

CABG or PCI or Both: Current Status of Hybrid Coronary Revascularization

Alan C. Yeung, MD
Li Ka Shing Professor of Medicine
Chief, Division of Cardiovascular Medicine
Stanford University School of Medicine



Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship

- Grant/Research Support
- Grant/Scientific Advisory Board
- Executive Physician Council

Company

- Edwards Lifesciences, Abbott
- Medtronic, Abbott
- Boston Scientific Corp



Both PCI and CABG

- After traditional CABG, early PCI may be needed:
 - Acute vein closure
 - LIMA anastomosis suture stenosis
 - Radial artery failure
 - Incomplete territory revascularization
 - Rapid native disease progression
- Hybrid Coronary Revascularization

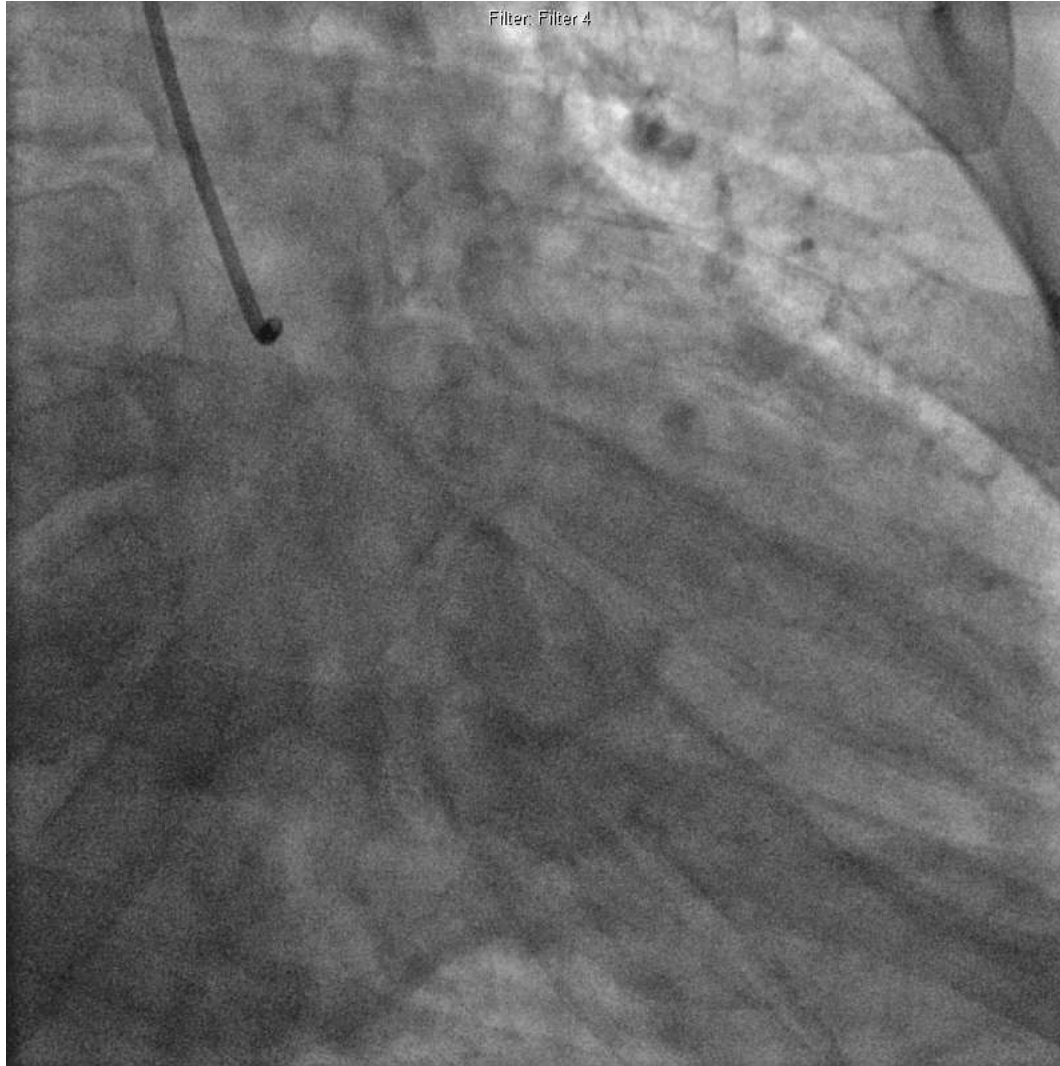


S.B.

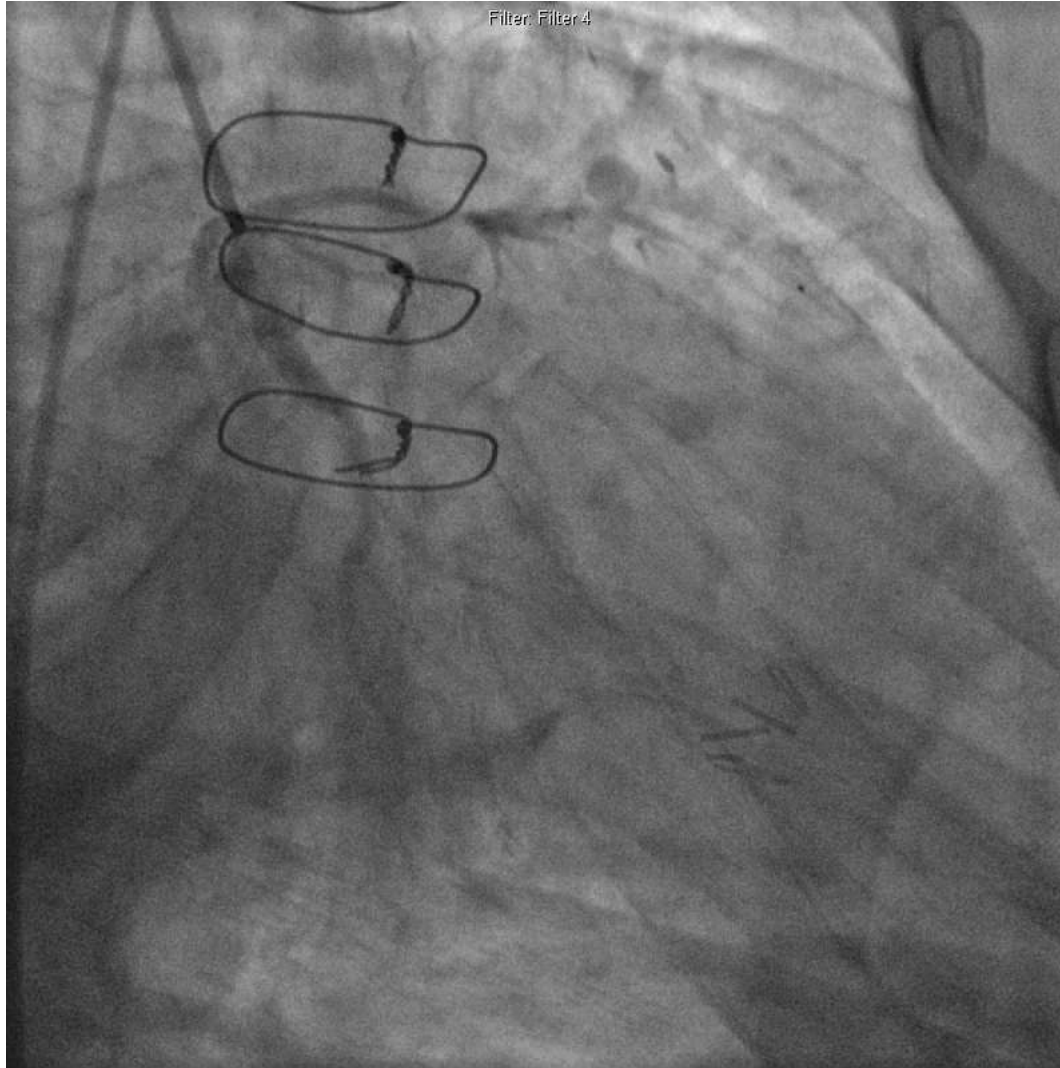
- 64 year old male with HTN, DM, Lp(a)
- PCI of RCA in 2003, referred to CABG (LIMA to LAD, radial to OMB and SVG to RCA) in 10/17
- Afterwards have persistent left arm exertional chest pain
- Positive nuclear stress with moderate to large reversible ischemia in the lateral wall in 4/18

