Storia della Medicina e Antropologia Medica

La Cardiologia
IERI, OGGI, DOMANI

Maria Grazia Modena

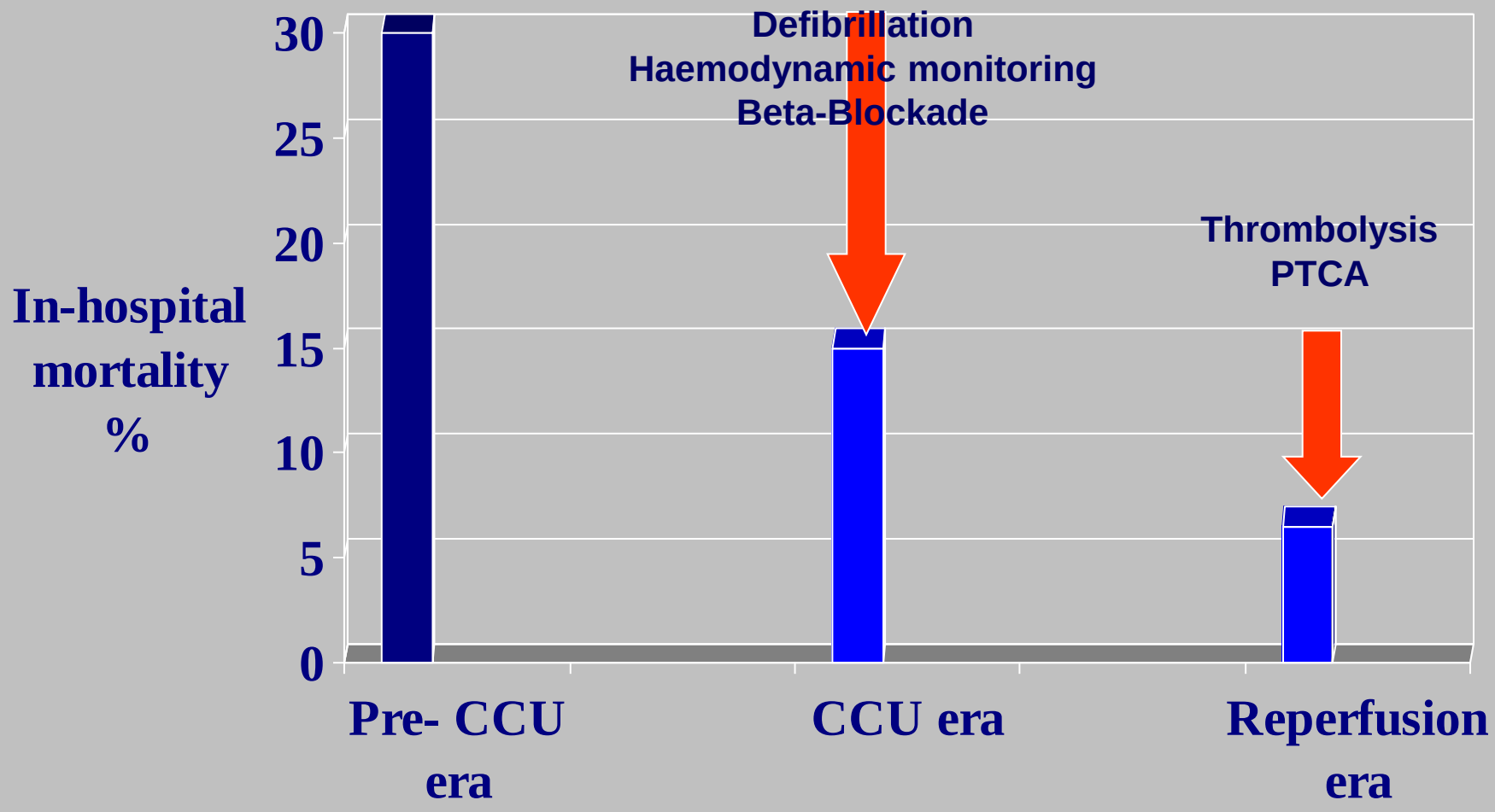
Modena

24 Marzo 2010

SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Ospedaliero-Universitaria di Modena

Cattedra di Cardiologia, Dipartimento Emergenza-Urgenza,
Direttore Prof.ssa MG. Modena

RIDUZIONE DELLA MORTALITA' CORRELATA ALL'IMA: RUOLO DELL'UTIC



Modificata da Braunwald: Heart Disease 2005

NASCITA DELLE UTIC

1962
Julian apre a Sydney il primo reparto dedicato ai pazienti con IMA gestito da personale medico e paramedico capace di eseguire la RCP

1962
Day, negli Stati Uniti, conia il termine di "Coronary Care Unit".

1964
Julian apre alla Royal Infirmary la prima UTIC Europea.

1967
Presso gli Ospedali San Camillo di Roma e Niguarda di Milano vengono aperte le prime due UTIC italiane.

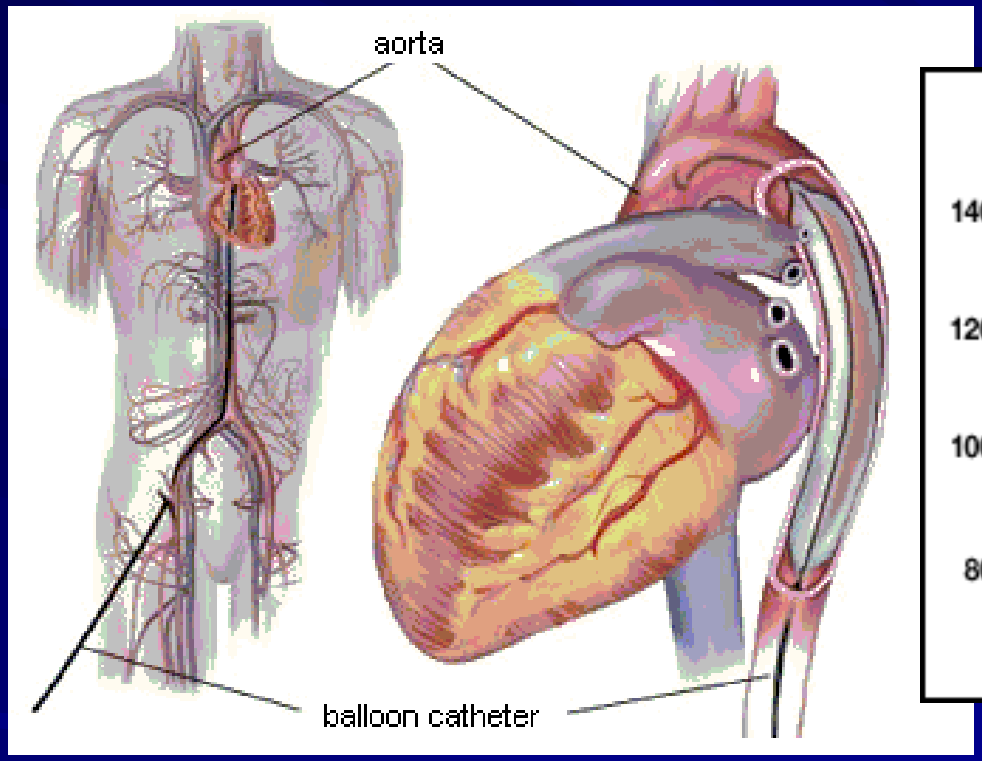
Pre-thrombolytic era

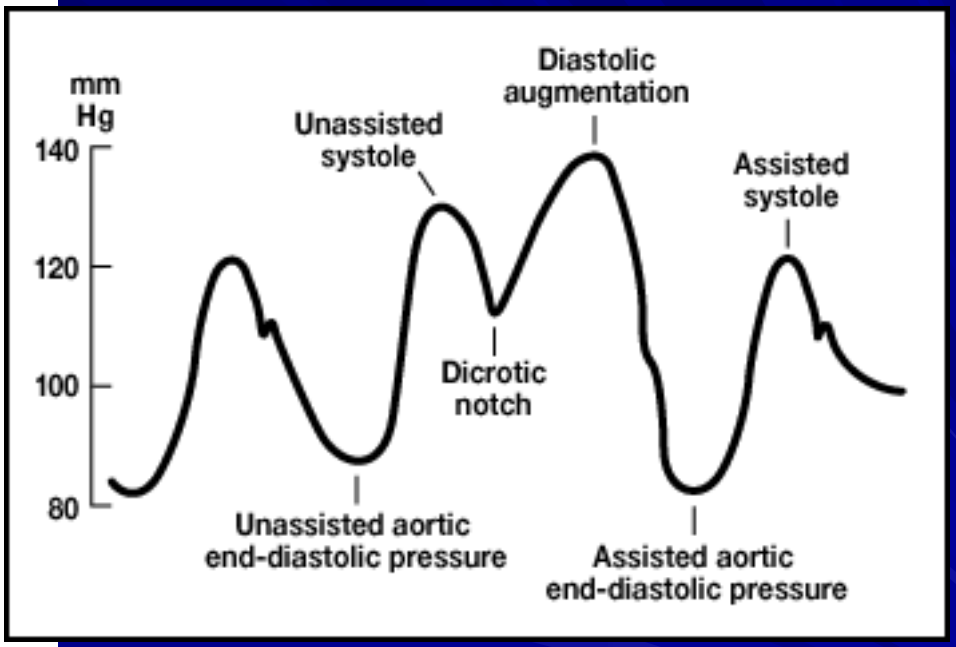
- Monitoring
- Anti-arrhythmic drugs
- Defibrillation
- Pacing

Arrhythmia	PRE-CCU No.	PRE-CCU No. Deaths	PRE-CCU Mortality, %	POST-CCU No.	POST-CCU No. Deaths	POST-CCU Mortality, %
2° A-V Block	6	4	66.7	4	0	0
Atrial flutter	2	1	50.0	4	0	0
Sinus bradycardia	12	0	0	16	1	6.2
Atrial fibrillation	10	6	60.0	8	1	12.5
1° A-V Block	11	2	18.2	12	2	16.7
S V tachycardia	6	4	66.7	7	3	42.9
Vent. fibrillation	7	5	71.4	9	4	44.4
Sinus tachycardia	19	10	52.6	26	12	46.2

Bloomfield, CHEST, VOL. 57, MARCH 1970

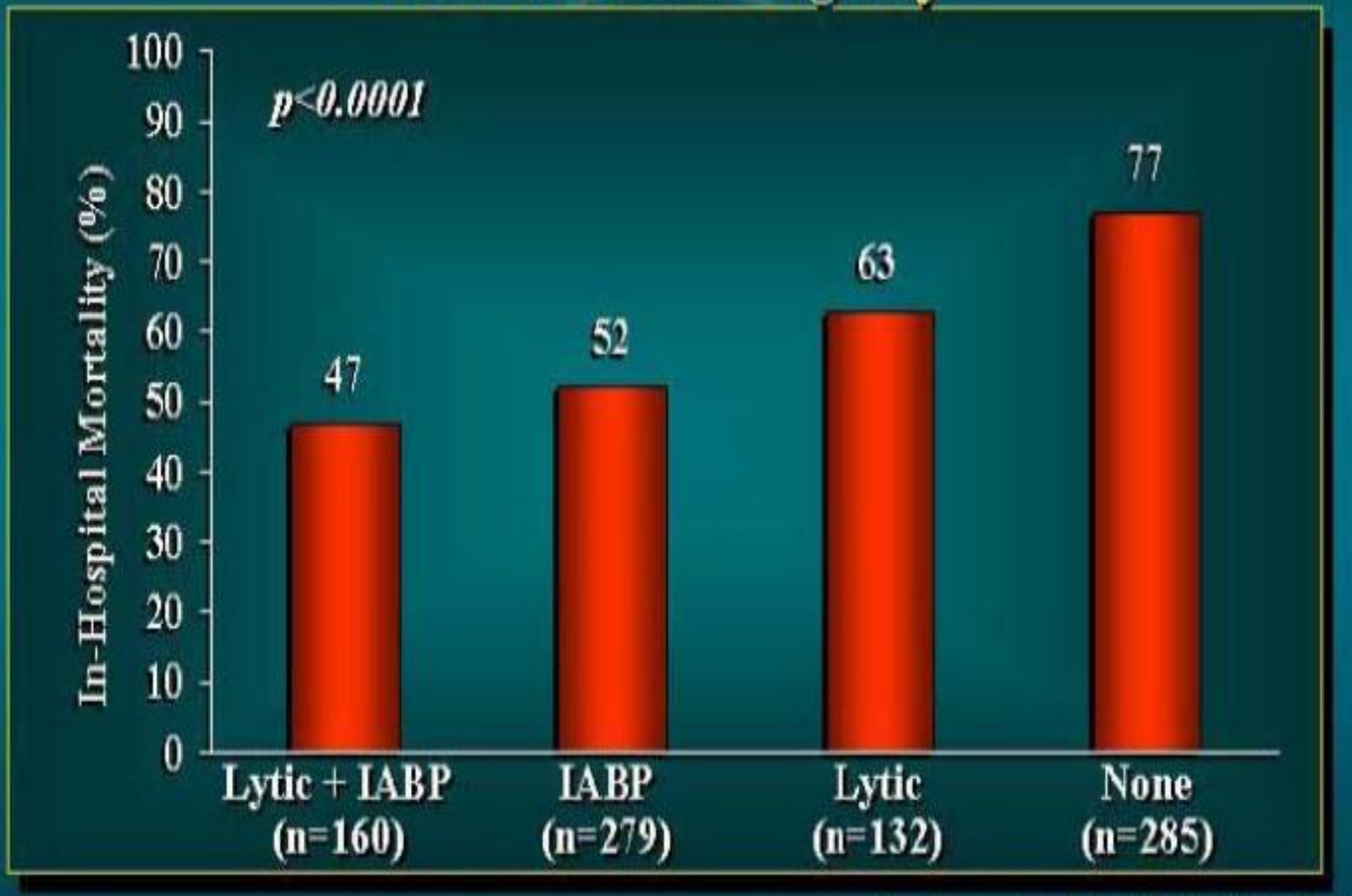
IABP





First implantation in 1967 by Dr. Kantrowitz

SHOCK Trial Registry



Sanborn et al. JACC 2000;36:1123

Thrombolythic era

ОРИГИНАЛЬНЫЕ СТАТЬИ

УДК 616.127-005.8-036.11-085.273.55-032:611.132.2

Е. И. Чазов, Л. С. Матвеева, А. В. Мазаев, К. Е. Саргин, Г. В. Садовская, М. Я. Руда

ВНУТРИКОРОНАРНОЕ ВВЕДЕНИЕ ФИБРИНОЛИЗИНА ПРИ ОСТРОМ ИНФАРКТЕ МИОКАРДА

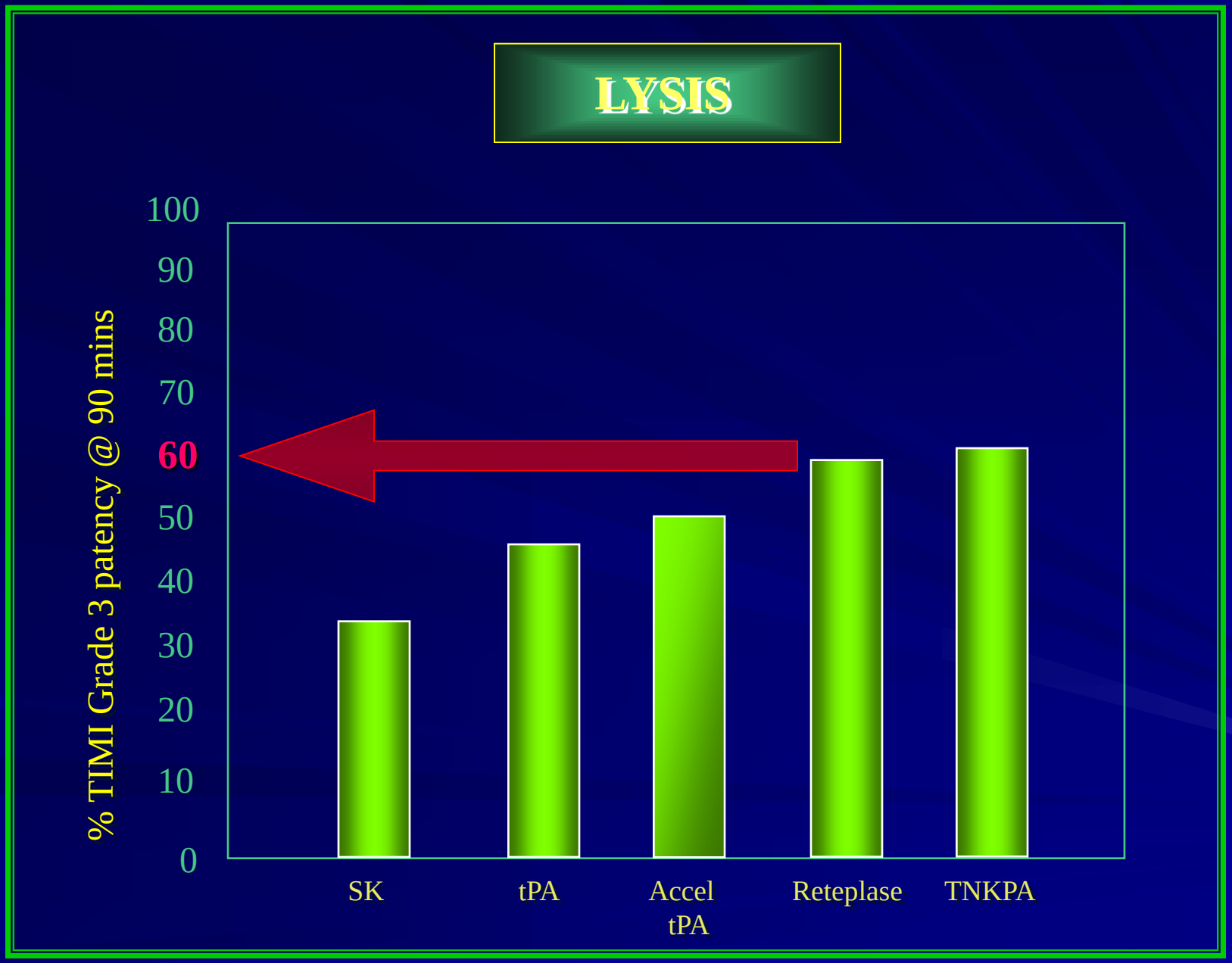
Всесоюзный кардиологический научный центр (дир.— акад. АМН СССР Е. И. Чазов) АМН СССР, Москва

EI Chazov
Ter Arkh vol. 48, 1976

The Pathophysiology of AMI

Ruptured fibrous cap with luminal and intraplaque occlusive thrombus

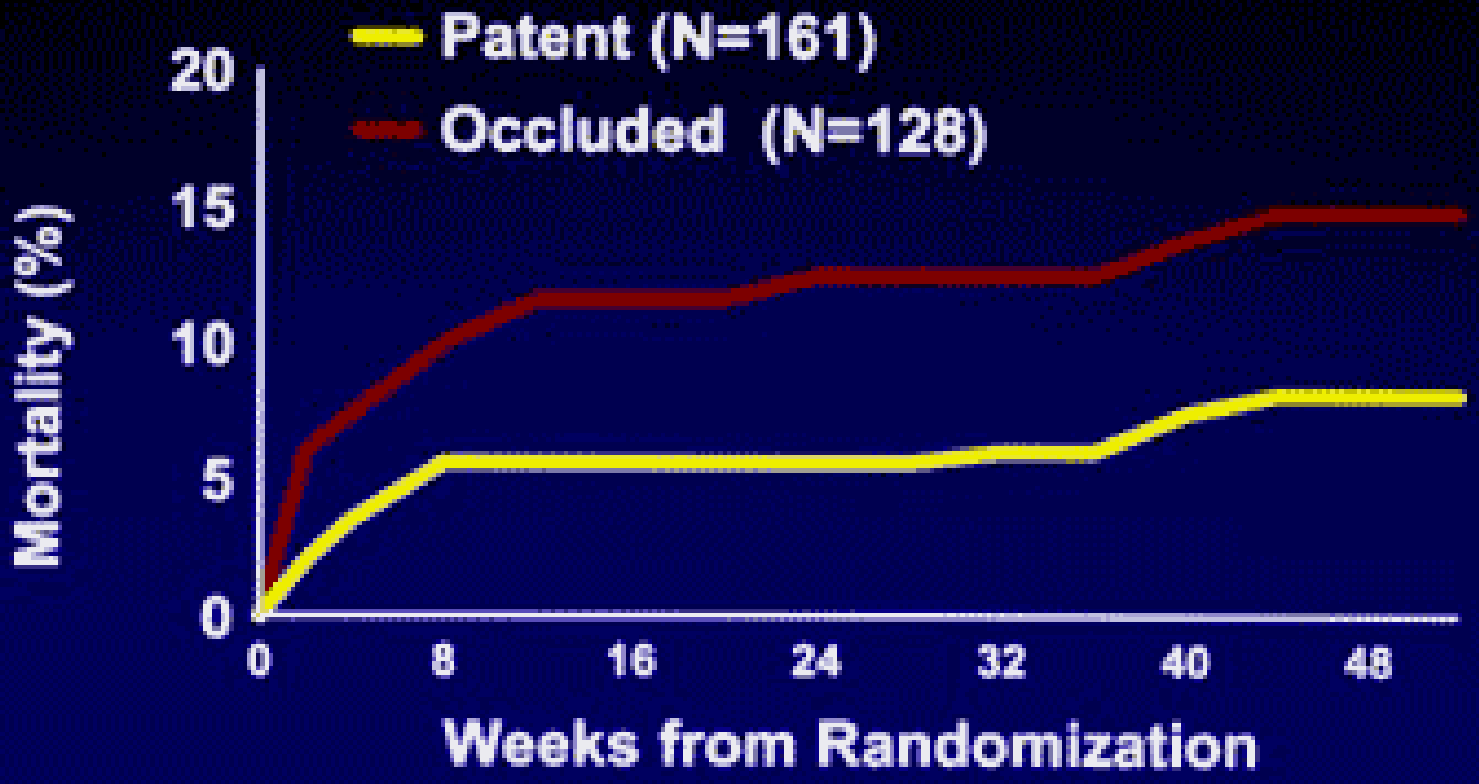
TIMI GRADE 3 FLOW



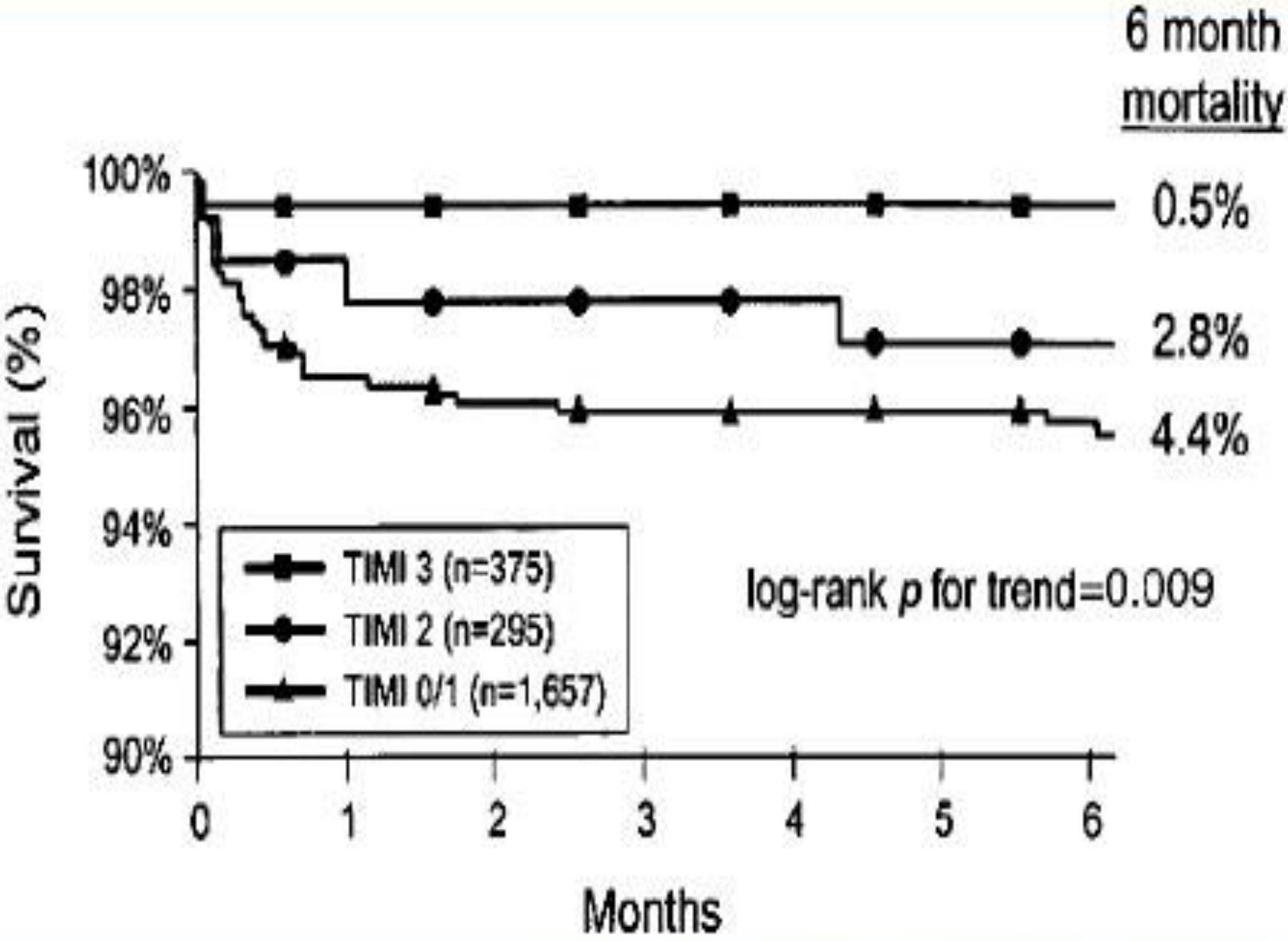
TIMI 1

Open Artery Theory

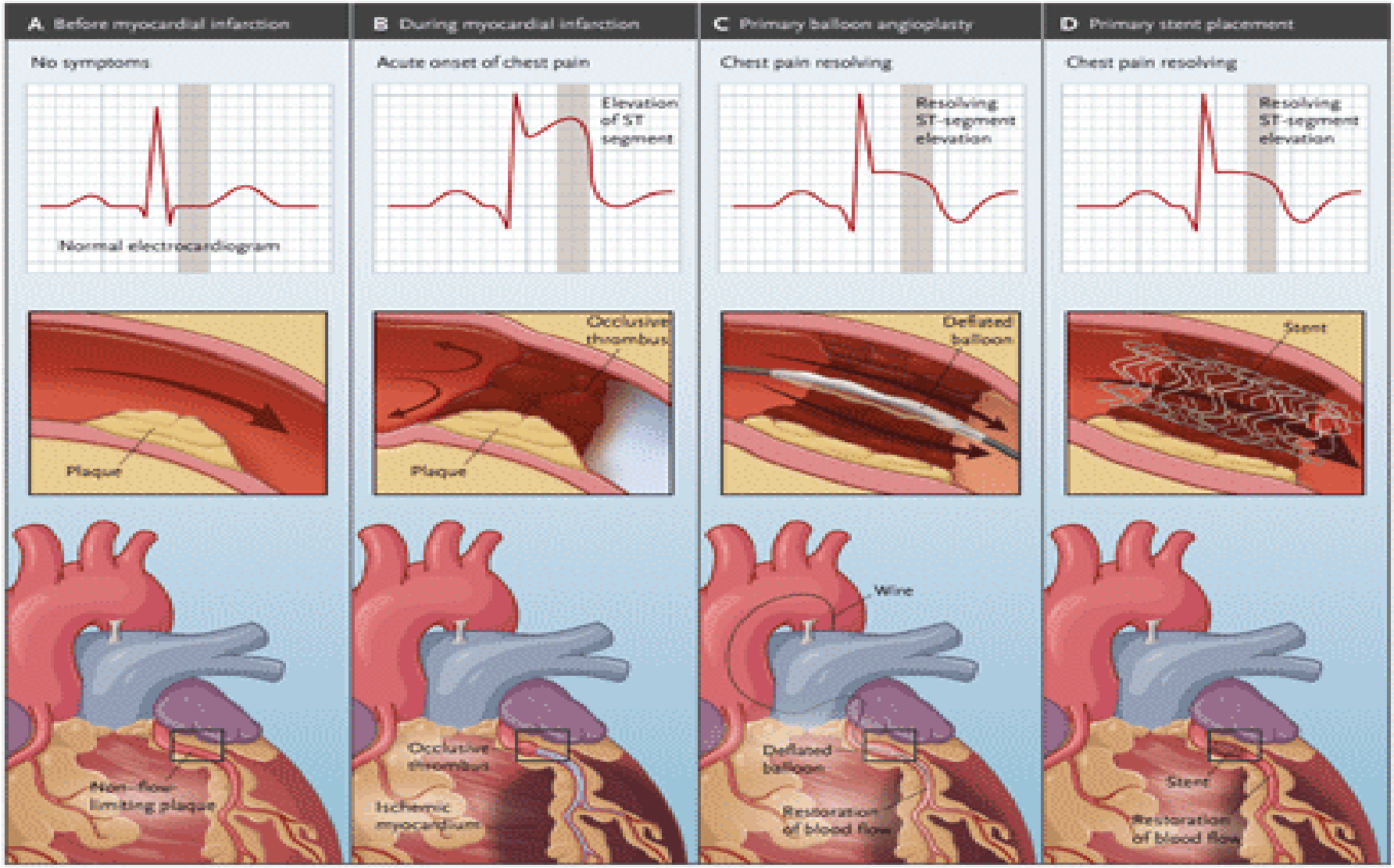
Impact of 90 Minute Patency on Mortality



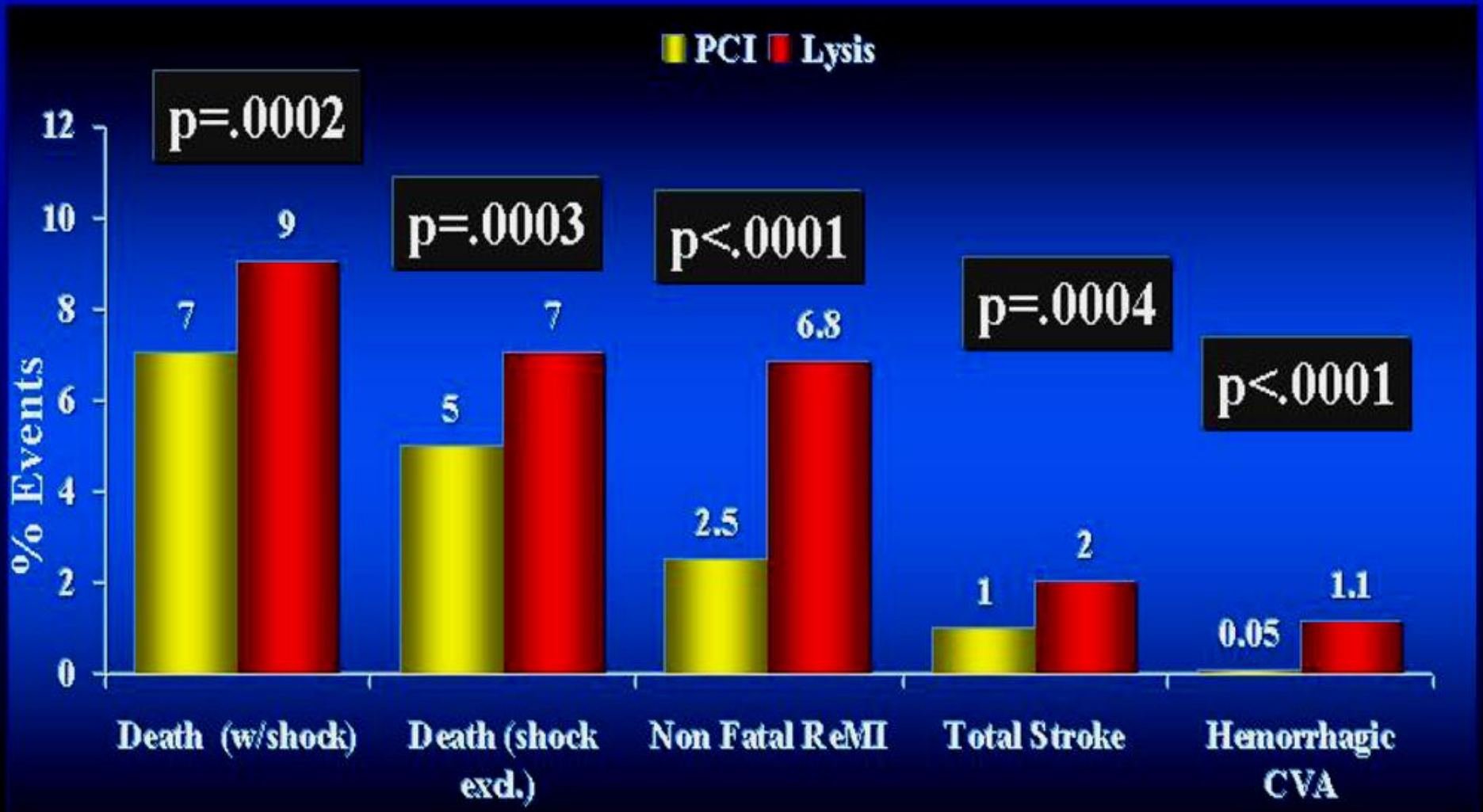
Dalen, et. al. Am J Cardiol 1988; 62:179-85


