

Guideline compliance, utilization trends and device selection

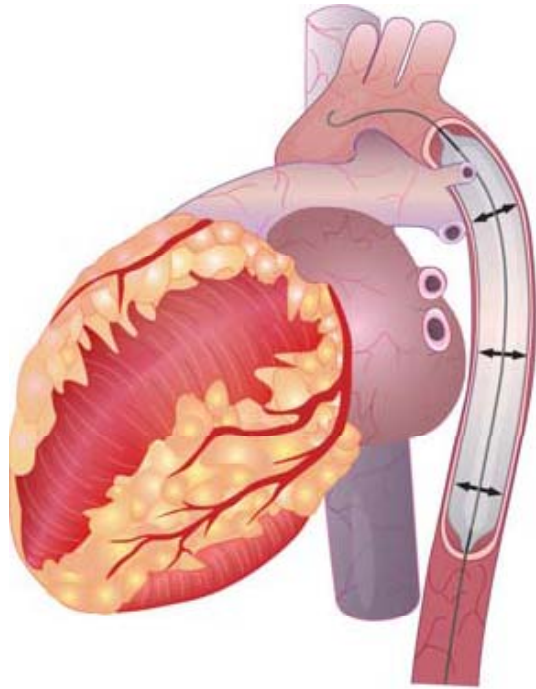


Tilmann Schwab
Cardiology / Intensive care

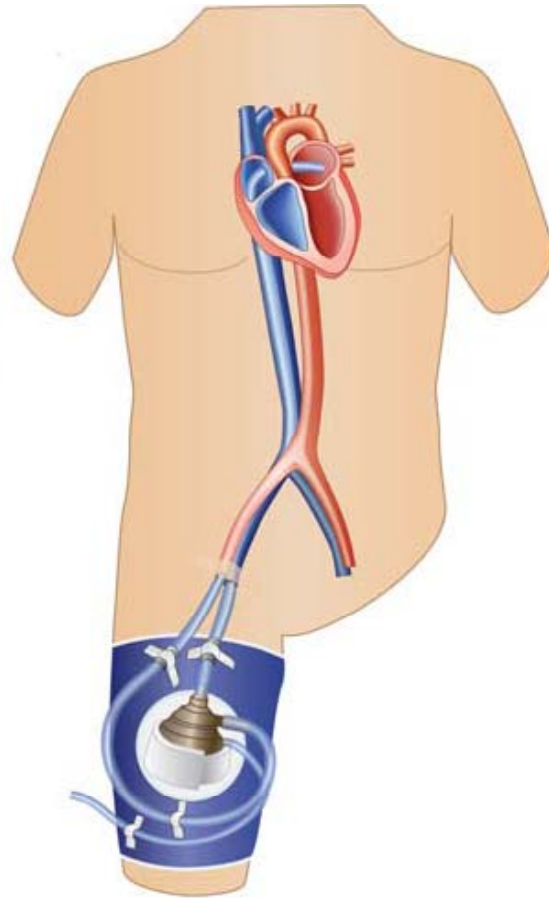
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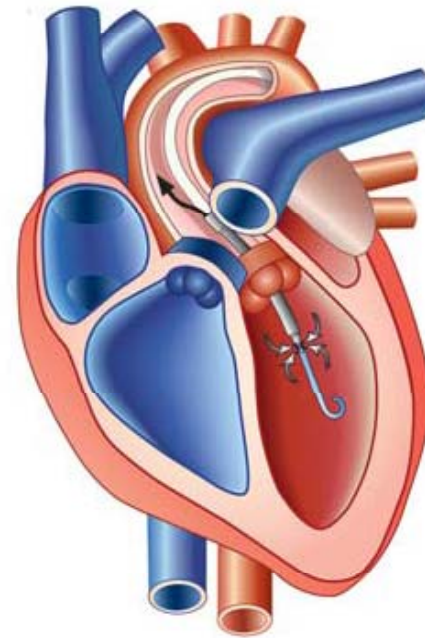
Cardiac support



IABP



LVAD

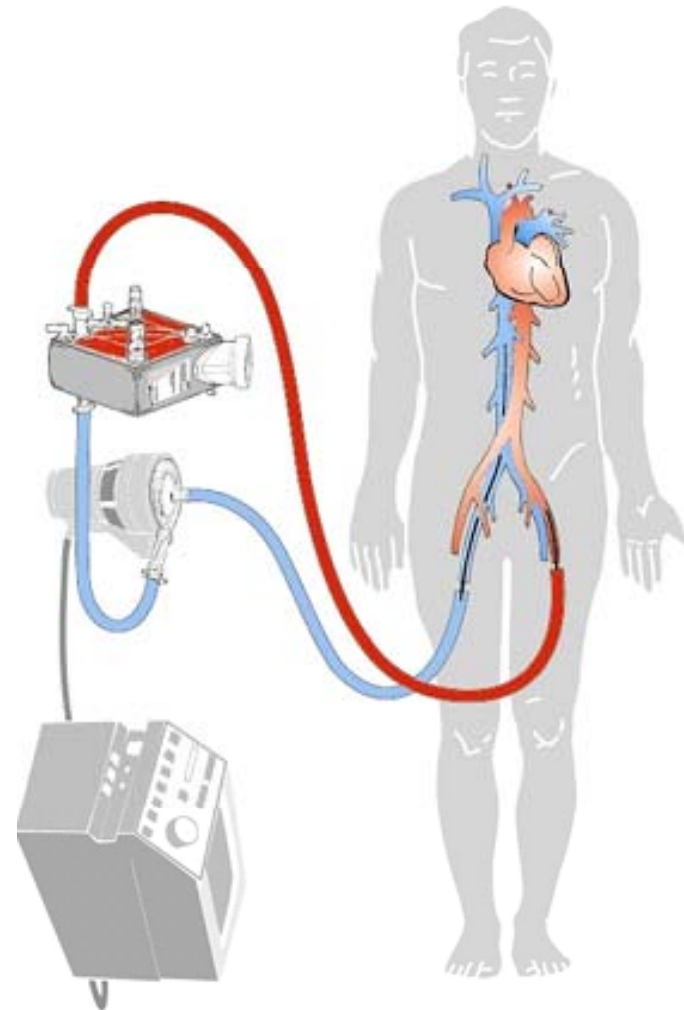
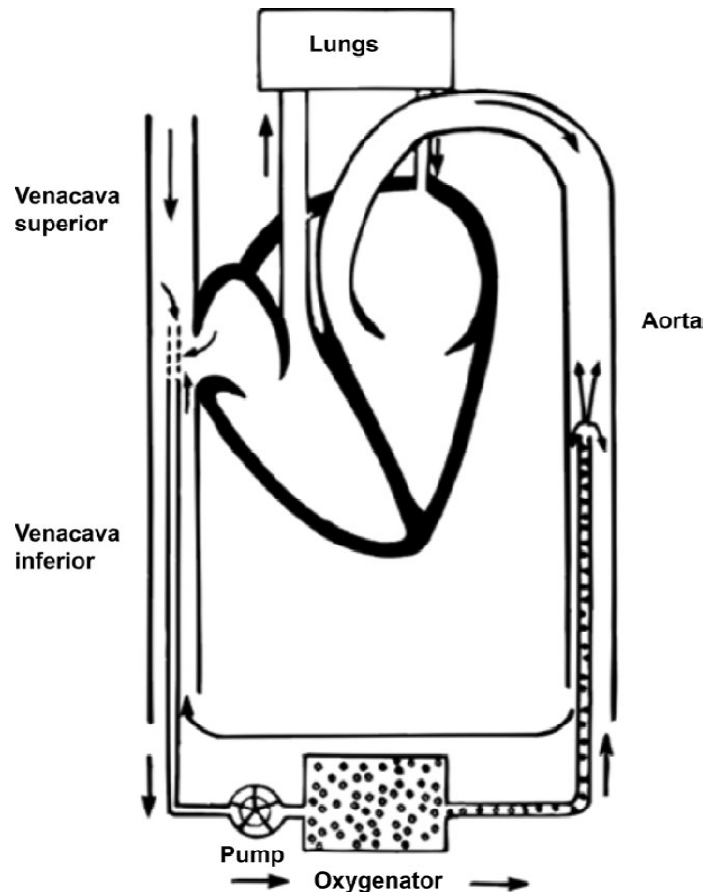


Transluminal LVAD

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Cardiac support



Emergency cardiac life support (ECLS)
cardiopulmonary support (CPS)

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Guidelines state

intra-aortic balloon pump (IABP) or cardiopulmonary support (CPS)

Elective high-risk PCI can be performed safely without IABP or CPS

Emergency high-risk PCI such as direct PCI of acute MI can usually be performed without IABP or CPS.

CPS for high-risk PCI for example in cardiogenic shock situations.

Patients with borderline hemodynamics, ongoing ischemia, or cardiogenic shock IABP → improved outcomes.

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Briguori, et al. *Am Heart J* 2003; 145:700-7

Mishra S., Chu W., Torguson R, et al. *Am J Card.* September 2006;5:608-612

But what is High-Risk PCI ?

Definition

Ongoing Hypotension SBP ≤ 90 mmHg

LV Dysfunction (EF $\leq 30\%$)

Large area of myocardium at risk, (jeopardy score > 8)

Ongoing ischemia

Multi-vessel disease

Unprotected left main lesion

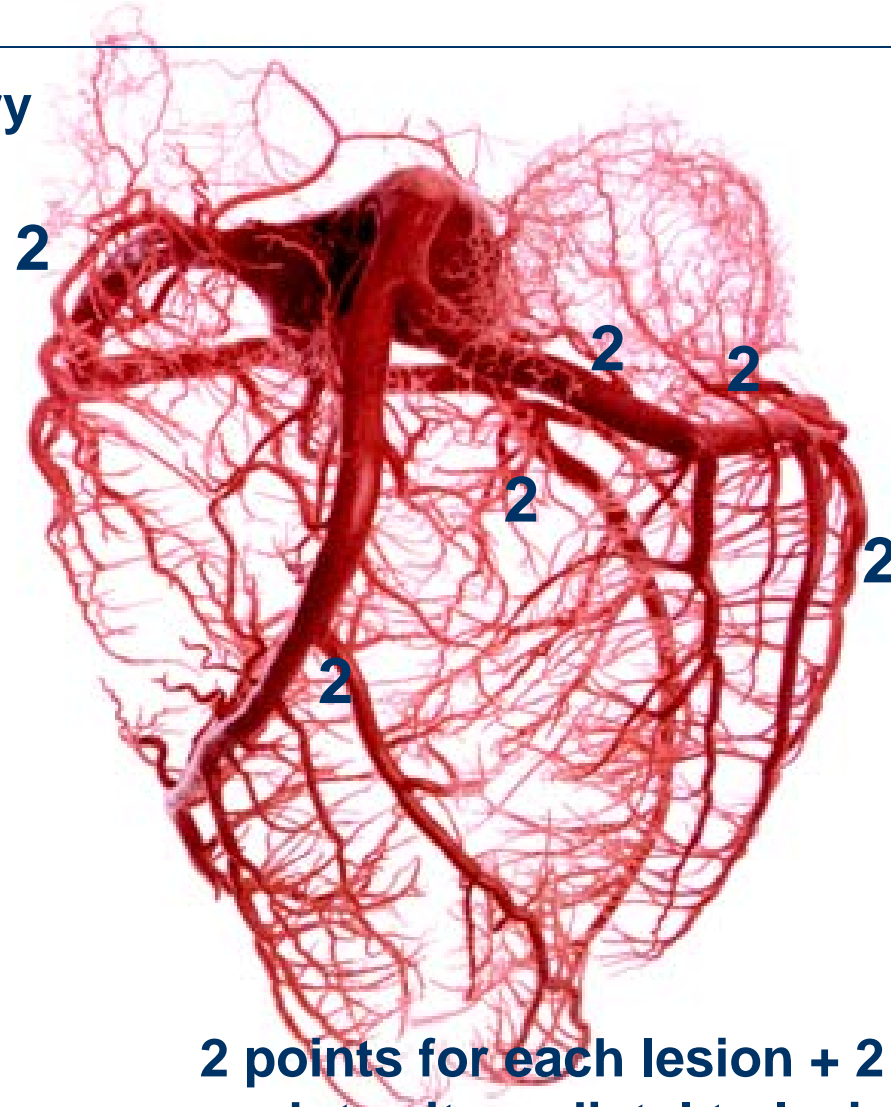
Acute coronary syndrome

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Jeopardy Score

6 Major Coronary Segments



2 points for each lesion + 2 for each territory distal to lesion

Califf et al JACC 1985;5:1055-63

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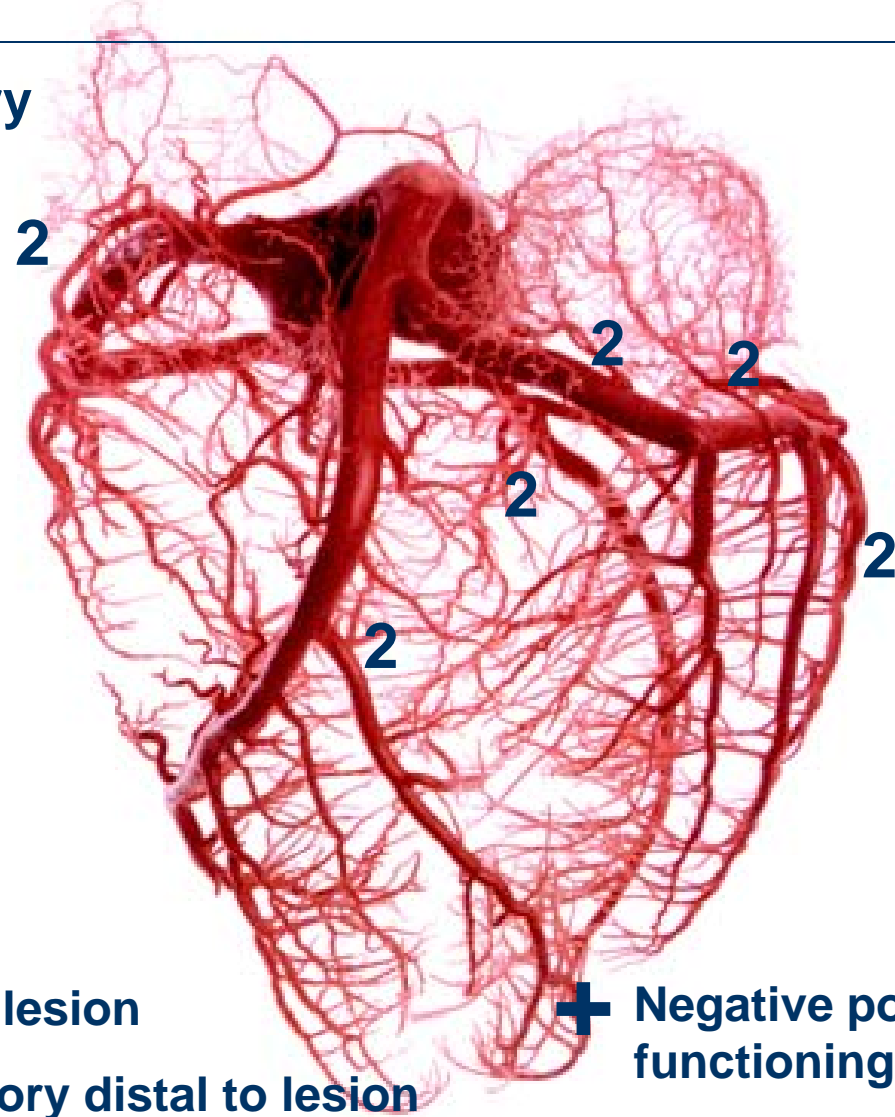


