SYSTEMS OF CARE FOR STEMI

Colin M. Barker, M.D., FACC, FSCAI

HOUSTON Methodist℠
DEBAKEY HEART & VASCULAR CENTER

DISCLOSURES

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

Advisory Board:

Boston Scientific, Medtronic

Speakers Bureau:

Boston Scientific, Medtronic, Abbott Vascular

OBJECTIVES

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

1. Door to Balloon Time
2. Regional Systems of Care for STEMI
3. Case Illustrations

CASE 1

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

53 year old man with CAD, HTN and dyslipidemia was fixing his car in the garage after work and developed chest pressure.

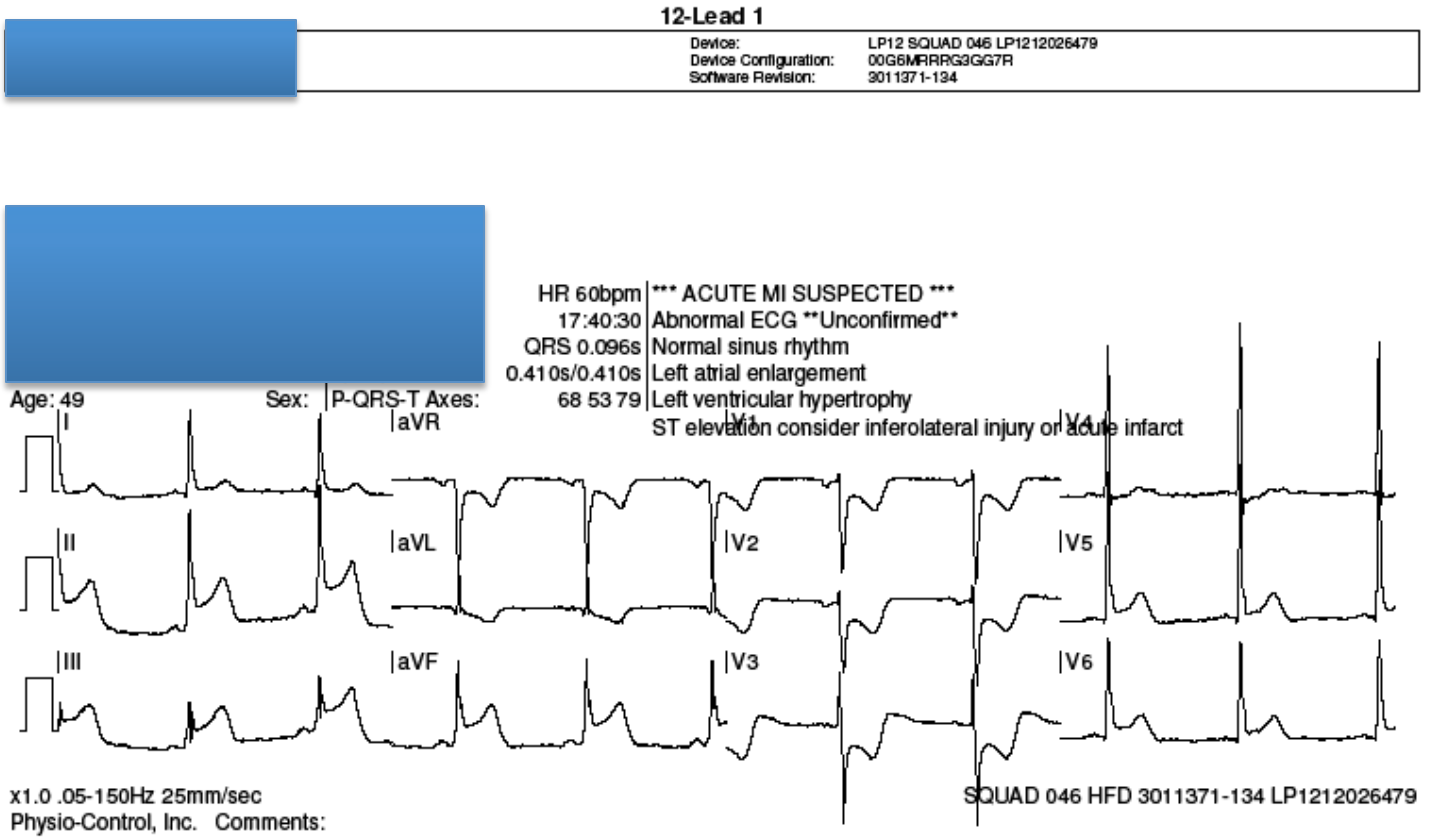
Pain is not relieved with 2 SL nitroglycerines.

Wife calls 911

HFD arrives

CASE 1

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER



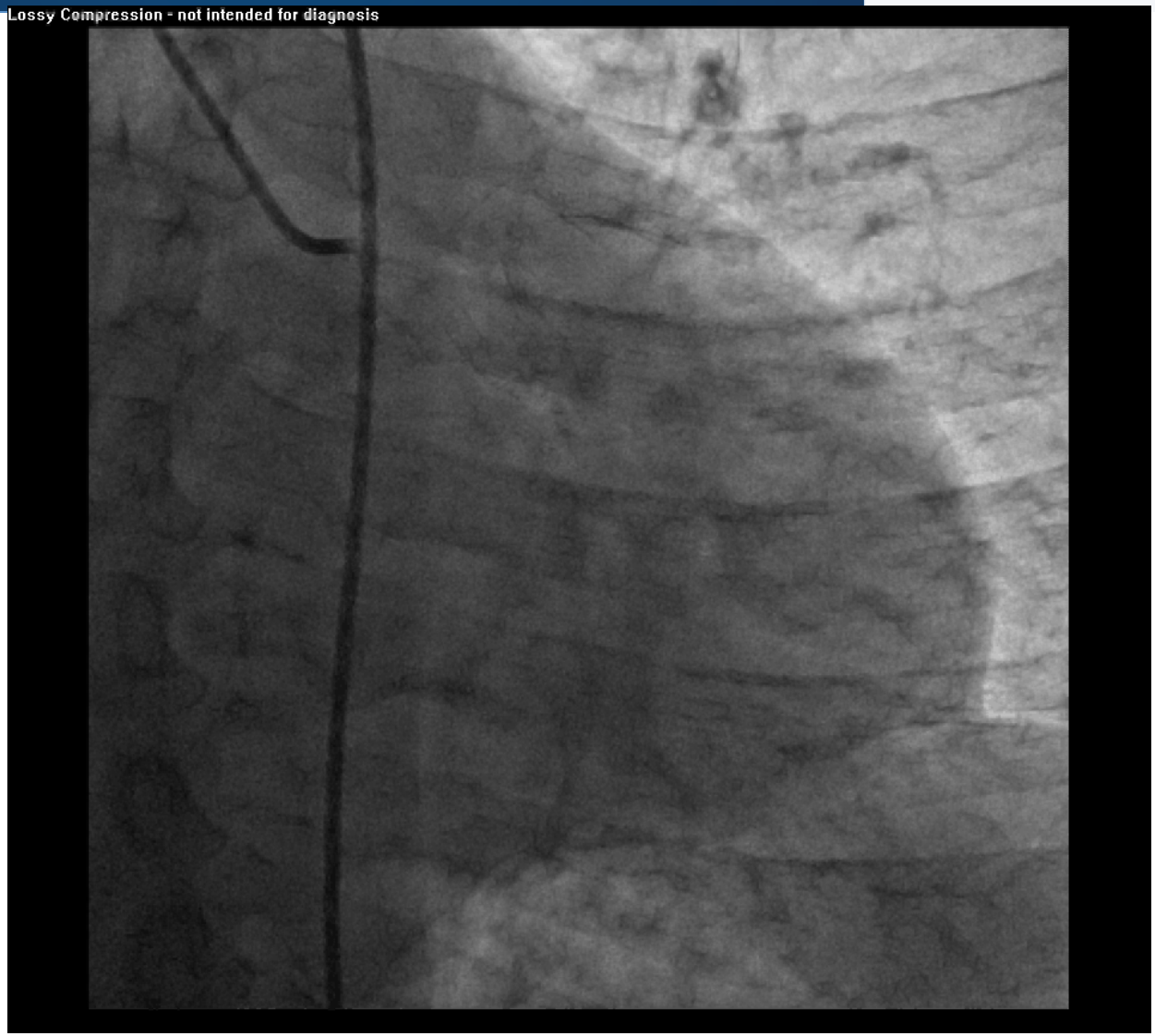
ST measurements are measured at the median point and are expressed in mm.