6 month
mortality
100%
98%
96%
94%
92%
90%
Survival (%)
0.5%
2.8%
4.4%
TIMI 3 (n=375)
TIMI 2 (n=295)
TIMI 0/1 (n=1,657)
log-rank p for trend=0.009
0
1
2
3
4
5
6
Months

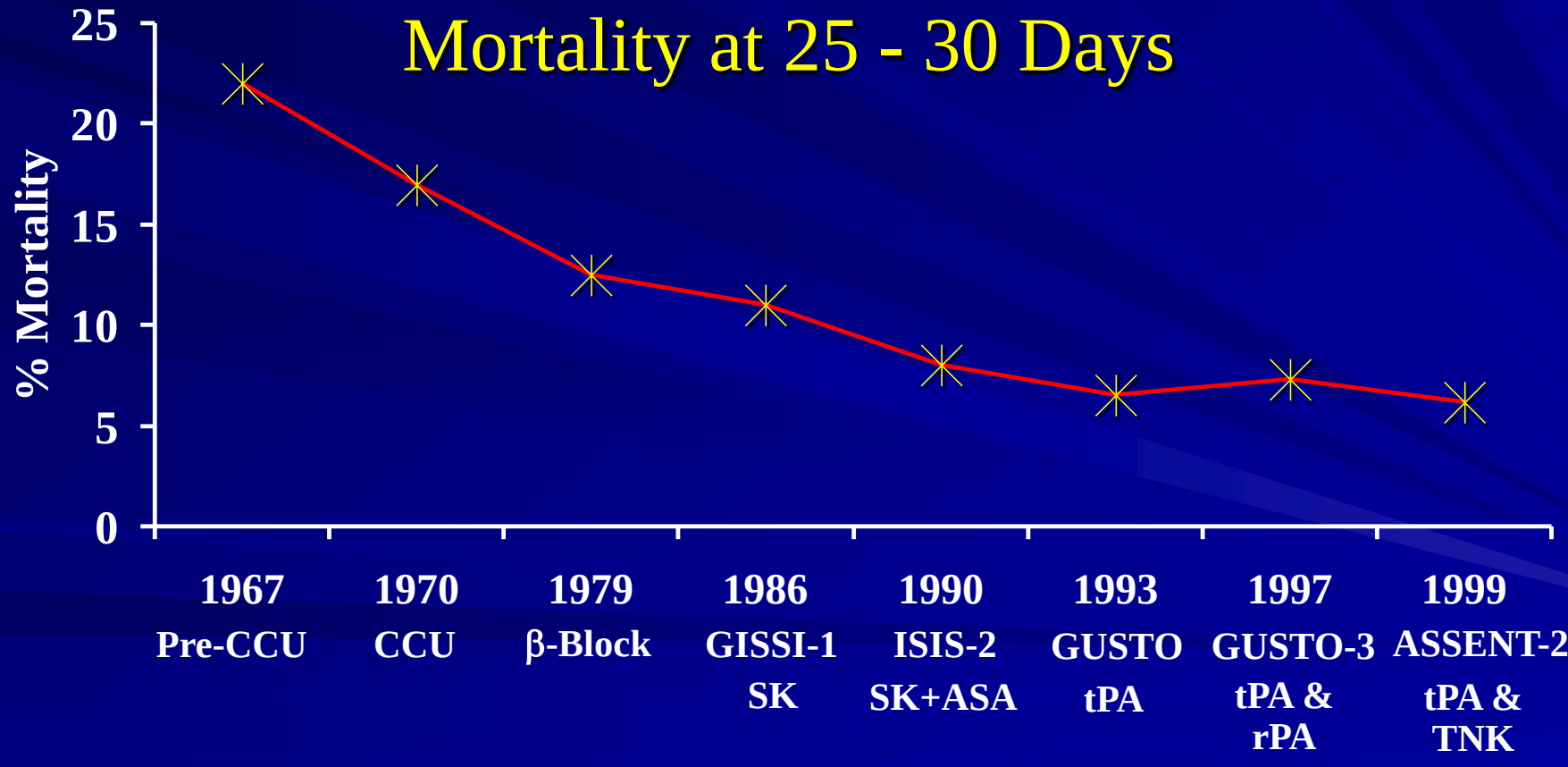
90`s: Primary angioplasty



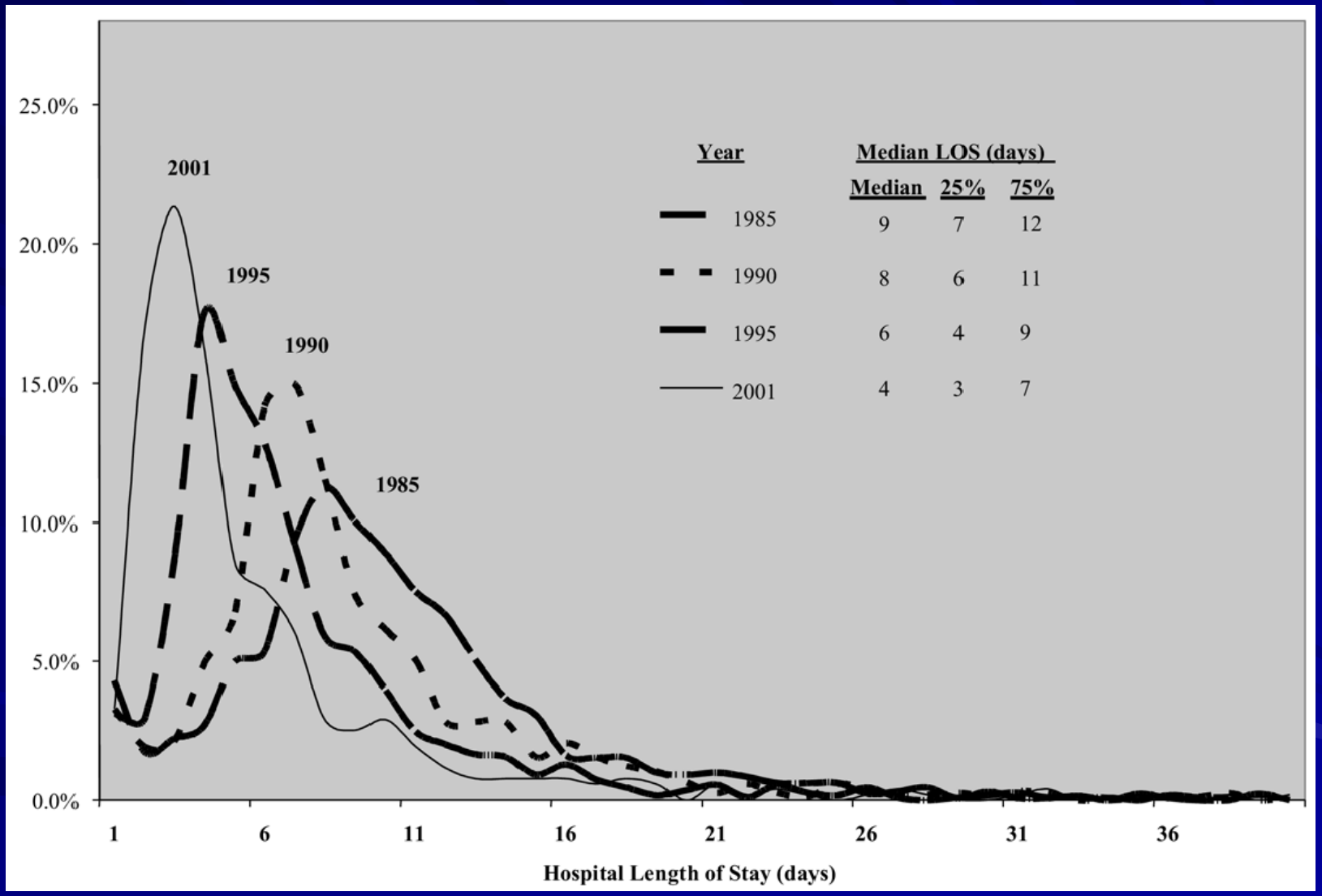
Meta-Analysis of 23 Randomized Trials of PCI vs Lysis (n=7739)



Early Mortality After AMI

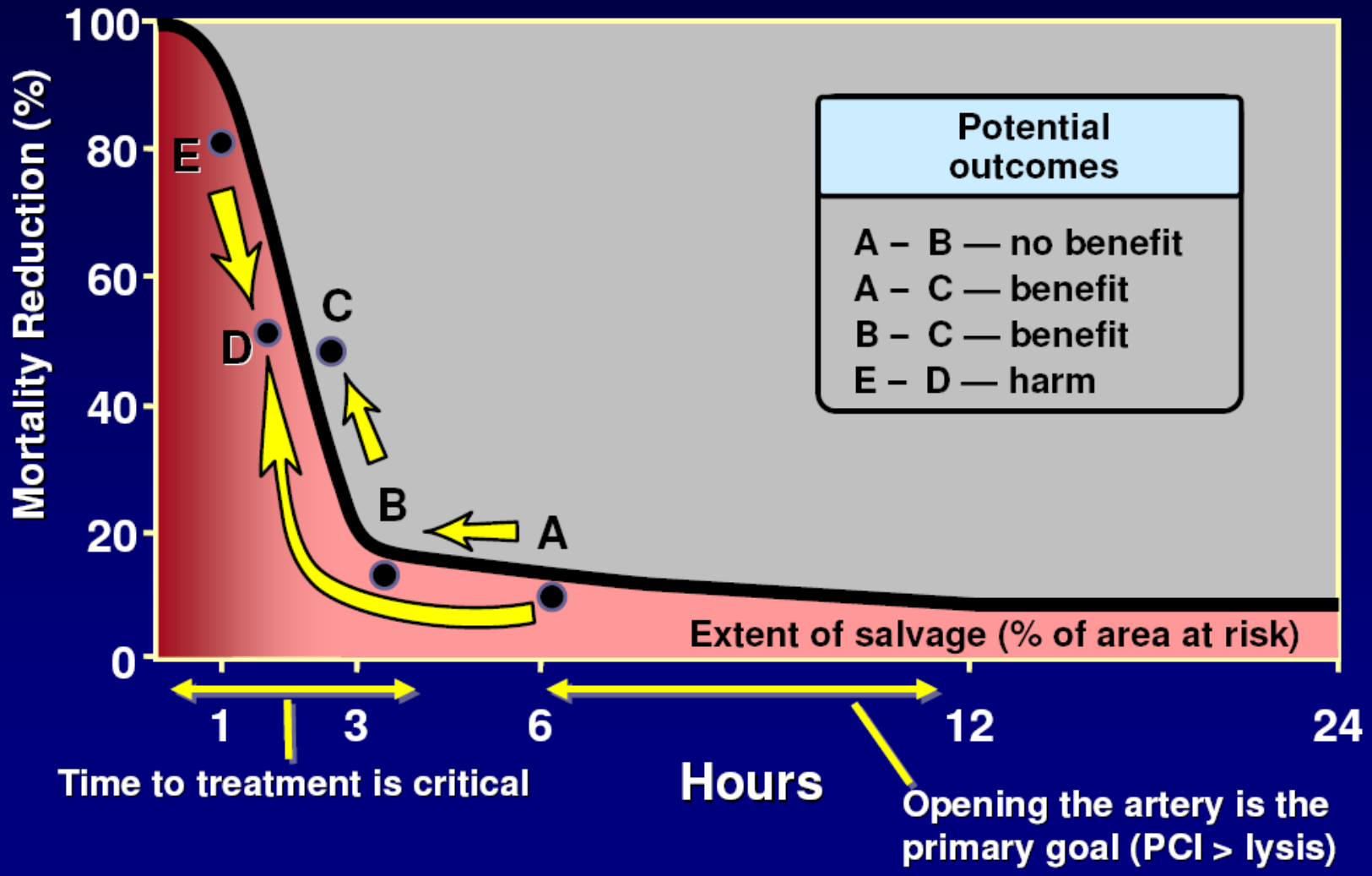


Decreasing in hospital stay



Am J Cardiol 2008;101:428 – 434

Time and Myocardial Salvage



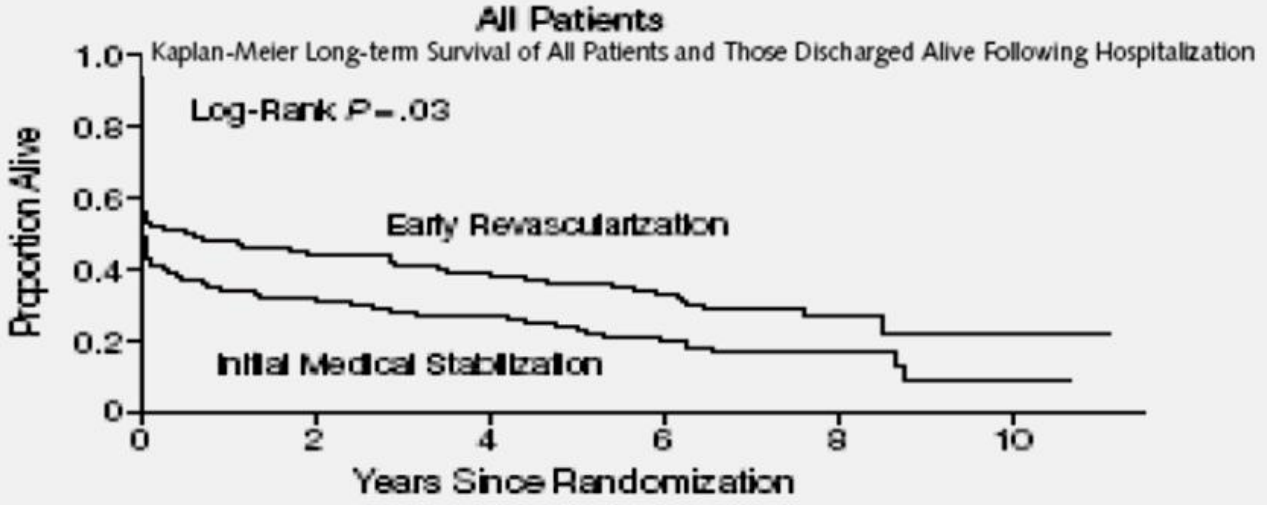
Gersh BJ, et al. *JAMA*. 2005;293:979.

Early Revascularization and Long-term Survival in Cardiogenic Shock Complicating Acute Myocardial Infarction

JAMA, June 7, 2006—Vol 295, No. 21

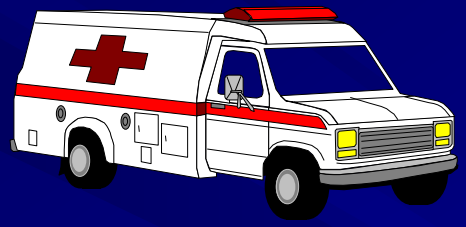
Judith S. Hochman, MD
Lynn A. Sleeper, ScD
John G. Webb, MD
Vladimir Dzavik, MD
Christopher E. Buller, MD
Philip Aylward, MD
Jacques Col, MD
Harvey D. White, DSc
for the SHOCK Investigators

Conclusions In this randomized trial, almost two thirds of hospital survivors with cardiogenic shock who were treated with early revascularization were alive 6 years later. A strategy of early revascularization resulted in a 13.2% absolute and a 67% relative improvement in 6-year survival compared with initial medical stabilization. Early revascularization should be used for patients with acute MI complicated by cardiogenic shock due to left ventricular failure.



