Left Main PCI in Acute Myocardial Infarction

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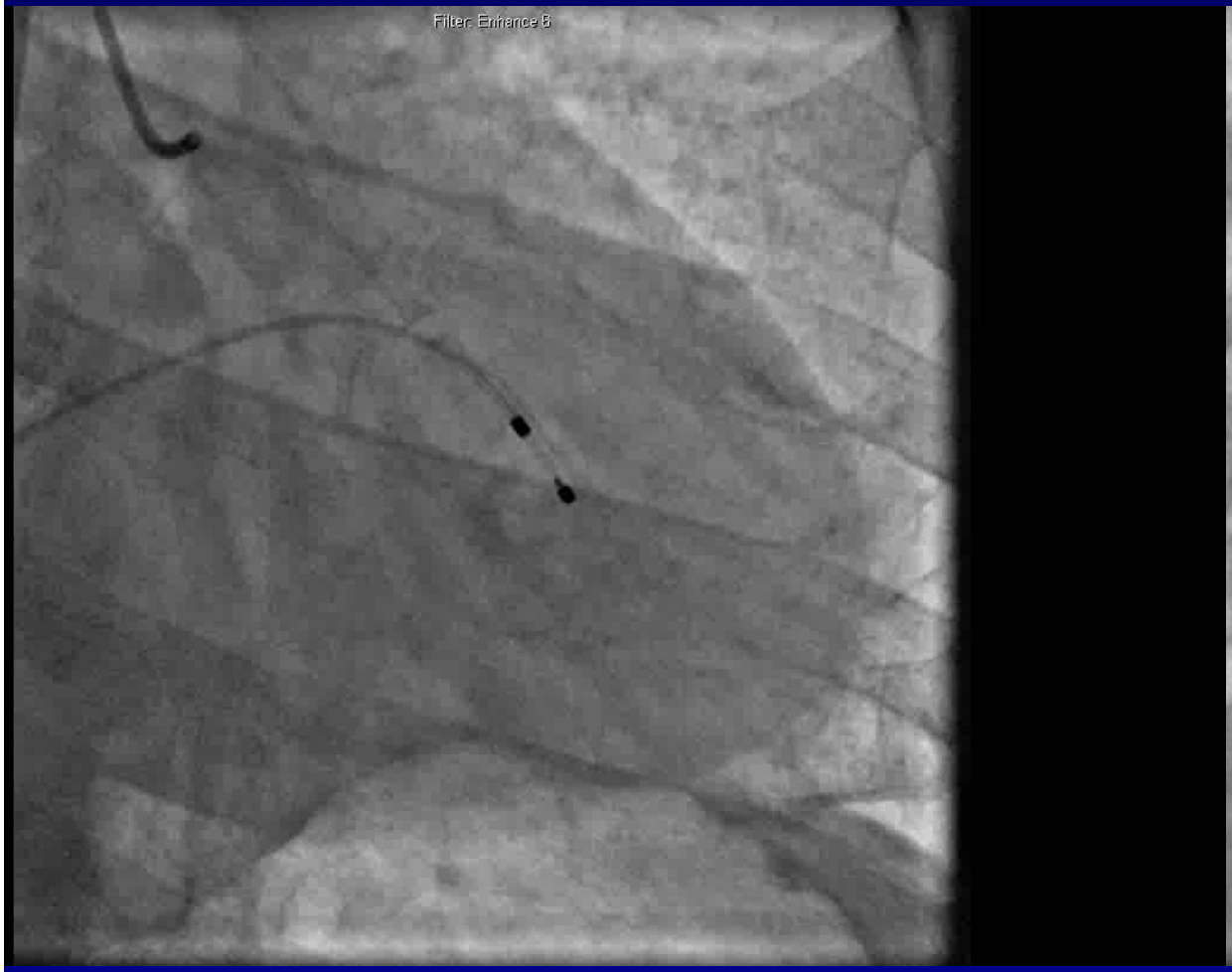
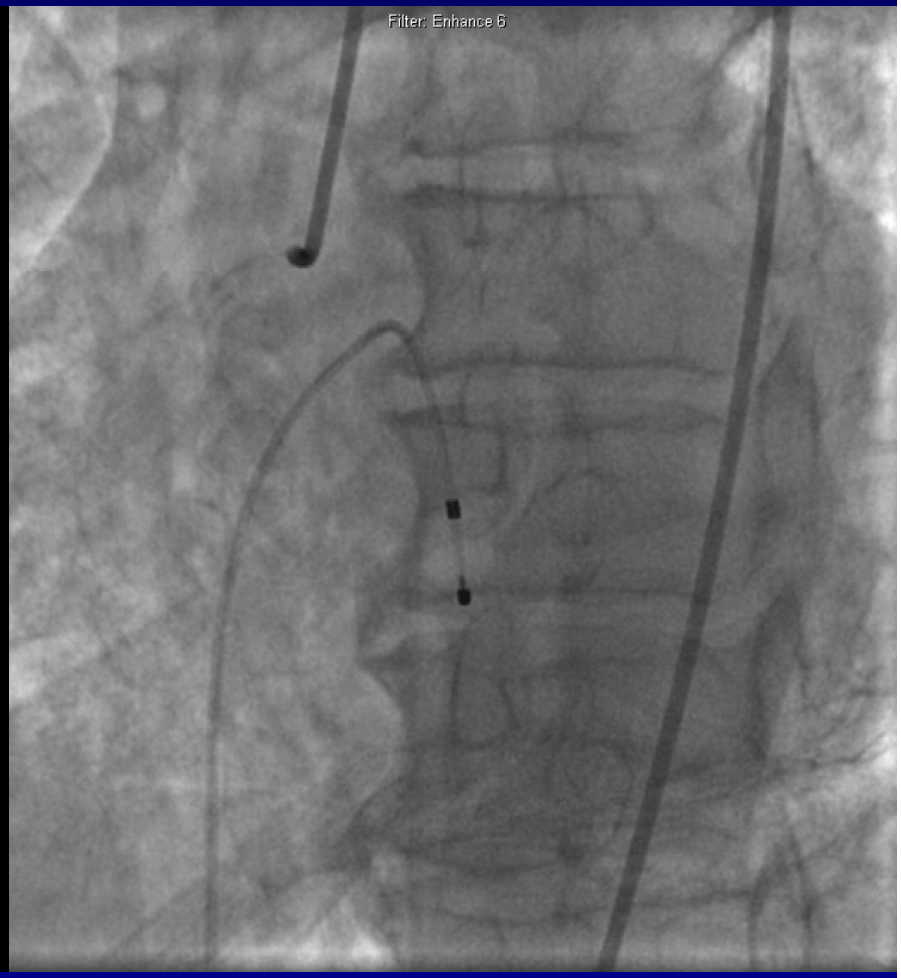
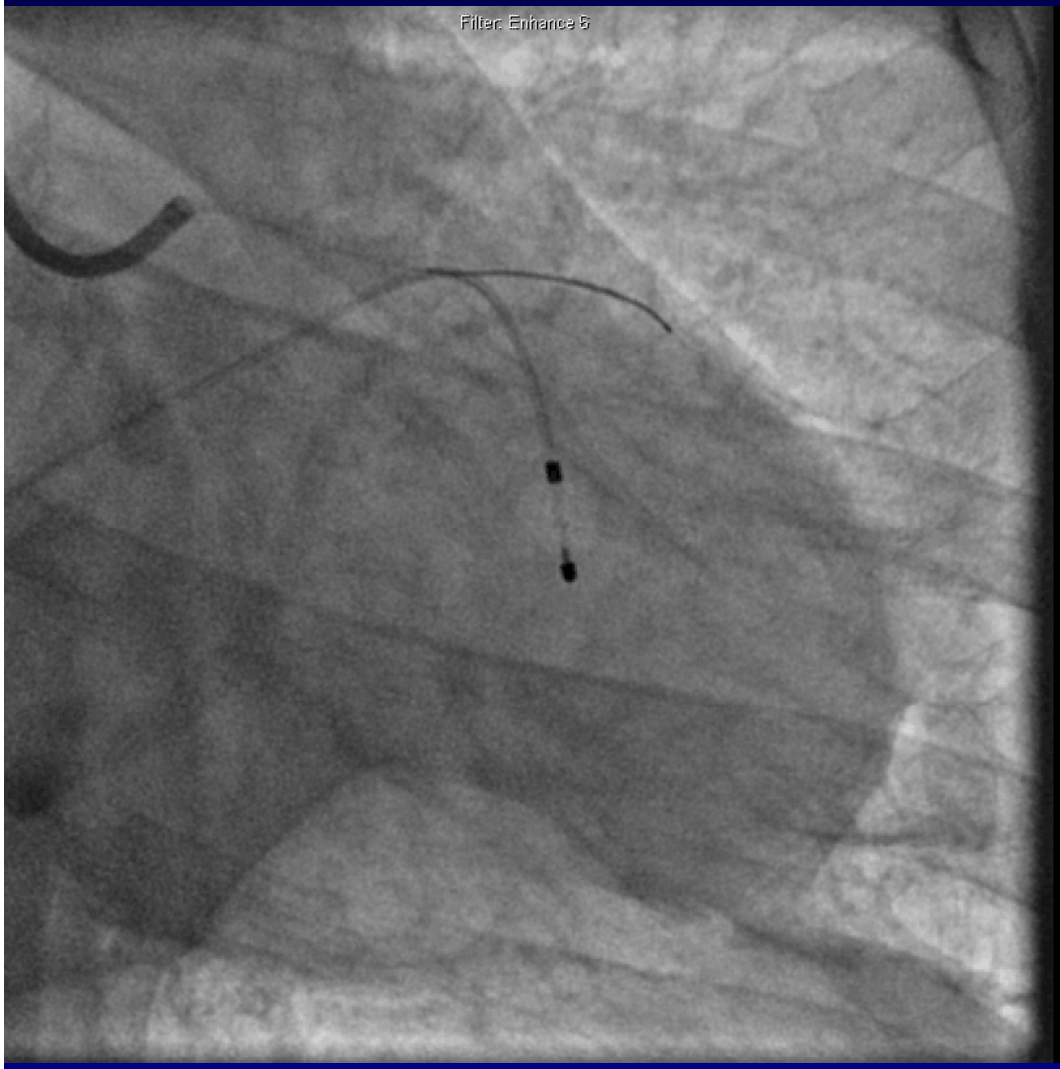




Acute left main occlusion occurs in 0.8% of STEMI

CABG vs. PCI?

- **Feasibility**
- **Safety**
- **Efficacy**
- **More rapid reperfusion with PCI**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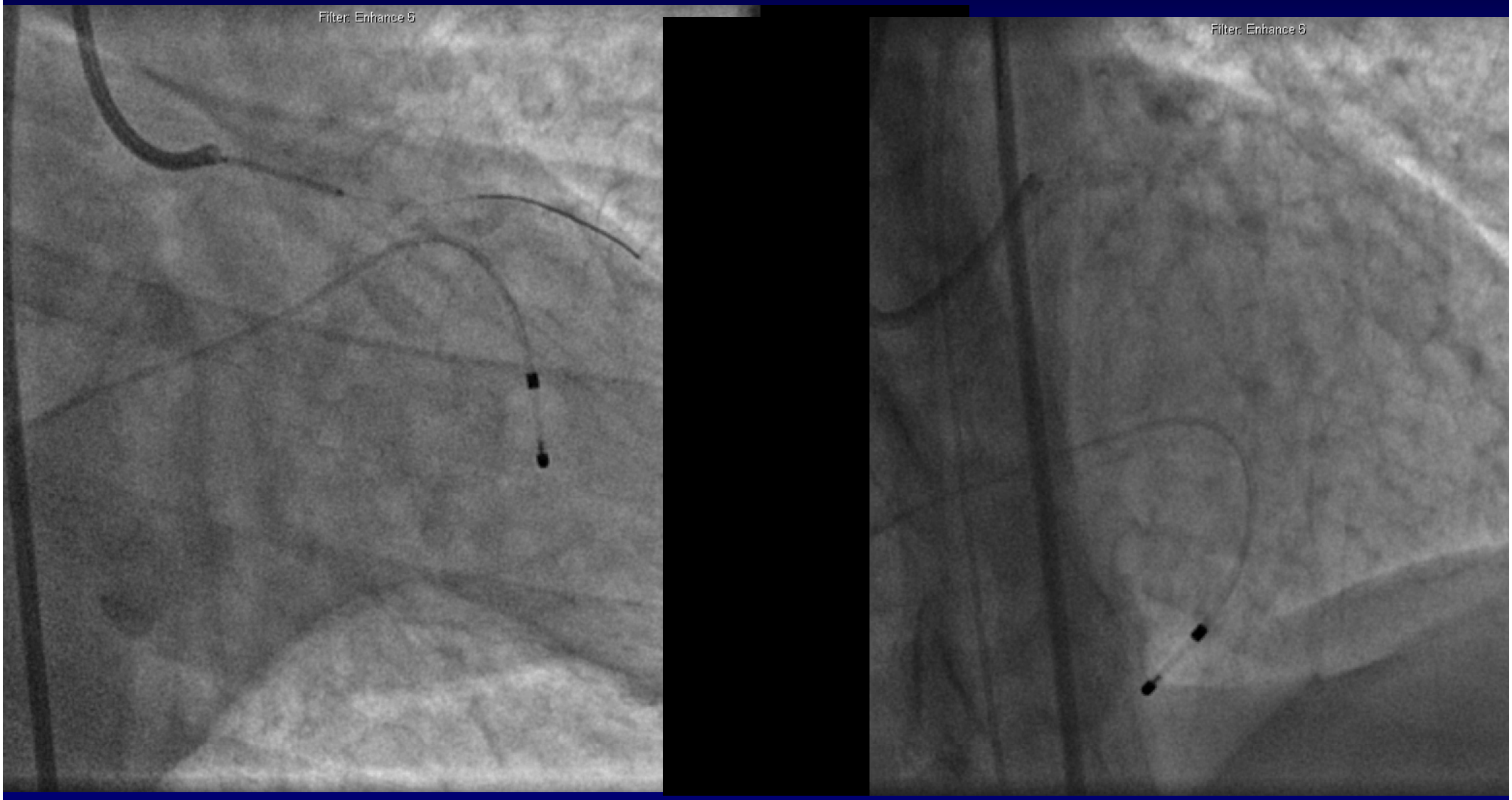
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European Heart Journal
doi:10.1093/eurheartj/ehp353