I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
0.53	4.10	3.56	-2.35	-1.52	3.85	-2.98	-3.57	-3.76	-0.20	1.61	1.66

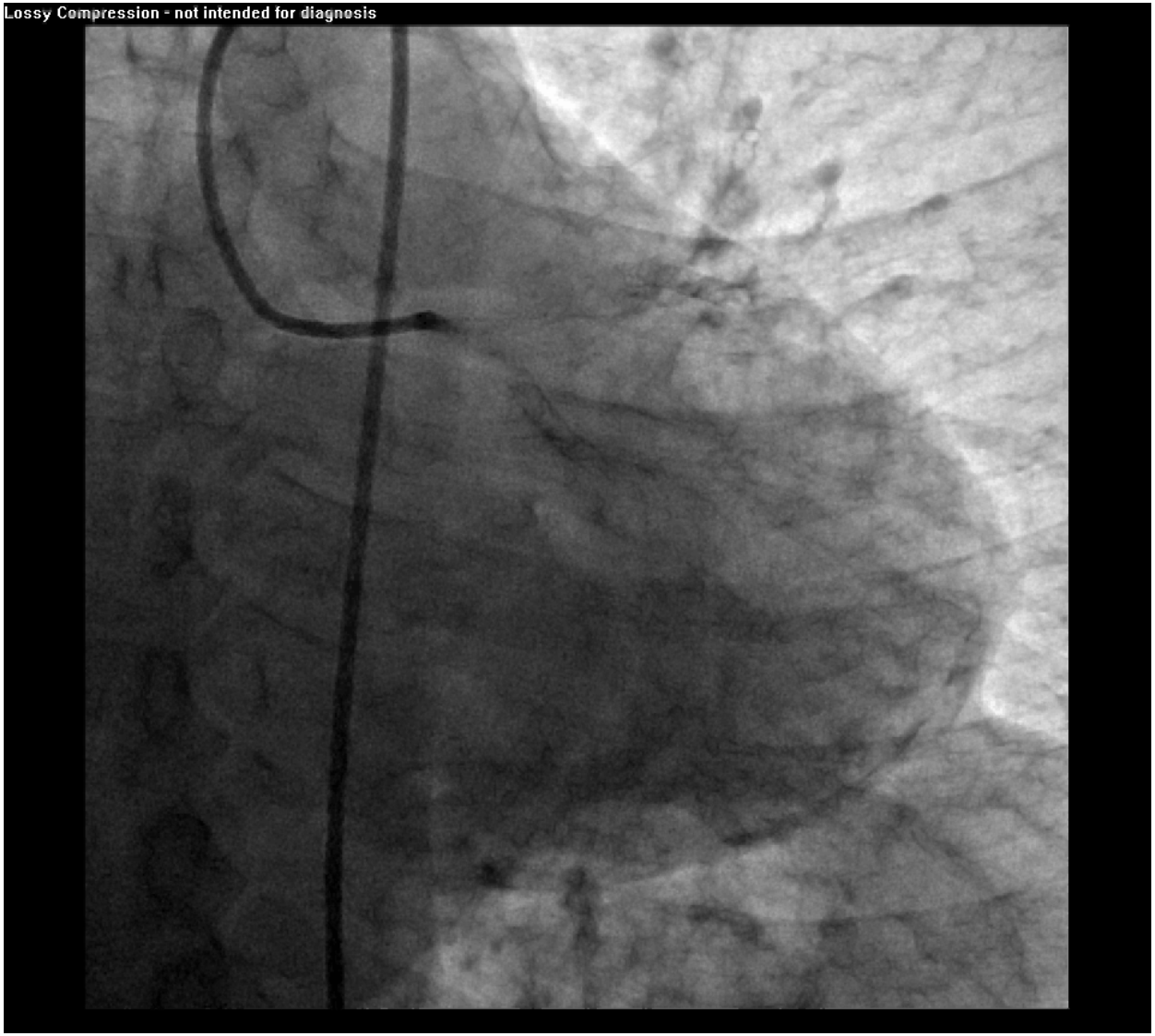
To ensure printer accuracy, confirm that the calibration markers are 10mm high and the grid squares are 5mm wide.

CASE 1

HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER



HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER



CASE 1 RUN SHEET

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

Door To Balloon Time:	9 minutes
Recommended Goal:	90 minutes
National Median D2B:	67 minutes*