Options for Transport of Patients With STEMI and Initial Reperfusion Treatment

Call 118
Call fast



Onset of symptoms of STEMI

118 EMS Dispatch

EMS on-scene

- Encourage 12-lead ECGs.
- Consider prehospital fibrinolytic if capable and EMS-to-needle within 30 min.

EMS Triage Plan

Hospital fibrinolysis: Door-to-Needle within 30 min.

Not PCI capable

Inter-Hospital Transfer

PCI capable

GOALS

5 min. | 8 min. | EMS Transport

Patient

EMS

Dispatch
1 min.

Prehospital fibrinolysis
EMS-to-needle within 30 min.

EMS transport
EMS-to-balloon within 90 min.

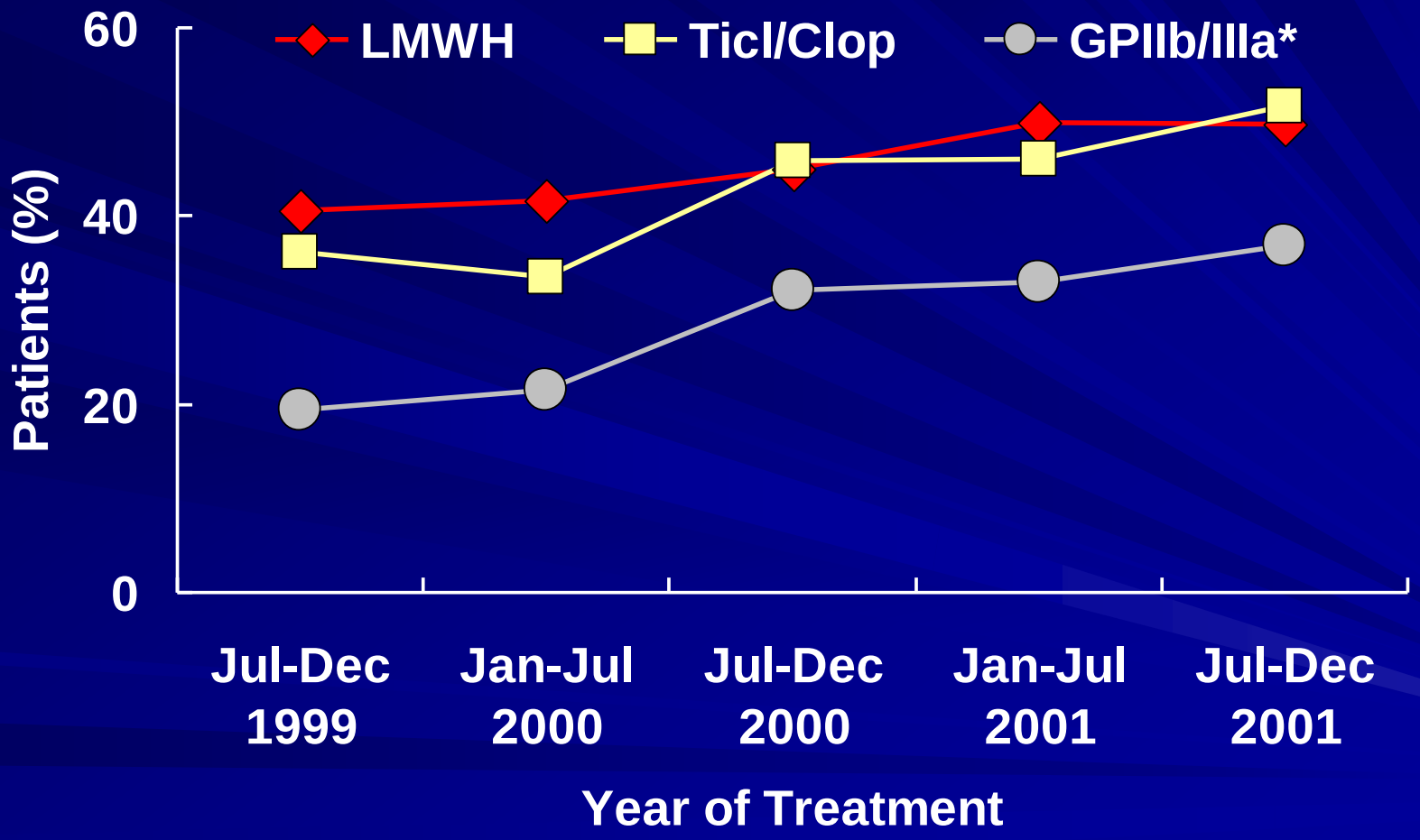
Patient self-transport
Hospital door-to-balloon within 90 min.

Golden Hour = first 60 min.

Total ischemic time: within 120 min.

Antman EM, et al. *J Am Coll Cardiol 2008.* Published ahead of print on December 10, 2007. Available at http://content.onlinejacc.org/cgi/content/full/j.jacc.2007.10.001. Figure 1.

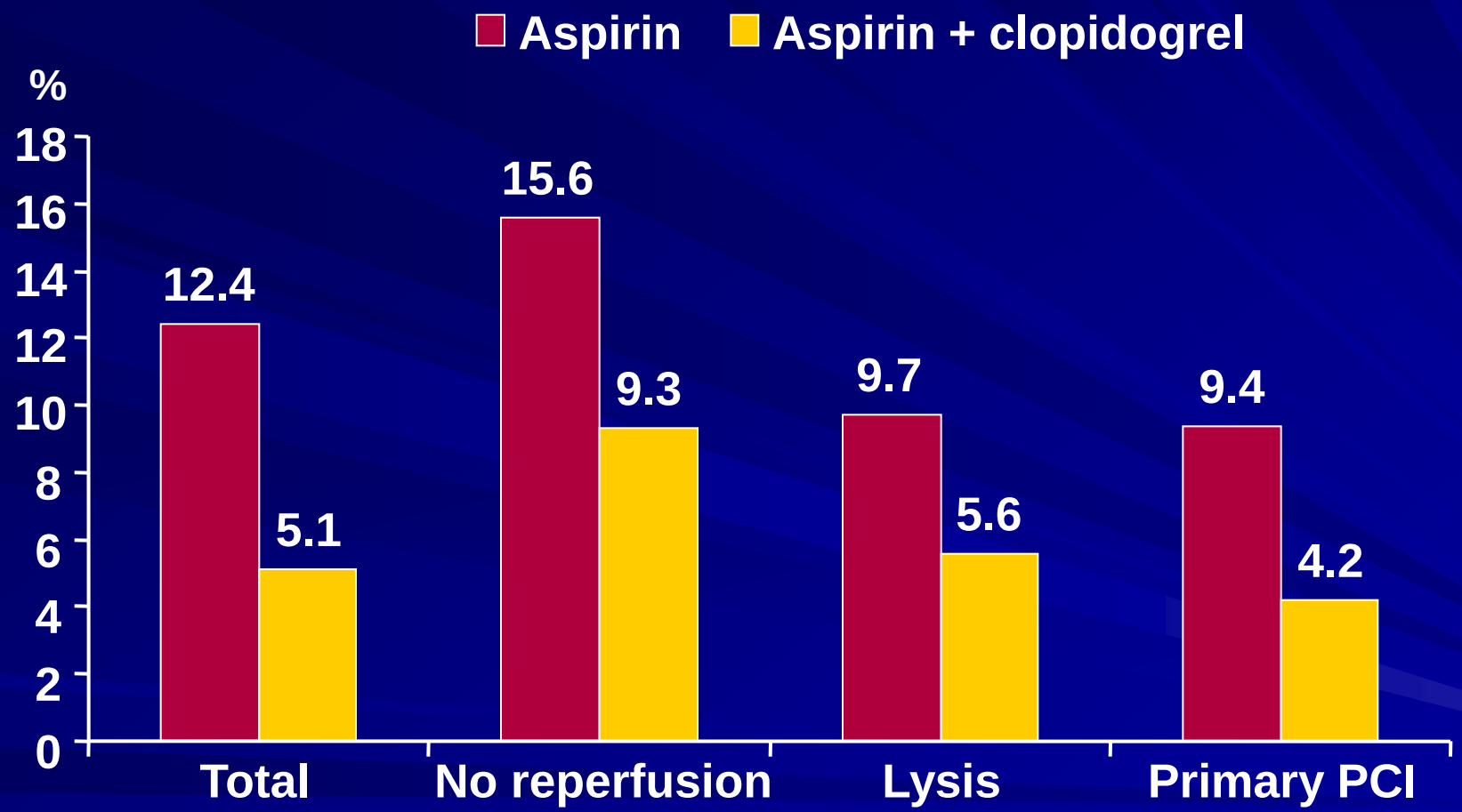
Temporal Trends STEMI: In-hospital Therapies



*without PCI

Fox KAA et al. Eur Heart J 2003;24:1414-24.

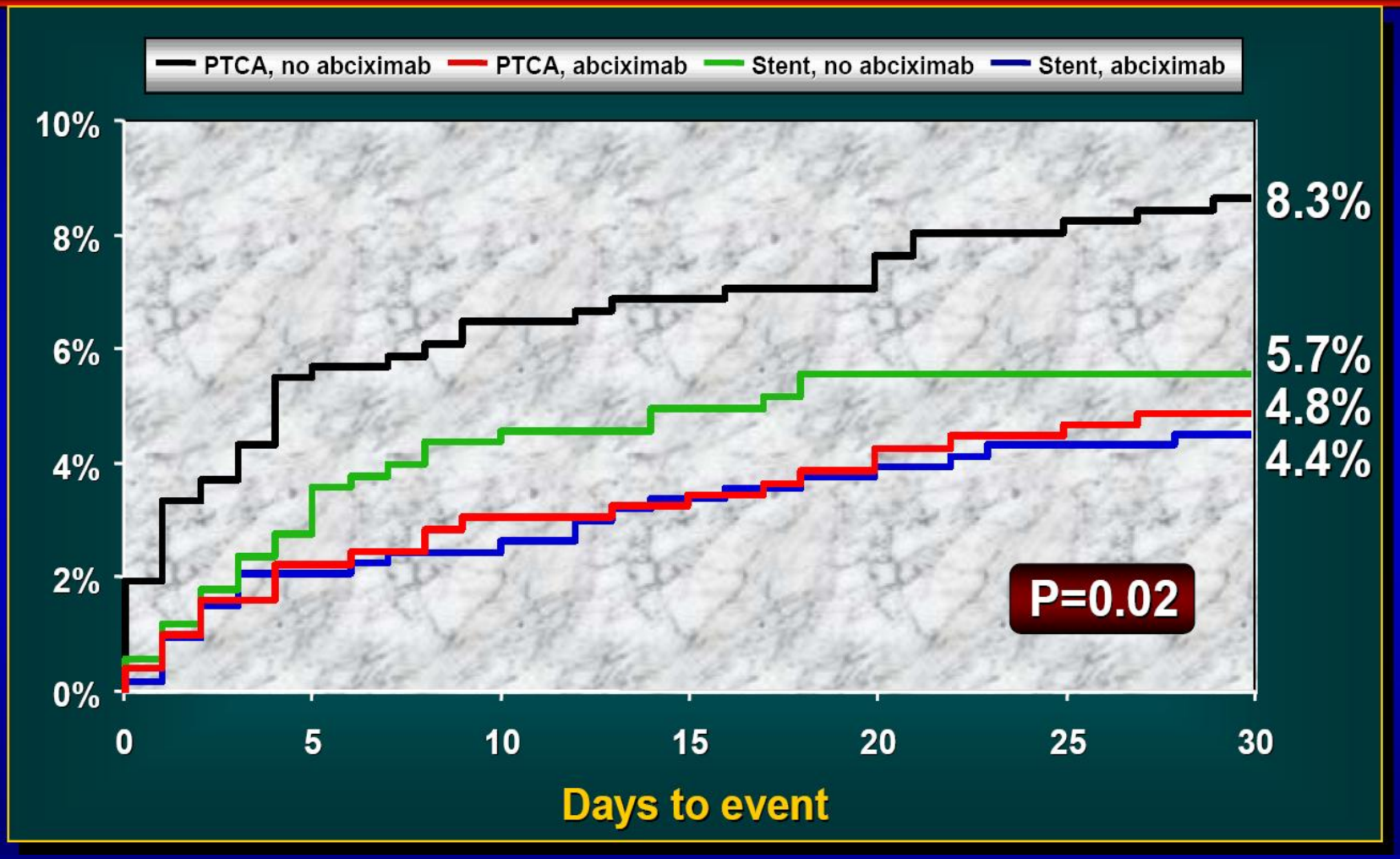
Impact of early clopidogrel therapy on in-hospital mortality in STEMI in the ACOS Registry



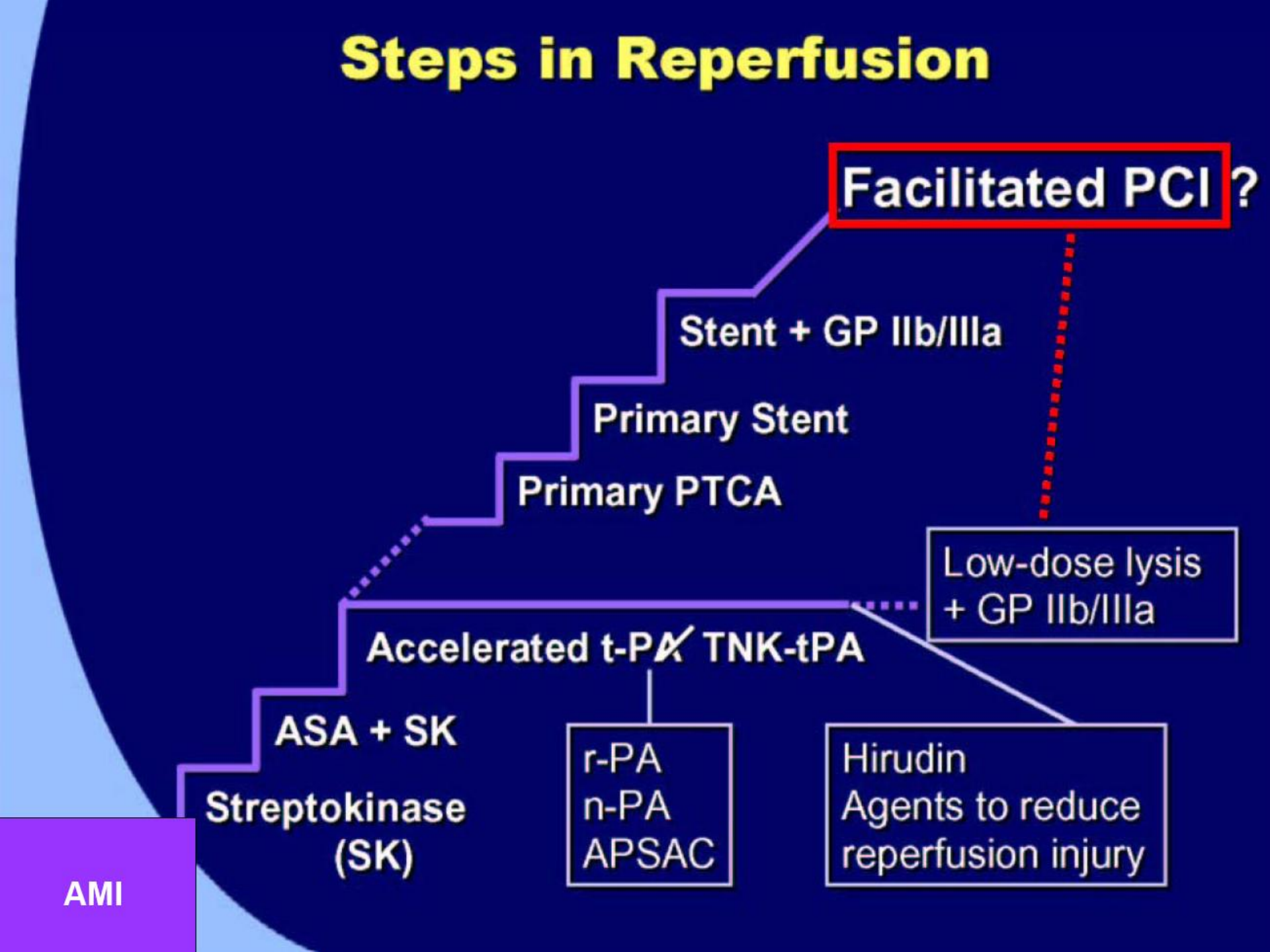
PCI, percutaneous coronary intervention; STEMI, ST-elevated myocardial infarction.