FASTTRACK
ESC CLINICAL TRIAL UPDATE

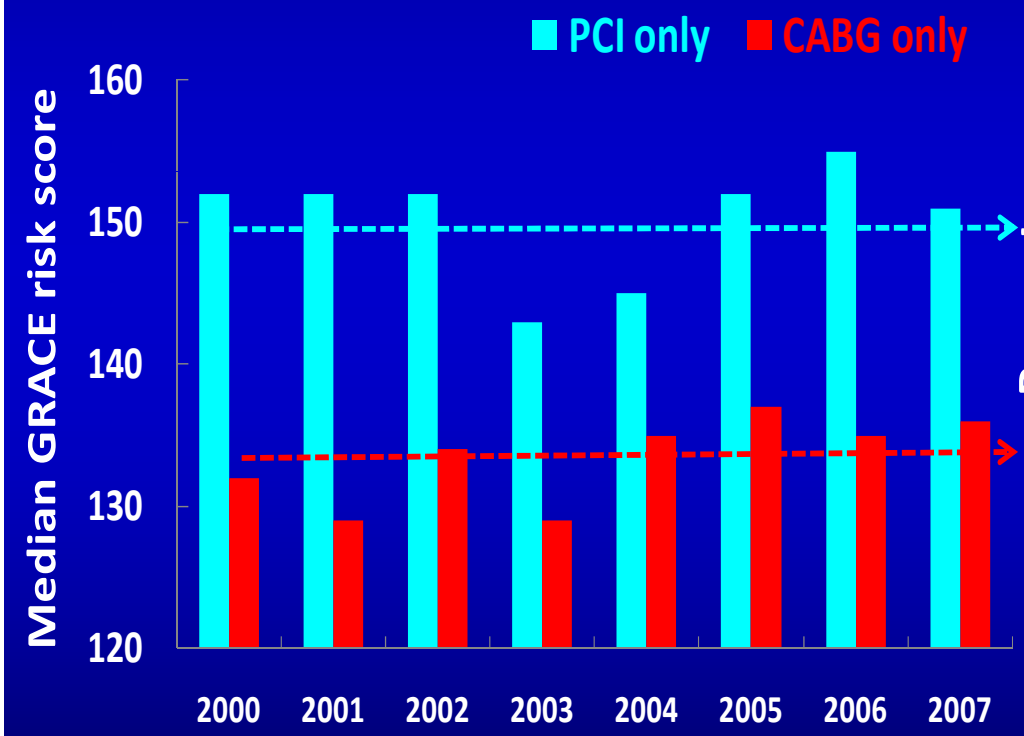
Unprotected left main revascularization in patients with acute coronary syndromes

Gilles Montalescot, David Brieger, Kim A. Eagle, Frederick A. Anderson Jr, Gordon FitzGerald, Michael S. Lee, Ph Gabriel Steg, A´ lvaro Avezum, Shaun G. Goodman, and Joel M. Gore for the GRACE Investigators

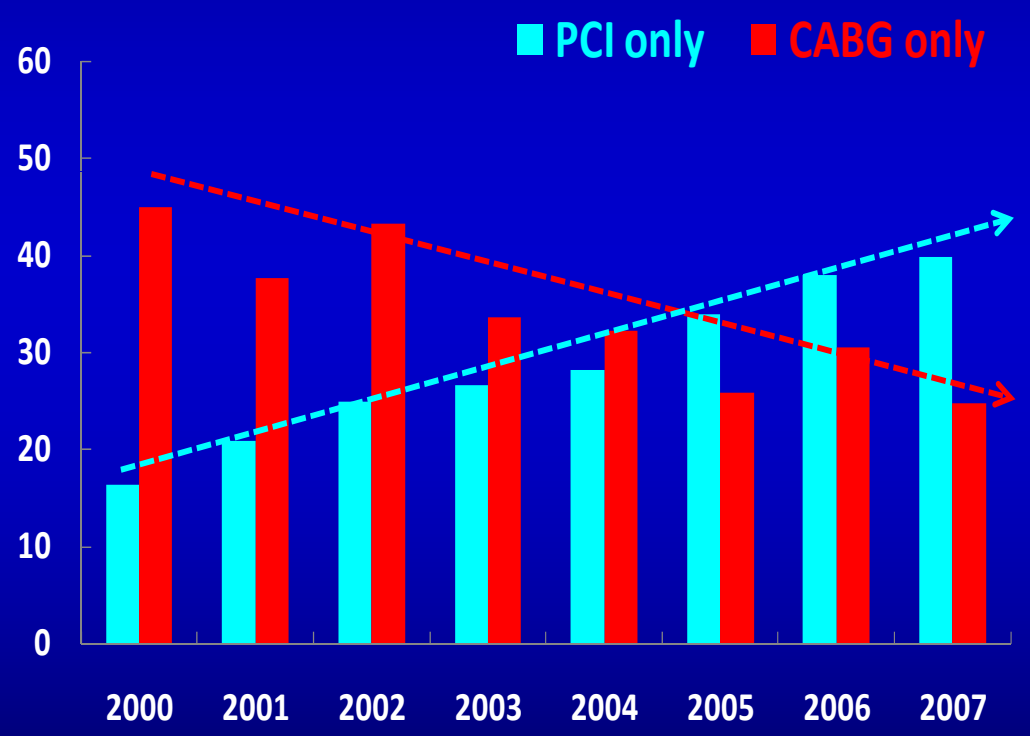
http://eurheartj.oxfordjournals.org/cgi/content/full/ehp353

ULMCD Revascularization in ACS

Temporal Trends in Severity of ACS



Temporal Trends in Type of Revascularization



p<.001 using Mantel-Haenszel linear trend test

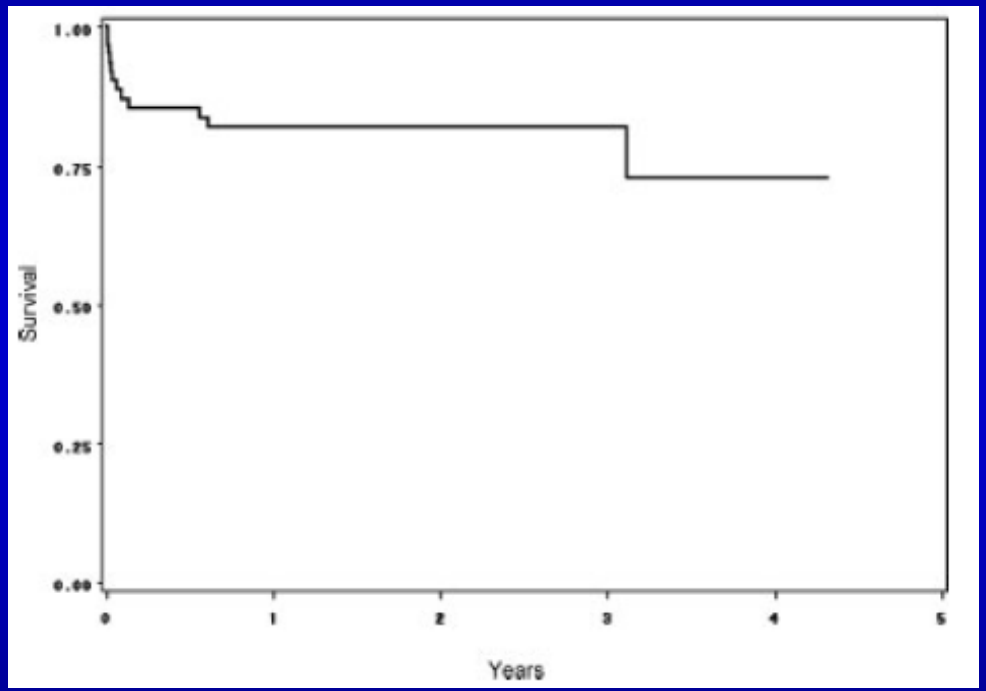
SCAI The Society for Cardiovascular Angiography and Interventions

Multicenter International Registry of Unprotected Left Main Coronary Artery Percutaneous Coronary Intervention With Drug-Eluting Stents in Patients With Myocardial Infarction

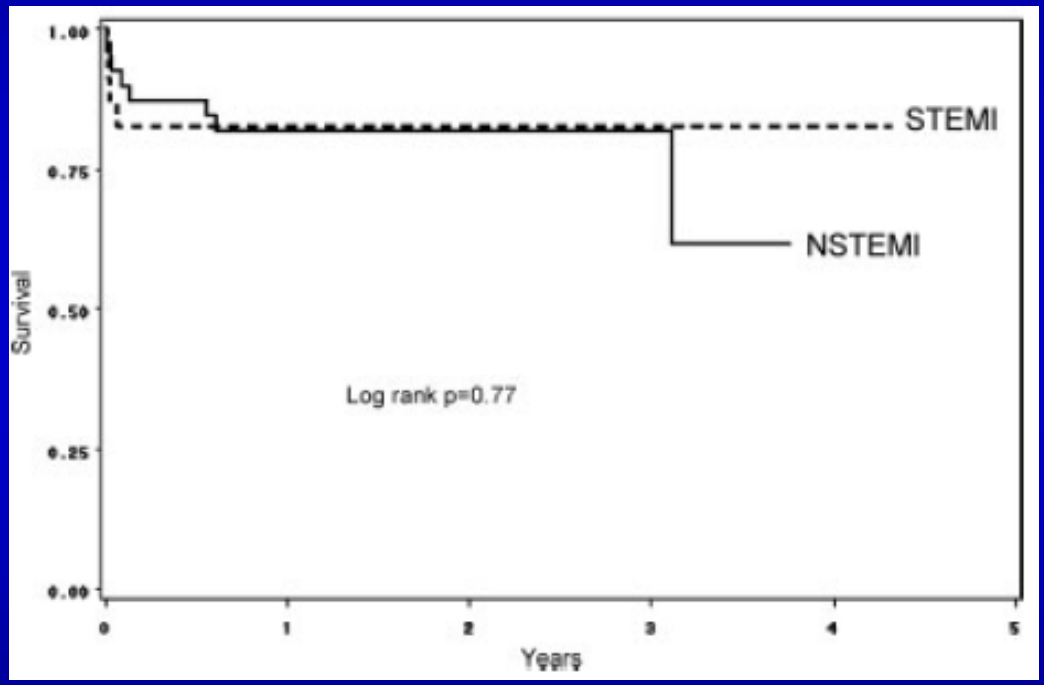
Michael S. Lee,[1]* MD, Dario Sillano,[2] MD, Azeem Latib,[3] MD, Alaide Chieffo,[3] MD, Giuseppe Biondi Zoccai,[2] MD, Ravi Bhatia,[1] Imad Sheiban,[2] MD, Antonio Colombo,[3] MD, and Jonathan Tobis,[1] MD

Background: Patients who present with myocardial infarction (MI) and unprotected left main coronary artery (ULMCA) disease represent an extremely high-risk subset of patients. ULMCA percutaneous coronary intervention (PCI) with drug-eluting stents (DES) in MI patients has not been extensively studied. **Methods:** In this retrospective multicenter international registry, we evaluated the clinical outcomes of 62 consecutive patients with MI who underwent ULMCA PCI with DES (23 ST-elevation MI [STEMI] and 39 non-ST-elevation MI [NSTEMI]) from 2002 to 2006. **Results:** The mean age was 70 ± 12 years. Cardiogenic shock was present in 24%. The mean EuroSCORE was 10 ± 8. Angiographic success was achieved in all patients. Overall in-hospital major adverse cardiac event (MACE) rate was 10%, mortality was 8%, all due to cardiac deaths from cardiogenic shock, and one patient suffered a periprocedural MI. At 586 ± 431 days, 18 patients (29%) experienced MACE, 12 patients (19%) died (the mortality rate was 47% in patients with cardiogenic shock), and target vessel revascularization was performed in four patients, all of whom had distal bifurcation involvement (two patients underwent repeat PCI and two patients underwent bypass surgery). There was no additional MI. Two patients had probable stent thrombosis and one had possible stent thrombosis. Diabetes [hazard ratio (HR) 4.22, 95% confidence interval (CI) (1.07–17.36), $P = 0.04$), left ventricular ejection fraction [HR 0.94, 95% CI (0.90–0.98), $P = 0.005$), and intubation [HR 7.00, 95% CI (1.62–30.21), $P = 0.009$) were significantly associated with increased mortality. **Conclusions:** Patients with MI and ULMCA disease represent a very high-risk subgroup of patients who are critically ill. PCI with DES appears to be technically feasible, associated with acceptable long-term outcomes, and a reasonable alternative to surgical revascularization for MI patients with ULMCA disease. Randomized trials are needed to determine the ideal revascularization strategy for these patients.