1st Medical Contact to Balloon: 40 minutes

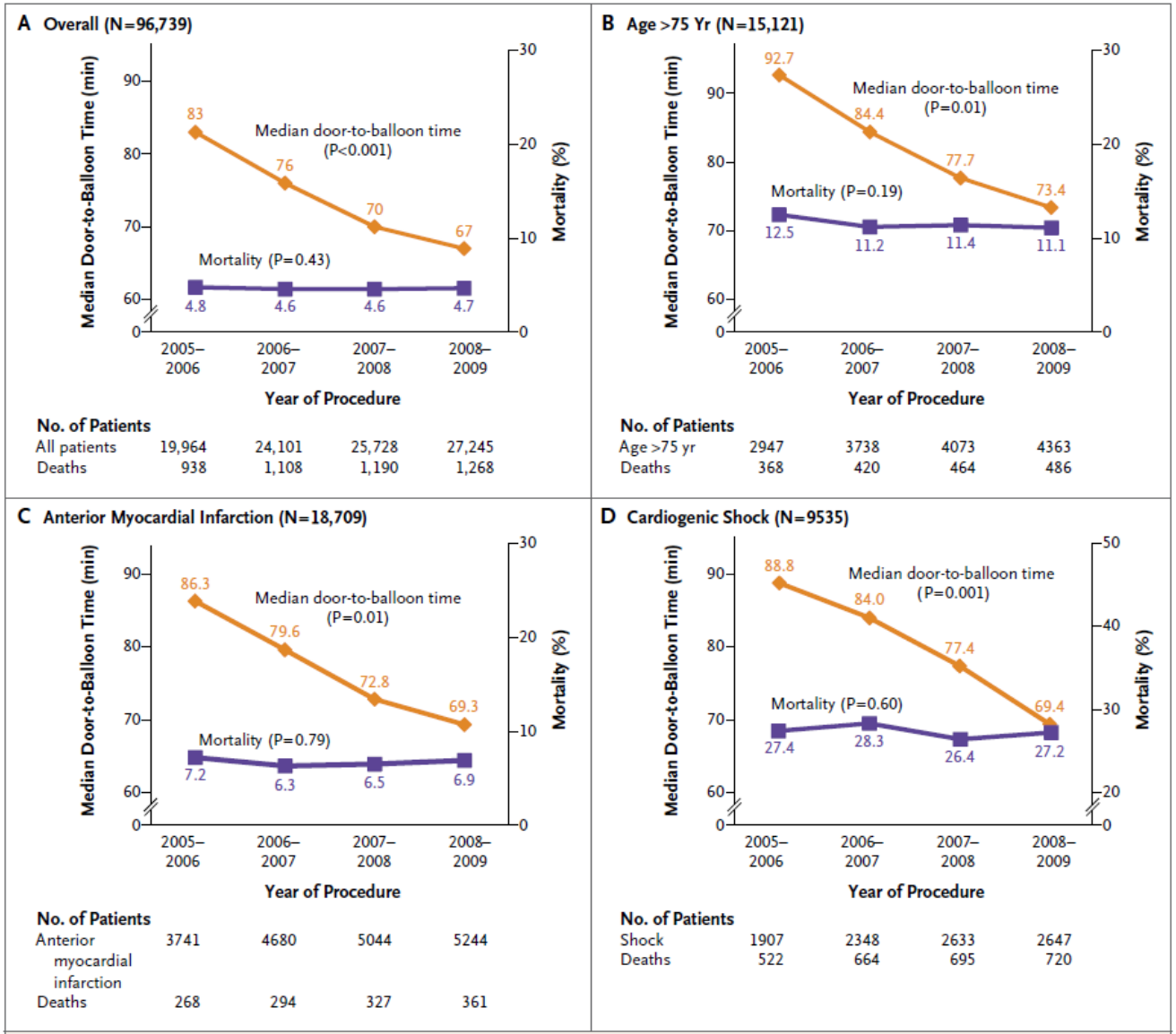


Figure 1. Door-to-Balloon Times and Mortality in the Overall Population and High-Risk Subgroups, 2005 to 2009.

Meness, NEJM 2013

MEDICARE.GOV HOSPITAL COMPARE

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

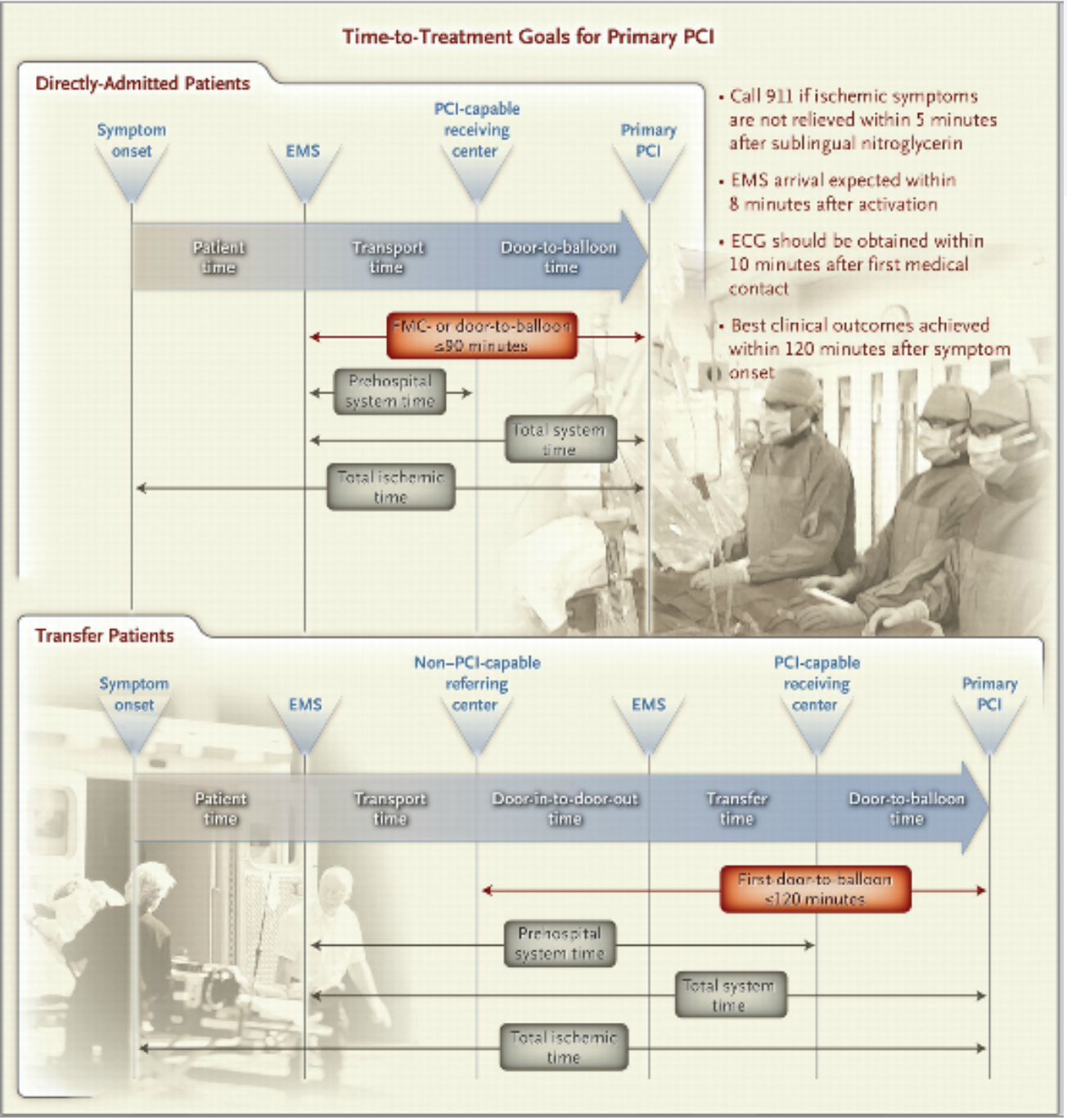
▼ **Timely Heart Attack Care**

Show Graphs | View More Details

	METHODIST HOSPITAL,THE	TEXAS AVERAGE	NATIONAL AVERAGE
Average number of minutes before outpatients with chest pain or possible heart attack who needed specialized care were transferred to another hospital *A **lower** number of minutes is better*	Not Available[5]	60 Minutes	58 Minutes
Average number of minutes before outpatients with chest pain or possible heart attack got an ECG *A **lower** number of minutes is better*	Not Available[5]	7 Minutes	7 Minutes
Outpatients with chest pain or possible heart attack who got drugs to break up blood clots within 30 minutes of arrival ***Higher** percentages are better*	Not Available[5]	51%	58%
Outpatients with chest pain or possible heart attack who got aspirin within 24 hours of arrival ***Higher** percentages are better*	Not Available[5]	95%	97%
Heart attack patients given fibrinolytic medication within 30 minutes of arrival ***Higher** percentages are better*	Not Available	75%	61%
Heart attack patients given PCI within 90 minutes of arrival ***Higher** percentages are better*	100%	95%	95%

