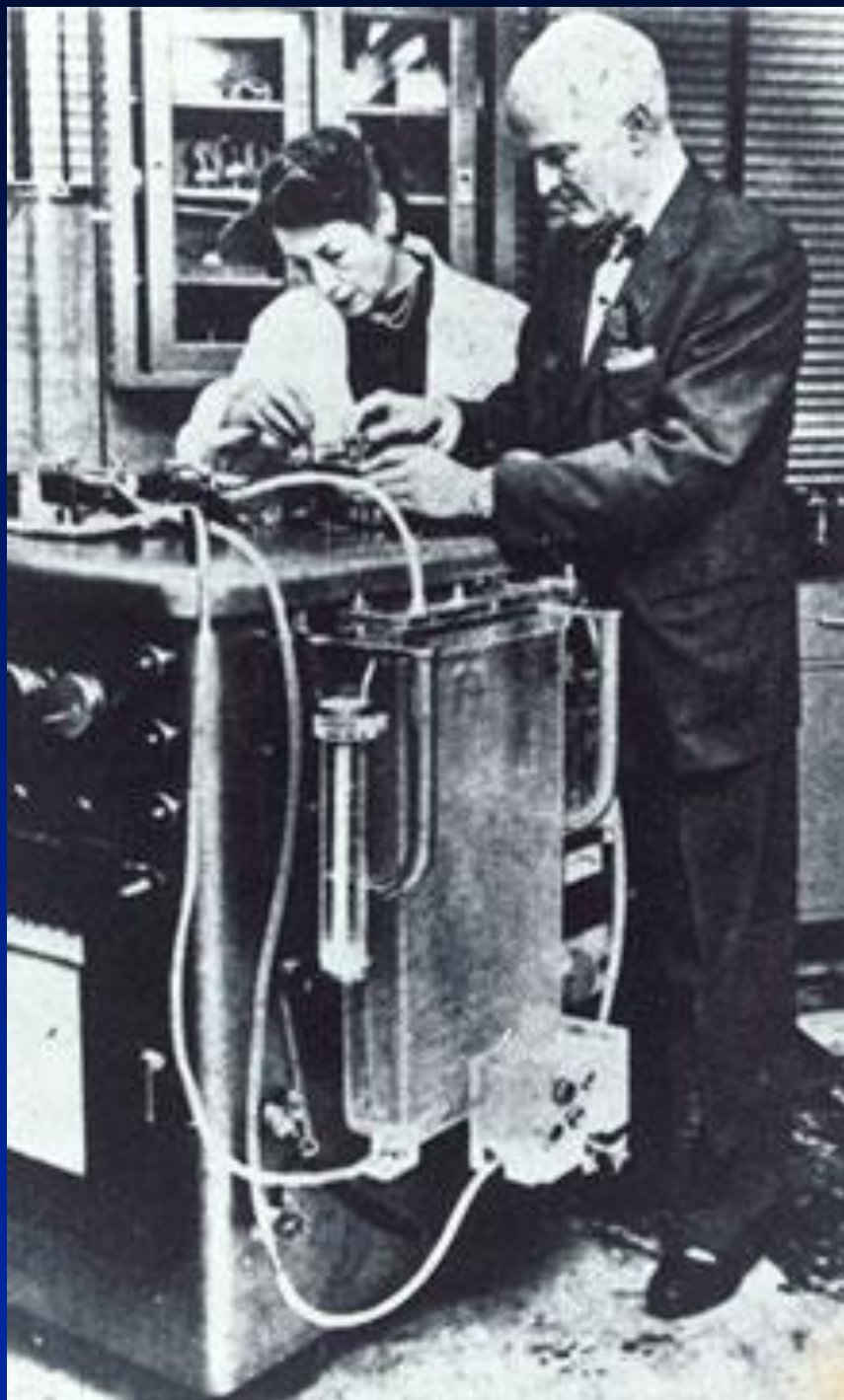


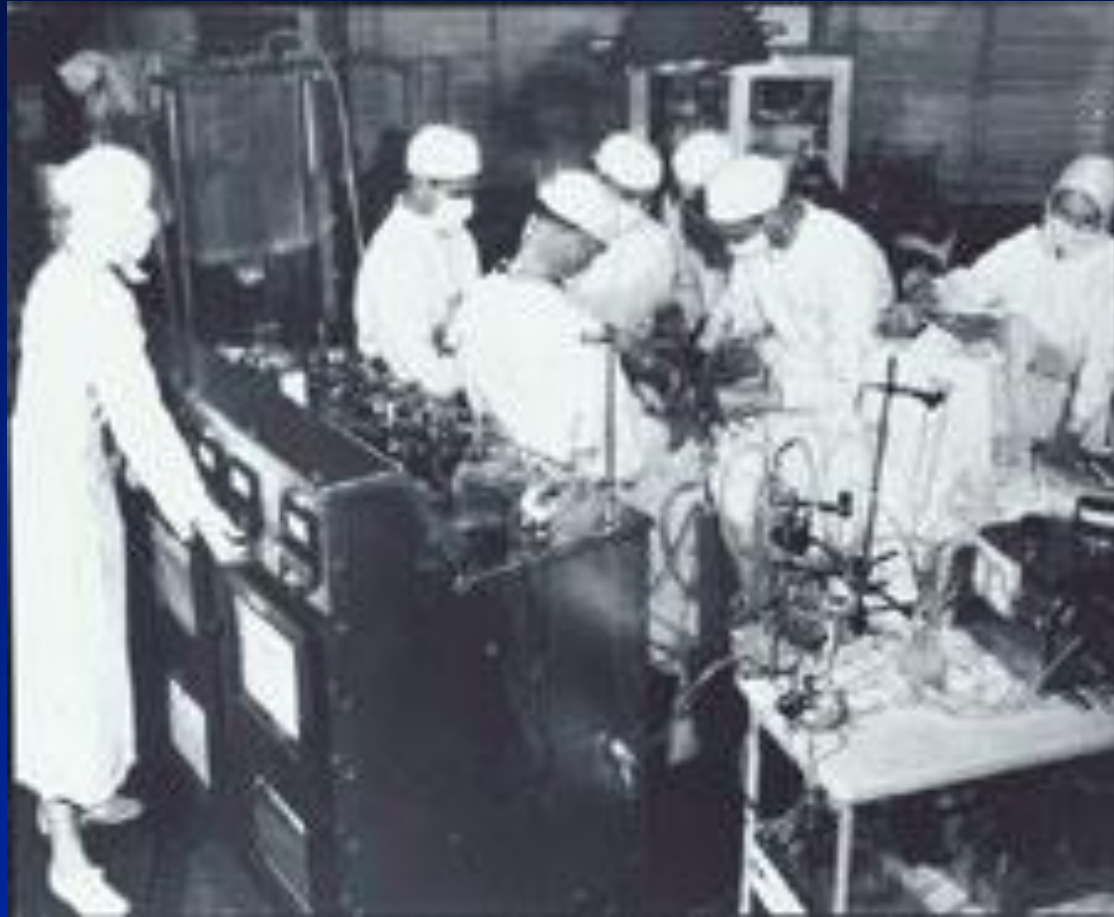


Side effects of CPB: What is the reality?

G D ANGELINI

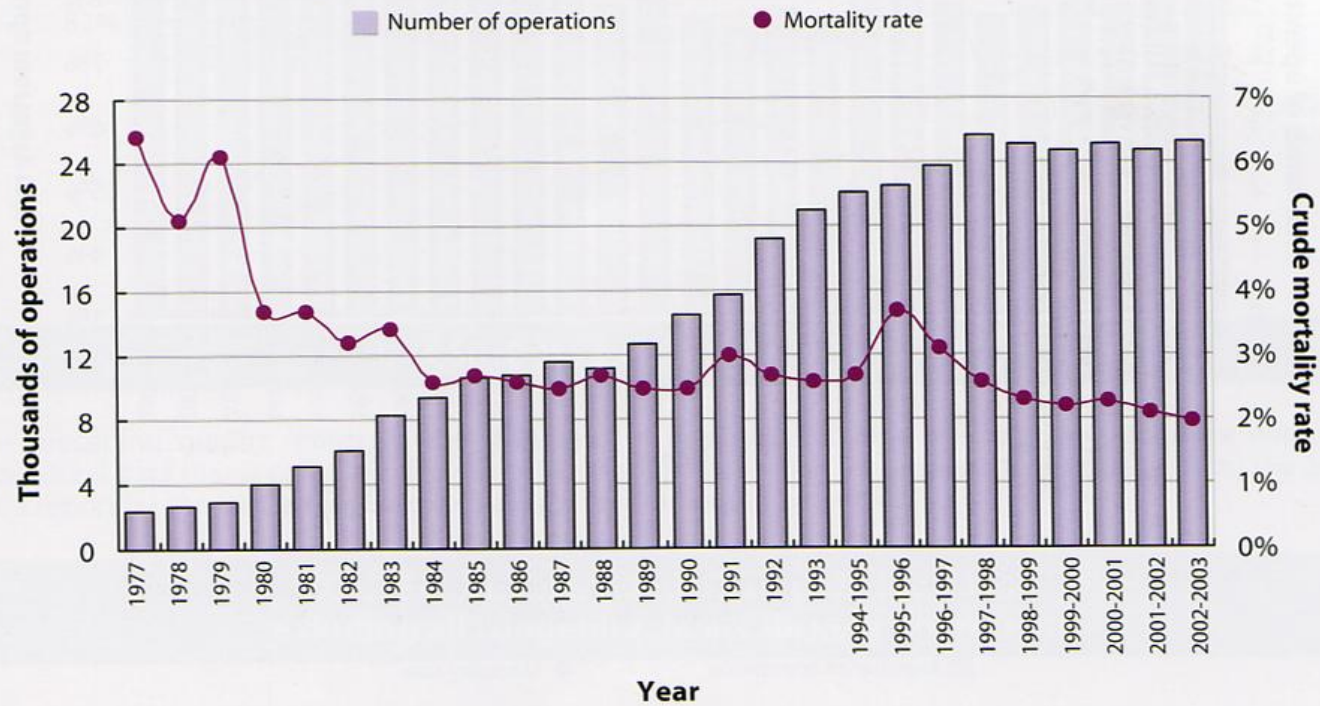
BRITISH HEART FOUNDATION PROFESSOR OF CARDIAC SURGERY





U.K. Cardiac Surgical Register

UKCSR: Activity and mortality trends for isolated coronary surgery (n=386,745)



The Cardiac Surgeon's...Syndromes



O V I D

MEDLINE

<1966 to 1996>



Author



Title



Journal



Search Fields



Tools



Combine



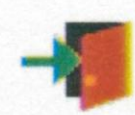
Limit



Basic



Change Database



Logoff

#	Search History	Results	Display
1	Cardiopulmonary Bypass/	7228	Display

Run Saved Search

Save Search History

Delete Searches

O V I D

MEDLINE

<1997 to December Week 4 2000>



Author



Title



Journal



Search Fields



Tools



Combine



Limit



Basic



Change Database



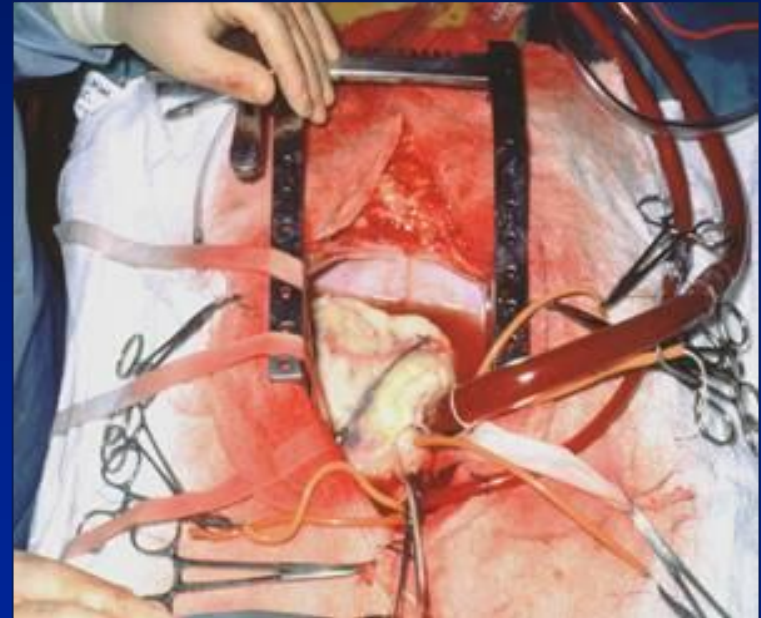
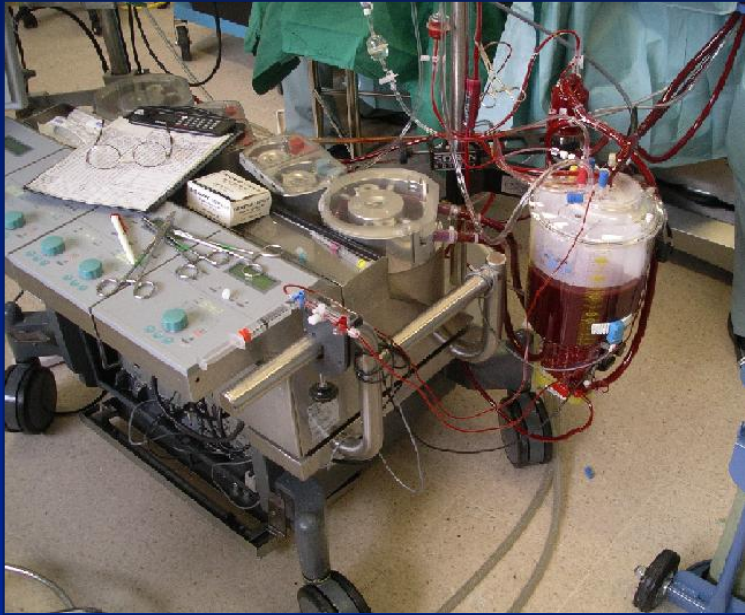
Logoff