BCIS-1 Jeopardy Score

Allows LM and Graft Classification



6 Major Coronary Segments



2 points for each lesion

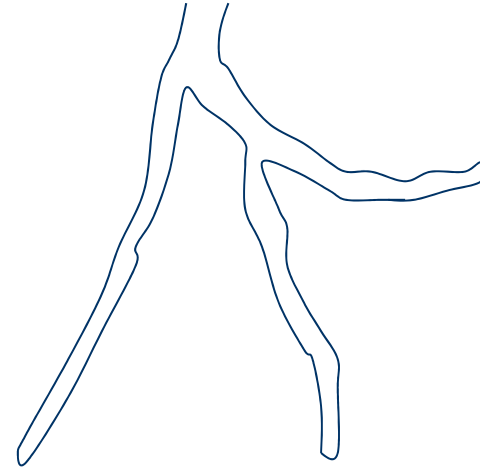
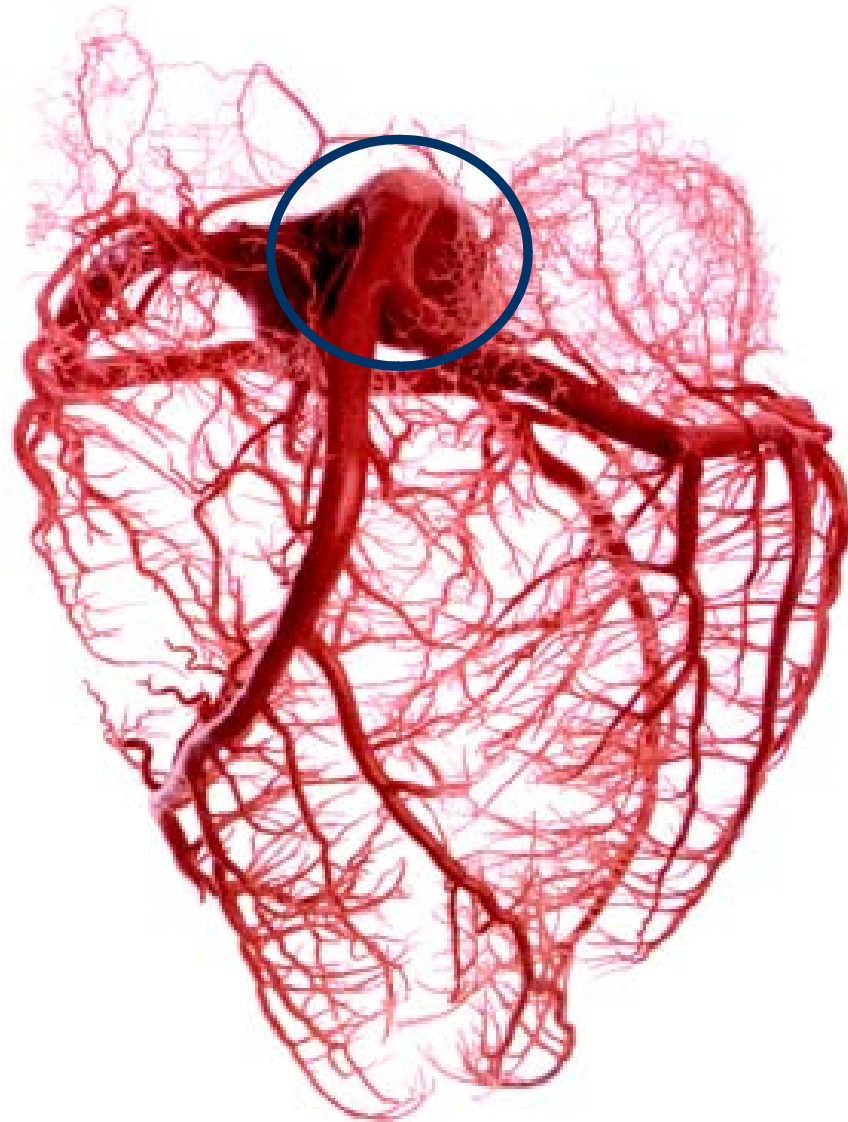
+ 2 for each territory distal to lesion

+ Negative points for functioning grafts

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High risk PCI

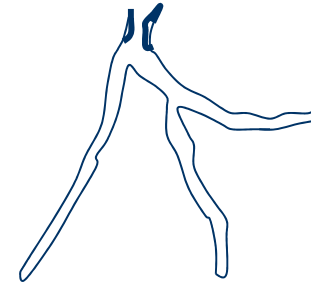


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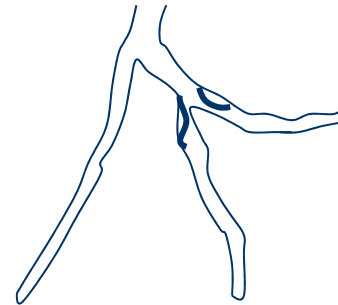


High risk PCI

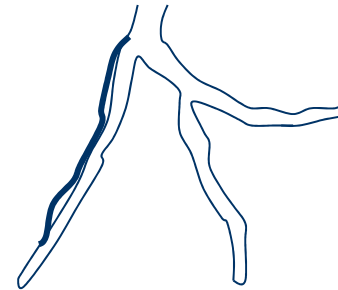
Main vessel interventions



Kissing Intervention (bifurcation)



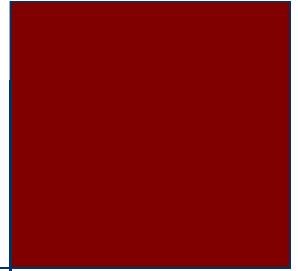
Reconstruction interventions



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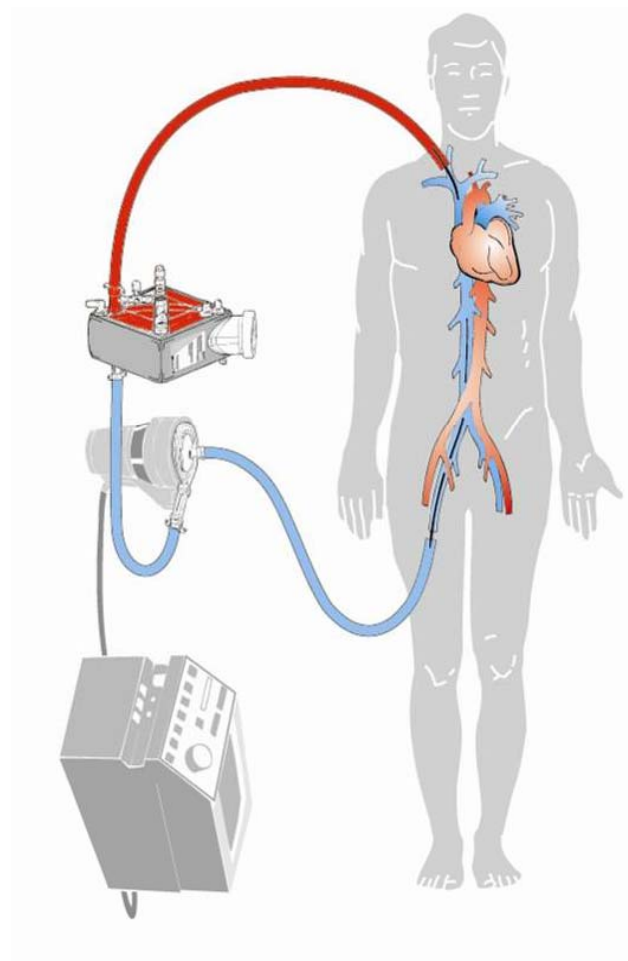
Cardiac support



intra-aortic balloon pump (IABP)



cardiopulmonary support (CPS)



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intra-aortic balloon pump (IABP)

reduction of the systolic afterload

**Assistance of the diastolic
Perfusionspressure**

> 10% -40% in cardiac output

**More diastolic bloodflow in the coronaries
> 65%**

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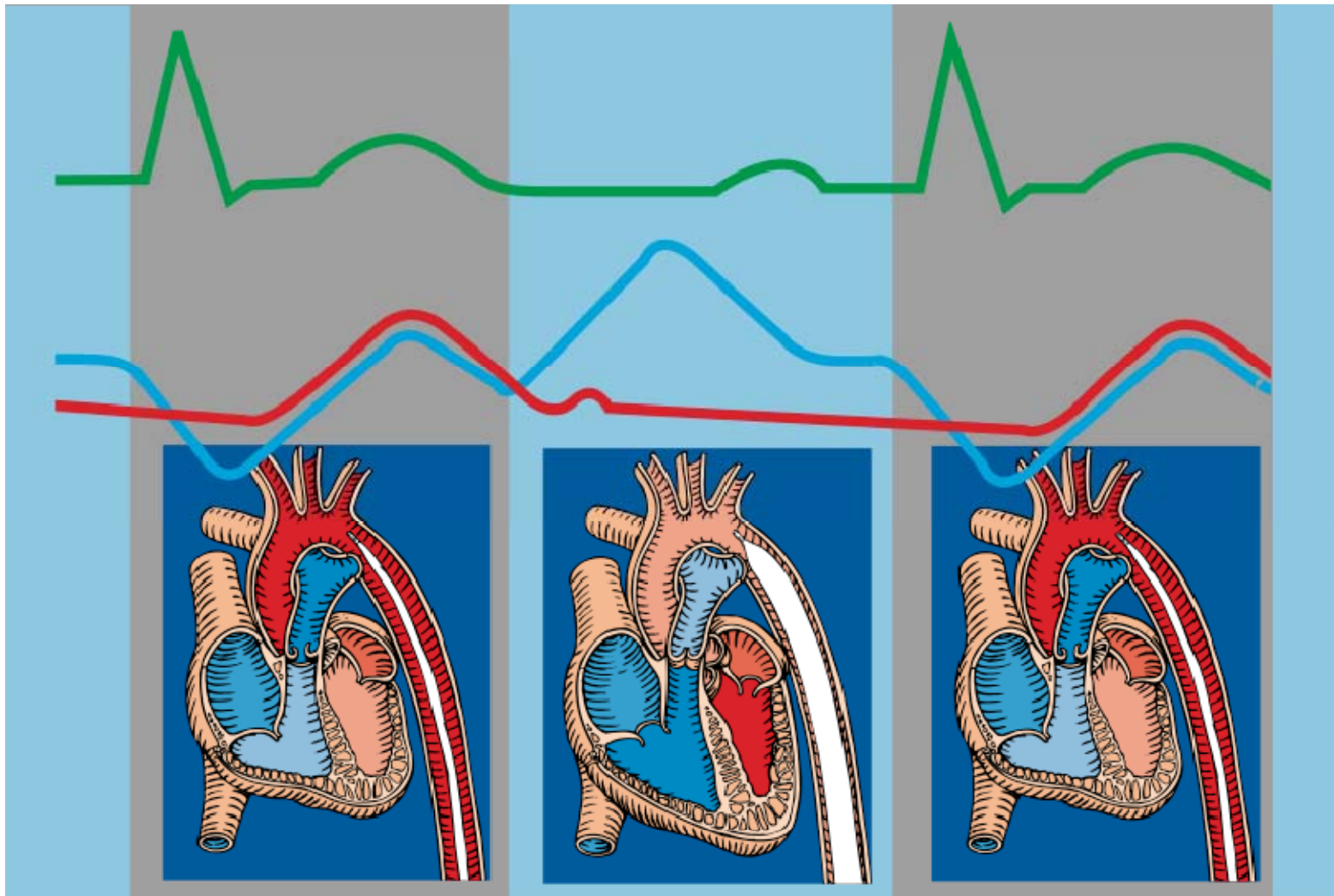
Mueller H et al. J Clin Invest 1971;50:1885
Scheidt S et al N Engl J Med 1973;288:979



