



University
of Glasgow | Institute of Cardiovascular
& Medical Sciences

IMR in STEMI

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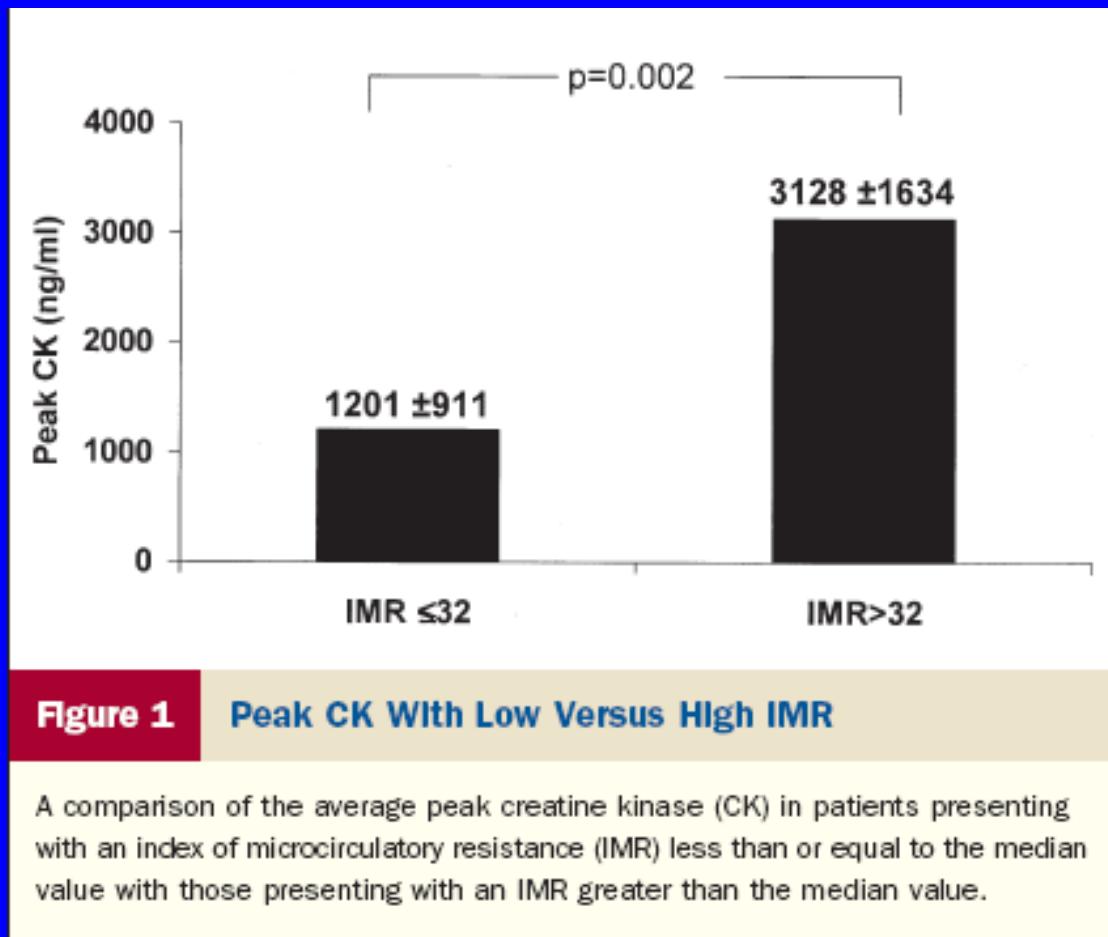
$$\text{IMR} = 77 \times 0.24 = 18.5$$

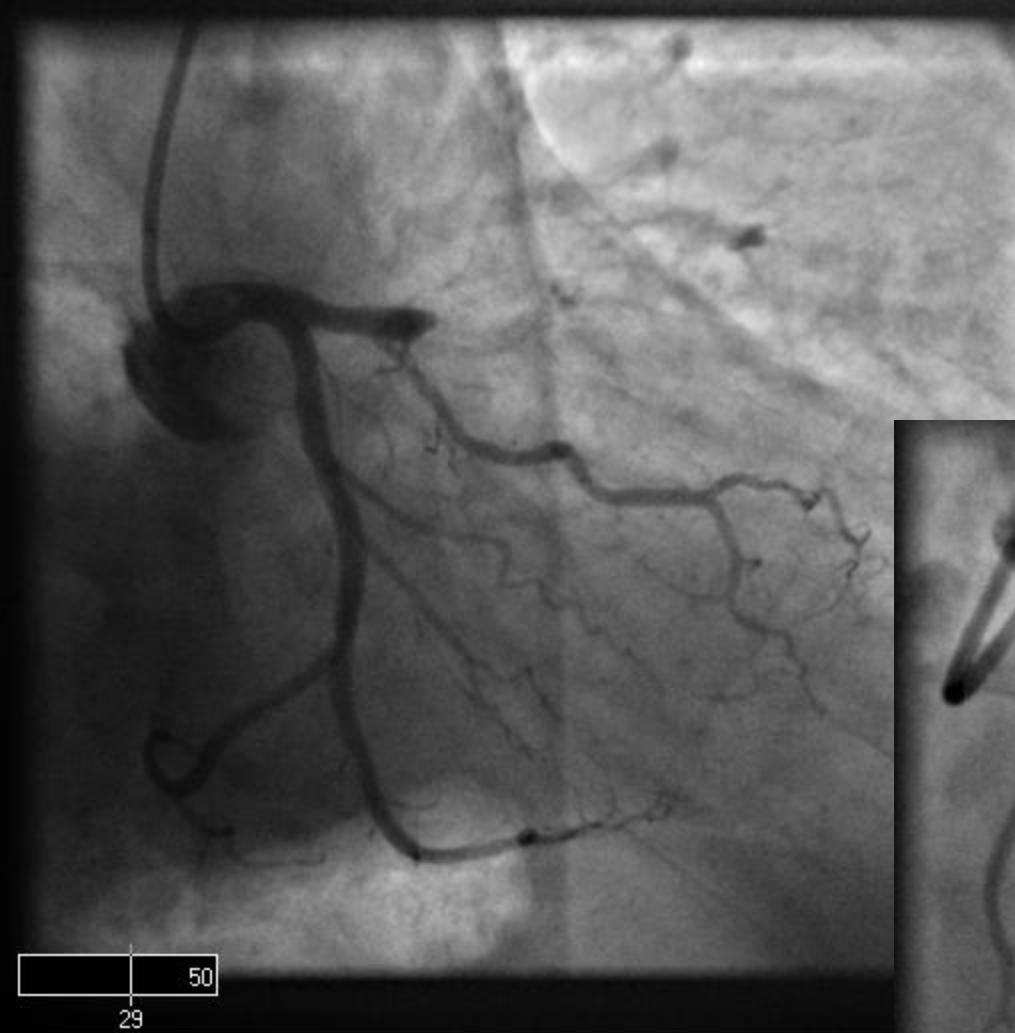


Predictive Value of IMR in STEMI

- 29 patients undergoing pPCI for STEMI
 - STE resolution
 - TMPG (blush) and cTFC
 - CFR and IMR
- Of these, only IMR correlated significantly with peak CK
 - $R = 0.61, p = 0.0005$
- Of these, only IMR correlated significantly with 3/12 echo WMS
 - $R = 0.59, p = 0.002$
- IMR was the only significant predictor of recovery of LV function
 - $R = 0.50, p < 0.01$

