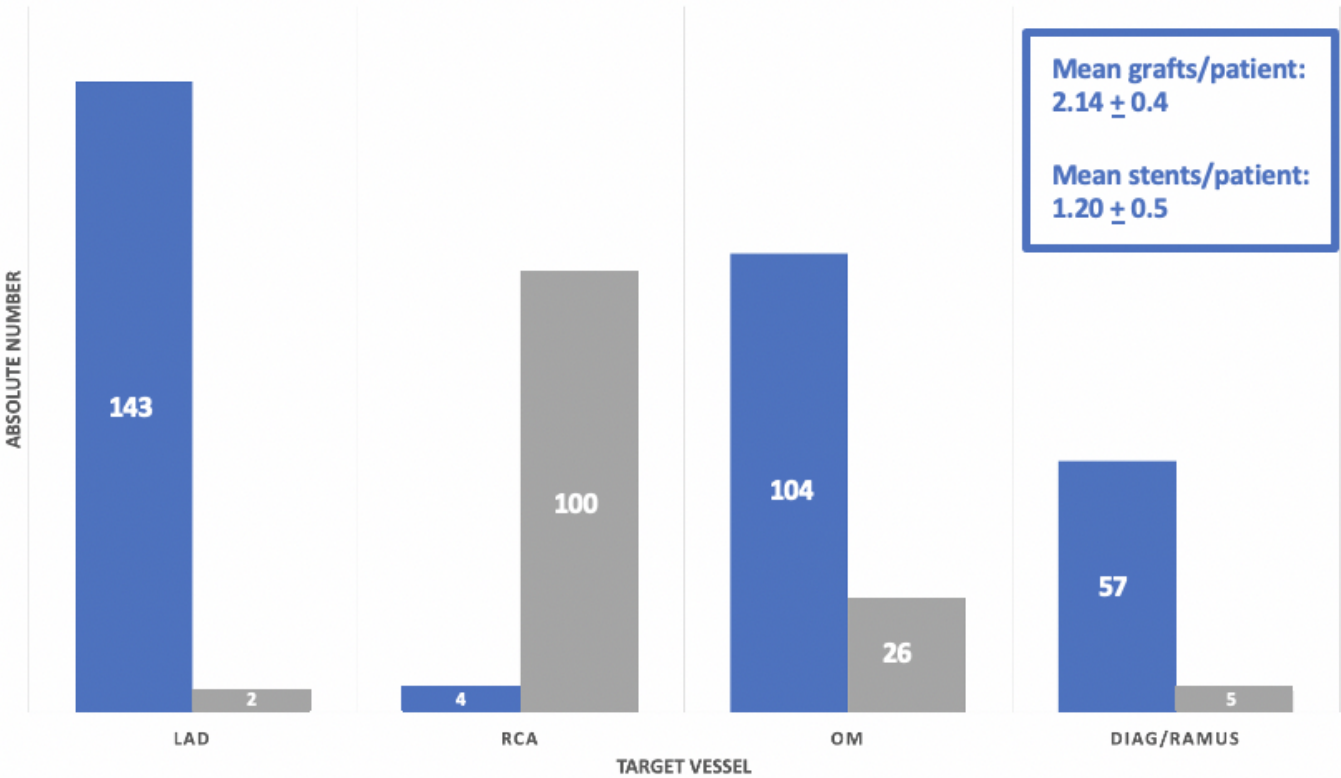Early mortality occurred in 2 patients, one from complications of liver failure and one from an undiagnosed acute respiratory syndrome during the SARS-CoV-2 pandemic. Early overall graft patency was 97% (193/198 grafts); LIMA-LAD patency was 100% (63/63 grafts). At 7-year follow-up in 142 patients (mean 32+23 months), all-cause and cardiac-related mortality were 9.9% and 3.5%, respectively. Freedom from MACE including repeat revascularization was 93%.

Conclusions:
In patients with multivessel CAD, integrating robotic multi-vessel TECAB with PCI resulted in excellent early and midterm outcomes. The robotic endoscopic approach allows the routine use of multiple arterial grafting during HCR in experienced hands. Further studies are warranted

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TARGET VESSEL IN ADVANCED HYBRID CORONARY REVASCULARIZATION USING BITA

■ Bypass   ■ PCI

Mean grafts/patient: 2.14 $\pm$ 0.4

Mean stents/patient: 1.20 $\pm$ 0.5

ABSOLUTE NUMBER

LAD: 143, 2
RCA: 4, 100
OM: 104, 26
DIAG/RAMUS: 57, 5

TARGET VESSEL

Clinical Outcomes

Early Graft Patency — 97
LIMA-LAD Patency — 100
Freedom from Cardiac Mortality — 96.5
Freedom from MACE & Repeat Revasc — 93

%

■ Bypass   ■ PCI