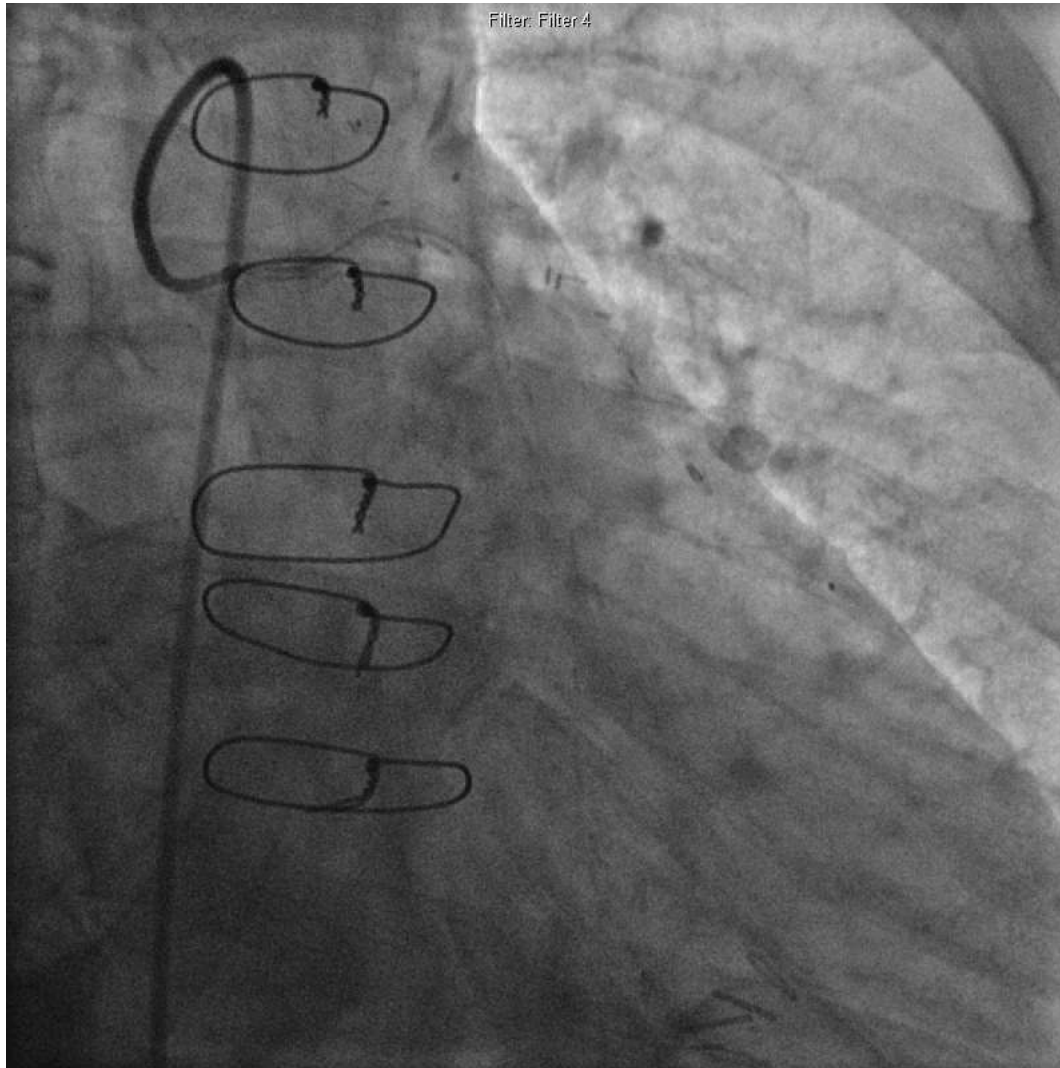


Pre-CABG



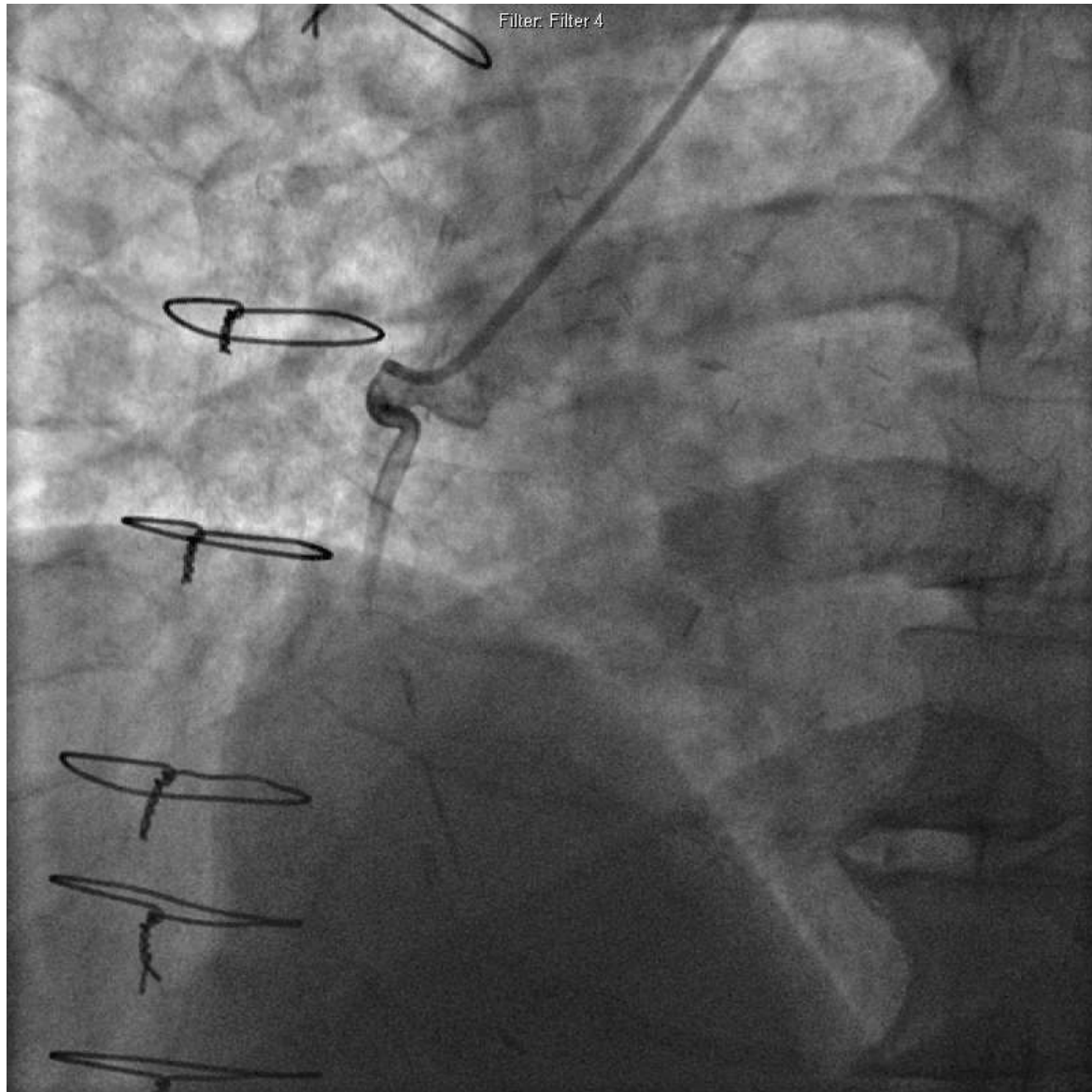
Post-CABG





Radial to OMB2

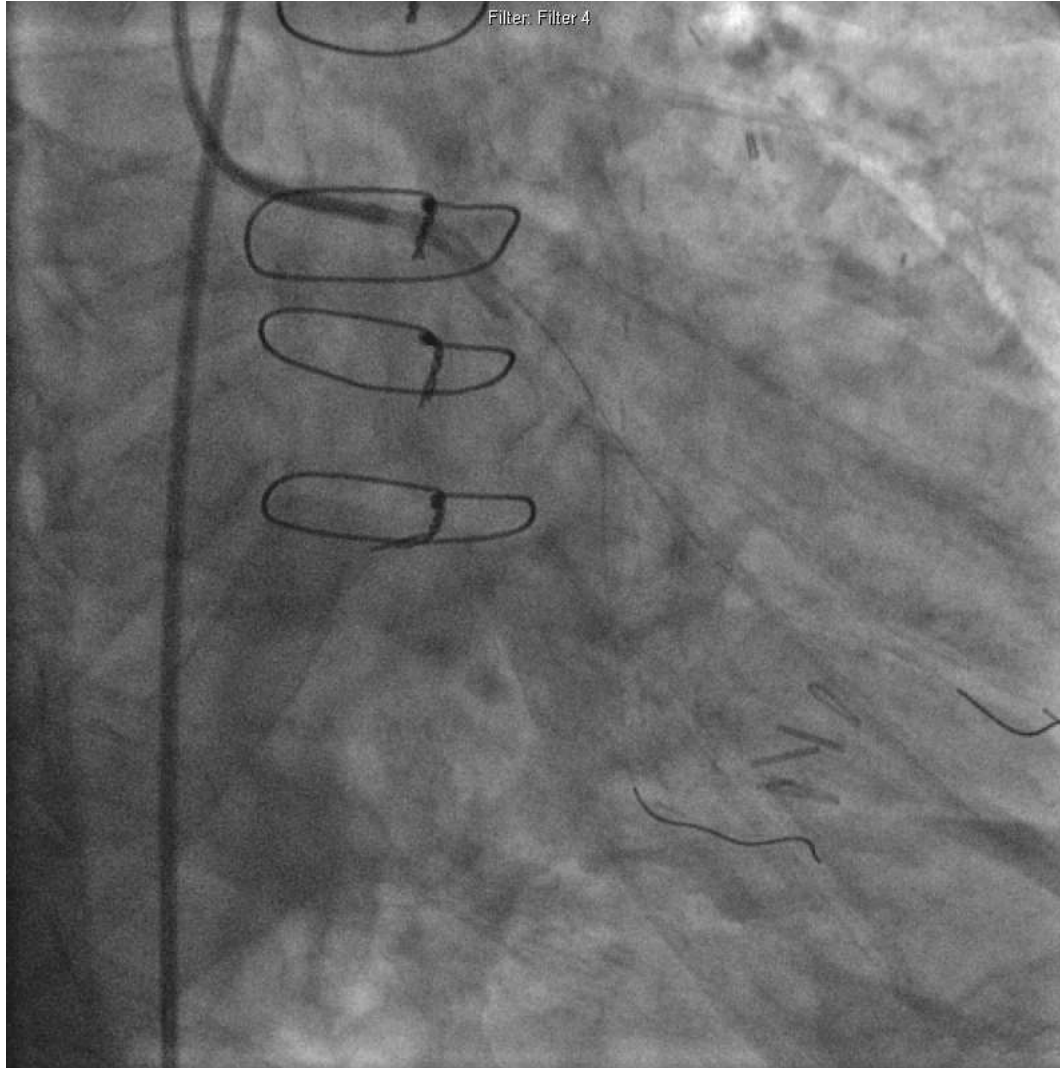




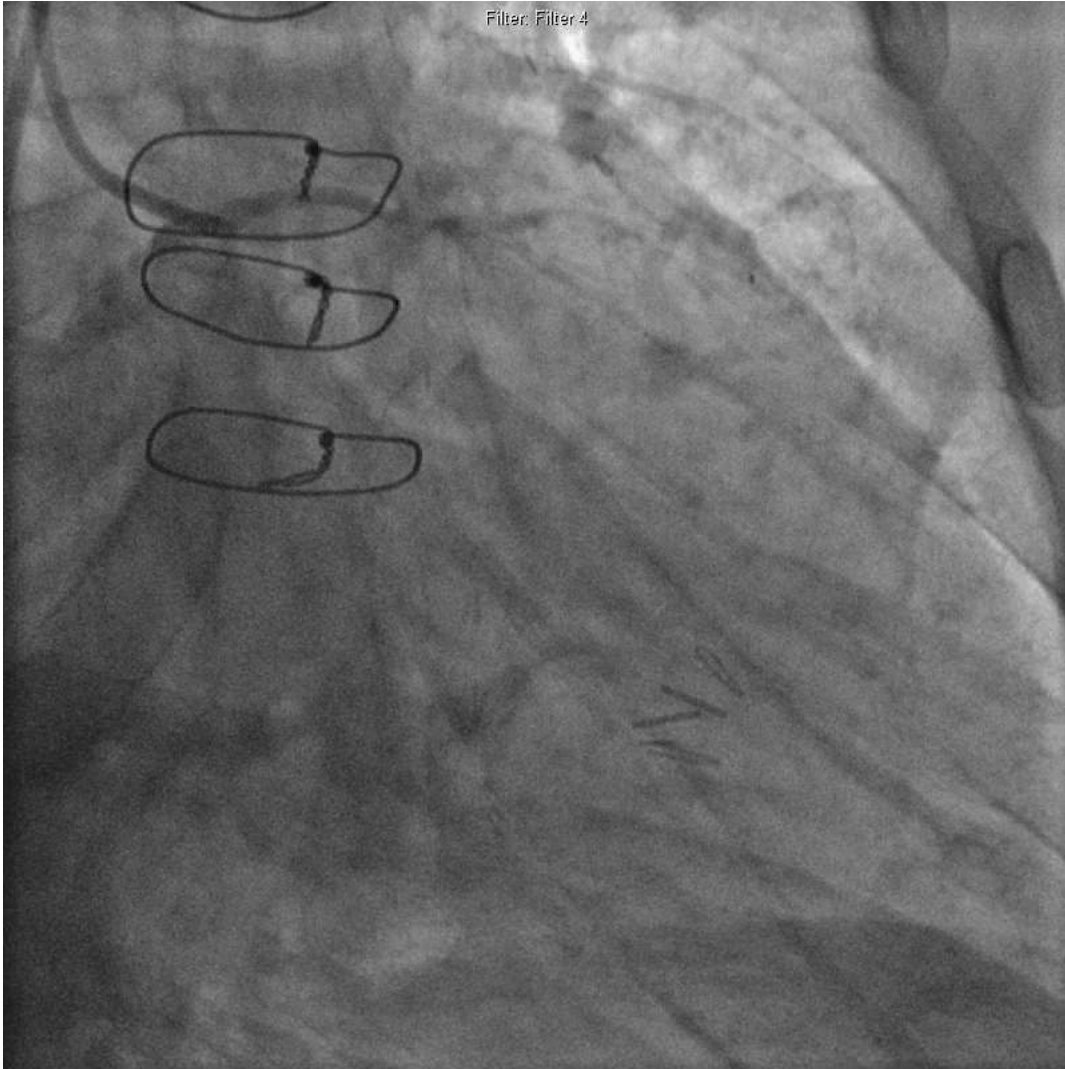
SVG to PDA



PCI



Filter: Filter 4



Filter: Filter 4

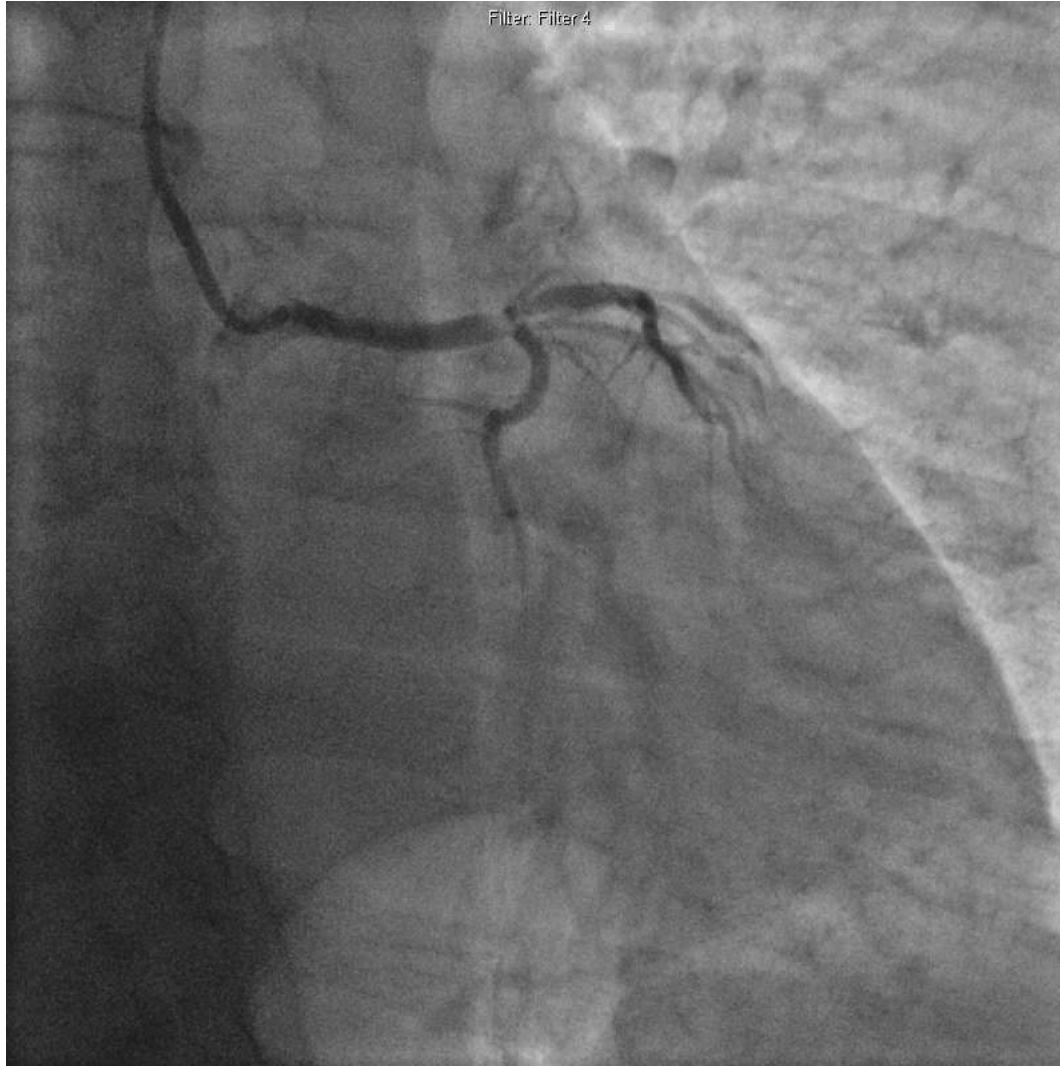


G.L.

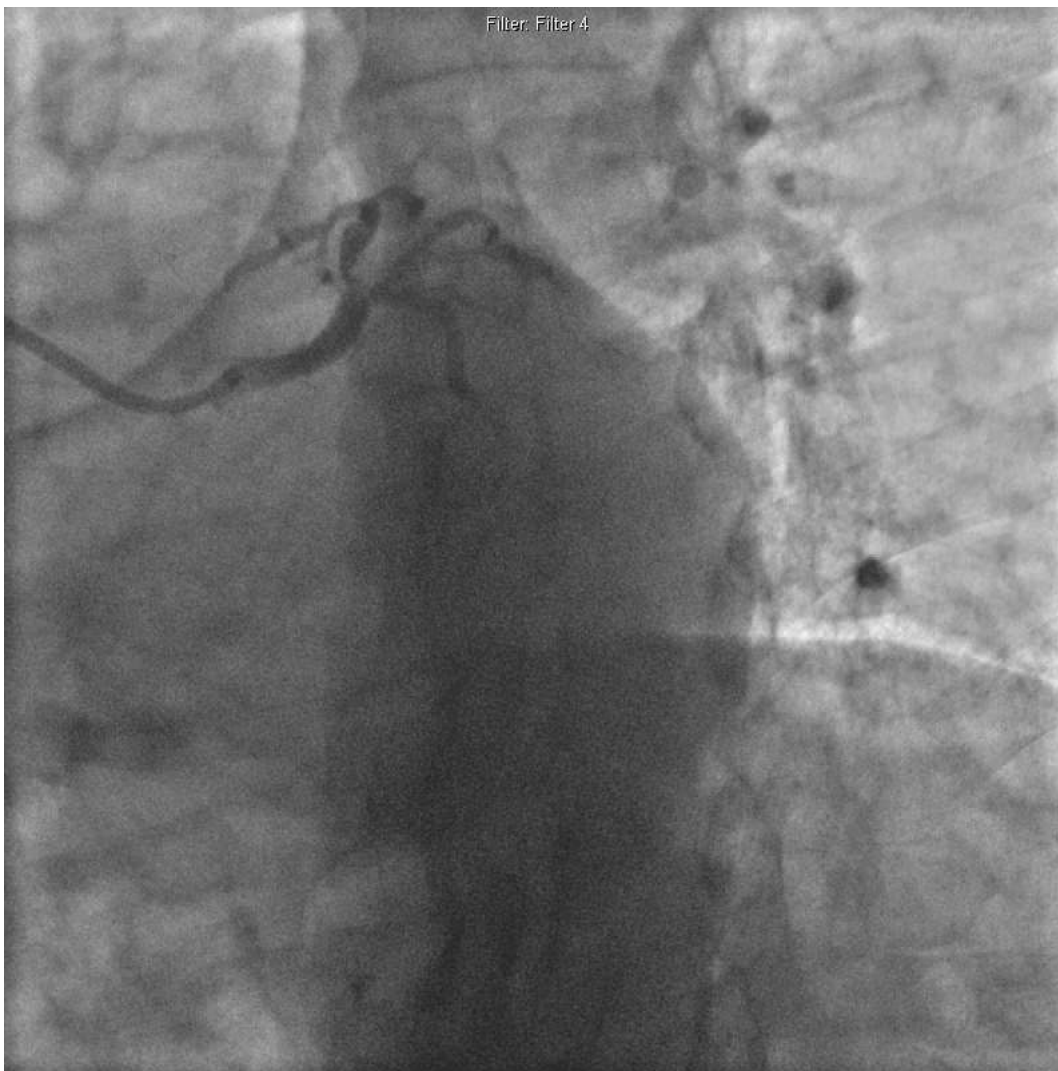
- 48 year old male with HTN, CAD, unstable angina
- 9/17: CABG: LIMA, RIMA to ramus, SVGs to OM, PDA
- Was on Ticagrelor; post-op bleeding with wash out.
- Persistent and significant angina after
- Cath on 1/18