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Run Saved Search

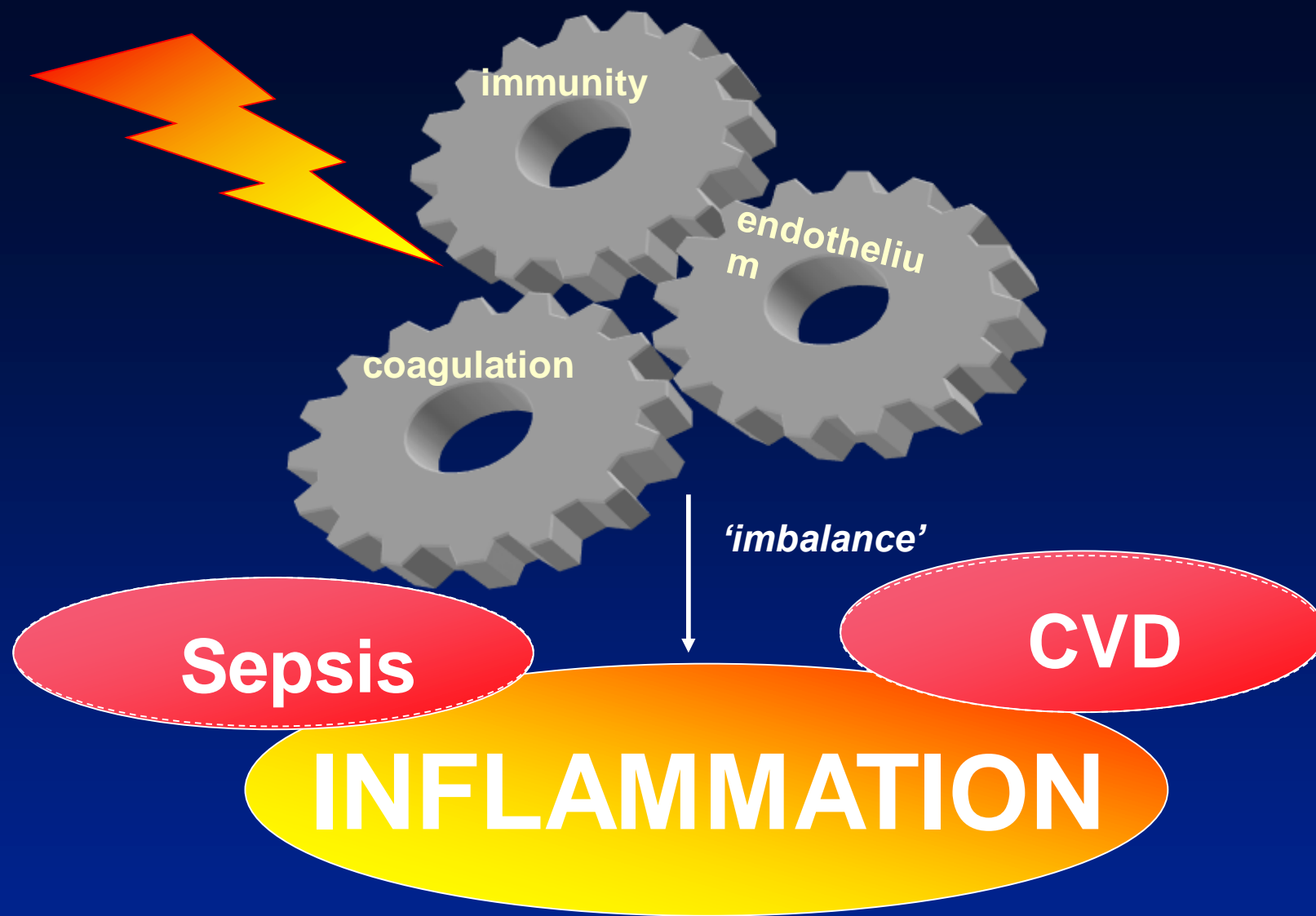
Save Search History

Delete Searches





Inflammation – a new concept for therapy?



Inflammation is the host's defense mechanism to infection or injury including surgery.

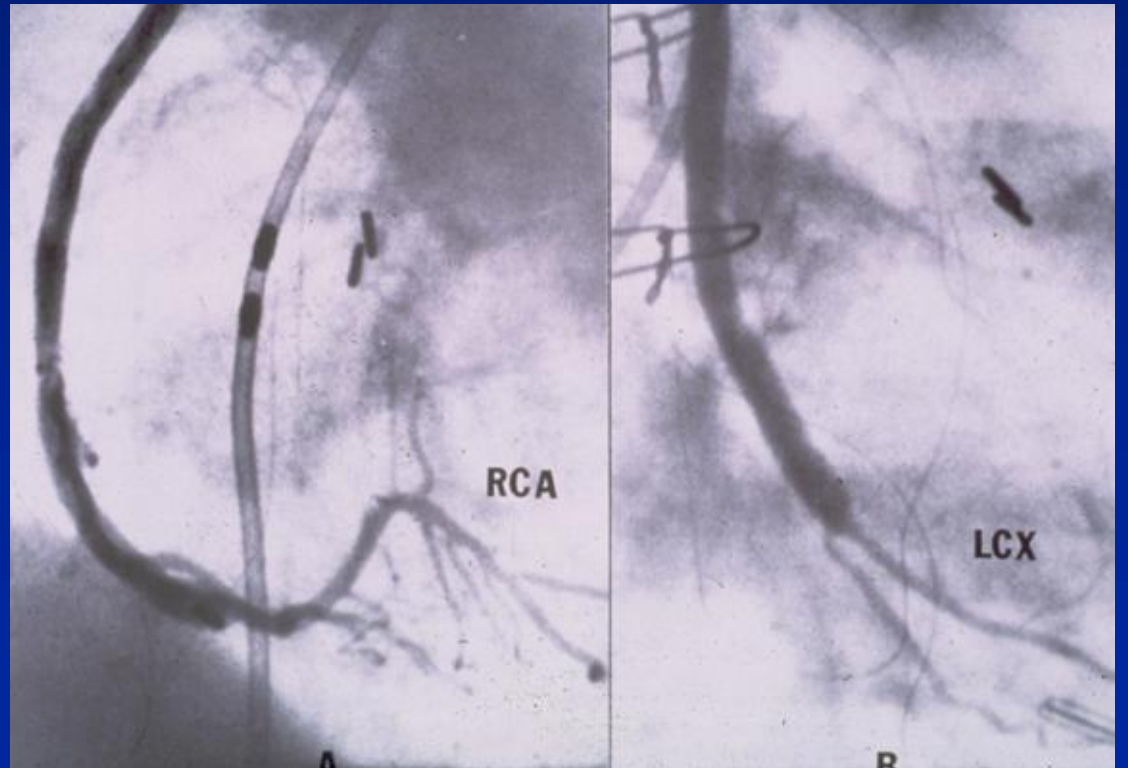
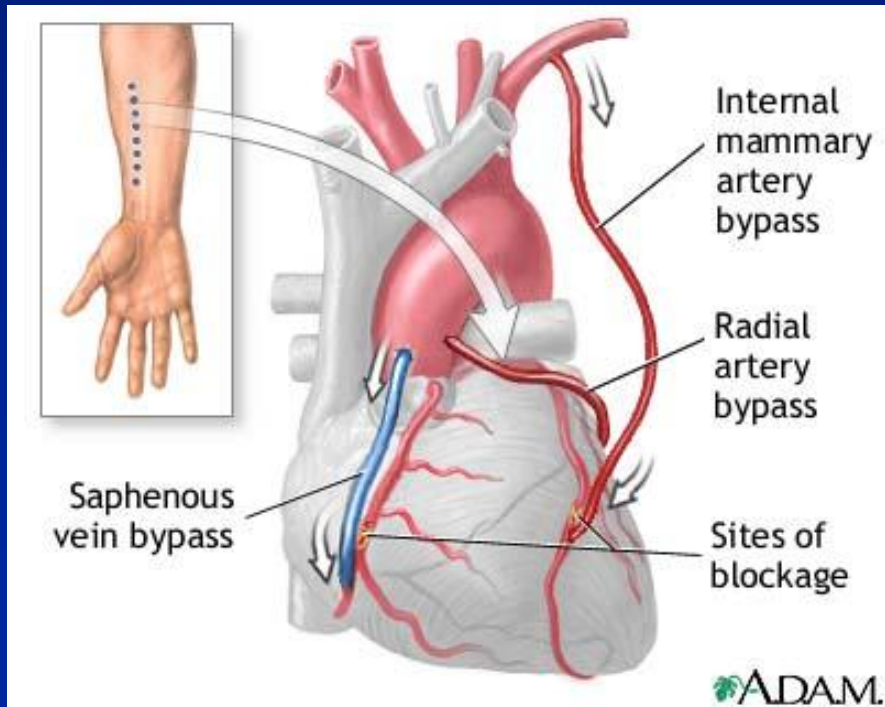
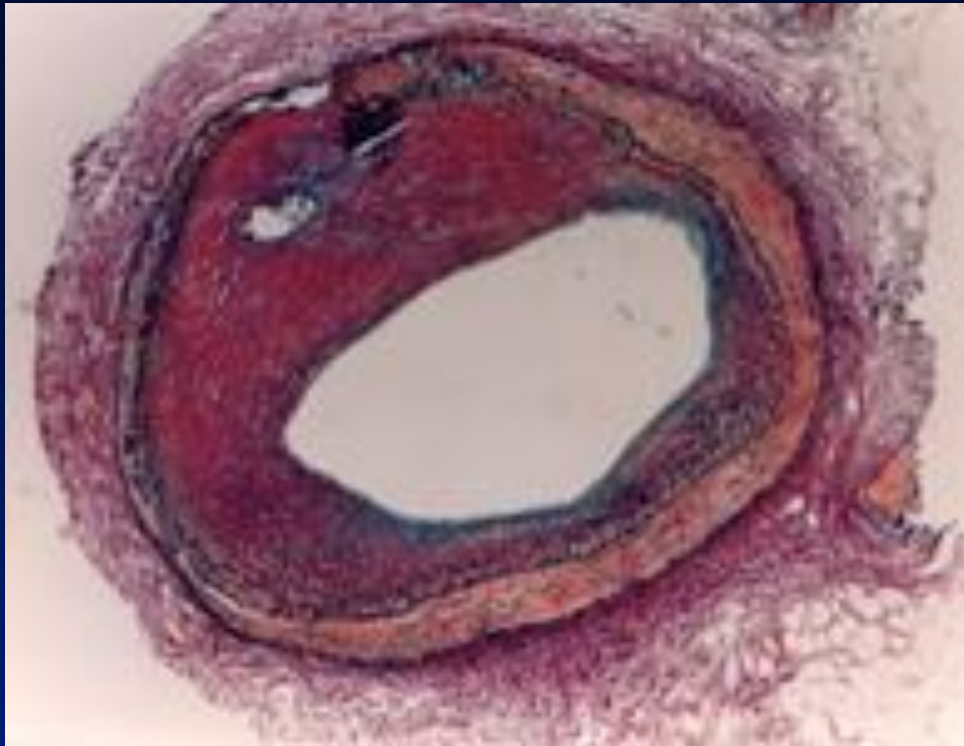
CPB



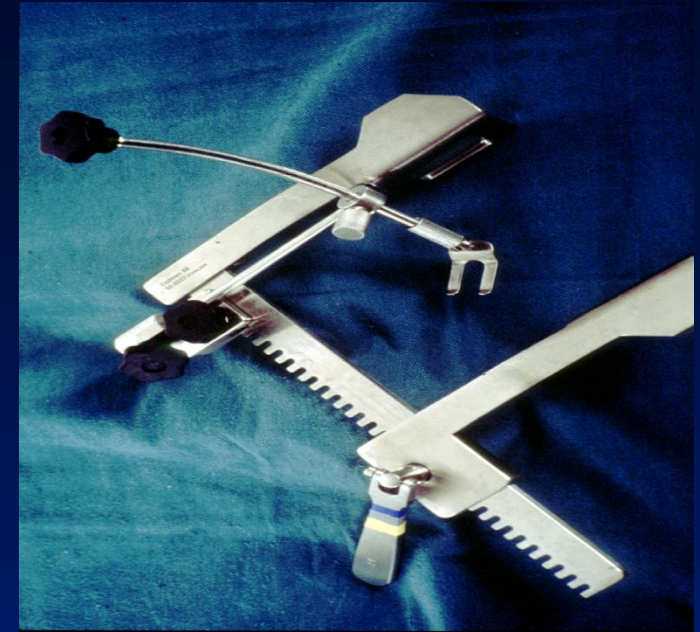
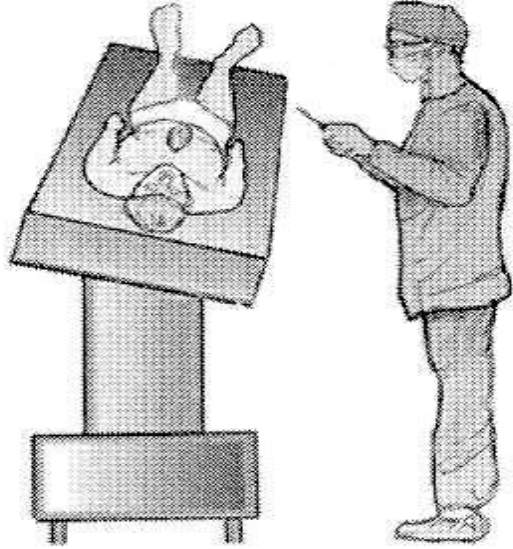
CONTROL



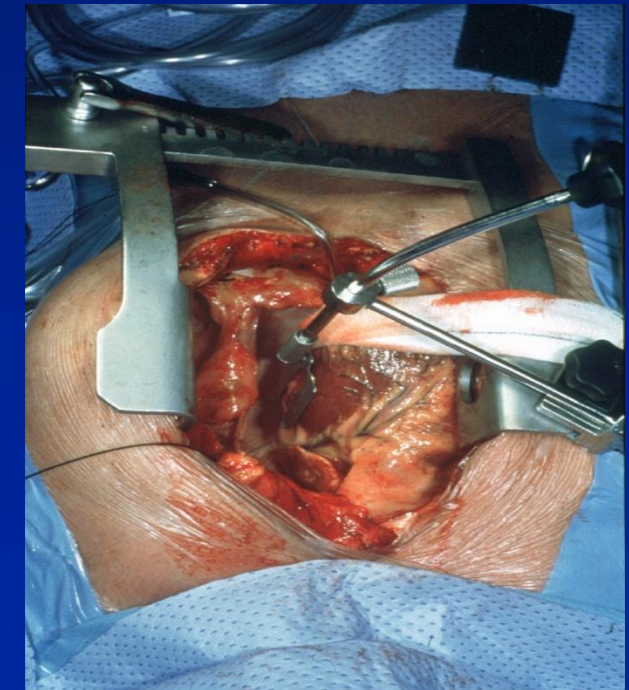
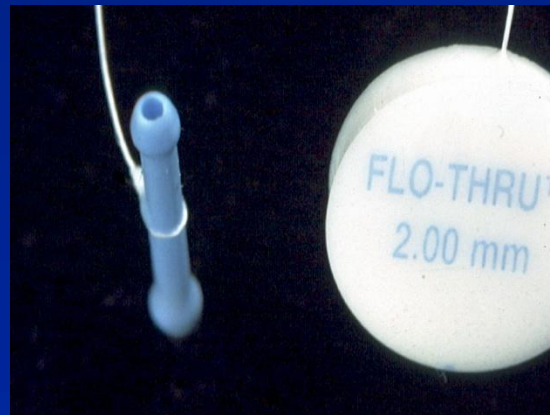
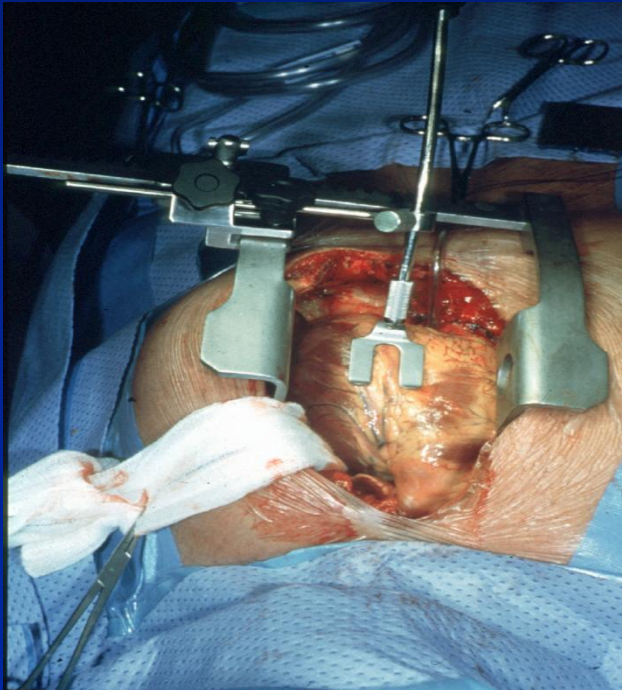
=



