Implementation of Emergency Service of Primary Percutaneous Coronary Intervention (Primary PCI) for ST-Elevation Myocardial Infarction

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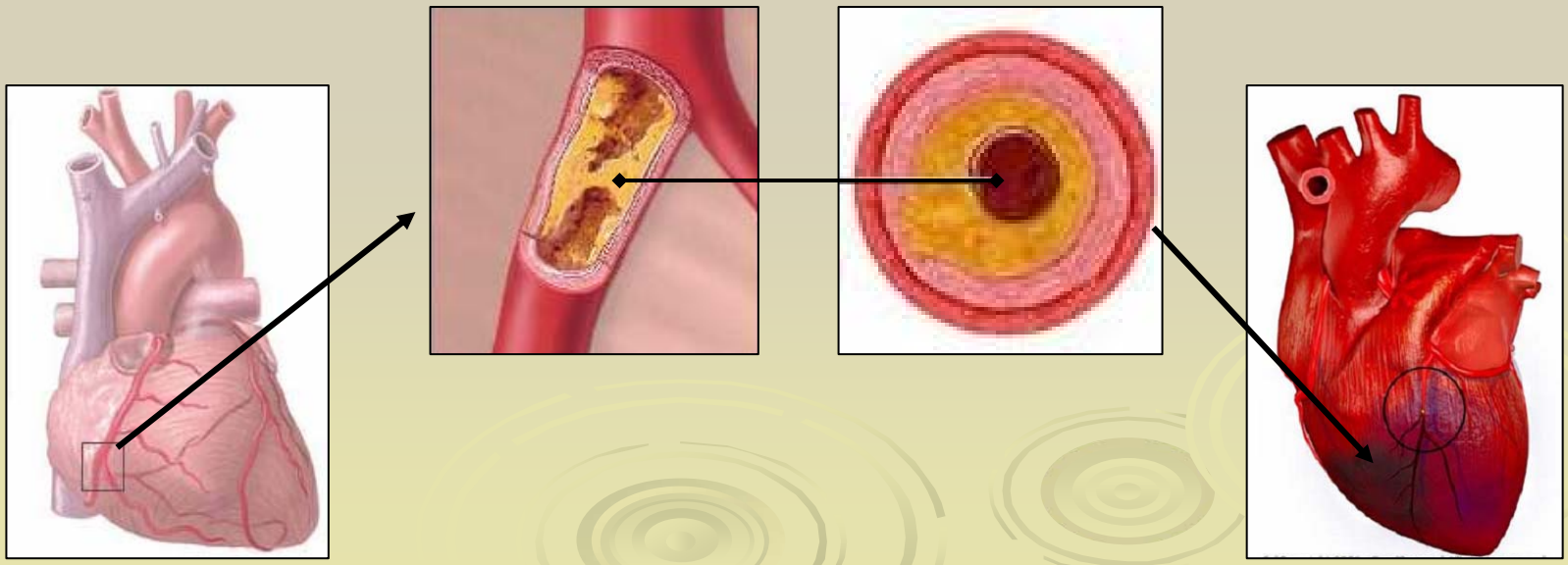
Background

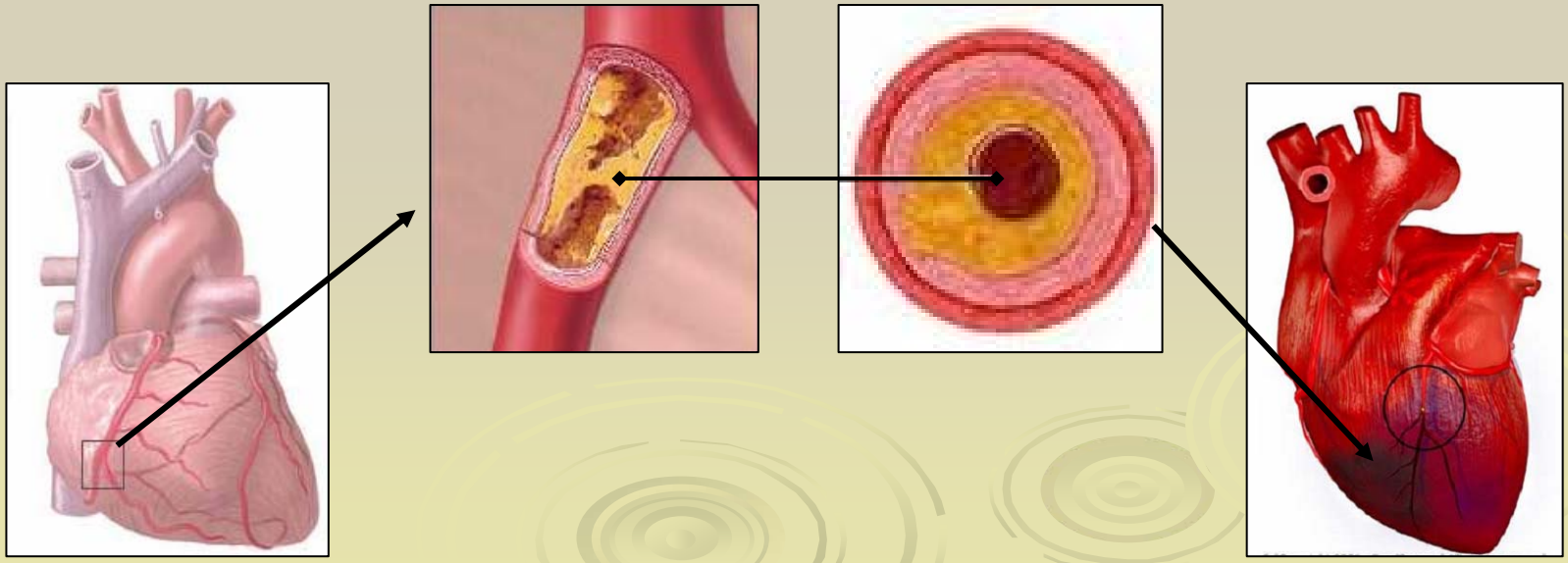
Pathophysiology of acute STEMI (ST-elevation myocardial infarction)