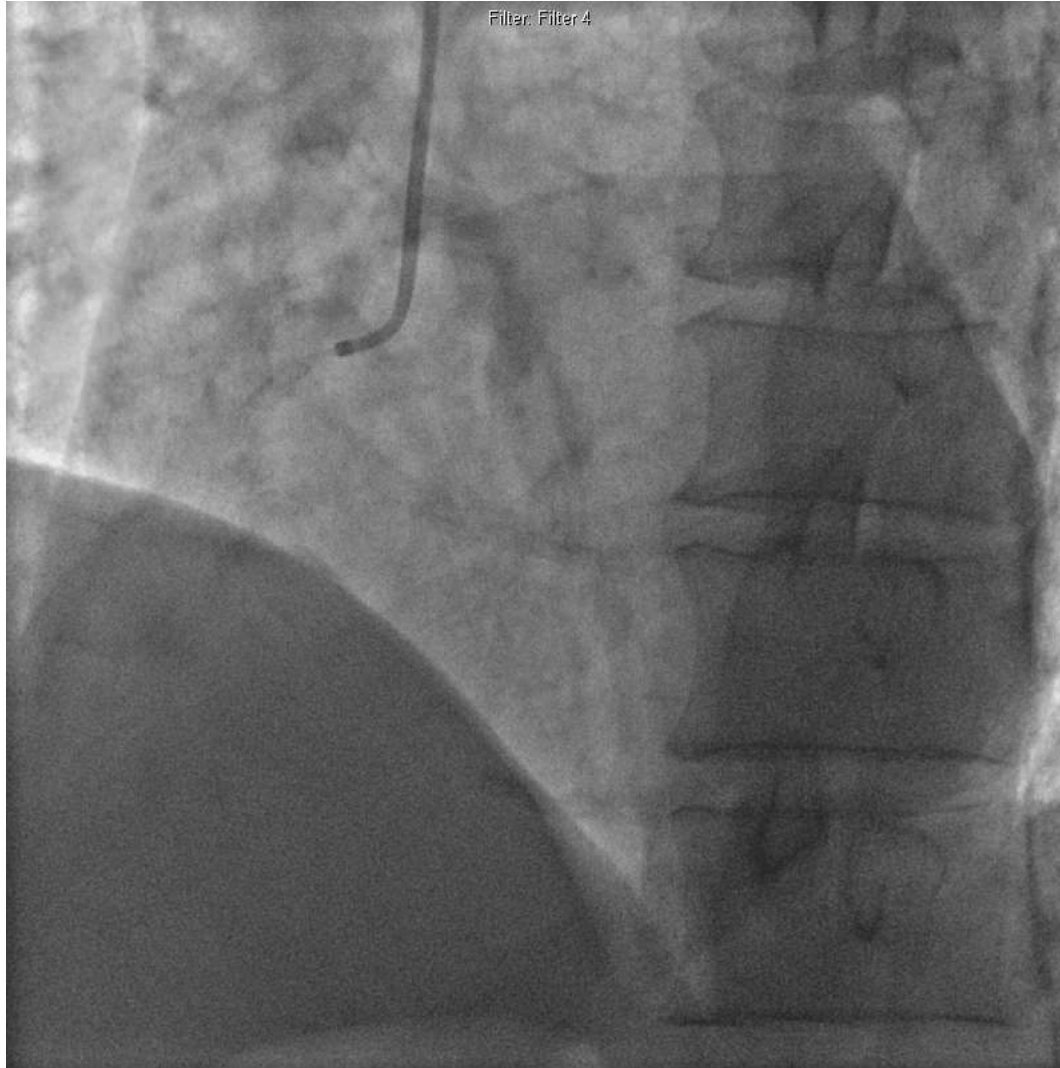
Pre-CABG



Filter: Filter 4



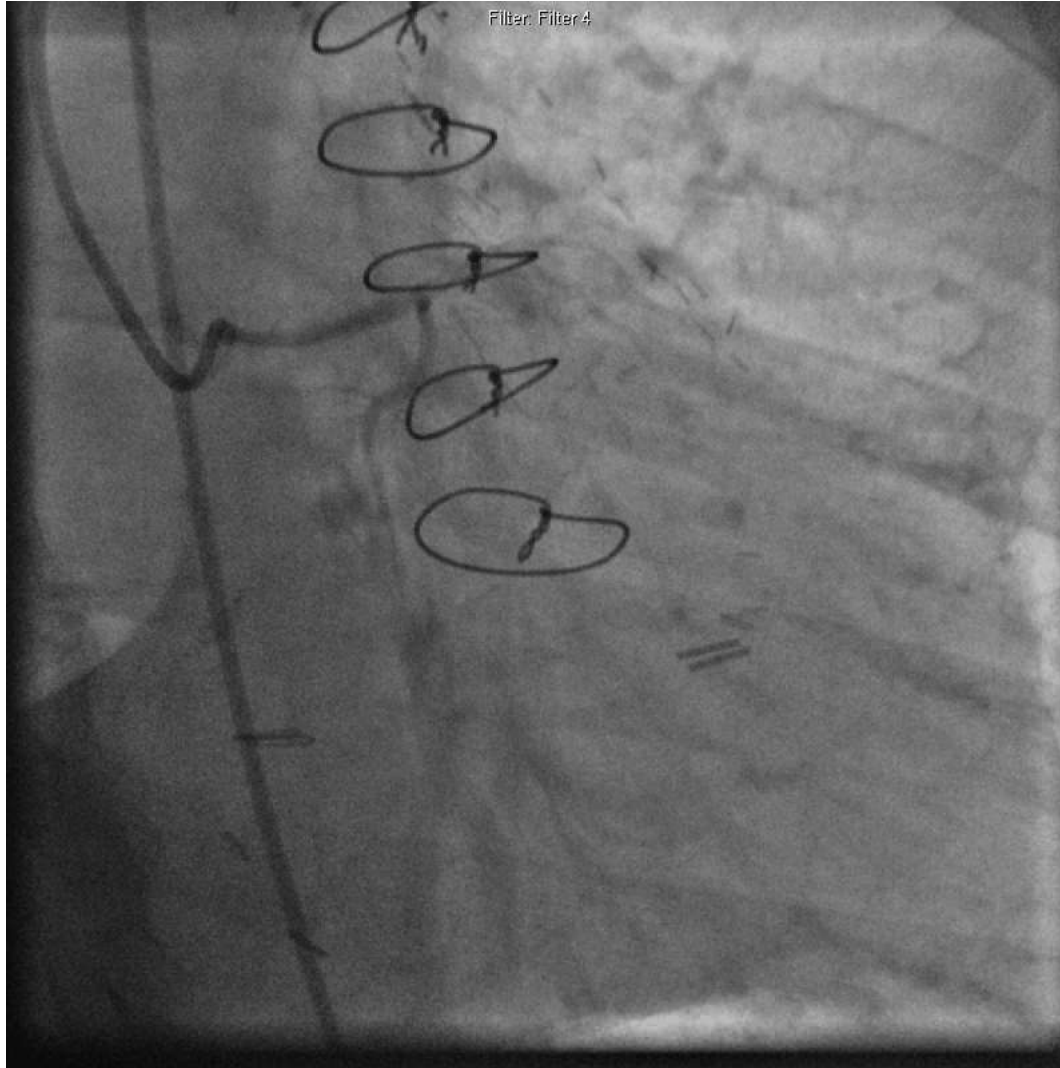


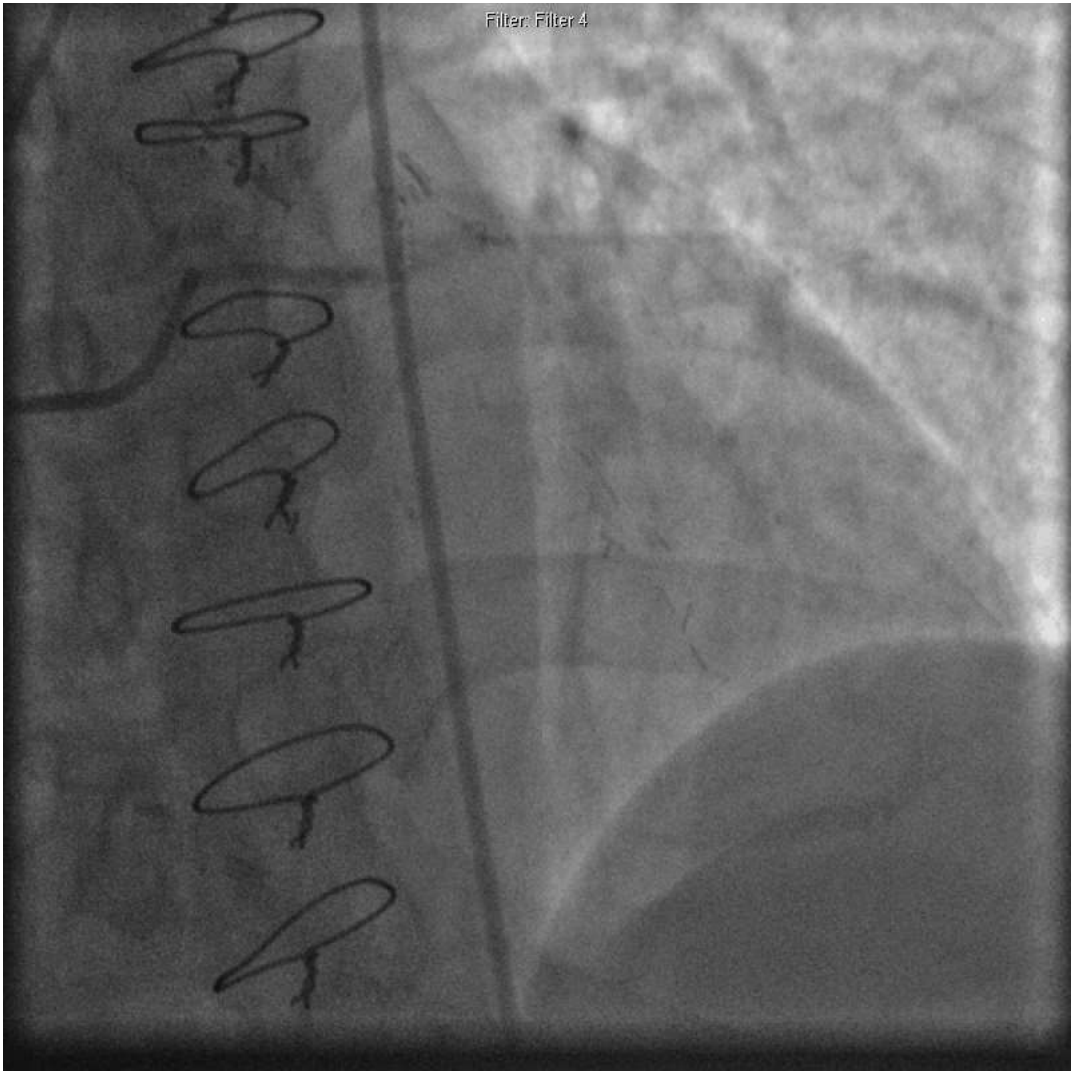


Filter: Filter 4

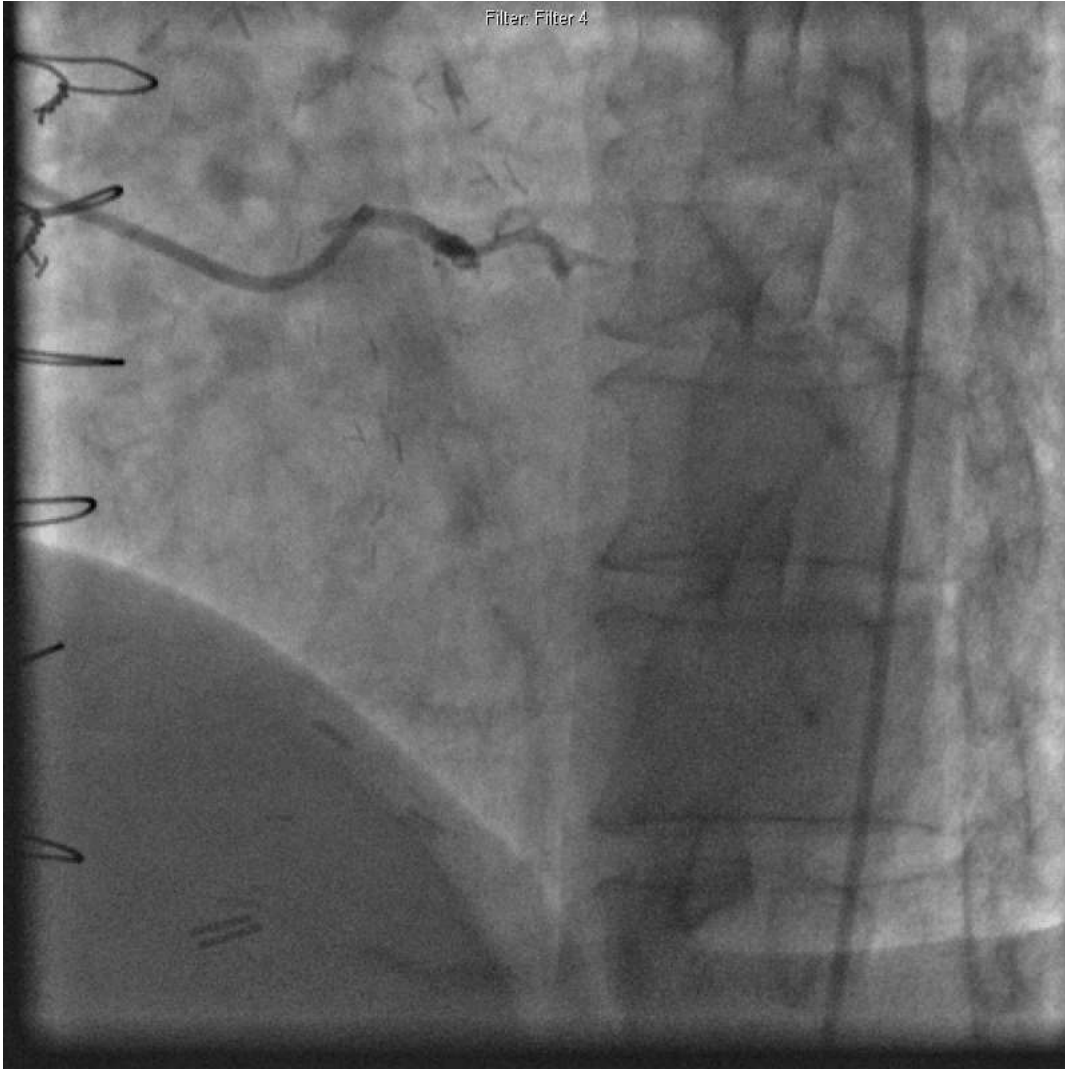


Post-CABG

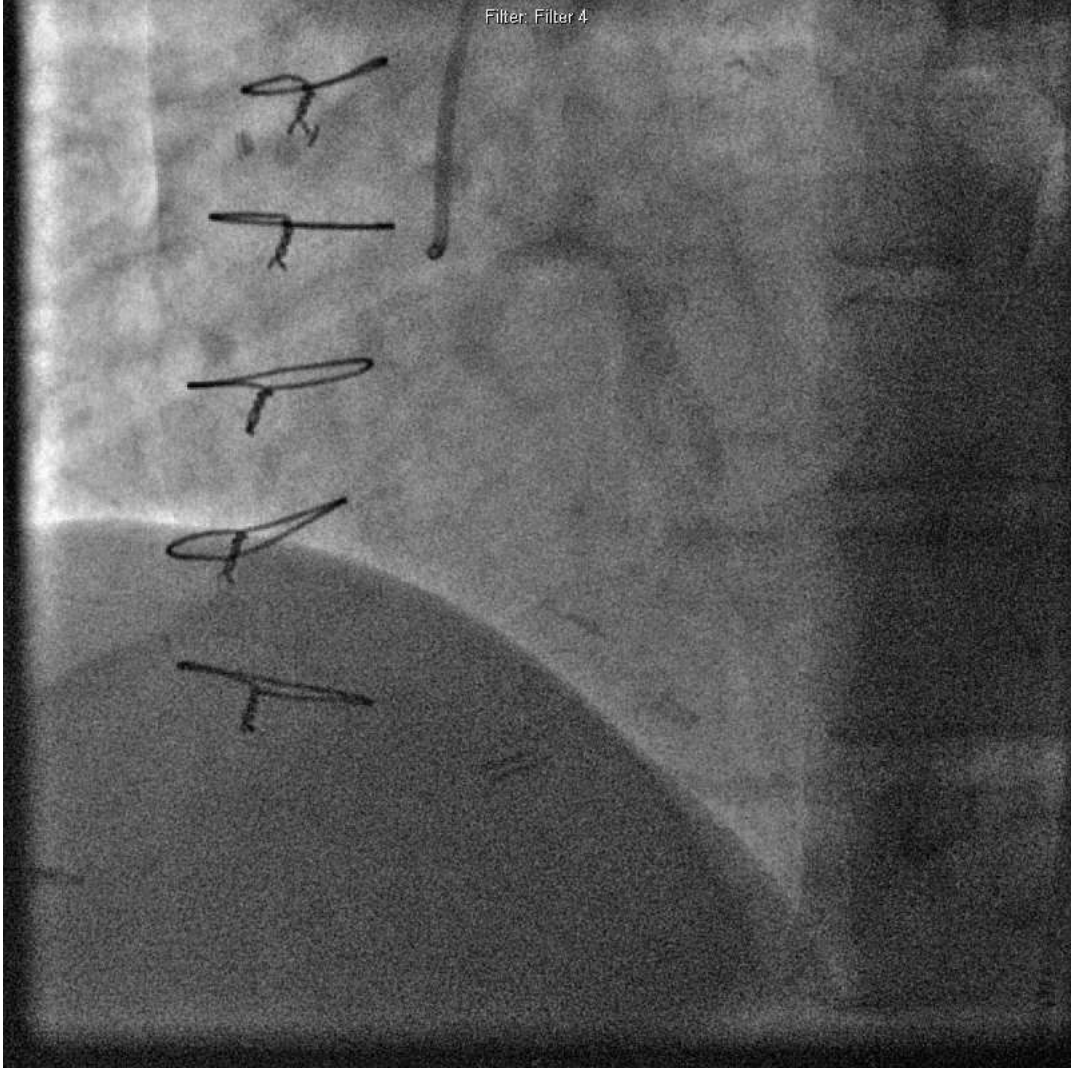




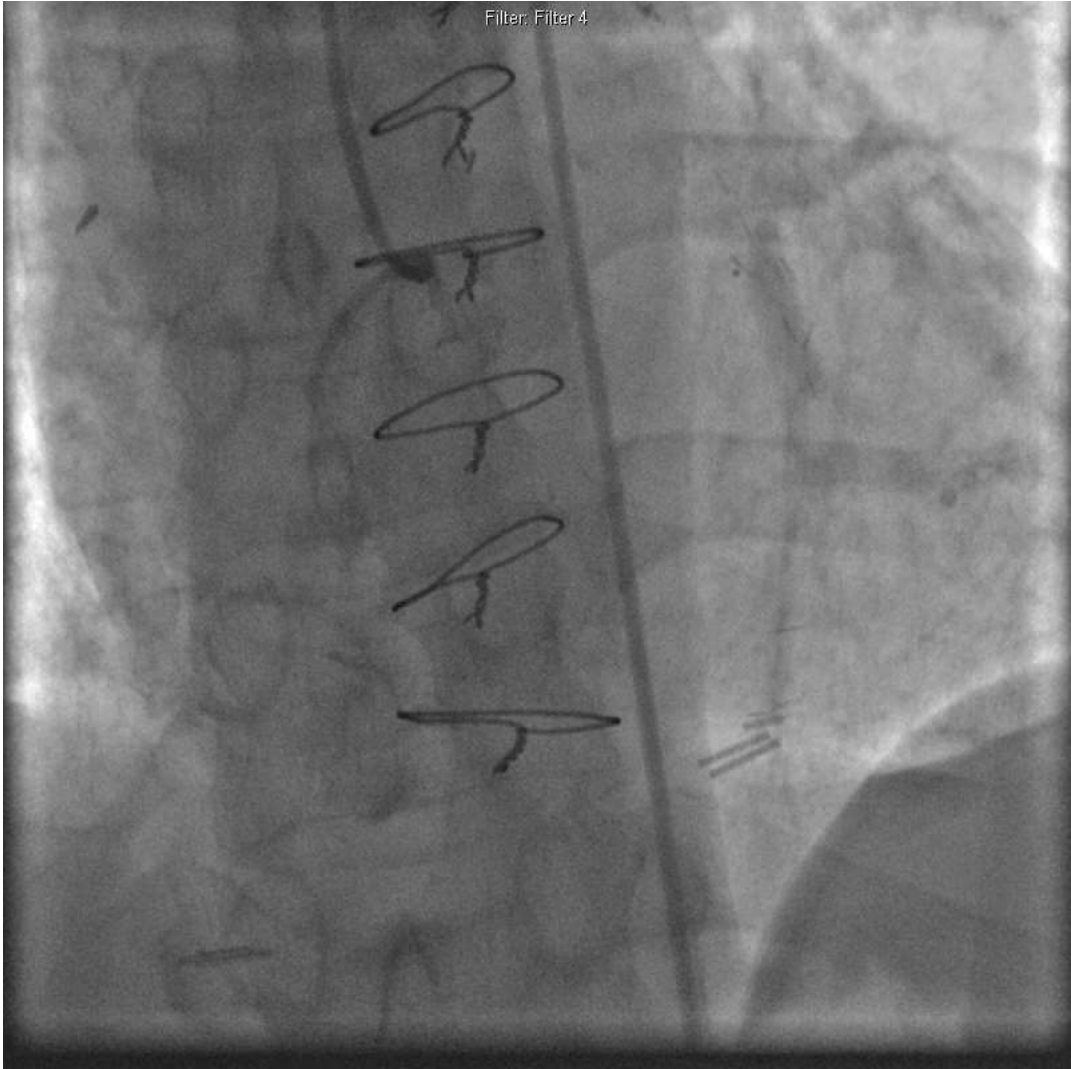
Filter: Filter 4



Filter: Filter 4



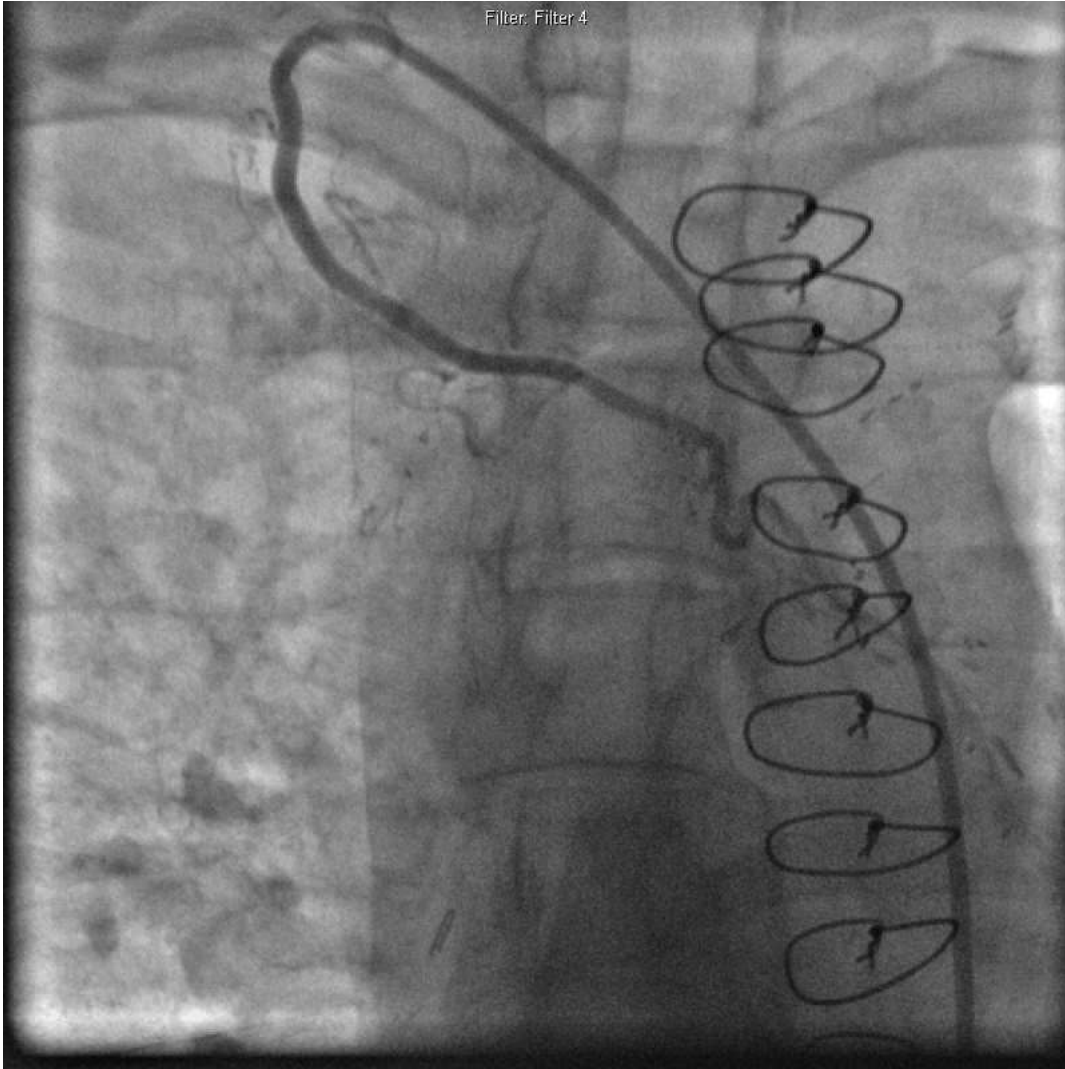