Predictive Value IMR in STEMI





TB_ECG - Pg 1

ID: 2809415196

22-Jul-2009

6:09:49

GJNH

69years
Male Caucasian
Room: 5

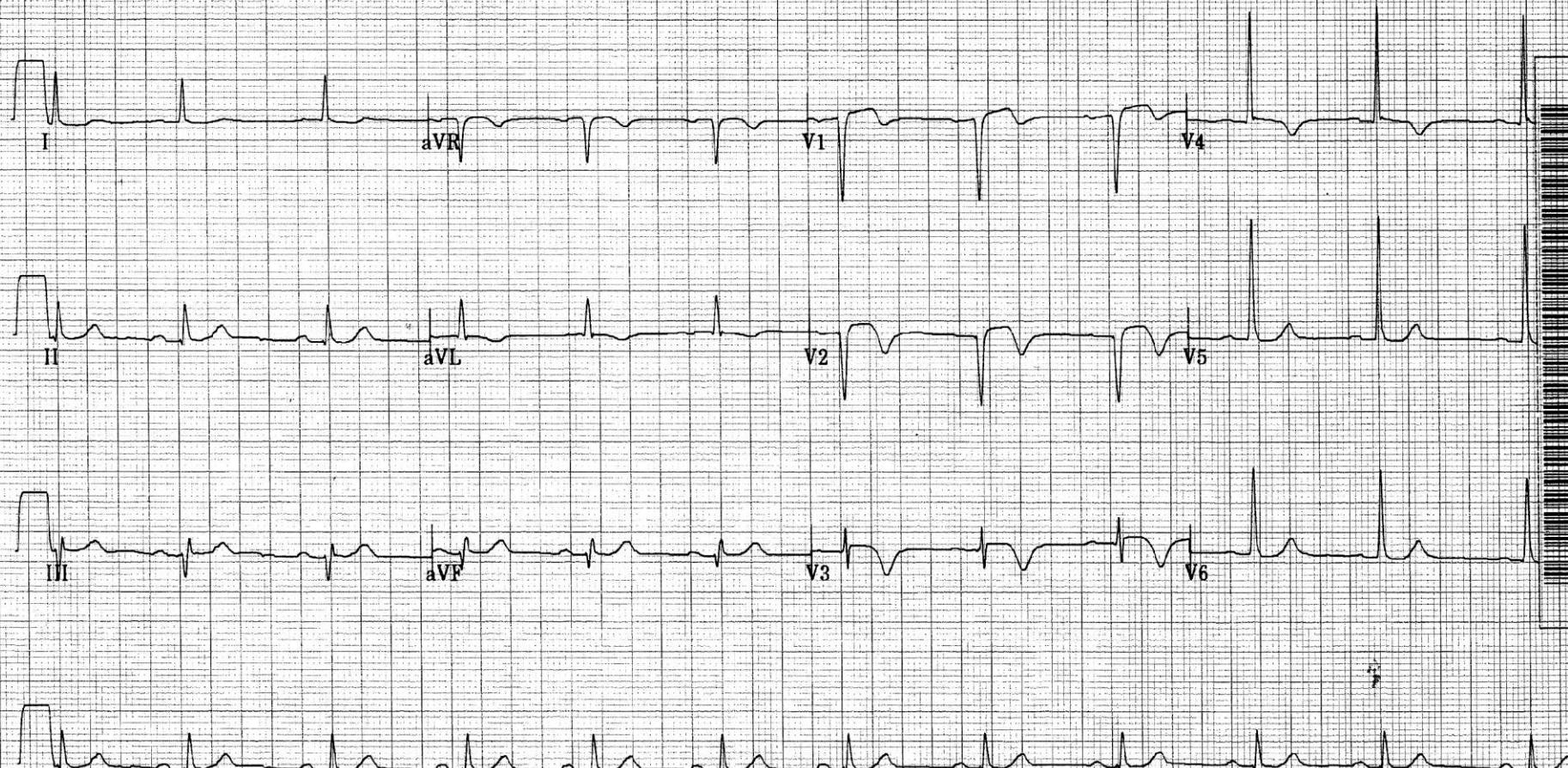
Vent. rate 68 bpm
PR interval 176 ms
QRS duration 84 ms
QT/QTc 396/421 ms
P-R-T axes 71 15 81

Normal sinus rhythm
Minimal voltage criteria for LVH, may be normal variant
Septal infarct, age undetermined
T wave abnormality, consider anterolateral ischemia

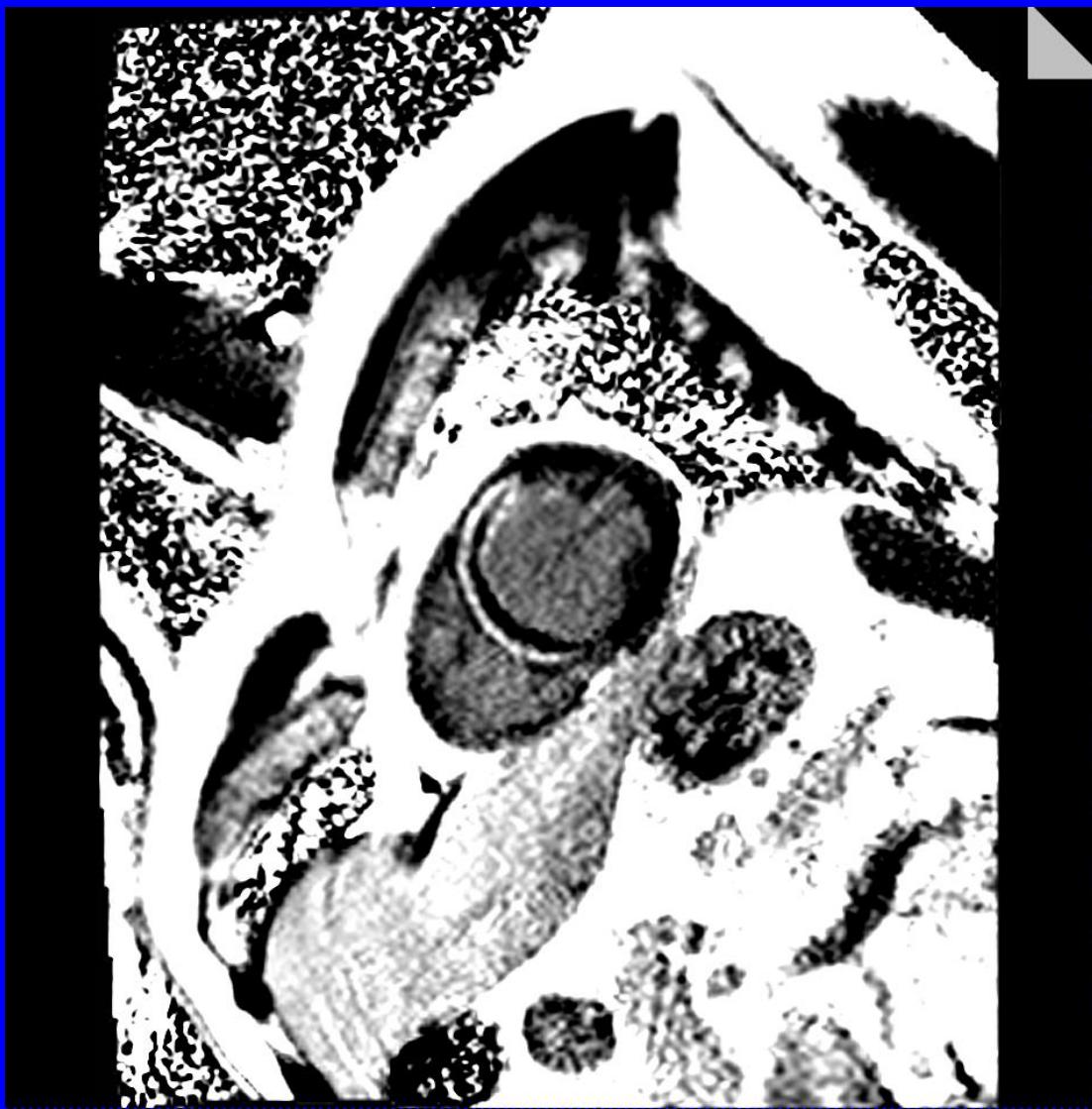
Technician: MS
Test ind: ROUTINE

Referred by:

Unconfirmed



TB – CE-CMR Day 1



PCI for STEMI (Primary and Rescue)

Microvascular obstruction CE-CMR			
	Present (n=27)	Absent (n=26)	p
IMR median(IQR)	38.1 (29 – 55)	26.9 (18 – 36)	0.003