**Systole /
Deflation**

**Diastole /
Inflation**

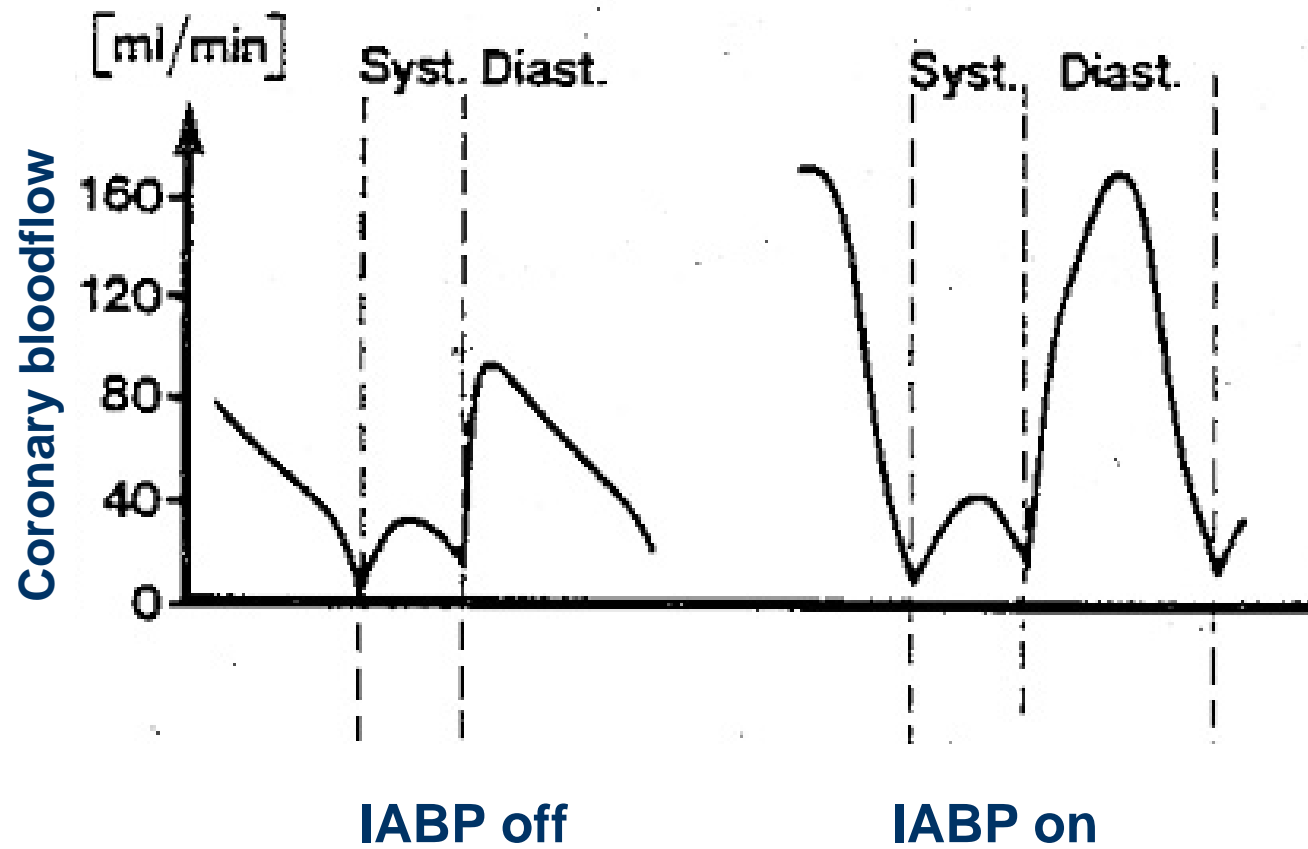
**Systole /
Deflation**



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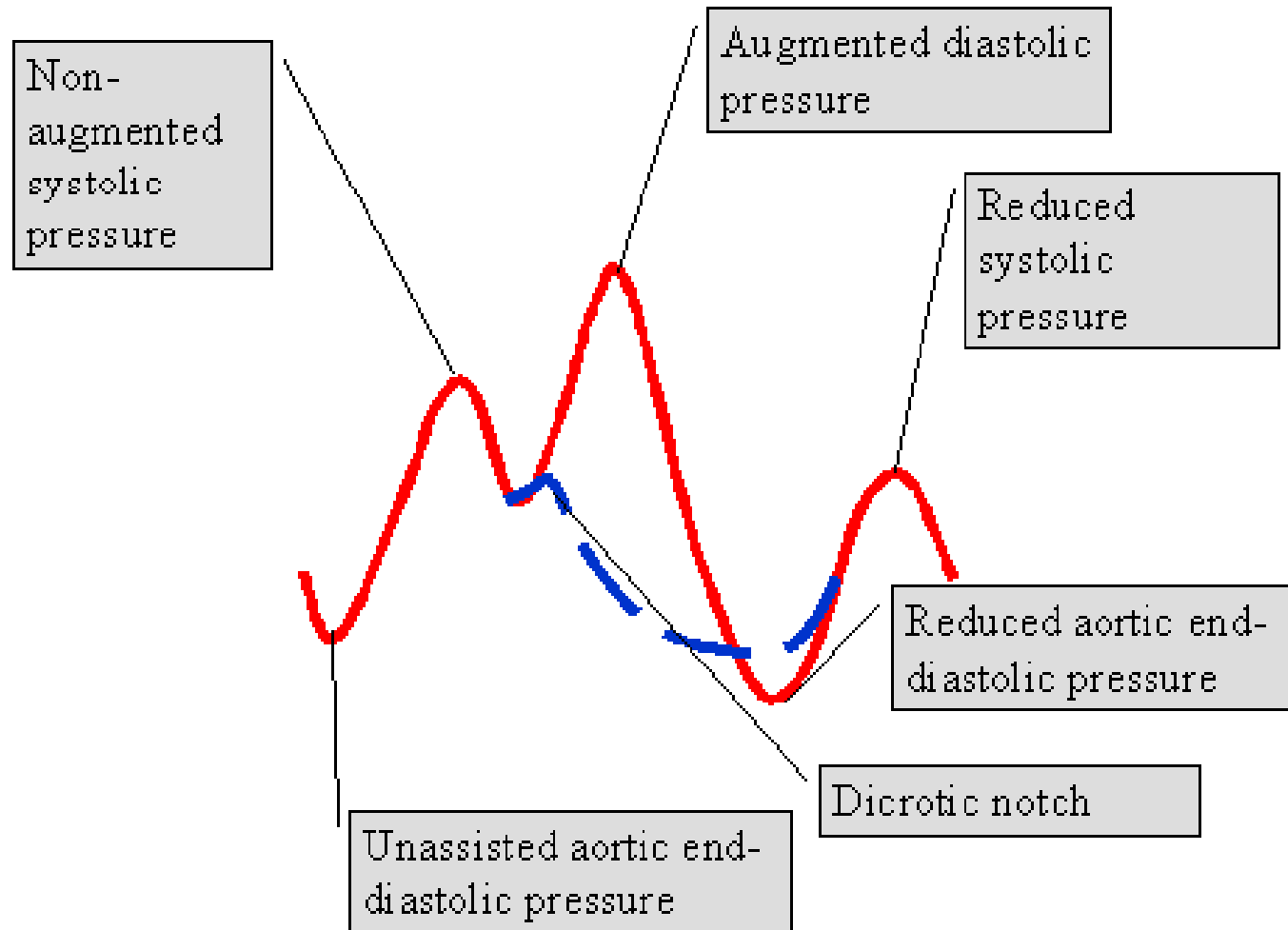
Coronary Perfusion



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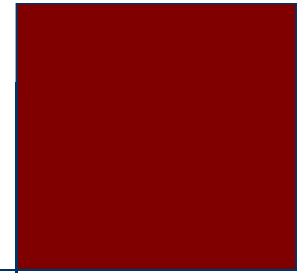
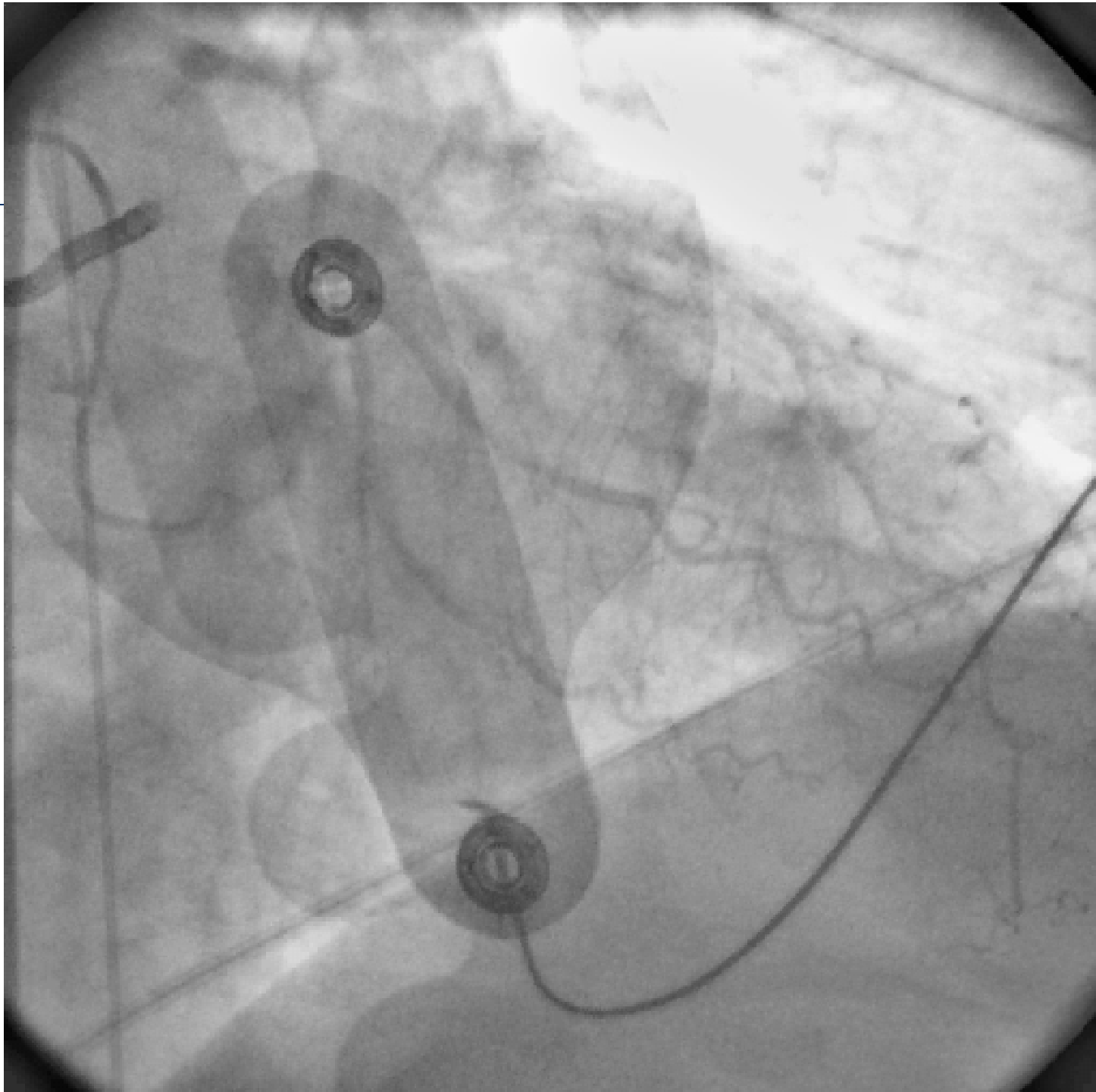


IABP-Wave



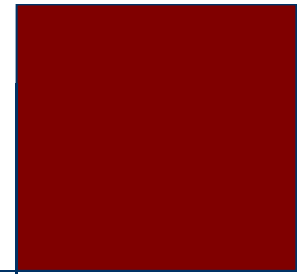
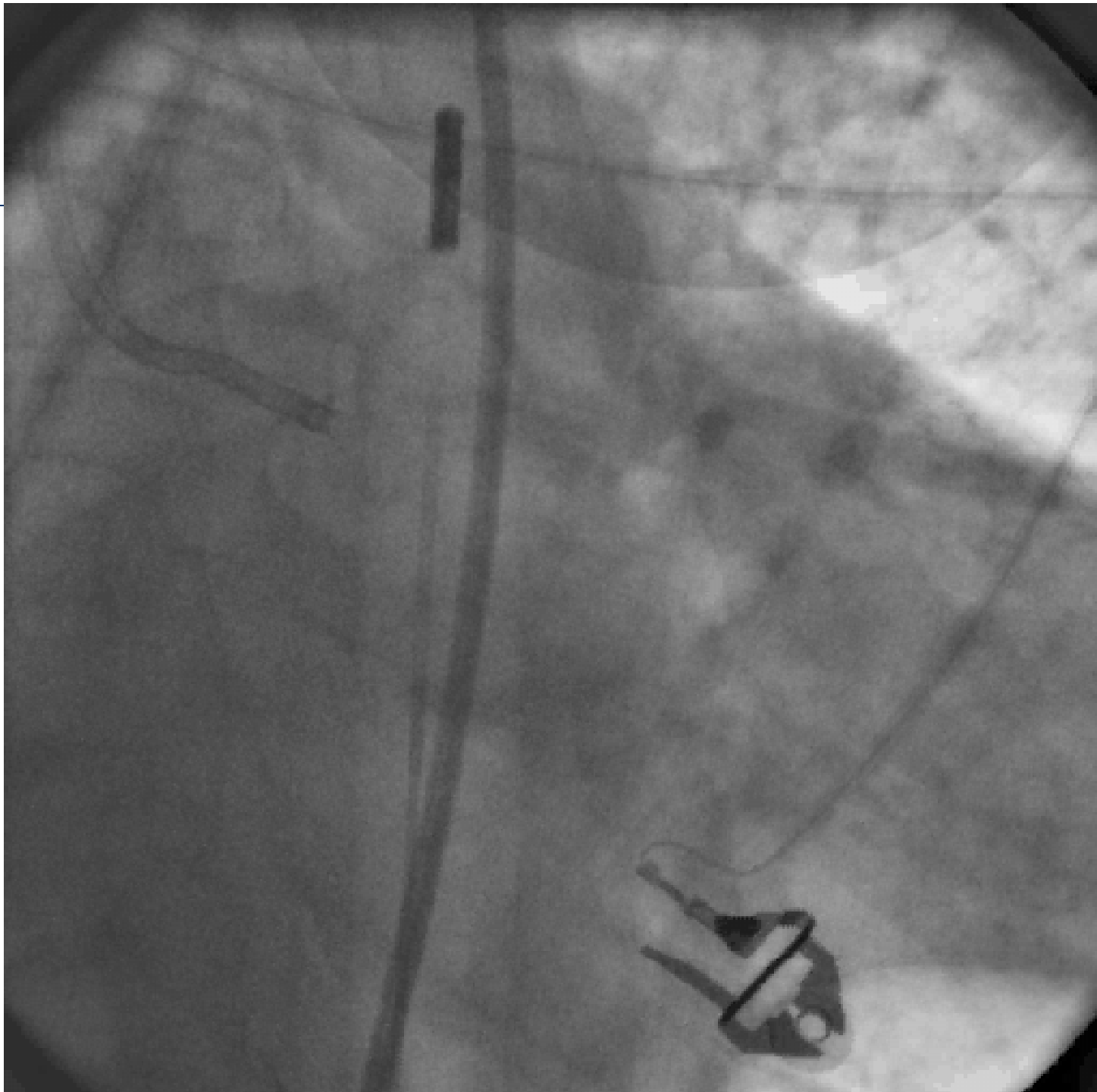
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IABP Limitations

Lowest output

Nowflow, Cardiac arrest

Recurrent malignant Arrhythmia

Vascular limitations

But..... „Bridge to bridging“

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...so, whats the state ?