Filter: Filter 4



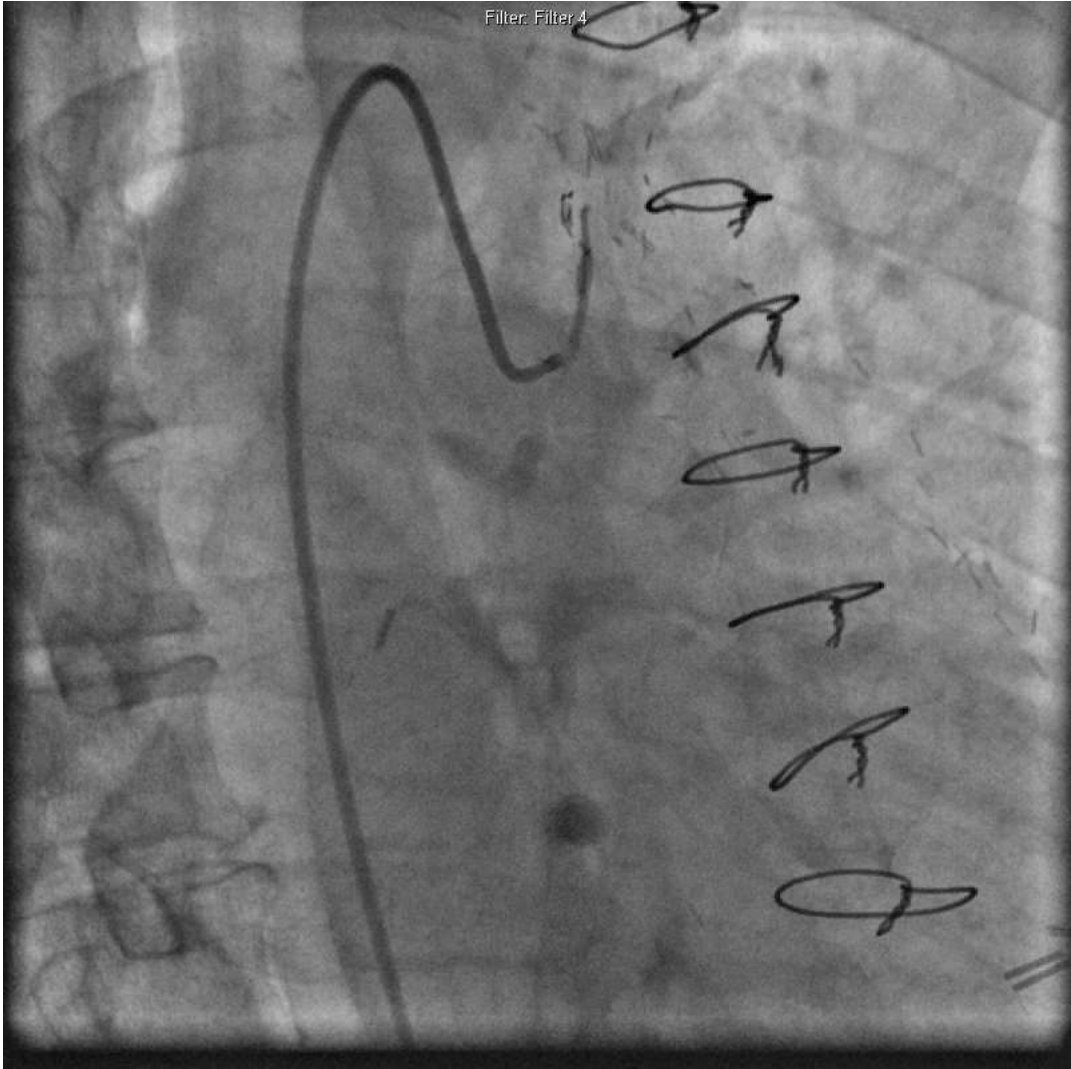
Filter: Filter 4



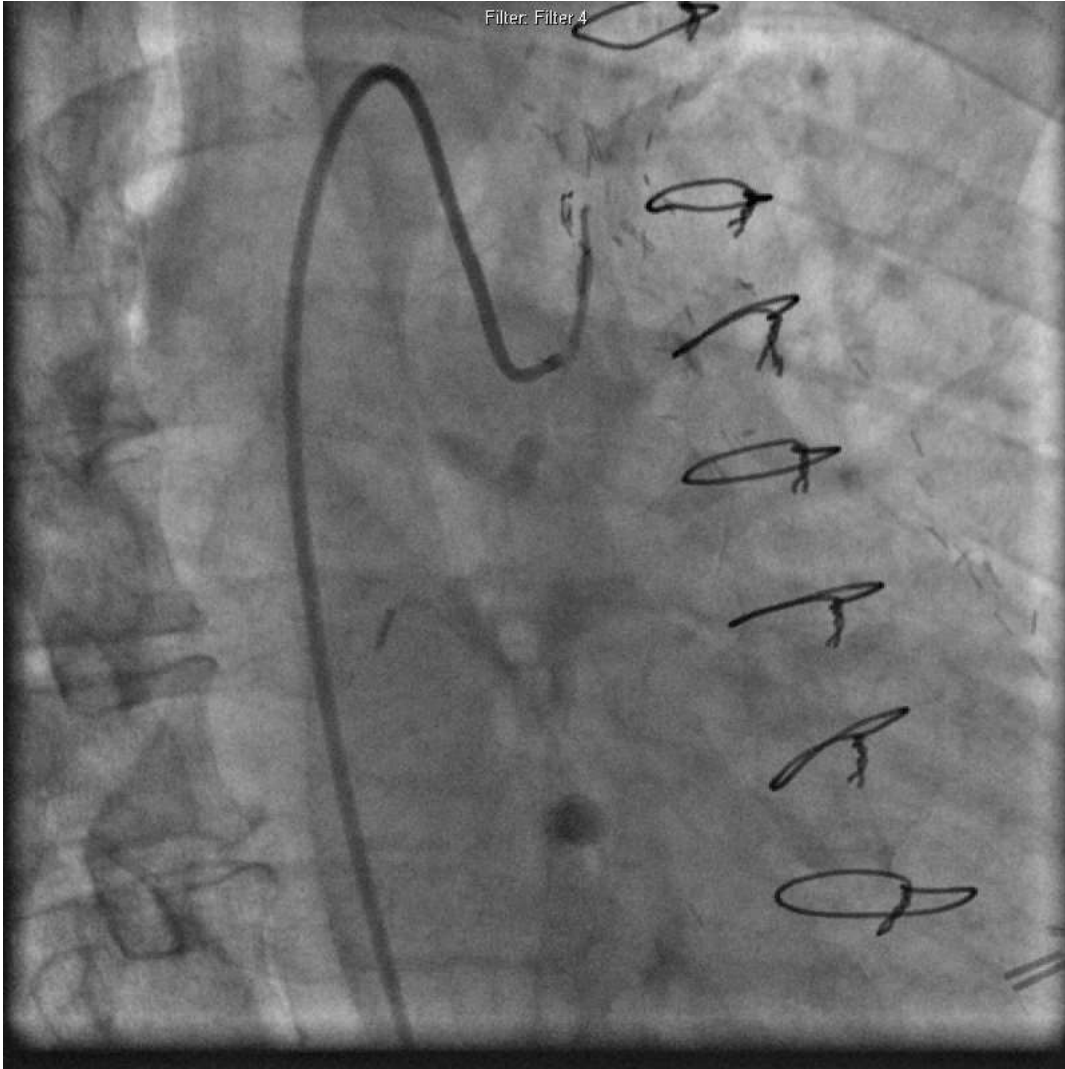
Filter: Filter 4



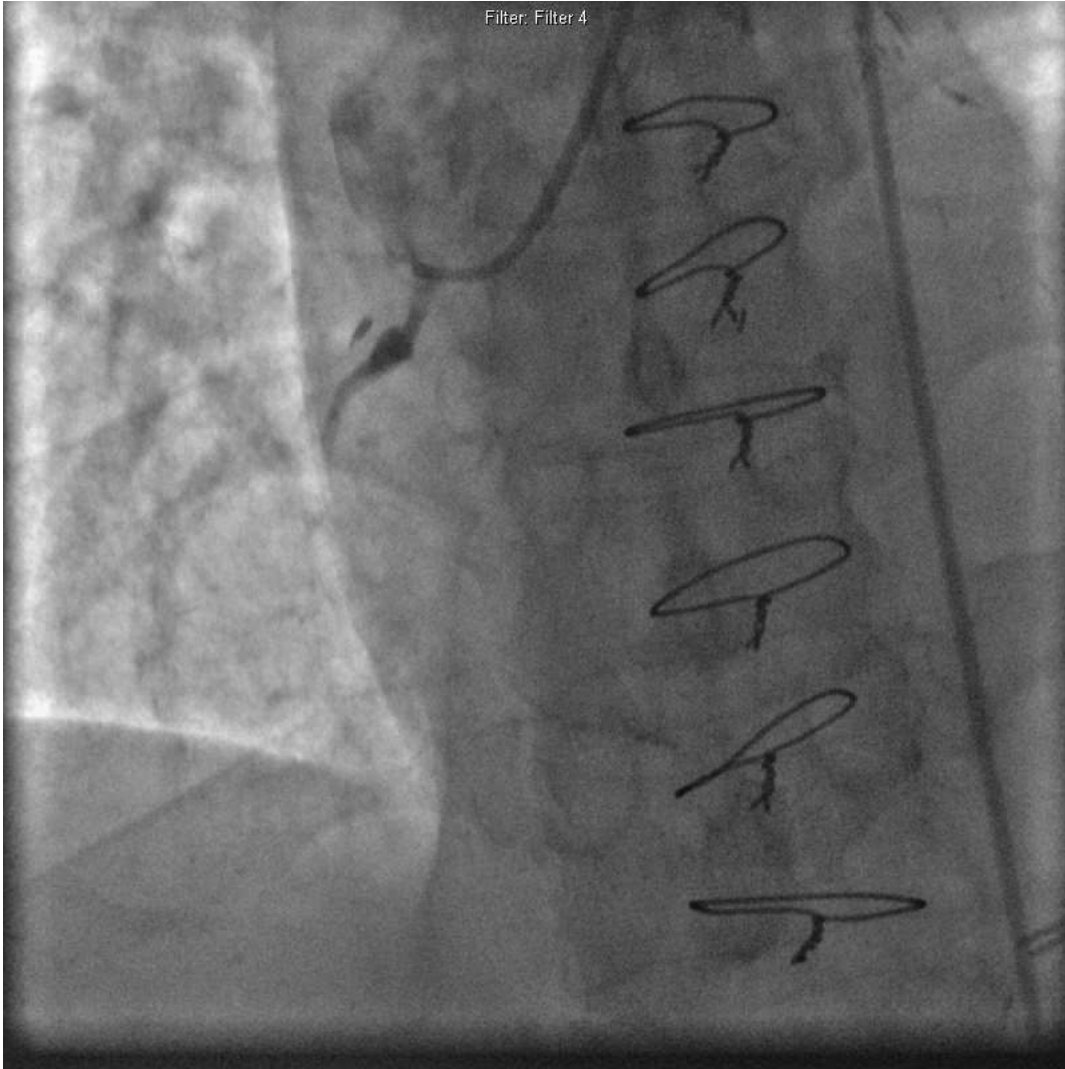
Filter: Filter 4



Filter: Filter 4

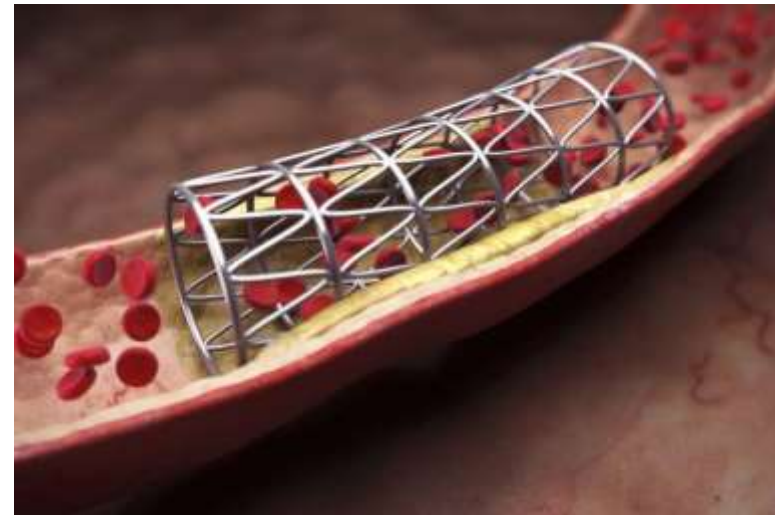
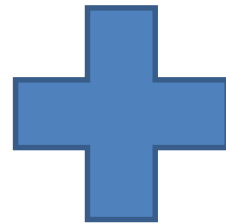


Filter: Filter 4



Hybrid Coronary Revascularization:

Planned combination of surgical and percutaneous techniques in two different coronary territories, both scheduled and performed within a predefined time period in a patient with multi-vessel coronary artery disease



A.T.

- 64 year old male with NSTEMI in Europe
- History of amyloidosis and bleeding, want to avoid traditional surgery
- 10/8: robotic assisted LIMA to LAD
- 10/9: PCI to PDA, PLA and Cx.