Predictors of LVEF at 3 months

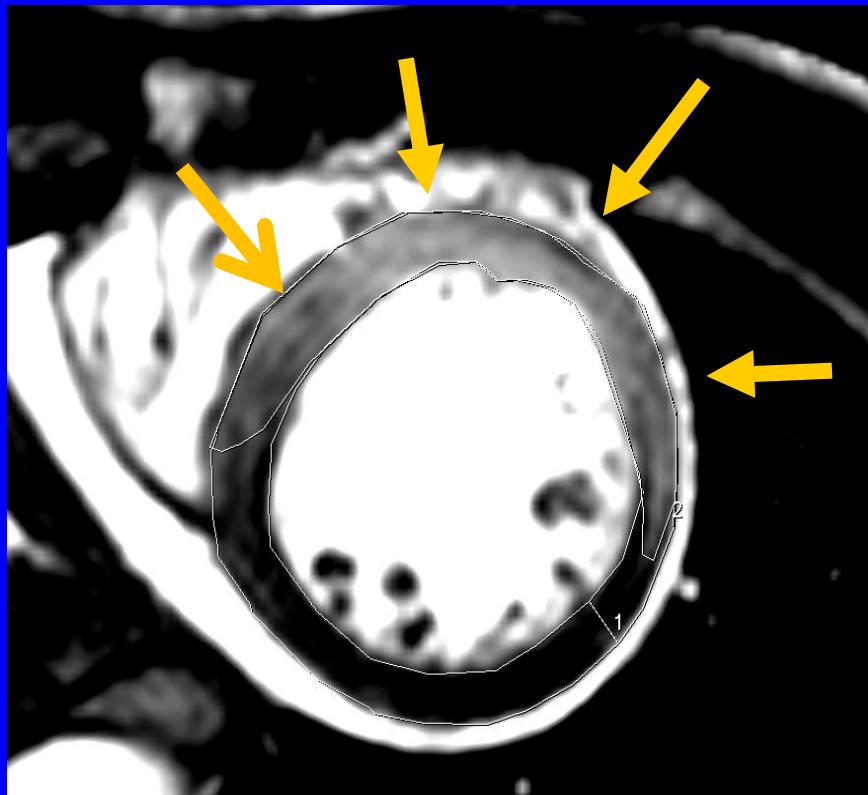
	Univariate R^2 value	P value	Multivariate analysis
Age	0	0.97	
Male	2.0	0.34	
Smoking	1.7	0.37	
Hyperlipidaemia	12	0.01	p = 0.017
Hypertension	0.7	0.56	
Diabetes	2.0	0.34	
GP2b3a inhibitor	10.8	0.02	p = 0.014
Thrombectomy	3.2	0.22	
IMR	14.5	0.007	p = 0.004
CFlp	0.1	0.81	
Pw	0	0.95	

Infarct Volume at 3 months

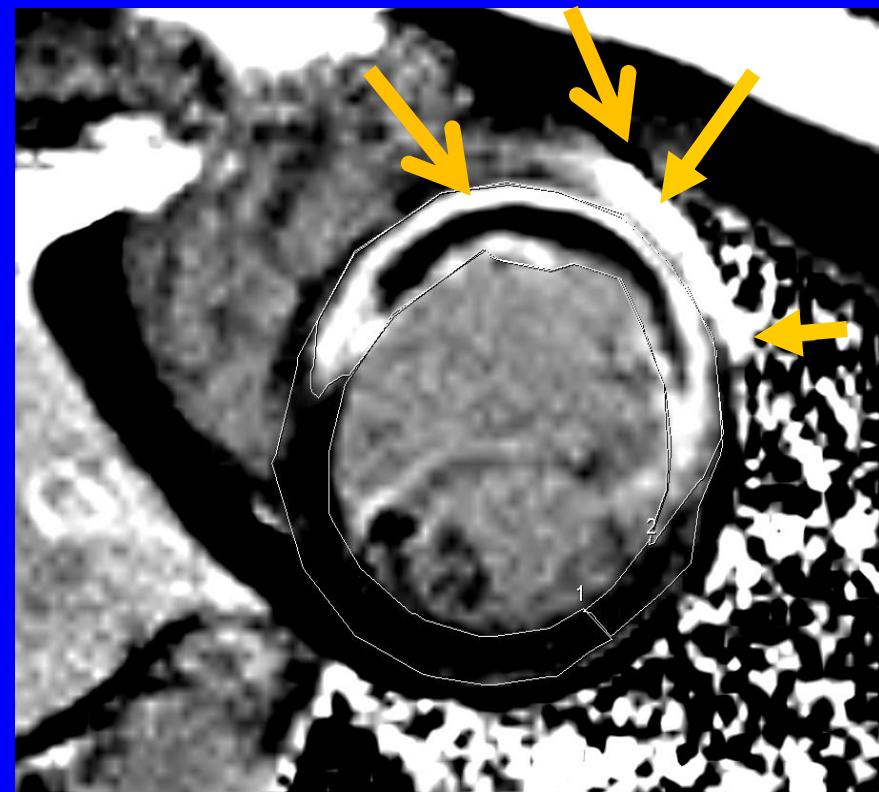
	Univariate R ² value	P value	Multivariate analysis
Age	0.1	0.84	
Male	1.1	0.49	
Smoking	0.9	0.52	
Hyperlipidaemia	9.1	0.04	
Hypertension	0.8	0.55	
Diabetes	0.9	0.52	
GP2b3a inhibitor	5.5	0.11	
Thrombectomy	2.8	0.26	
IMR	15.6	0.006	p = 0.008
CFIp	0.4	0.67	
Pw	0.3	0.72	