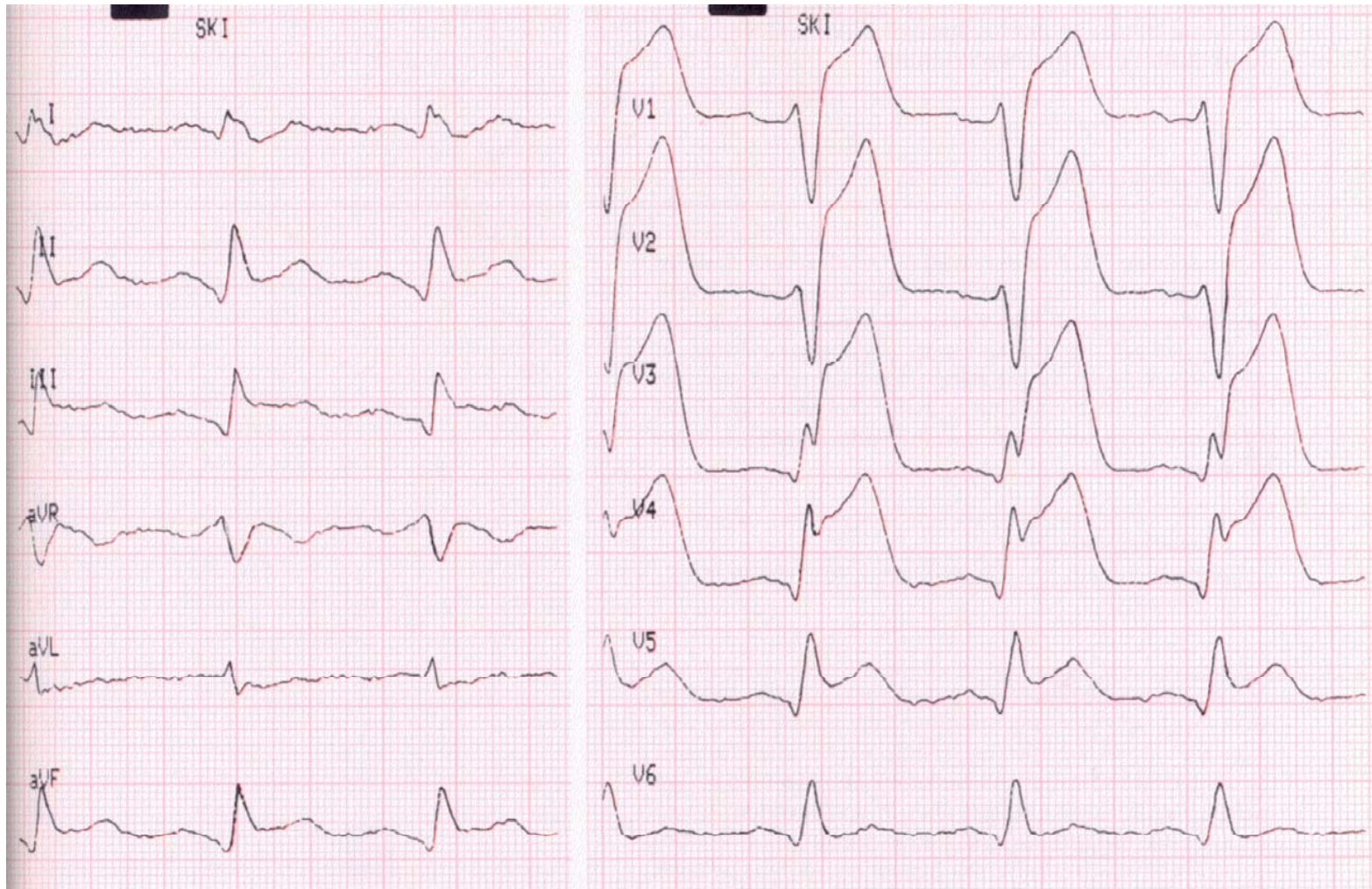
Bridging to



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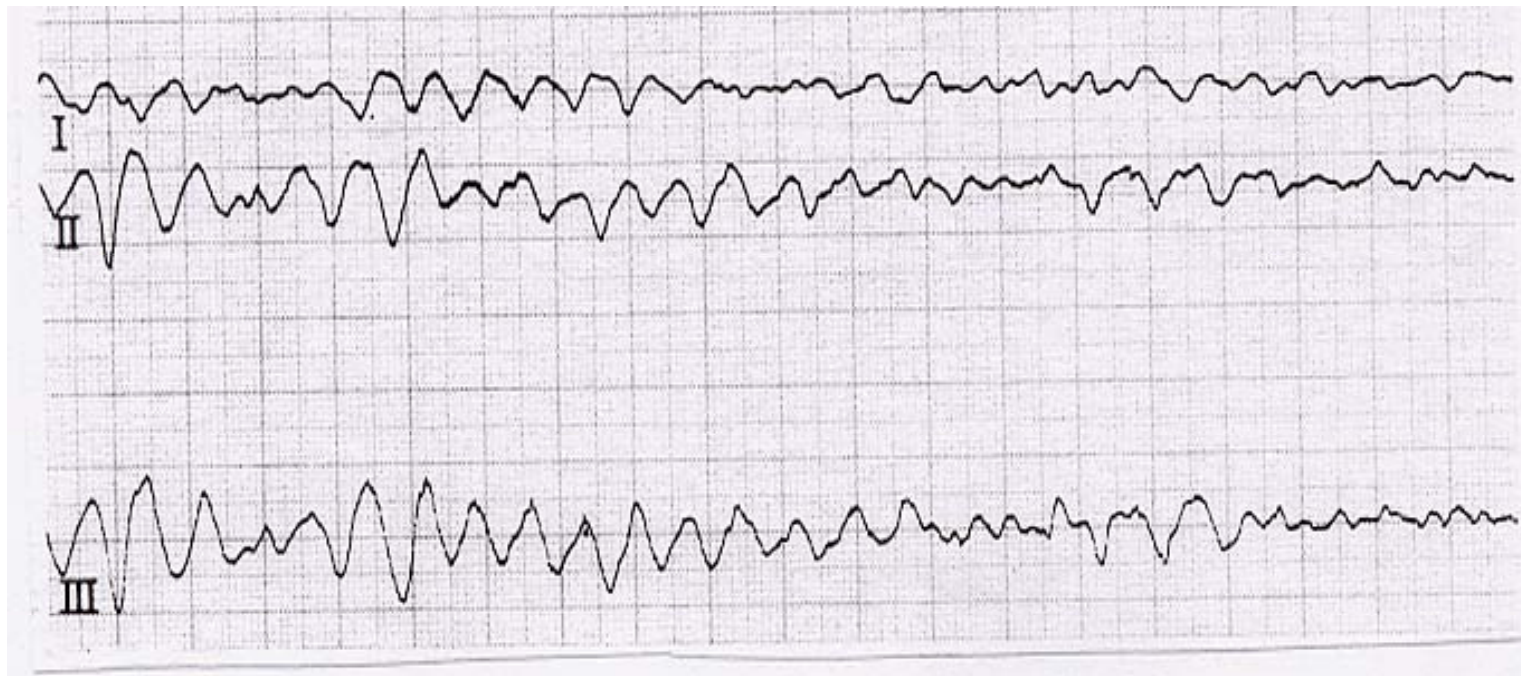
Case



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suddenly



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Case

52 year old male

Wake-up with heavily chestpain and dizziness

Emergency team ECG with sign of anterior STEMI

In the cathlab instable situation → IABP

things get worse

Hemodynamic instability

ventricular fibrillation Start CPR, Defibrillations

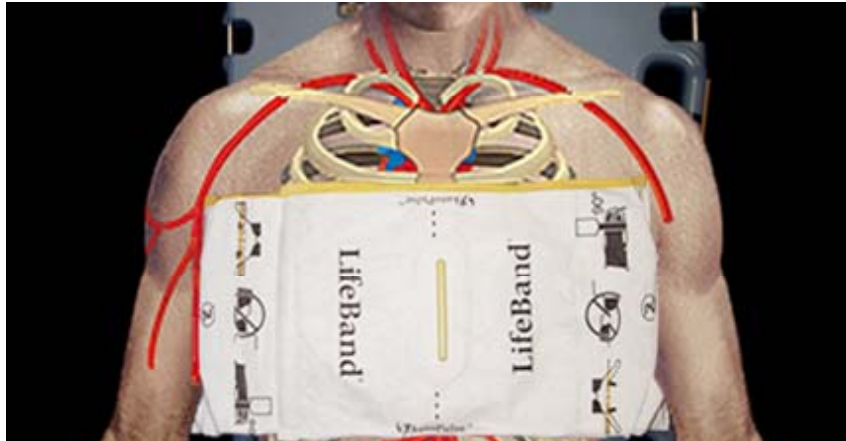
No return of spontaneous circulation (ROSC)

Ongoing CPR

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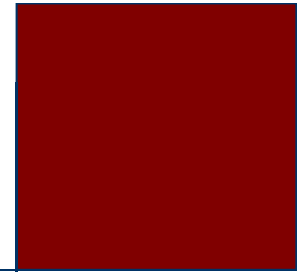


Technical support for transport



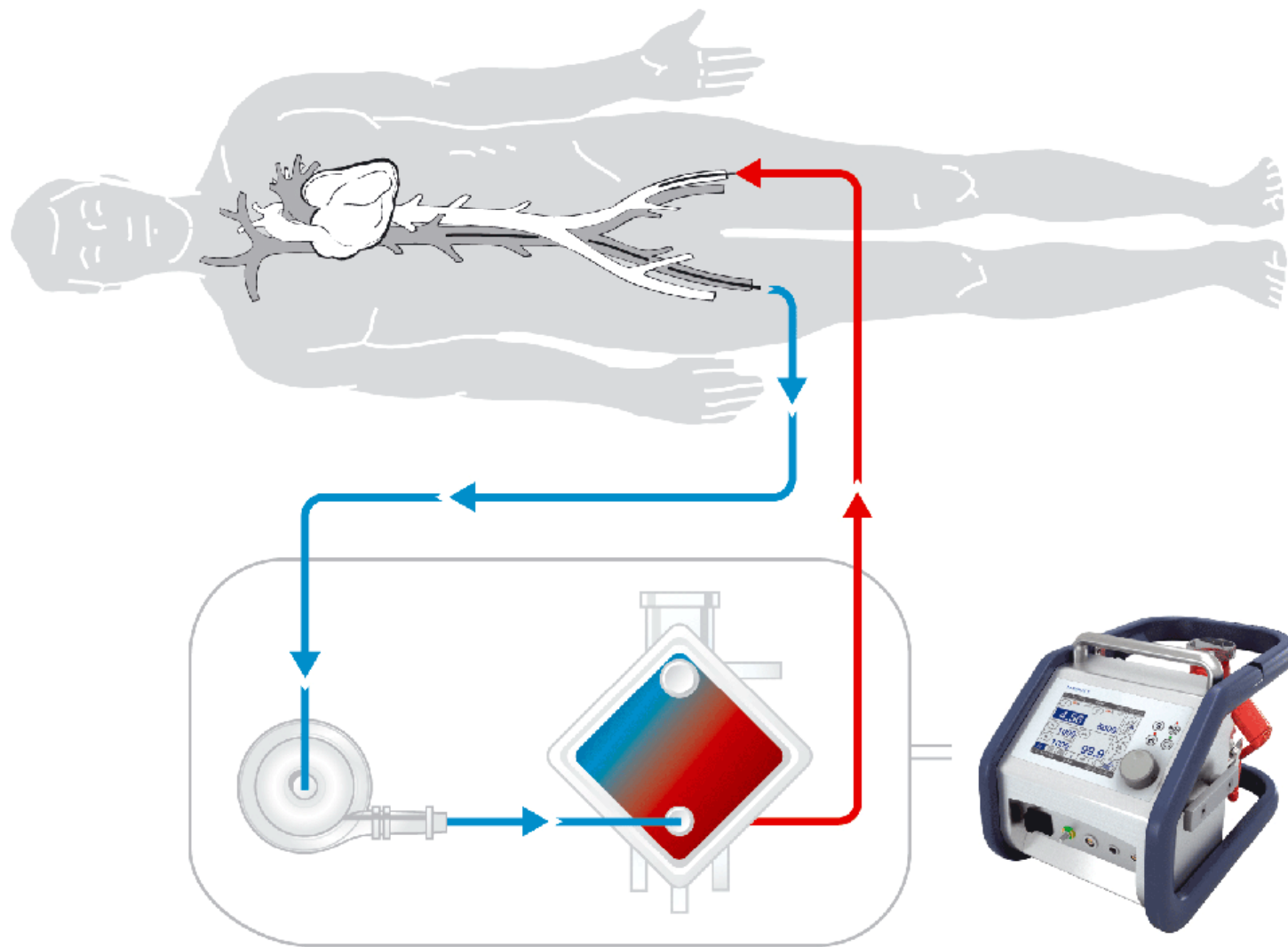
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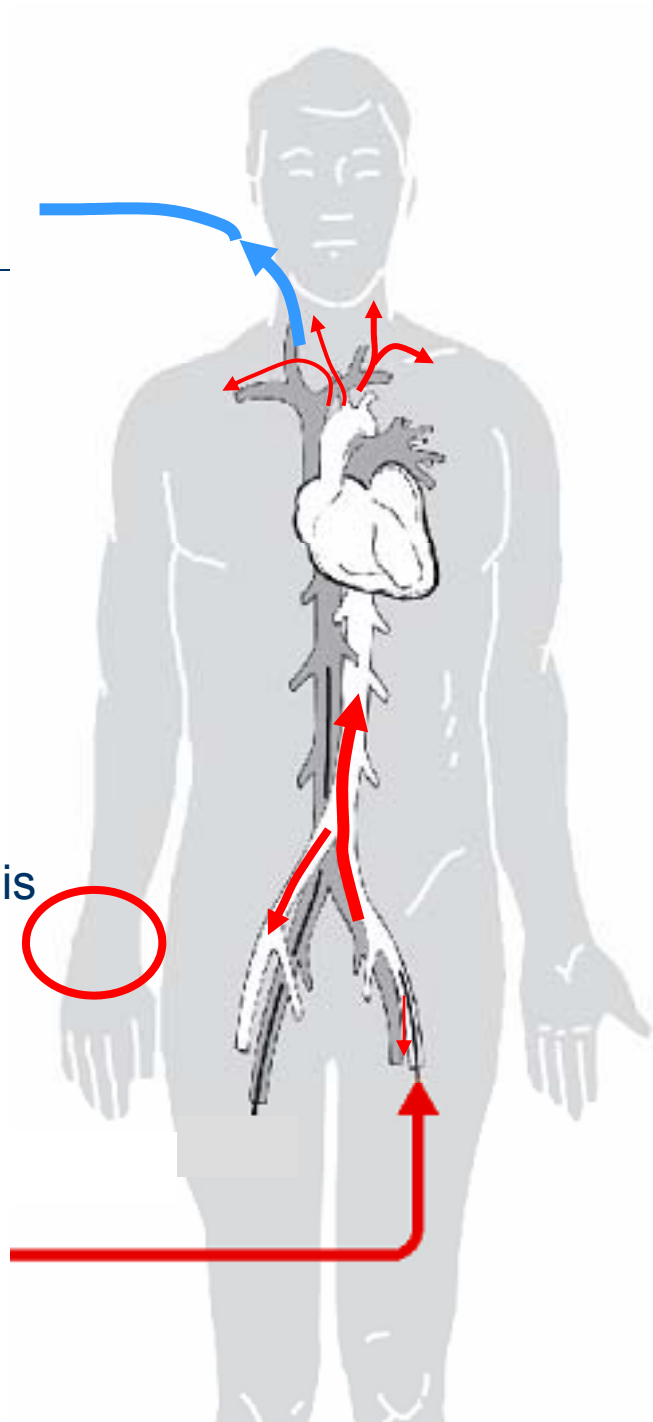
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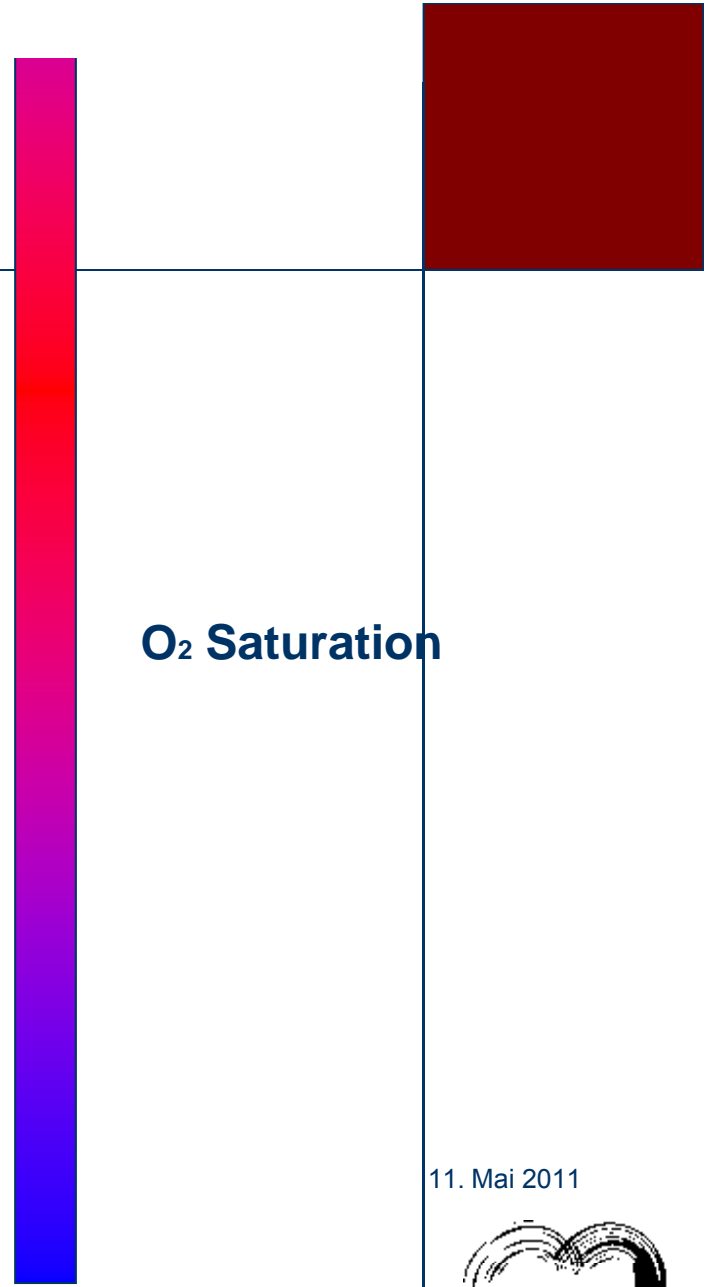