- Acute thrombotic occlusion of coronary artery
- Leading to myocardial injury



Background

Reperfusion: Key to acute management



Background

Reperfusion: Key to acute management

- Thrombolytic therapy
- Primary PCI
  (percutaneous
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Reperfusion: Key to acute management

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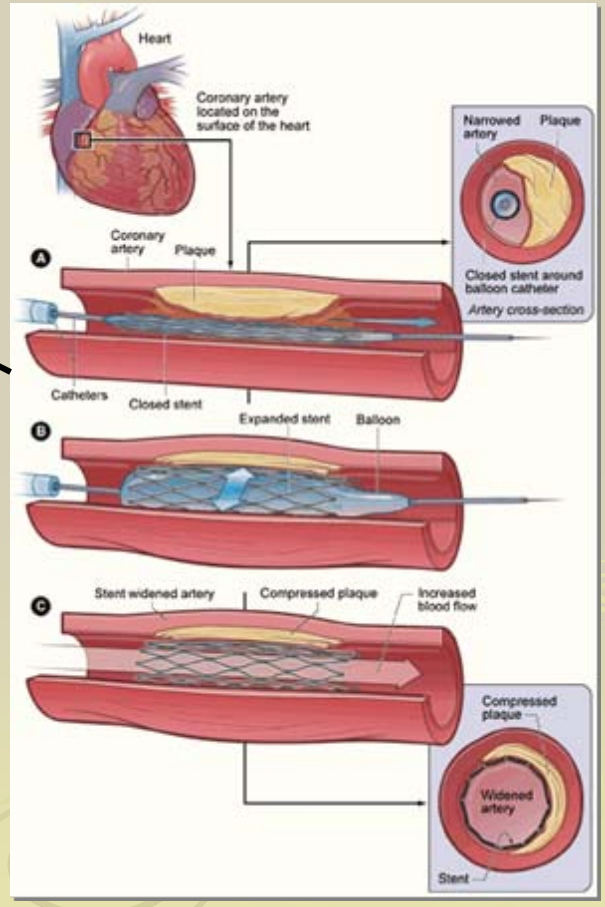
Reperfusion: Key to acute management

- Thrombolytic therapy
- **Primary PCI (percutaneous coronary intervention)**



Background

Reperfusion: Key to acute management

- Thrombolytic therapy
- Primary PCI
  (percutaneous
  coronary intervention)

Primary PCI Vs Thrombolytics

- Takes longer time to implement
  – potential delay in reperfusion

- But a much higher rate of reperfusion
  (93- 96% compared to 50- 60% with thrombolytic therapy)