Head Down & Rotated



OPCAB Surgery - The 'Bristol Technique'

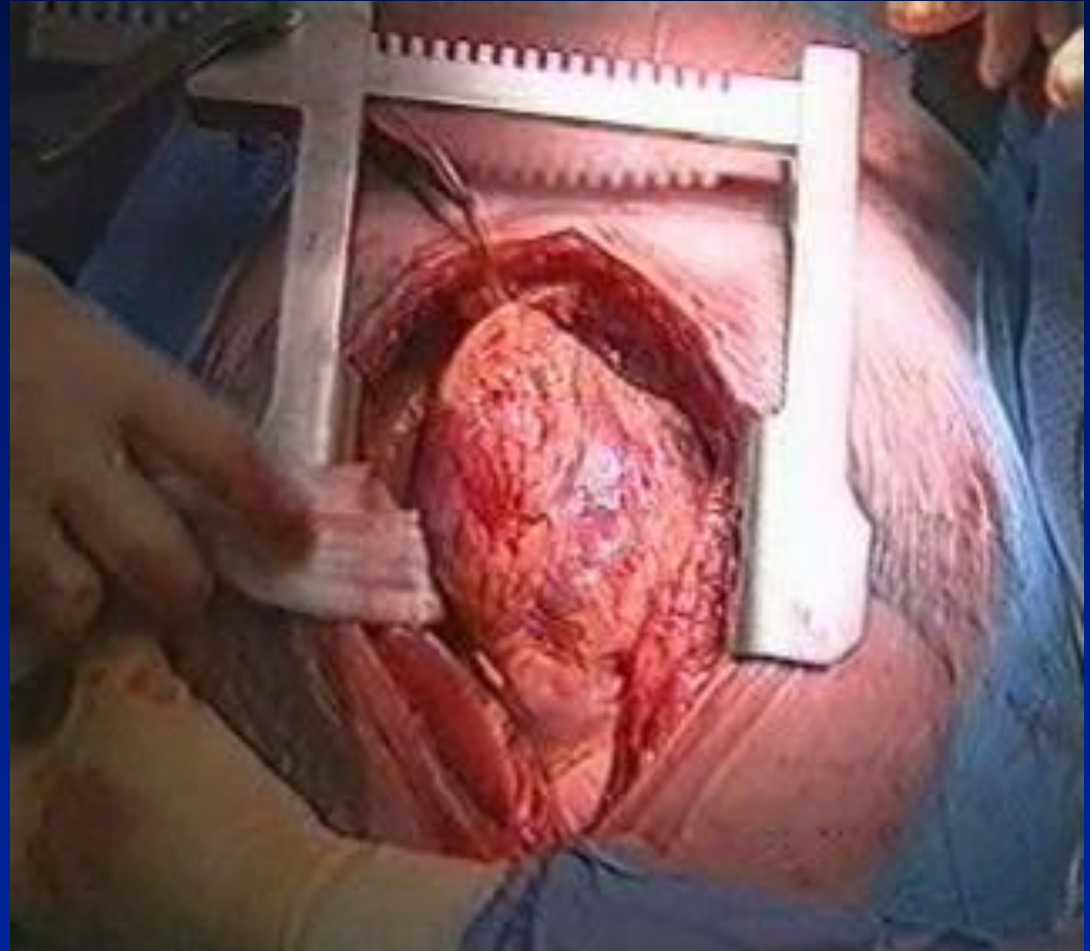


EJCS 2001;19:34-40.

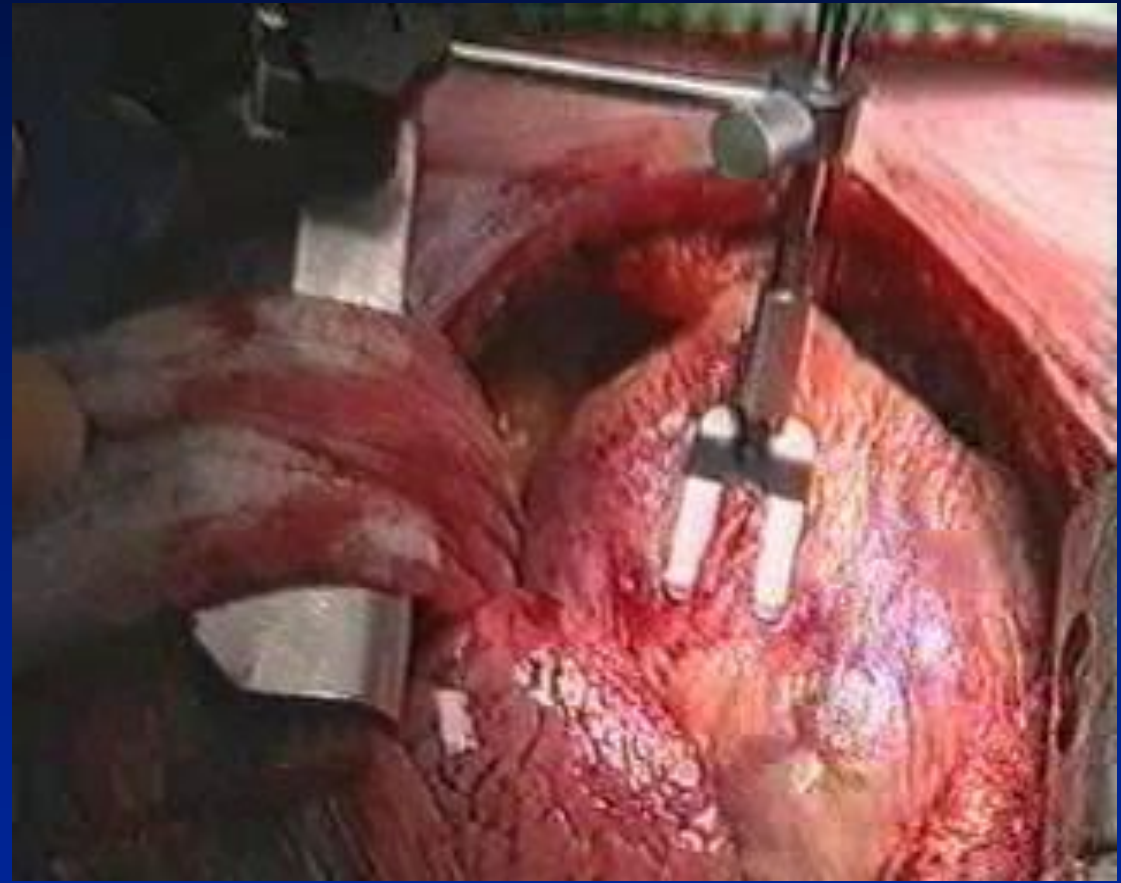
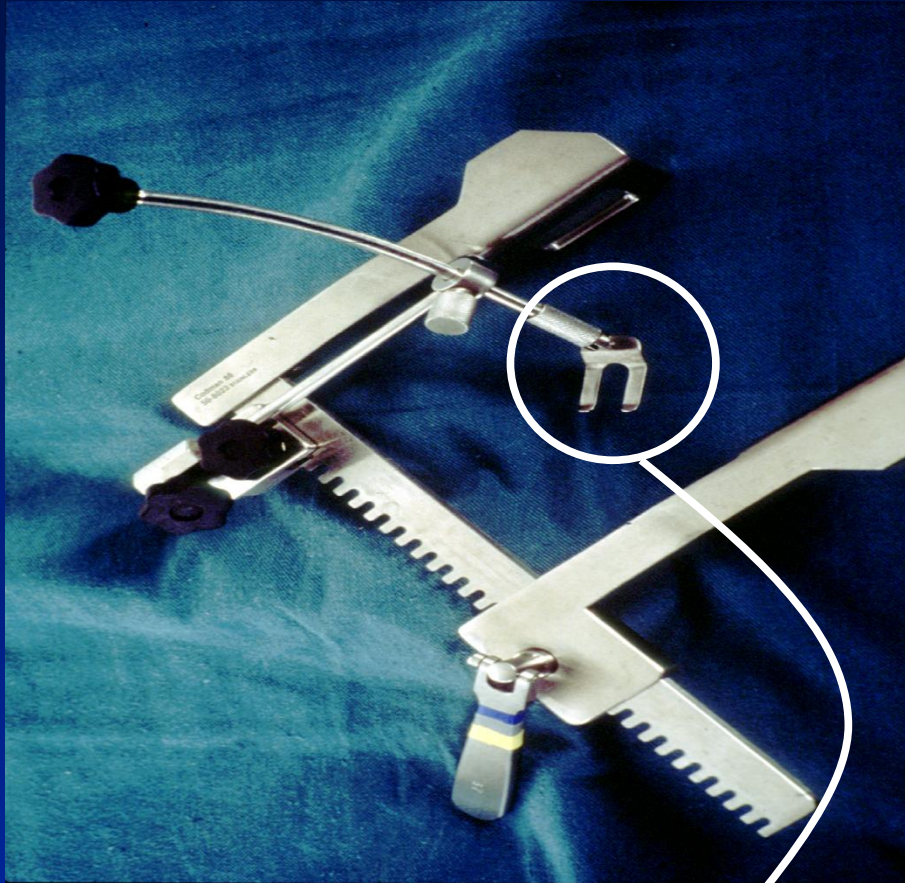
CABG on the beating heart!



Heart-lung machine

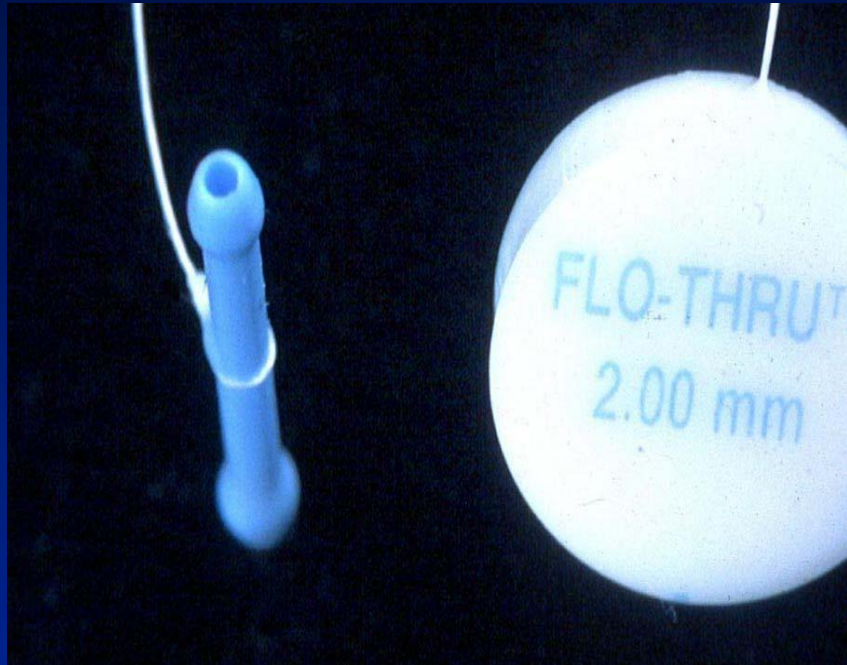


An engineering solution



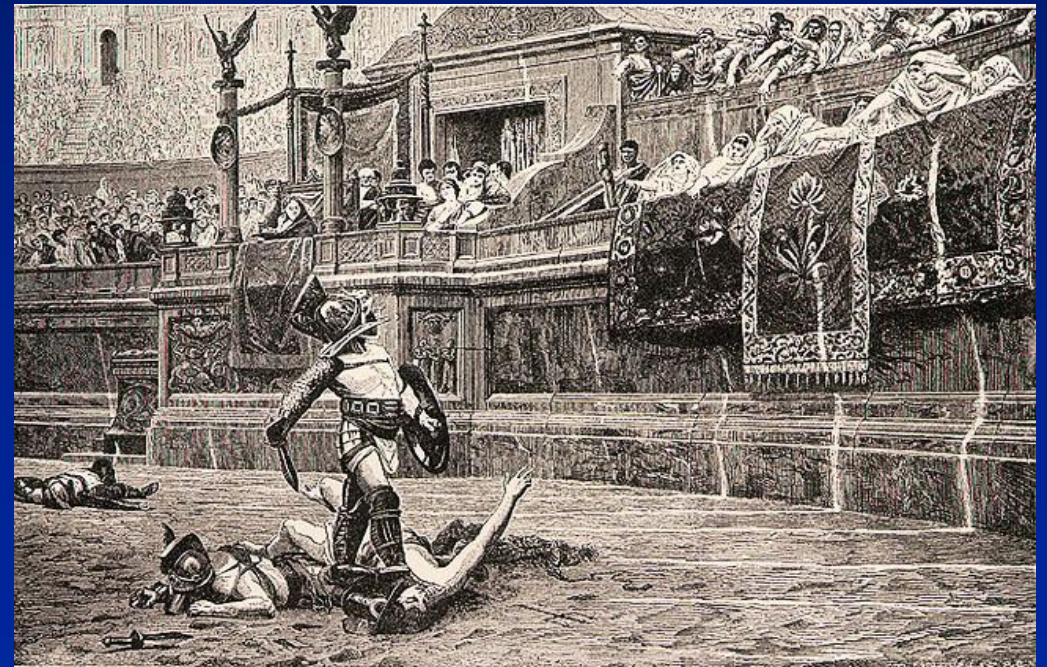
**Stabiliser based on the foot
of a sewing machine**

An engineering solution



Device to maintain flow during anastomosis construction





“Vox populi, vox dei!”.



