

Hybrid Revascularization Reduces Morbidity and Hospital Length of Stay: A Risk-Stratified Single Center Analysis



M. Kasim Fatmi¹ | Samip Vasaiwala, MD² | Lucian Lozonschi, MD²

Nova Southeastern University¹ | University of South Florida, Tampa General Hospital²



Objective

Hybrid Coronary Revascularization (HCR) combines durable surgical left internal mammary artery (LIMA) to left anterior descending (LAD) grafts with the minimal invasiveness of percutaneous coronary intervention (PCI).

This study aims to evaluate outcomes and resource utilization of HCR compared to conventional sternotomy On-Pump Coronary artery bypass grafting (CABG) specifically within an elective population to minimize patient acuity as a confounding variable.

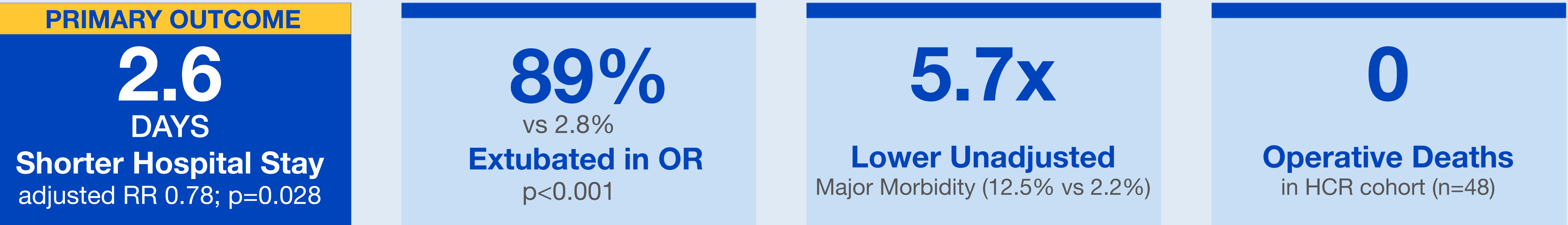
Methods

A single-center retrospective STS database review identified patients undergoing elective coronary revascularization, stratified into: On-Pump CABG (n=289) and HCR (robotic LIMA-LAD + PCI, n=48).

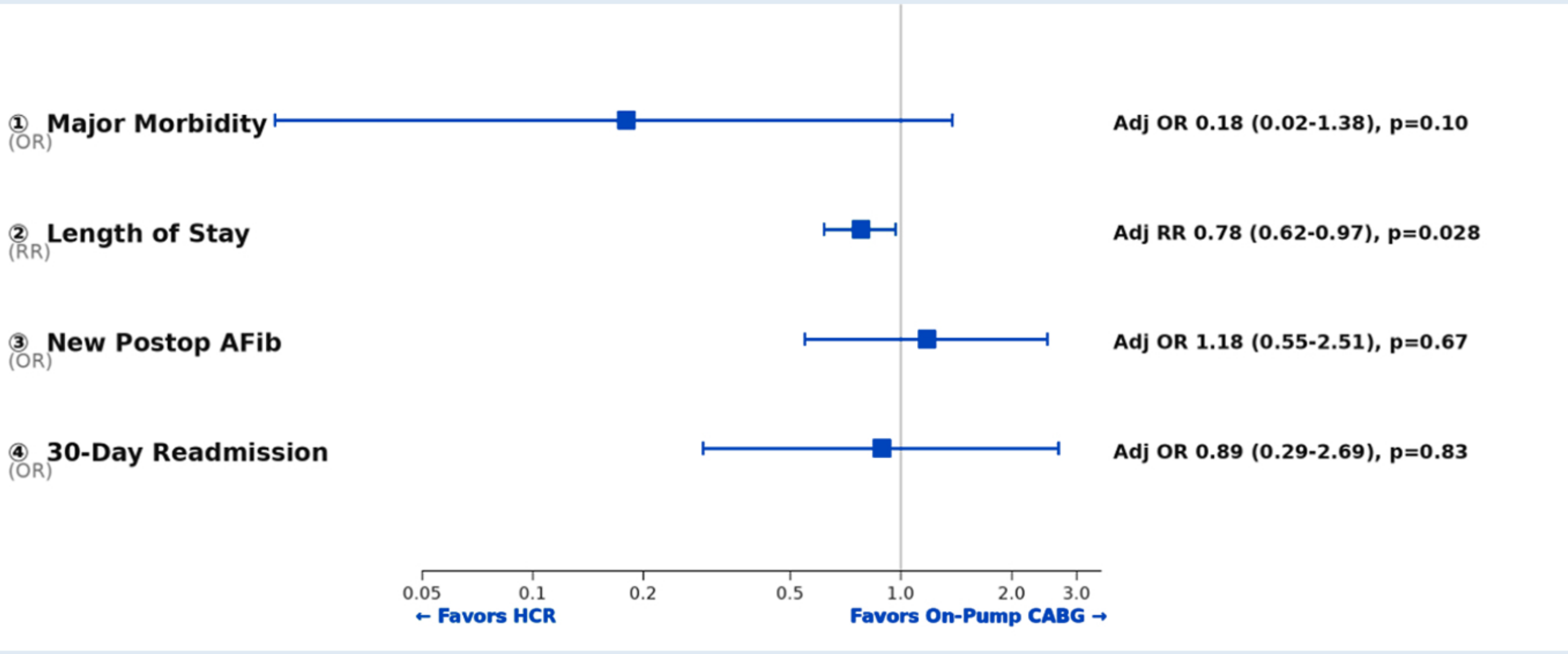
Chi-square/Fisher's exact and Wilcoxon Rank-Sum tests were used for unadjusted comparisons. Multivariable logistic and negative binomial regression adjusted outcomes for MELD score and STS predicted morbidity.