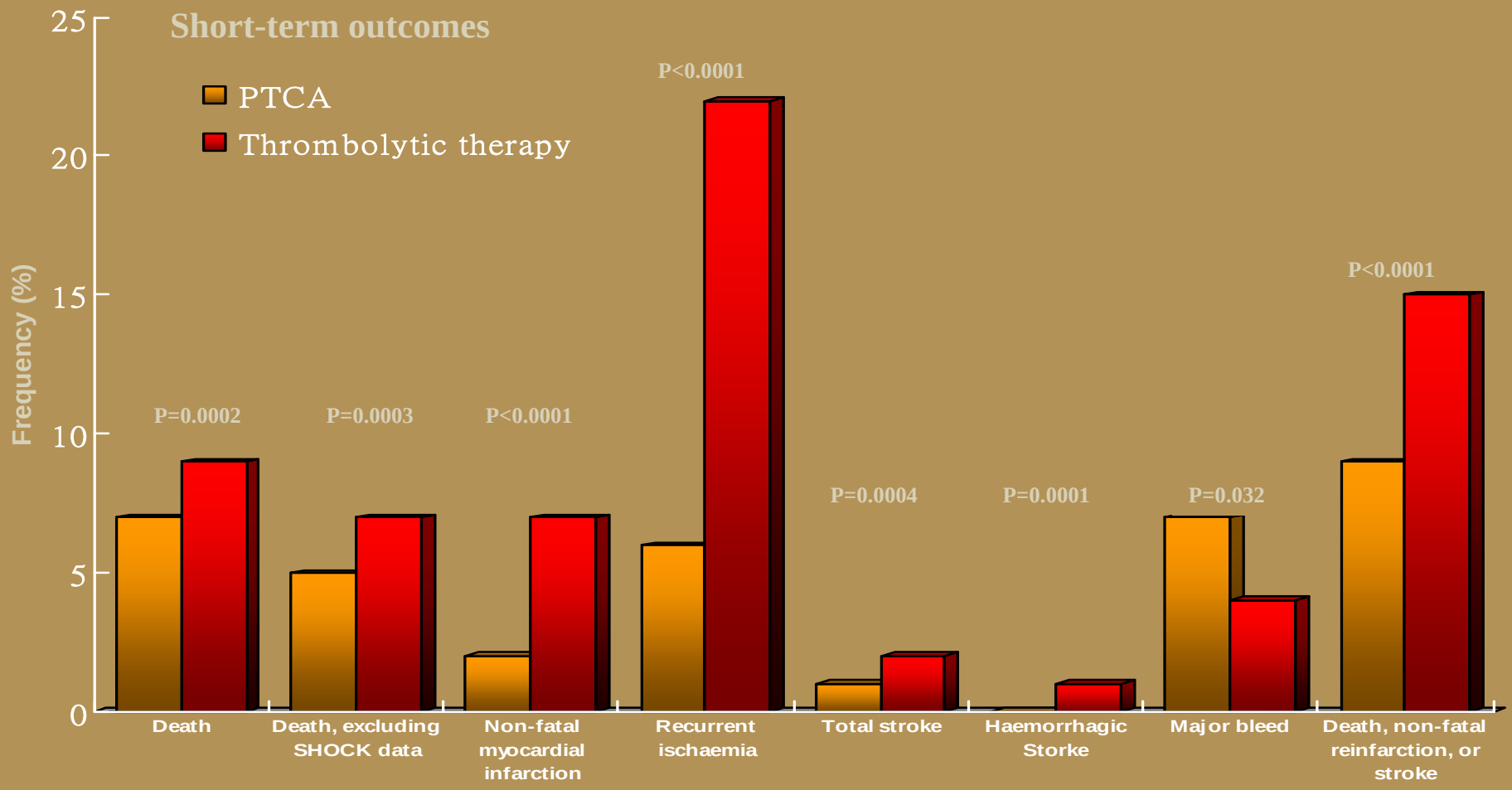
J Am Coll Cardiol 2003 Nov 19;42(10):1739-46.

N Engl J Med 2002 Mar 28;346(13):957-66.

Primary angioplasty versus intravenous thrombolytic therapy for AMI:

a quantitative review of 23 randomised trials

Lancet 2003 Jan 4;361(9351):13-20



Current Recommendation x AMI

Primary PCI preferable:

- In general, if available in timely fashion
  - (Goal: “Door-to-balloon” time < 90min)
- Special indications
  - Contraindication to thrombolytic therapy
  - Cardiogenic shock
  - Severe congestive heart failure (CHF)
  - Delayed presentation, with CHF, haemodynamic instability or persistent ischaemic symptoms

Limited Availability of Primary PCI

- Cath lab availability
- Lack of manpower & logistics for primary PCI

- Routine service not available in HA hospitals

- Thrombolytic therapy remains a mainstay of treatment

Objectives

- To maximize the utilization of resources and implement an emergency service of primary PCI for STEMI patients
  - “Routine” during cardiac cath lab (CCL) working hours
  - For special indication during off-hours
- Review the outcome of implementation

Methodology:
Implementation of Primary PCI

Since Nov 2003:

- During CCL operating hours
  - AED/medical colleagues alerted CCL team for all MI cases
  - Primary PCI as possible
- During off-hours
  - Cardiologist and nurses on-call
  - Primary PCI for patients with specific indications

CCL= cardiac catheterization laboratory

Methodology:
Review of outcome

- Review period: Jan 02 to Jul 07
- Primary outcome analysis
  - The No. & proportion of reperfusion achieved by primary PCI, in CCL hrs & non-CCL hrs
- Secondary outcome analysis
  - In-hospital mortality
  - Door-to-balloon time in selected consecutive patients