BRISTOL HEART INSTITUTE
UNIVERSITY OF BRISTOL



Early and midterm outcome after off-pump and on-pump surgery in Beating Heart Against Cardioplegic Arrest Studies (BHACAS 1 and 2): a pooled analysis of two randomised controlled trials

G Angelini, F Taylor, B Reeves, R Ascione

Lancet 2002,359,1194-99

Flow diagram of the phases of BHACAS 1 and 2



BHACAS 1

Eligible (n = 538)

Randomized [n = 200 (37.2%)]

Off-pump (n = 100)
Cross-over (n = 2)

On-pump (n = 100)

Lost follow-up (n = 1)

BHACAS 2

Eligible (n = 320)

Randomized [n = 201 (62.8%)]

Off-pump (n = 100)

On-pump (n = 101)

Lost follow-up (n = 2)

Lost follow-up (n = 3)

End-points

Early clinical outcome

- In-hospital mortality and morbidity

Sub-system function

- Myocardial: Troponin I
- Renal: NAG, microalbumin/creatinine ratio
- IFM markers: IL-8, PMN Elastase, C3a, C5a
- Neurological: Serum S100 β -protein

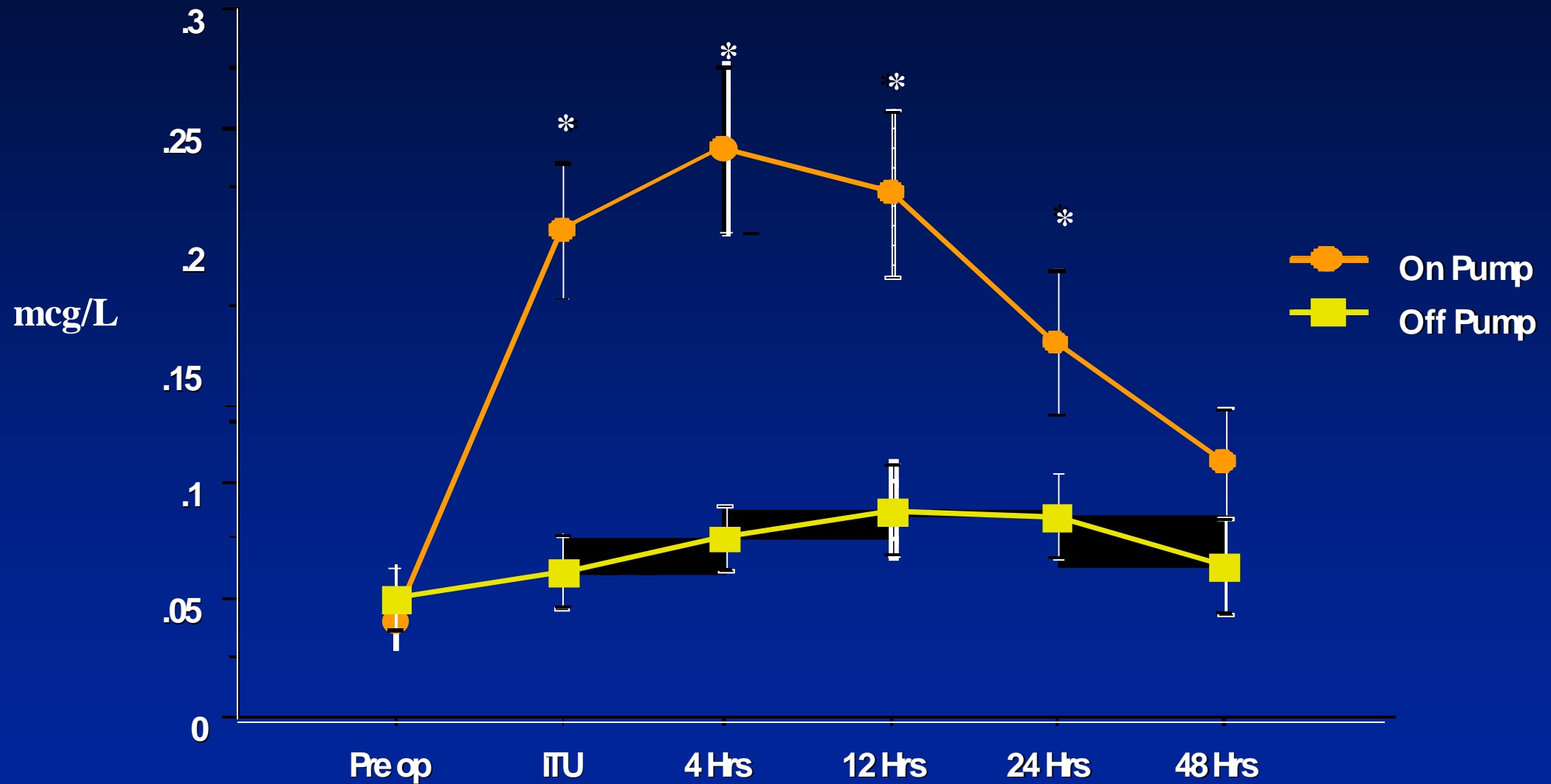
Economic evaluation

Mid-term clinical outcome

- Mortality
- Cardiac-related events

Myocardial function

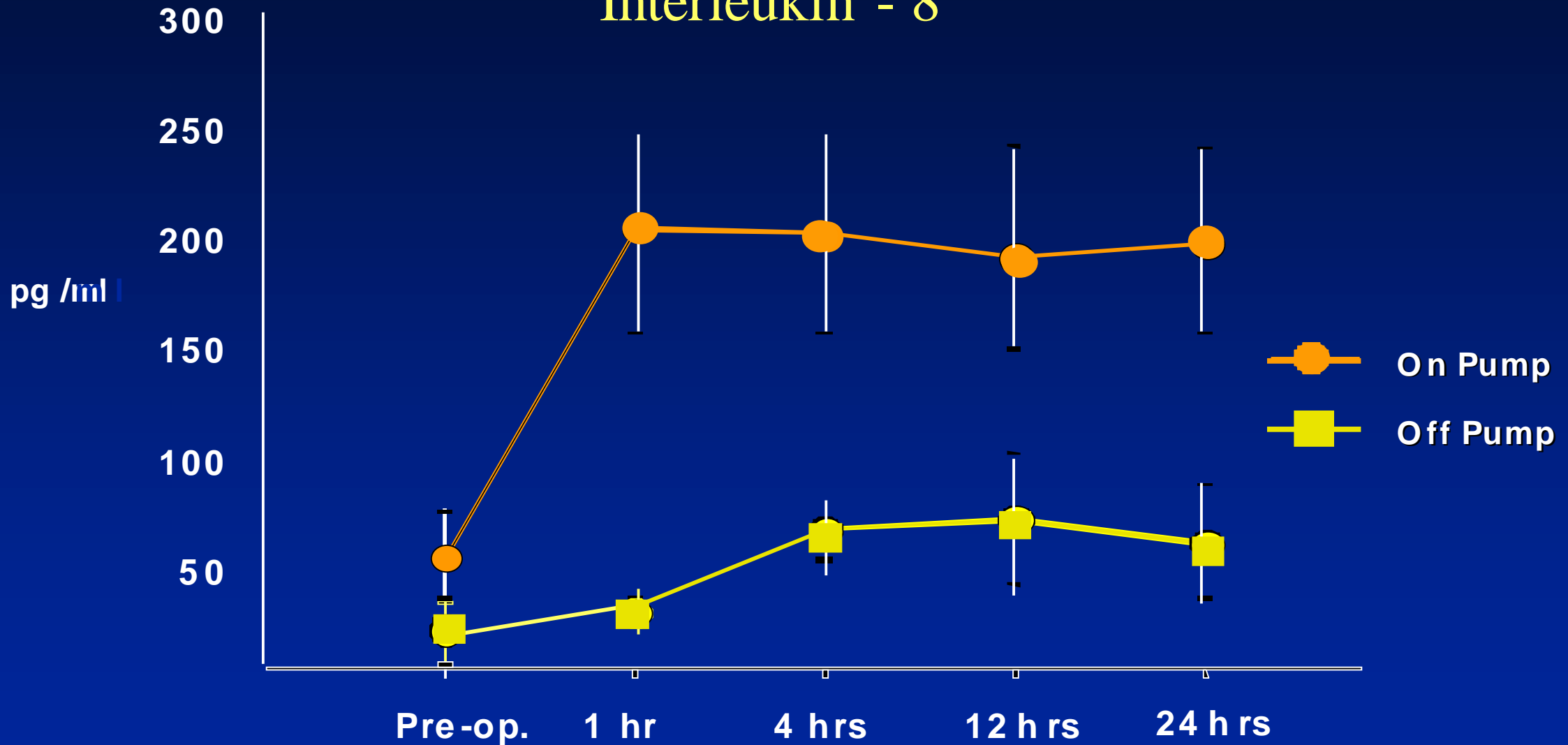
Troponin I release



* P < 0.05

Inflammatory response

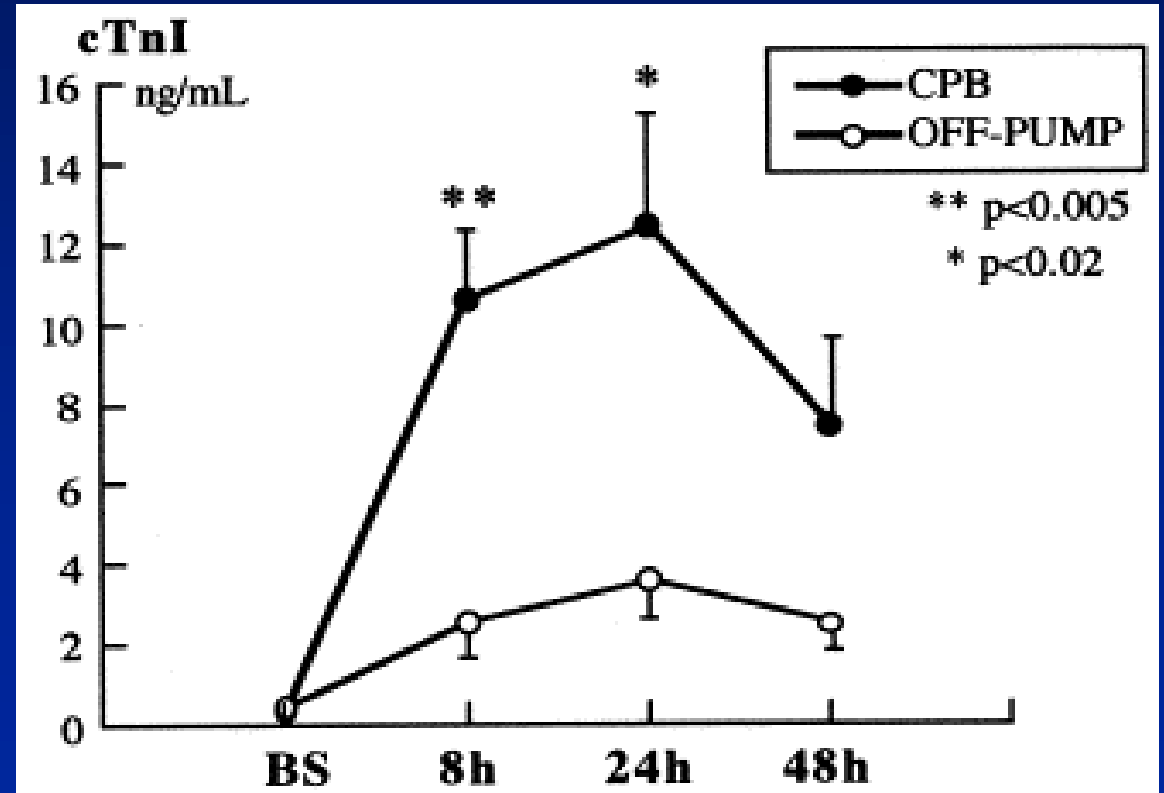
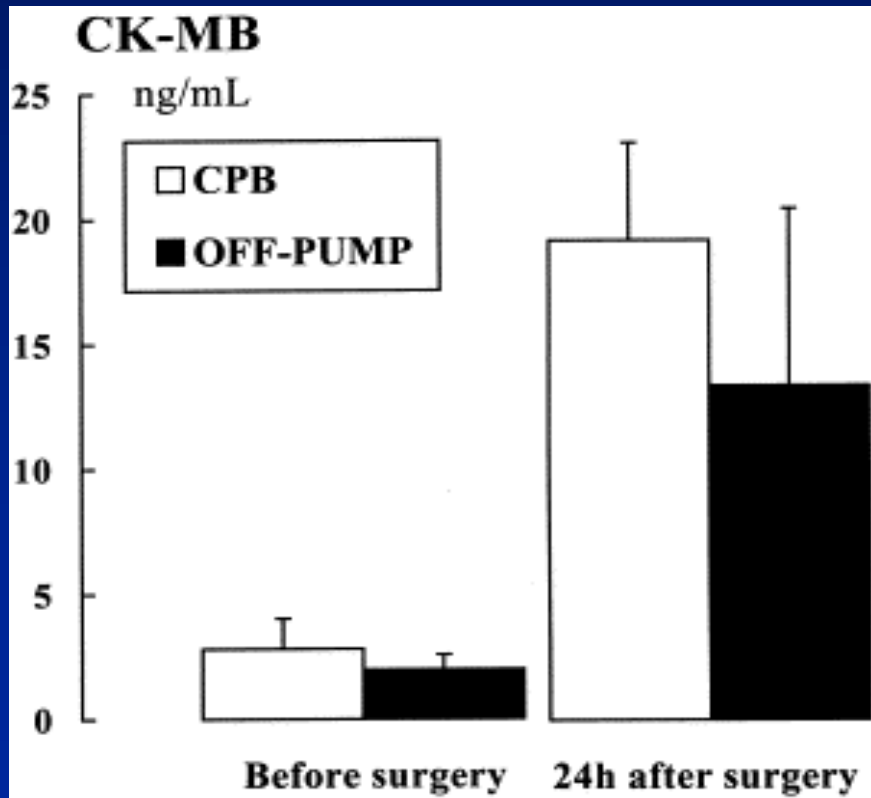
Interleukin - 8

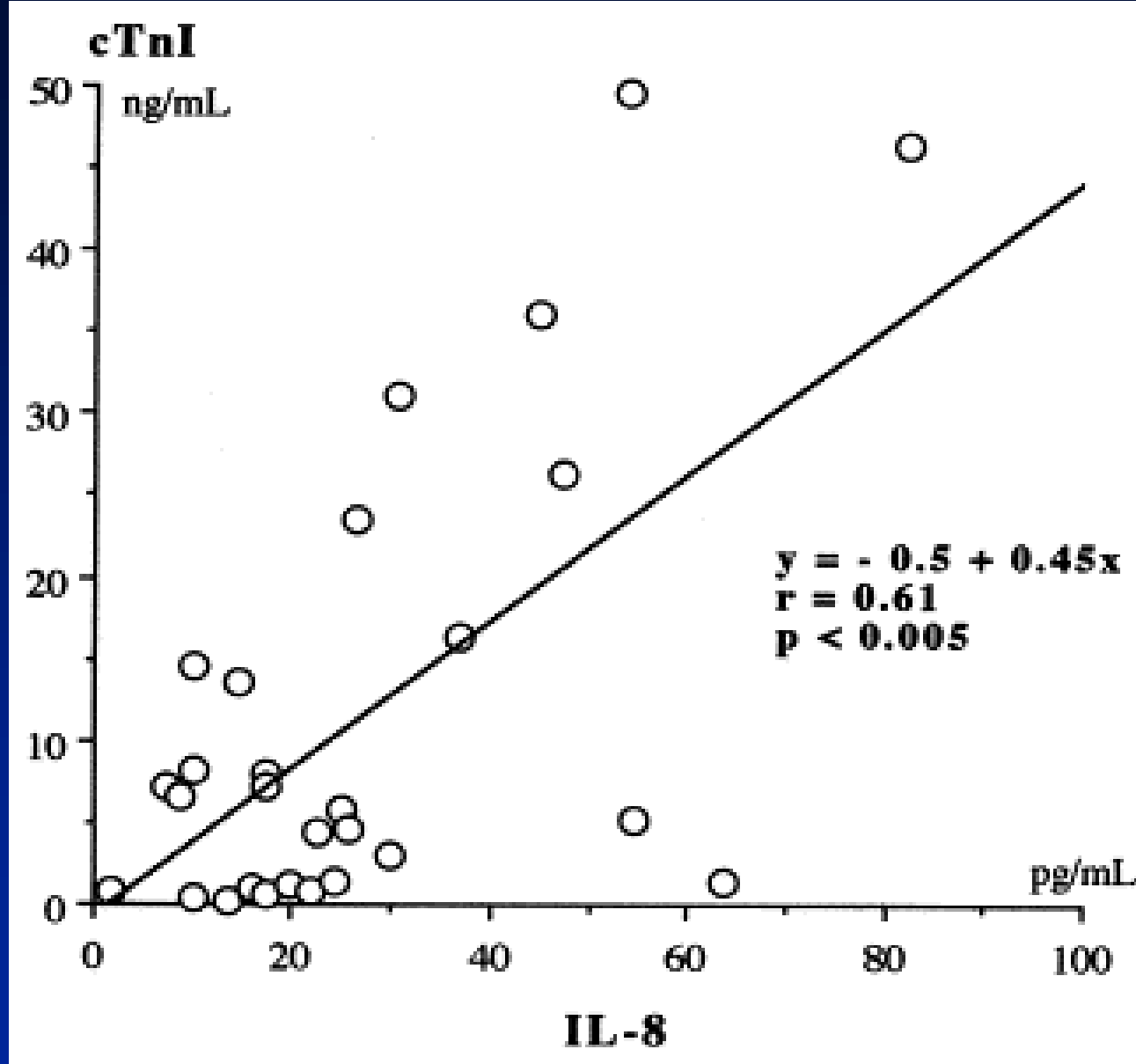


p = 0.01 ANOVA

Avoiding cardiopulmonary bypass in multivessel CABG reduces cytokine response and myocardial injury