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bloodgases
right a. radialis

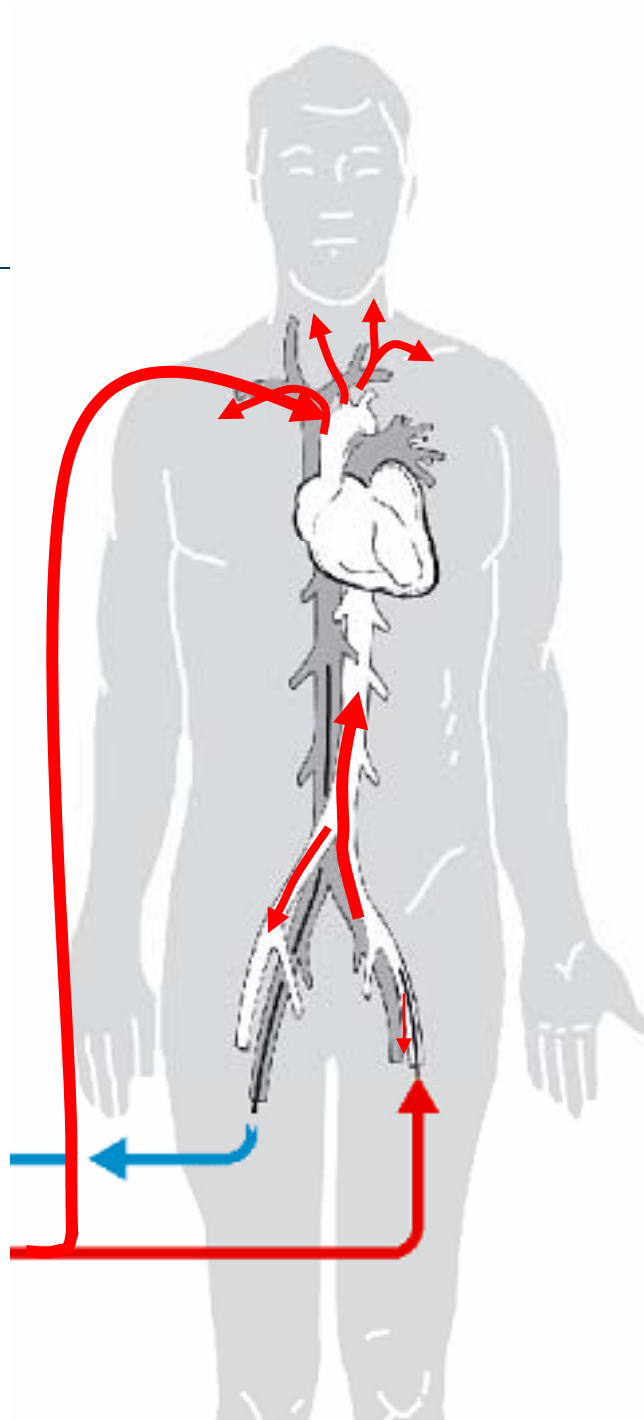


O₂ Saturation

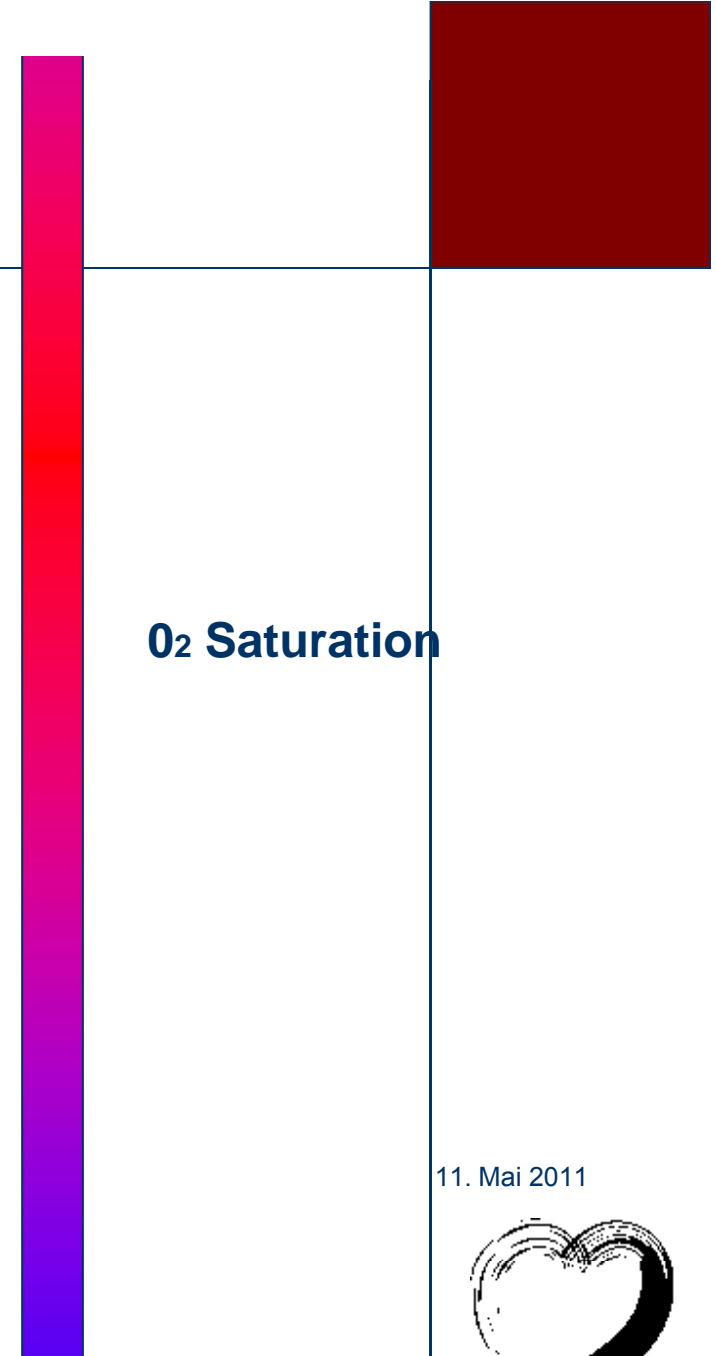
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Y-Piece

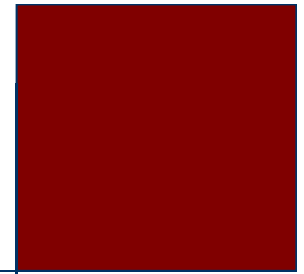
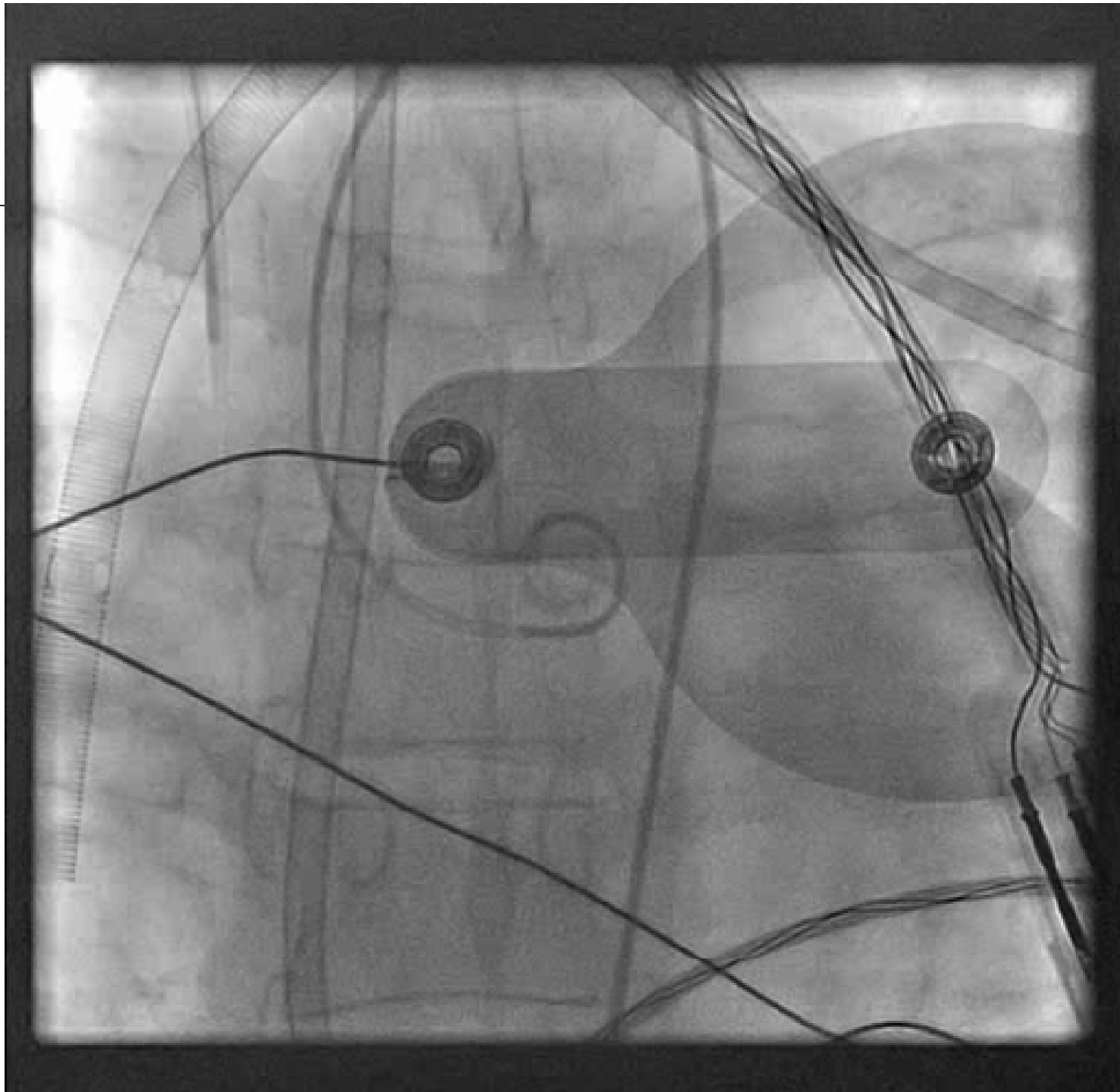


O₂ Saturation



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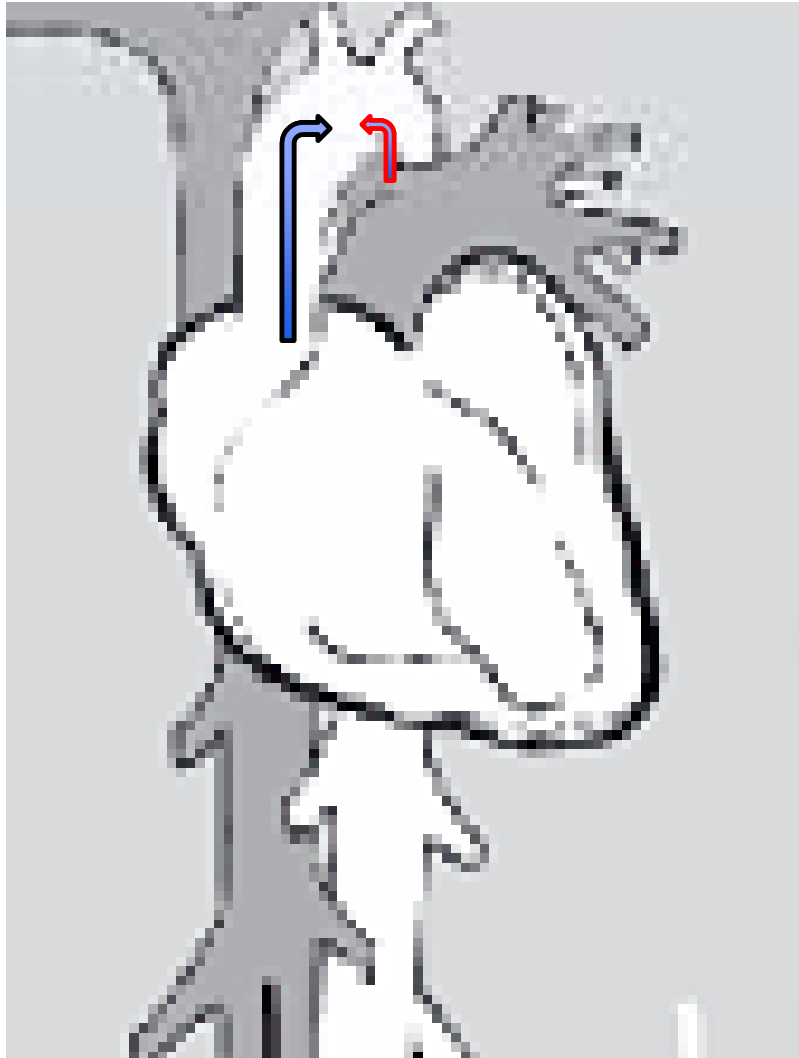