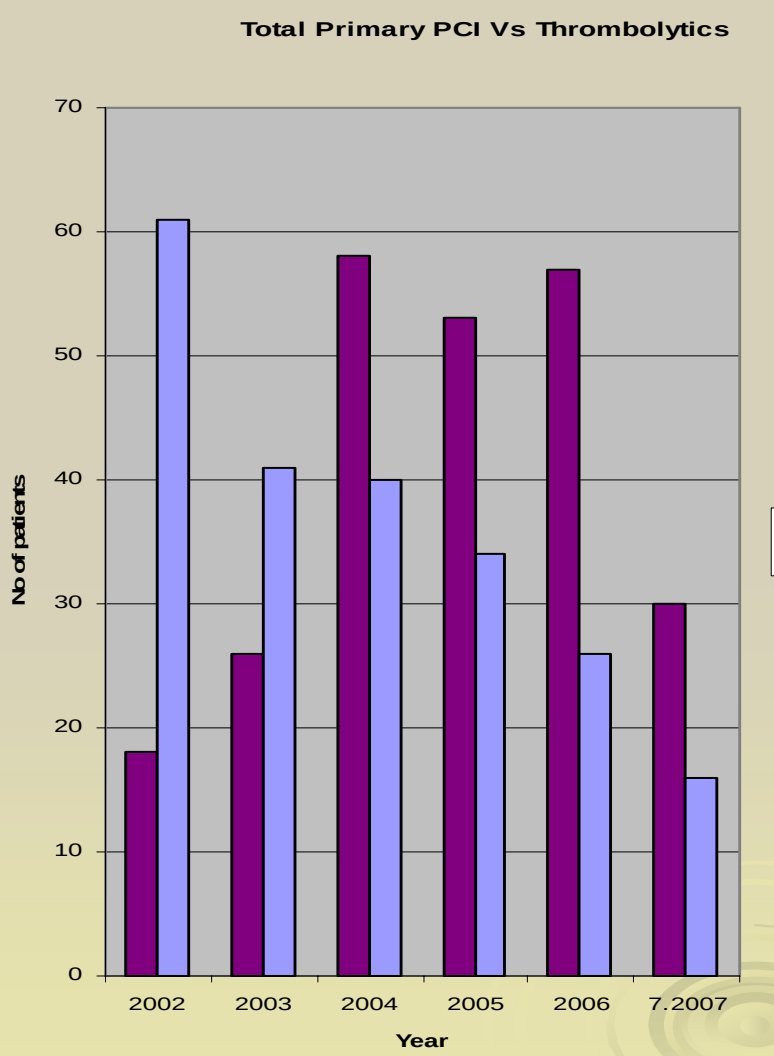
CCL= cardiac catheterization laboratory

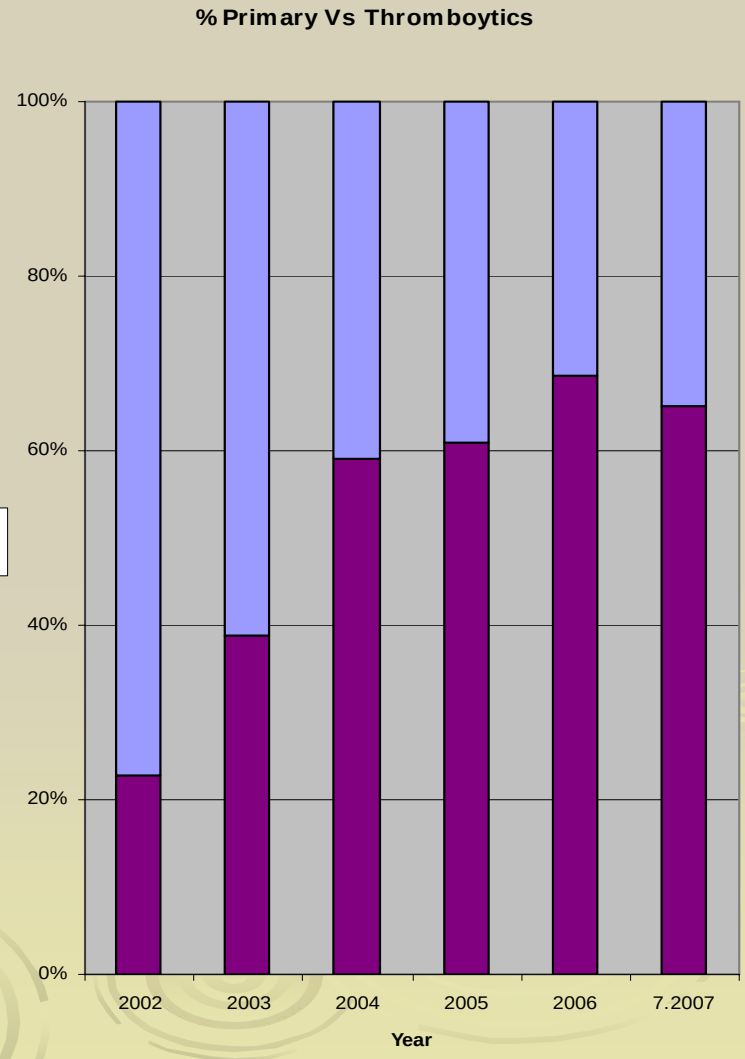
Result

- Study period: Jan 02 to Jul 07
- Primary PCI Vs Thrombolytics = 242 : 218 (Primary PCI = 52.6%)