Medicare.gov

HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER

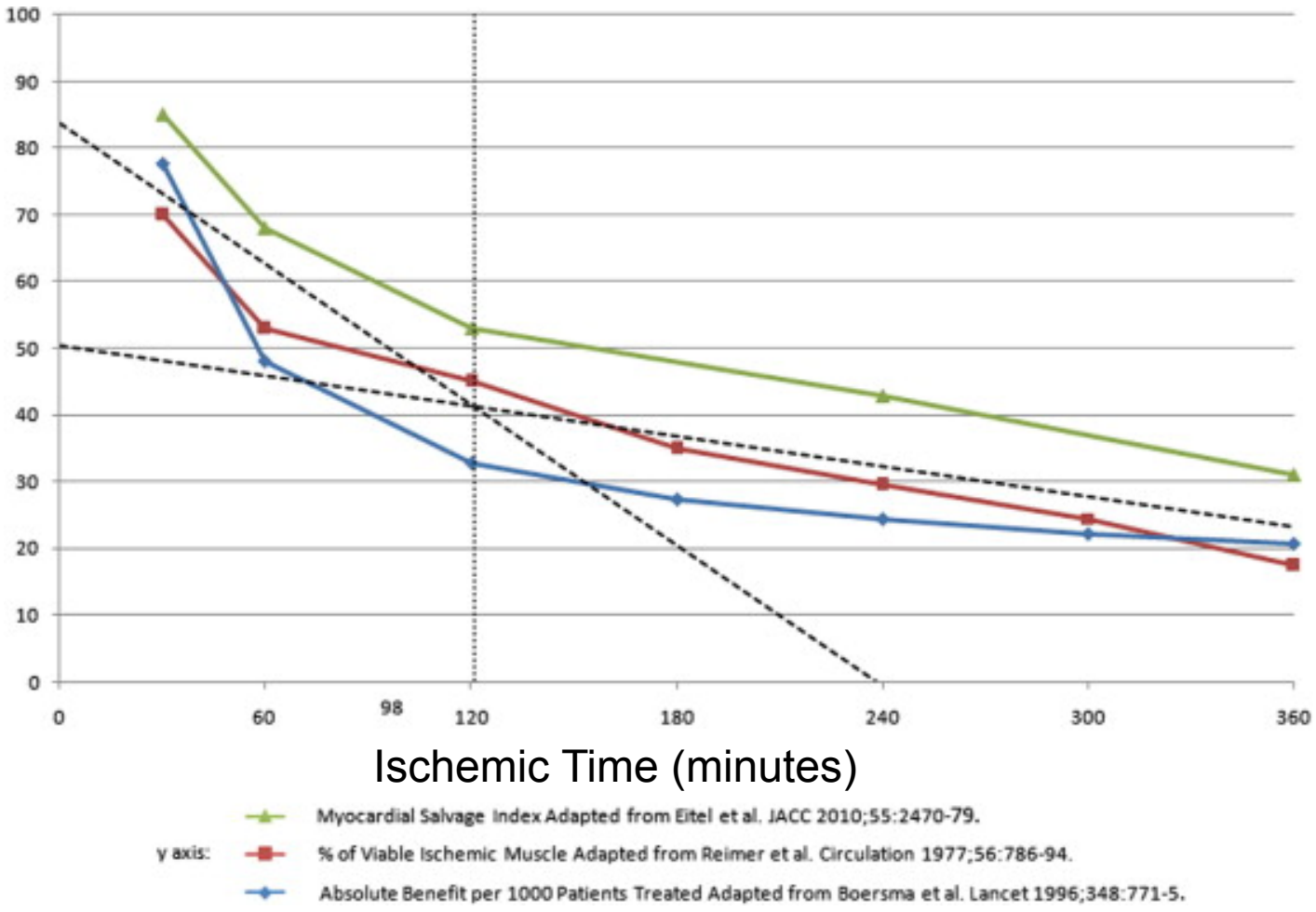


Bates and Jacobs, NEJM, 2013

ISCHEMIC TIME

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

Salvageable Myocardium



Denktas, JACC Interventions 2011

STEMI SYSTEMS OF CARE

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

In the ideal STEMI system of care:

all stake holders in the treatment of STEMI patients - from EMS providers to cardiologists, from hospital administrators to policymakers and from third-party payers to the public - share a common belief that quality and timely patient care is the top priority.

There is a mutual respect for the critical role of each player in the STEMI system. Individual parties are not out to promote their own self-serving interests. Rather, everyone works together to build a consensus on what the ideal STEMI system looks like for their region, considering its unique challenges.