Zeymer U *et al. Eur Heart J* 2006;27:2661–6.

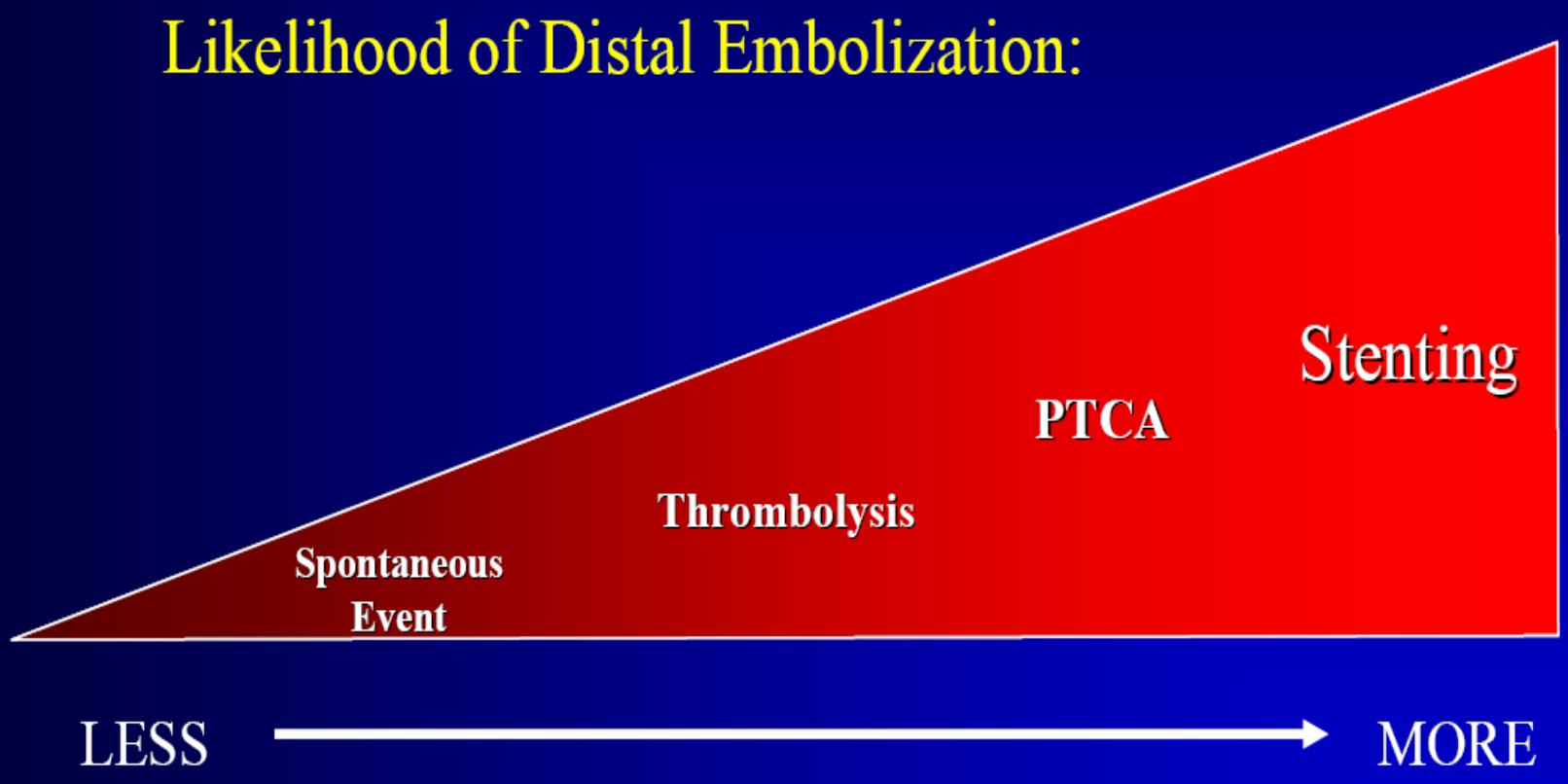
CADILLAC: 30-Day MACE



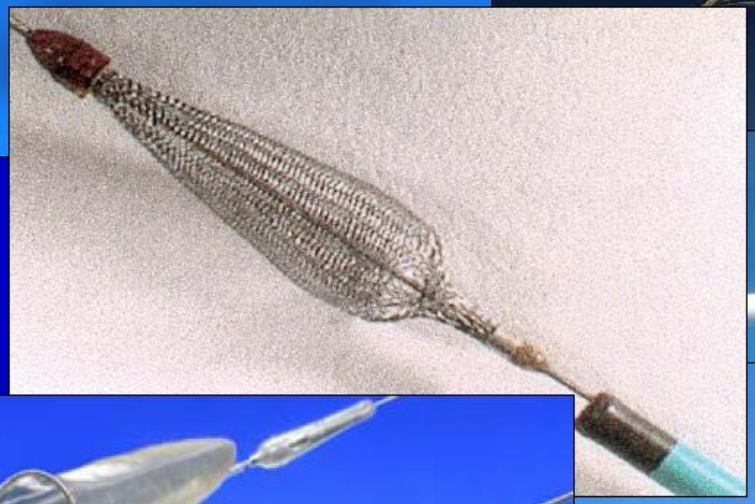
Steps in Reperfusion

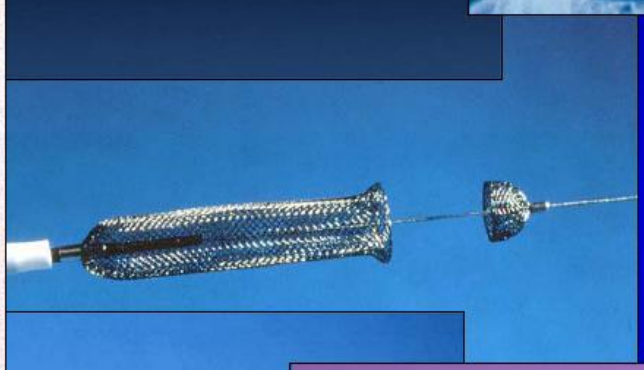


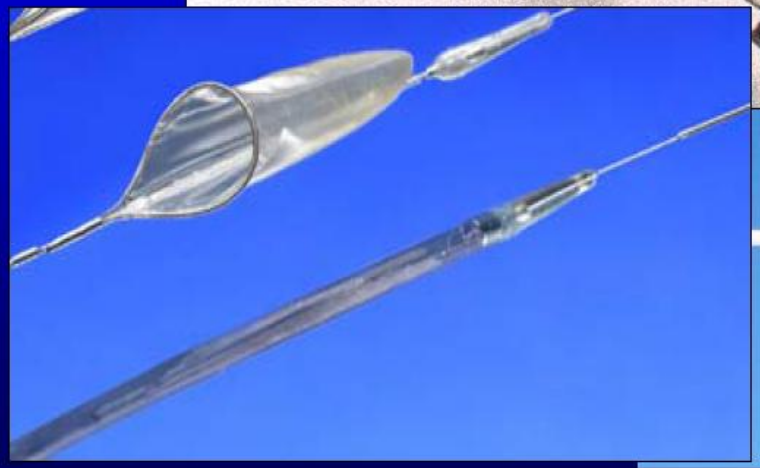
From " Open Artery Theory" to "Myocardial Protection Theory"