Song Wan, Mohammad Bashar Izzat, Tak Wai Lee, Innes Y. P. Wan, Nelson L. S. Tang, and Anthony P. C. Yim



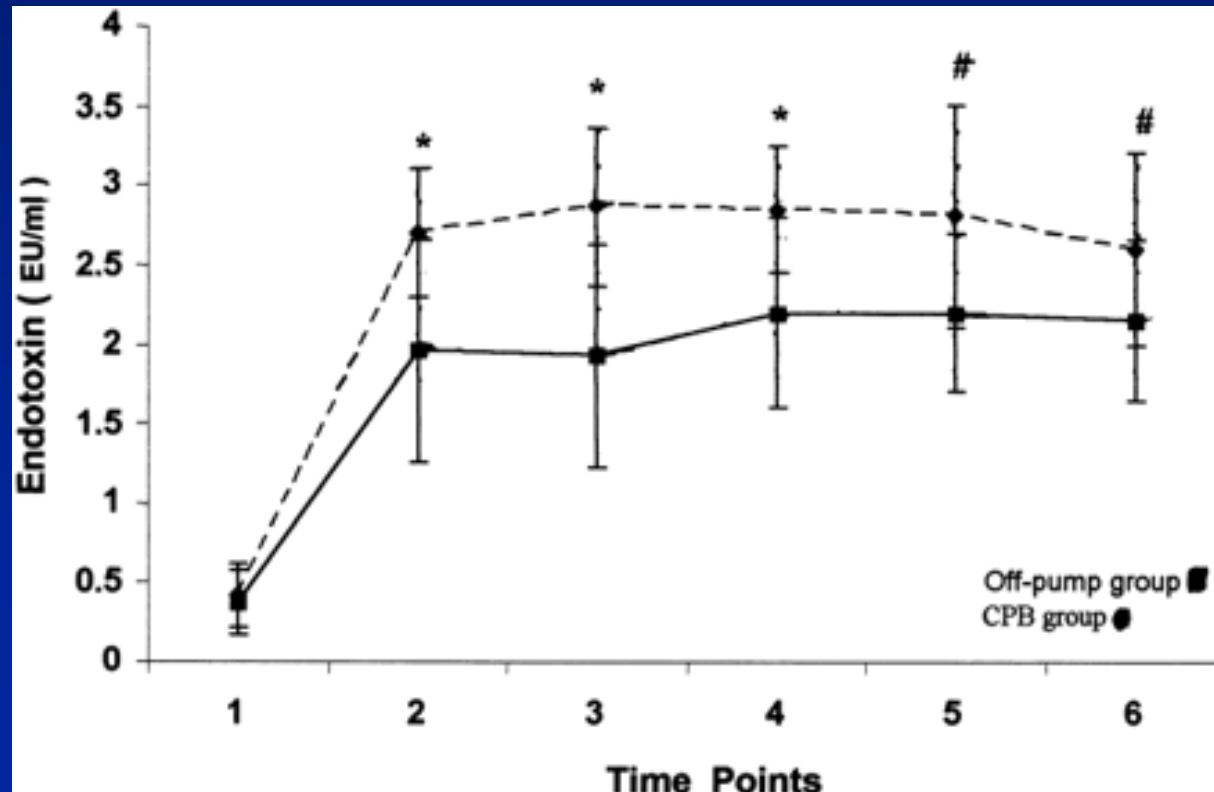


Ann Thorac Surg 1999;68:52-7.

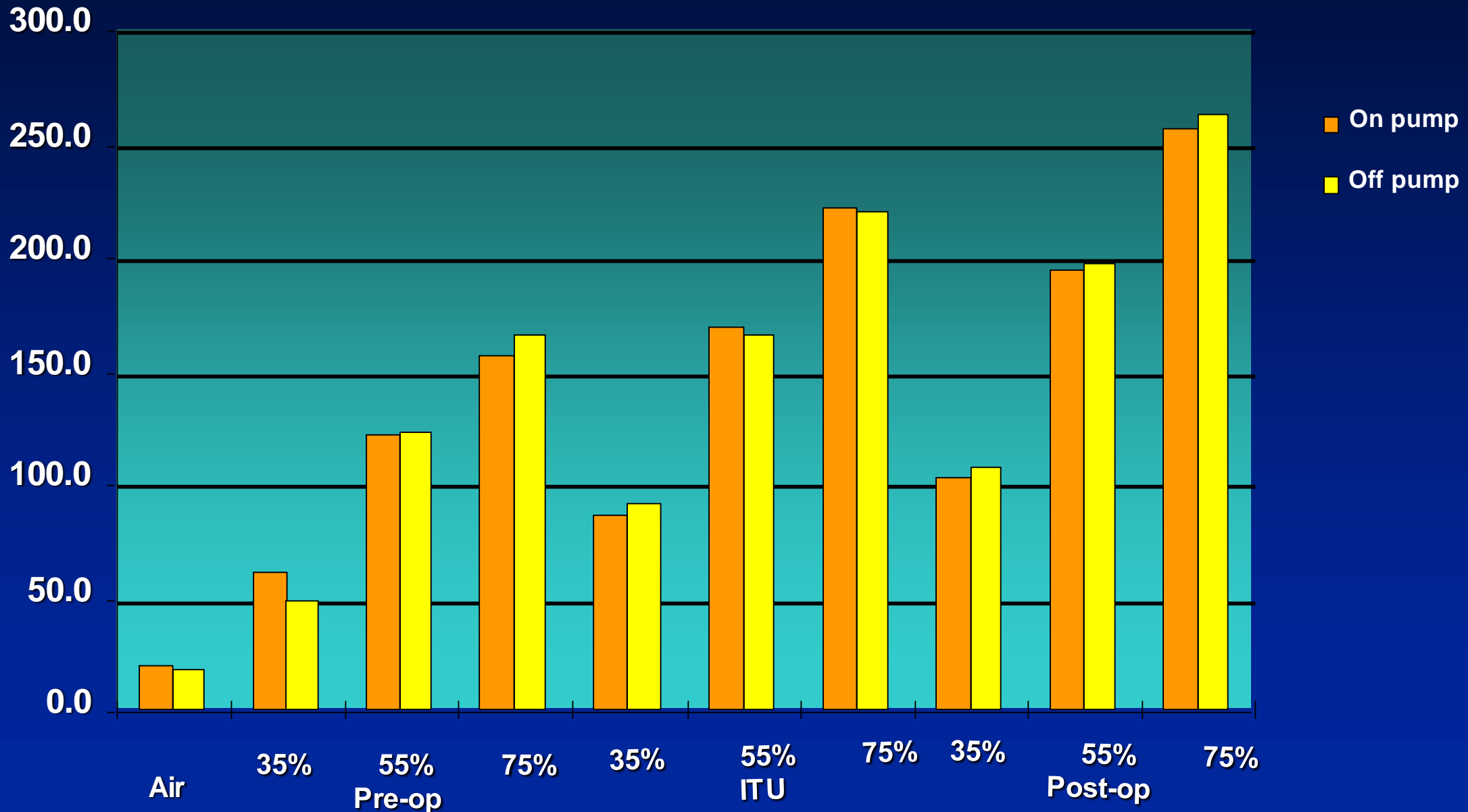
Endotoxemia in coronary artery bypass surgery: A comparison of the off-pump technique and conventional cardiopulmonary bypass

Naz Bige Aydin, MD^a, Hakan Gercekoglu, MD^a, Burak Aksu, MD^b, Vedat Ozkul^c, Tufan Sener, MD^a University of Marmara, Istanbul, Turkey

Objectives: The endotoxemia associated with cardiac surgery is thought to be dominantly influenced by the use of cardiopulmonary bypass. The objectives of this study were to assess the relative contribution of cardiopulmonary bypass on endotoxemia apart from cardiac surgical access and to improve our understanding of the potential benefits of off-pump procedures.



Alveolar-Arteriolar Oxygen Gradient

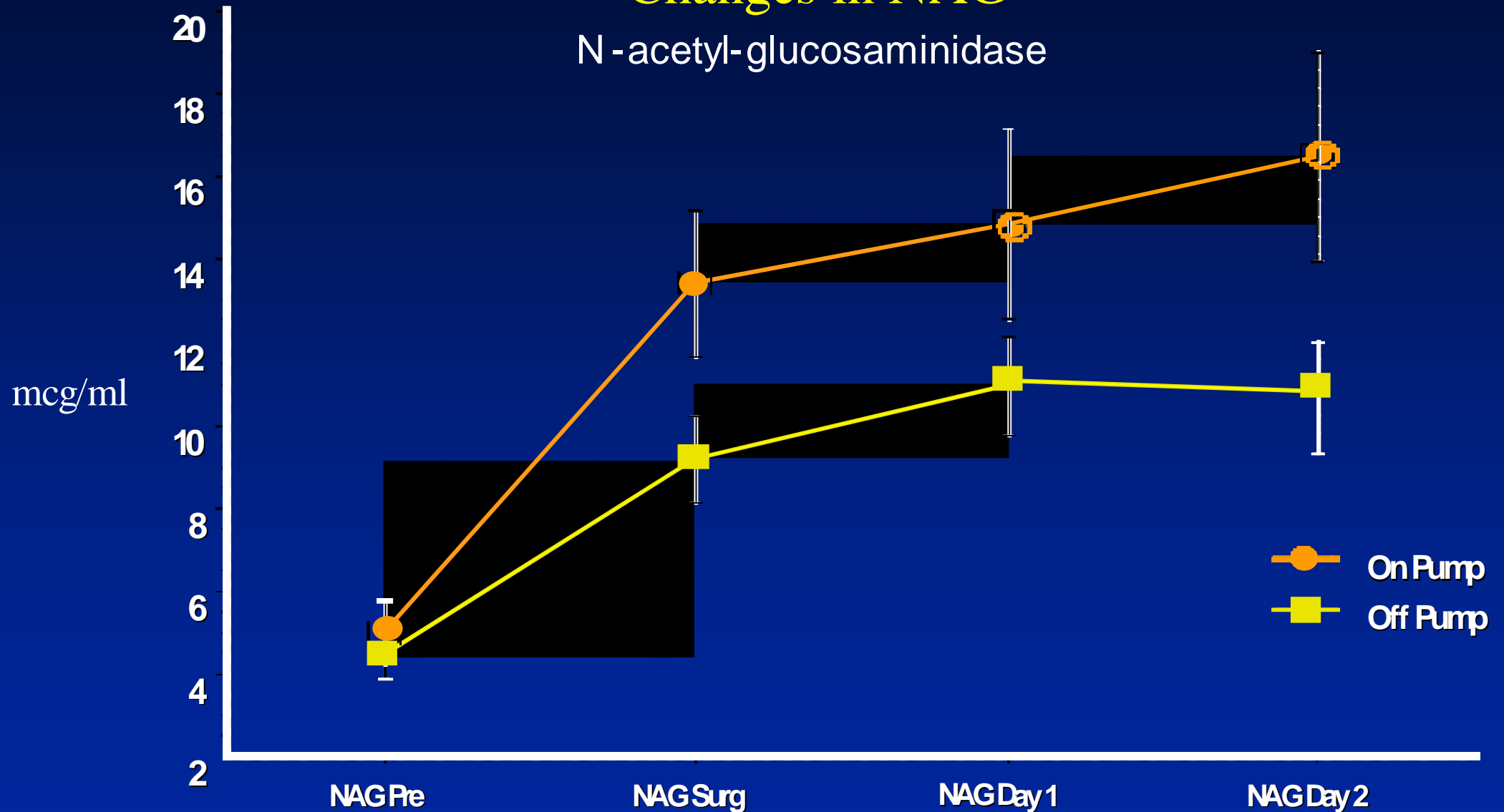


Ann Thorac Surg 2000; 69:140-145.

Renal function

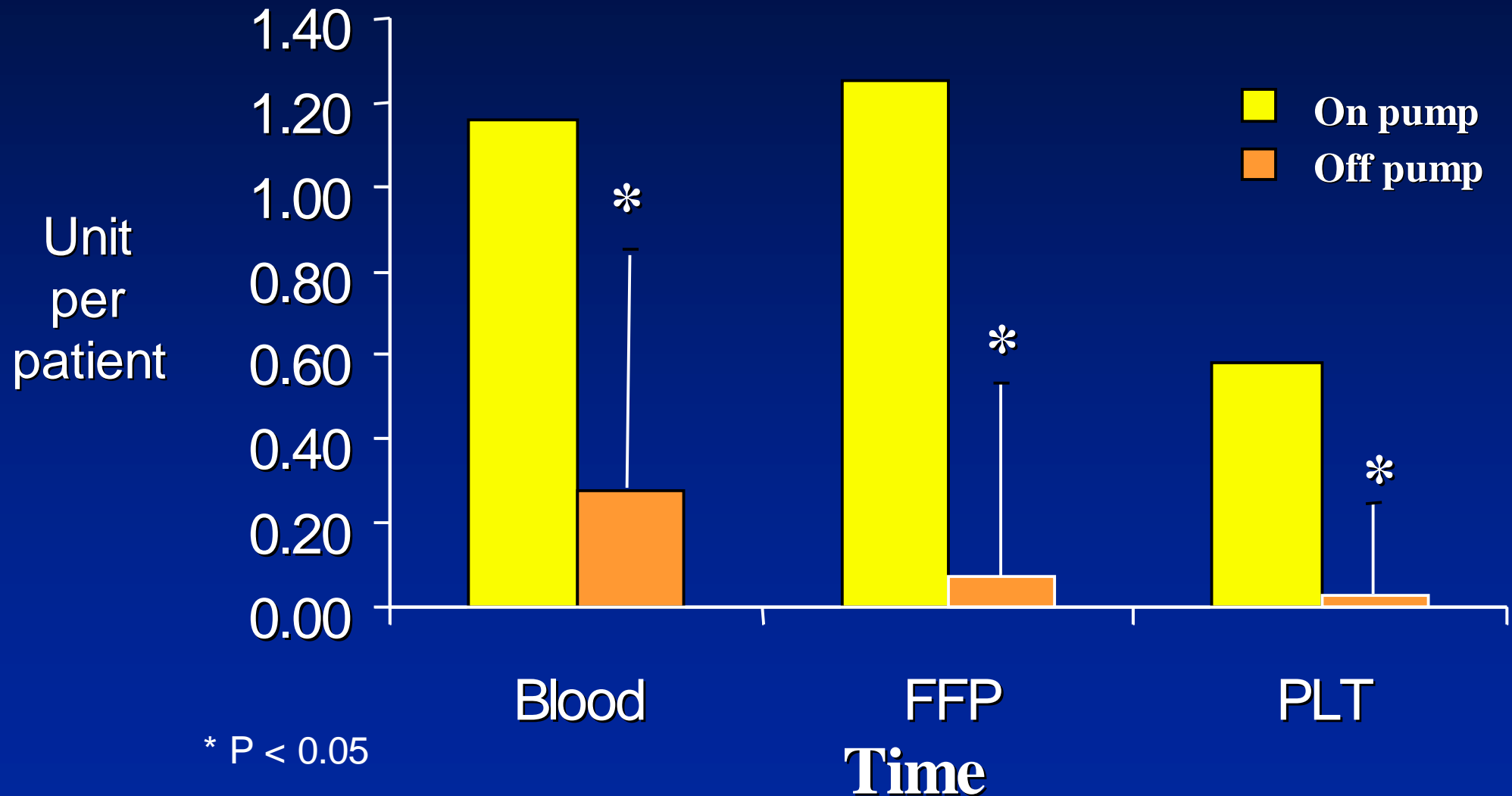
Changes in NAG

N-acetyl-glucosaminidase

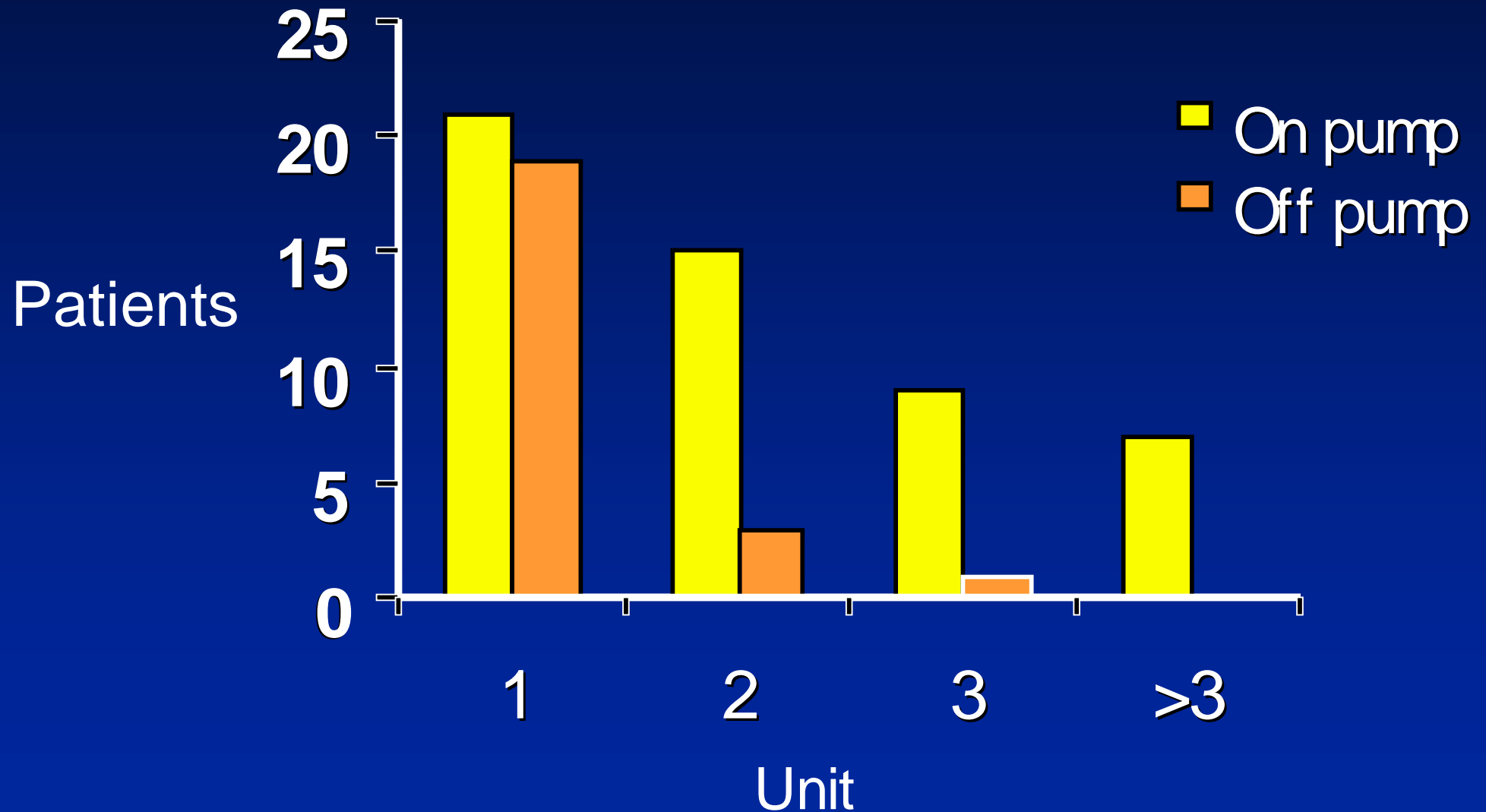


$p = 0.0272$ ANOVA

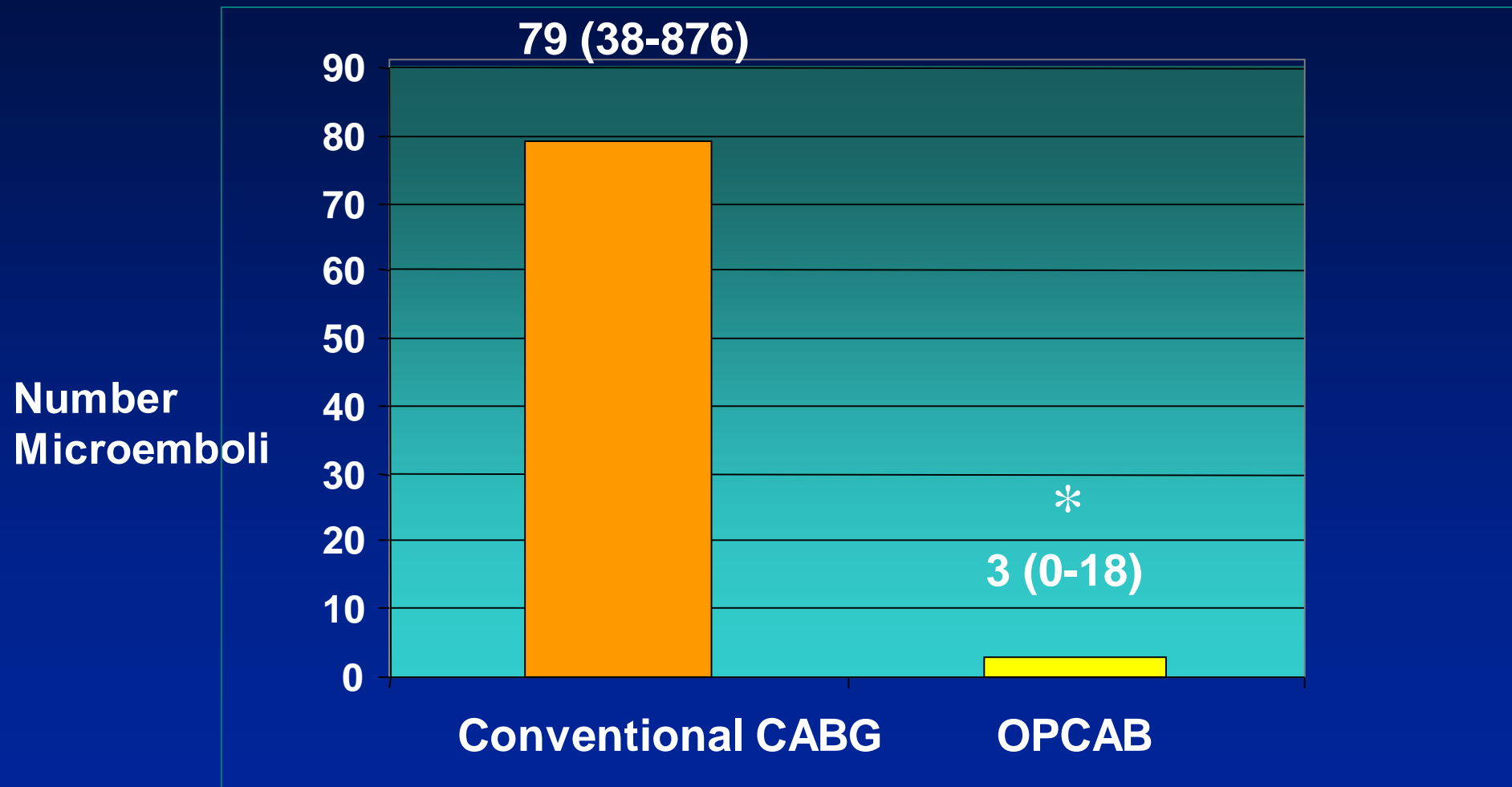
TRANSFUSION REQUIREMENT



RBC TRANSFUSION



Trans-cranial Doppler Ultrasound Emboli counts median (range)



* P <0.001

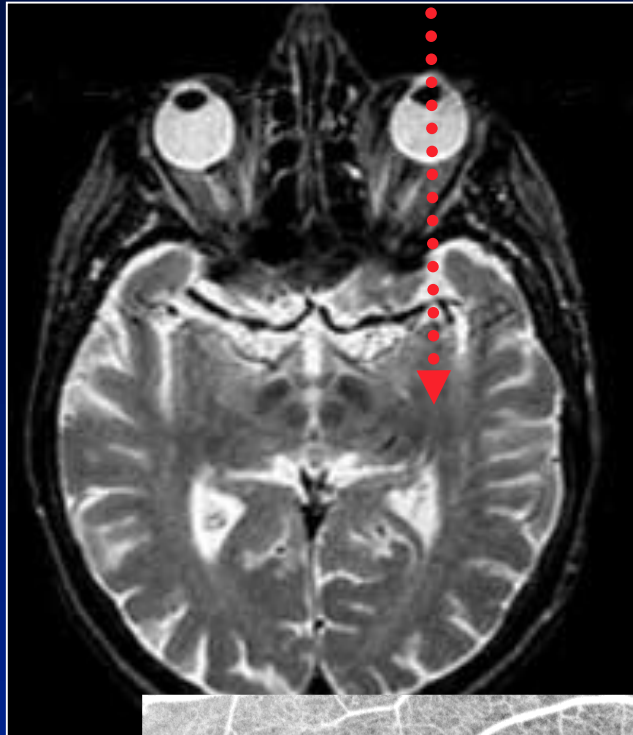
NEW WAYS TO
EXPLAIN
THE **BRAIN**



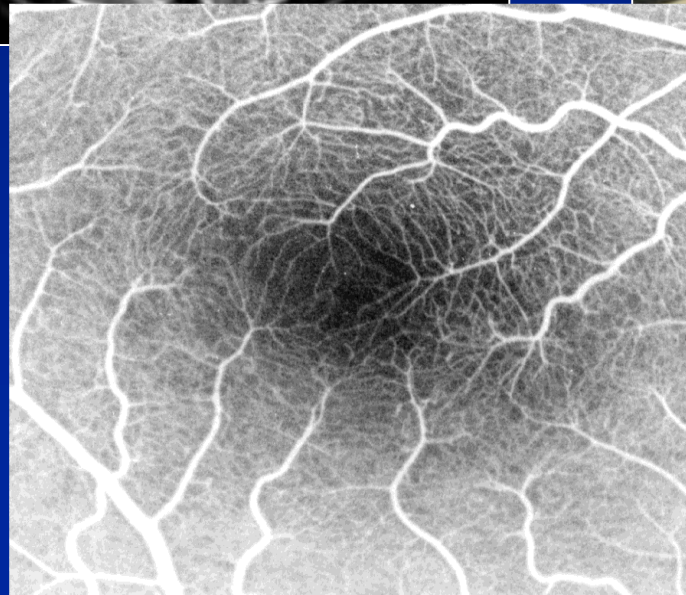
**The brain is my second
favourite organ**

W. Allen

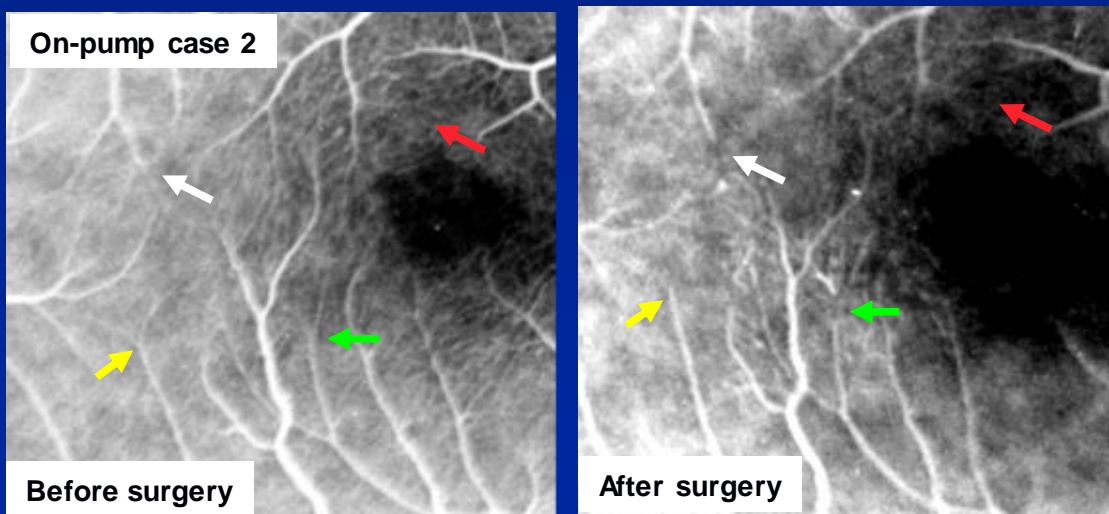
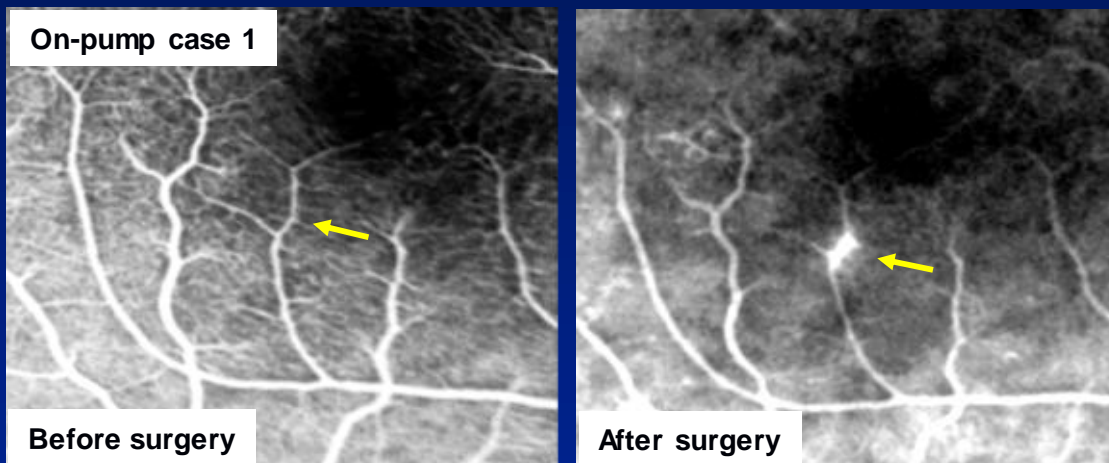
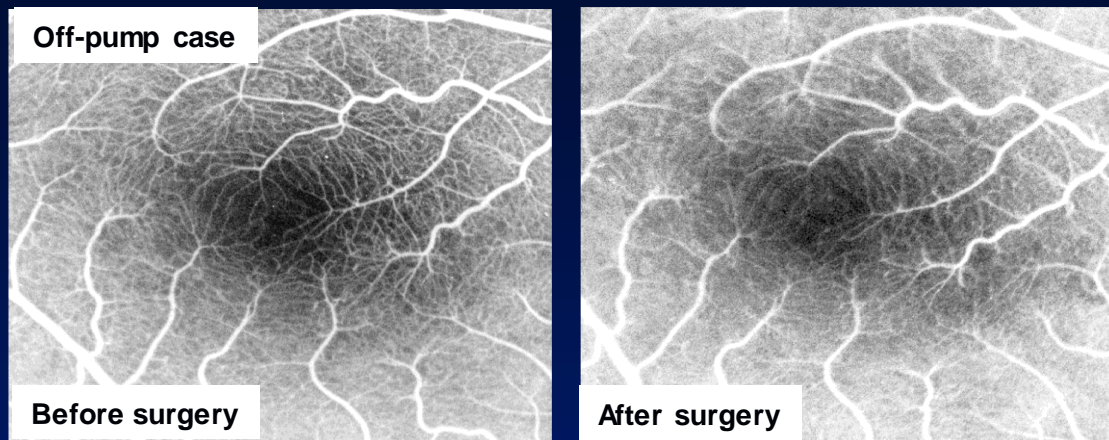
Retinal and cerebral microembolization during coronary artery bypass surgery: a randomized, controlled trial.



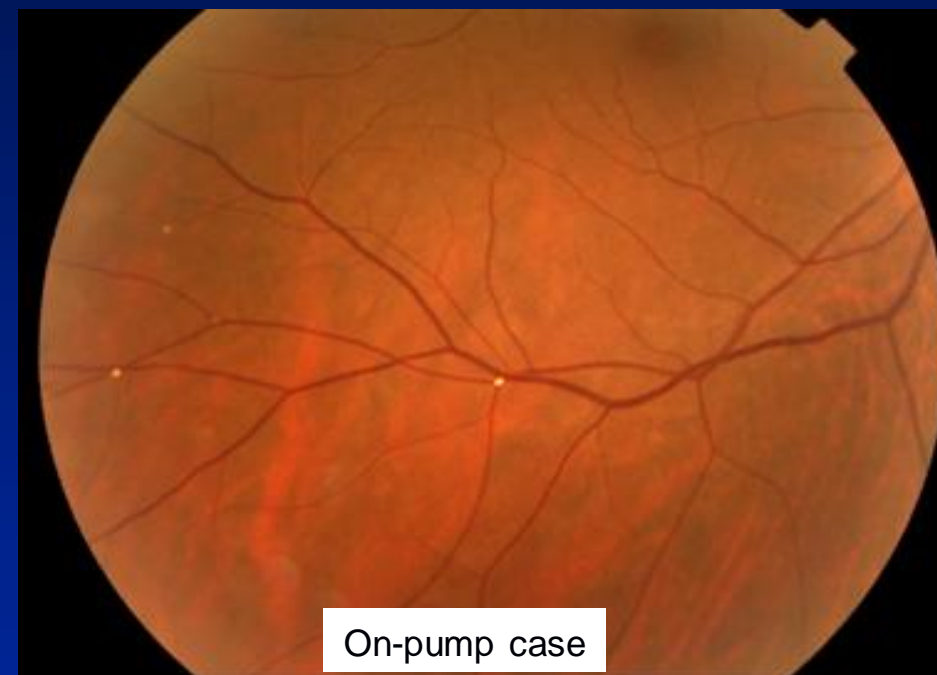
Retinal fluorescein angiography



Retinal fluorescein angiography



Disc photograph

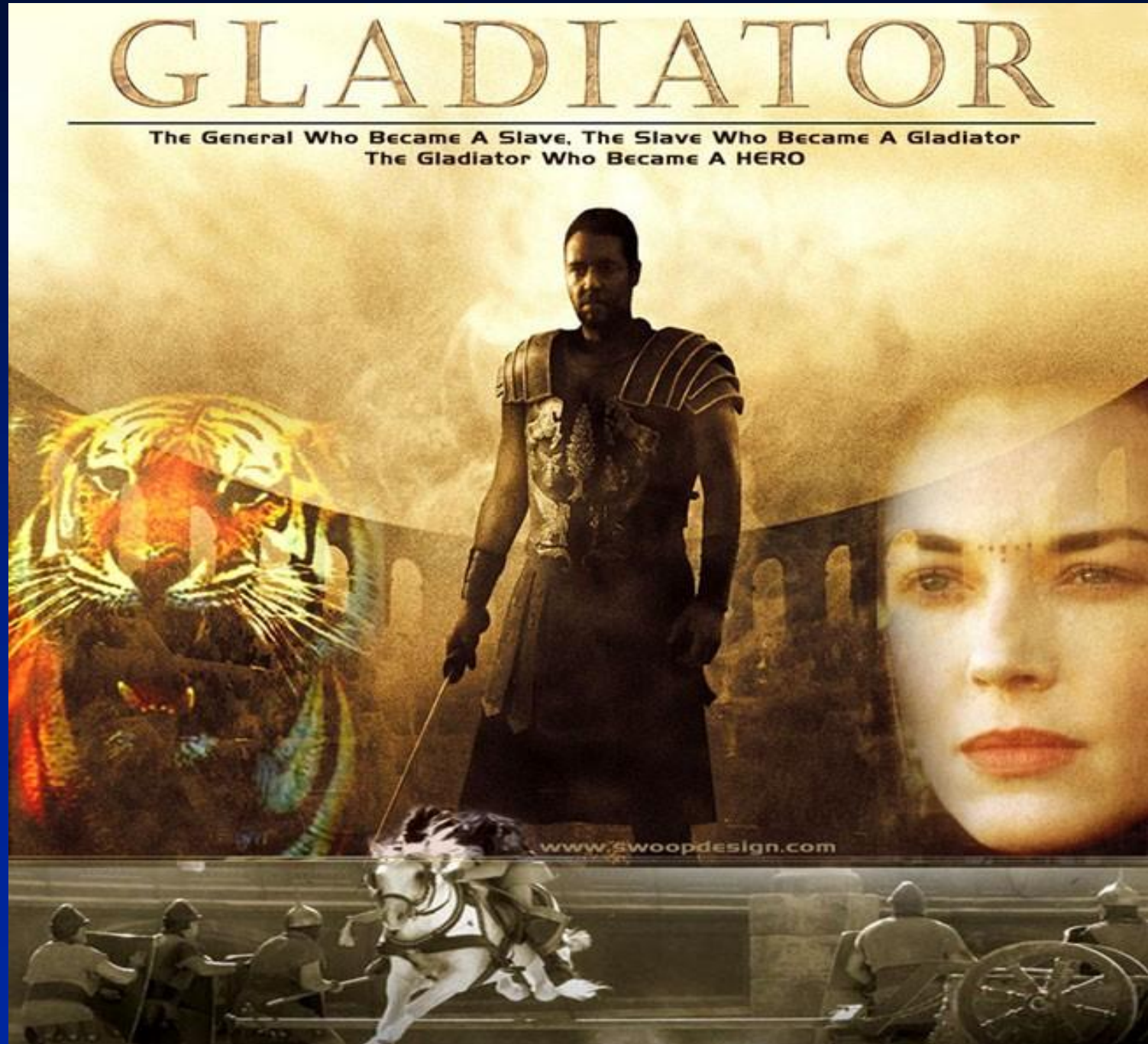


In-hospital outcome

	BHACAS 1			BHACAS 2			Pooled data
	On-pump (n=100)	Off-pump (n=100)	P value	On-pump (n = 101)	Off-pump (n = 100)	P value	Combined RR 95% CI
Deaths	2	0	0.16	0	0	-	0.00 (-)
Inotropes	23	6	0.0006	18	5	<0.0001	0.22 (0.11, 0.42)
Post-op. arrhythmias	49	14	<0.0001	36	17	<0.0001	0.24 (0.15, 0.40)
Chest infection	22	8	0.006	16	8	0.001	0.34 (0.18, 0.63)
Blood loss > 1000 ml	37	21		25	20	0.42	0.58 (0.36, 0.91)
Transfusion Packed cells (> 1 u)	52	22	<0.0001	45	13	<0.0001	0.7 (0.43, 1.0)
Intub. time (> 10 hr)	32	14	0.003	49	36	0.07	0.48 (0.31, 0.74)
ICU stay (> 1 day)	22	7	0.003	18	7	0.02	0.30 (0.16, 0.58)
Hospital stay (day)	7.17±2.3	6.3 ±2.8	<0.05	6.48 ±2.3	6.2 ±1.8	0.12	0.54 (0.98, 0.09)

In-hospital outcome

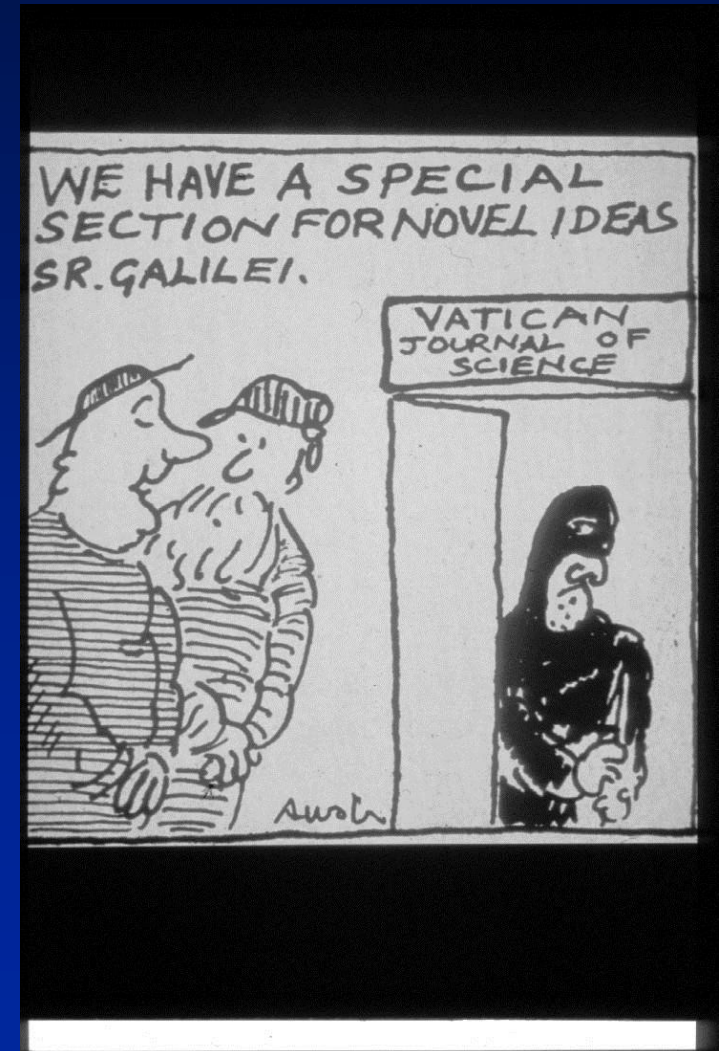
	BHACAS 1			BHACAS 2			Pooled data
	On-pump (n=100)	Off-pump (n=100)	P value	On-pump (n = 101)	Off-pump (n = 100)	P value	Combined RR 95% CI
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It is dangerous to be right in matters on which the established authorities are wrong. (Voltaire)

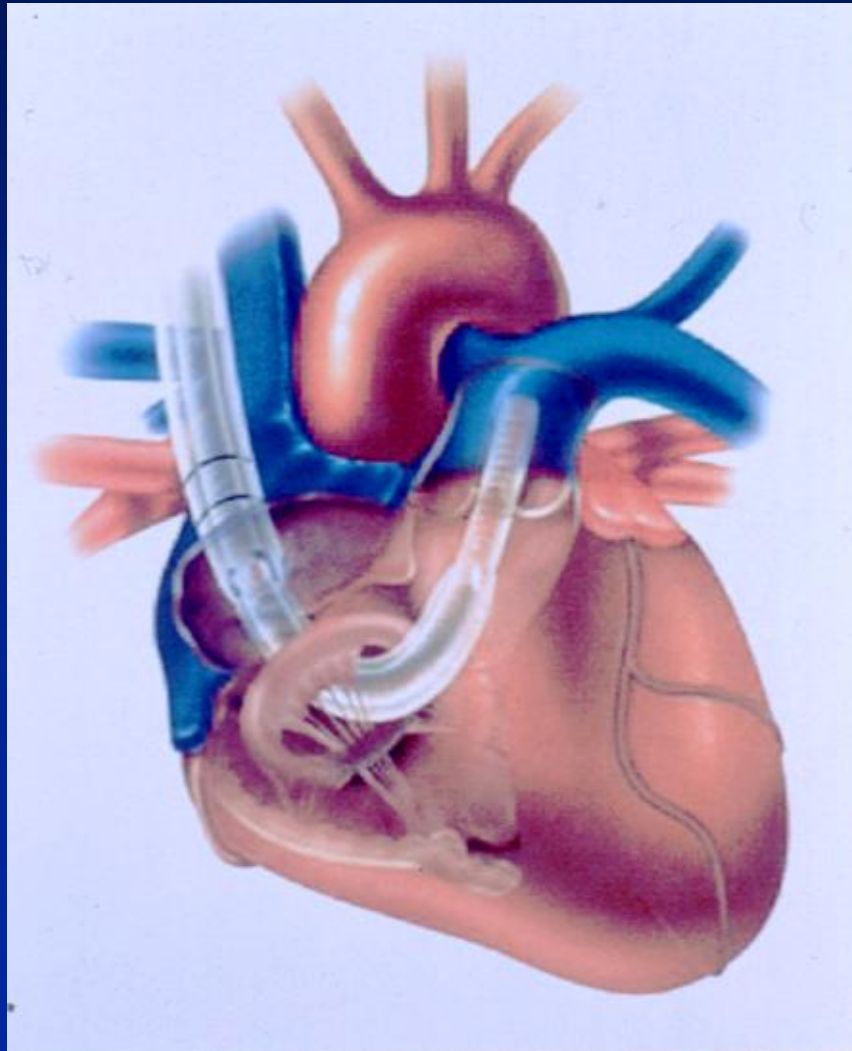


Galileo Galilei 1475-1542



Effect of off-pump coronary surgery with right ventricular assist device on organ function and inflammatory response: a randomized controlled trial

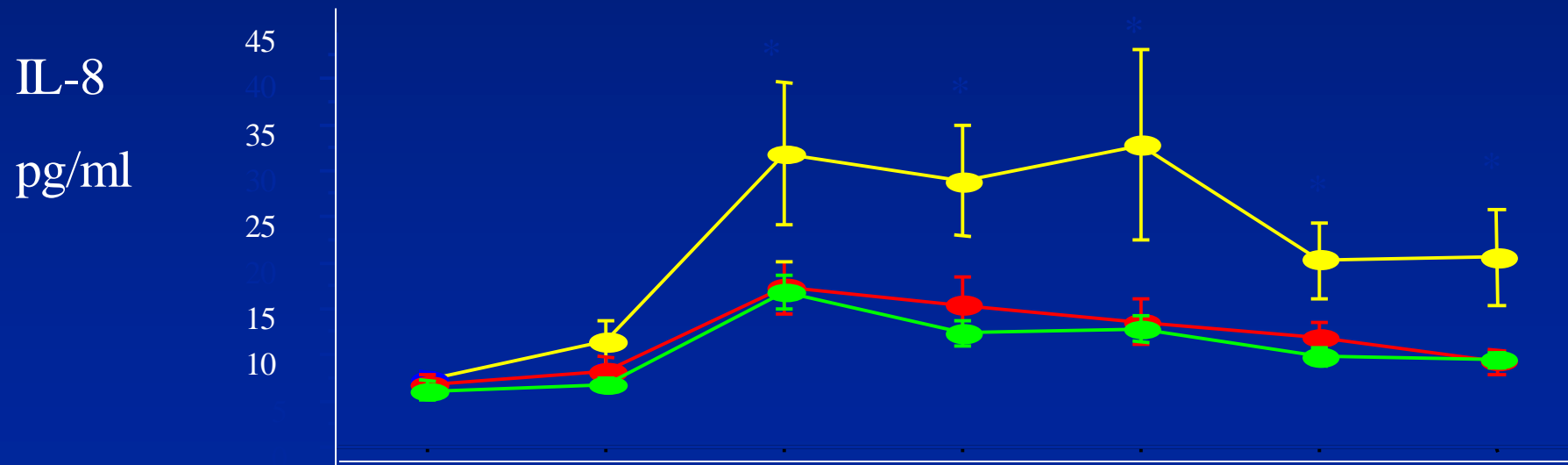
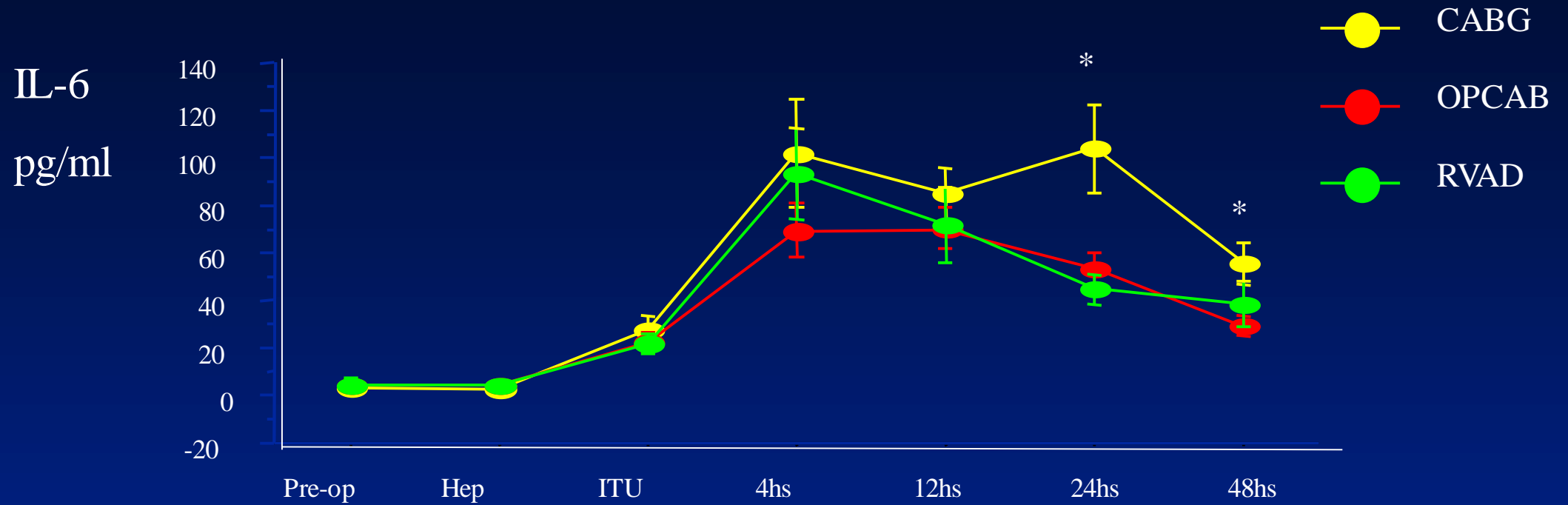
Massimo **Caputo**, Mark Yeatman, Pradeep Narayan, Giovanni Marchetto, Raimondo Ascione, Barnaby C. Reeves, and Gianni D. Angelini



CONCLUSIONS: Off-pump coronary revascularization, with or without RVAD, reduces inflammatory response, myocardial, neurologic, and renal injury, and decreases hemolysis when compared with conventional surgery with CPB and cardioplegic arrest.

Ann. Thorac. Surg. 2002 74: 2088-2095

Inflammatory markers: IL-6, IL-8.



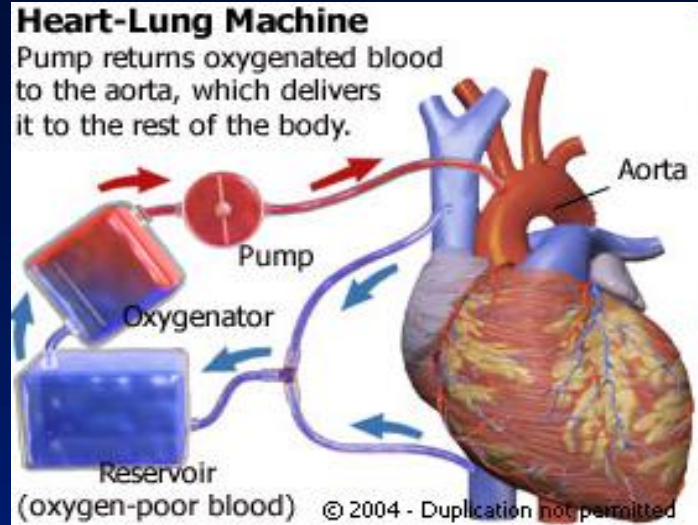
p=0.01 vs OPCAB and RVAD groups

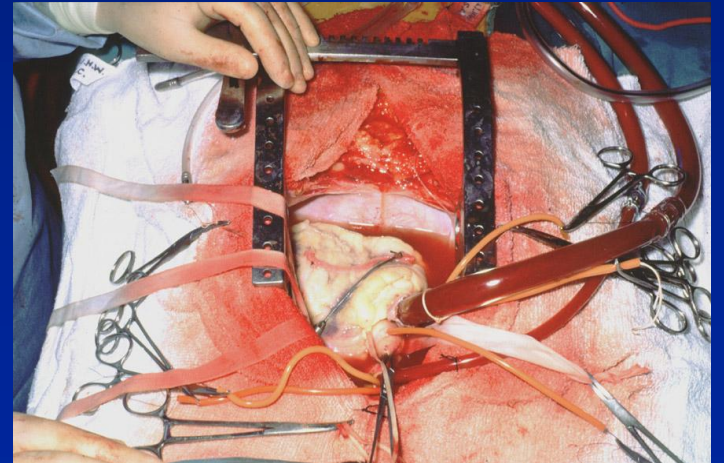
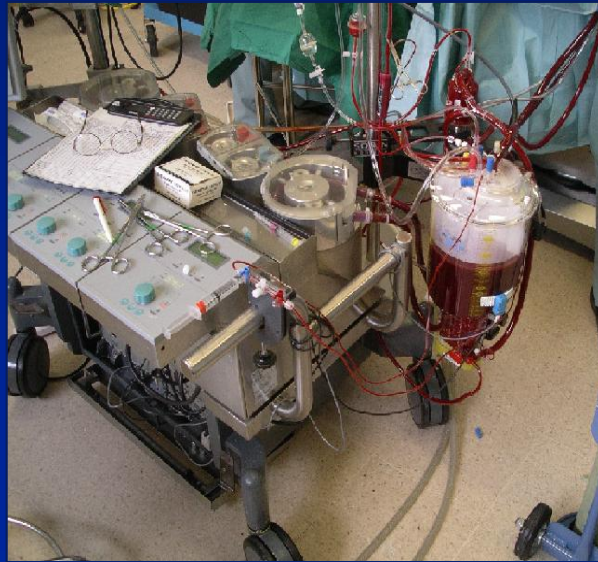
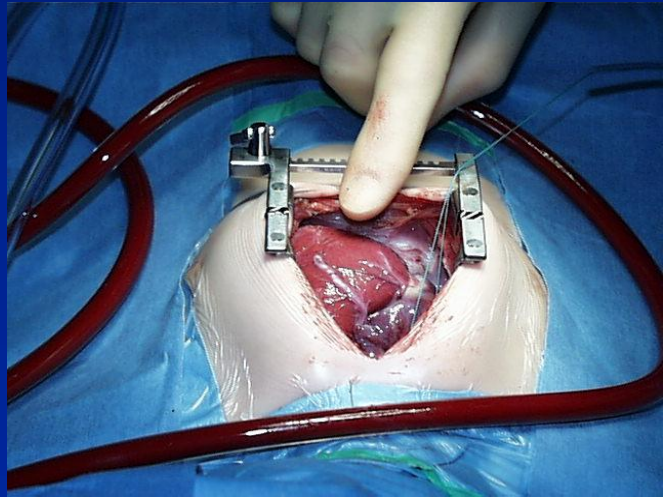
Heparin coated circuit
Mini CPB (reduced prime,
no reservoir....)

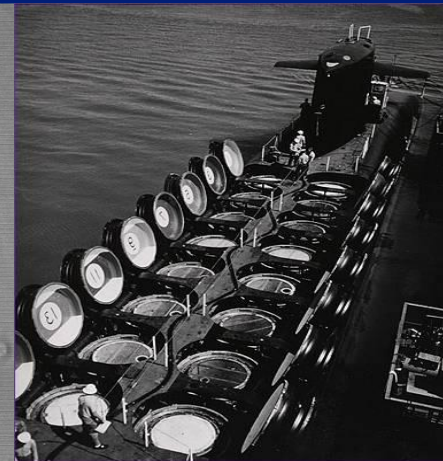
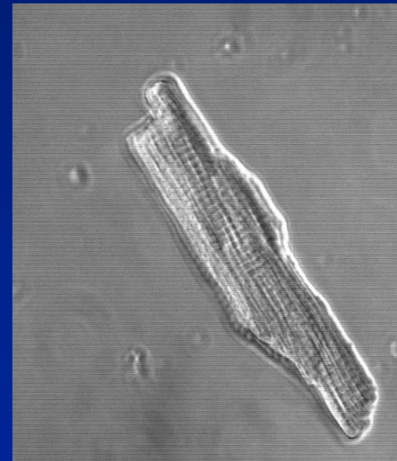


Raphael portrait of a pregnant woman c.1506

Mini CPB







Circulation 2001;103:1551-1556
Ann Thorac Surg 2002;74:1998-2002.
JCTS 2004;128:67-75.
Ann Thorac Surg 2006; 81: 943-949.
EJCTS 2006;29;941-947

Normothermic open-heart surgery



JCTS 2004;128:67-75.

JCTS 2004;127:963-969.

Ann Thorac Surg 2005; 80: 982-988

Br J Pharmacol 2008; 153:21-33.

JCTS 2009;137:1530-1537.

Normoxic Cardiopulmonary bypass



Oxygen Saturation < 80%

JTCS 2002;124:1035-1036

J TCS 2009;138:206-216.

JTCS 2010 [Epub ahead of print] PubMed PMID: 20416888

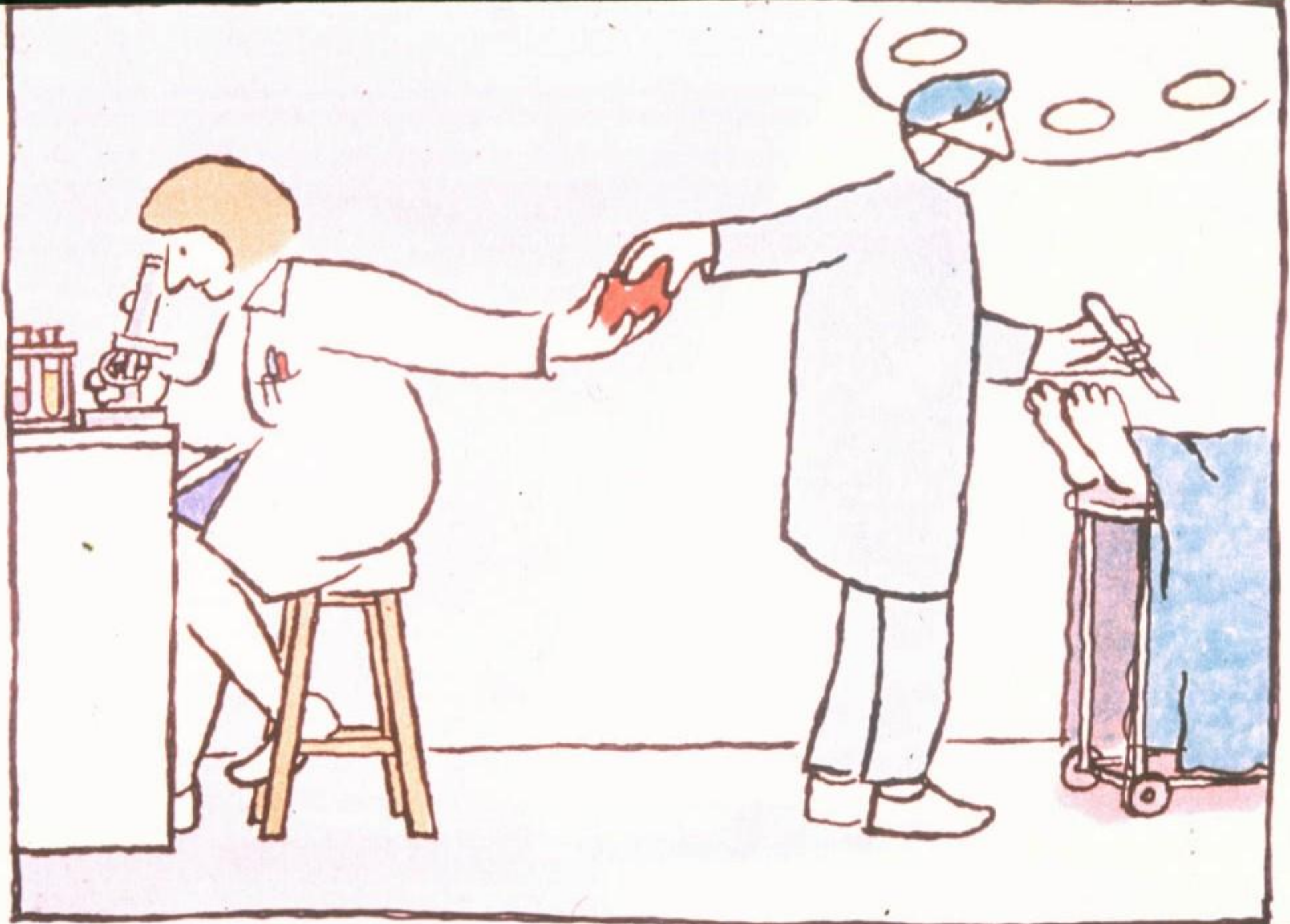
Cures all known diseases

**Ridiculous
Idea**

**Good
Treatment**

Would not use it on my dog







Te best is yet to come.....!



British Heart Foundation

Garfield Weston Trust