Overall Survival



STEMI vs. NSTEMI



N=62
Cardiogenic shock 24%
All in-hospital deaths from cardiogenic shock

STATE-OF-THE-ART PAPER

Unprotected Left Main Coronary Disease and ST-Segment Elevation Myocardial Infarction

A Contemporary Review and Argument for Percutaneous Coronary Intervention

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Los Angeles and La Jolla, California; Seoul, South Korea; New York, New York; and Turin, Italy

"Absent a randomized trial, it is our belief that physicians and guidelines committees should recognize emergent PCI as the preferred reperfusion modality for selected patients with MI and LMCA occlusion."

vessel revascularization associated with ULMCA PCI compared with CABG is an acceptable tradeoff given the primary need for rapid reperfusion to enhance survival. (J Am Coll Cardiol Intv 2010;3:791–5)

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PRACTICE GUIDELINE

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions

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2.2. Revascularization to Improve Survival: Recommendations

Left Main CAD Revascularization

CLASS I

1. CABG to improve survival is recommended for patients with significant (≥50% diameter stenosis) left main coronary artery stenosis (24–30). *(Level of Evidence: B)*

CLASS IIa

1. PCI to improve survival is reasonable as an alternative to CABG in selected stable patients with significant (≥50% diameter stenosis) unprotected left main CAD with: 1) anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of good long-term outcome (e.g., a low SYNTAX score [≤22], ostial or trunk left main CAD); and 2) clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality ≥5%) (13,17,19,23,31–48). *(Level of Evidence: B)*
2. PCI to improve survival is reasonable in patients with UA/NSTEMI when an unprotected left main coronary artery is the culprit lesion and the patient is not a candidate for CABG (13,36–39,44,45,47–49). *(Level of Evidence: B)*
3. PCI to improve survival is reasonable in patients with acute STEMI when an unprotected left main coronary artery is the culprit lesion, distal coronary flow is less than TIMI (Thrombolysis In Myocardial Infarction) grade 3, and PCI can be performed more rapidly and safely than CABG (33,50,51). *(Level of Evidence: C)*

Outcome After Surgery and Percutaneous Intervention for Cardiogenic Shock and Left Main Disease

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Division of Cardiology, Department of Medicine, and Department of Cardiac Surgery, University of California, Los Angeles Medical Center, Los Angeles, California; Division of Cardiology, New York University Medical Center, New York, New York; and Division of Cardiology, Cleveland Clinic, Cleveland, Ohio

Background. The ideal revascularization strategy (bypass surgery versus percutaneous coronary intervention [PCI]) for patients with cardiogenic shock in the setting of left main coronary artery disease is unknown.

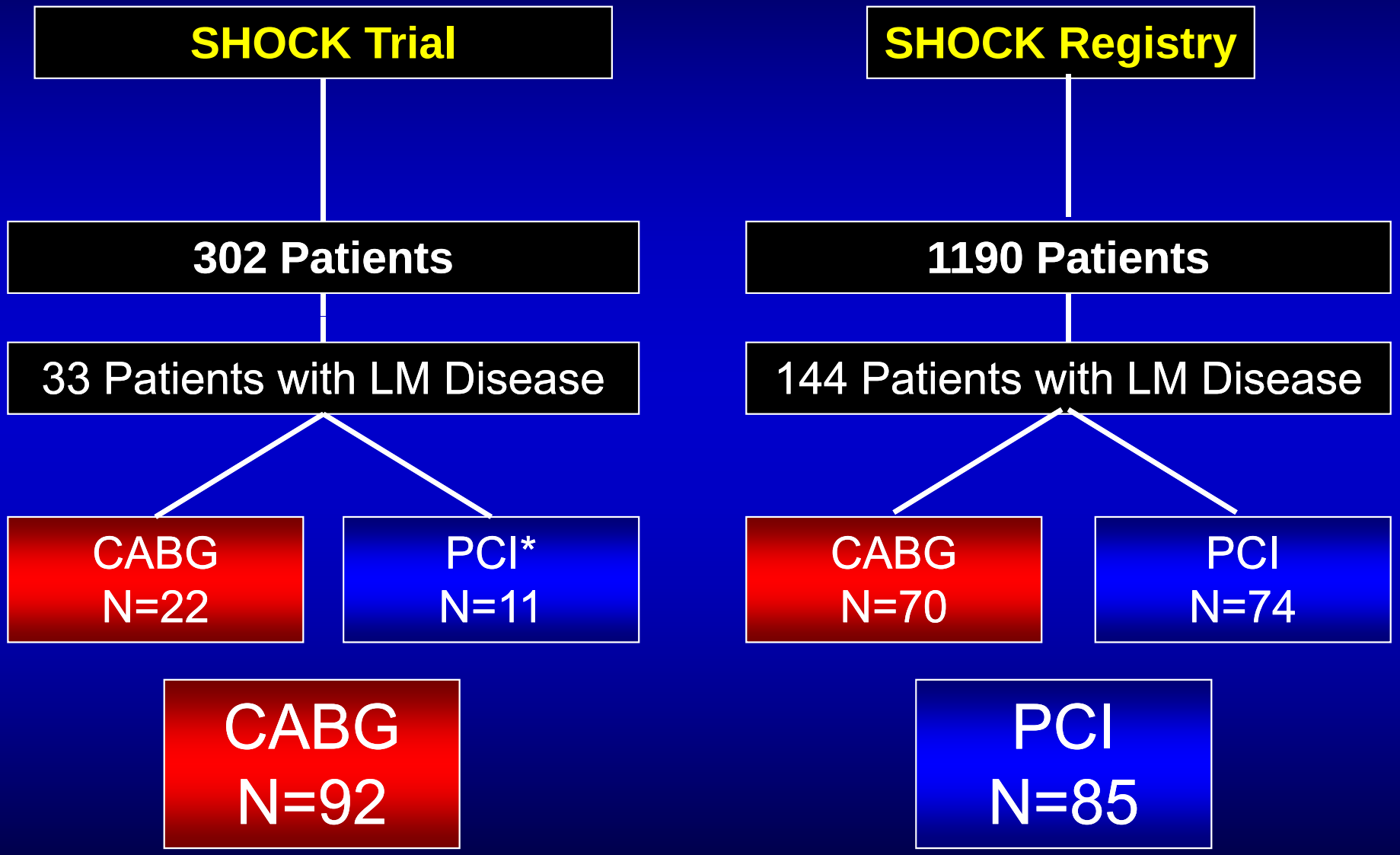
Methods. The Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock Trial and Registry included 164 patients with left main disease who underwent revascularization. Although the standard of care at the time and the trial protocol recommended coronary artery bypass graft surgery for patients with left main disease, the revascularization strategy (79 coronary artery bypass graft surgery and 85 PCI) was individualized for each patient by site investigators.

Results. The median time from myocardial infarction to revascularization was 24.3 hours (interquartile range, 8.7 to 82.5 hours) in the surgical group and 7.4 hours (interquartile range, 3.7 to 19.5 hours) in the PCI group ($p < 0.05$). Overall 30-day survival with surgery in this setting was 54% (95% confidence interval, 0.43 to 0.69) and was significantly superior to the 14% (95% confidence interval, 0.09 to 0.35) in the PCI group ($p \leq 0.001$). When the left main was the infarct-related artery, the 30-day survival rate was 40% in the surgical group (n = 6) and 16% in the PCI group (n = 15; $p = 0.03$). Coronary artery bypass graft surgery (hazard ratio, 0.41; 95% confidence interval, 0.22 to 0.77; $p = 0.006$) and age (per 10 years, hazard ratio, 1.04; 95% confidence interval, 1.01 to 1.08; $p = 0.02$) were independently associated with 30-day survival.

Conclusions. Coronary artery bypass graft surgery appeared to provide a survival advantage over PCI at 30-day follow-up in patients with left main coronary artery disease. The impact of current PCI strategies on this subgroup is undetermined.

(Ann Thorac Surg 2008;86:29–34)

Methods



*Emergency CABG was recommended for patients with LMCA stenosis ≥50% in the SHOCK Trial

Baseline Demographic and Angiographic Characteristics

	CABG n=92	PCI n=85	p value
Age (yrs ± SD)	67.3	67.5	0.79
Men (%)	66.3	67.1	0.44
Hypertension (%)	48.9	45.9	0.70
Diabetes mellitus (%)	25.0	22.4	0.75
Renal insufficiency (%)	12.0	9.4	0.44
Previous stroke (%)	10.0	8.0	0.72
Previous AMI (%)	32.6	30.6	0.79
Previous CABG (%)	6.5	14.1	0.34
Previous PCI (%)	4.3	11.8	0.23
Triple-vessel disease (%)	87.0	73.0	<0.05
Infarct-related artery			0.015
LM (%)	20.3	29.4	
LAD (%)	15.2	18.8	
LCX (%)	12.7	17.6	
RCA (%)	19.0	23.5	
SVG (%)	32.9	10.6	
Peak CK (U/L ± SD)	2595 ± 2772	4203 ± 5364	0.015

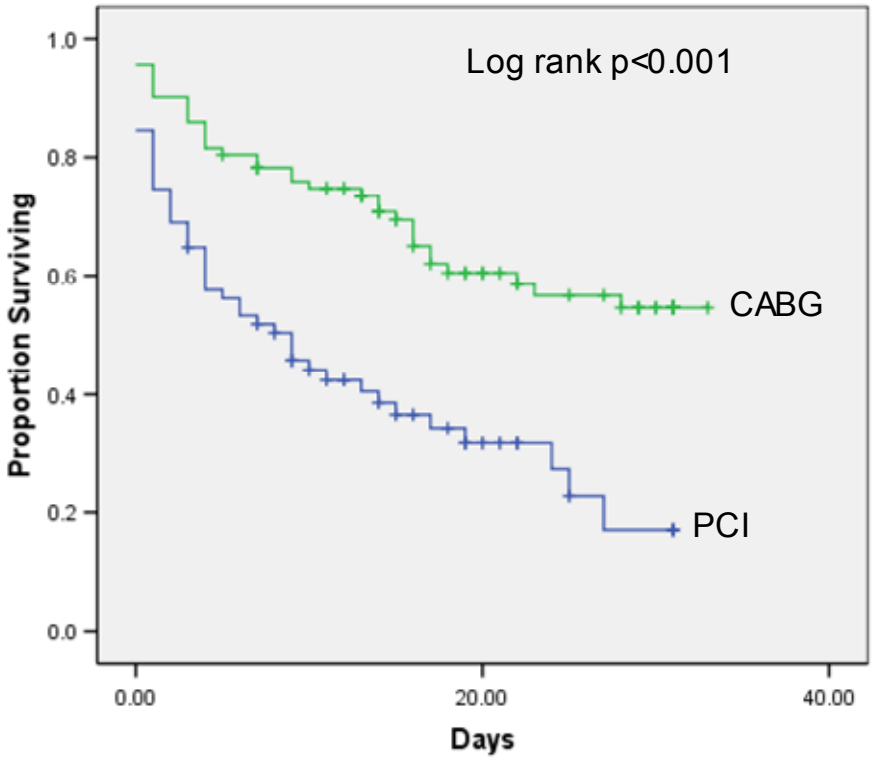
Timing Data

	CABG	PCI	p value
	(n=92 patients)	(n=85 patients)	
Median time from AMI to revasc (h)*	29.0 (10.0-90.8)	7.5 (4.0-19.4)	<0.05
Median time from shock to revasc (h)*	10.6 (3.8-66.0)	3.1 (1.9-7.3)	<0.05
	(n=22 trial patients)	(n=11 trial patients)	
Median time from AMI to revasc (h)*	19.0 (10.5-36.8)	7.1 (4.7-13.2)	0.1
Median time from shock to revasc (h)*	11.25 (5.6-18.0)	4.75 (2.43-8.75)	0.12
	(n=70 registry pts)	(n=74 registry pts)	
Median time from AMI to revasc (h)*	38.5 (10.0-109.1)	7.6 (3.9-20.4)	0.001
Median time from shock to revasc (h)*	10.3 (2.3-98.0)	3.0 (1.8-6.8)	<0.001