	PCI gp (n=242)	TT gp (n=218)	Overall (n=460)
Sex (%male)	69%	72%	70%
Age (yrs)	66 +/- 13	68 +/- 13	67 +/- 13

Primary PCI Vs Thrombolytics
Combined CCL & Non-CCL hours

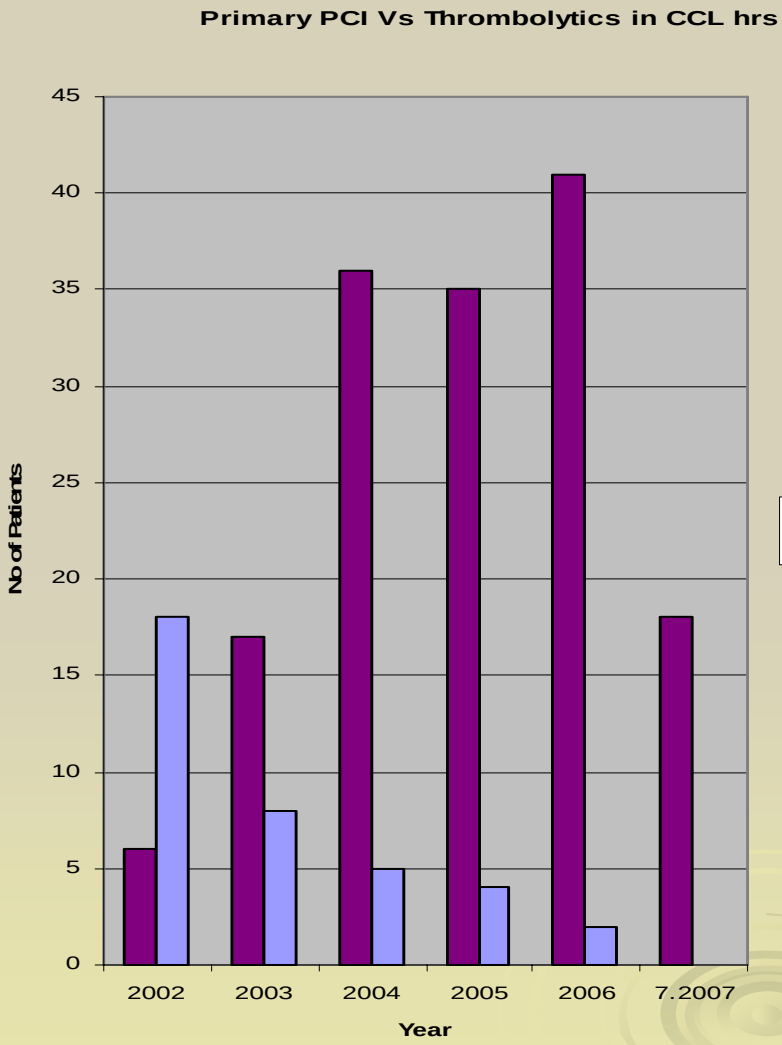