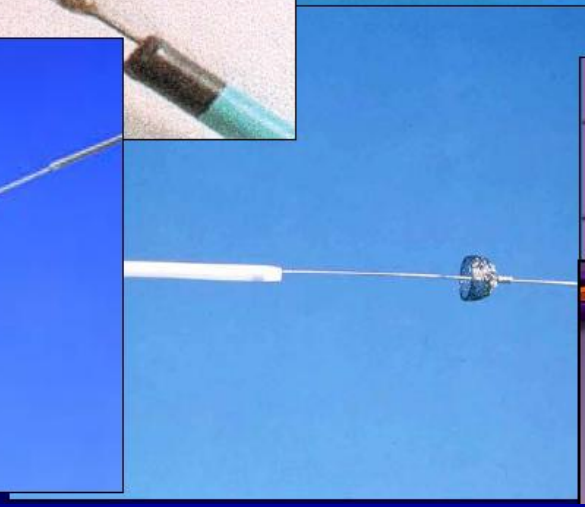


Filters and Thrombectomy devices

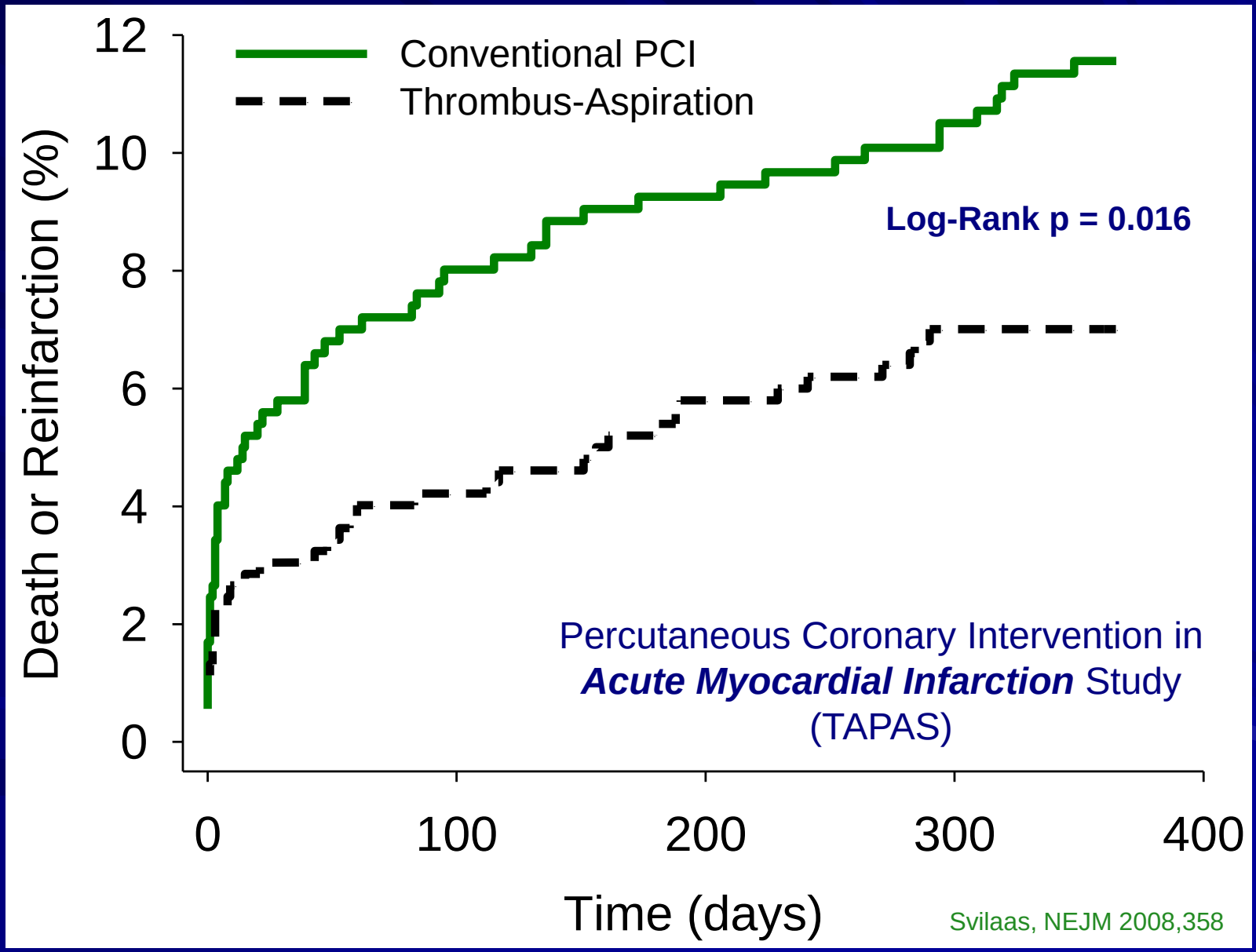








Mortality or non-fatal ReMI at 1 year

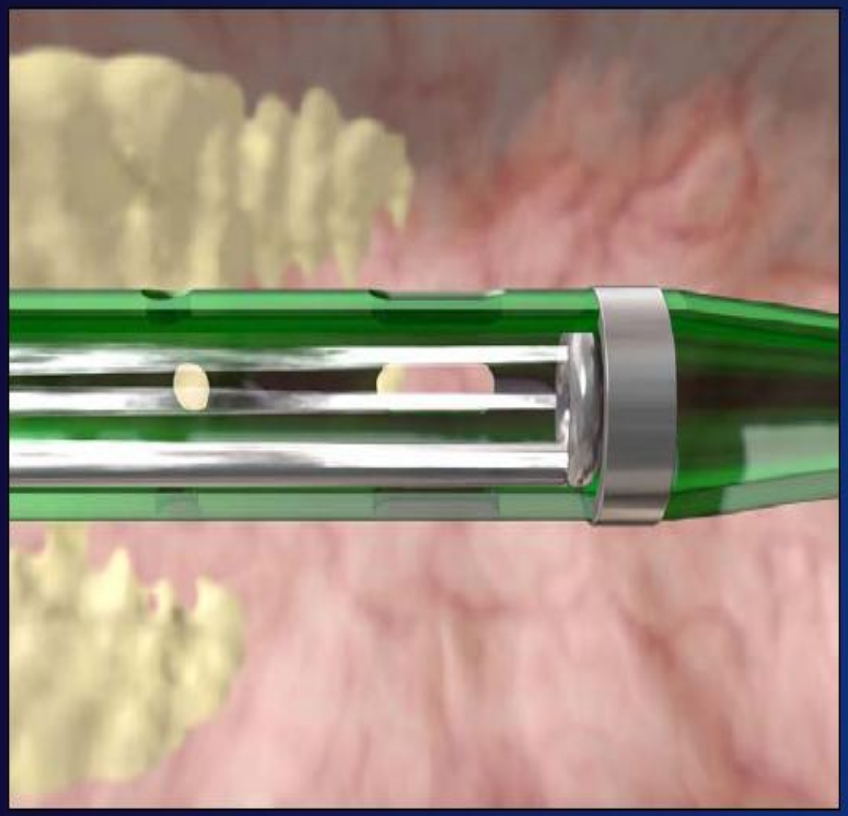


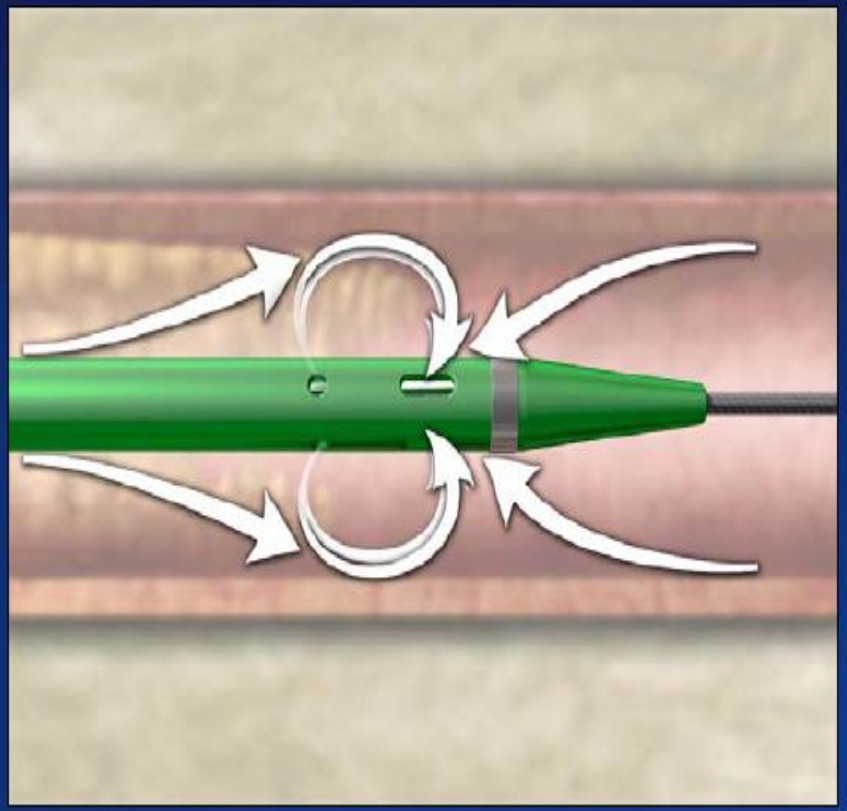
Svilaas, NEJM 2008,358

AngioJet Mechanism of Action

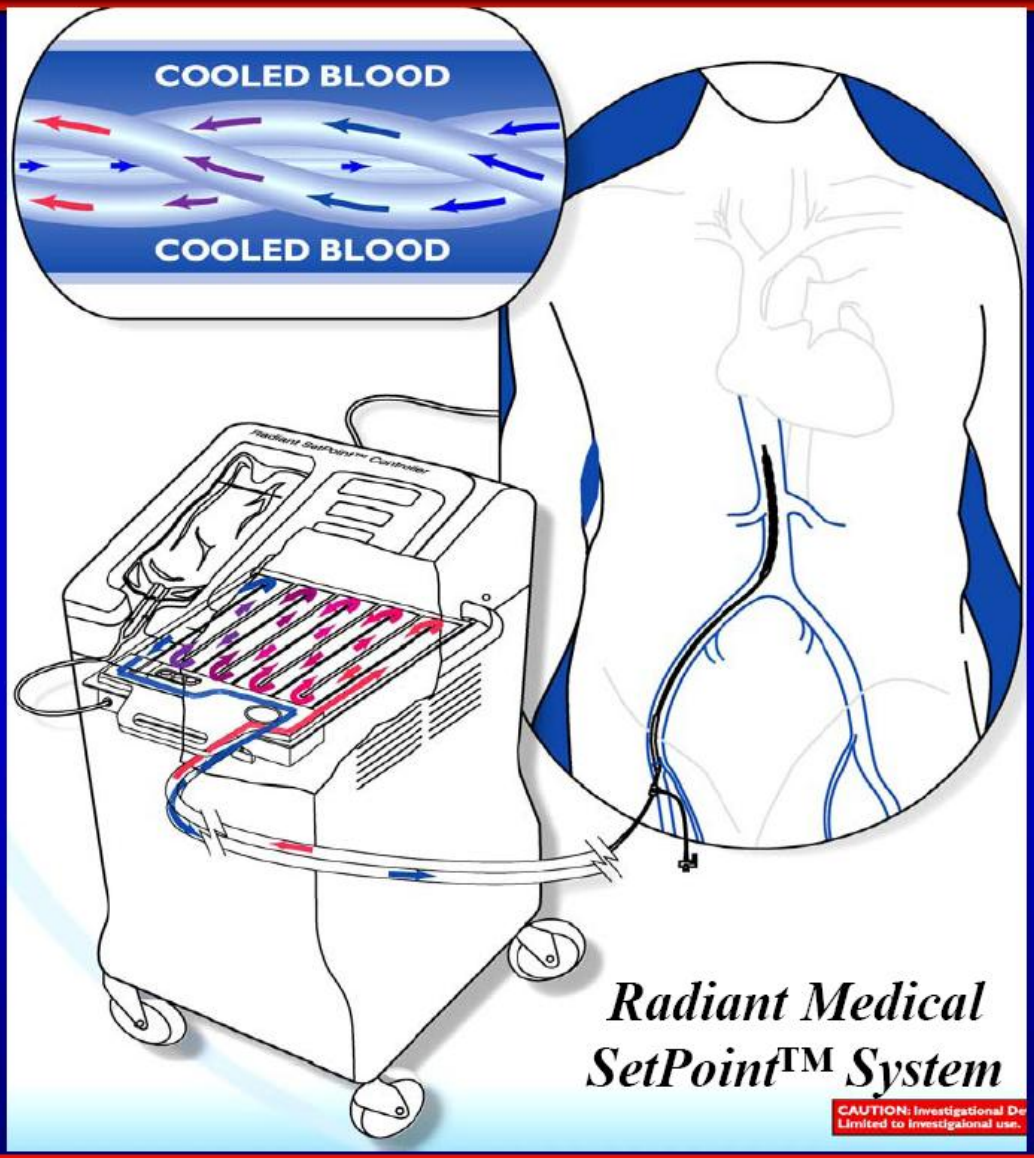
The Bernoulli Principle explains the relationship between velocity and pressure.

Where the velocity is highest, pressure is lowest--creating a vacuum.





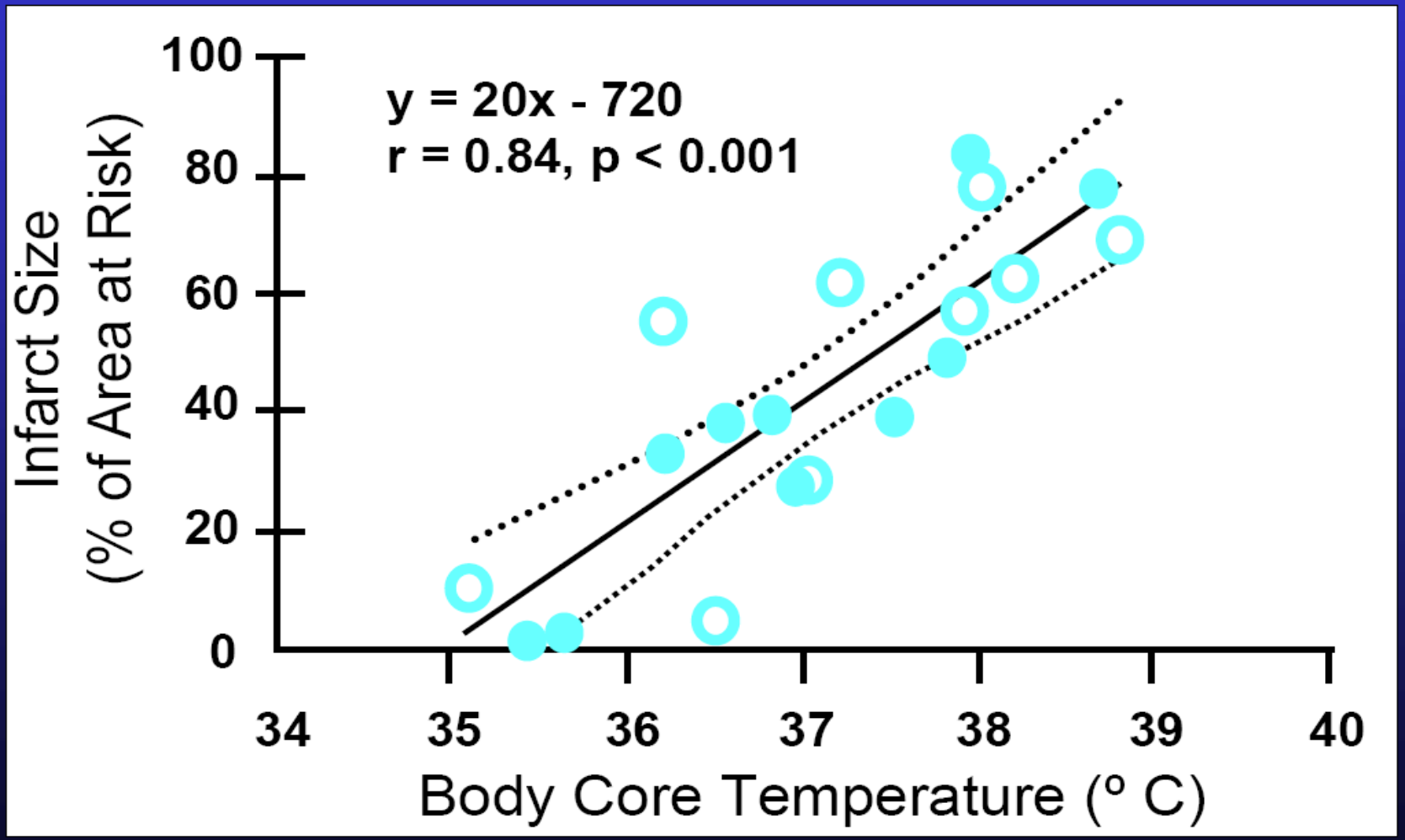
Radiant: Endovascular Heat Exchange



Normothermia (38°C)

Hypothermia (34°C)

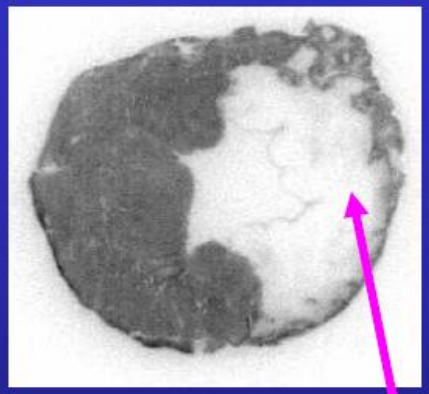
Pre-Clinical Research
Temperature & Infarct Size*



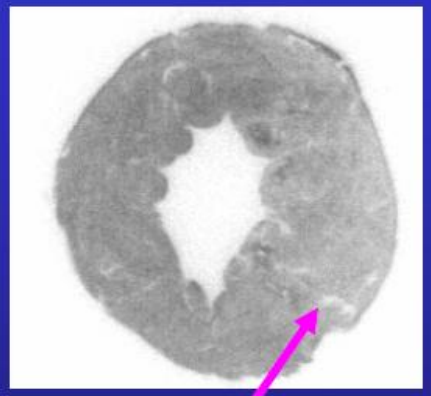
* Am J Physiol Heart Circ. Physiol 1996; 270: H1189-99