Procedural details of PCI

Multiple vessels treated initially (%)	17.9
Stenting (%)	30.6
Glycoprotein IIb/IIIa antagonists (%)	11.8
Hemodynamic support with IABP (%)	93.5
Subsequent CABG (%)	14.1

Kaplan-Meier 30-day Survival Estimates

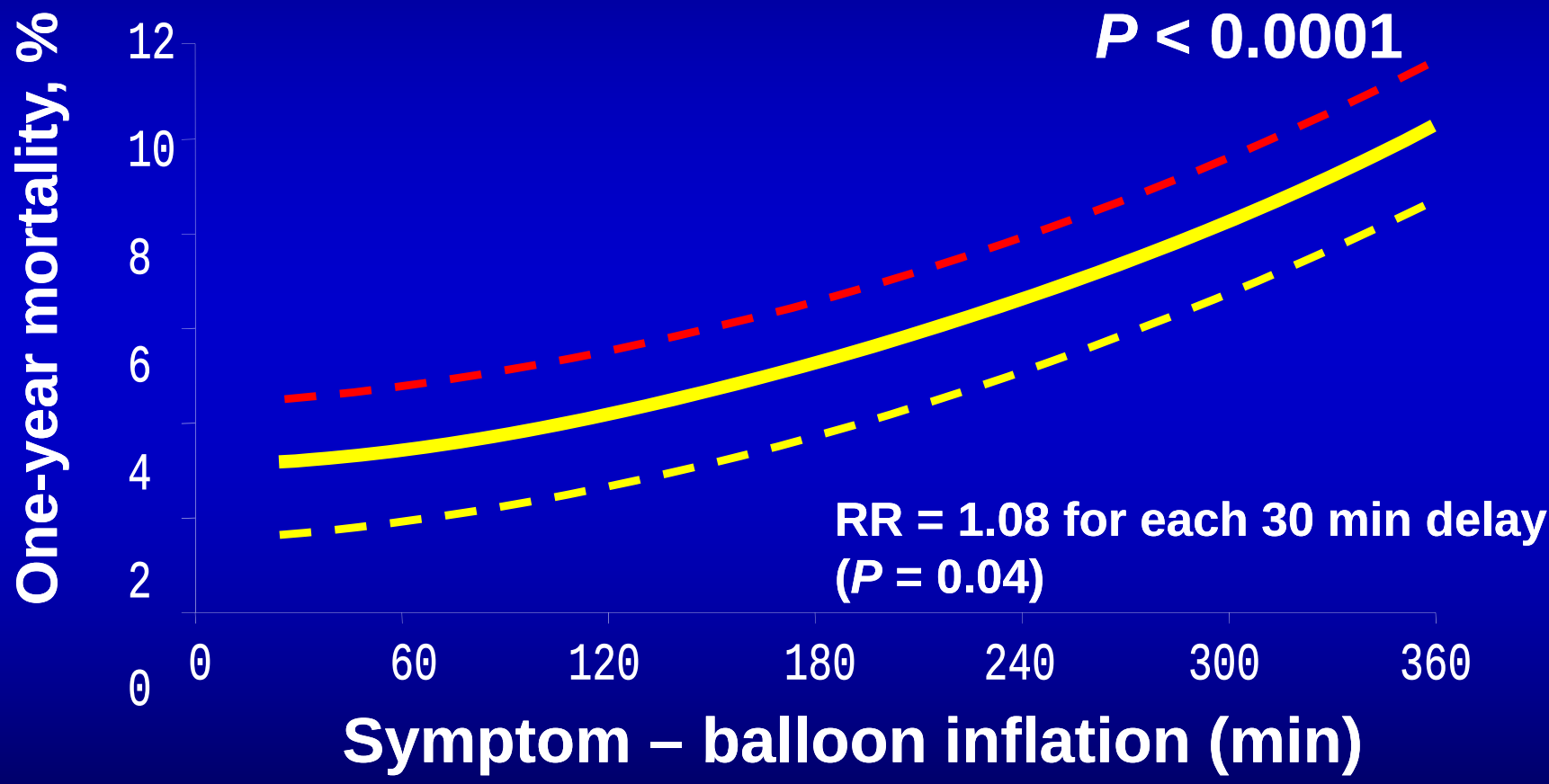


Minimum 1 hour

5 minutes!