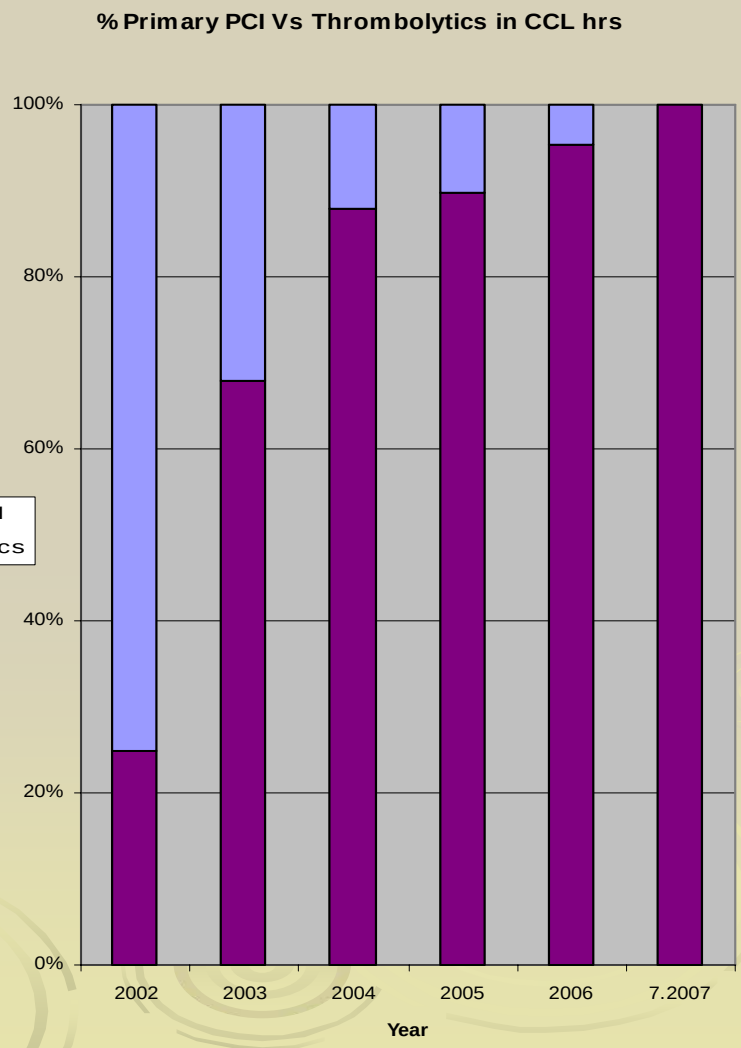


Primary PCI Vs Thrombolytics
CCL Vs Non-CCL hours

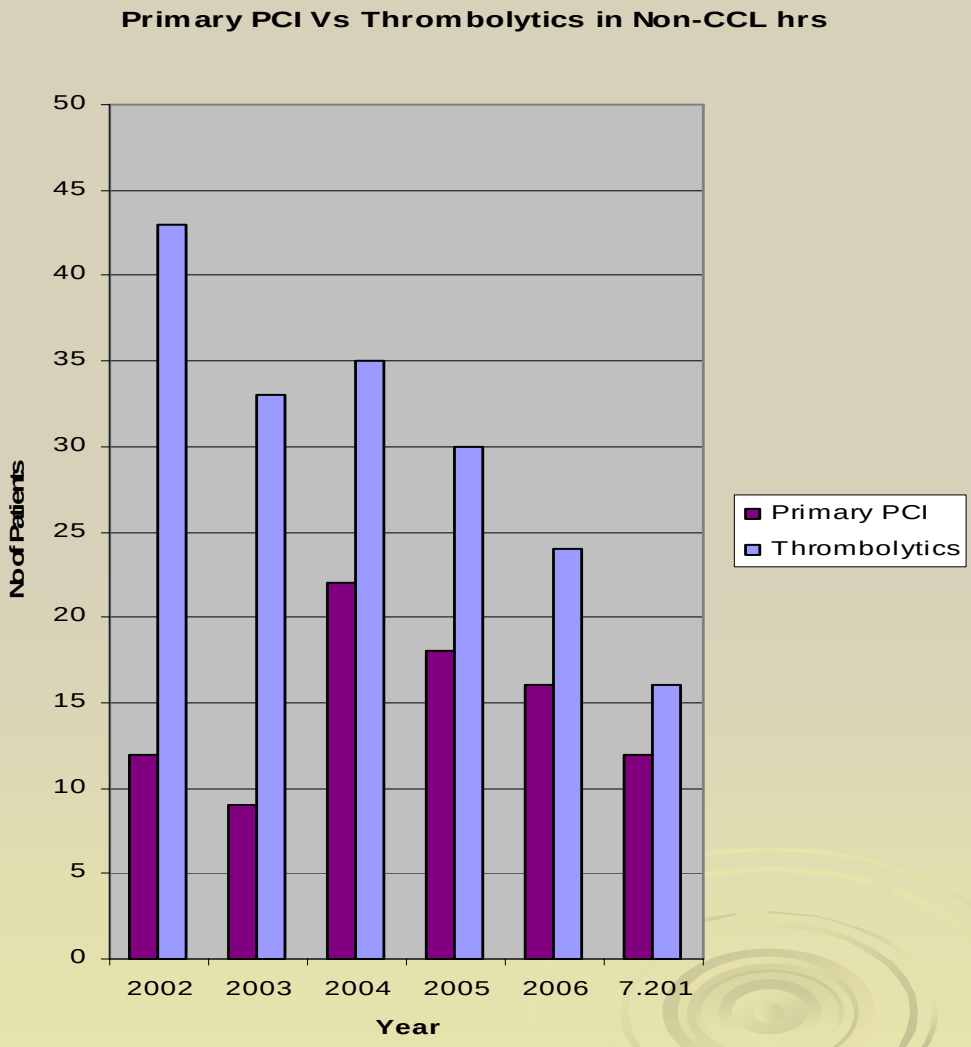
	Primary PCI	Thrombolytics	Total
CCL hrs	153	37	190
Non-CCL hrs	89	181	270
Total	242	218	