MELD was included as a surrogate for systemic comorbidity burden. Cardiac reoperation defined as return to OR for bleeding, tamponade or early graft failure.

Results



Multivariable Adjusted Outcomes (95% CI)



Key Baseline & Perioperative Outcomes

Variable	On-Pump CABG n=289	MidCAB HCR n=48	p
STS Predicted Risk of Mortality	1%	1%	0.65
STS Predicted Morbidity/Mortality	9%	7%	0.023
MELD Score	8.99	7.45	0.032
Total OR Time, hours	6.68	6.72	0.37
Operative Mortality	5 (1.7%)	0	1.00
Extubated in OR	8 (2.8%)	41 (89.1%)	<0.001
① Major Morbidity	36 (12.5%)	1 (2.2%)	0.04
② Surgical Length of Stay, days	8.97	6.37	<0.001
Post-op Stroke	8 (2.8%)	0	0.61
Renal Failure	8 (2.8%)	0	0.61
30-Day Mortality	5 (1.7%)	0	1.00
④ 30-Day Readmission	28 (9.7%)	4 (8.7%)	1.00
③ New Post-op AFib	59 (20.4%)	12 (26.1%)	0.44

①②③④ Rows marked in blue correspond to outcomes in the forest plot above.

Discussion

HCR offers tangible clinical advantages over on-pump CABG via sternotomy in this elective low-risk cohort. After adjustment for STS predicted morbidity and MELD score, HCR was associated with substantially lower major morbidity (Adj OR 0.18, 0.02-1.38, p=0.10), strongly favoring HCR though underpowered for significance. Shorter Length of Stay (Adj RR 0.78; p=0.028) was the most robust clinical signal.

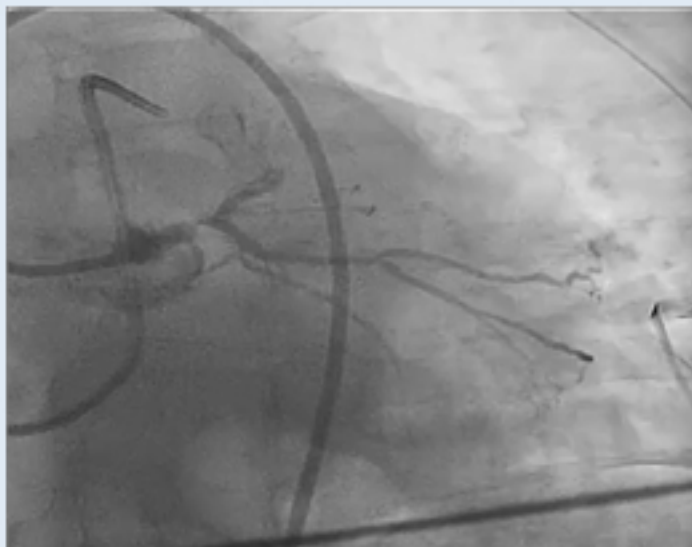
Limitations: retrospective single-center design, cohort imbalance (n=48 vs 289), non-randomized allocation, no long-term outcomes data.

HCR Procedure: Imaging & Cosmesis

Angiographic Findings



LIMA-LAD ANASTOMOSIS



PRE-PCI CRITICAL LM
PROXIMAL STENOSIS



POST-PCI RESTORED
LM LUMEN

Patient Cosmesis



Mini-Thoracotomy with chest tube
Post-op day 0



Long-term healed result
Small lateral scar; no median sternotomy

Patient photographs courtesy of Tampa General Hospital, used with consent. Faces removed.