Myocardial Salvage

Area-at-risk



Infarct size

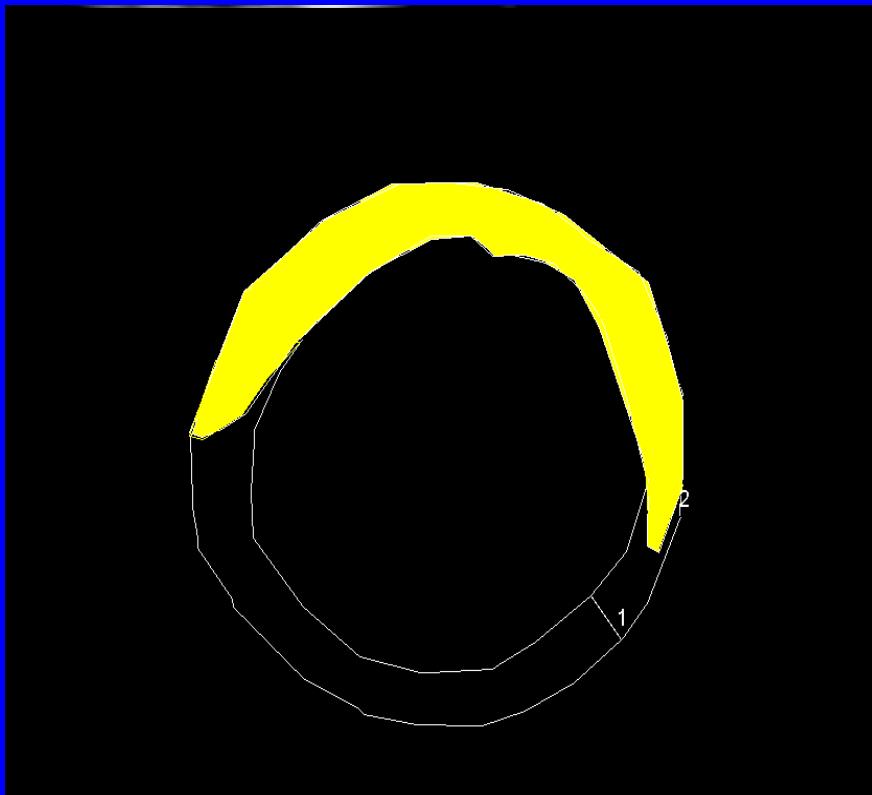


Oedema T_2 weighted MRI

Contrast MRI

Myocardial Salvage

Area-at-risk



Infarct size

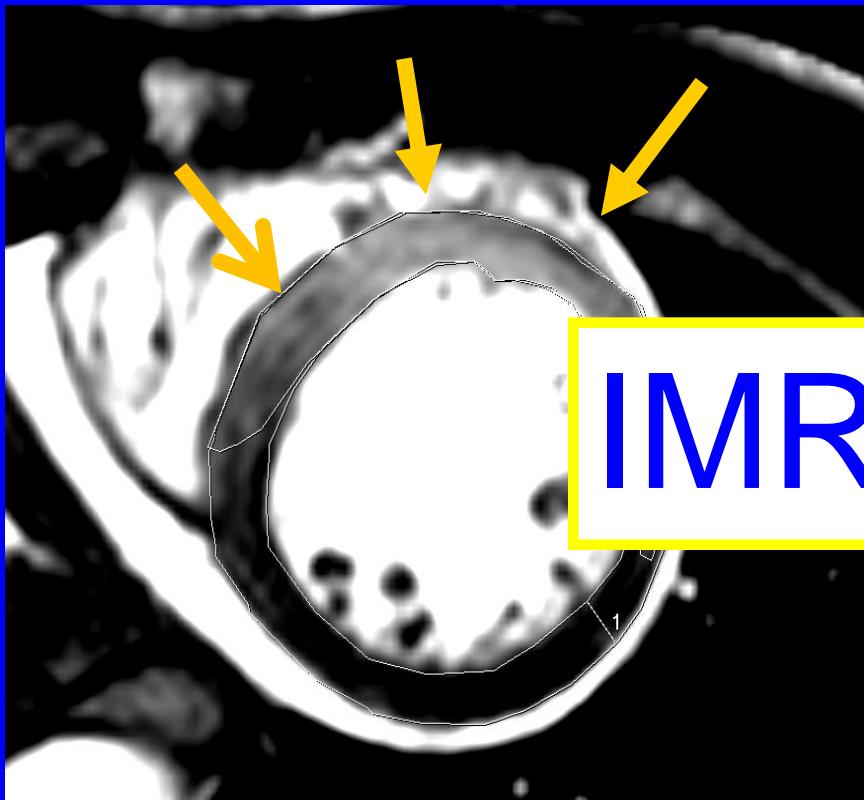


Oedema T_2 weighted MRI

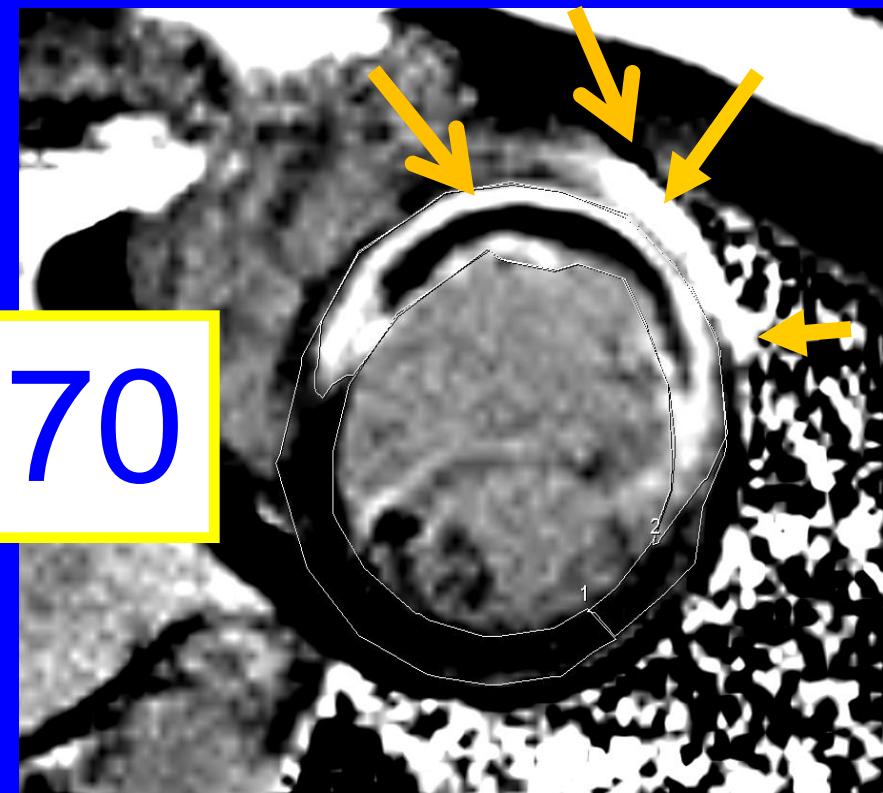
Contrast MRI

Myocardial Salvage

Area-at-risk



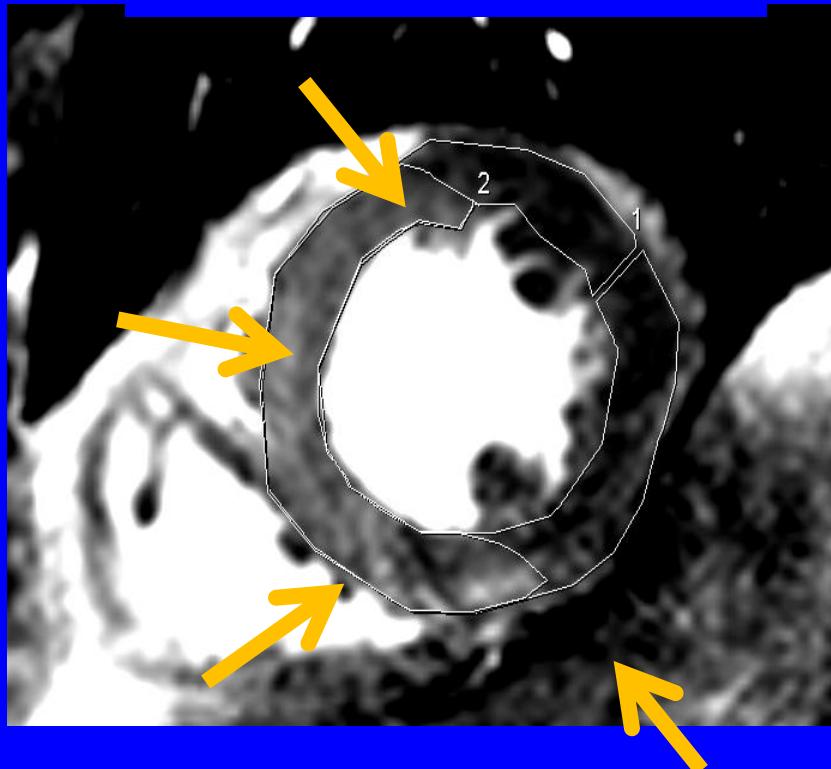
Infarct size



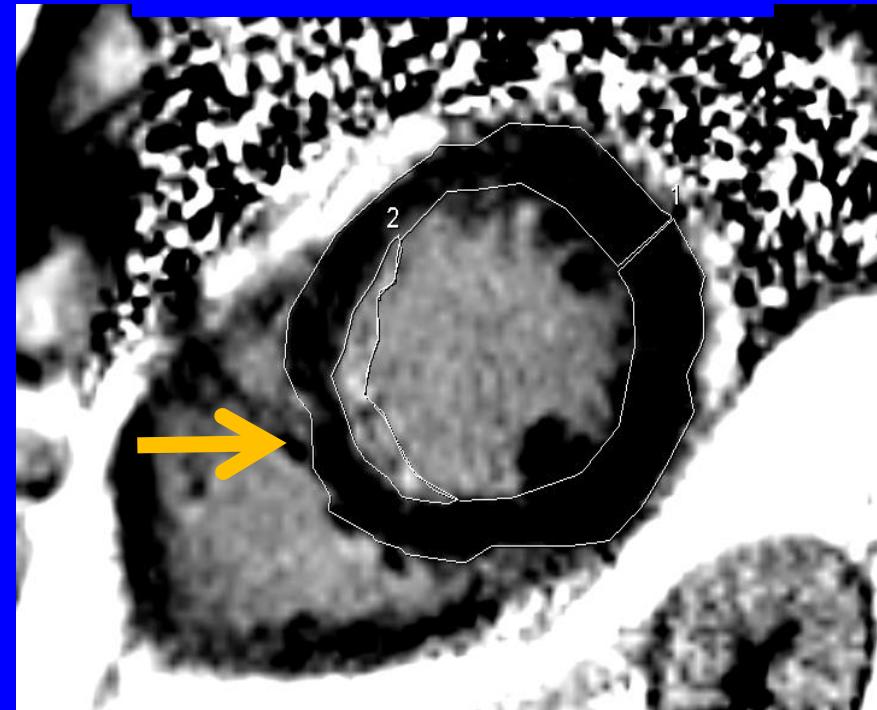
Area-at-Risk	57.5%	Infarct size	57%
Salvage	0.5%	Salvage index	1%

Myocardial Salvage

Area-at-risk



Infarct size

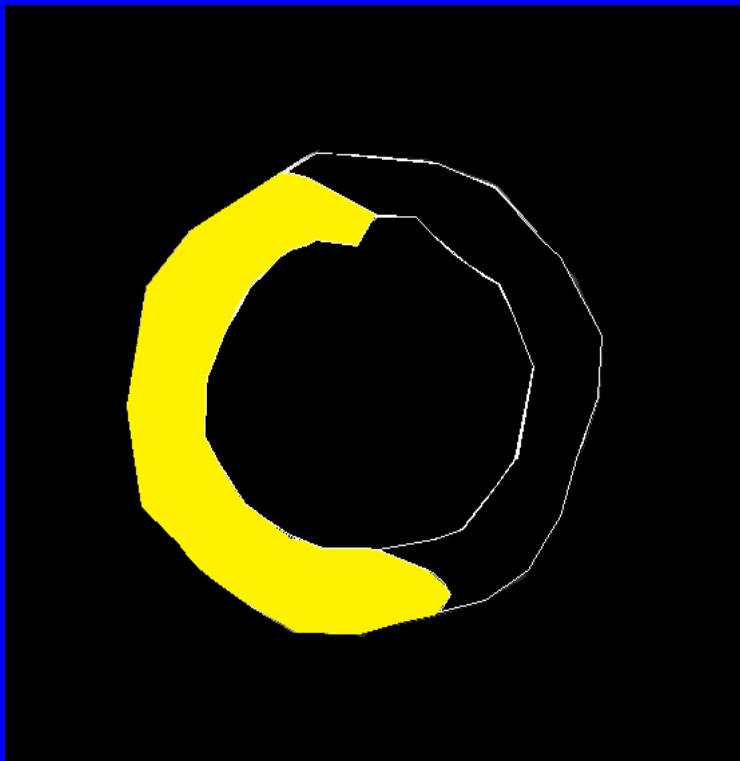


Oedema T_2 weighted MRI

Contrast MRI

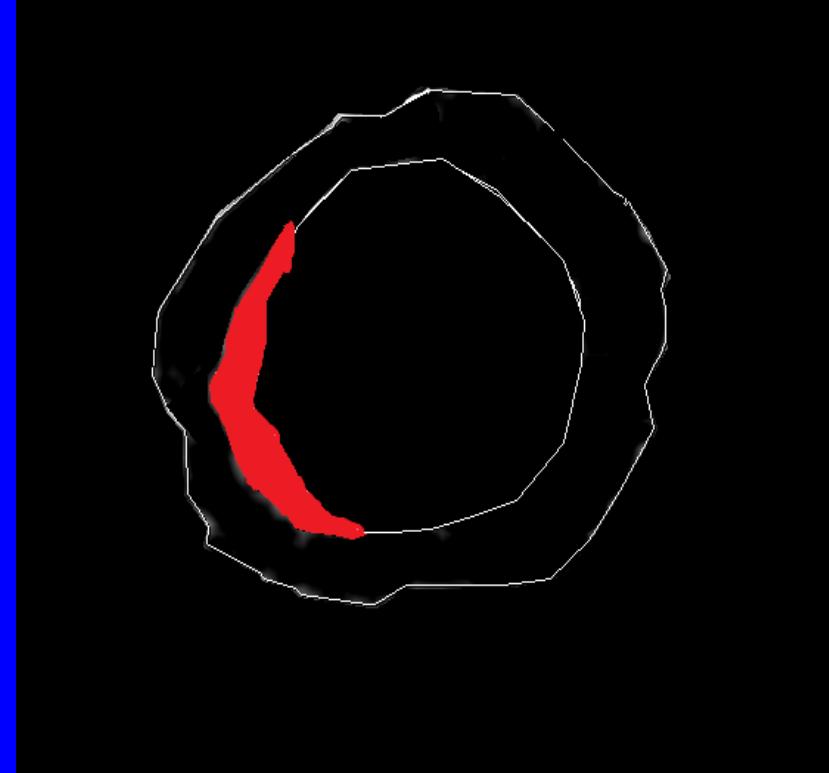
Myocardial Salvage

Area-at-risk



Oedema T_2 weighted MRI

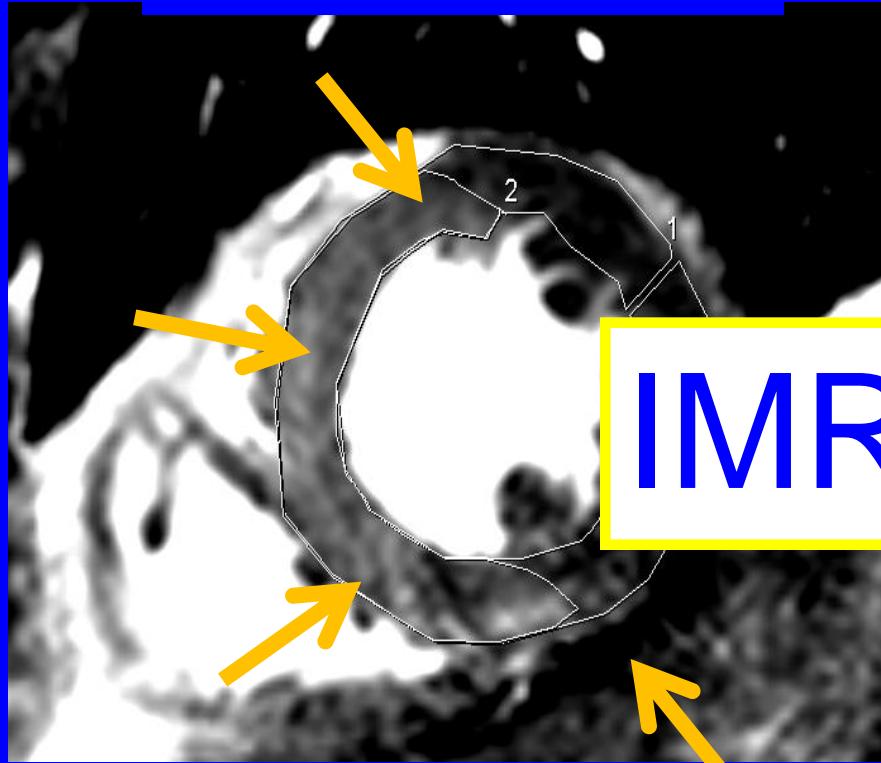
Infarct size



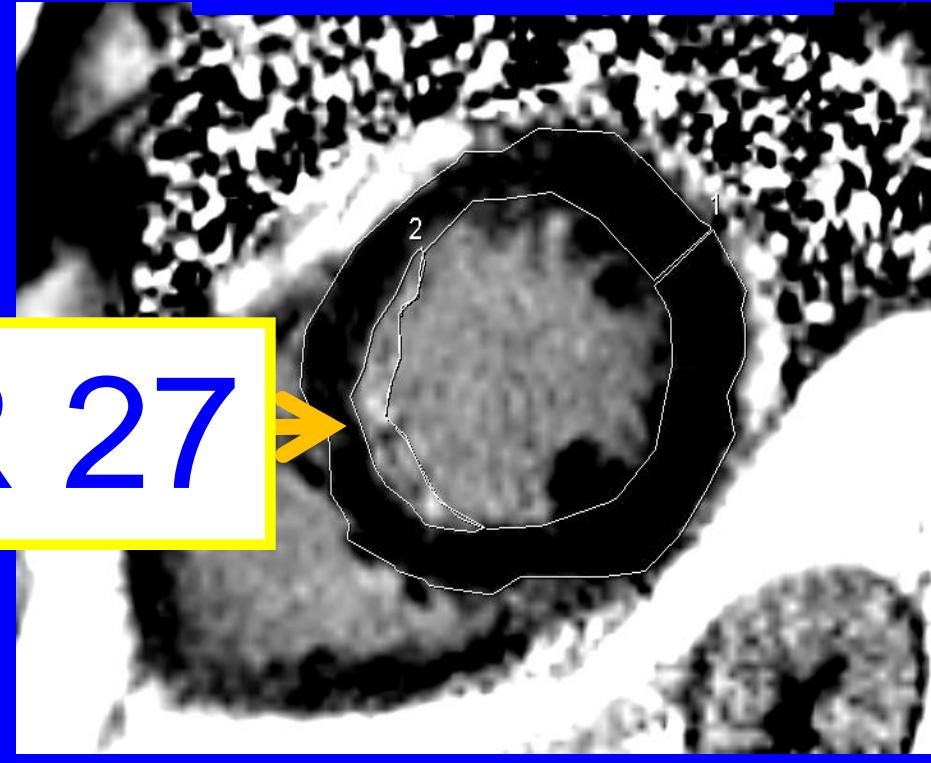
Contrast MRI

Myocardial Salvage

Area-at-risk



Infarct size



Area-at-Risk	57%	Infarct size	14%
Salvage	43%	Salvage index	75%

Primary PCI (n=108)

	Spearman Rank Correlation	p value
Infarct size	0.42	0.0005
MVO (% of LV)	0.38	0.0015
Myocardial salvage	-0.32	0.010
Myocardial salvage index	-0.42	0.0005