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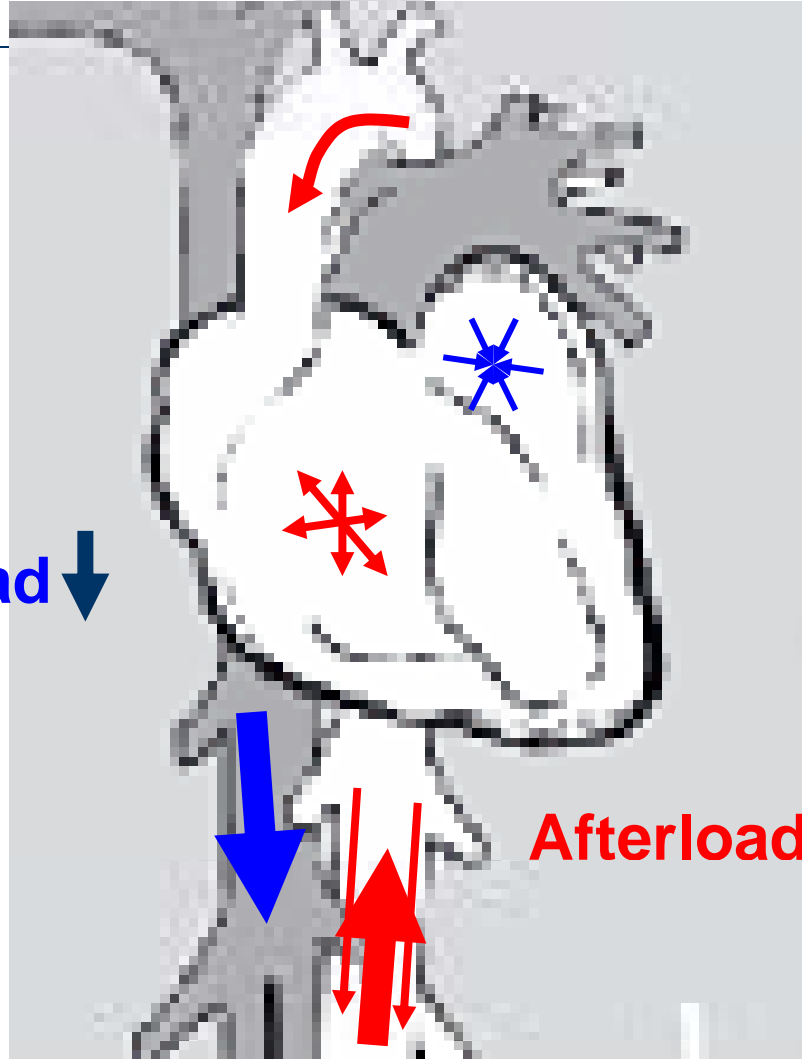
Watersheath-Syndrome



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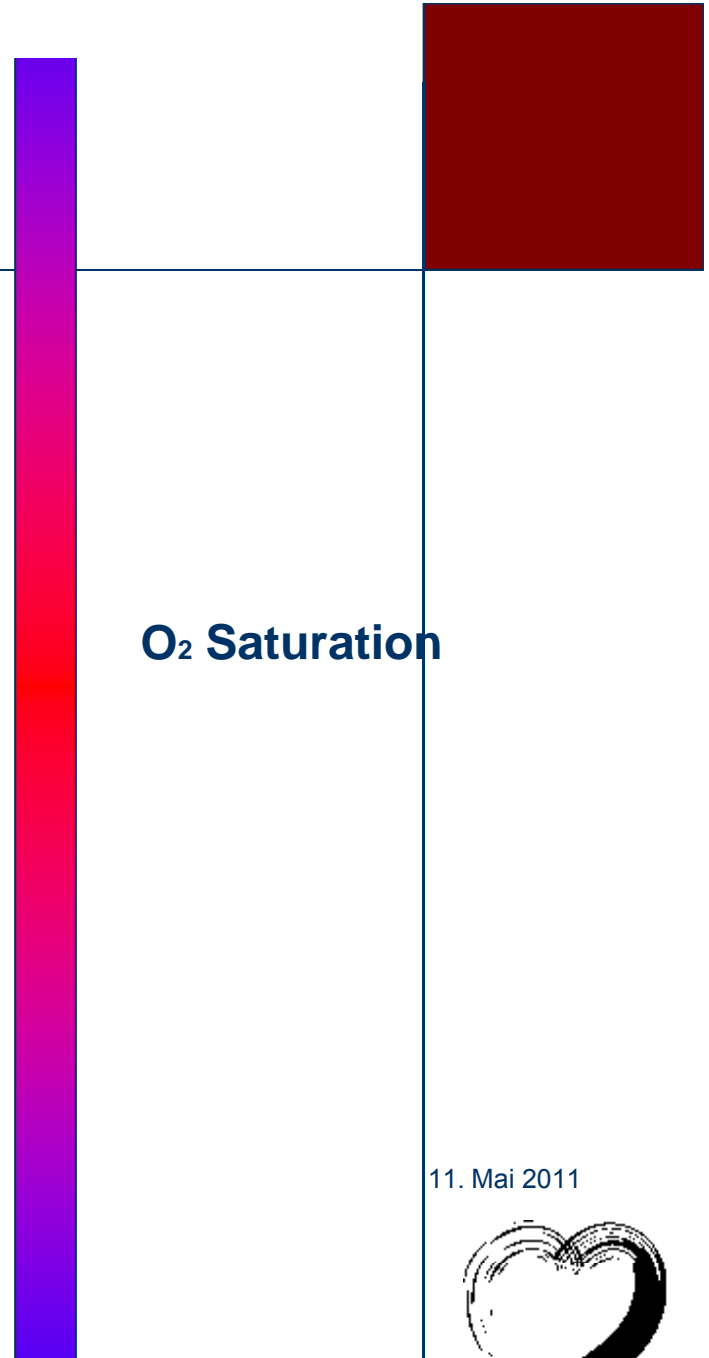
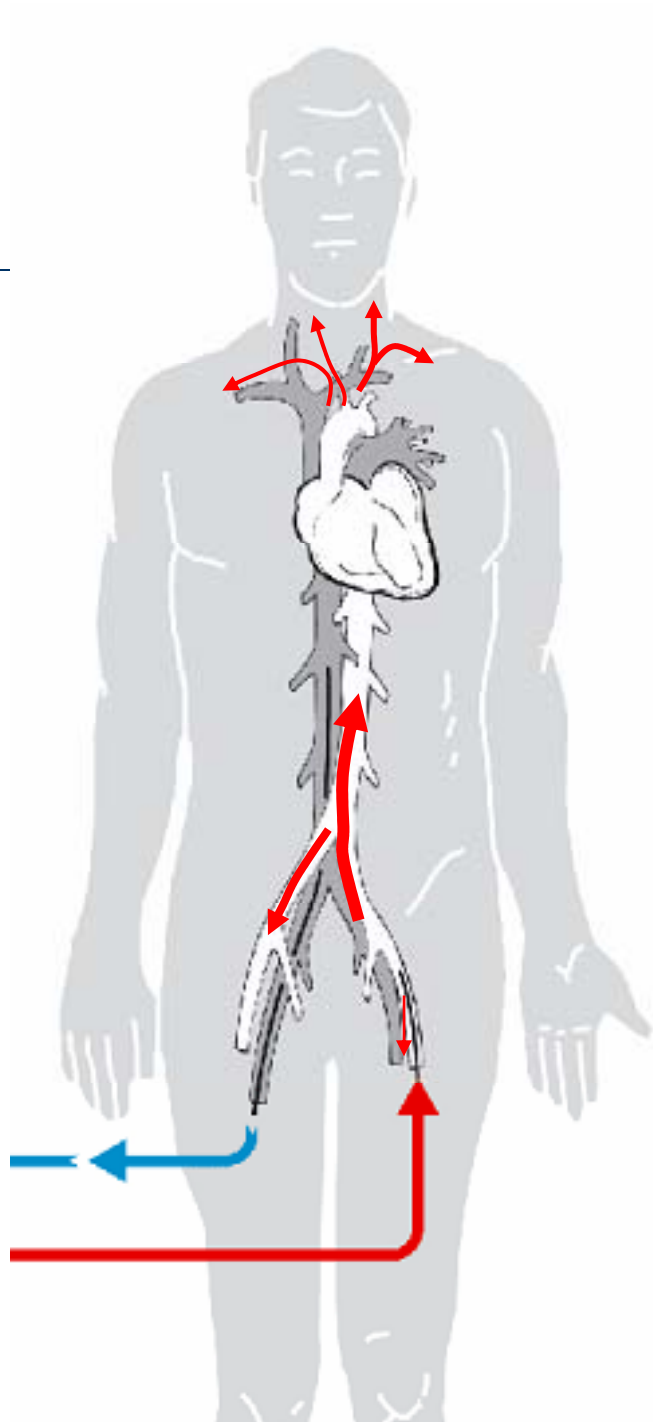
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Afterload ↑

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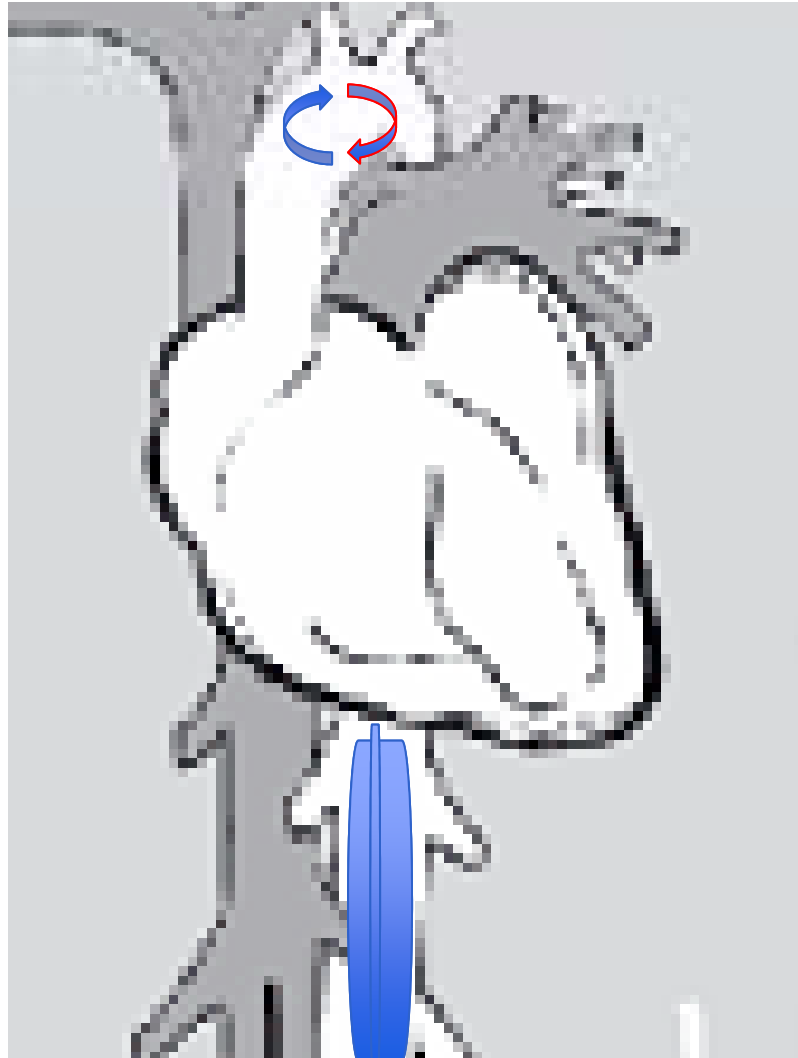


O₂ Saturation

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ECLS and IABP together



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Non-pulsatile and pulsatile device together