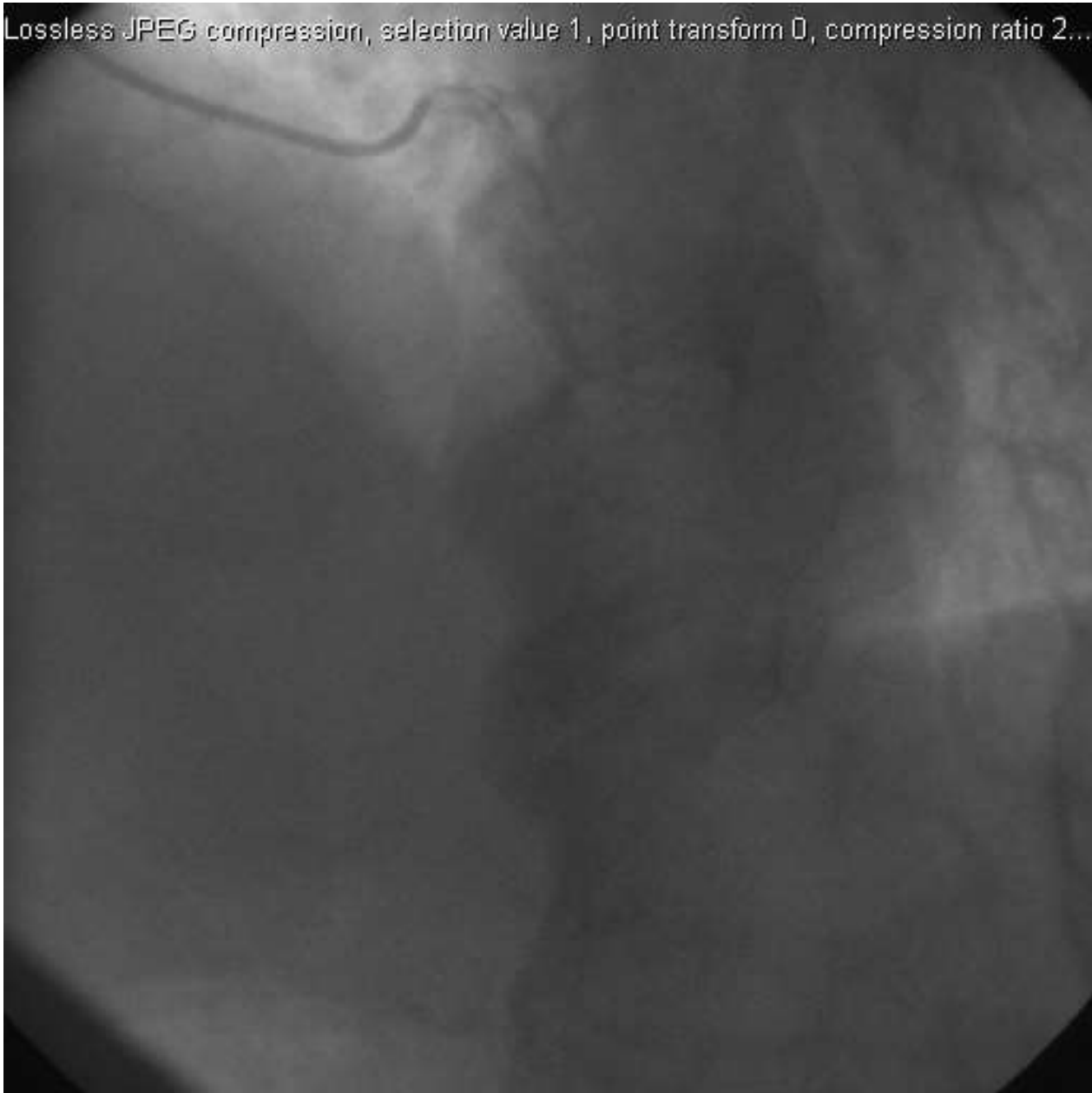
Pre- CABG



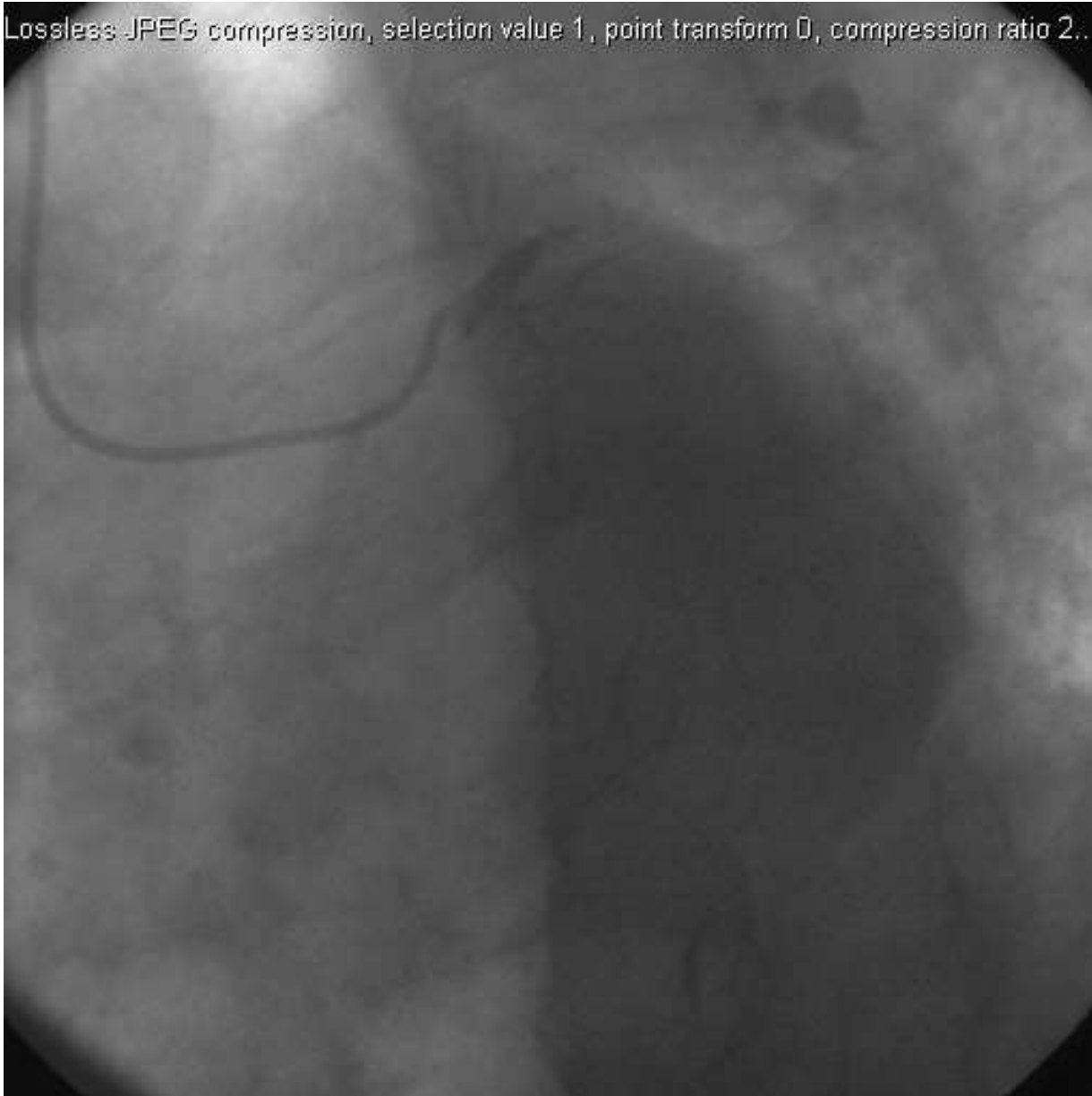
Lossless JPEG compression, selection value 1, point transform 0, compression ratio 2...



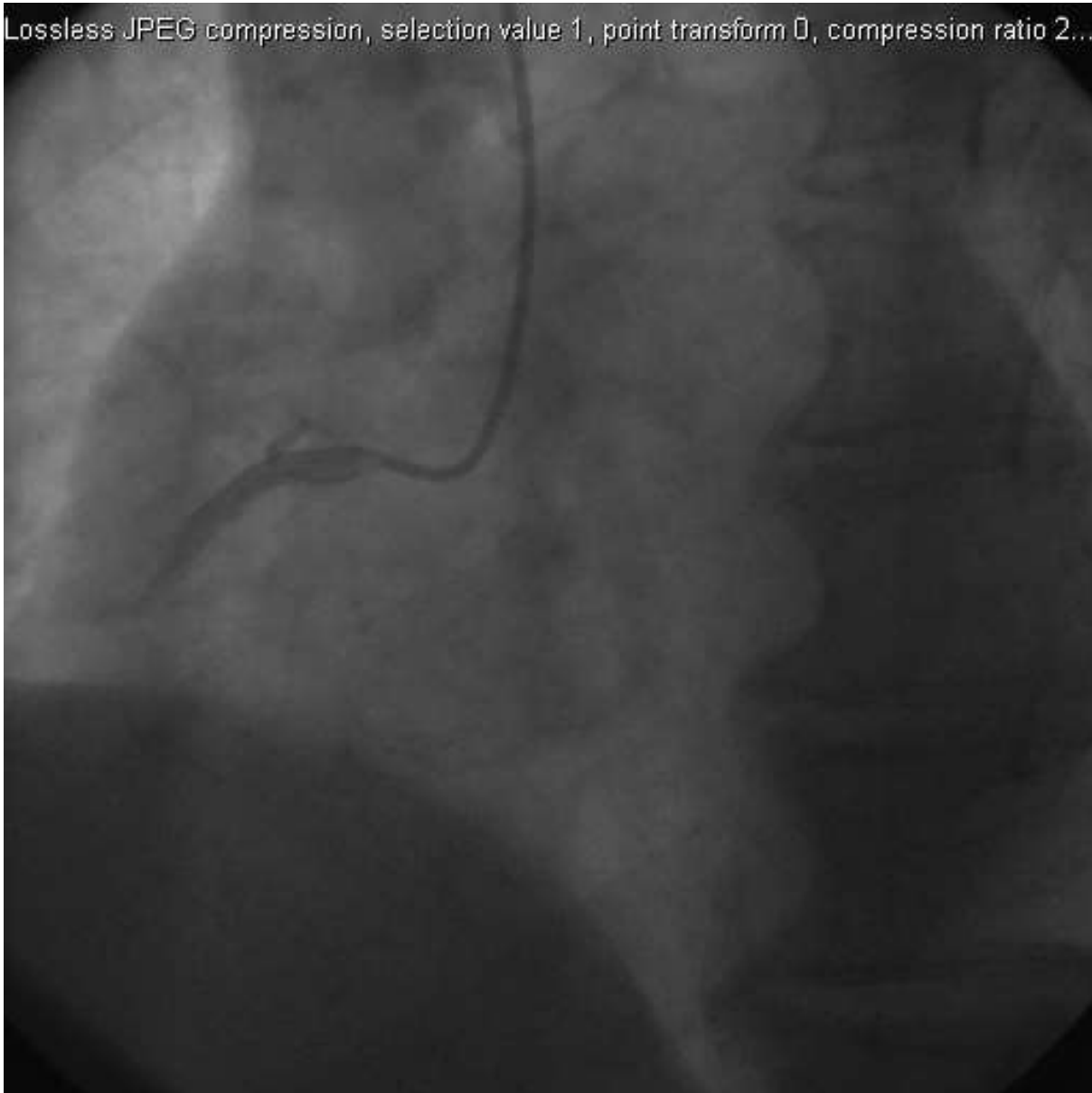
Lossless JPEG compression, selection value 1, point transform 0, compression ratio 2...



Lossless JPEG compression, selection value 1, point transform 0, compression ratio 2...



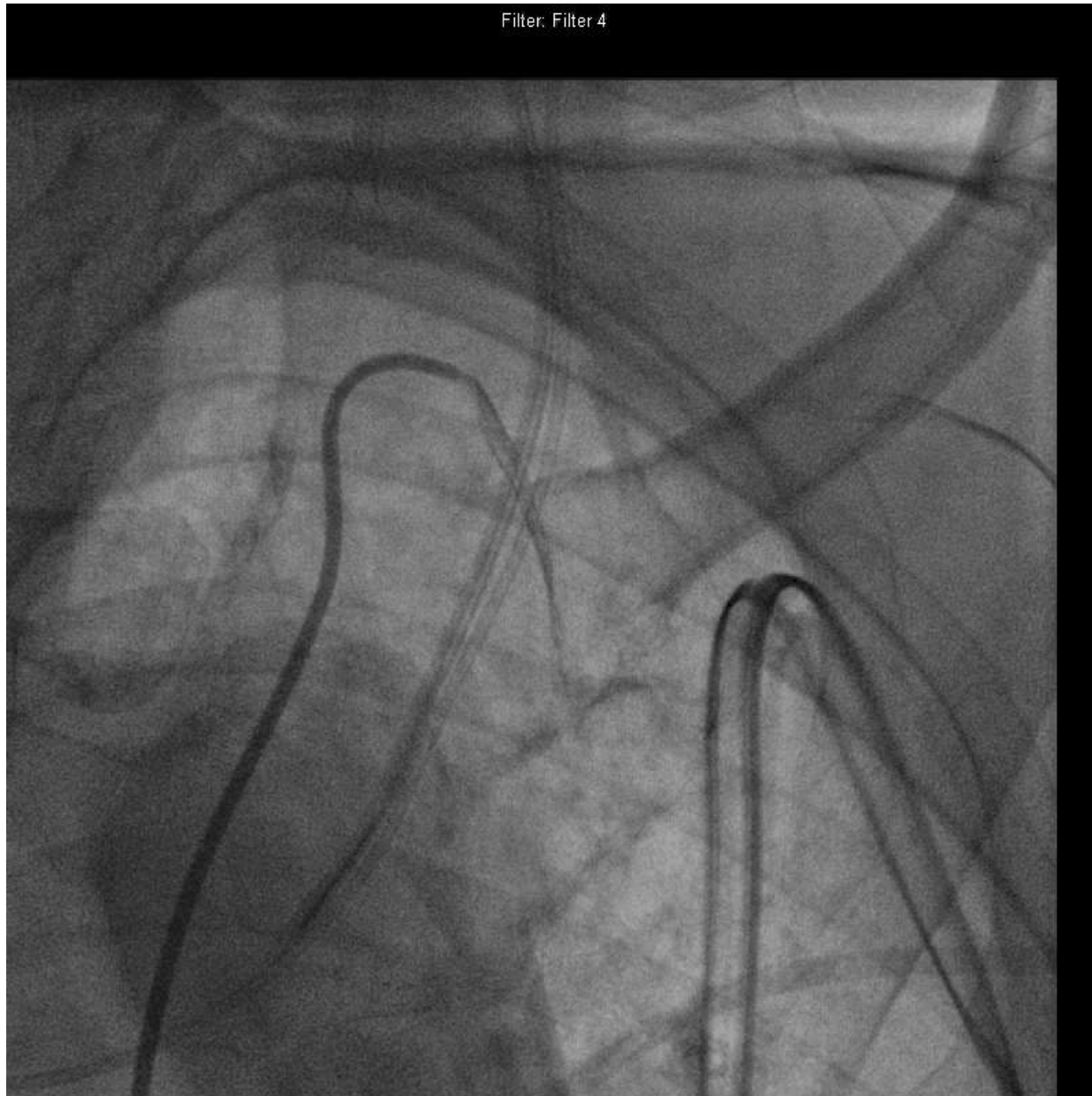
Lossless JPEG compression, selection value 1, point transform 0, compression ratio 2...



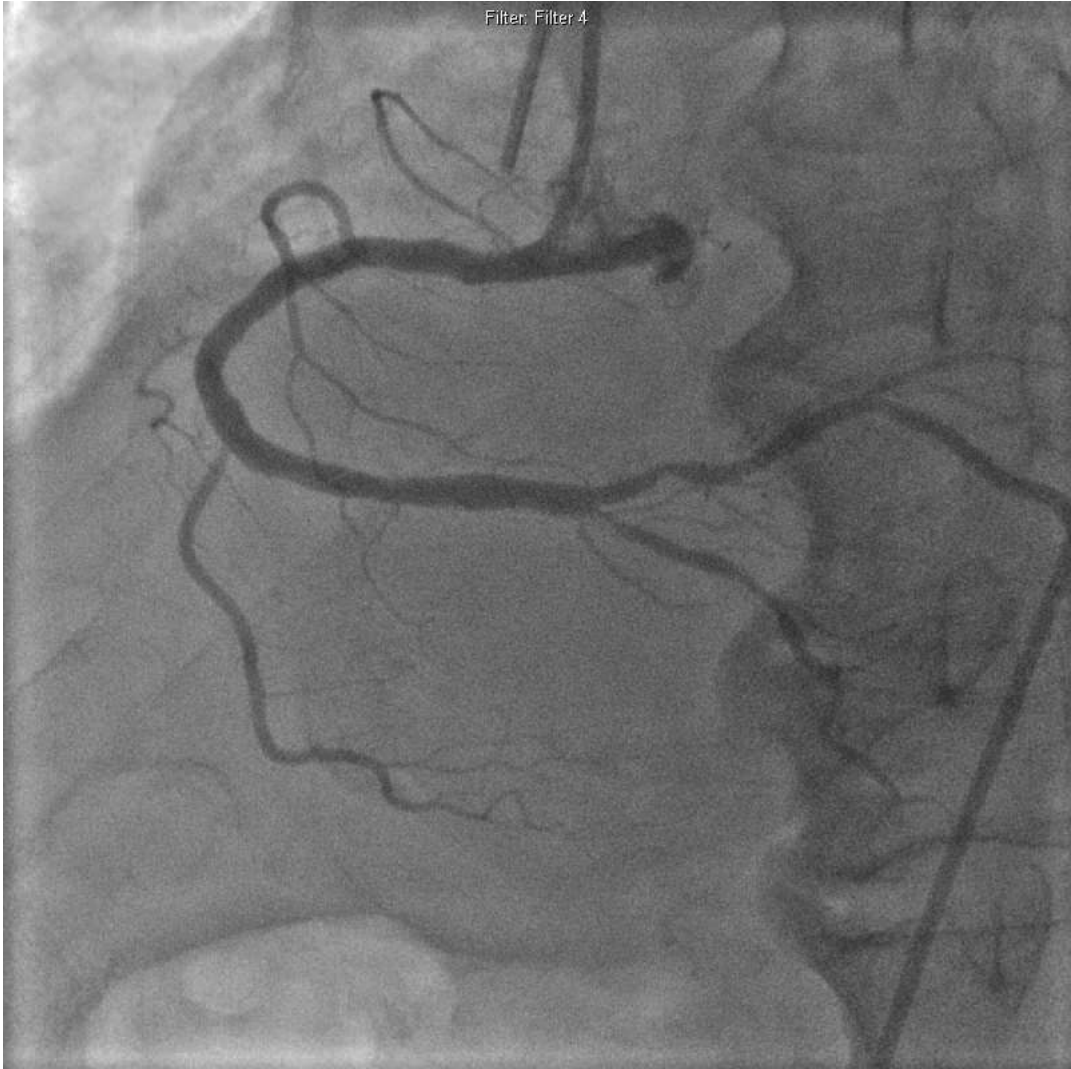
Lossless JPEG compression, selection value 1, point transform 0, compression ratio 2...



Post-CABG



Filter Filter 4



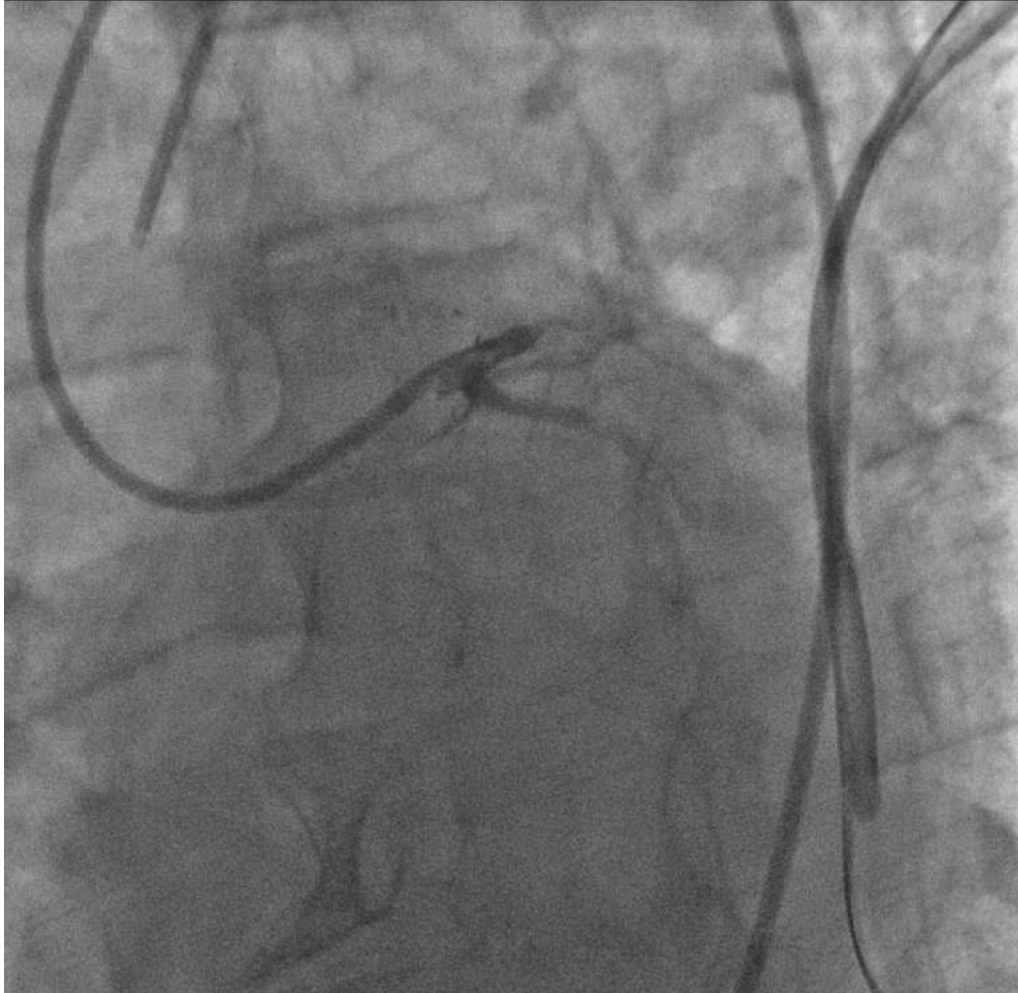
Filter: Filter 4



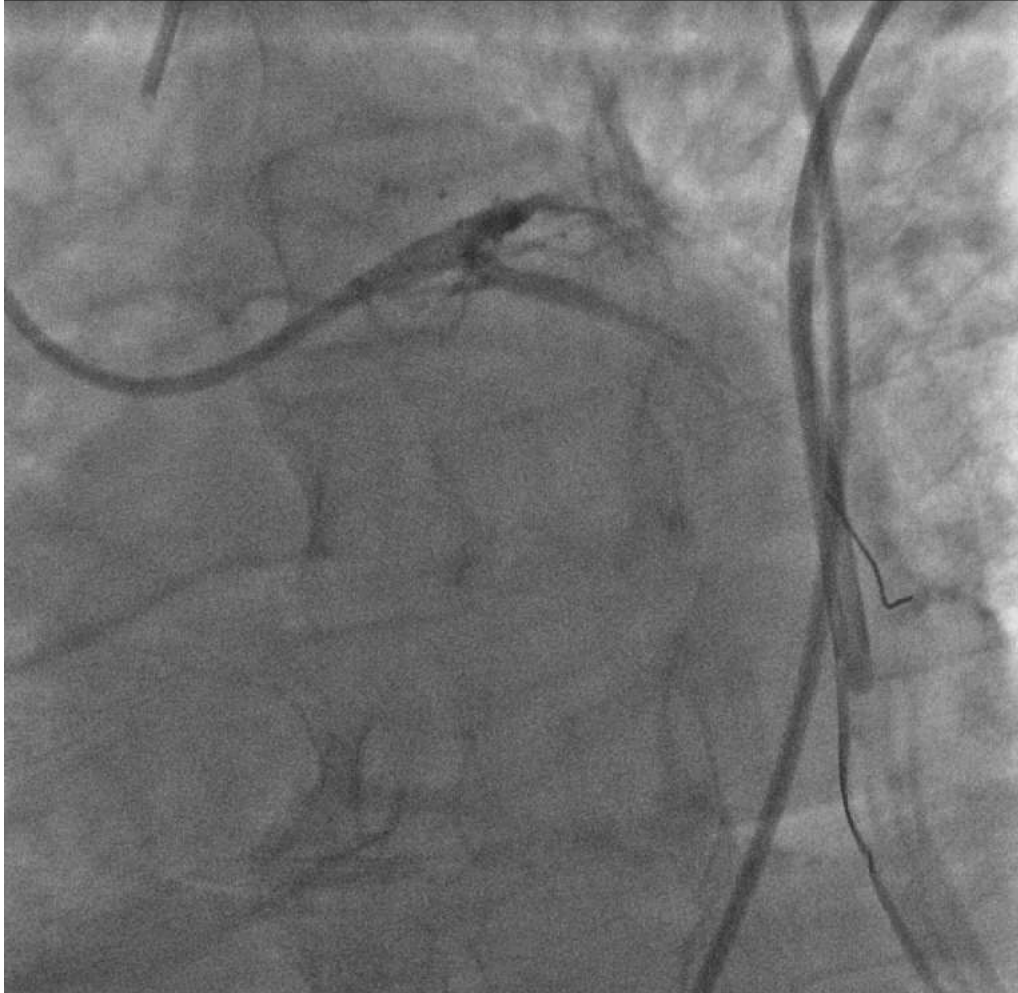
Filter: Filter 4



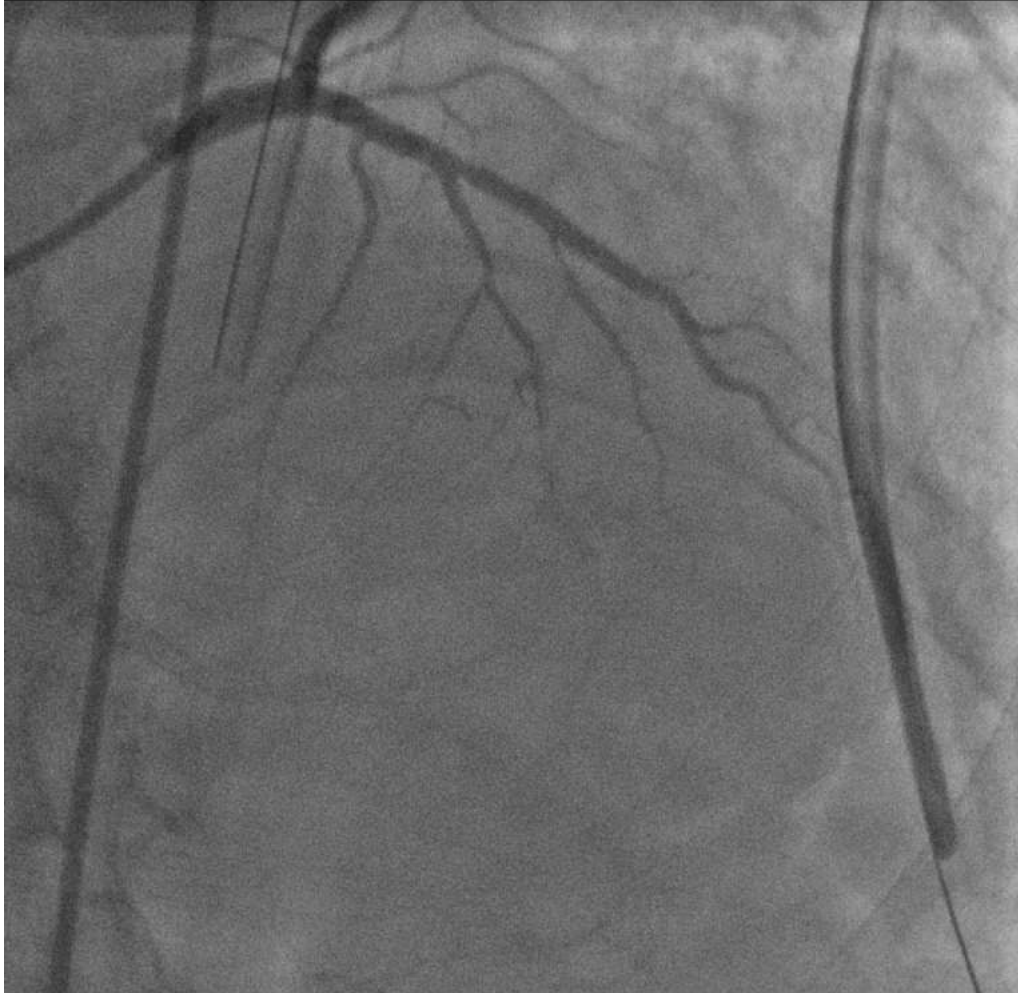
Filter: Filter 4



Filter: Filter 4



Filter: Filter 4





Letter to the Editor

Hybrid coronary revascularization versus coronary artery bypass surgery: Systematic review and meta-analysis[☆]

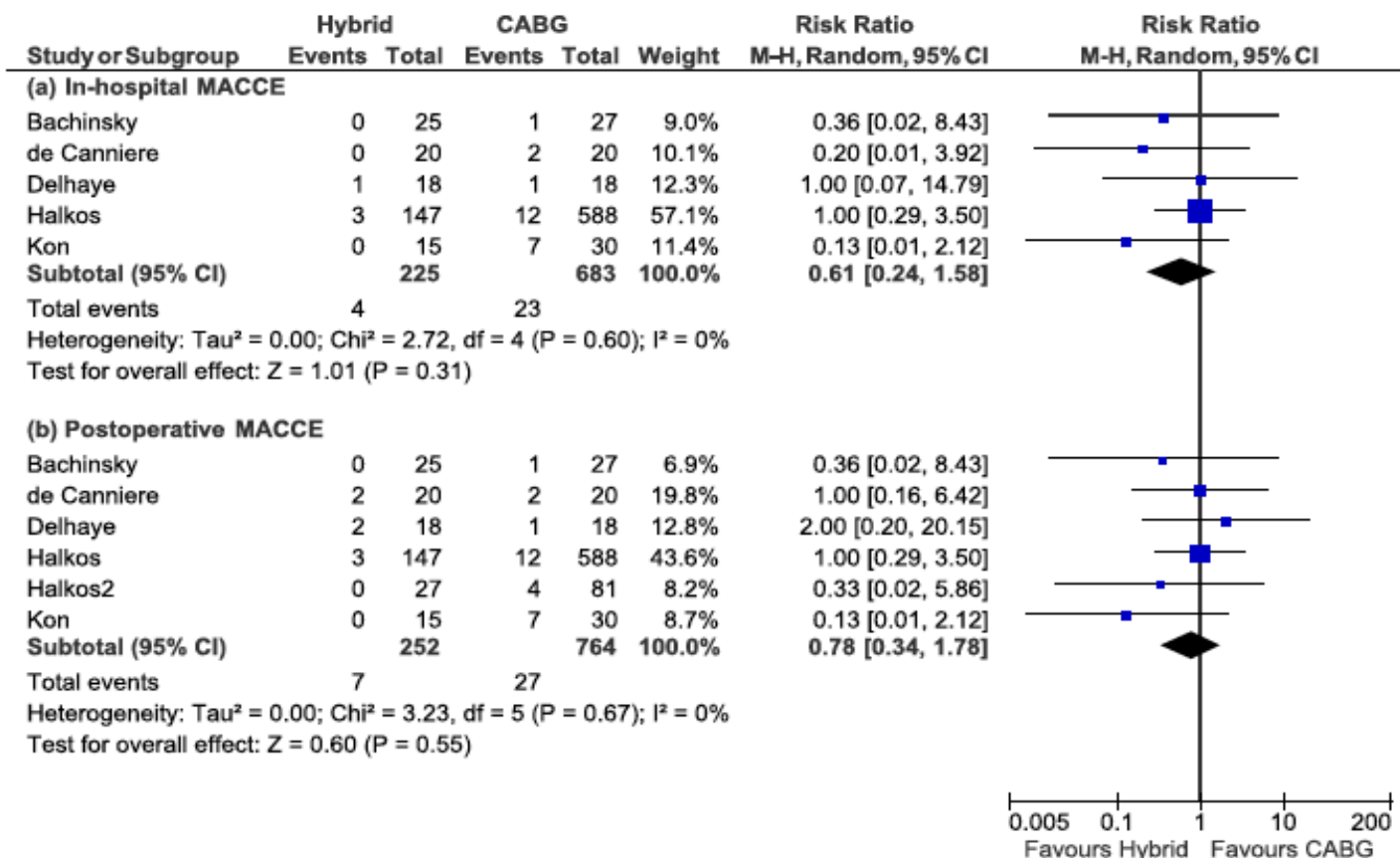
Kevin Phan^{a,b}, Sophia Wong^c, Nelson Wang^d, Steven Phan^d, Tristan D. Yan^{a,b,*}^a The Collaborative Research (COR) Group, Monash University, Sydney, Australia^b Sydney Medical School, University of Sydney, Sydney, Australia^c Cardiac Hospital, Cardiff, Australia