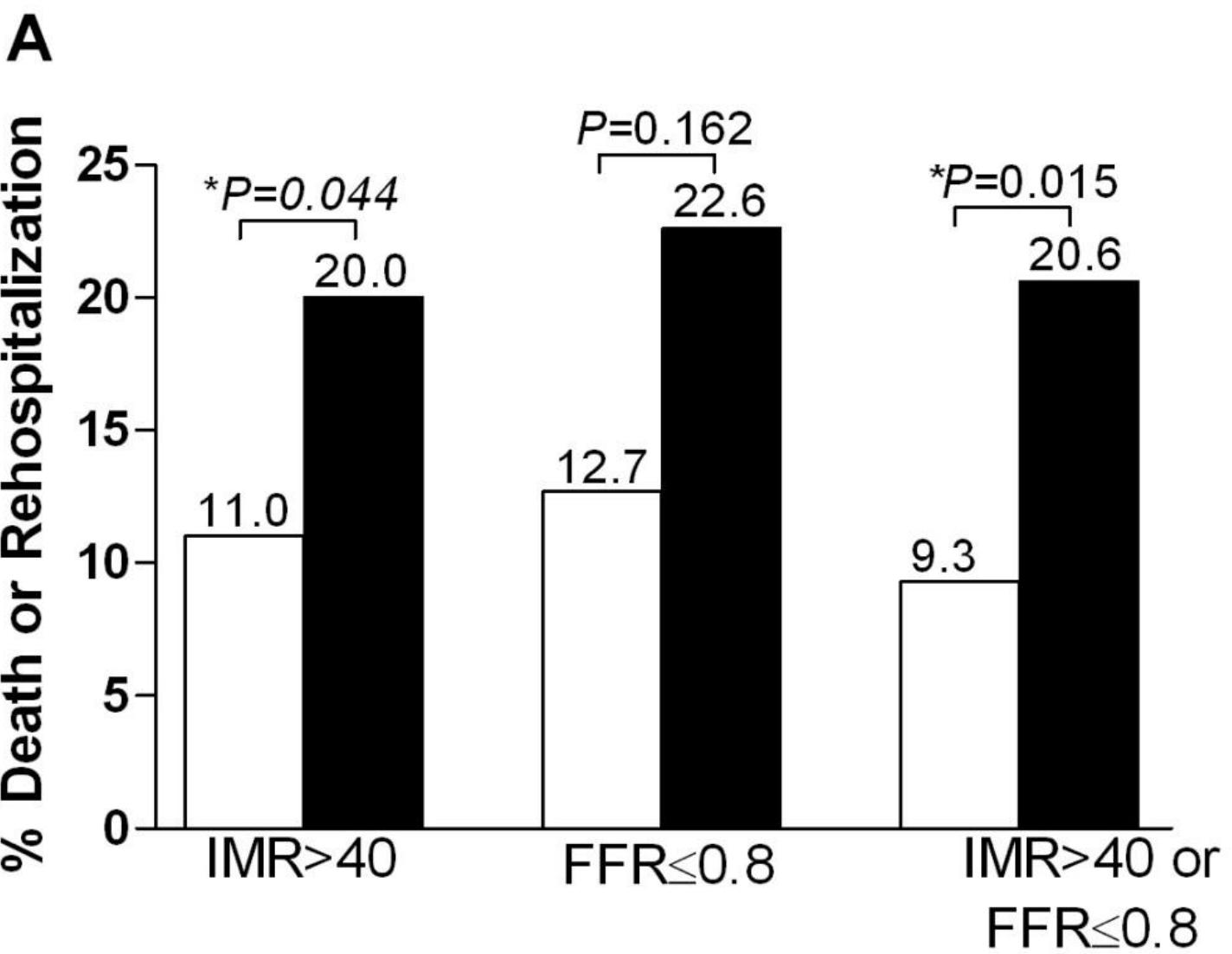
Correlations adjusted for age, gender, smoking status, BMI, pain to balloon time, CFlp, use of thrombectomy catheter or glycoprotein IIbIIIa inhibitors

Primary PCI (n=108)

	IMR				
	<17	18-27	28-42	>42	p (trend)
Infarct size (%)	17±13	18±13	24±12	32±13	<0.001
MSI (%)	28±40	18±48	21±38	14±25	<0.001
LVEF (%)	54±8	54±10	51±10	46±9	0.005

IMR-STEMI Registry

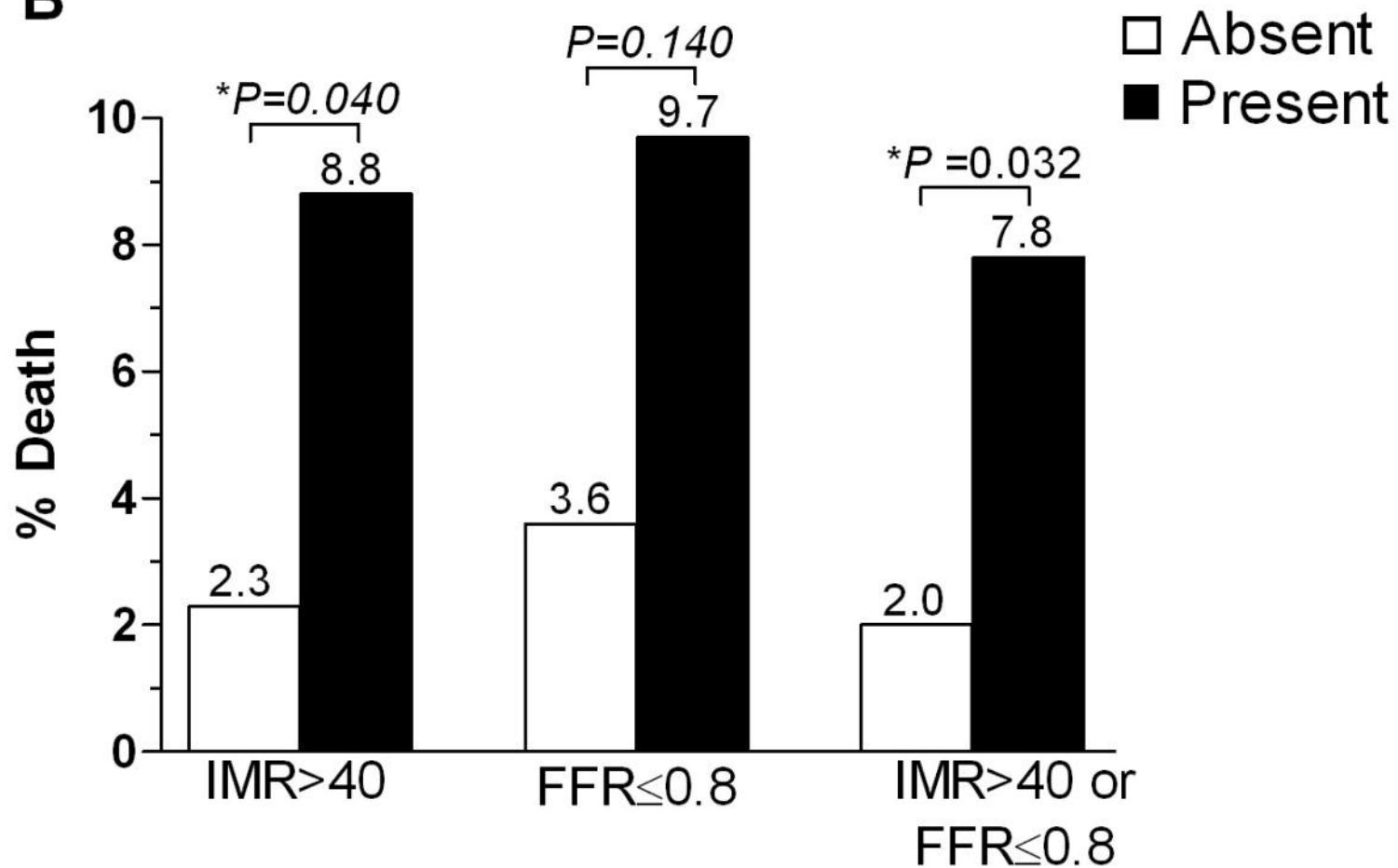
- 253 patients from Stanford, Singapore and Glasgow
 - Mean(SD) IMR was 40 ± 32
- IMR>40 was associated with an increased risk of:
 - death or rehospitalization for HF (HR 2.1, p=0.034)
 - death alone (HR 4.0, p=0.028)
- Independent predictors of death or rehospitalization for HF
 - IMR>40 (HR 2.2, p=0.026)
 - FFR ≤ 0.8 (HR 3.2, p=0.008)
 - DM (HR 4.4, p<0.001)
- IMR>40 was the only independent predictor of death alone (HR 4.3, p=0.02).