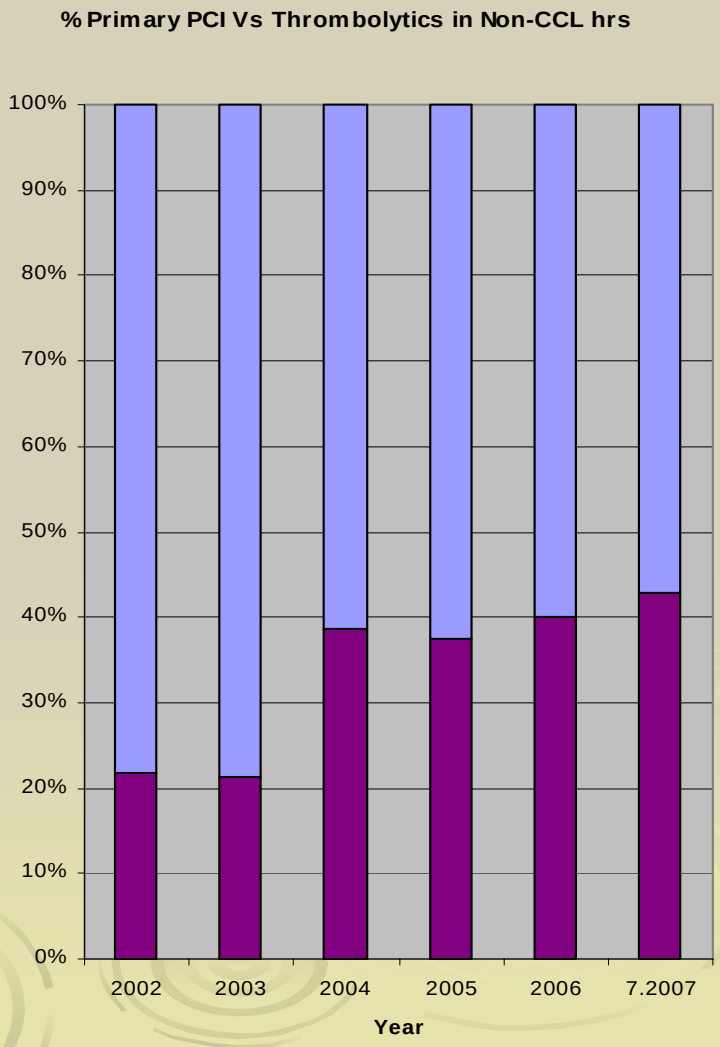
Primary PCI Vs Thrombolytics
CCL hours





Primary PCI Vs Thrombolytics
Non-CCL hours





Primary PCI in Non-CCL hrs (n=89)

Indications:

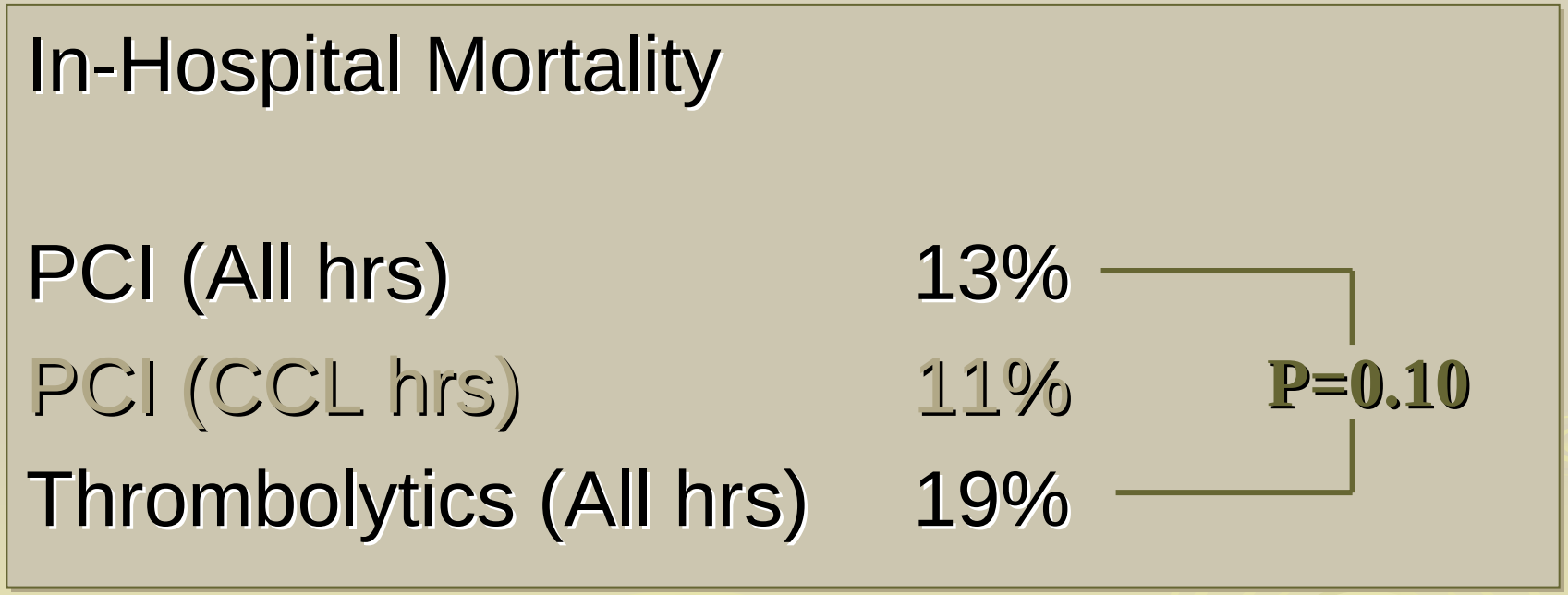
- Haemodynamic/electrical instability (including cardiogenic shock) 45 (51%)
- Contraindication to thrombolytics 18 (20%)
- Delayed presentation with ischaemia 18 (20%)
- Availability of manpower 9 (9%)

Clinical outcome: In-hospital mortality

In-Hospital Mortality	
PCI (All hrs)	13%
PCI (CCL hrs)	11%
Thrombolytics (All hrs)	19%

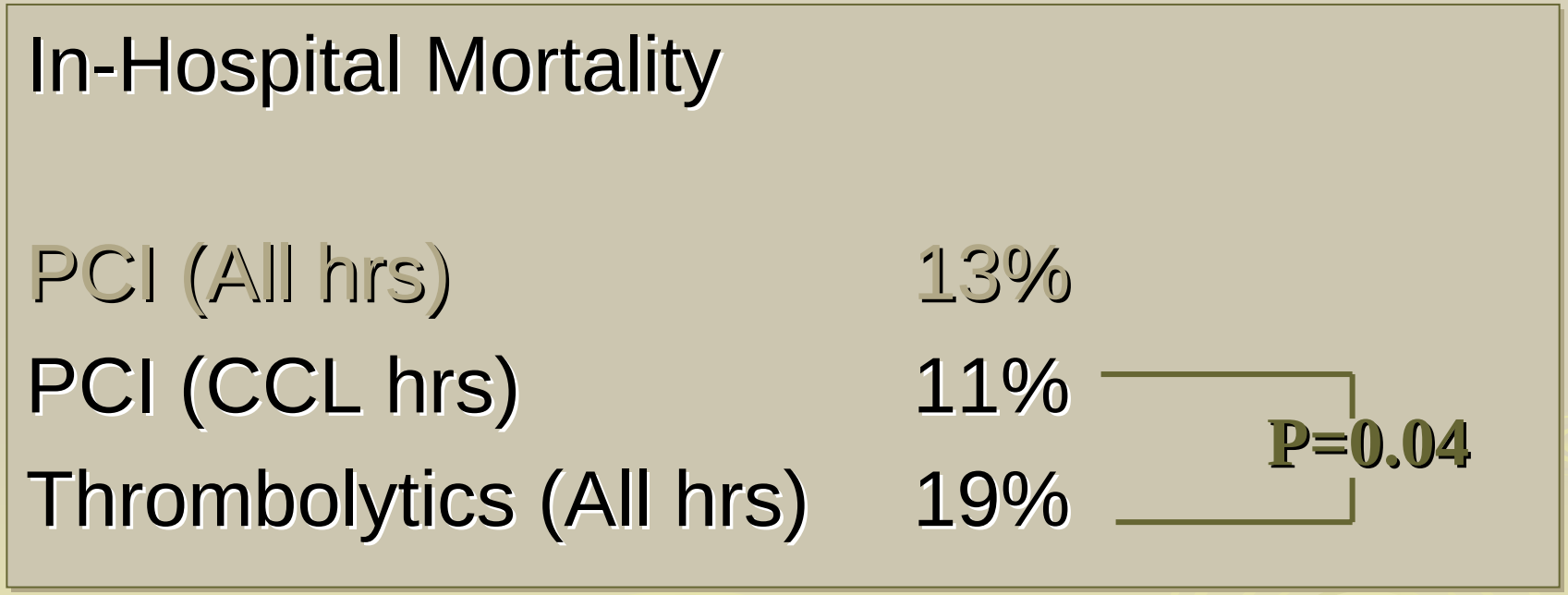
Clinical outcome: In-hospital mortality

PCI Vs Thrombolytics: No significant difference -- a trend toward reduction in mortality



Clinical outcome: In-hospital mortality

PCI in CCL hrs (“routine cases”) Vs Thrombolytics -- Reduced mortality



Door-to-Balloon Time

26 consecutive patients in CCL hrs (1/7/06 to 31/1/07)

Door to balloon time (4 cases excluded due to delayed in diagnosis initially)	Mean+/-SD:	86.3 +/- 36.7min
	Range:	30 – 156min
	<90min:	12/22 (54.5%)
	<120min:	21/22 (95%)

Conclusion

- We managed to provide primary PCI service to benefit a significant proportion of STEMI patients by optimal utilization of resources
- Improved short-term outcome by primary PCI
- Future goals
  - Further expand the implementation of primary PCI -- ? Routine service during off-hours
  - More comprehensive analysis of door-to-balloon (DTB) time & clinical outcome
  - Evaluate means to shorten the DTB time