Symptom Onset-Balloon Time and Mortality in Primary PCI for STEMI

6 RCTs of Primary PCI by Zwolle Group 1994 – 2001
N = 1791



The relative risk of 1-year mortality increases by 7.5% for each 30-minute delay

DeLuca, Suryapranata, Circ 109:1223, 2004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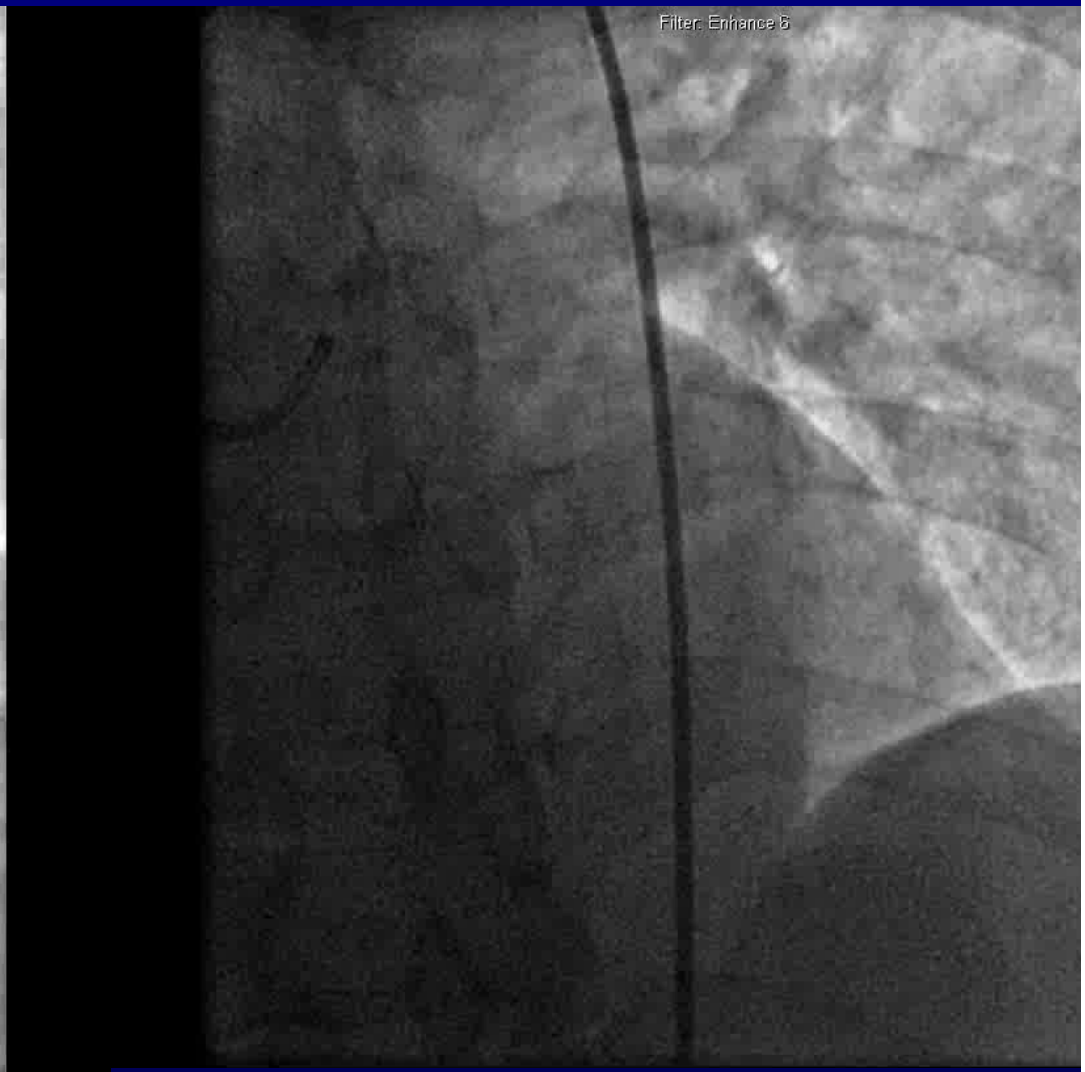
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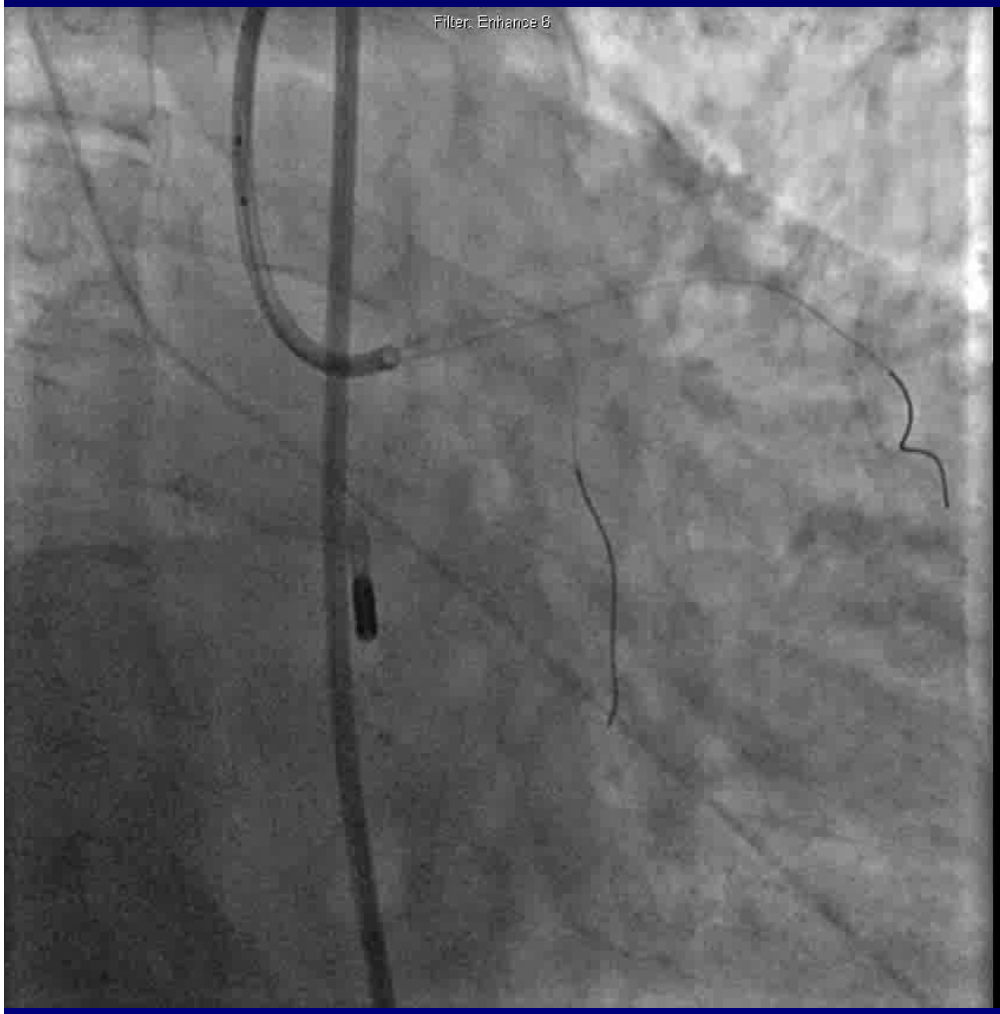
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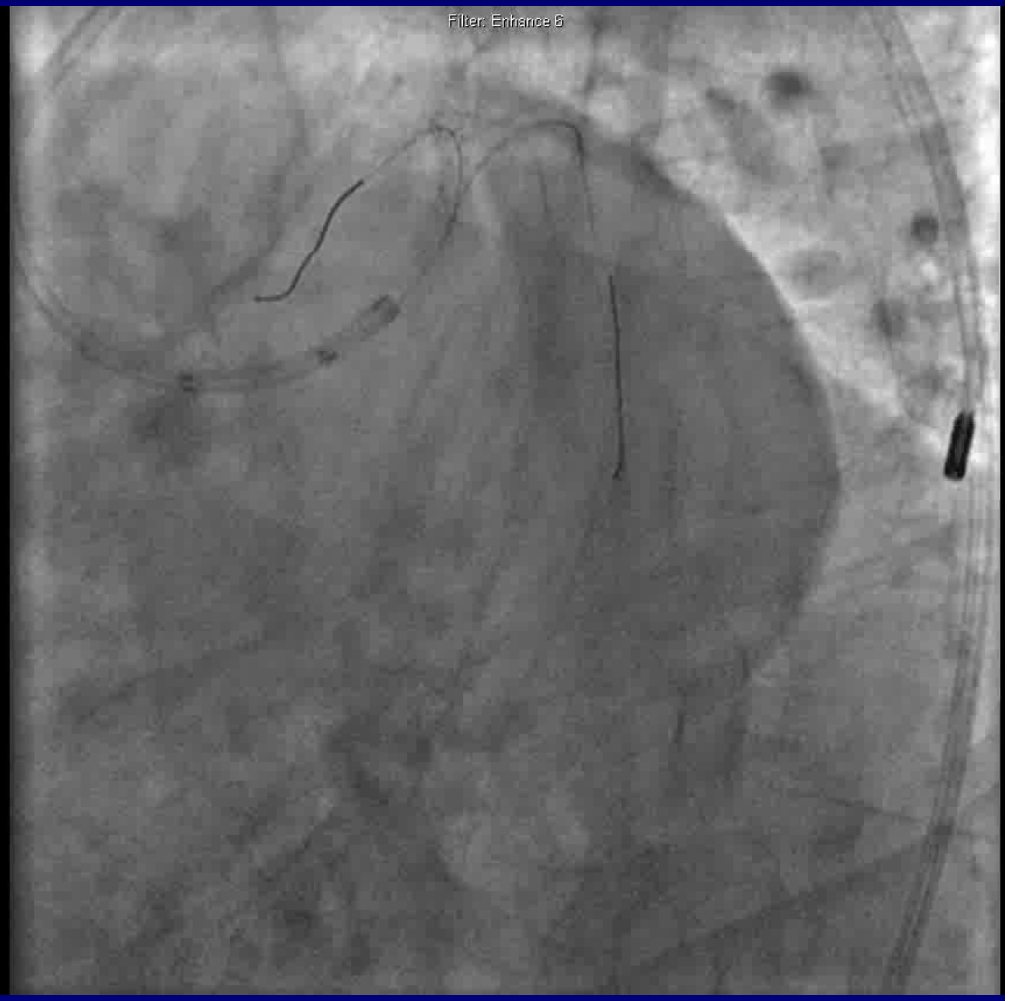
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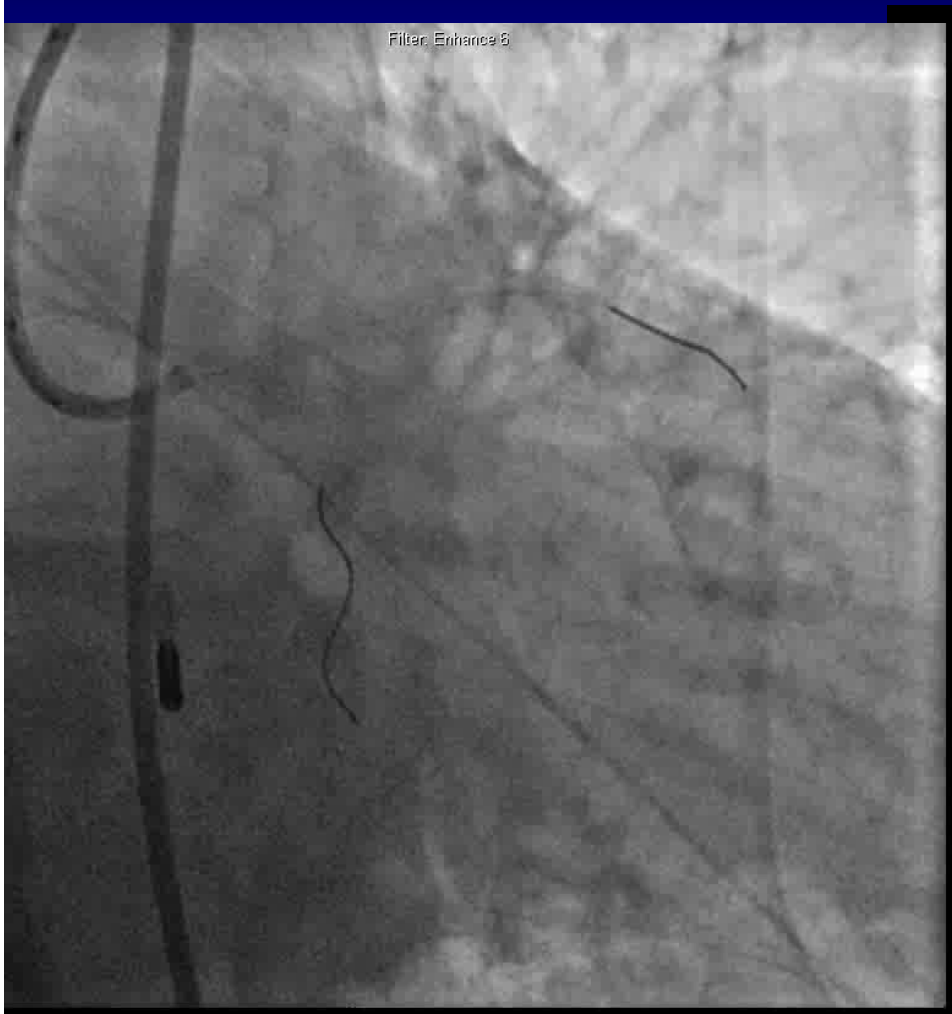
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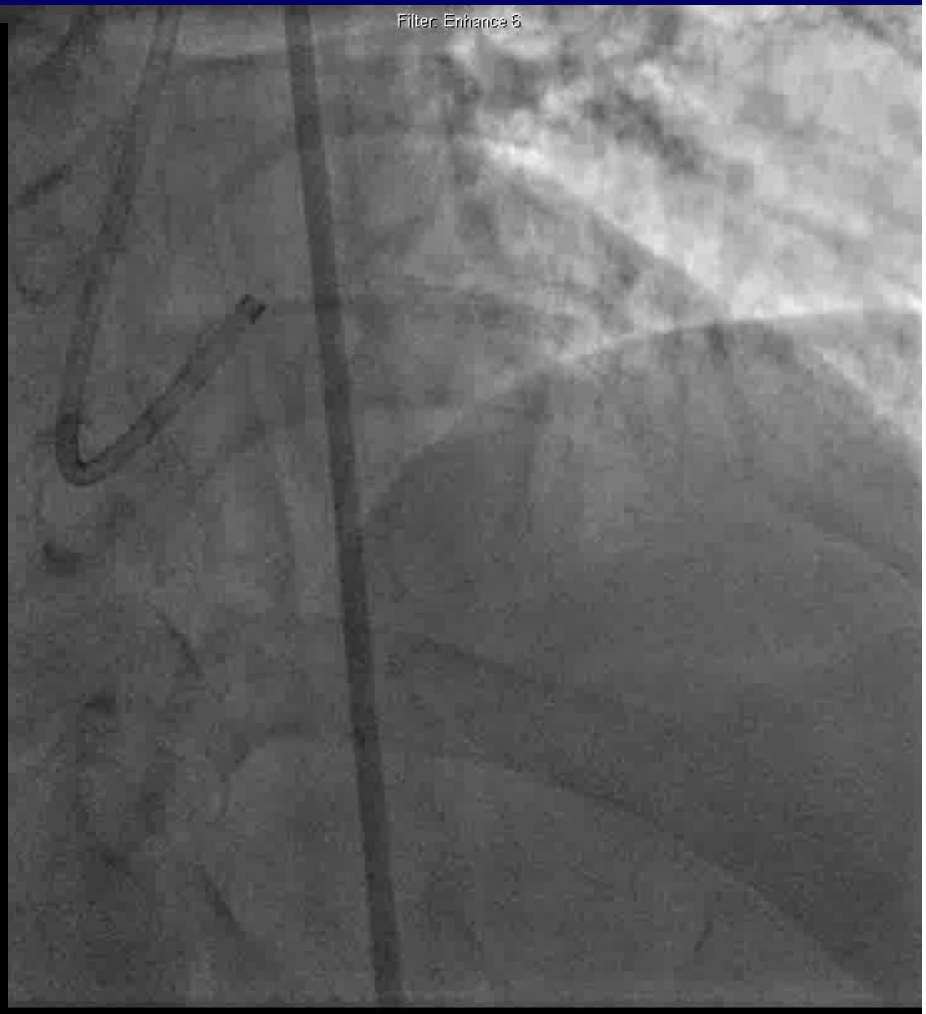
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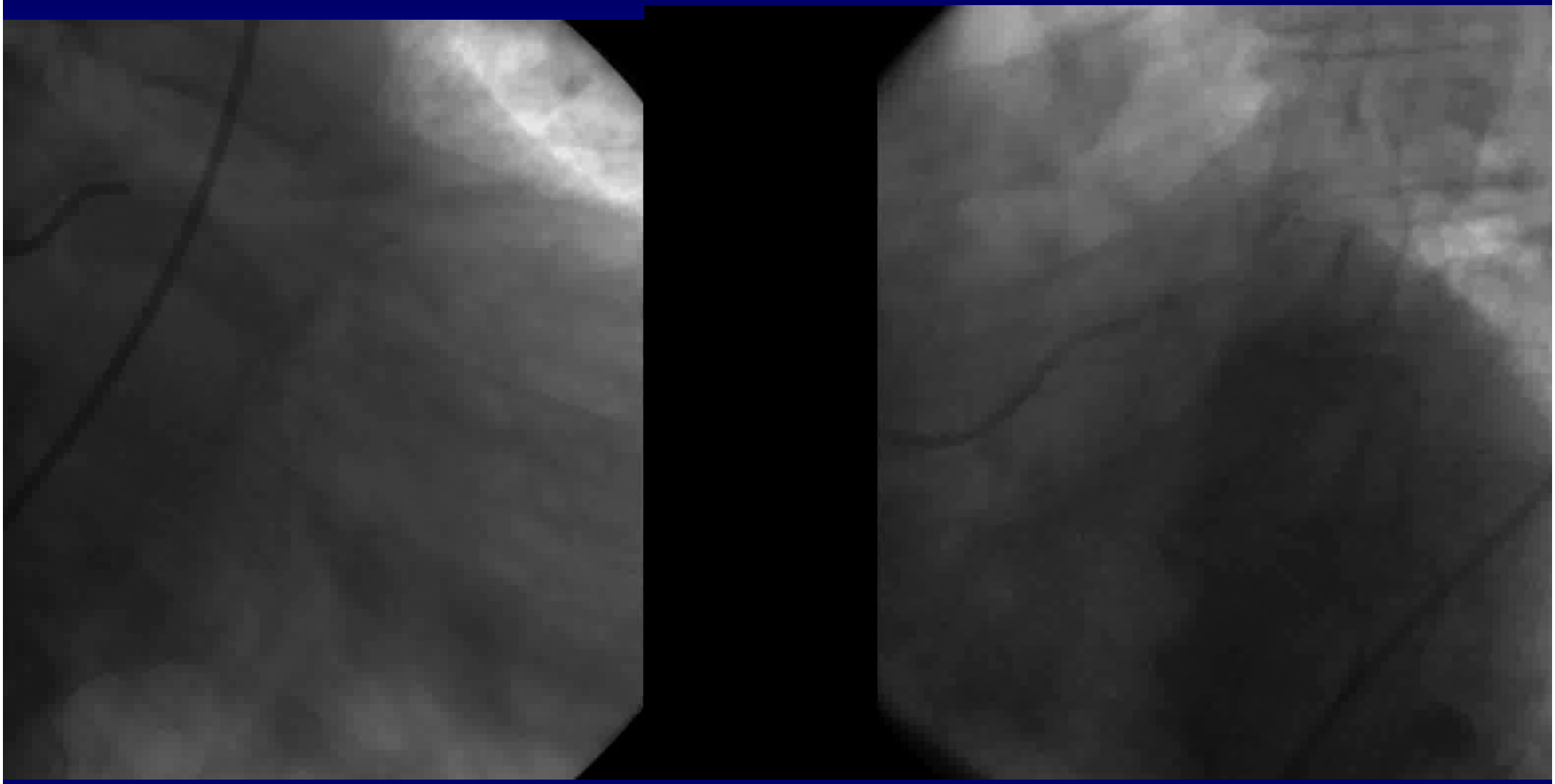

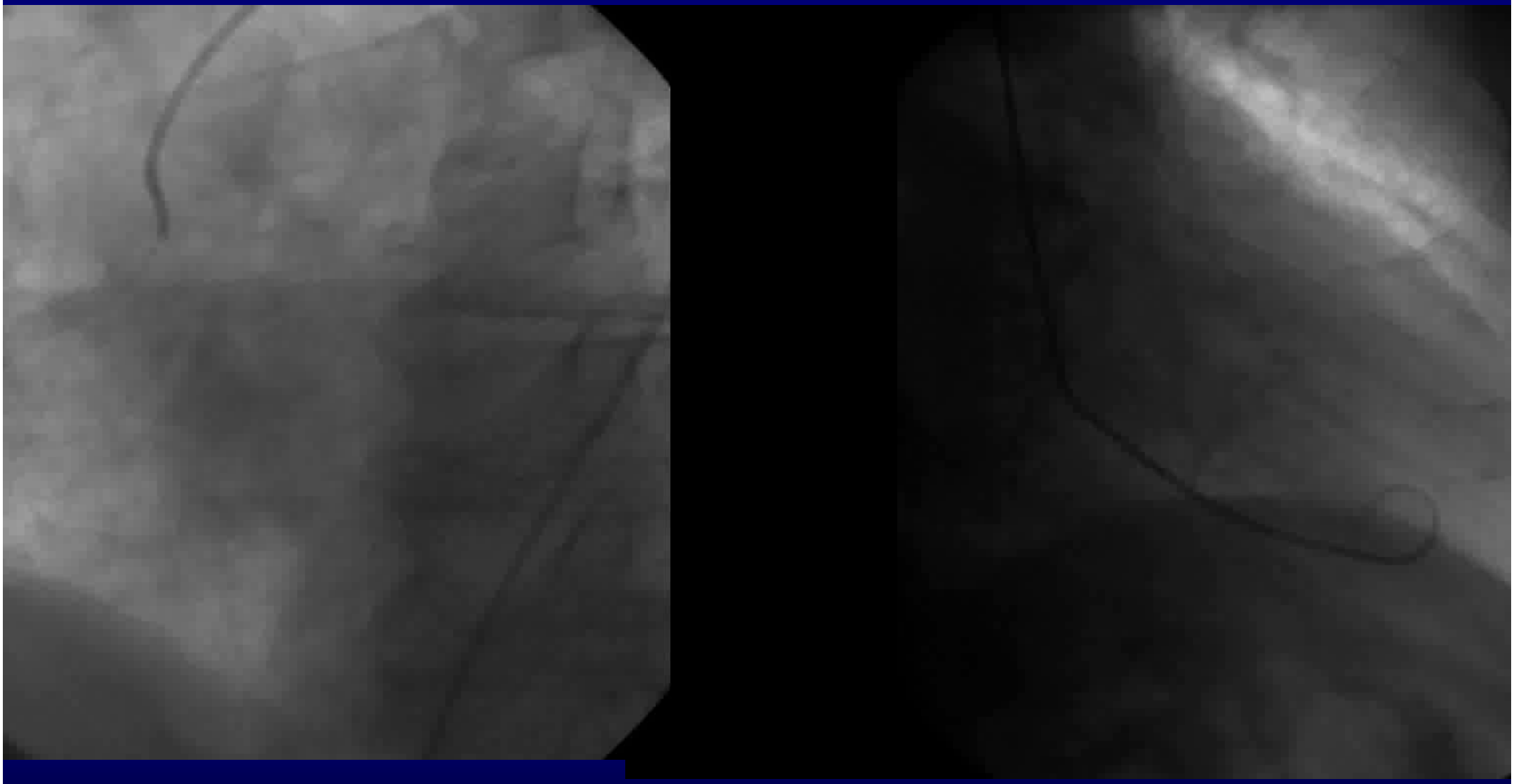


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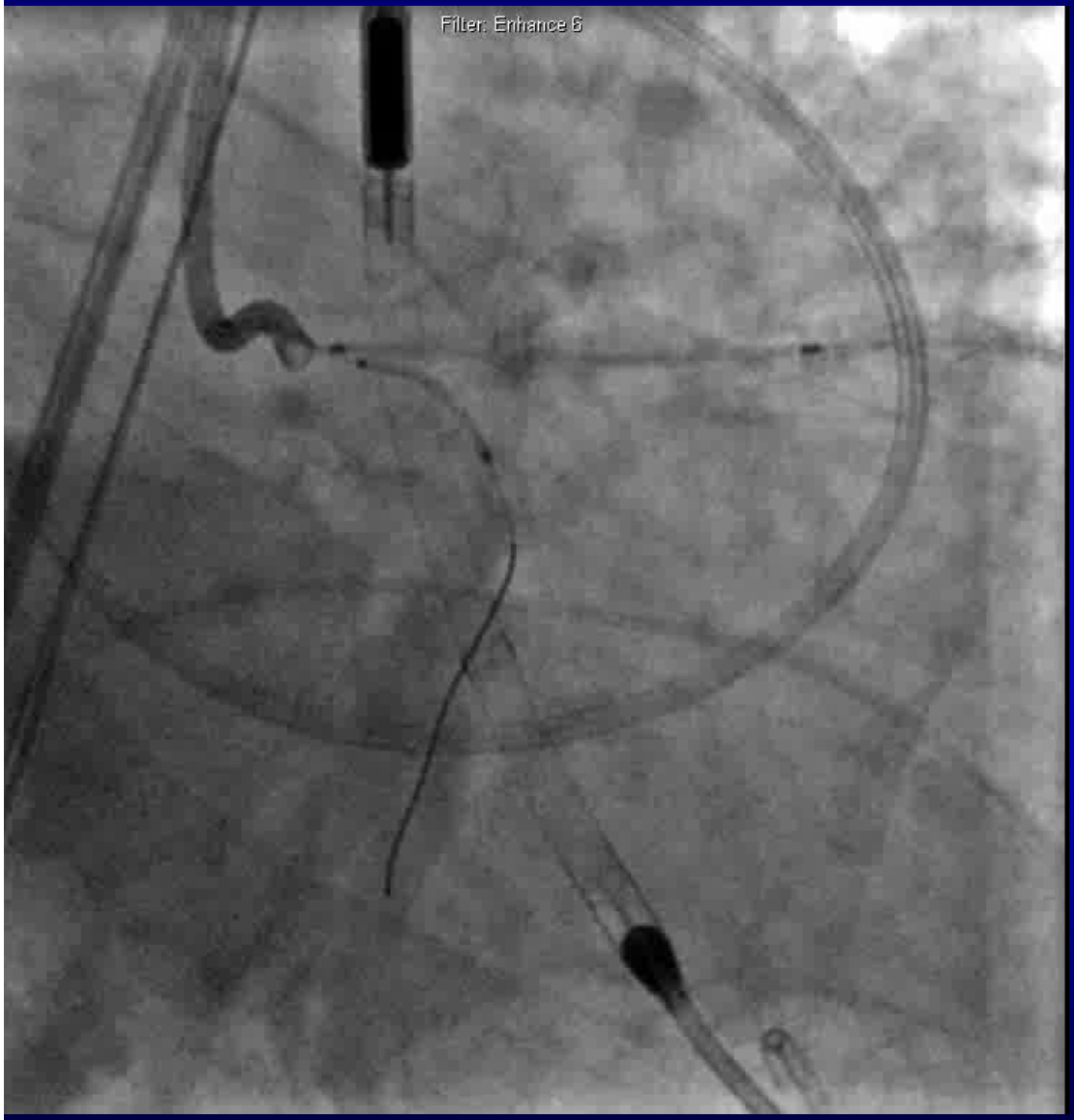
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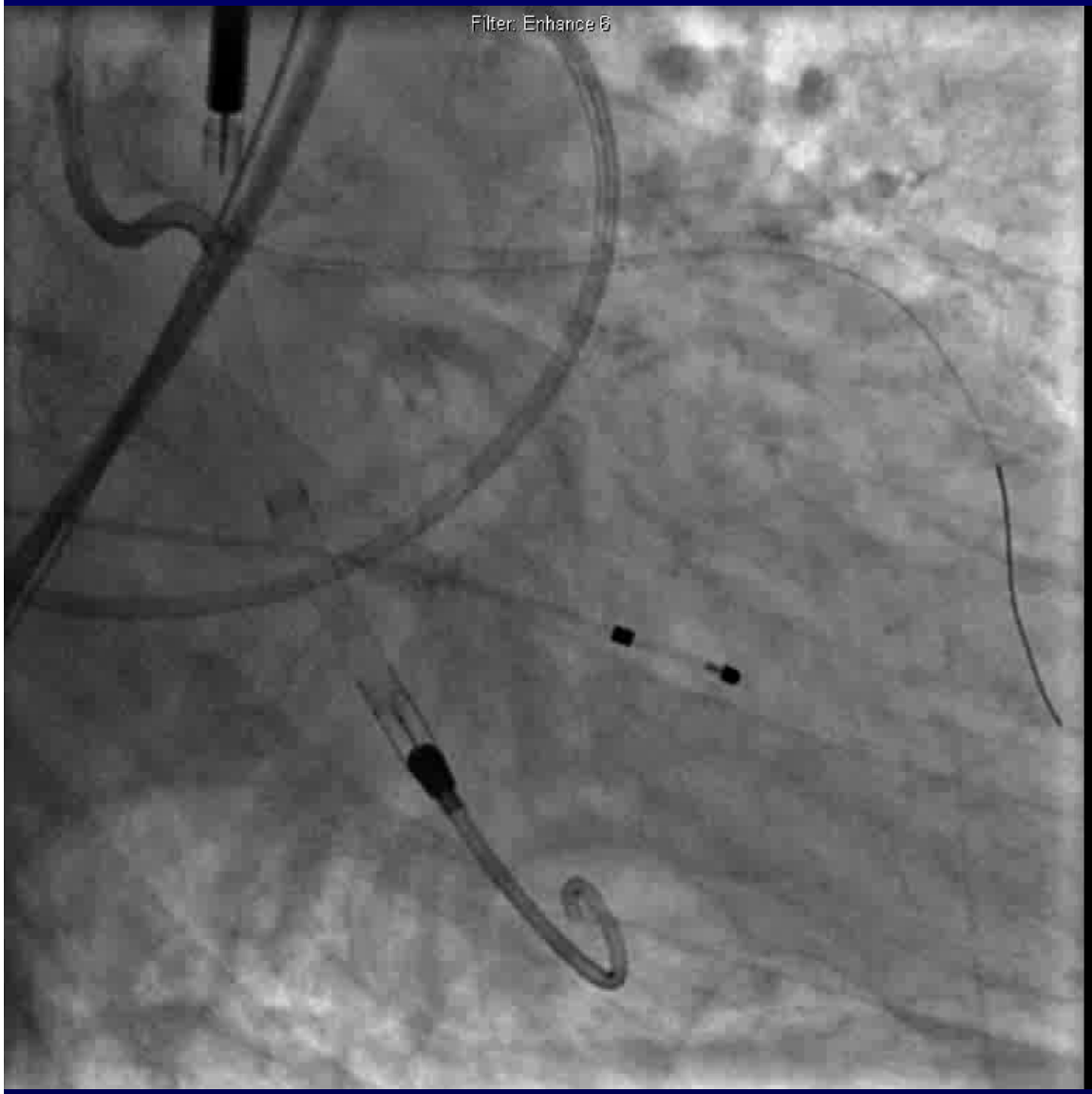
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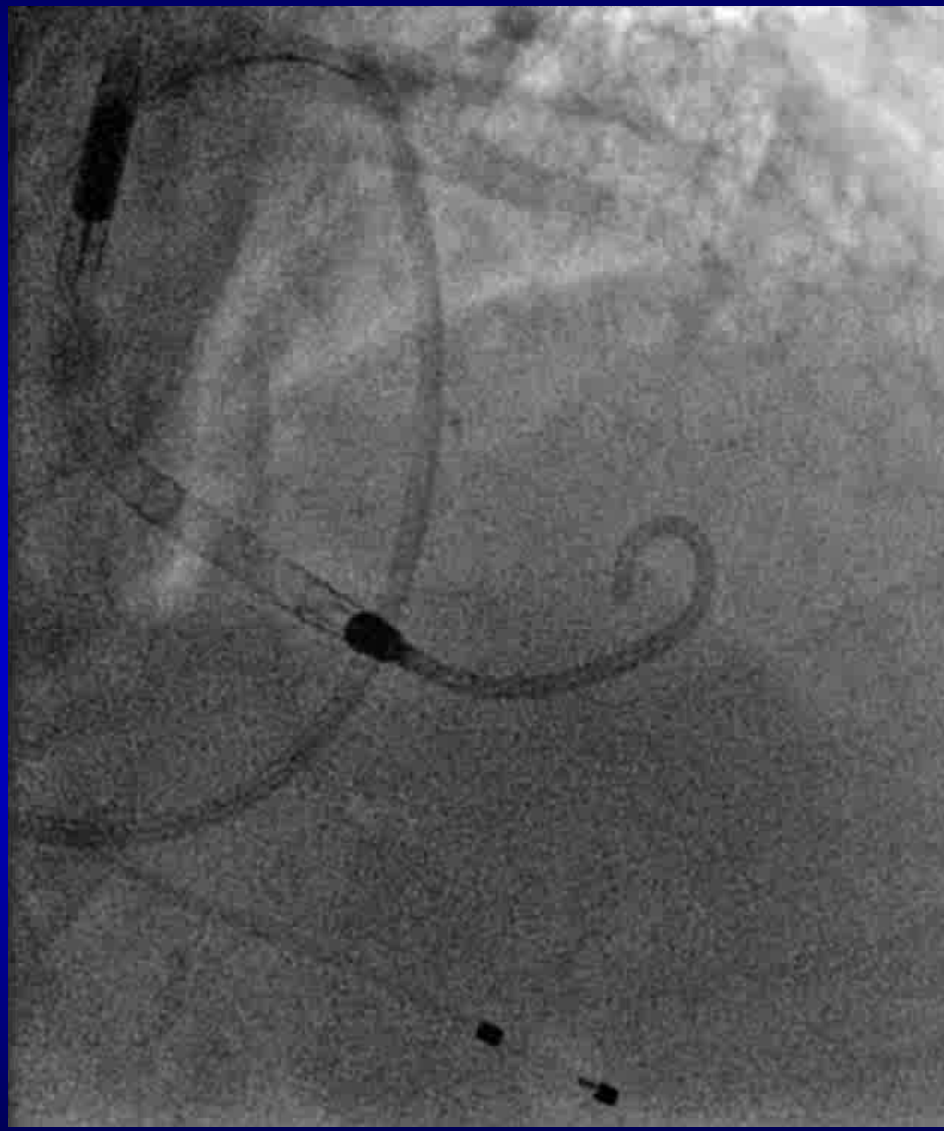

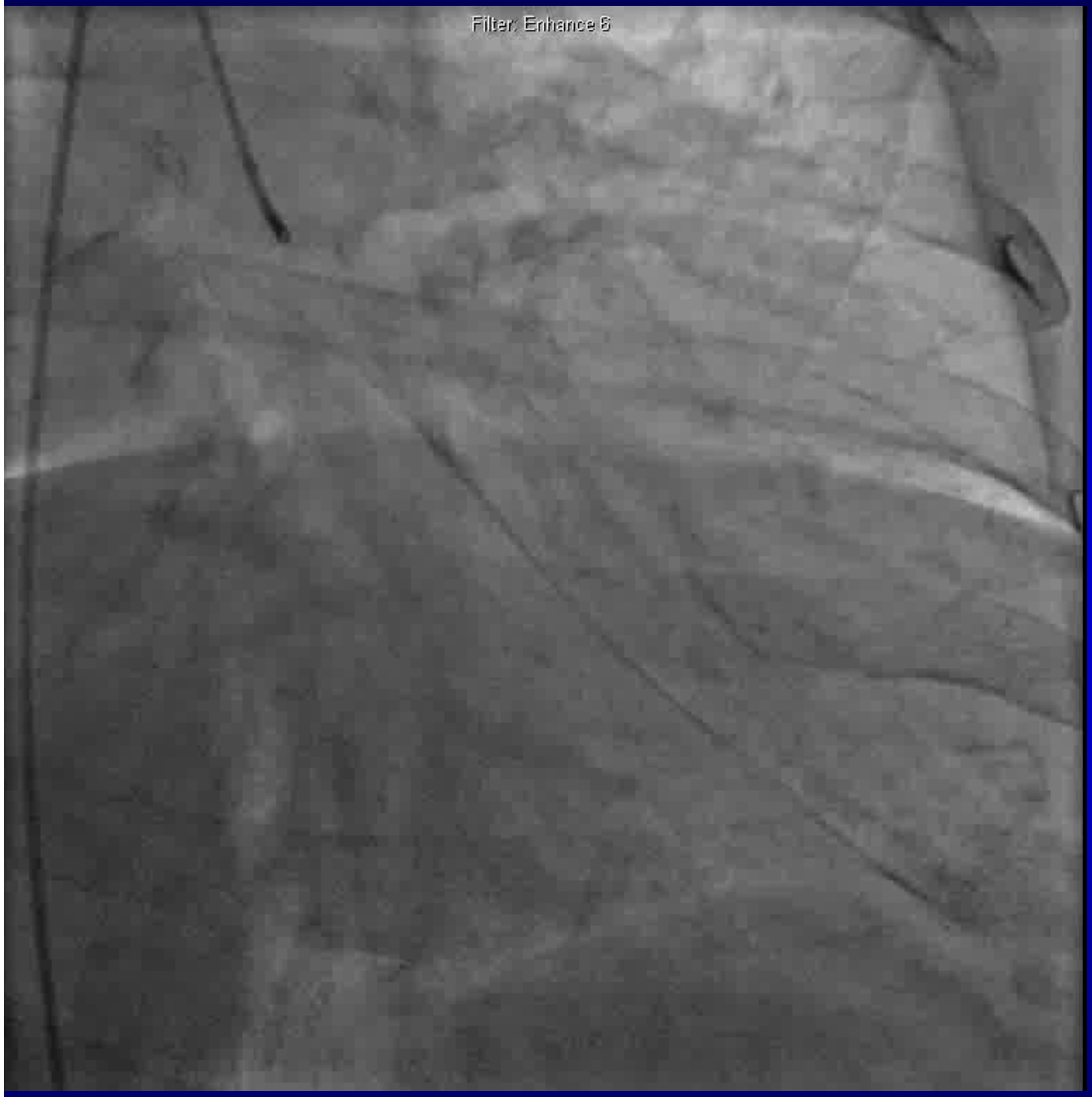
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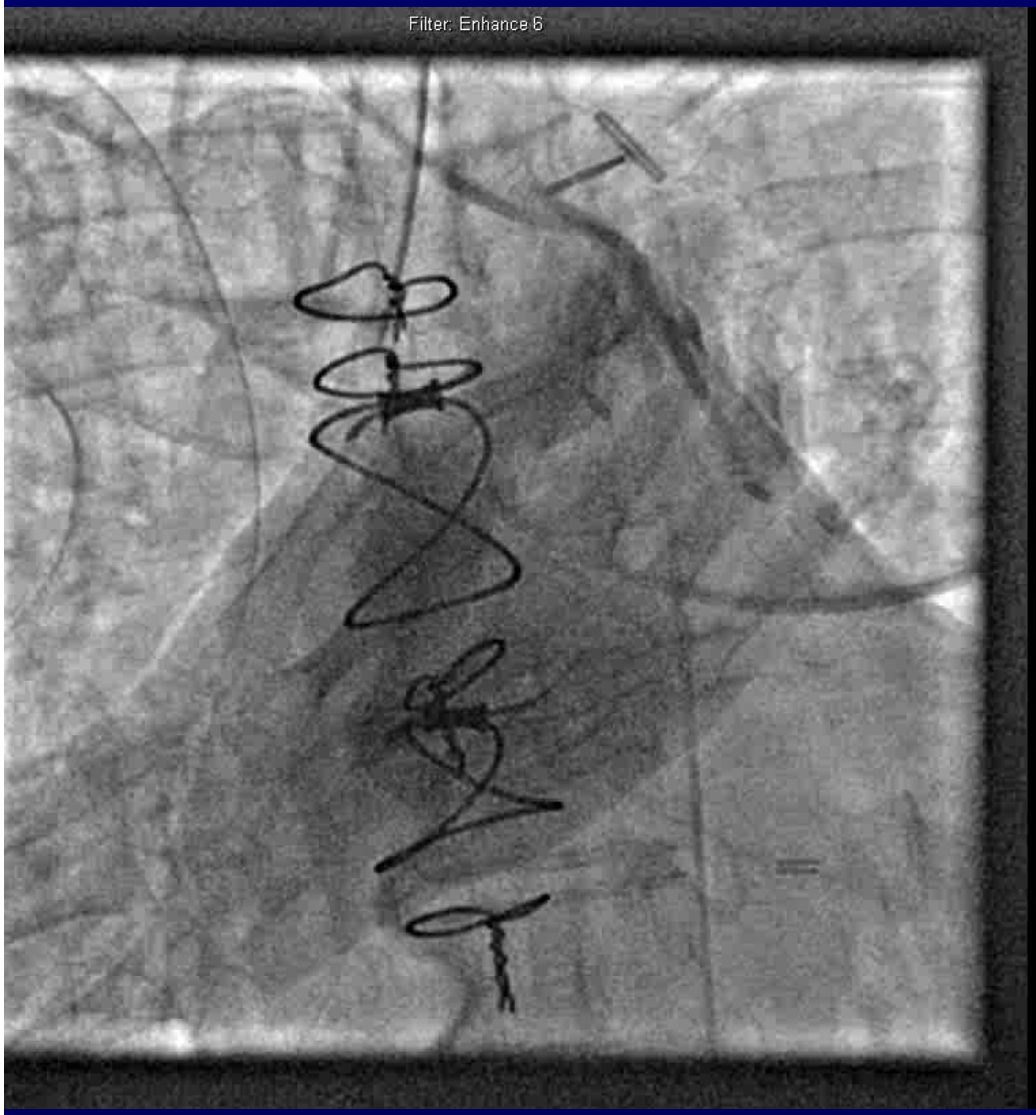
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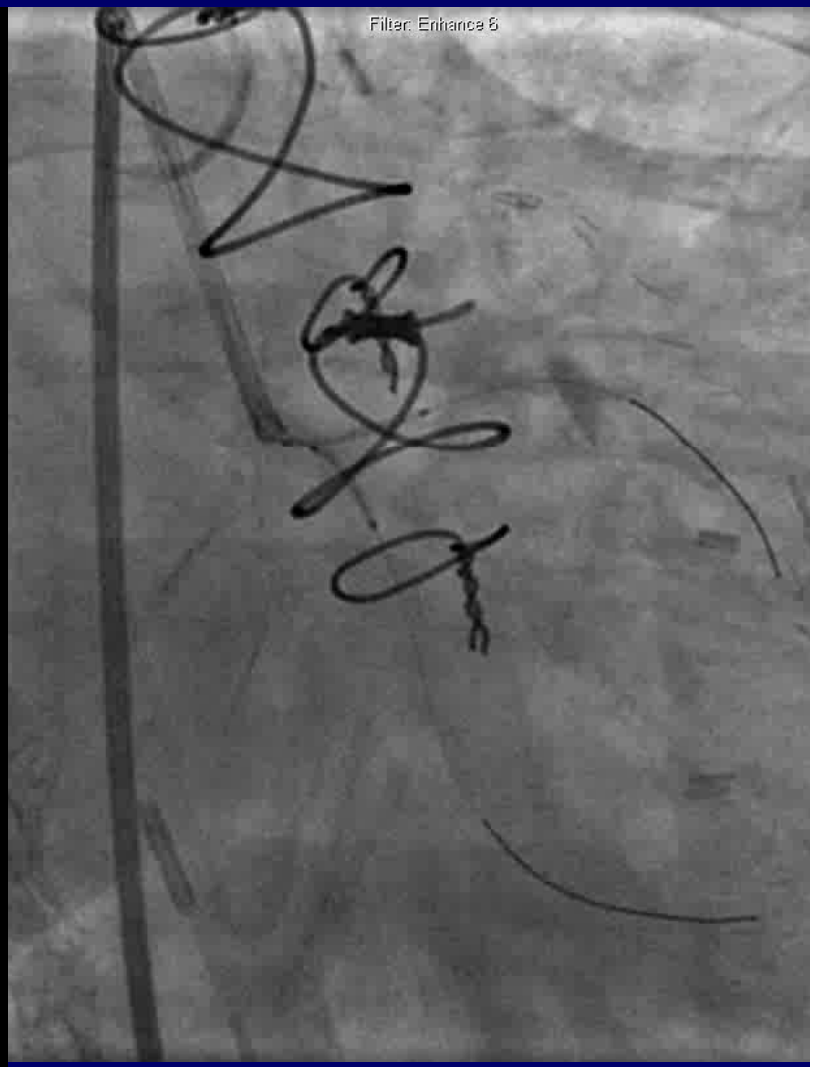
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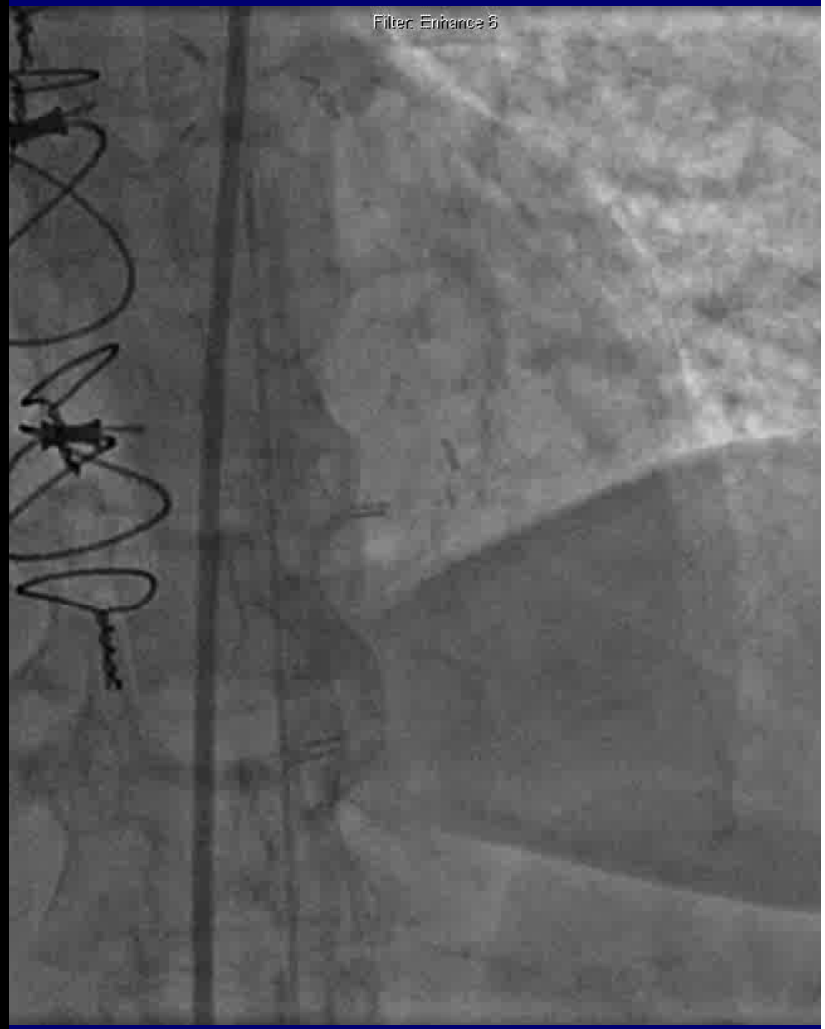
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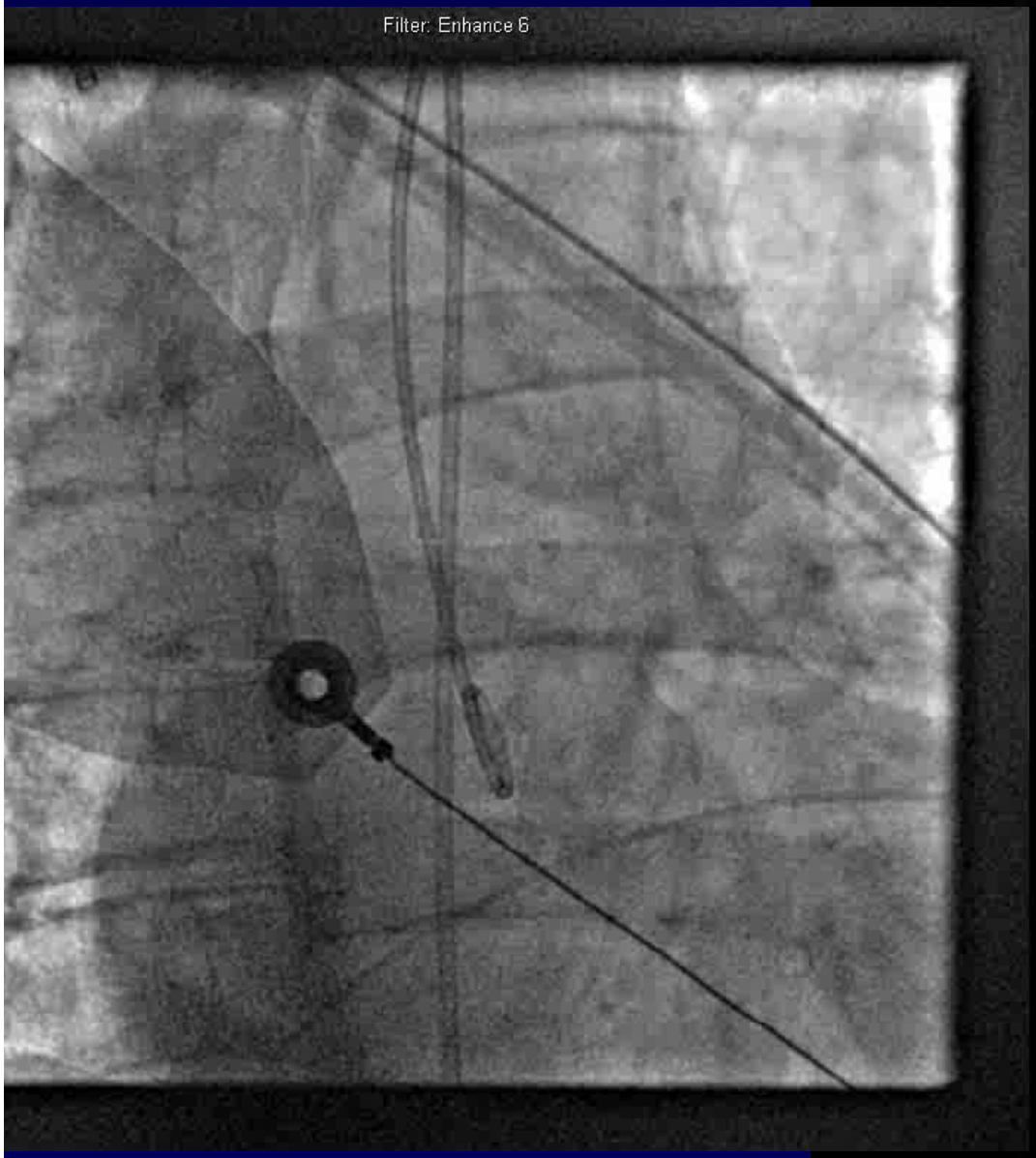
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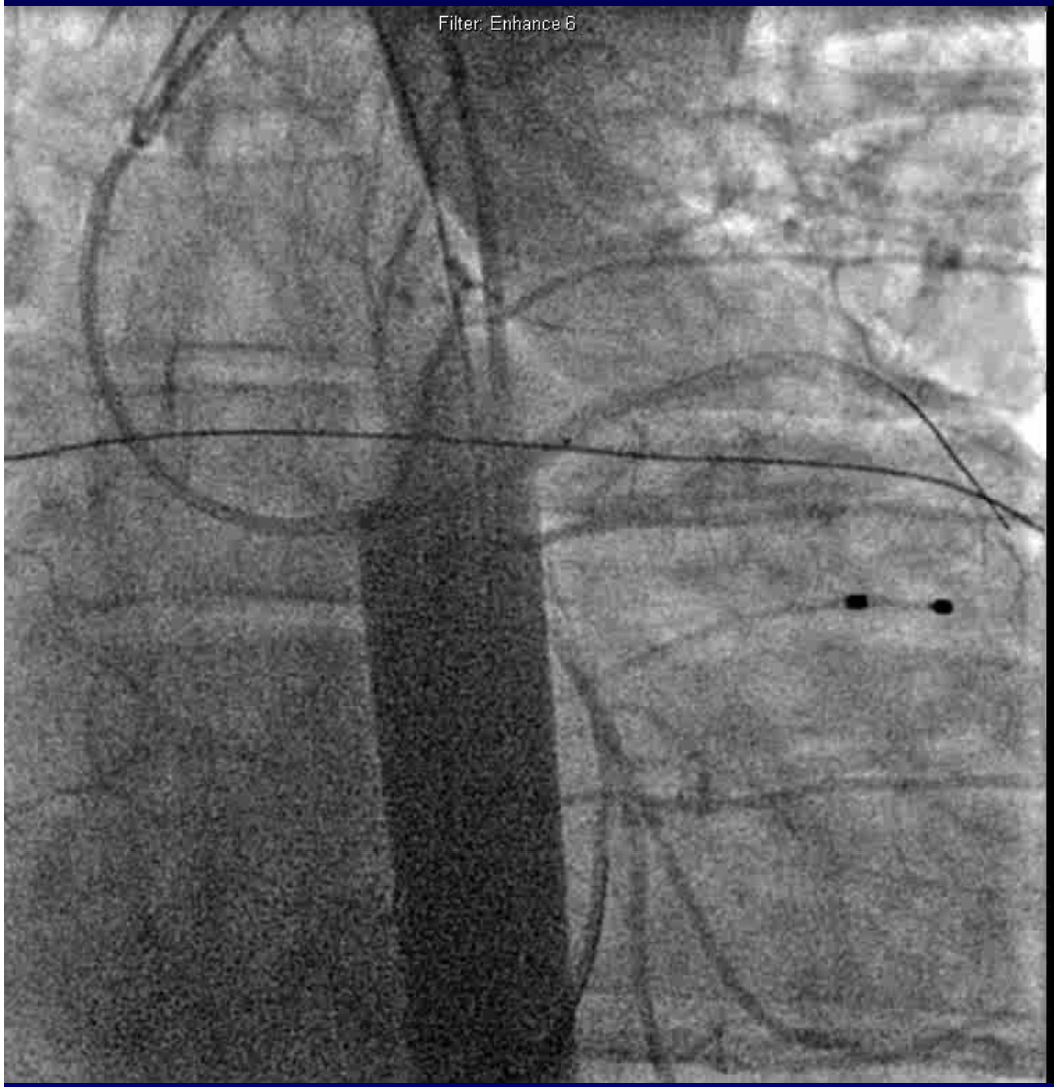
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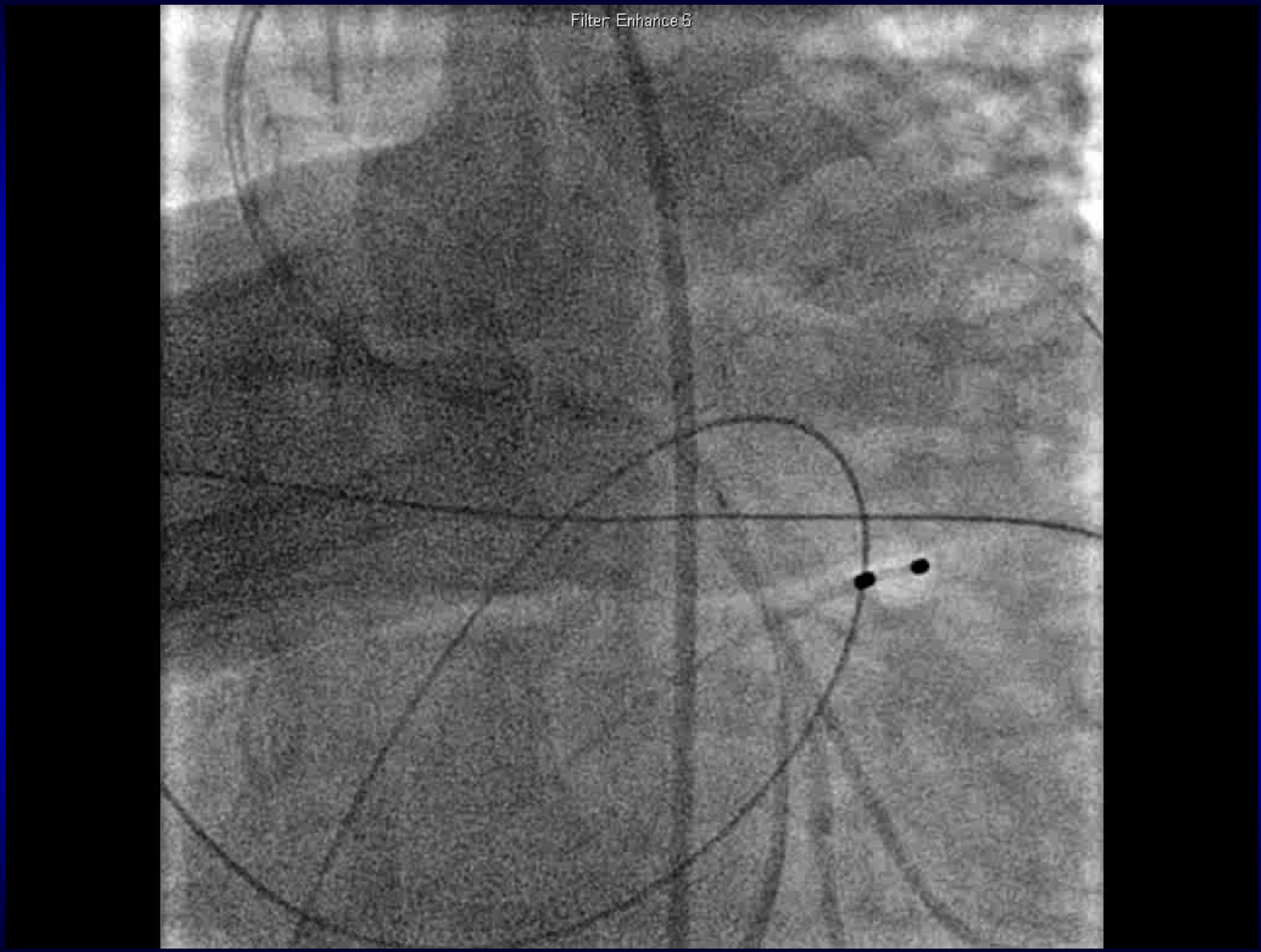
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UPLM PCI to Improve Survival (ACS)

COR	LOE
IIa—For UA/NSTEMI if not a CABG candidate	B
IIa—For STEMI when distal coronary flow is <TIMI grade 3 and PCI can be performed more rapidly and safely than CABG	C

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2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

Summary

- Acute ULMCA occlusion is a clinically catastrophic event, often leading to abrupt and severe circulatory failure, lethal arrhythmias, and sudden cardiac death.

- PCI is
  - technically feasible
  - provides more rapid reperfusion
  - is associated with a lower risk of stroke.

Summary

- Primary PCI of the ULMCA should be considered as a viable alternative to CABG
  - ULMCA occlusion and <TIMI flow grade 3
  - cardiogenic shock
  - persistent ventricular arrhythmias
  - significant comorbidities.