Prevalence, no. (%): 80 (31.6)

31 (12.3)

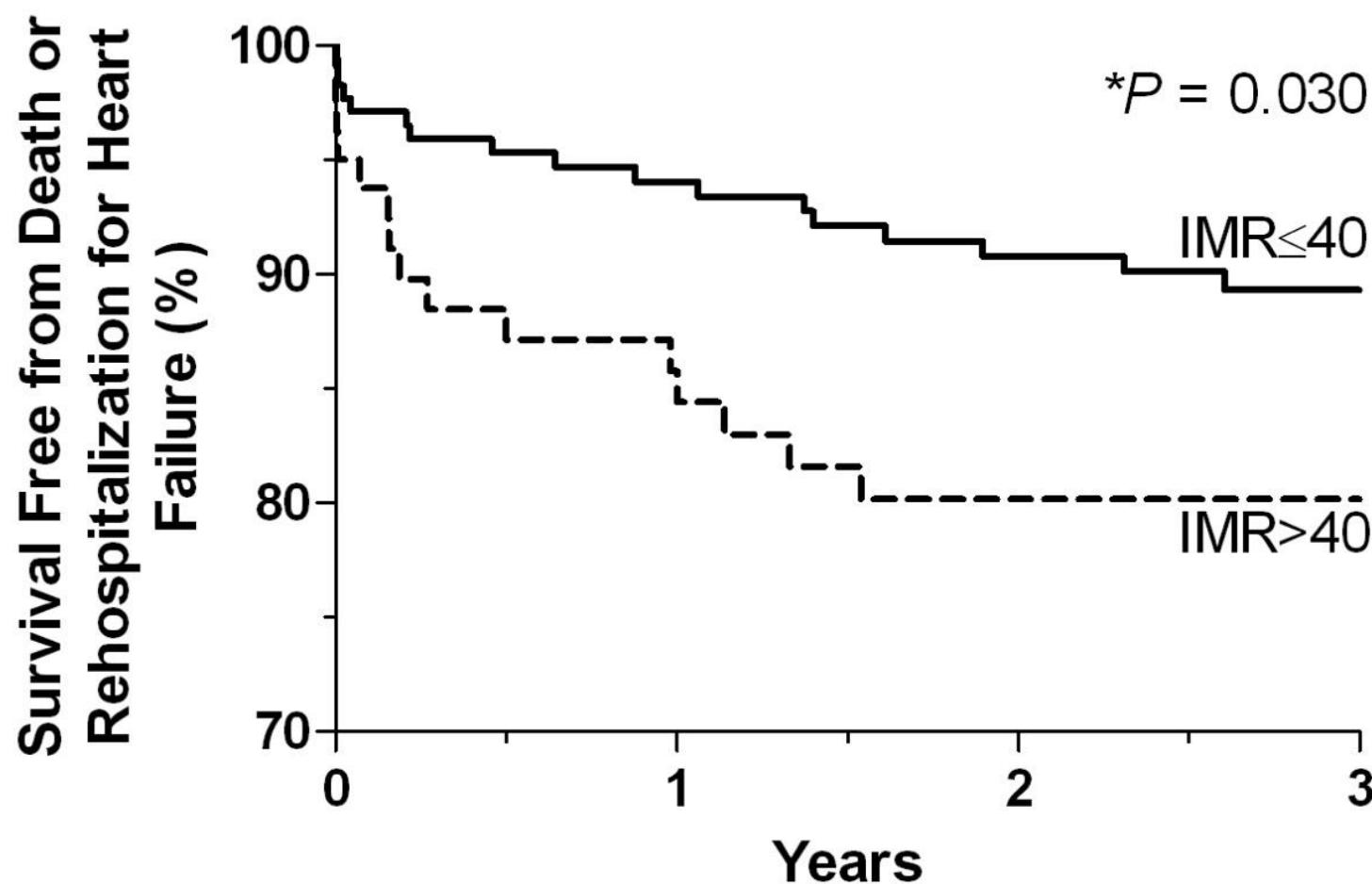
102 (40.3)

B

Prevalence, no. (%): 80 (31.6)

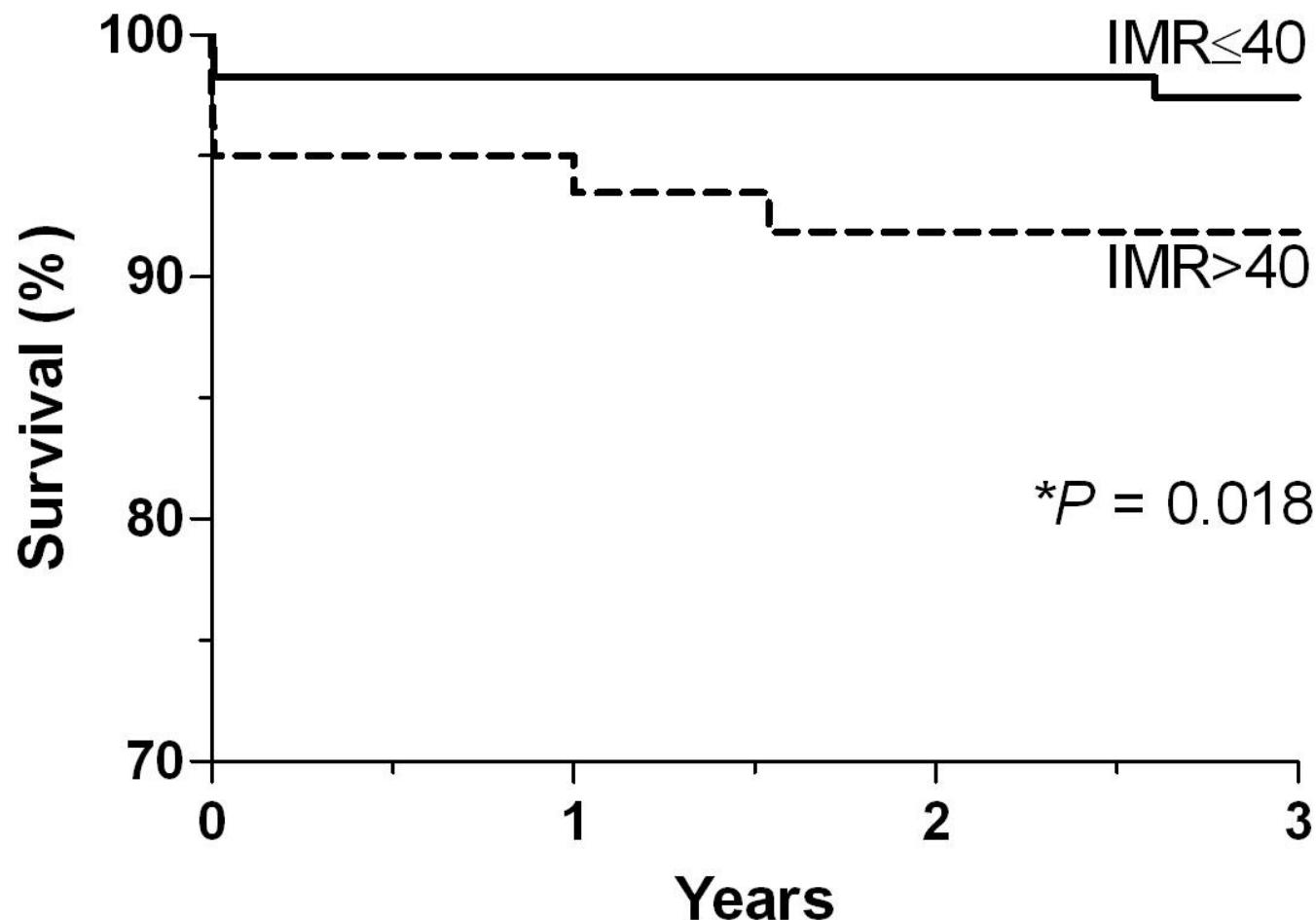
31 (12.3)

102 (40.3)

A

No. at risk:

IMR ≤ 40	173	148	138	76
IMR > 40	80	63	55	28

B

No. at risk:

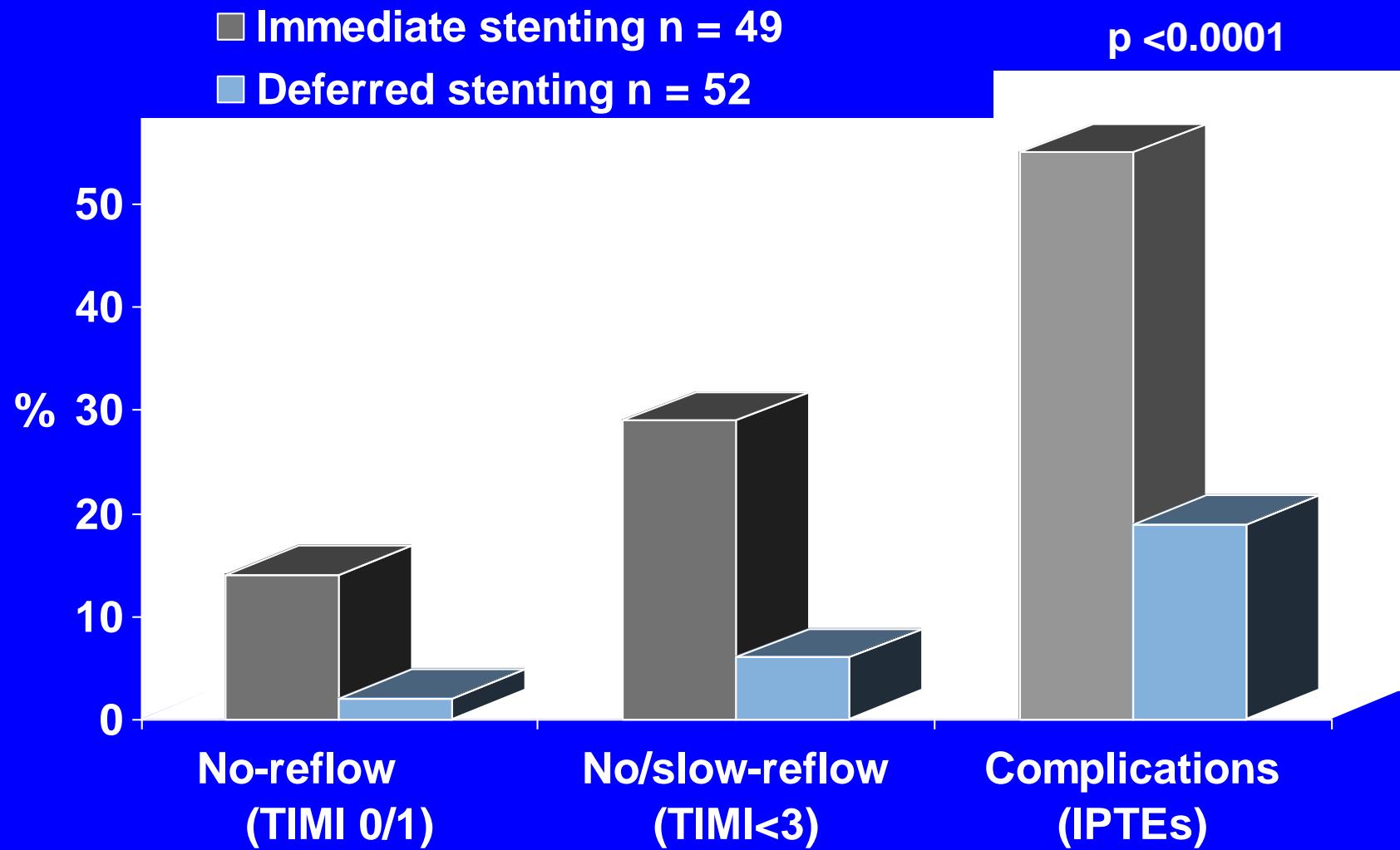
IMR ≤ 40	173	154	149	84
IMR > 40	80	69	63	33

So what's the value of knowing
in the cath lab
that myocardial salvage
will be poor?

- ? IABP
- ? Adenosine infusion
- ? MAPK inhibitor
- ? No stent
- ? Different stent
- ? Deferred stenting

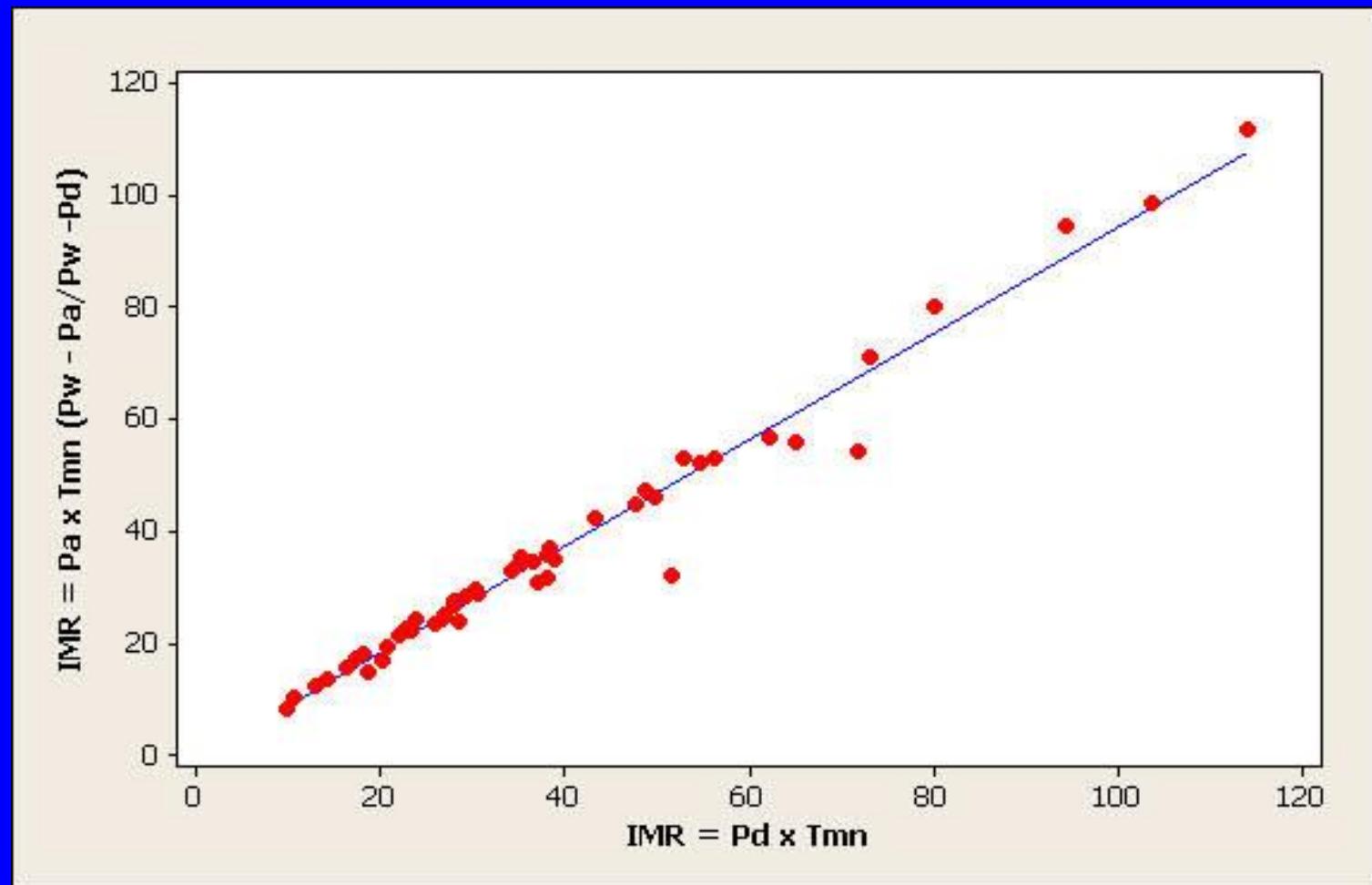
Deferred Stenting

March – Nov 2012; 438 STEMI patients, 101 randomised



Thank You

Effect of Including Coronary Wedge Pressure on IMR Values



Predictors of LVEF at Day 1

	Univariate R^2 value	P value	Multivariate analysis
Age	2.6	0.23	
Male	2.6	0.23	
Smoking	5.4	0.08	
Hyperlipidaemia	0.1	0.94	
Hypertension	0.4	0.63	
Diabetes	12.1	0.008	p = 0.03
GP2b3a inhibitor	3.7	0.15	
Thrombectomy	1.9	0.31	
IMR	29.1	<0.001	P ≤ 0.001
CFIp	0.7	0.54	
Pw	0.1	0.93	

Infarct Volume at Day 1

	Univariate R^2 value	P value	Multivariate analysis
Age	0	0.87	
Male	0.5	0.62	
Smoking	1.9	0.33	
Hyperlipidaemia	3.6	0.18	
Hypertension	2.6	0.25	
Diabetes	0.2	0.77	
GP2b3a inhibitor	5.3	0.09	
Thrombectomy	1.2	0.43	
IMR	18.6	0.001	p = 0.002
CFIp	0.8	0.53	
Pw	0.1	0.81	