Fig. 1. Forest plot of (a) in-hospital MACCE, (b) postoperative MACCE, from eligible studies comparing hybrid coronary revascularization with coronary artery bypass grafting in a random-effects model.

One-Stop Hybrid Coronary Revascularization Versus Coronary Artery Bypass Grafting and Percutaneous Coronary Intervention for the Treatment of Multivessel Coronary Artery Disease

3-Year Follow-Up Results From a Single Institution

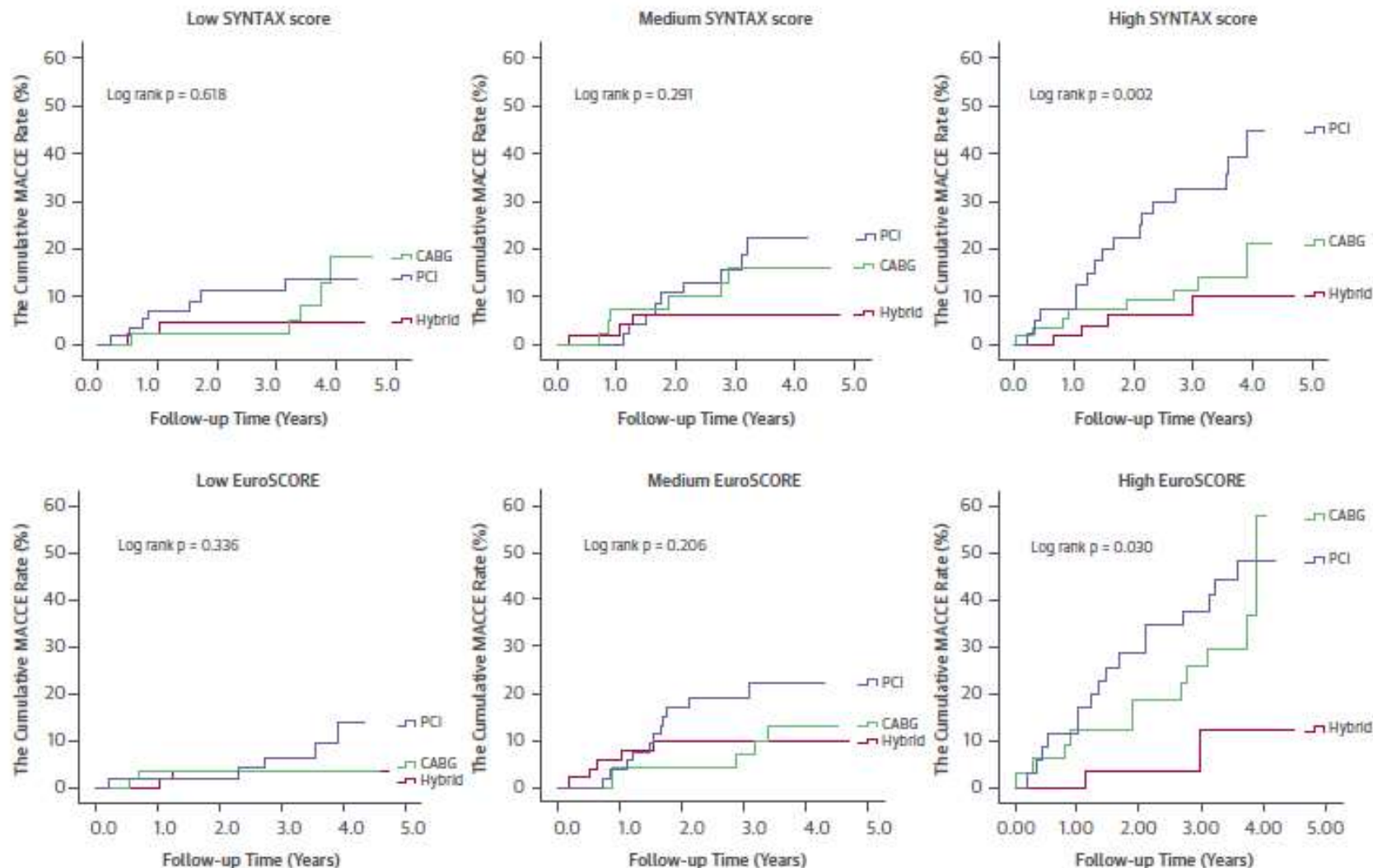
Methods

From June 2007 to December 2010, 141 consecutive patients underwent 1-stop HCR at Fuwai Hospital. Using propensity score methodology, these patients were matched with 2 separate groups of 141 patients who underwent isolated CABG or PCI during the same period. All patients were stratified by the EuroSCORE (European System for

Results

One-stop HCR incurred MACCE rate lower than that with PCI ($p < 0.001$), but similar to that with CABG ($p = 0.140$). After stratification by EuroSCORE or SYNTAX score, the cumulative MACCE rates were similar among the 3 groups in low and medium tertiles. But in the high EuroSCORE tertile, patients who underwent 1-stop HCR had a lower MACCE rate than did the groups that underwent CABG ($p = 0.030$) and PCI ($p = 0.006$). Meanwhile, patients with a high SYNTAX score who underwent 1-stop HCR had a MACCE rate lower than did those who underwent PCI ($p = 0.002$), but similar to that of those who underwent CABG ($p = 0.362$).

FIGURE 2 Improved MACCE in HCR Group



Improved major adverse cardiac and cerebrovascular events (MACCE) among patients in the HCR group versus conventional CABG and percutaneous coronary intervention (PCI) in the high EuroSCORE tertile. Adapted with permission from Shen et al. (36). SYNTAX = SYnergy Between PCI With TAXUS and Cardiac Surgery; other abbreviations as in Figure 1.

NIH Hybrid Coronary Revascularization Randomized Trial

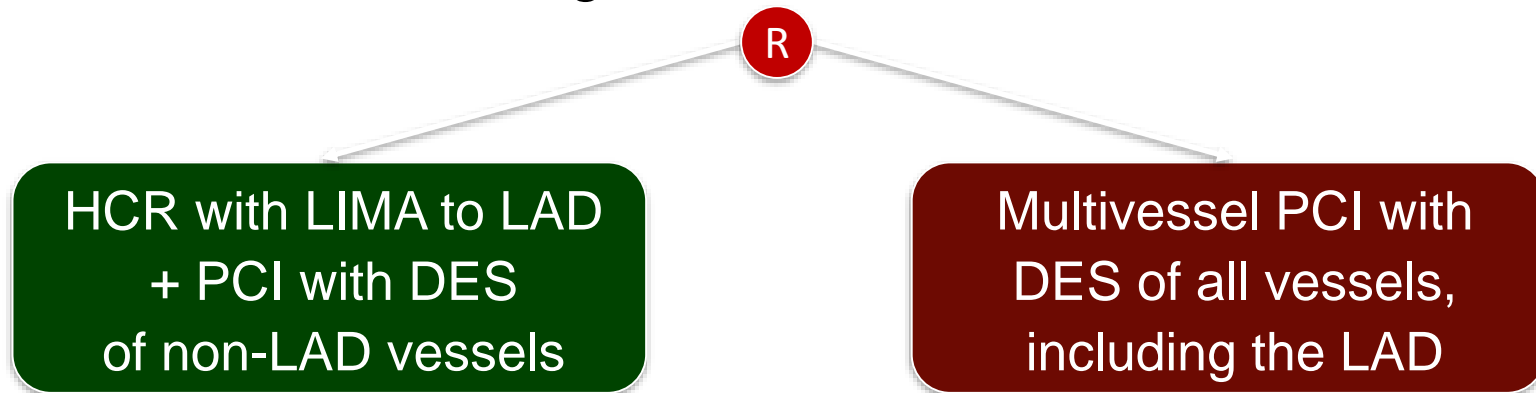
CCC: John Puskas (Mount Sinai) and Gregg Stone (CRF)

DCC: Emilia Bagiella, Alan Moskowitz (Mount Sinai)

Randomized Trial of HCR vs. PCI



2,354 pts at up to 70 sites with MVD involving the LAD distribution eligible for both HCR and PCI with DES



Follow-up: 30 days, 6 months, and then every 6 months through 5 years

Primary endpoint

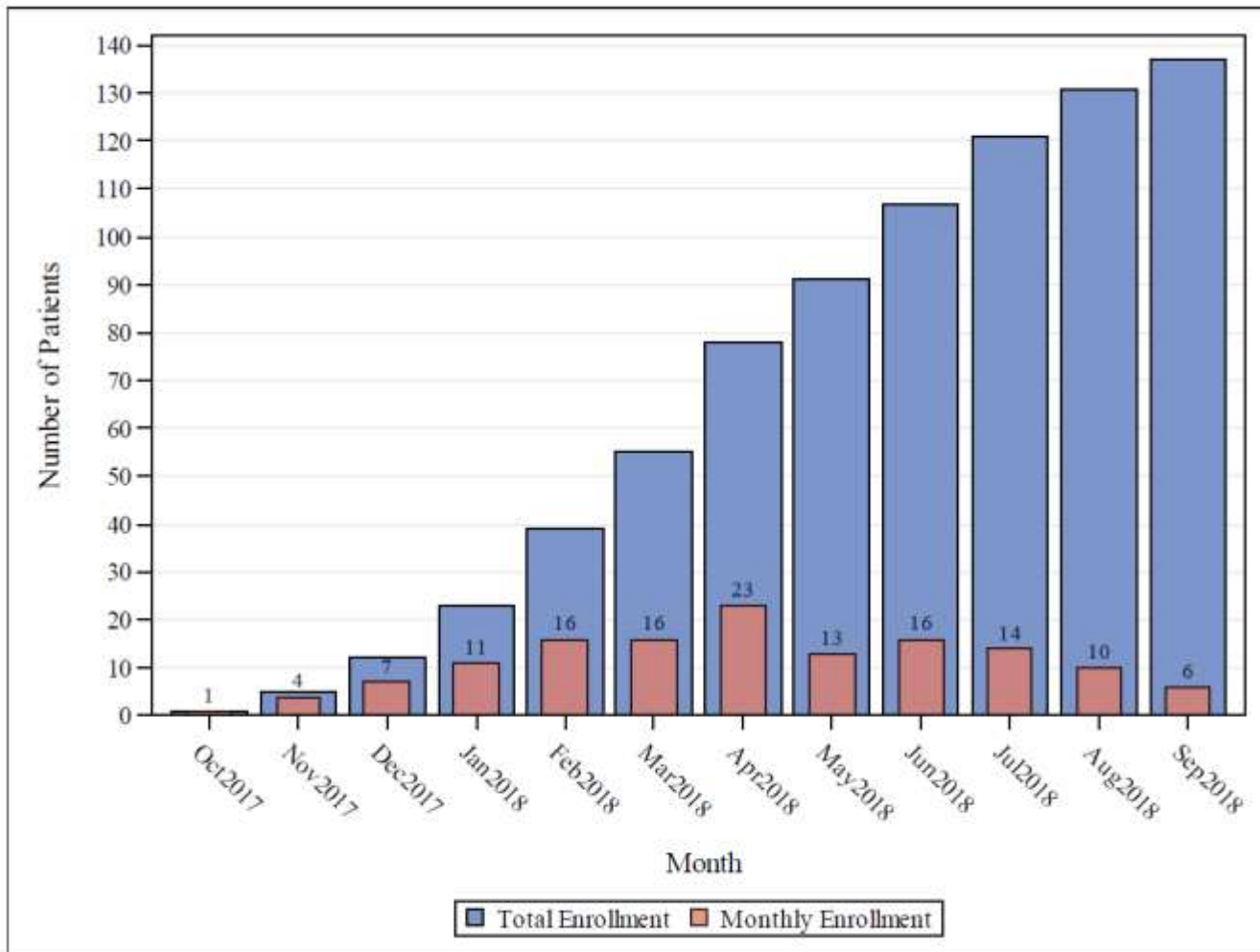
5-year MACCE (death, MI, stroke, or repeat revascularization)

Powered to detect superiority of HCR over PCI

Principal Investigators: John D. Puskas and Gregg W. Stone

Clinical and Data Coordinating Center: InCHOIR, Mt Sinai, NY, NY

Enrollment over Time (Target Enrollment 2354 Patients)



137 Randomized

305 Eligible

1568 Screened

Hybrid CABG/PCI

- Pitfalls
 - Early LIMA anastomosis anomalies, treat or not treat?
 - CHIP (CTO/bifurcation/calcified vessels) in non-LAD territories included? When should this be performed? May make interventional collaterals difficult.
 - Coronary perforation can lead to myocardial hematoma
 - Should it be compared to CABG in certain subsets?