AHA 2007

STEMI SYSTEMS OF CARE

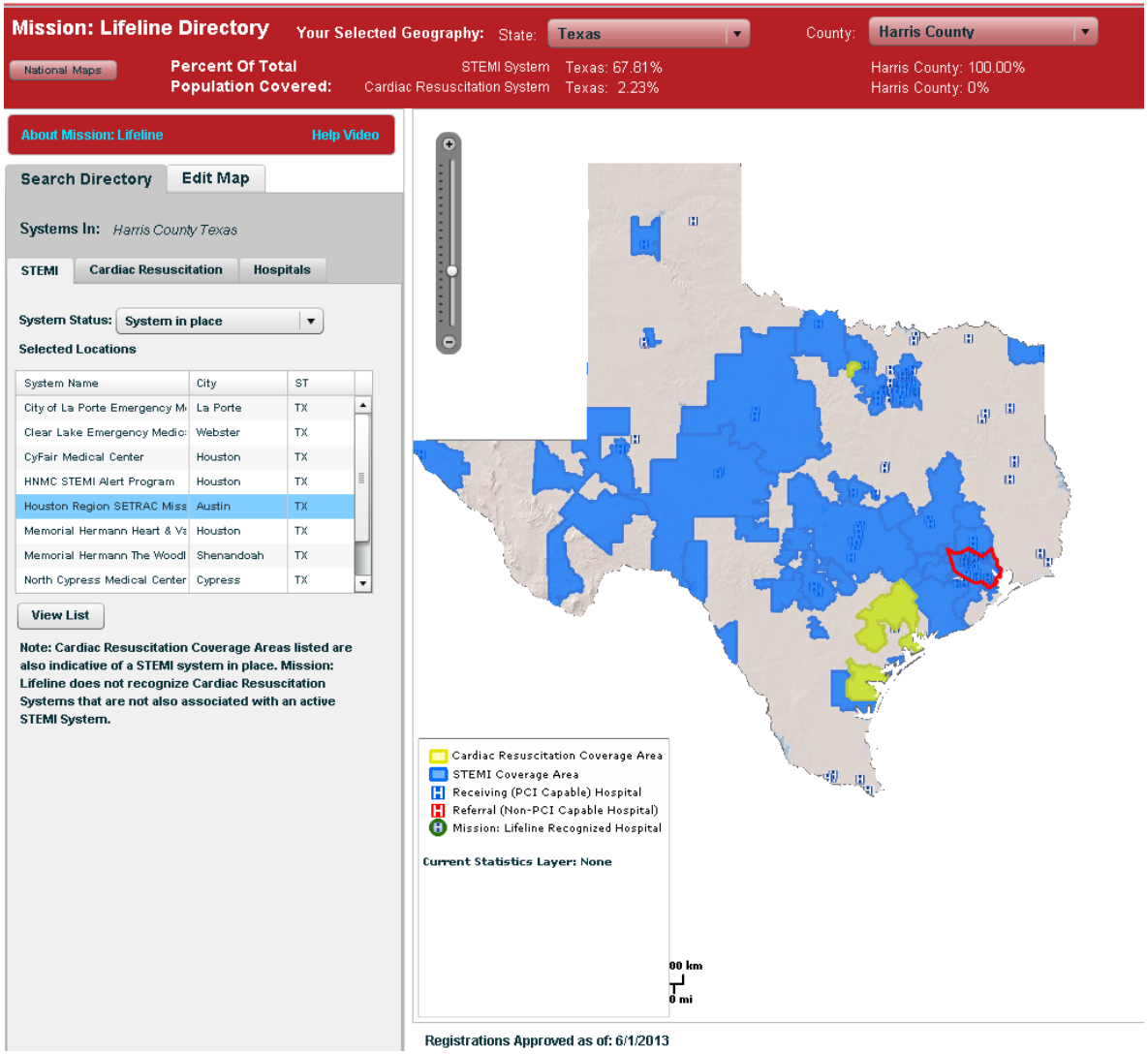
HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

Although attention to certain performance metrics, such as D2B, door-to-needle, and door-in–door-out times, have catalyzed important institutional quality improvement efforts, broader initiatives at a systems level are required to reduce total ischemic time, the principal determinant of outcome.

HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER

American Heart Association. Learn and Live

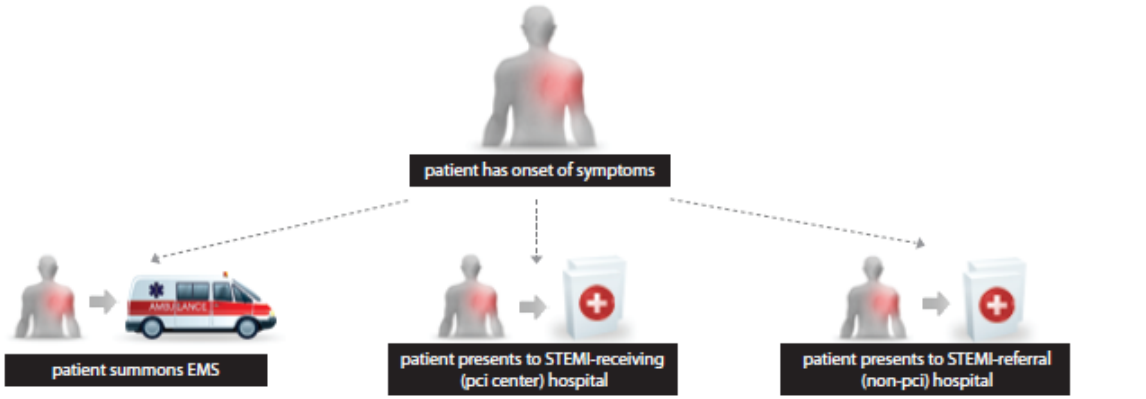
MISSION: LIFELINE



Mission: Lifeline helps STEMI-receiving centers leverage the capabilities of emergency medical services (EMS) and non-PCI hospitals for optimum treatment of STEMI patients. By working together under a shared set of guidelines and closing communication gaps about patient outcomes, the professionals within a STEMI system of care can save lives and improve the health of the communities they serve.

Mission: Lifeline STEMI Protocol

(Accounts for Urban and Rural Communities)



Diagnosis confirmed through 12-lead ECG

- EMS activates air medical transport and proceeds directly to the designated helicopter landing zone
- EMS or ED activates cath lab with a single phone call
- EMS administers pre-hospital fibrinolysis
- EMS activates pre-hospital triage for fibrinolysis

Patient is taken to nearest STEMI-receiving hospital (cath lab fully operational within 30 min.; EMS contact-to-balloon time < 90 min.)

Follow middle panel

Patient is taken to nearest STEMI-referral hospital for in-hospital fibrinolysis (EMS contact-to-needle time < 30 min.)
If ineligible, arrange for transfer to STEMI-receiving hospital

Follow right panel

Discharge on secondary prevention measures

Diagnosis confirmed through 12-lead ECG

(acquisition and interpretation within 10 minutes of hospital arrival by ED physician)

- ED protocol
- Transfer to cath lab protocol
- Cath lab protocol (door-to-balloon time < 90 min.)

Discharge on secondary prevention measures

Diagnosis confirmed through 12-lead ECG

(acquisition and interpretation within 10 minutes of hospital arrival by ED physician)

- ED physician activates cath lab at STEMI-receiving hospital with a single phone call if PCI is preferred strategy
- Administration of fibrinolytic therapy (door-to-needle time < 30 min.) Transfer to PCI hospital for potential rescue PCI pharmaco-invasive strategy
- Administration of fibrinolytic therapy (door-to-needle time < 30 min.) If ineligible or in shock, arrange for transfer to STEMI-receiving hospital

Customized transfer plan according to region in which the patient is transferred (ground or helicopter)

Patient is taken to proximate STEMI-receiving hospital (cath lab fully operational within 30 min.; door-to-balloon time < 90 min.)

Discharge on secondary prevention measures
Return to local community/physician

CASE 2

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

39 year old man with no significant PMH, very active and athletic, who had been complaining of Left Shoulder Pain for 5 days.

He had was seen in an urgent care clinic and given NSAIDs and was scheduled for an MRI of his left shoulder

CASE 2

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

On the night of presentation, he woke up with nausea, vomiting and worsening left shoulder pain.

He presented to a free standing ER at 10:30 pm, was evaluated and transferred to TMH for admission – gastritis, possible sepsis

ECG (not available) – “early repolarization”

Arrived at TMH at 12:35 am

Upon triage he also complained of chest pain.