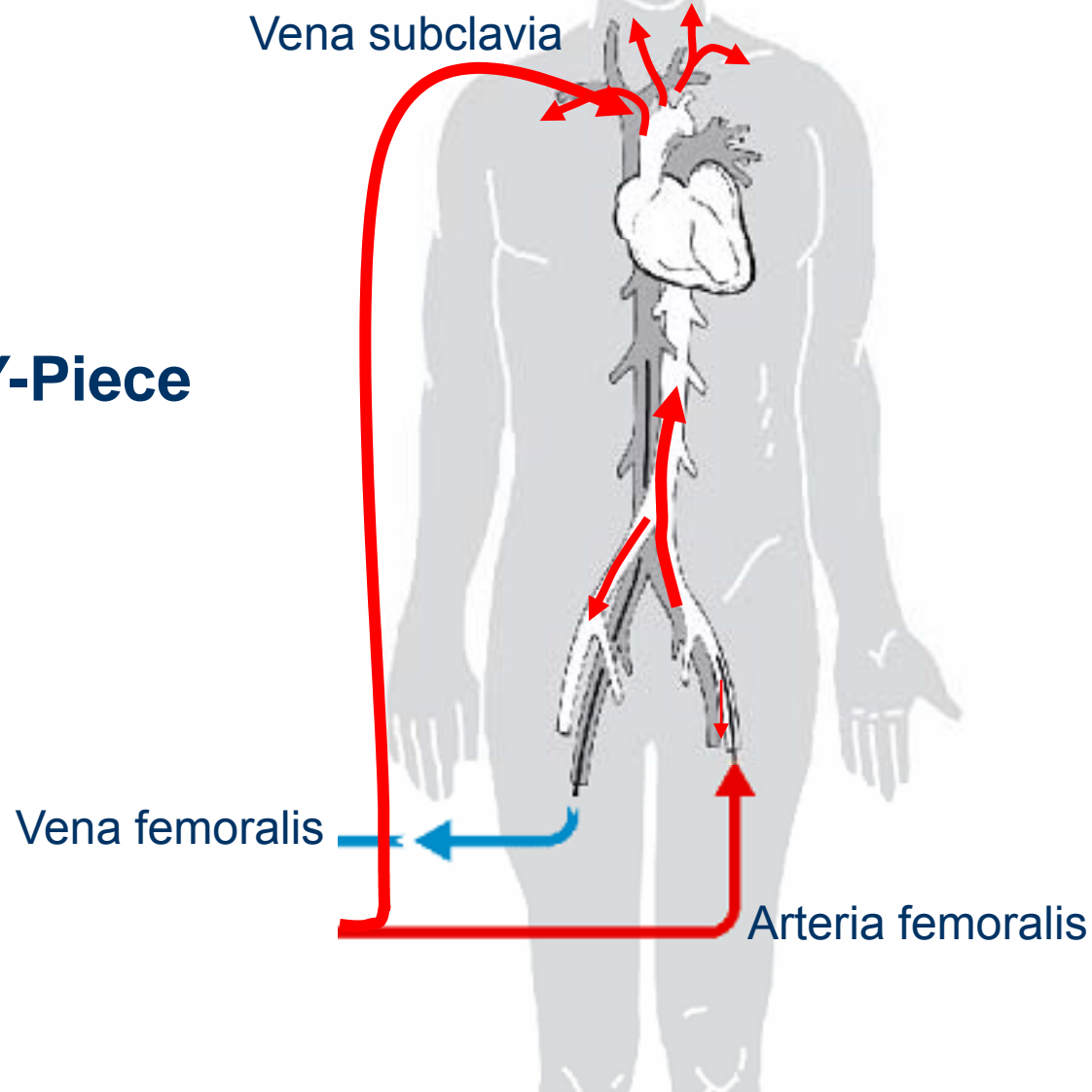


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V / VA-ECLS

Y-Piece

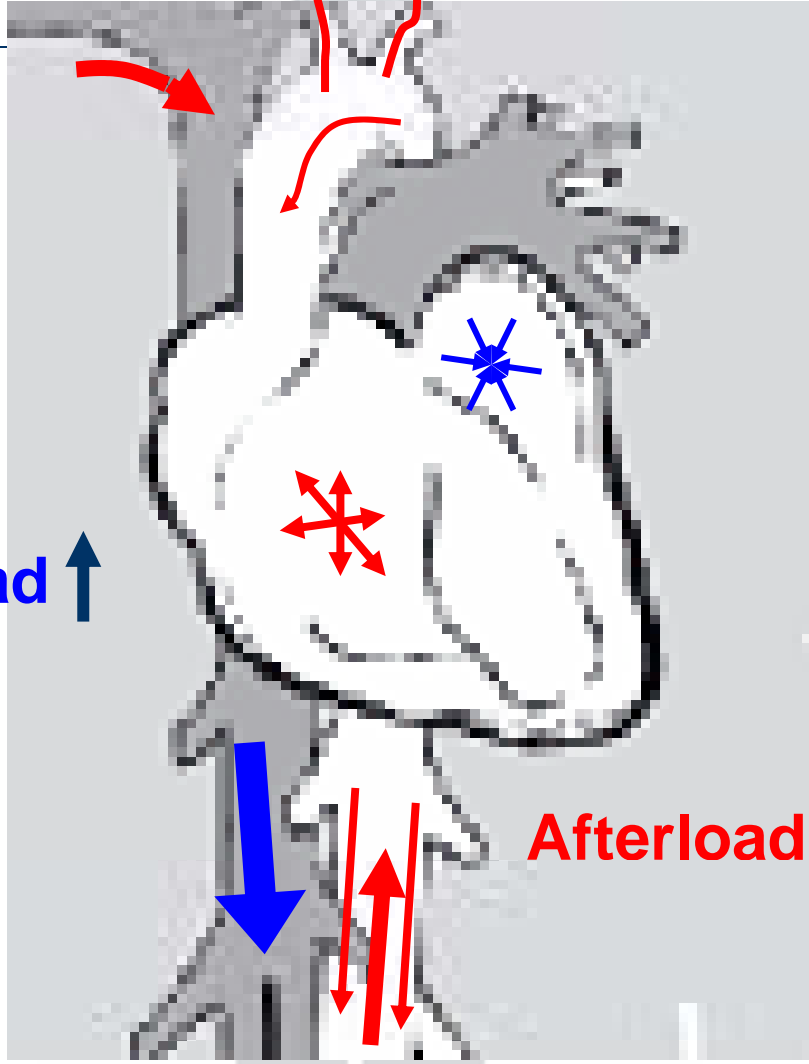


O₂ Saturation

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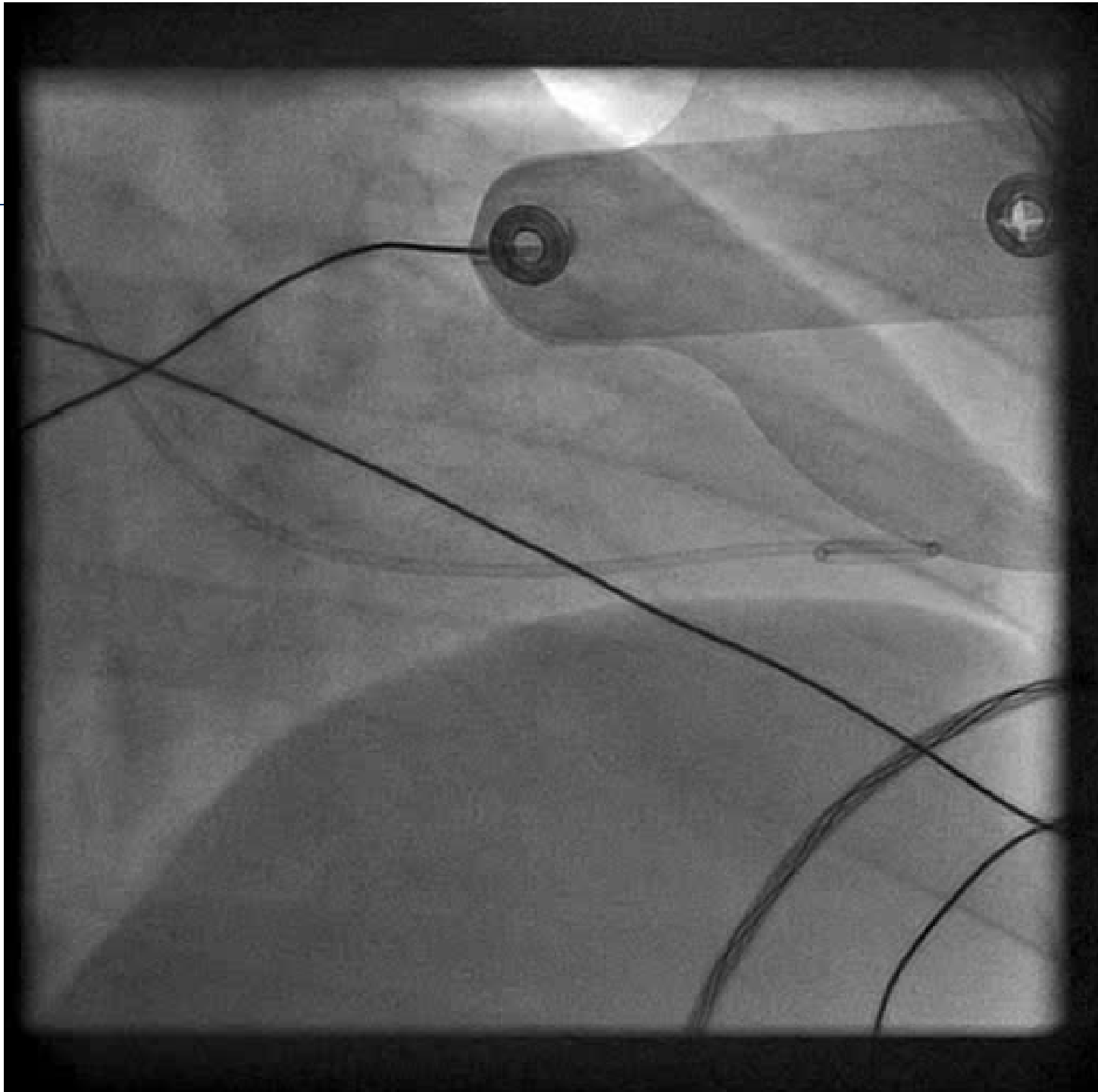
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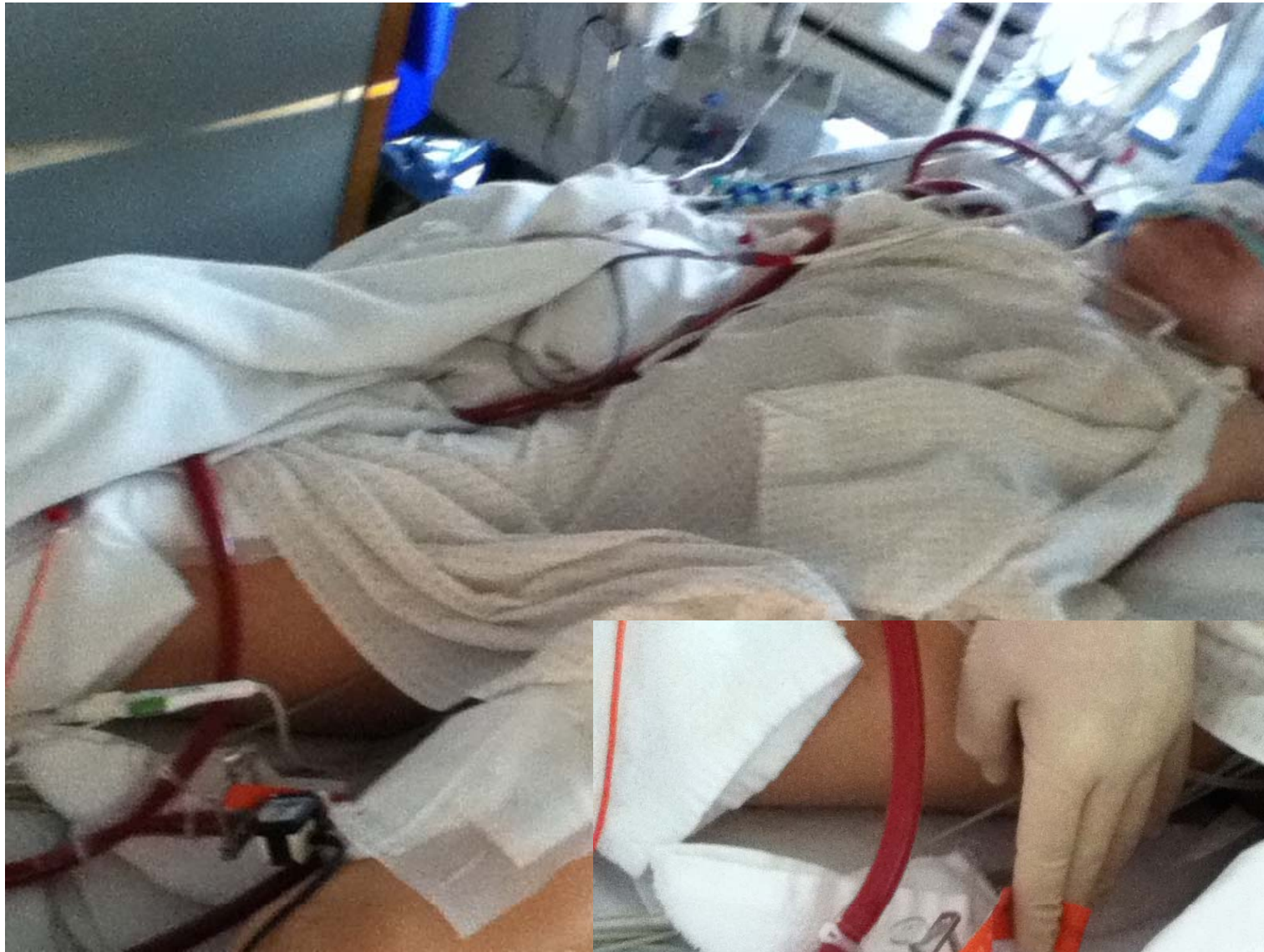
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Bridging the therapy

Time to reperfusion

Time for reperfusion

Time of myokardial stabilisation

Bridge to destination

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Bridge to destination (case)

23 year old male

Found by his girlfriend, pulsless

Start of bystander CPR

VF was detected, defibrillated, ROSC

Brought to hospital with EMS

Transporttime about 15 minutes in this time 7 times again VF

Cathlab: no coronary problems

About every five minutes fatal rhythm and defibrillation was necessary

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therapy

Inserting of ECLS-device (femo/femoral)

After a few minutes rhythmstabilisation

Myocarditis with Parvo B 19 Virus

EF gets down on 10% over the next 5 days

Implantation of an LVAD by cardiac surgeons after 6 days

Slowly stabilisation and weaning over 1/2 year

Leaving hospital with EF 45%

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Be prepared

..... for acute use

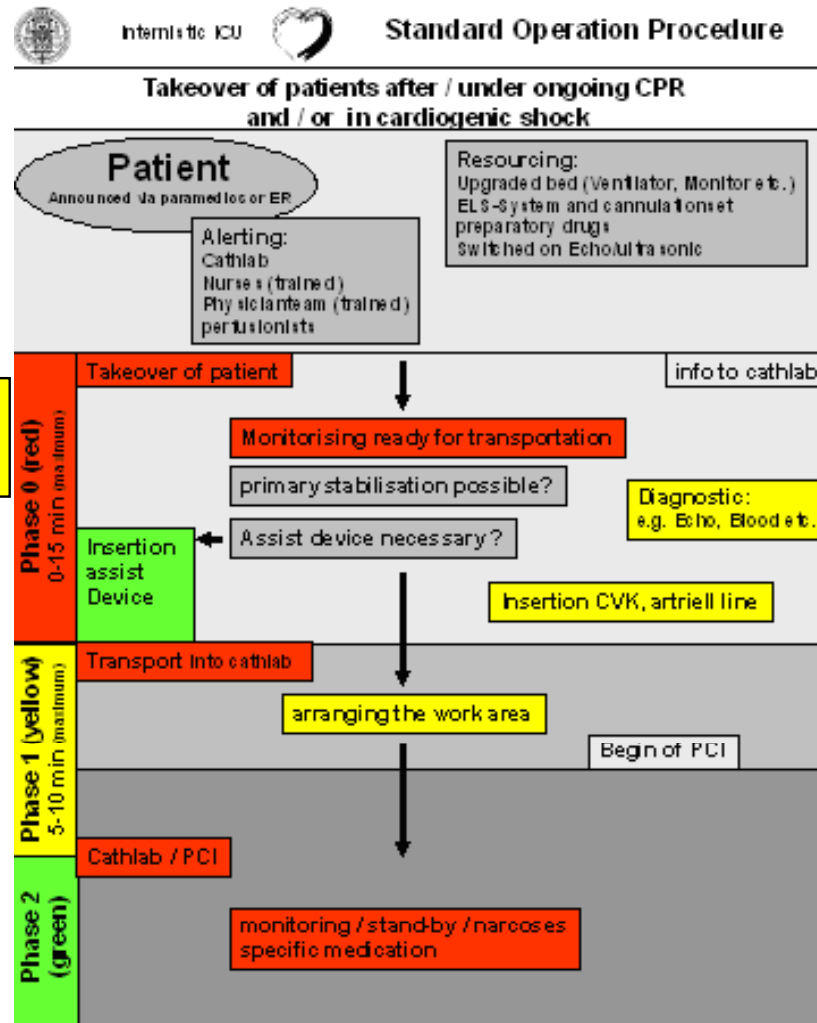
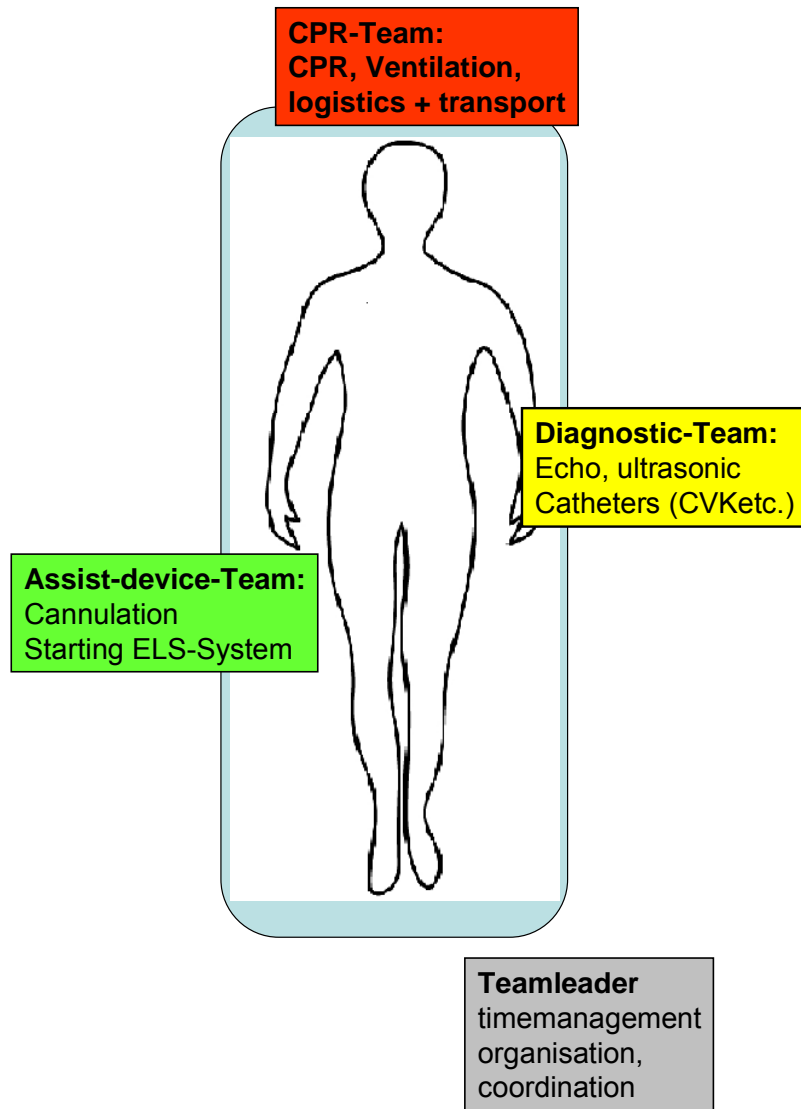
Trained Team

- CPR-Team
- ultrasonic
- interventionists (+ surgeons)
- perfusionists

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Implementation of Operation Procedures SOP



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Be prepared

.....for elective use

Think about it !

high risk interventions with a most probably risk

introduce a femoral arteriell and venous sheath

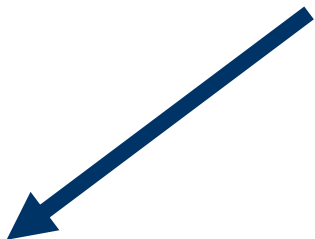
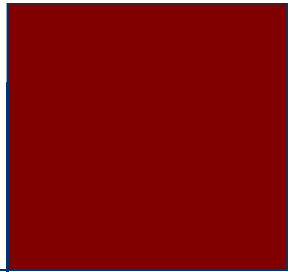
→ possibility for rapid canula-insertion

IABP in Standby

primed CPS-Device in Standby

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IABP



CPS



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The future themes

Transports

Other interventions

Go to the scene, devices for preclinical use

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Transports



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Transports



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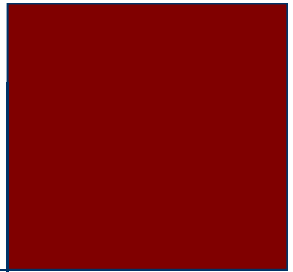


Transports



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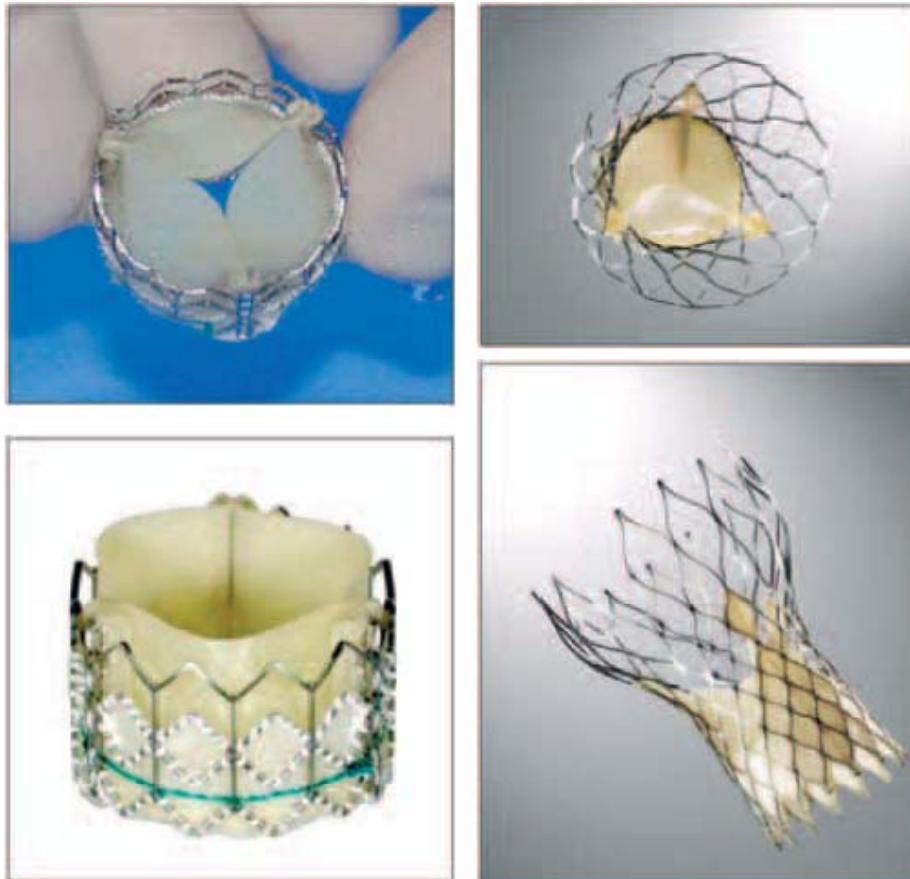


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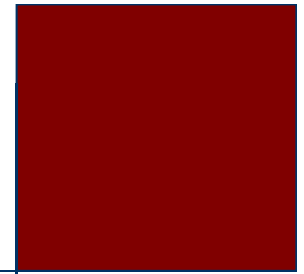
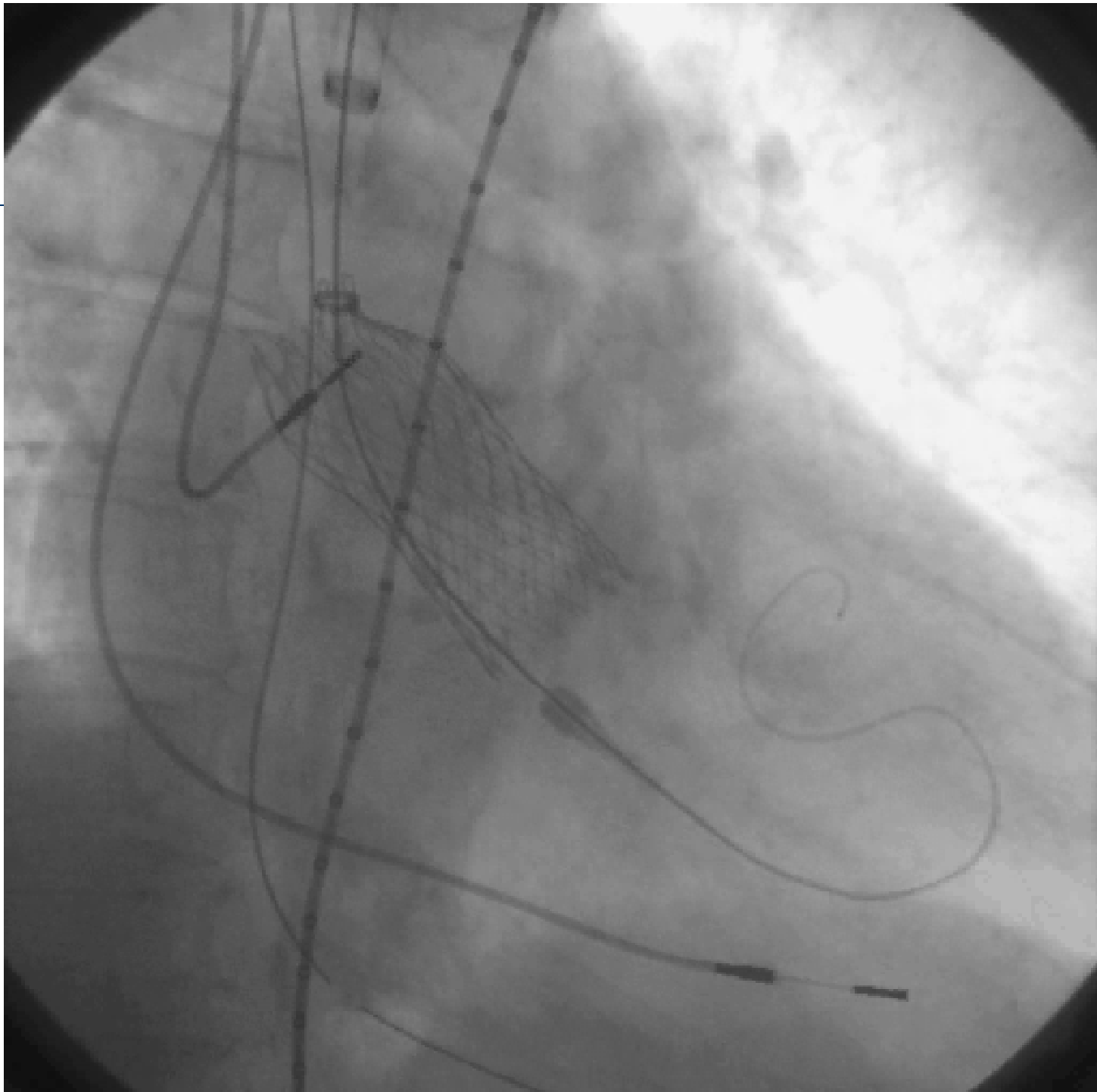
Other Interventions

Valves and minimal invasive reconstruction



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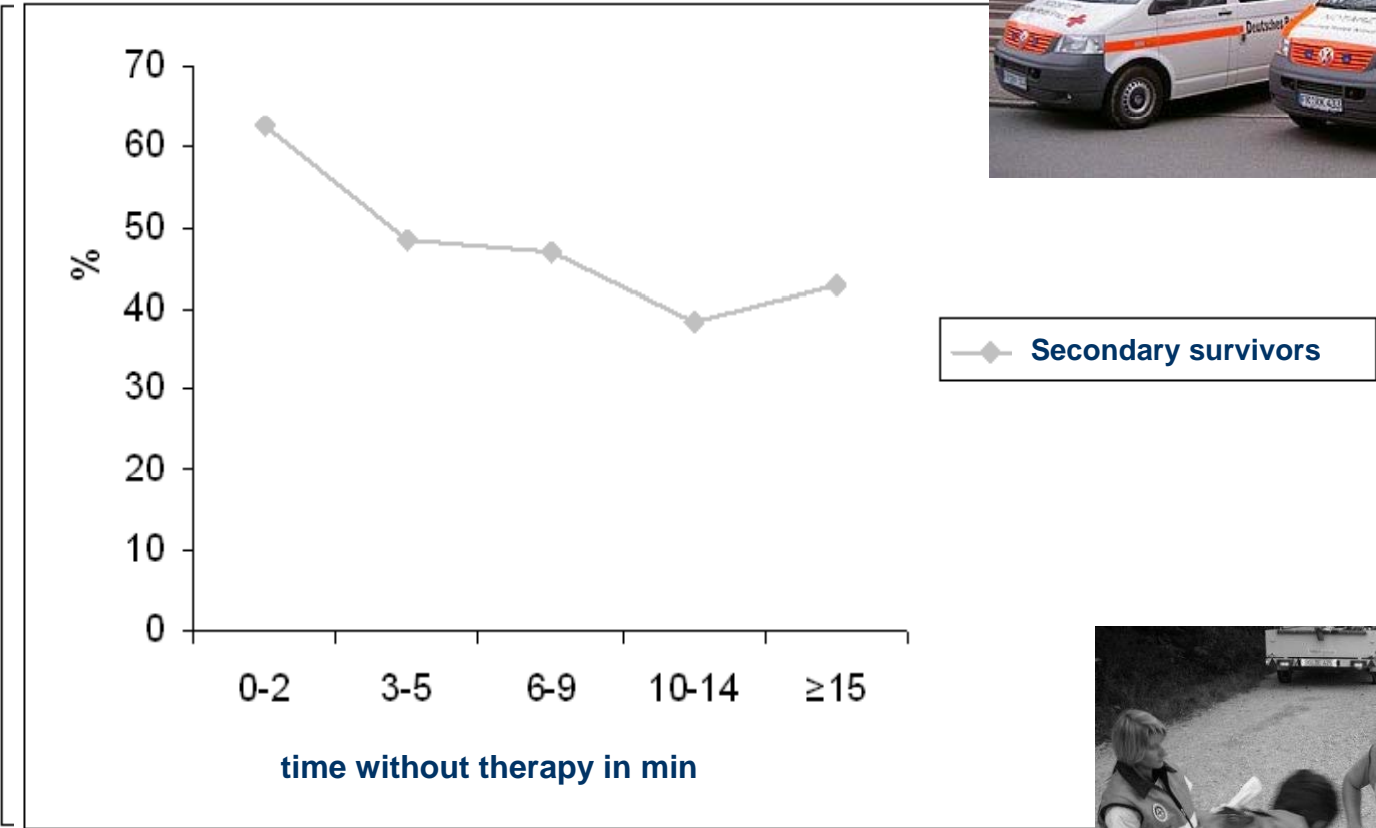


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Future themes

Preclinical Use



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conclusion

cardiology gets more and more invasive

We need backupsystems for:

- emergency treatments**
- transport**
- High risk PCI and other interventions**
- bridging to decision**

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Thank you for the attention