Pre-Clinical Research – Endovascular Cooling in MI* Area at Risk & Infarct Size

Sestamibi

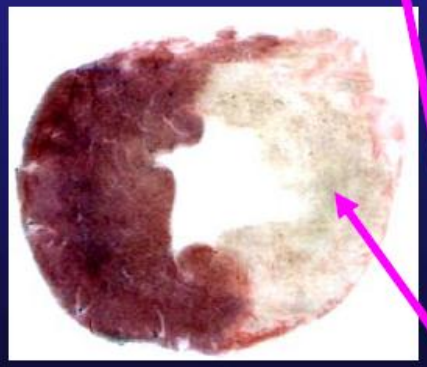


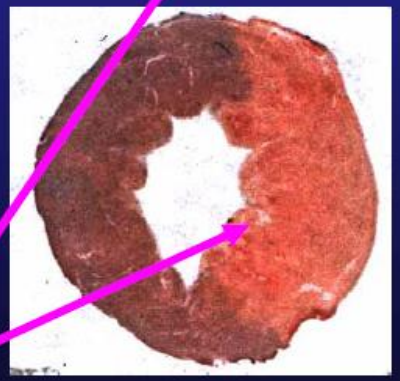
Normothermia



Hypothermia

AAR/TTC





White area = infarcted tissue

* Am J Physiol Heart Circ. Physiol 2002; 285: H1584-91

Clinical Approach to VAD for patients with AMI-Shock

Assistenza al circolo

VAD percutanei

VAD chirurgici

IABP

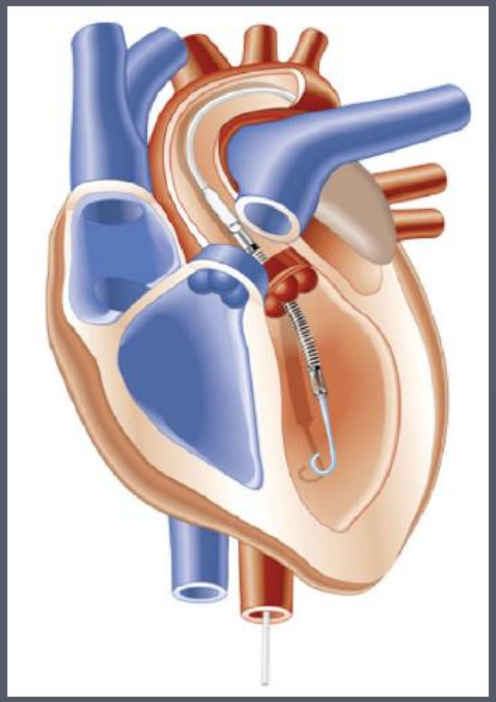
TandemHeart
Impella

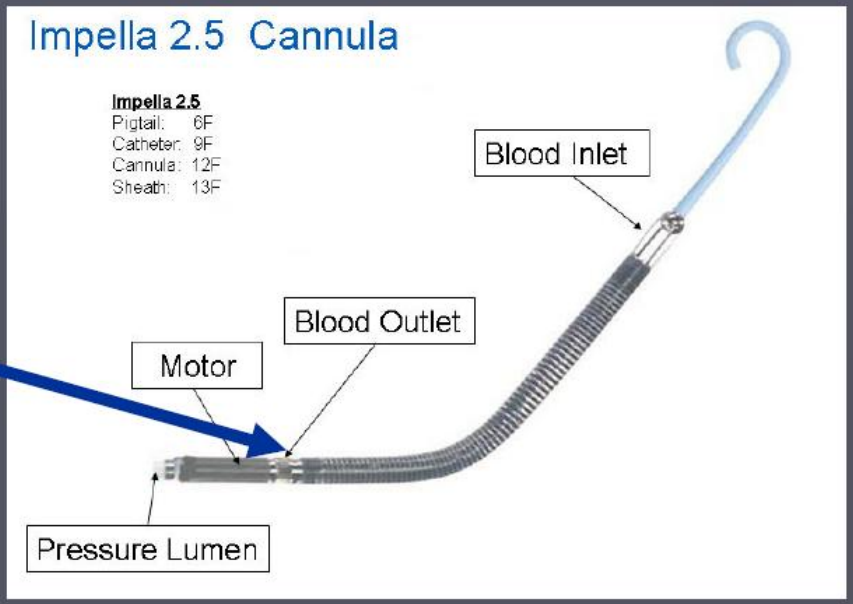
BVS/AB5000

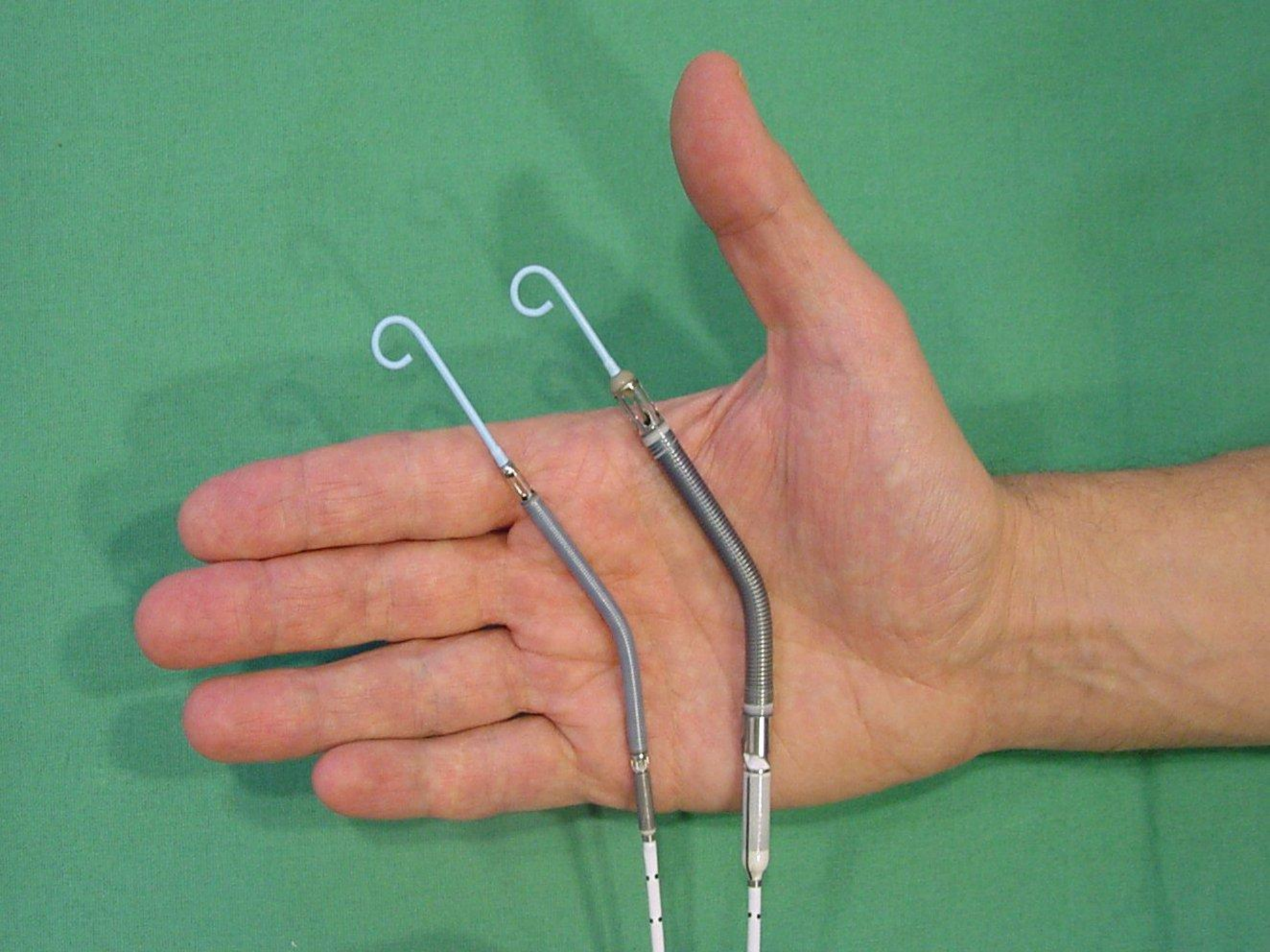
Biomedicus

Impella

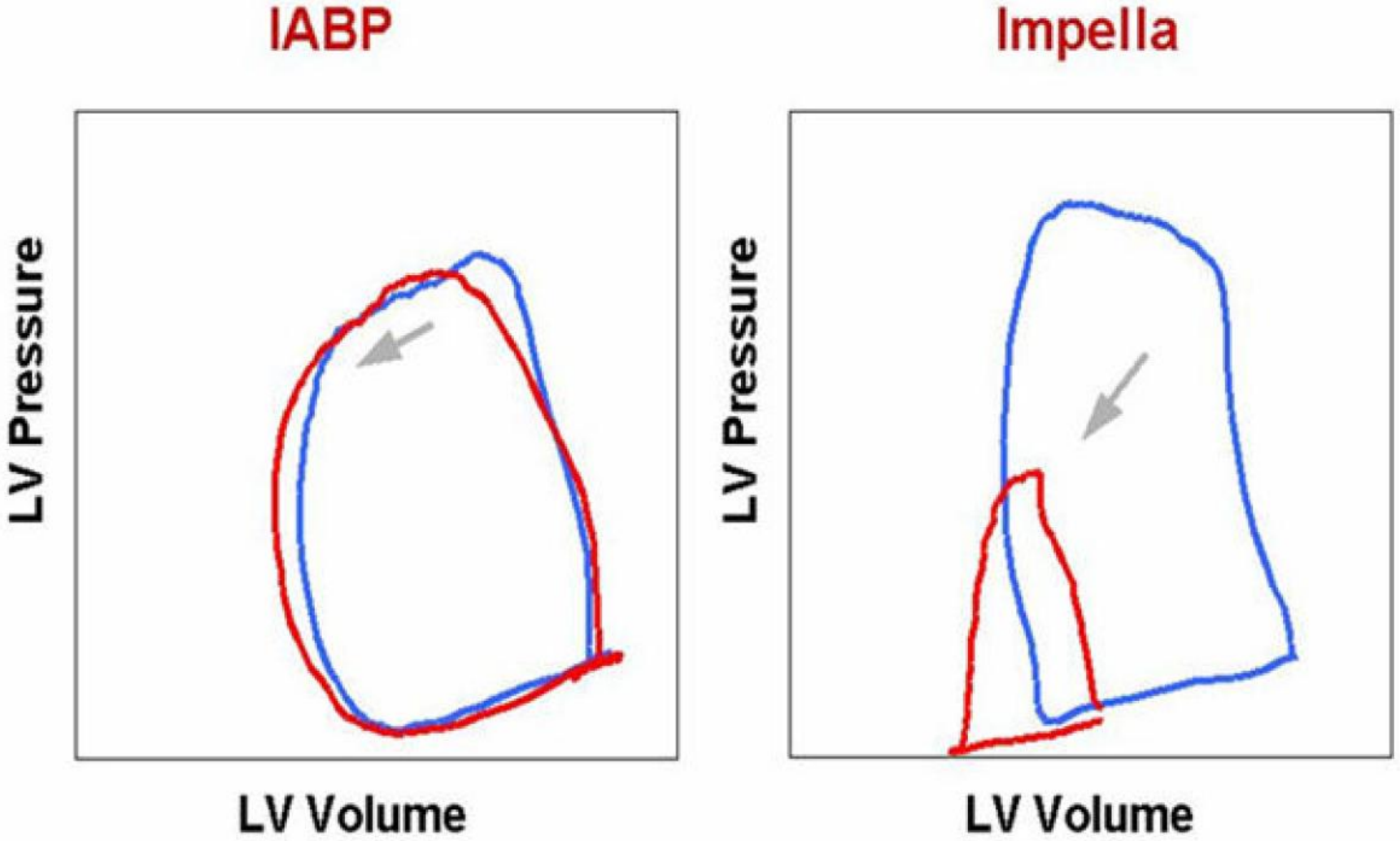
- Impella LP 2.5
  - 13 F sheath (percutaneous)
  - 9 F cannula
  - 2.5 L maximal flow
  - 510K FDA approved for LV support for up to 6 hours
  - Sold by AbioMed
- Impella LP 5.0
  - 21 F
  - Requires surgical implantation
  - 5.0 max flow

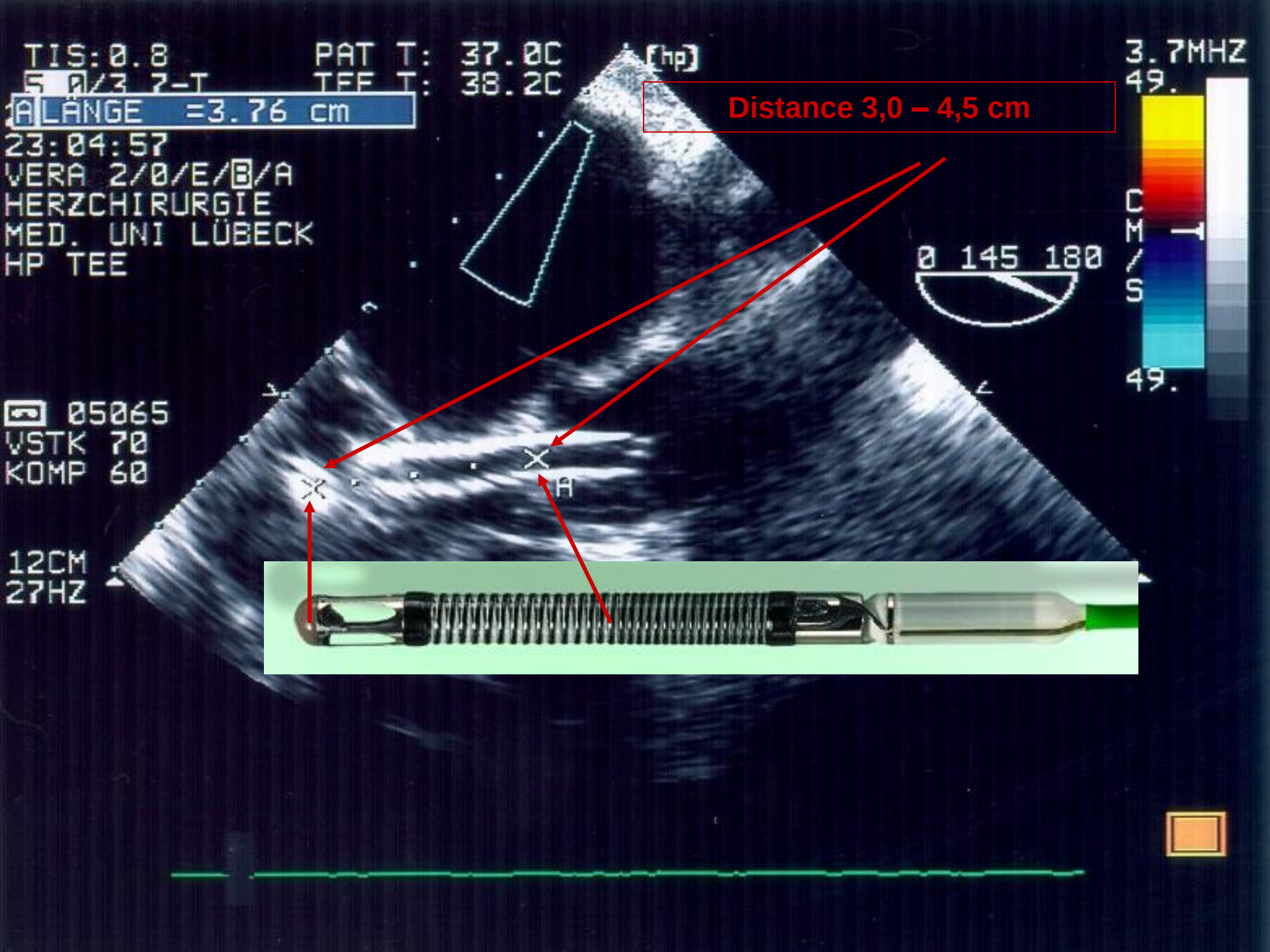


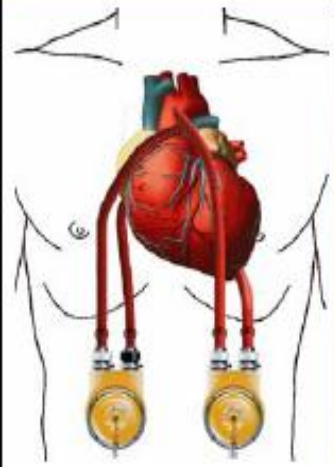




Comparison of IABP to Impella Pump

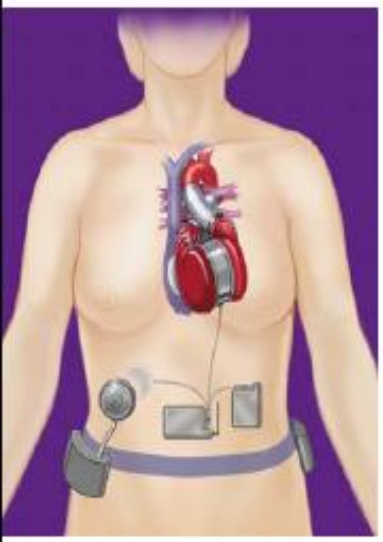
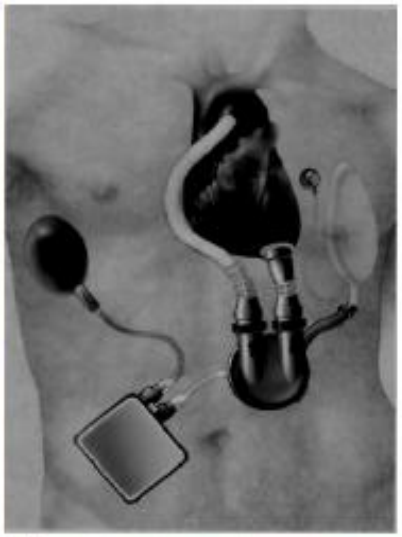



TIS:0.8
PAT T: 37.0C
TFF T: 38.2C
LÄNGE =3.76 cm
23:04:57
VERA 2/0/E/B/A
HERZCHIRURGIE
MED. UNI LÜBECK
HP TEE
05065
WSTK 70
KOMP 60
12CM
27HZ
3.7MHZ
49.
CM/S
49.
0 145 180
Distance 3,0 – 4,5 cm









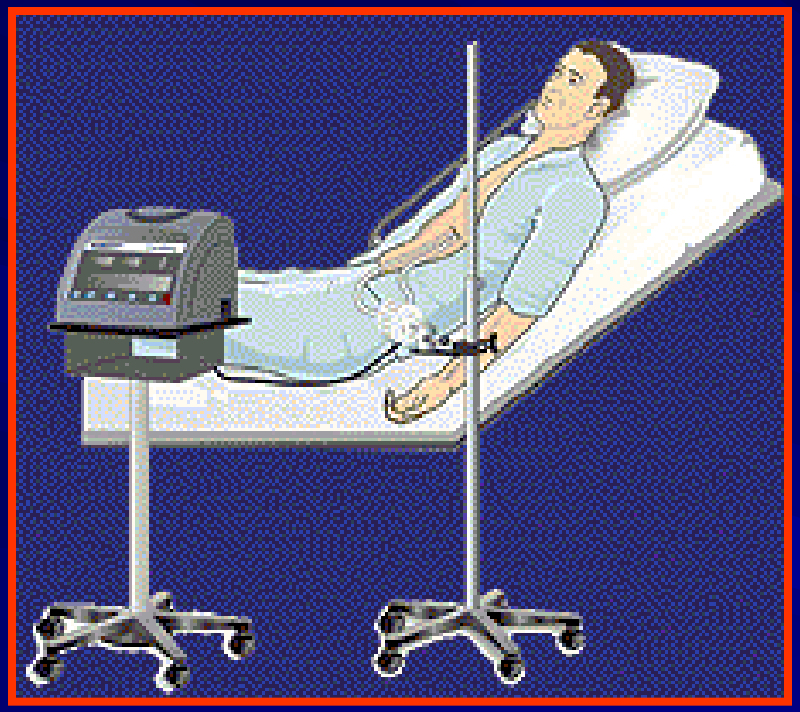


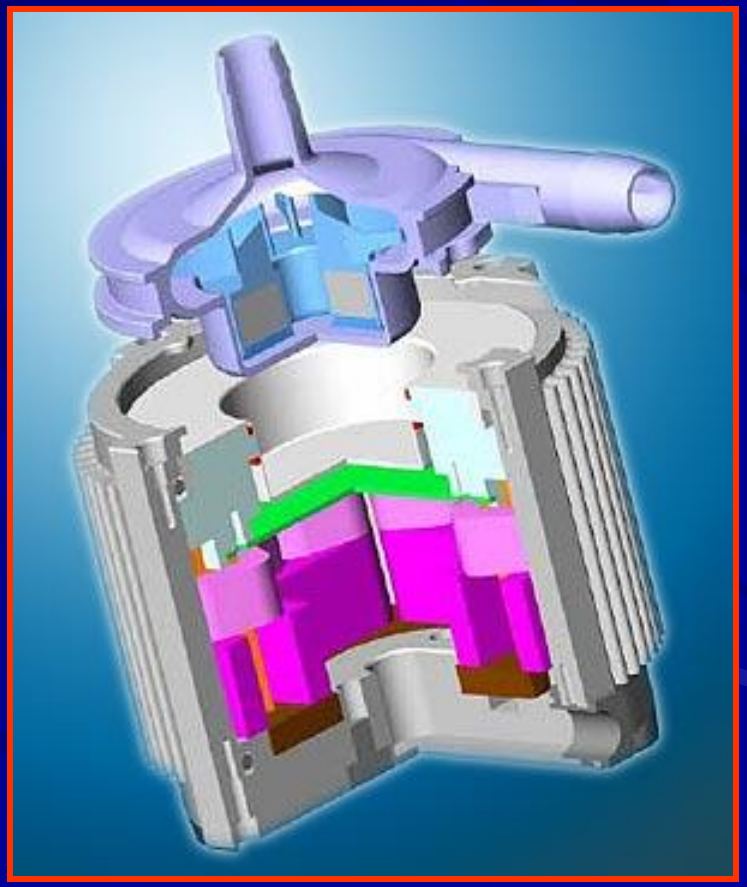


ECMO

(extra-corporeal membrane oxygenator)