ECG was repeated

CASE 2 ECG

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER

ID:030889596 11-JUL-2012 00:43:24 Methodist Hospital System

Vent. rate	63	BPM
PR interval	122	ms
QRS duration	126	ms
QT/QTc	412/421	ms
P-R-T axes	66 -54	-28

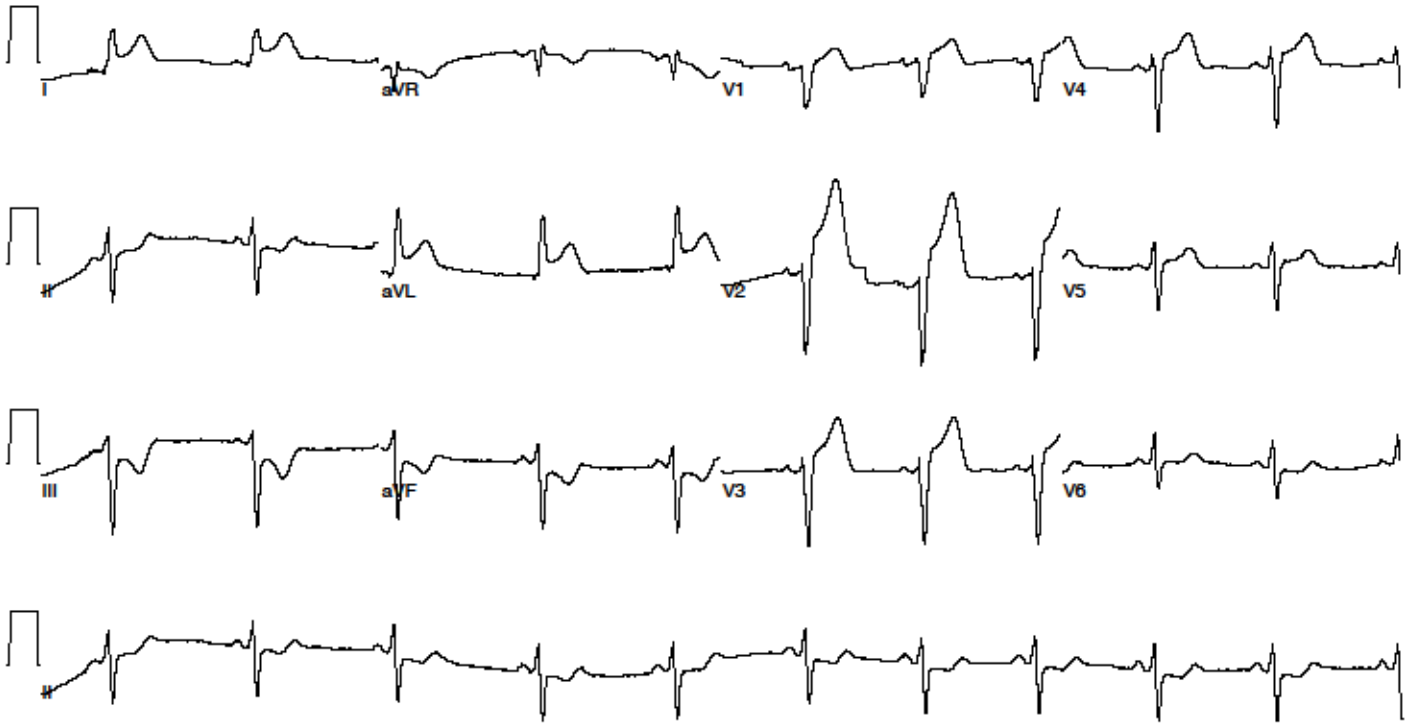
Normal sinus rhythm with sinus arrhythmia
Left axis deviation
Left ventricular hypertrophy with QRS widening
ST elevation, consider lateral injury or acute infarct
** ** ACUTE MI ** **
Abnormal ECG

Technician:Room TMH Emergency
Test ind:

Electronically Signed By Pratt MD, Craig M (1000), editor Middleton, Katherine (111) on 7/11/2012 11:42:25 AM

Referred by: COLIN BARKER MD Electronically signed by: Craig M Pratt MD

INTER, DRS: S1R2CR3:

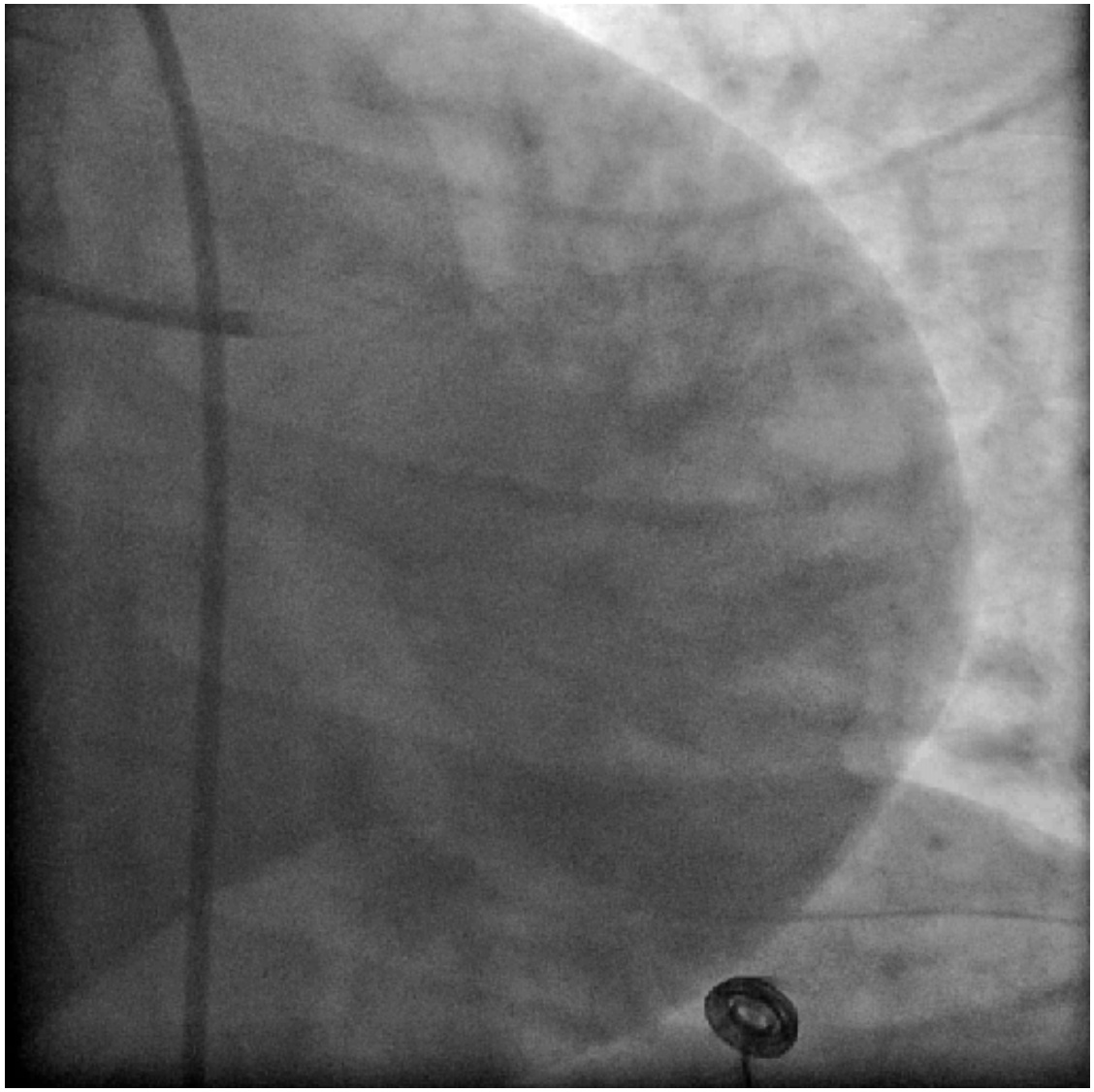


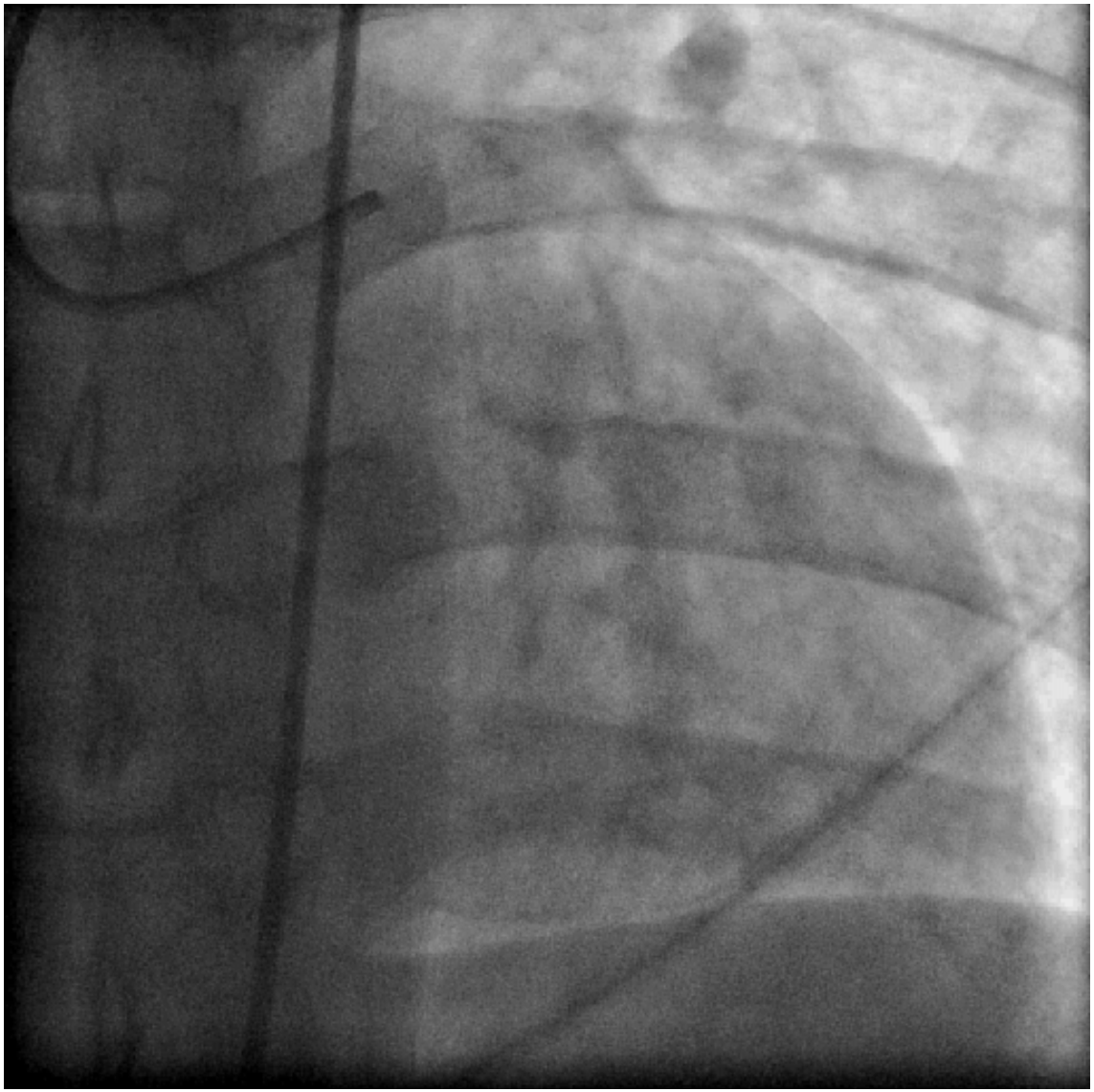
25mm/s 10mm/mV 150Hz 7.1.1 12SL 230 CID: 12

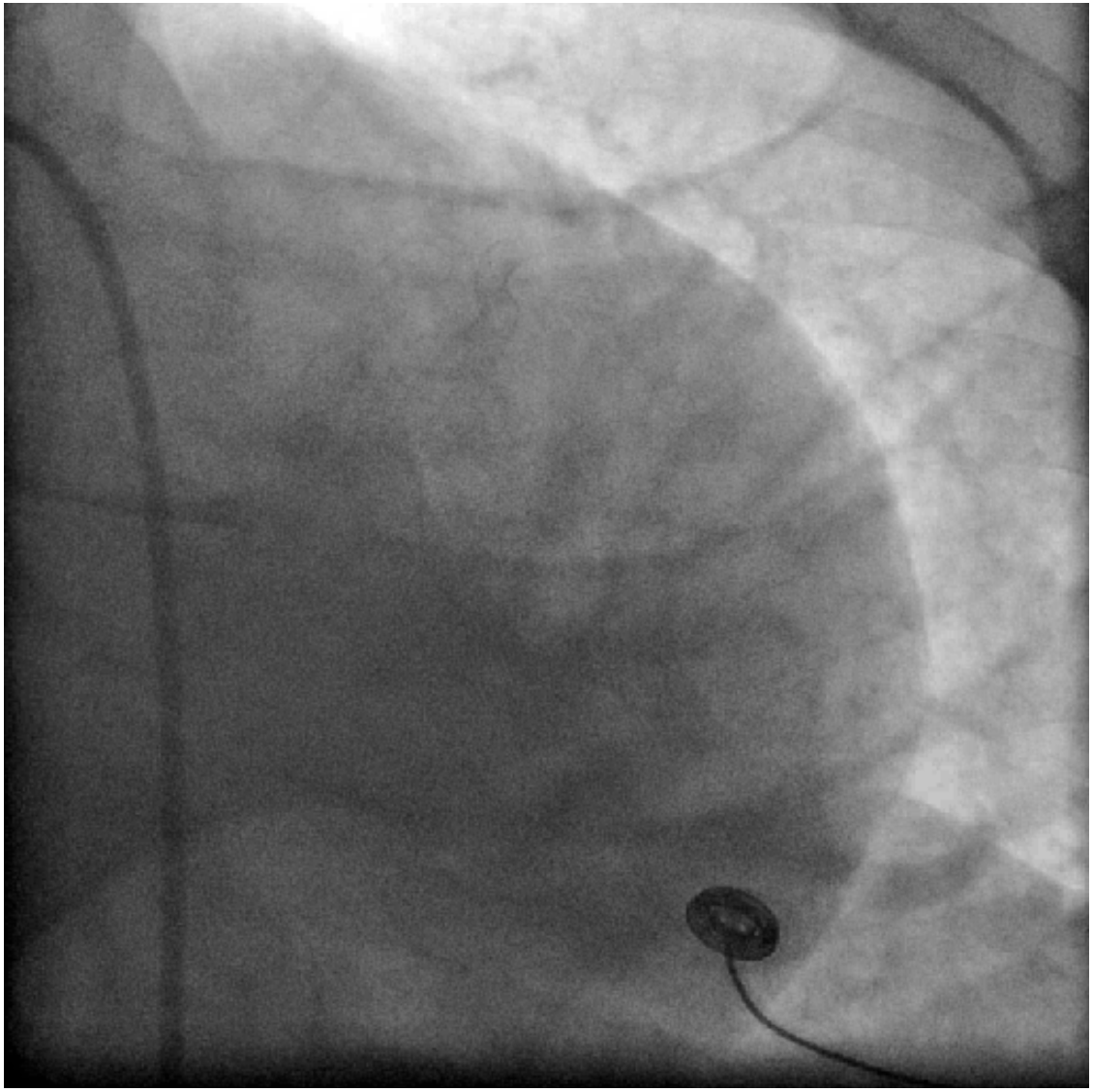
SID: 0308895962193 HID:111 HDT: 11:42 11-JUL-2012 ORDER: 001WCTCGI ACCOUNT: 0308895962193