Levitronix





Long Term VAD

VAD paracorporei

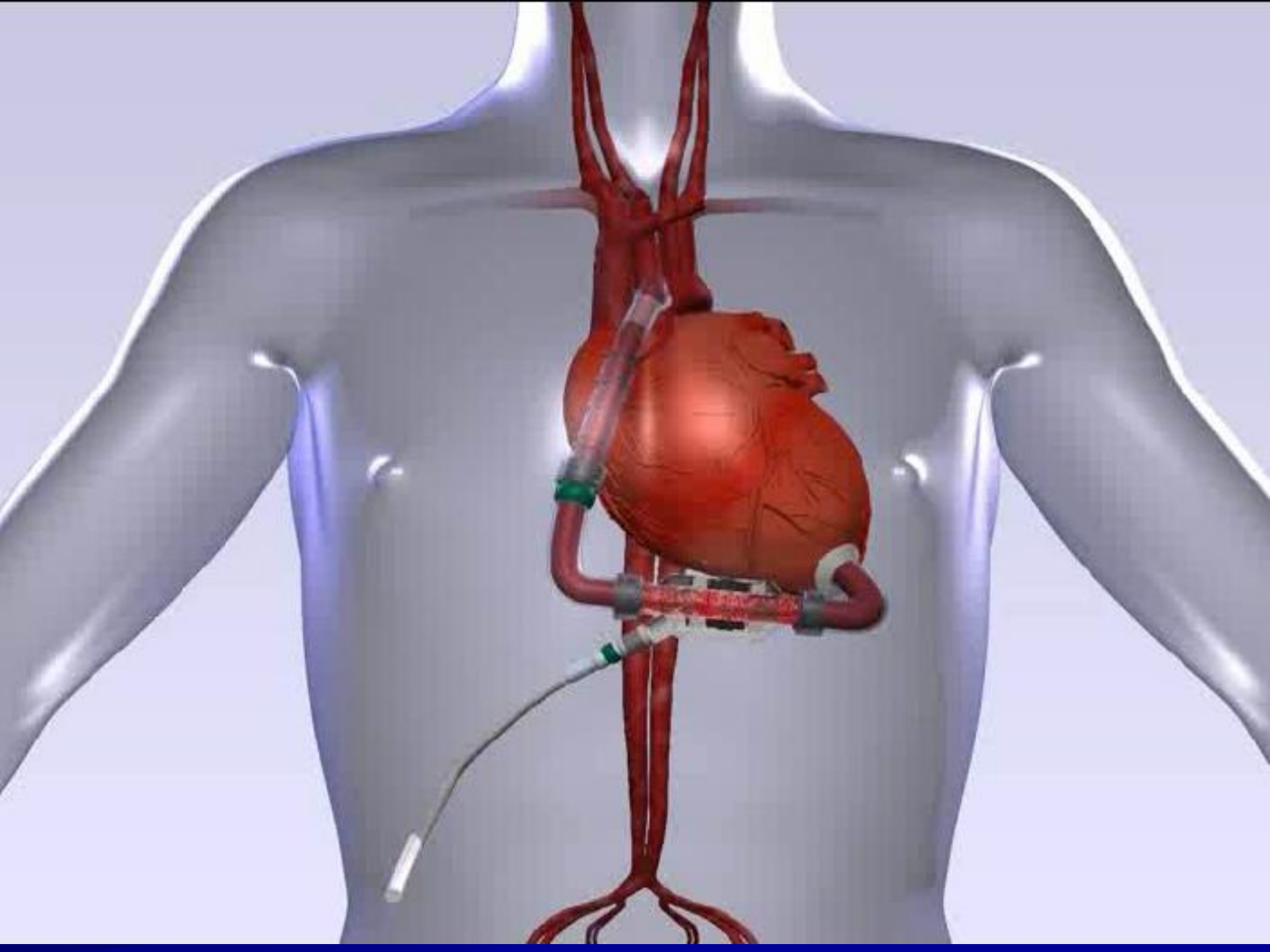
- LVAD – RVAD - BiVAD

Pompe assiali a flusso continuo: Incor I

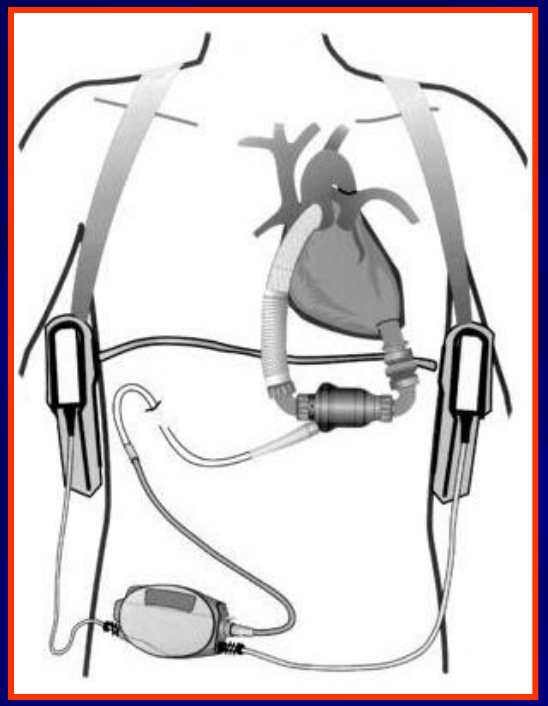
INCOR® LVAD Pump

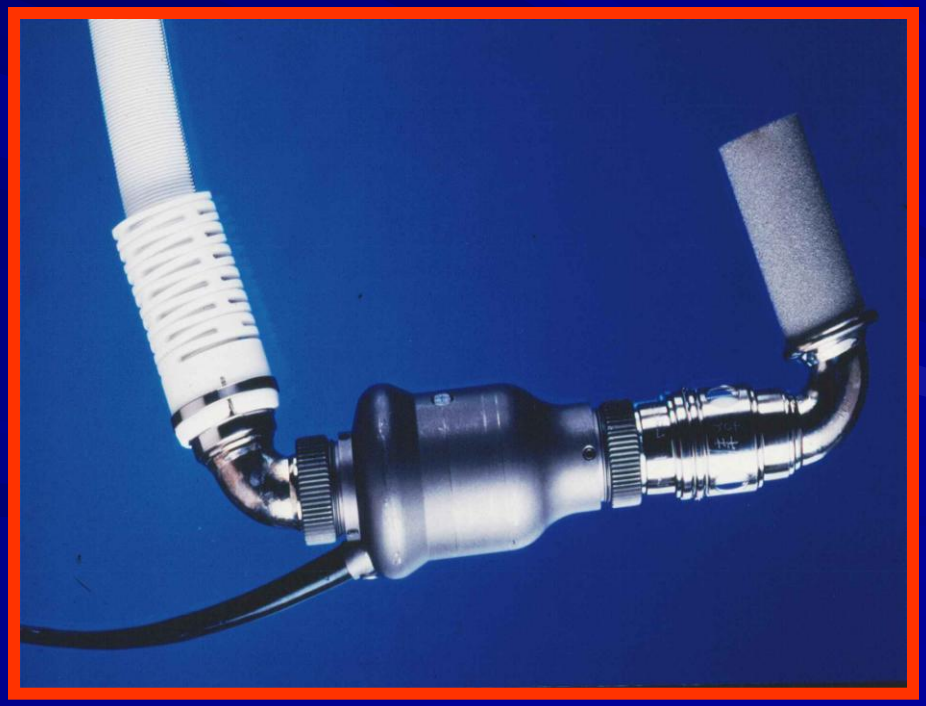
Berlin Heart®

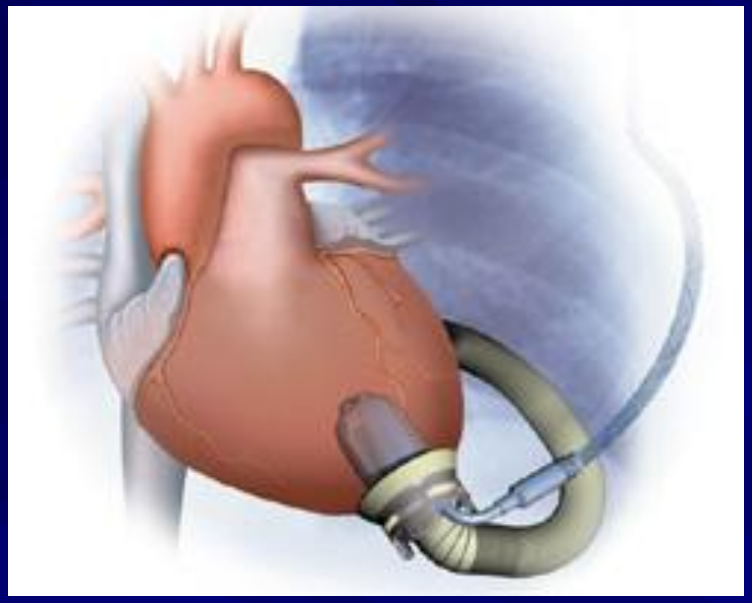
- Axial flow pump with contact- and wear-free magnetic bearing
- Material: Titanium
- Mass: 200 g
- Length: 114 mm
- External diameter: 30mm
- Performance: 6 l/min blood flow against 100 mm Hg
- Coated with Carmeda® BioActive Surface
- Anti-Suction algorithm



Pompe assiali a flusso continuo: HeartMate II

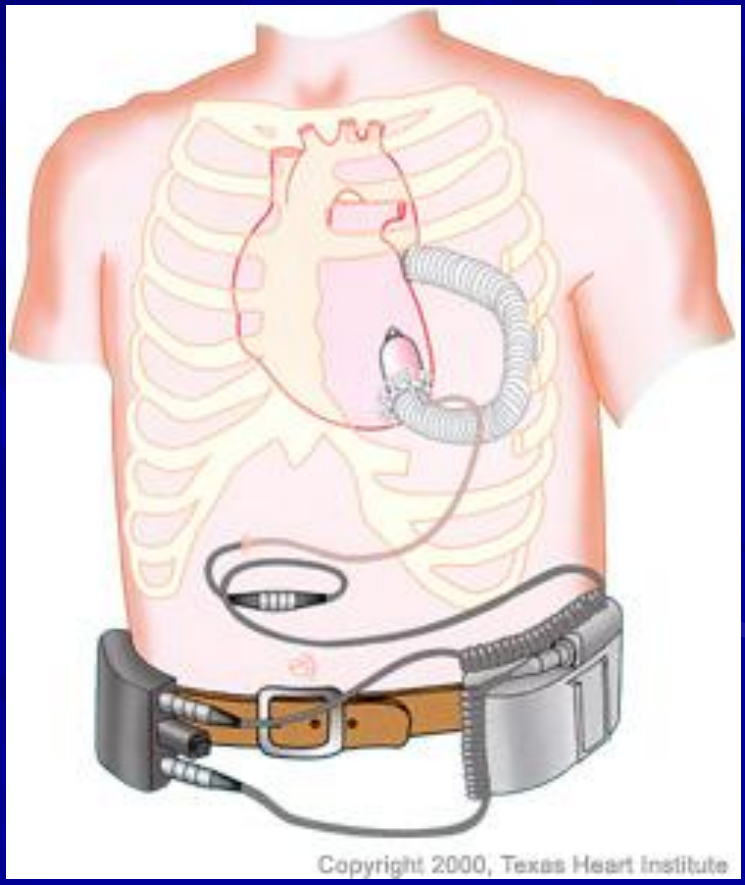






Jarvik 2000

- Classe NYHA III avanzata
- Destination Therapy



Indicazioni

Elezione

"NYHA class IV symptoms despite optimal medical therapy" and:

- LVEF < 28%
- PCWP > 18 mmHg
- LVSWI max < 20g.m/m2
- VO2max < 14 ml/kg/min
- LVEDD > 72 mm
- Ventricular dysrhythmias
- Repeated hospital admissions

Urgenza

"Failure to reduce inotropic support > 10 mcg/kg/min (> 7 days)" and :

- Failure to respond to other forms of mechanical support
- Systolic blood pressure < 80 mmHg
- CVP > 12 mmHg
- PCWP > 20 mmHg
- SvO2 < 50 %
- Oliguria < 20 ml/h

Pompa con Inflow intraventricolare ed outflow in aorta toracica discendente.

Impianto in Toracotomia

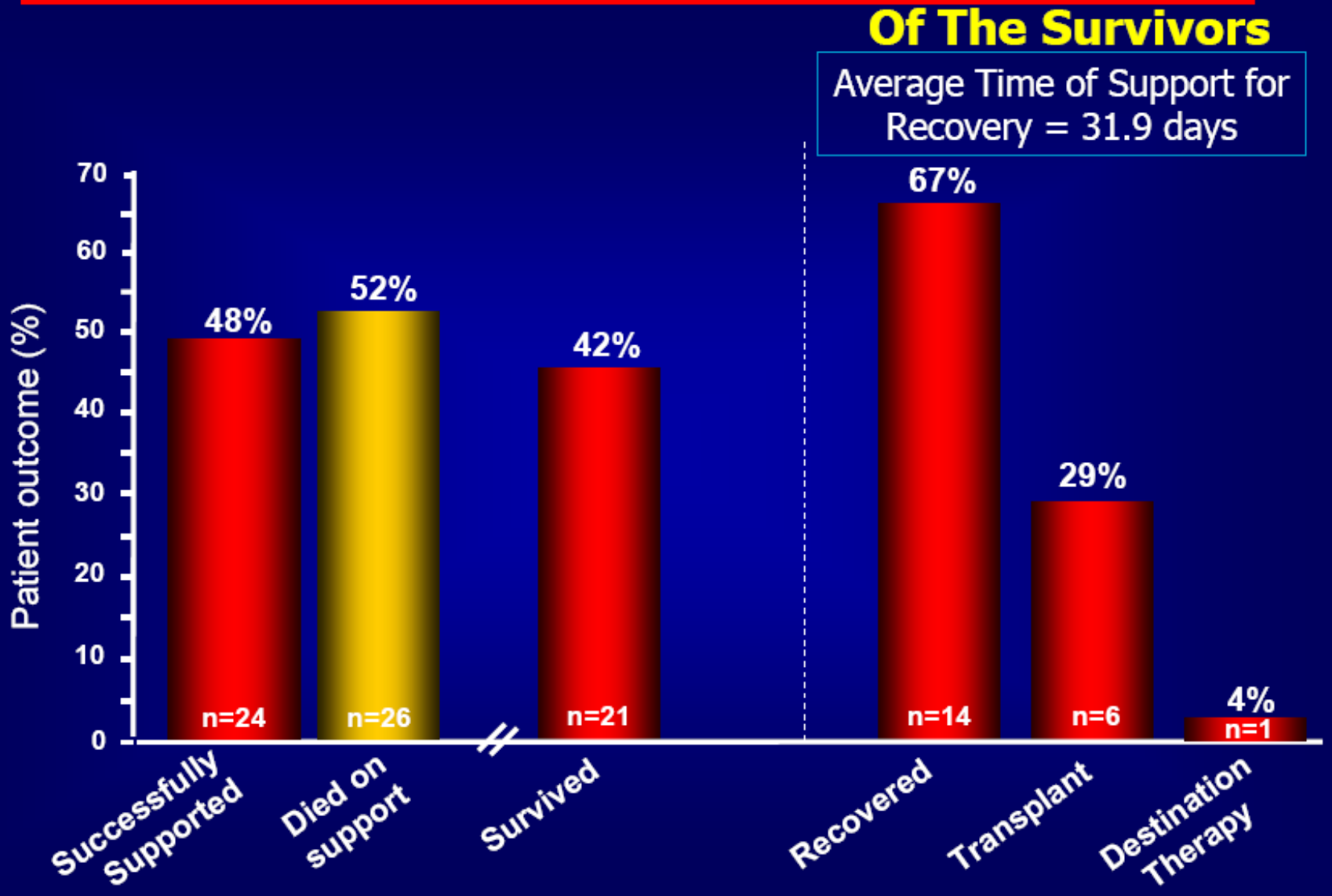
Cavo di alimentazione retroauricolare

=

Minori infezioni

Maggiore compliance del paziente

Patients Outcome



Anderson and al. Abstract in Amer. Journal of Cardiology Oct 2005. TCT 2005, N=50, 21 Centers

The Continuum of Care for the Ischemic Myocardium

- Reperfusion is only the beginning
- Protecting and preserving the myocardium is the next evolution of care for these patients