Page 1 of 1

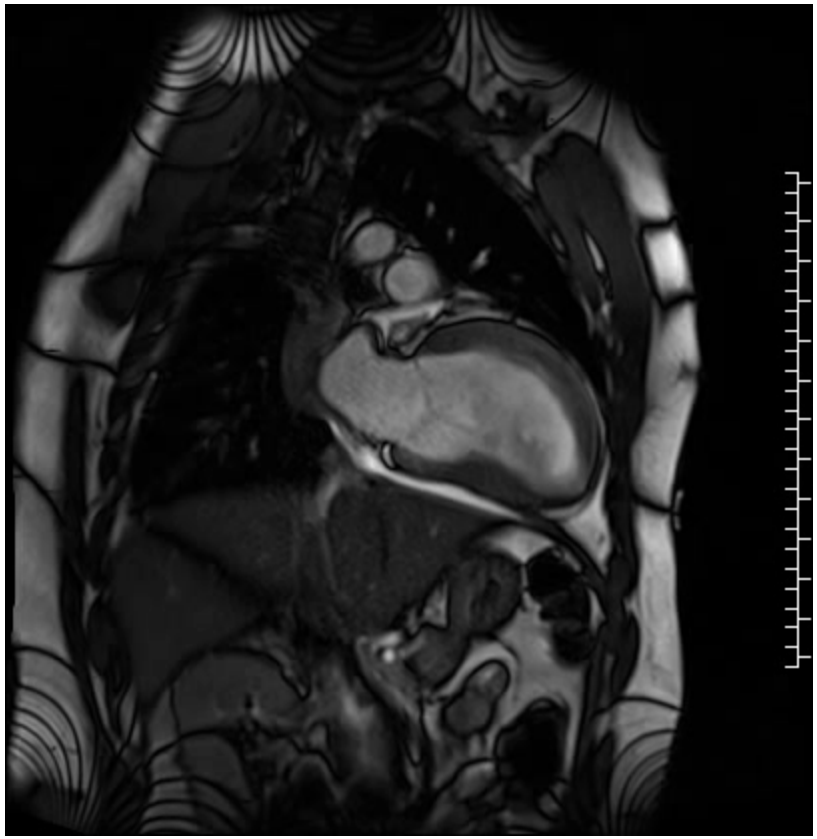
HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER

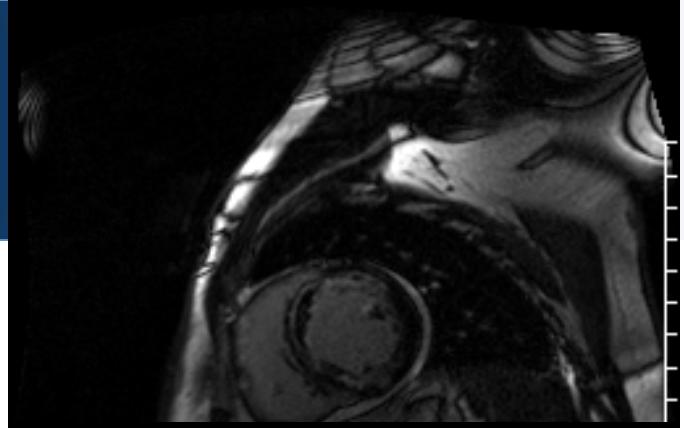


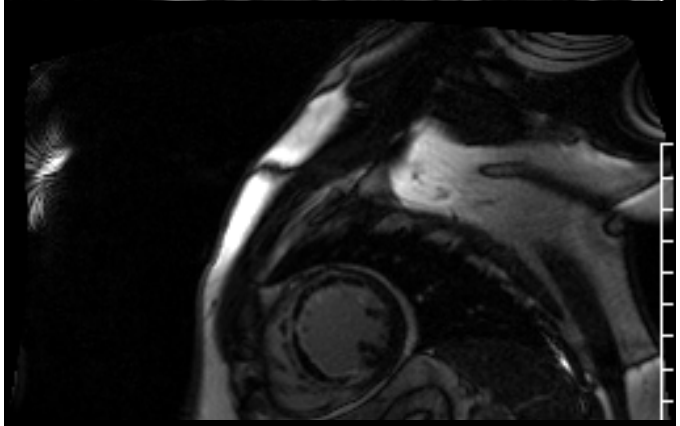


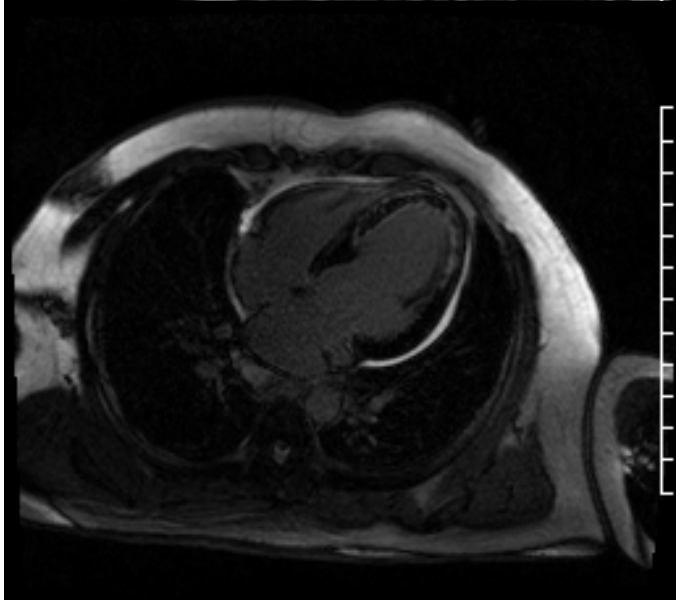


D2B Time
33 min
First Door to Balloon Time 150 min
Total Ischemic Time
???









CASE 2, 1 YEAR LATER

HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER