



Macro en microcirculatie

Congres

Topics in intensive care

December 2008

Door: Steven Winkel

Inhoud

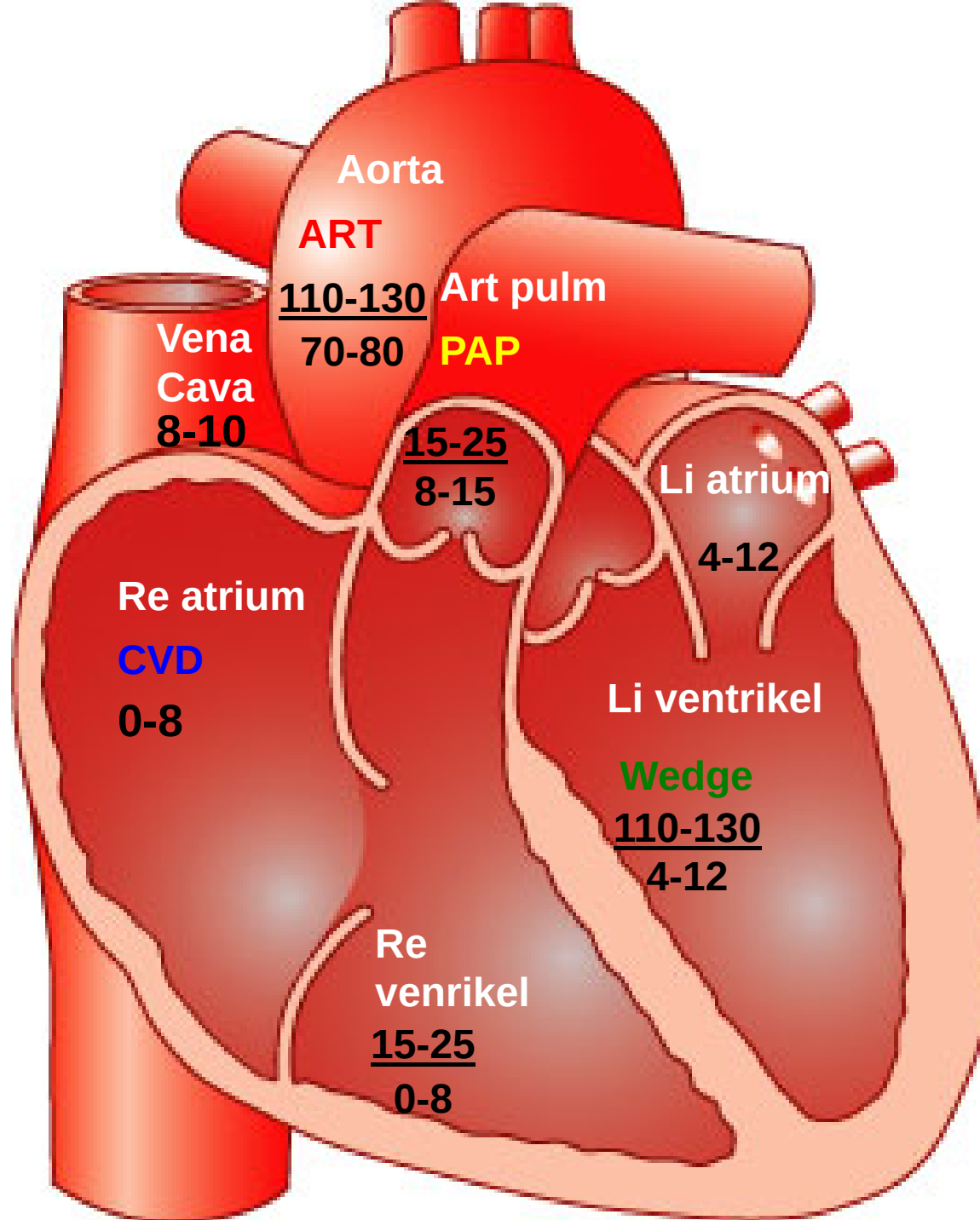
- **Theorie haemodynamica**
- **Presentatie casus**
- **Beoordelen macro circulatie**
- **Beoordelen micro circulatie**



Diagnostiek circulatie

	Macrocirculatie	Microcirculatie
Lichamelijk onderzoek	• Hartfrequentie • Diurese • RR • Bewustzijn	• Cutanea Marmorata
Invasief	• CVD • Arteriëlijn • Swan Ganz	• Bloedgasanalyse • Lactaat
Non invasief	• Echo • NiCO • Slokdarmdoppler	• Tonometrie • Sidestream Dark Field Imaging / Orthogonal polarization spectral (OPS)

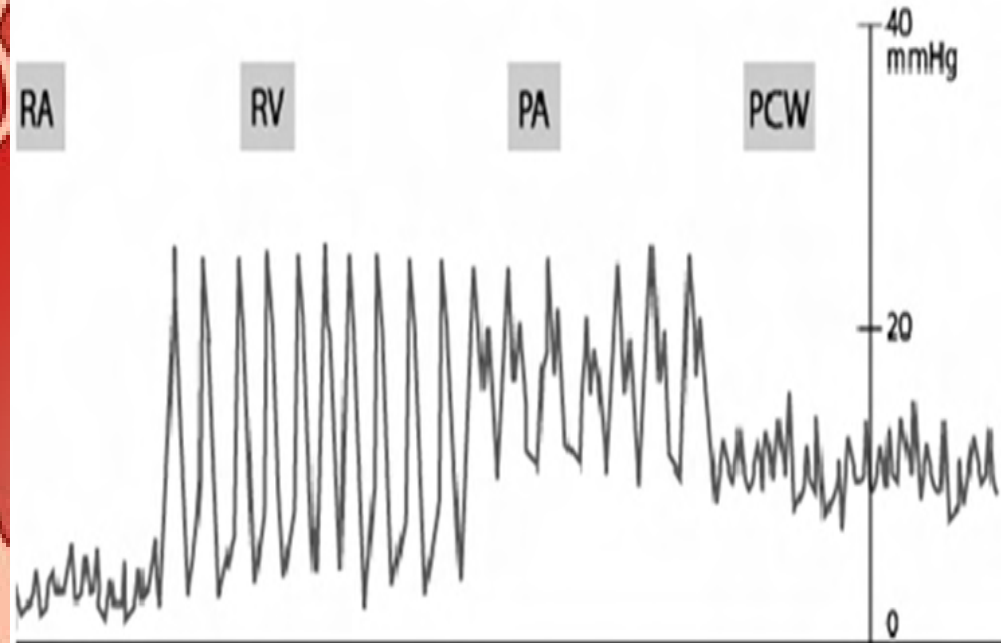
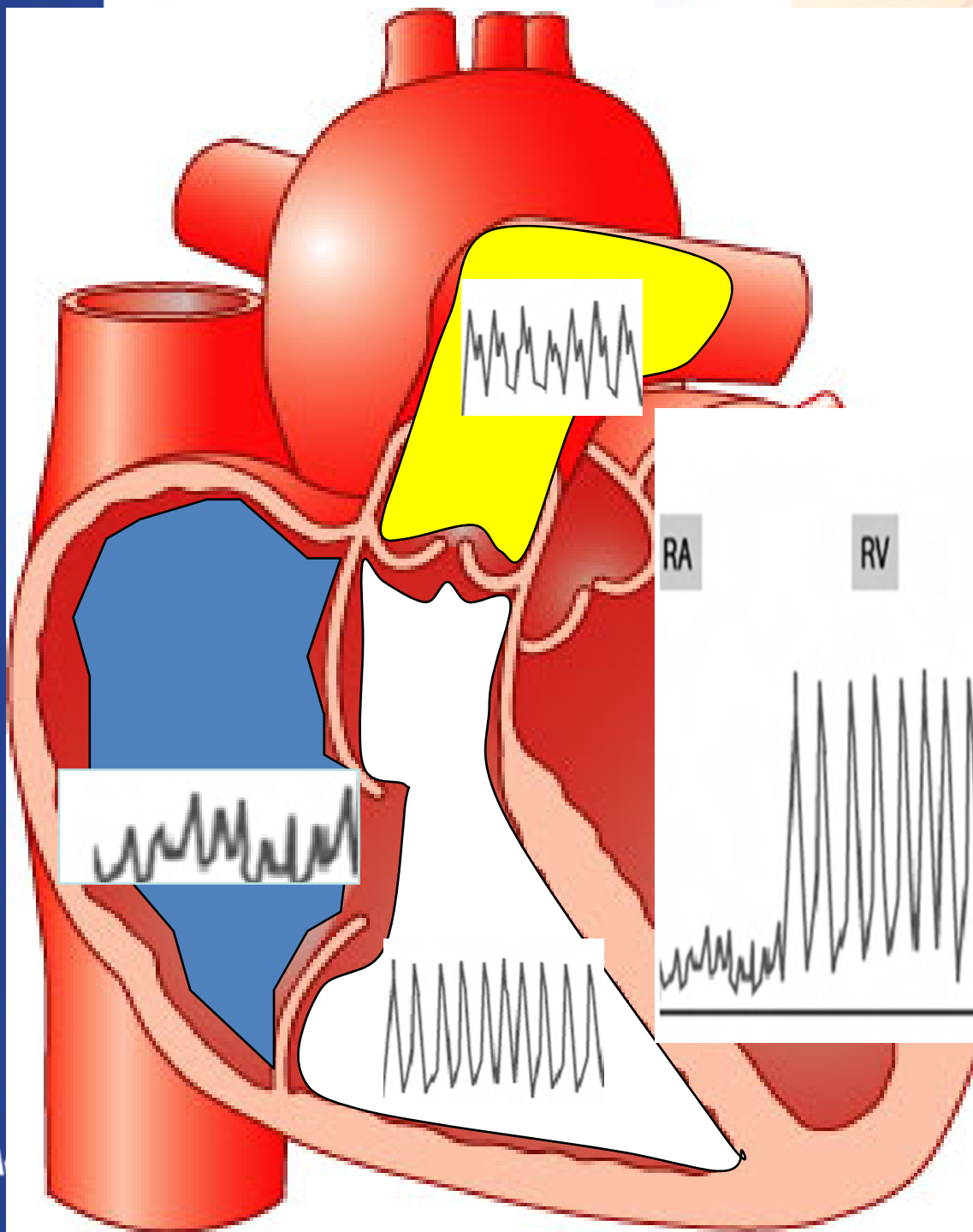




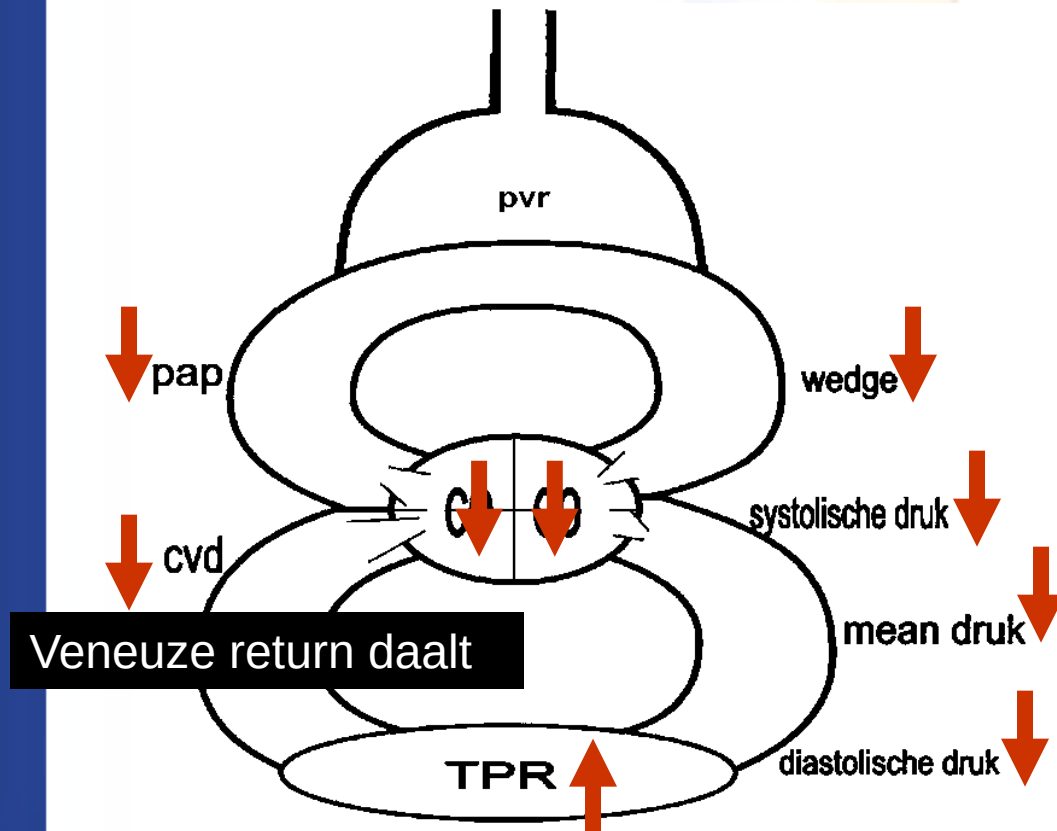
Drukcurves

- Swan Ganz catheter

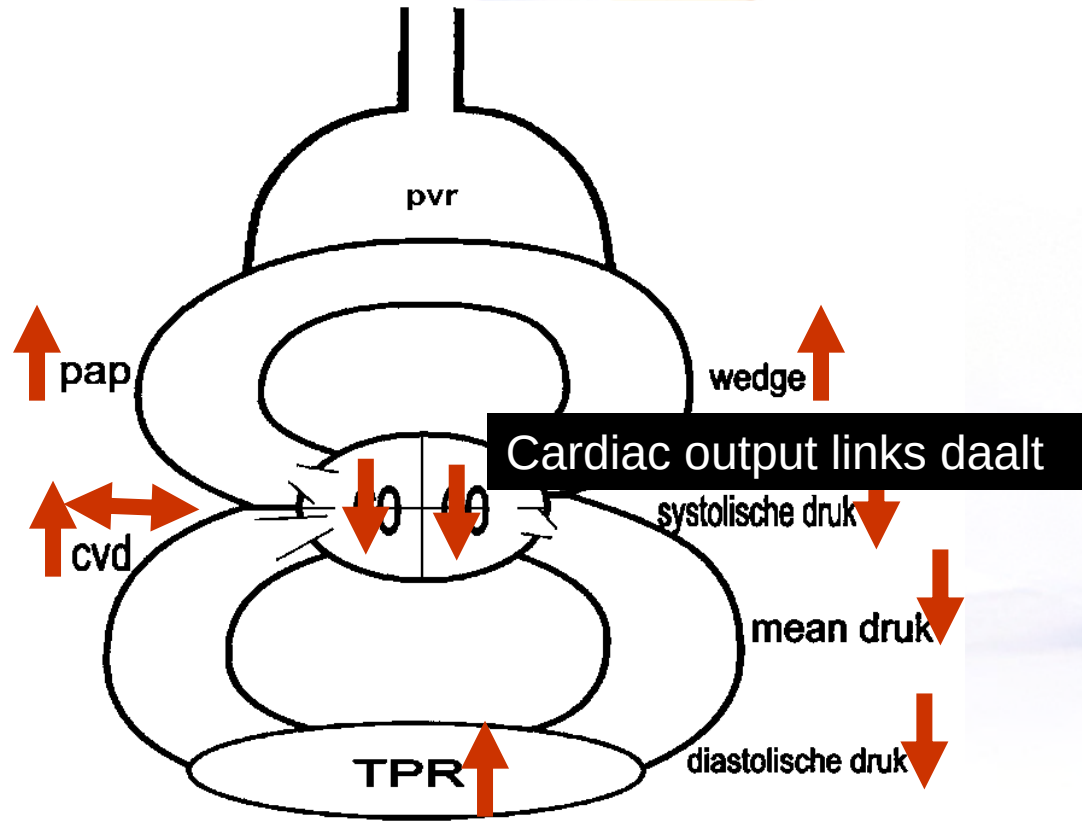




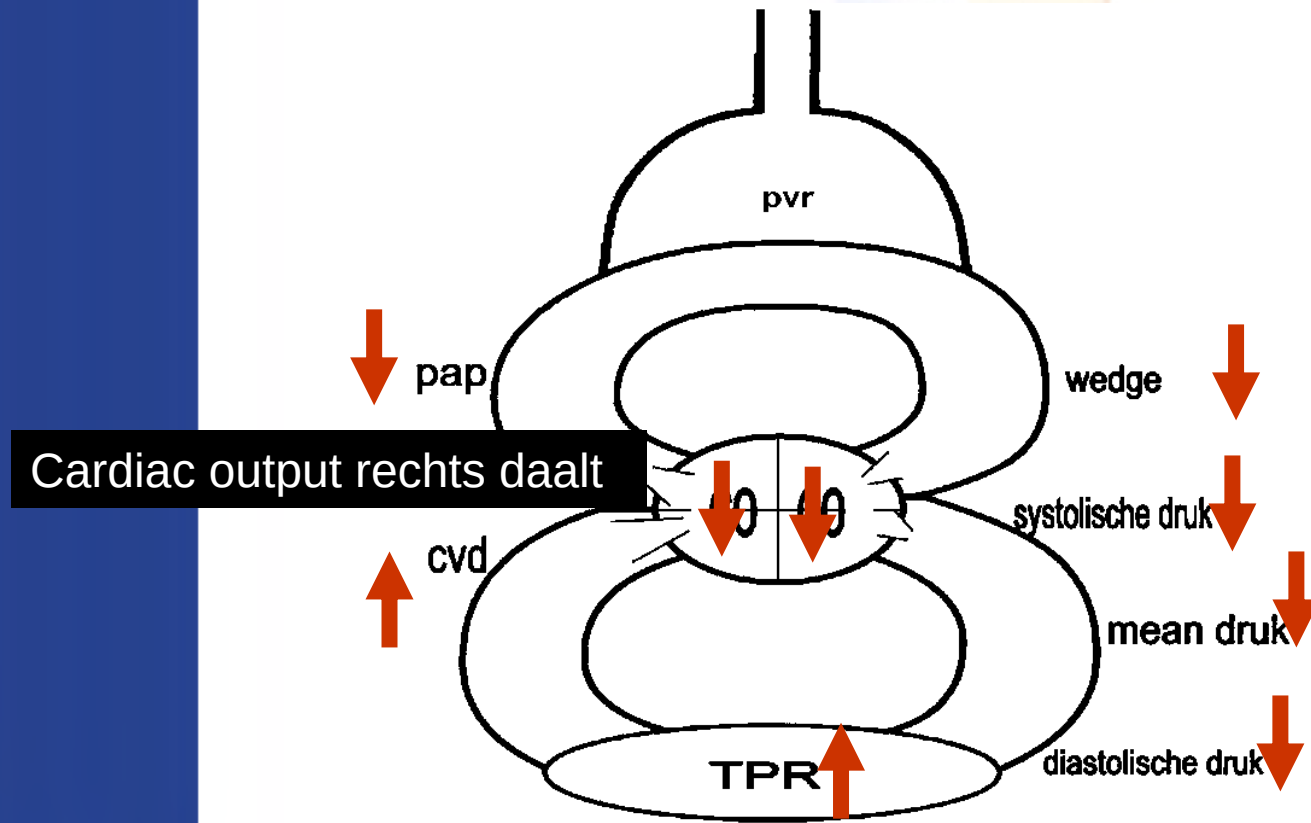
Hypovolaemisch



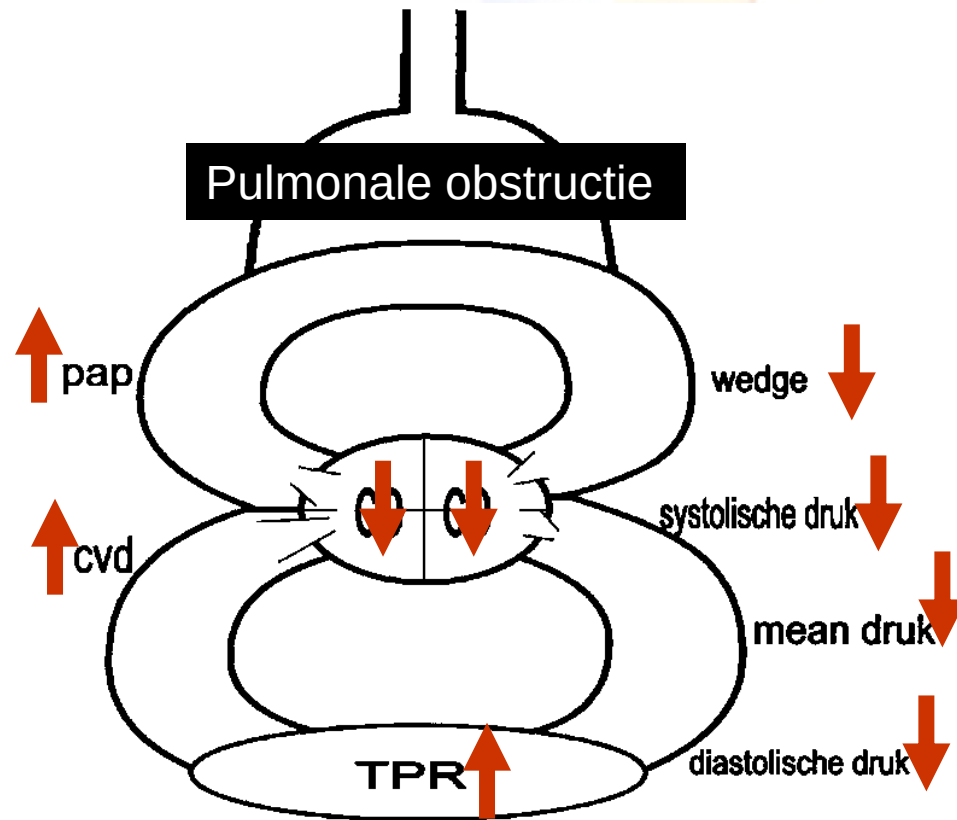
Cardiogeen links



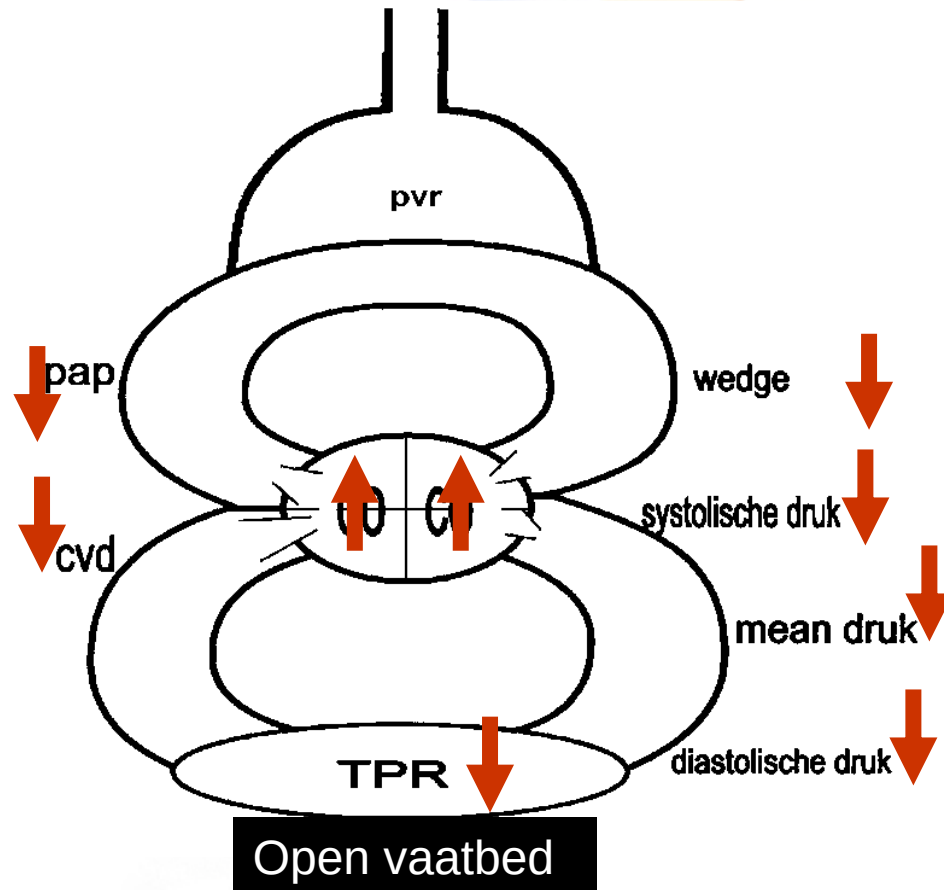
Cardiogeen rechts

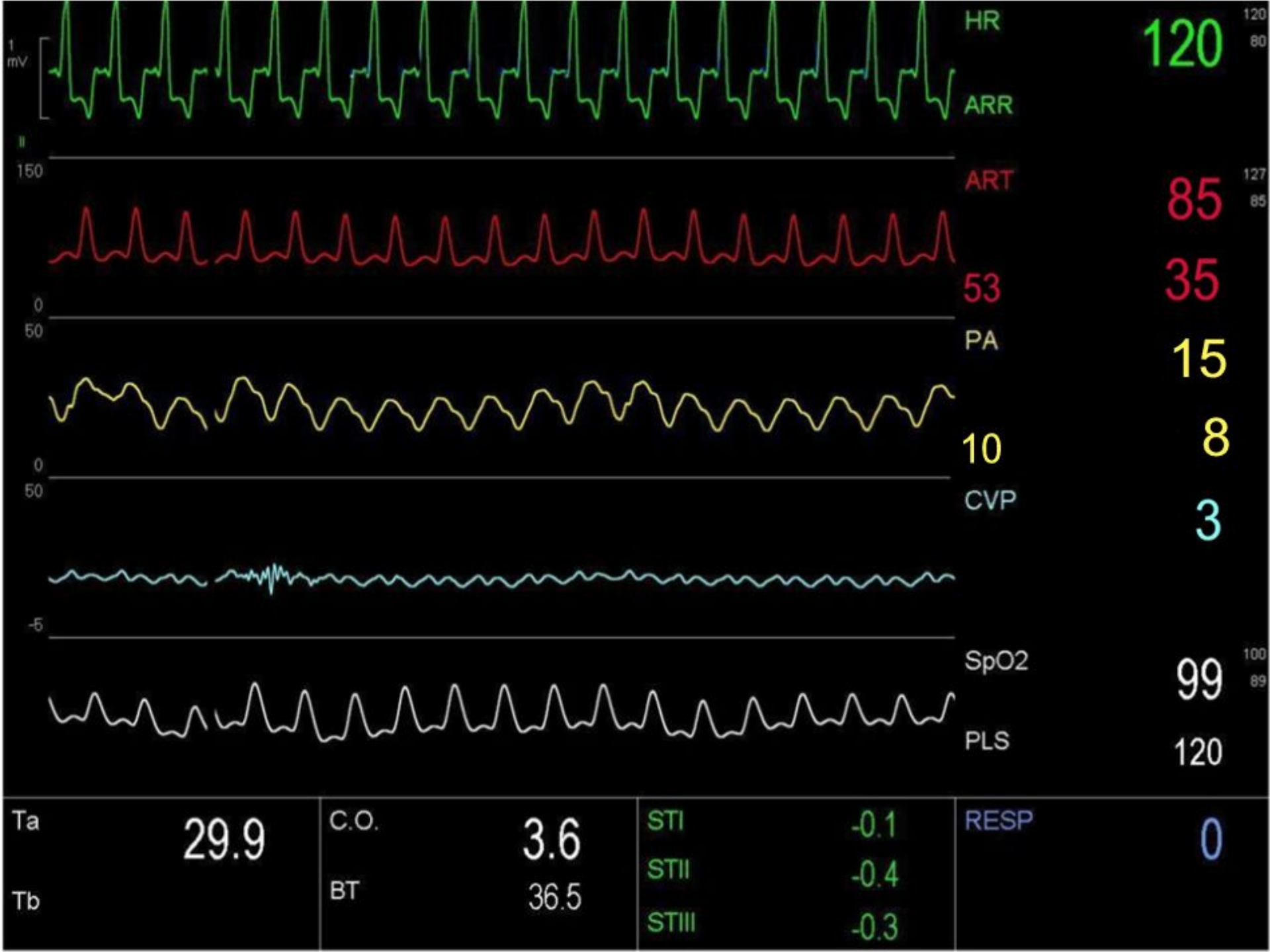


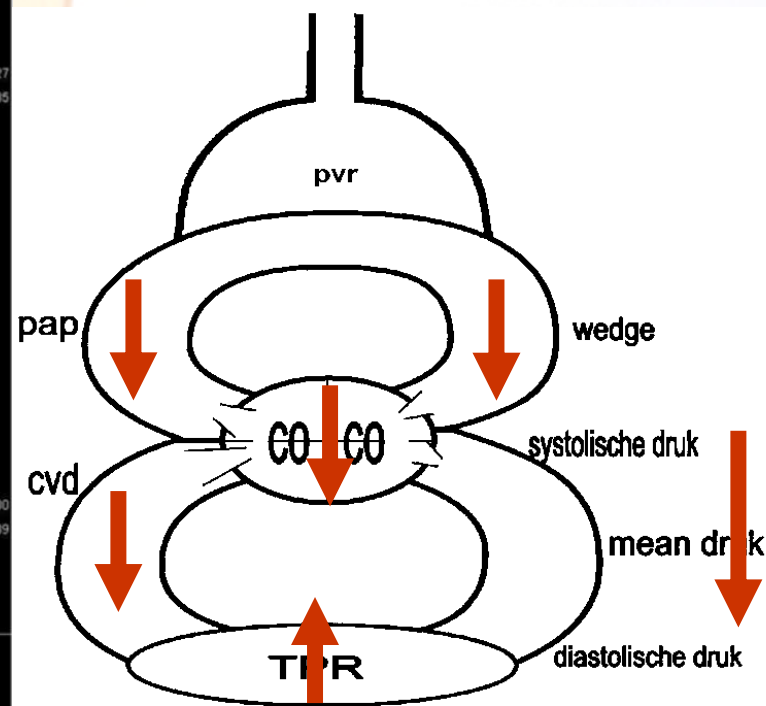
Obstructief



Distributief









HR

79

155
55

ARR

ART

85

219
75

53

35

PA

40

27

20

CVP

15

SpO2

88

PLS

80

Ta

28.9

C.O.

3.6

STI

STII

STIII

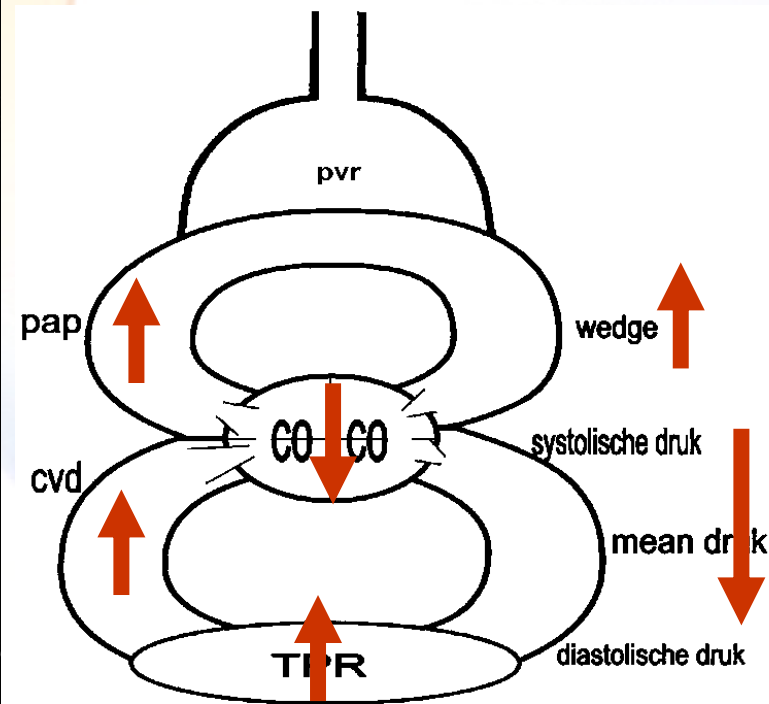
RESP

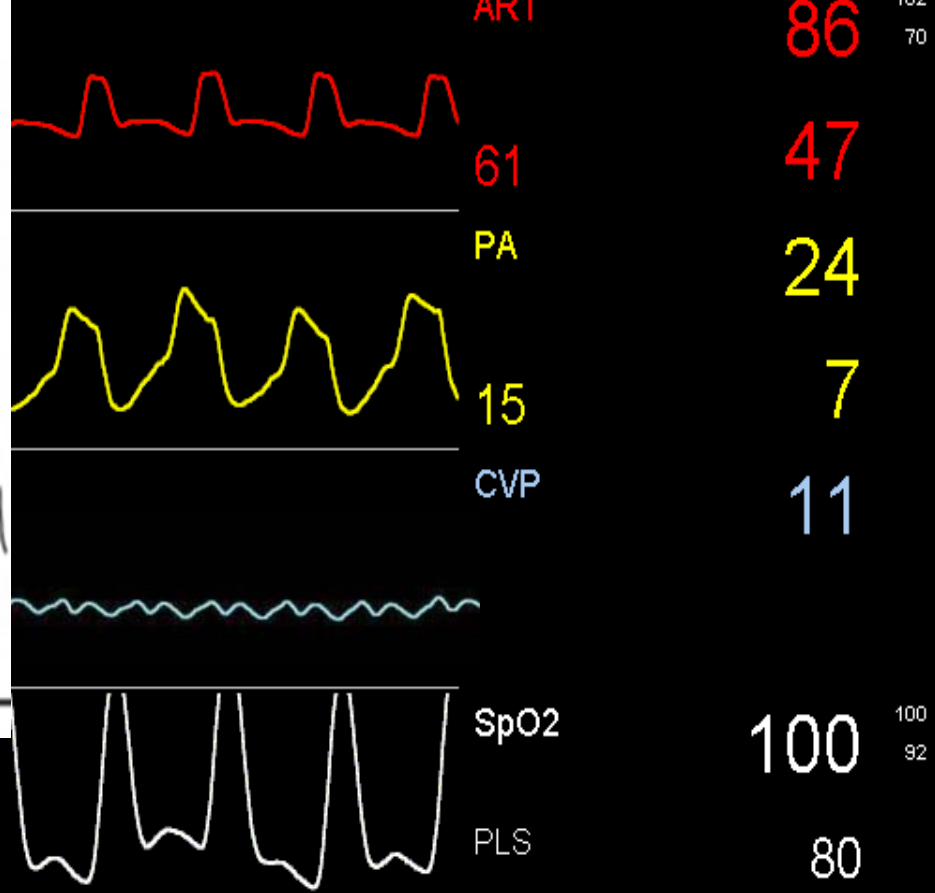
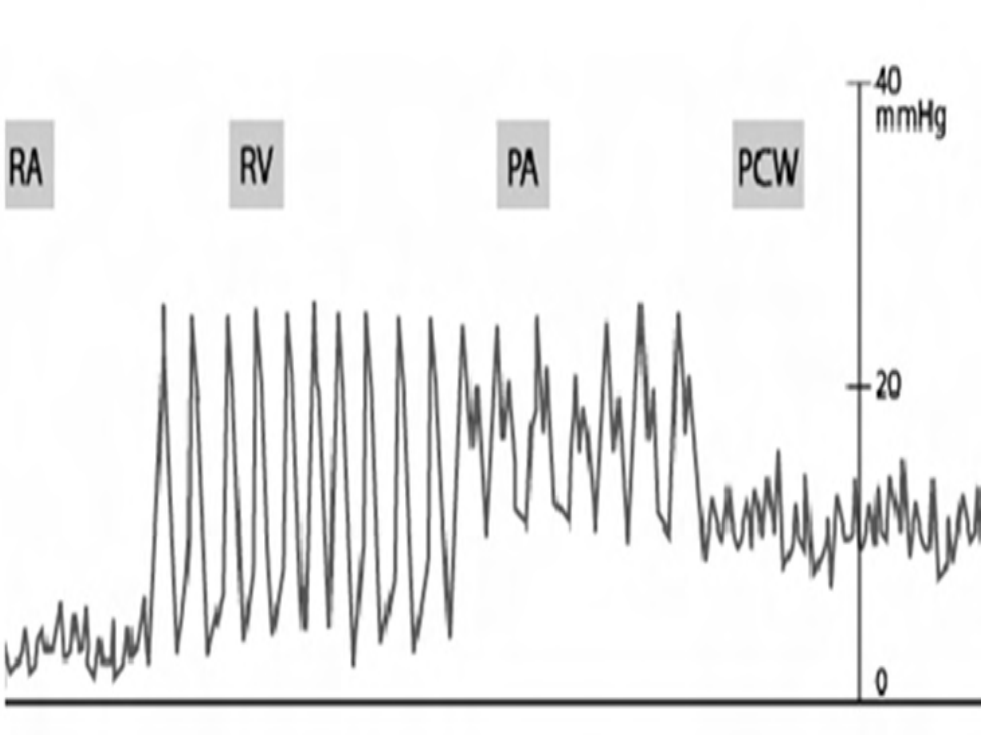
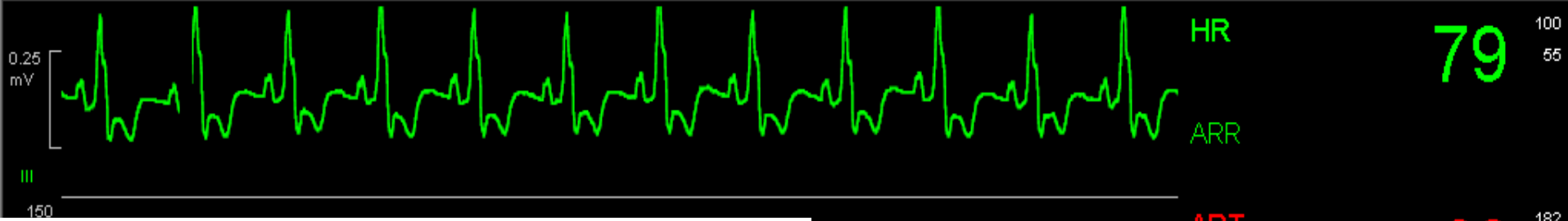
31

Tb

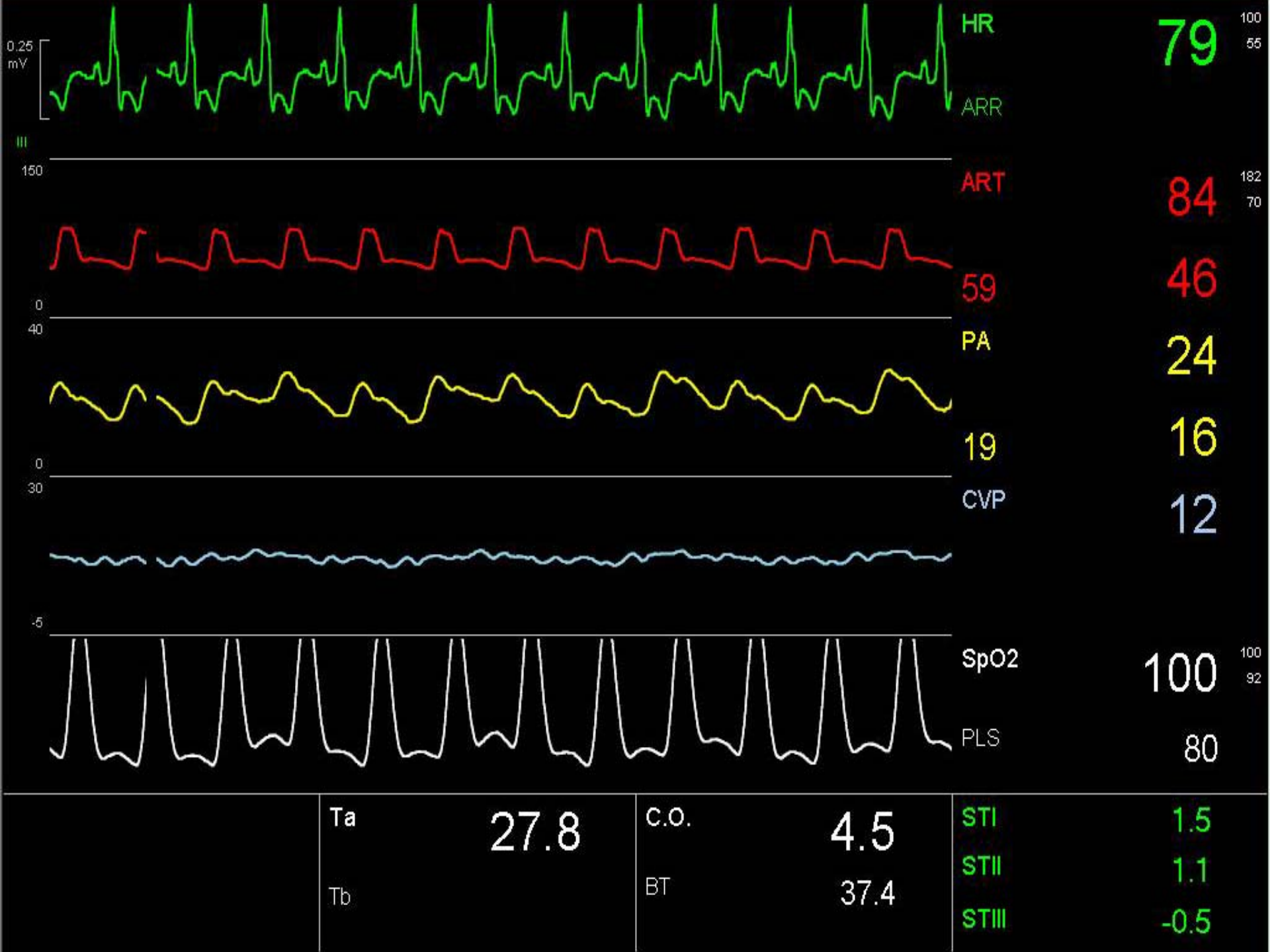
BT

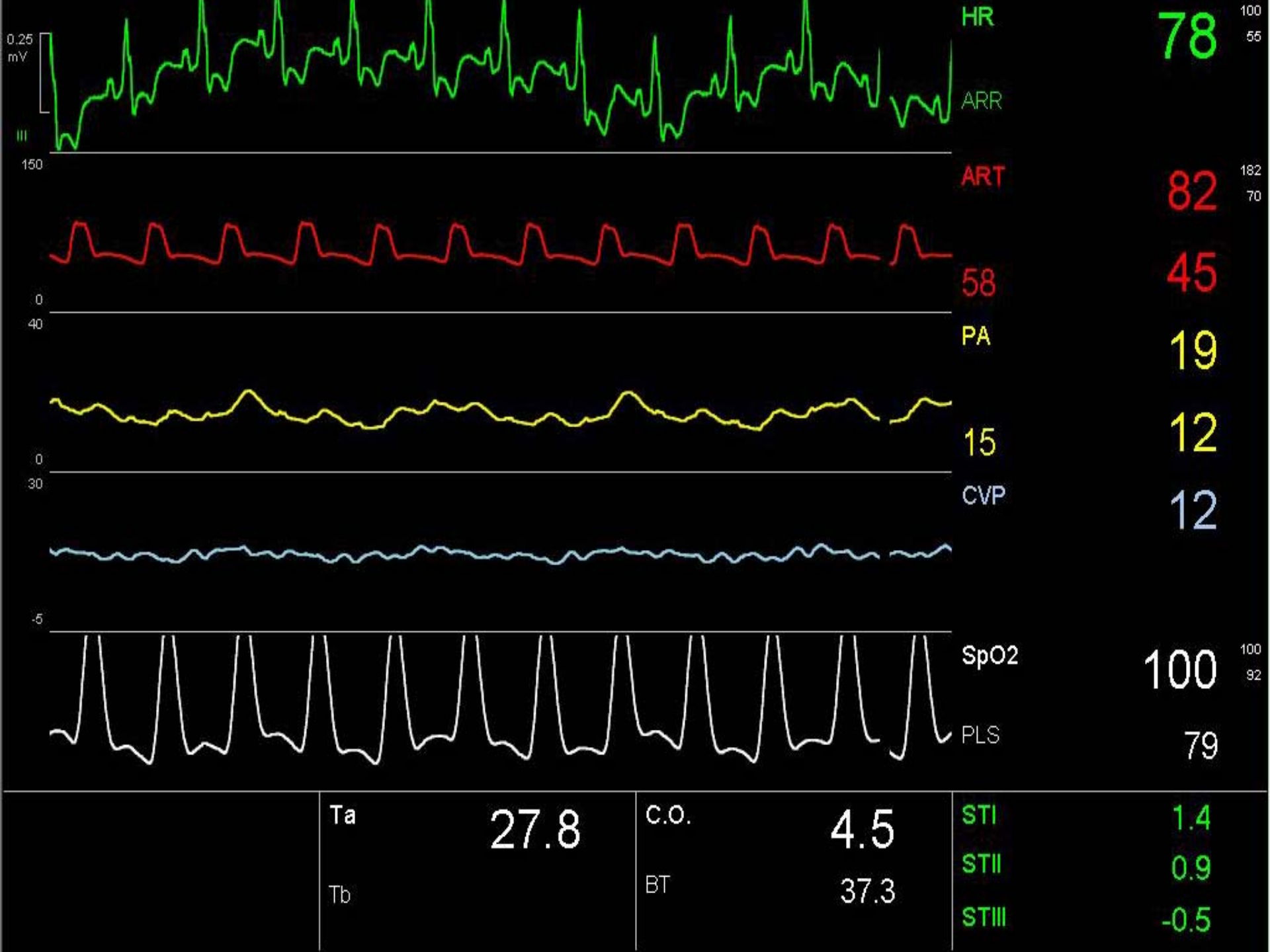
36.6





Ta	27.8	C.O.	4.5	STI	1.1
Tb		BT	37.3	STII	0.7
				STIII	-0.4

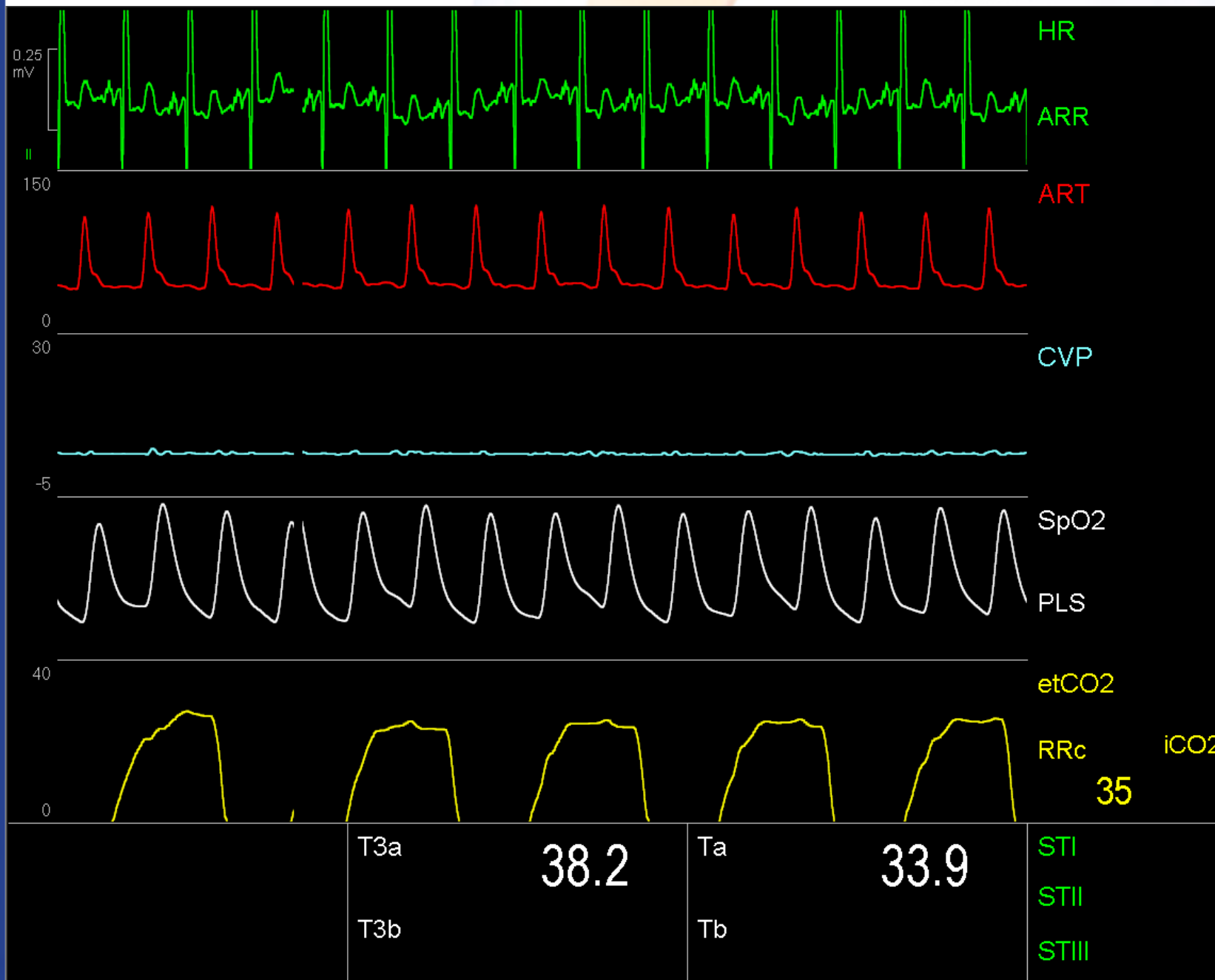




Casus

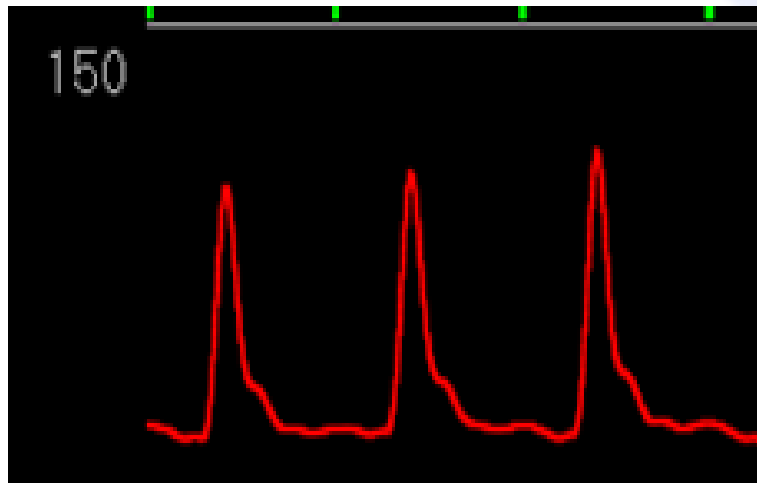
- **Patient: Heer C.Q. Laty**
- **Opname diagnose:**
 - Respiratoire insufficiëntie
 - Geperforeerde diverticulitis





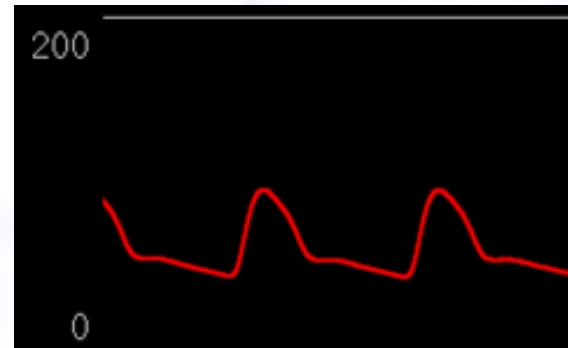
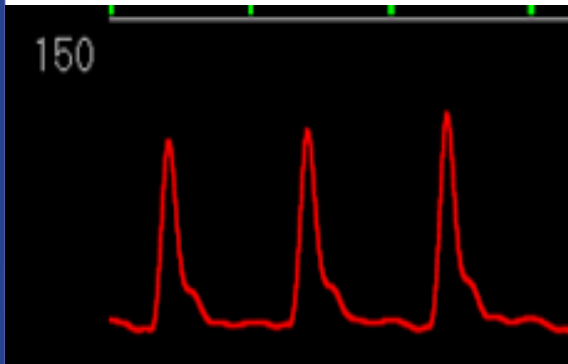
Arterie curve

- **Slagvolume:**
 - Afhankelijk van hoogte en breedte



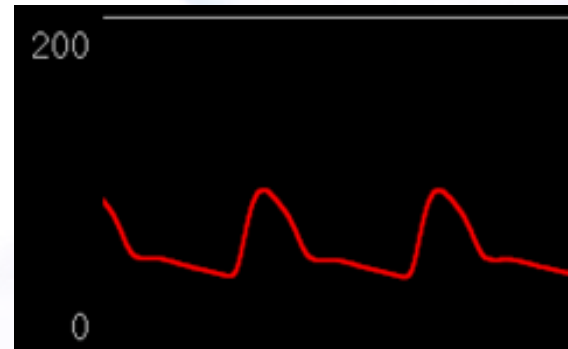
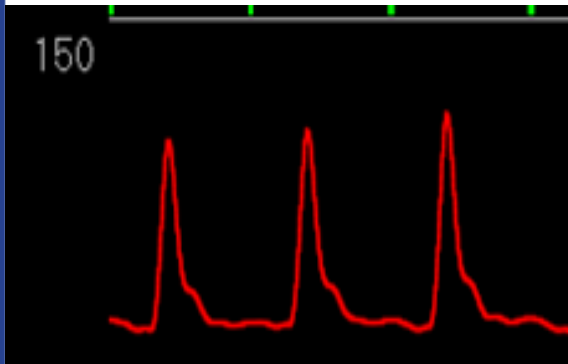
Arterie curve

- **Ejectiesnelheid / contractiekracht**
 - Hoek opstijgende been arterie curve
 - Steile curve + hoge systole = goede contractiekracht

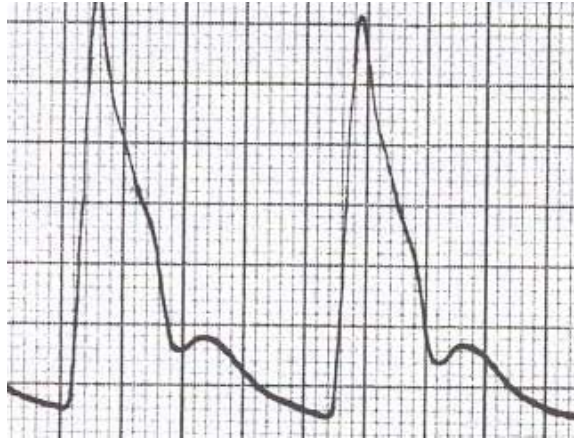


Arterie curve

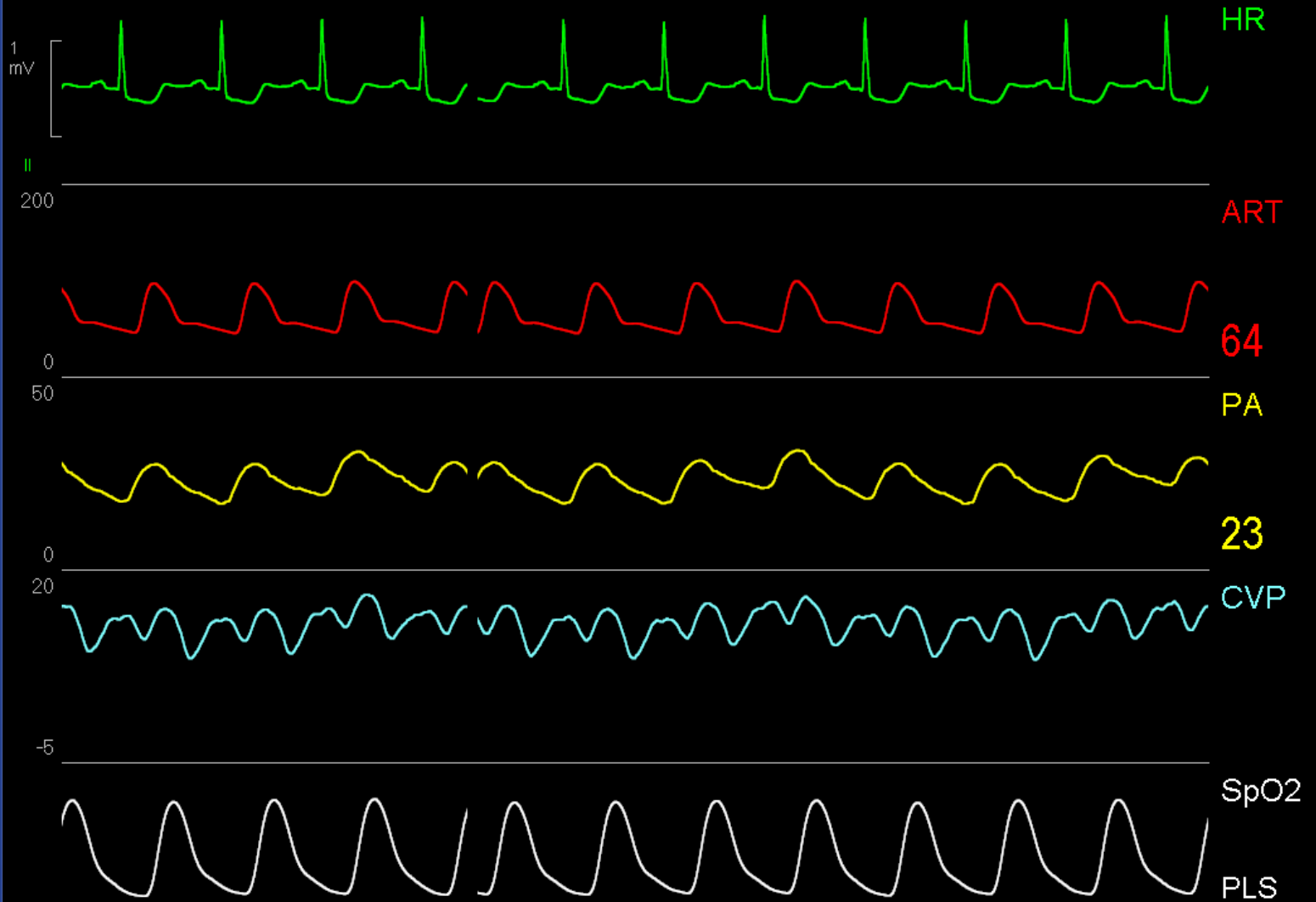
- **Perifere vaatweerstand**
 - Hoek diastolische plateau
 - horizontale plateau: hoge vaatweerstand



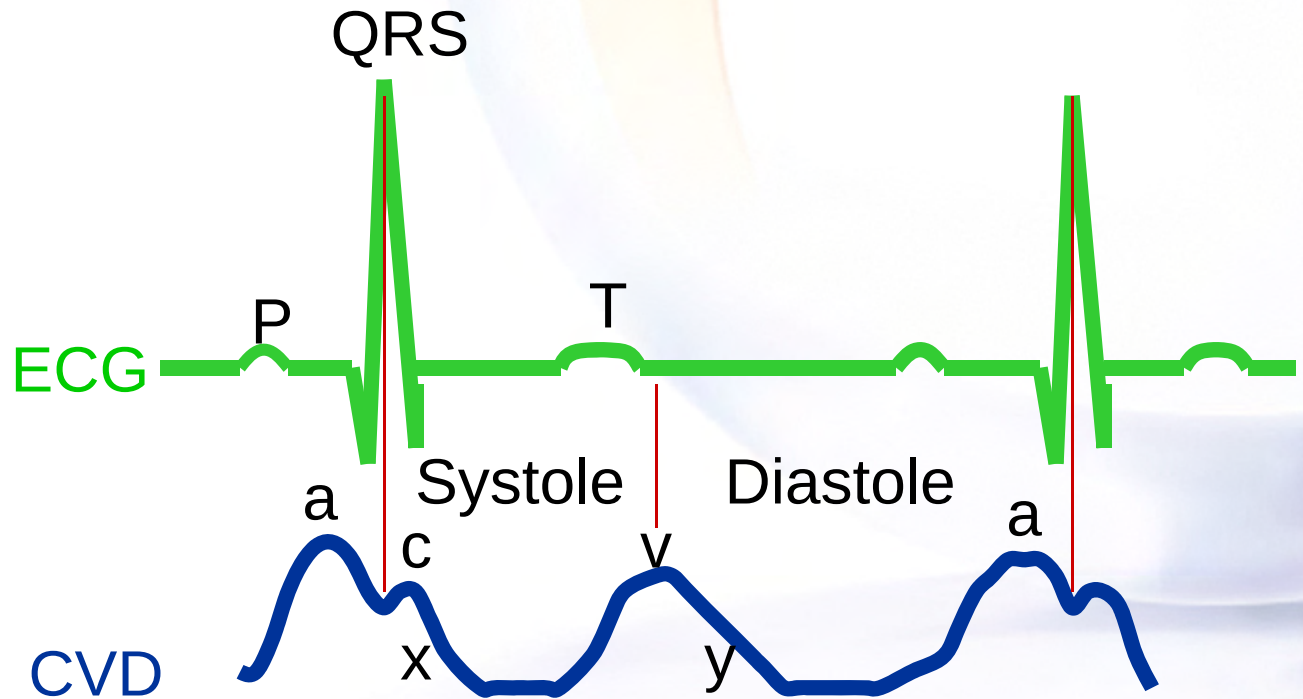
Arterie curve



CVD



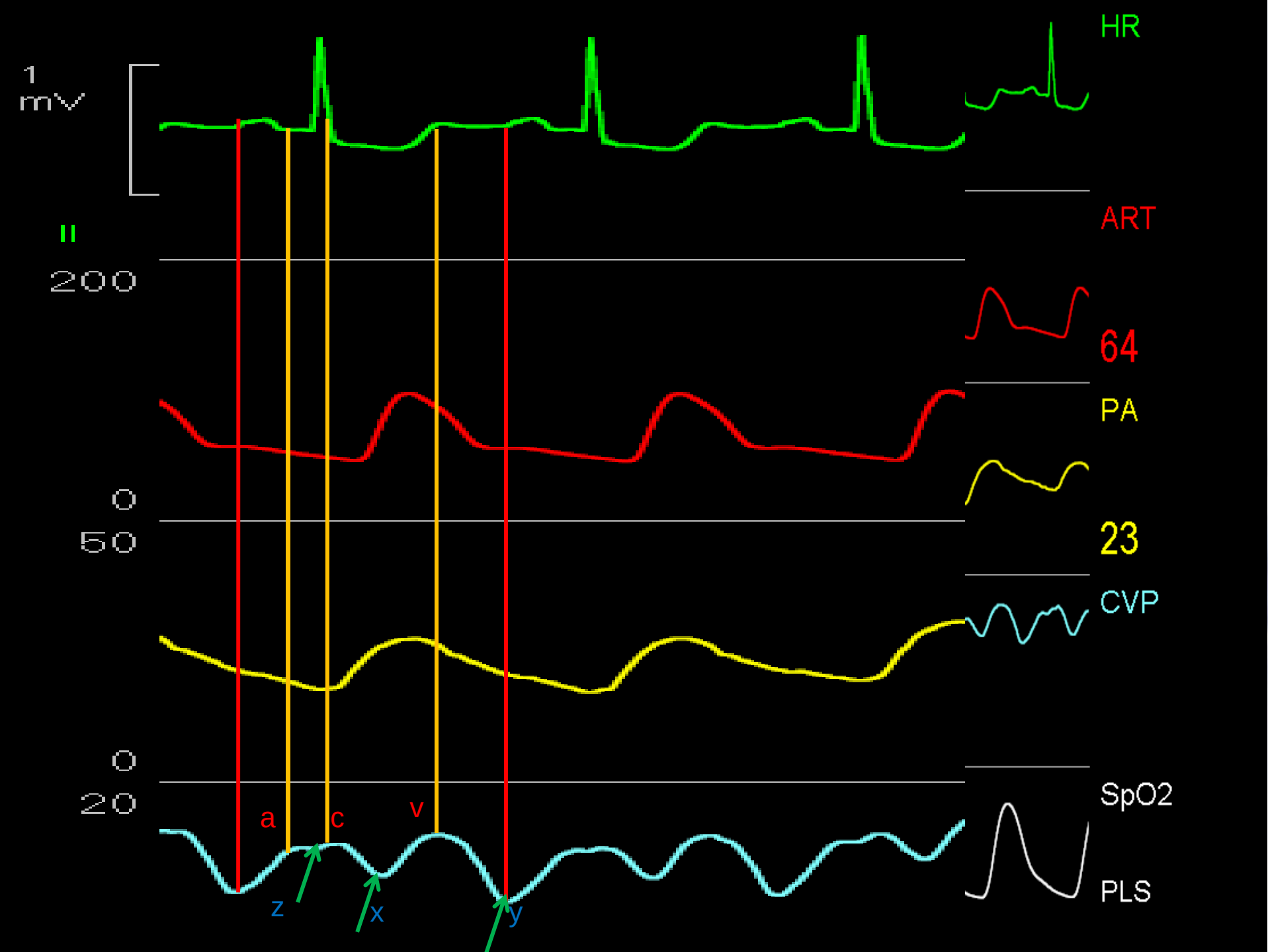
CVD



CVD

Golf	CVD
a golf	In PR
c golf	Eind QRS
v golf	Eind T





CVD

- **Tachycardie**
 - a en c golf vallen samen
- **Bradycardie**
 - Elke golf duidelijk zichtbaar
- **Boezemfibrilleren**
 - Geen atrial kick → geen a golf
- **A-V dissociatie (b.v.pacemaker)**
 - canon wave = Hoge a wave



CVD

- **Tricuspidaal insufficiëntie**
 - c wave + v wave vallen samen tot grote v wave

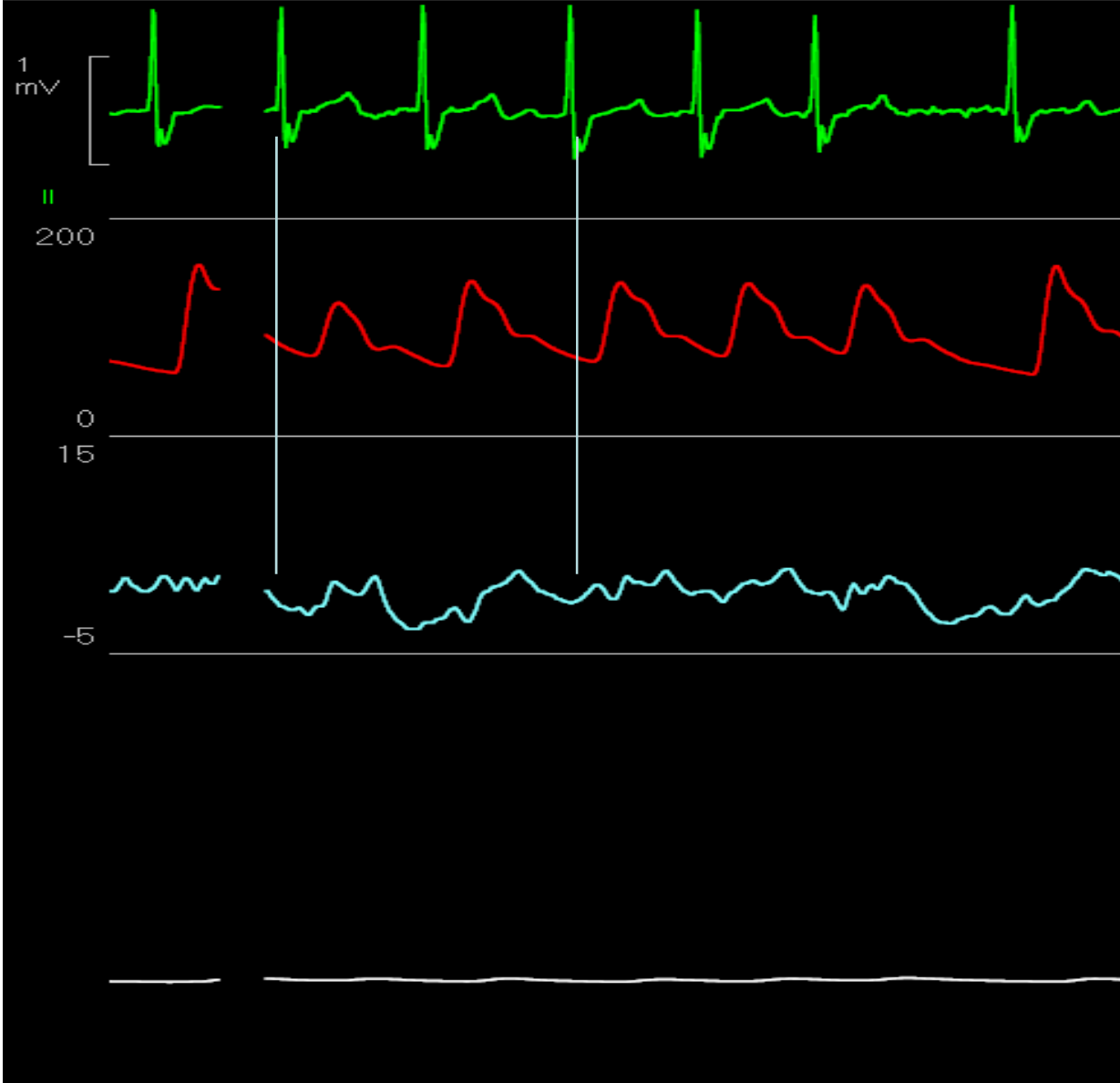


Atrial fibrillation (no P waves)



CVP = 10 mm Hg





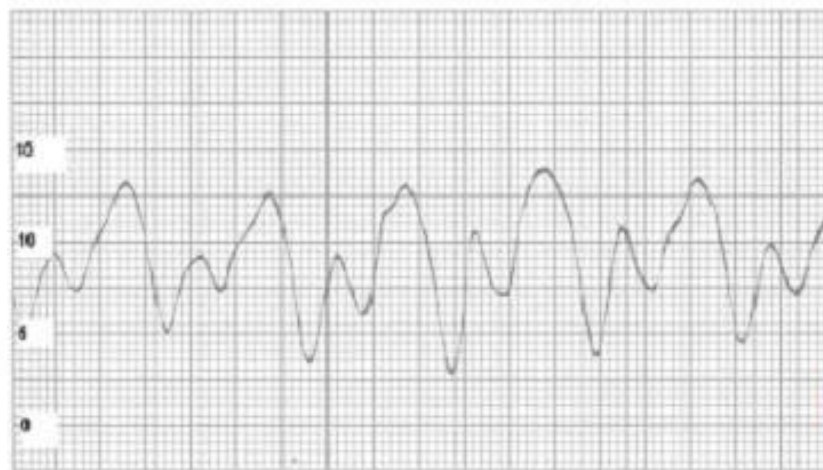
T3a

36.7

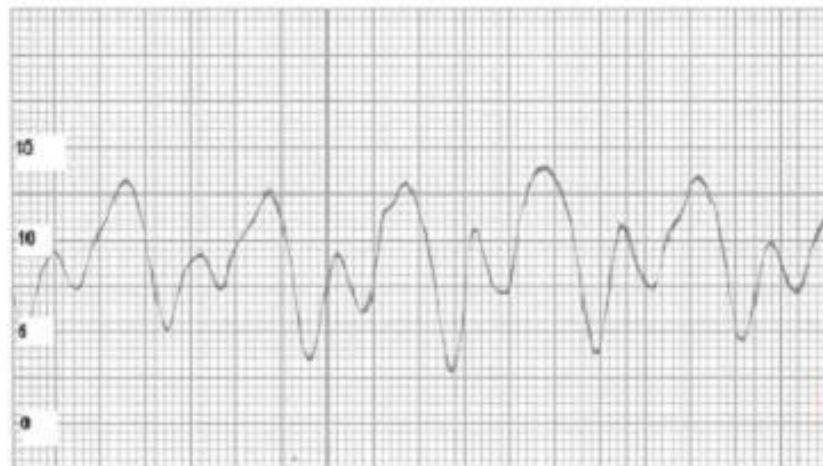
RESP

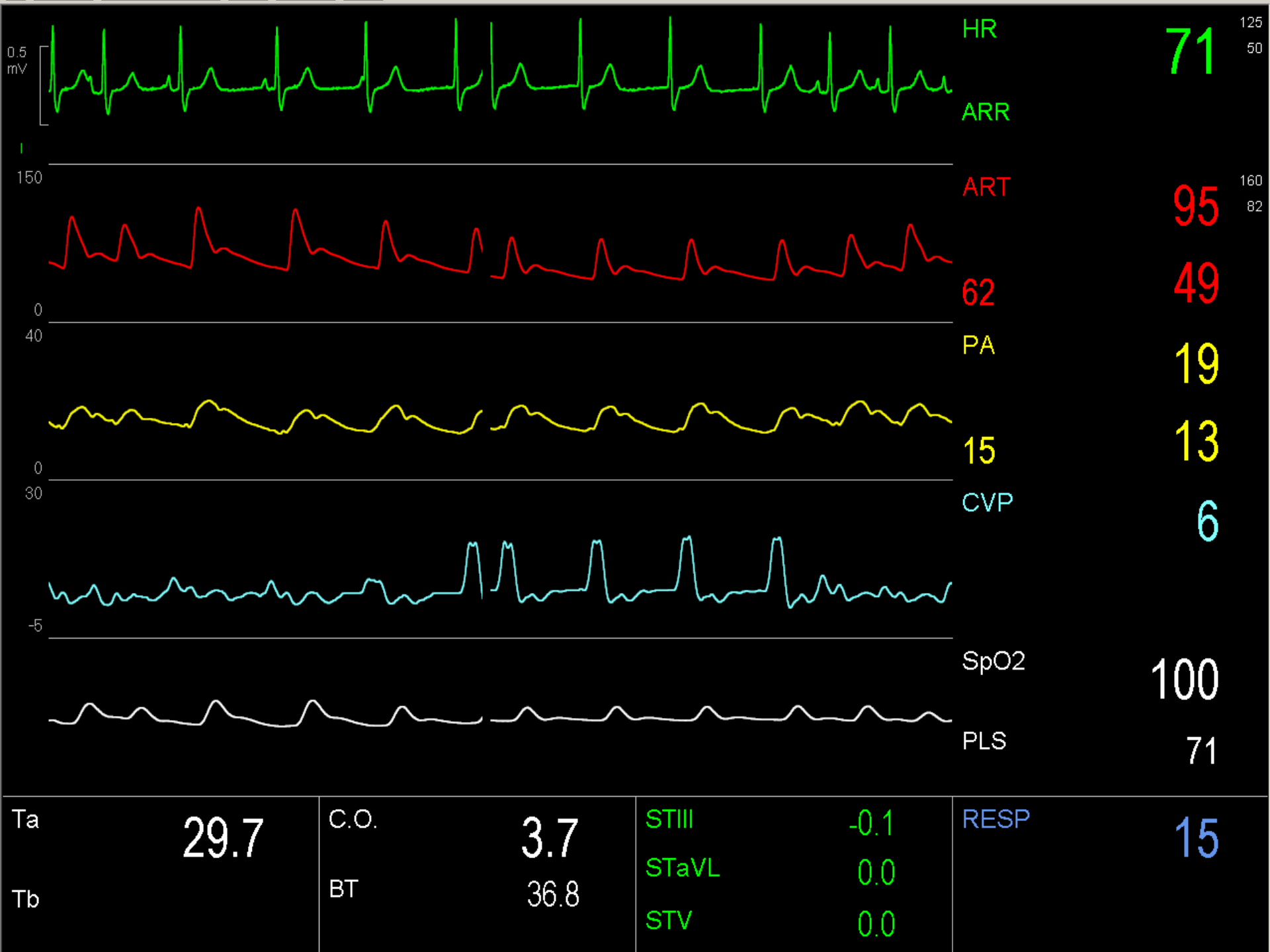
T3b

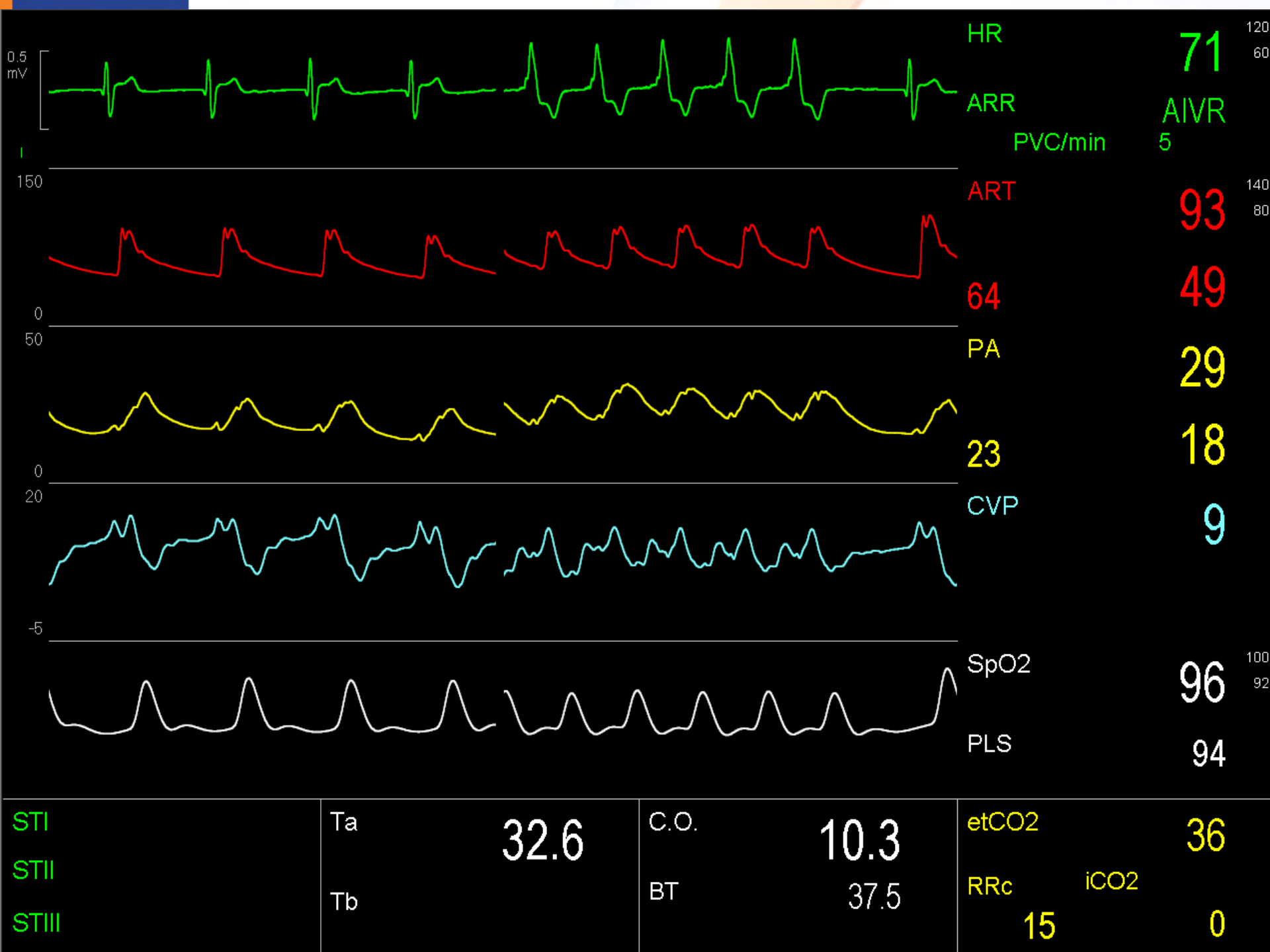




TI



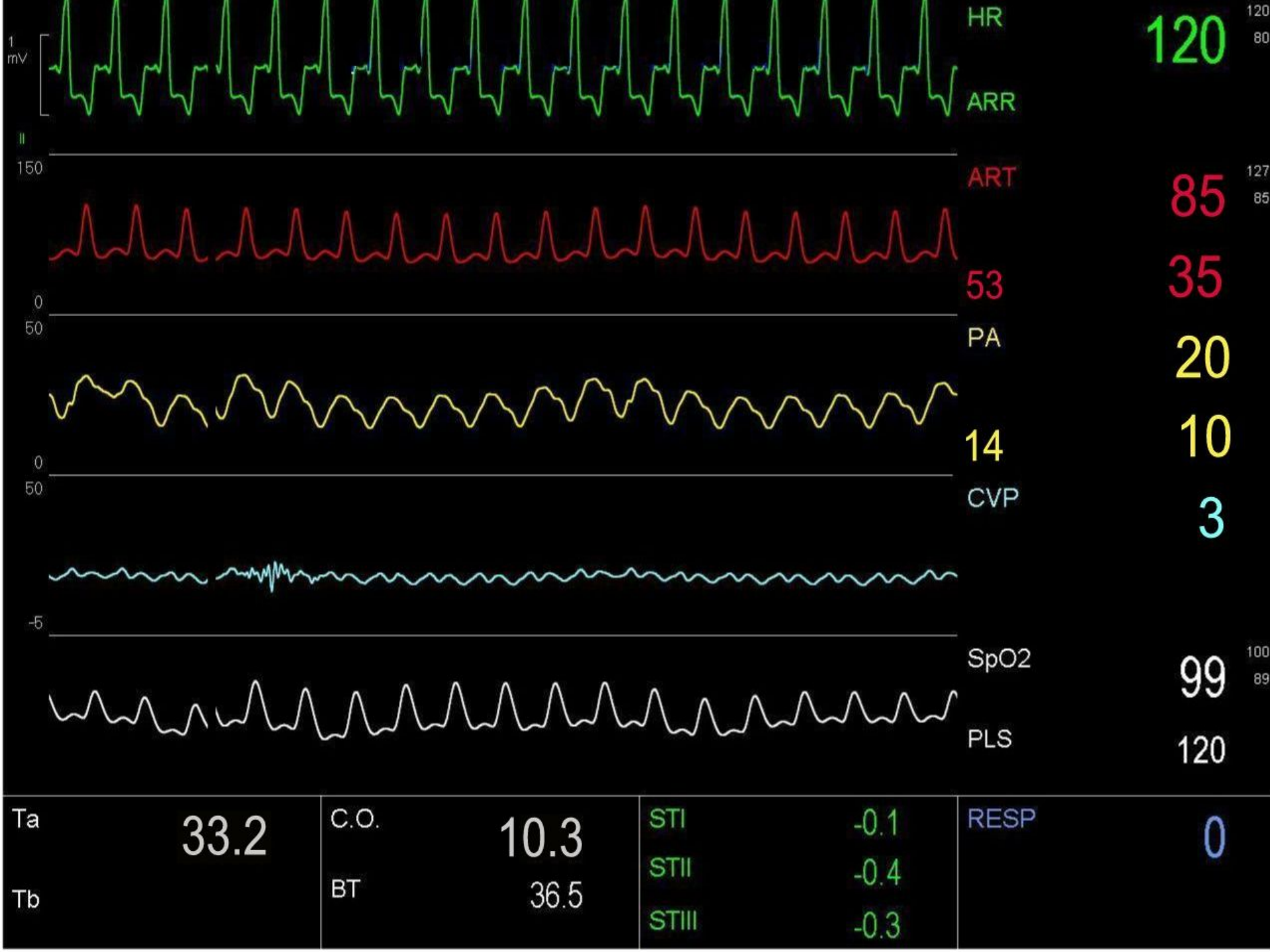






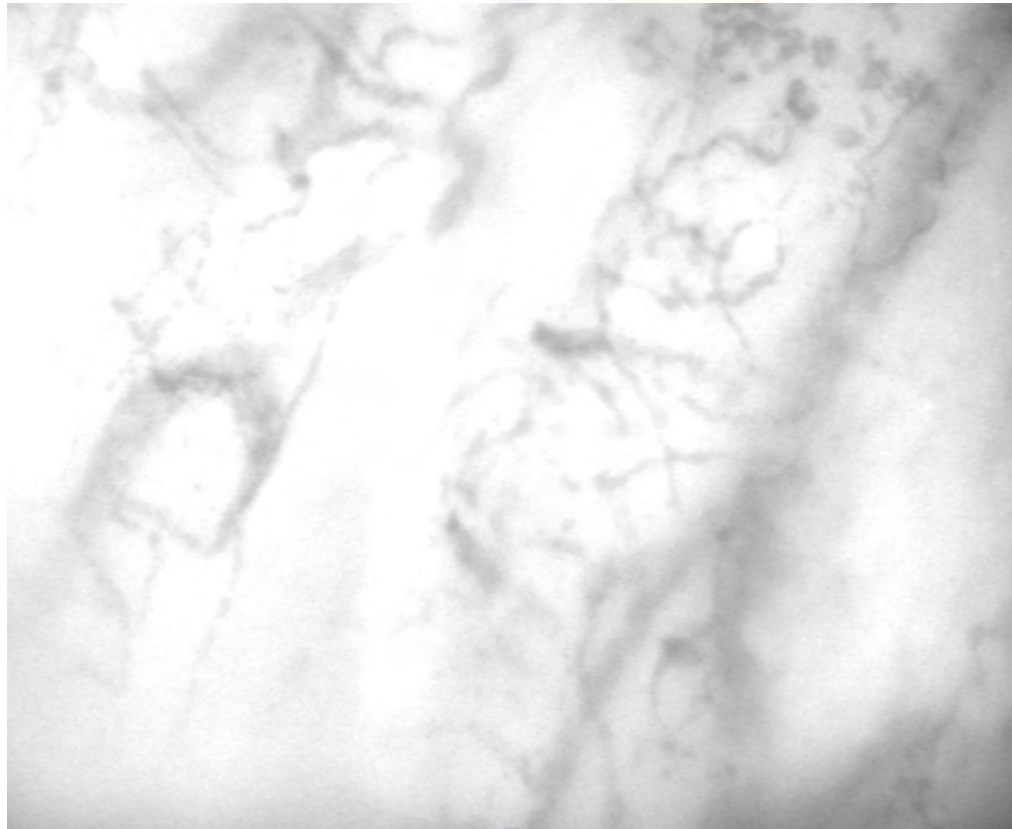
Casus → wat gaan we doen?





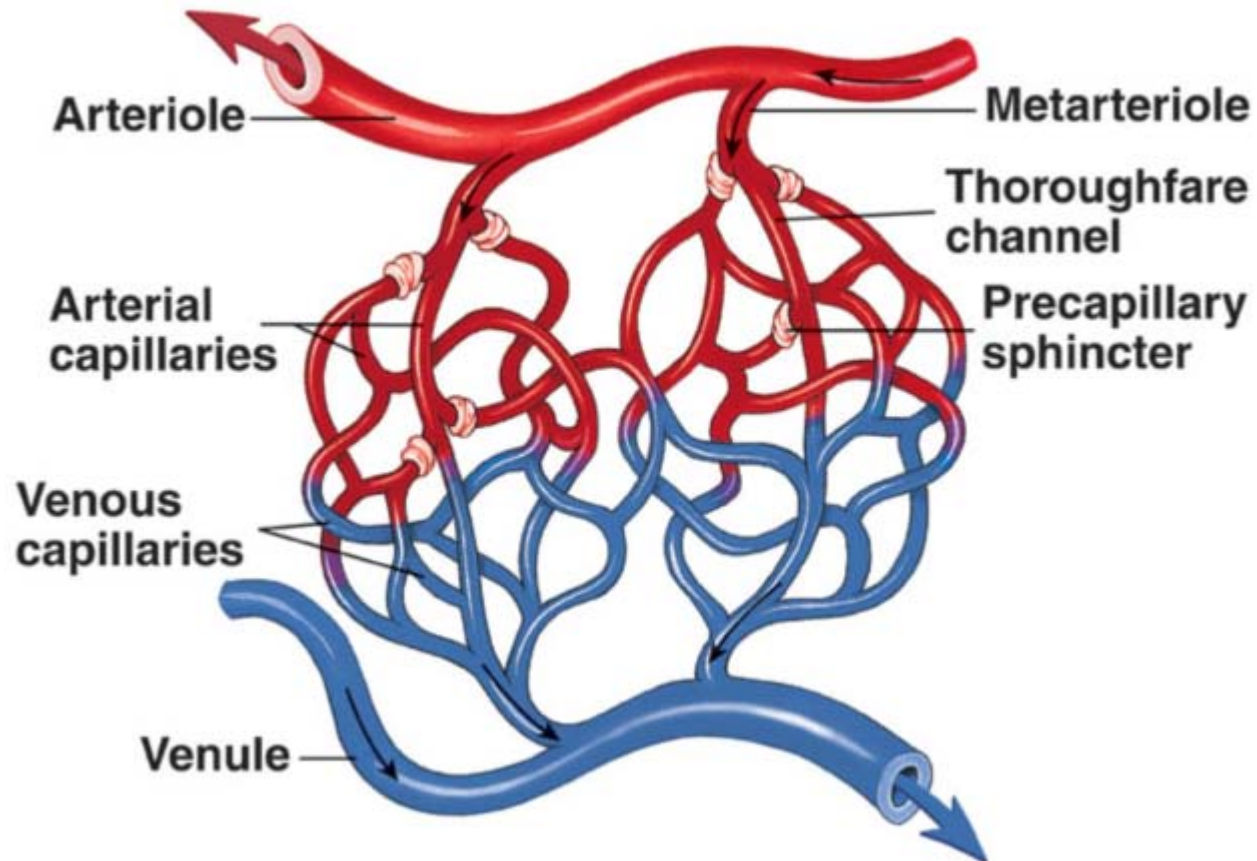


Sidestream Dark Field-imaging (SDF)





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Spronk: Lancet

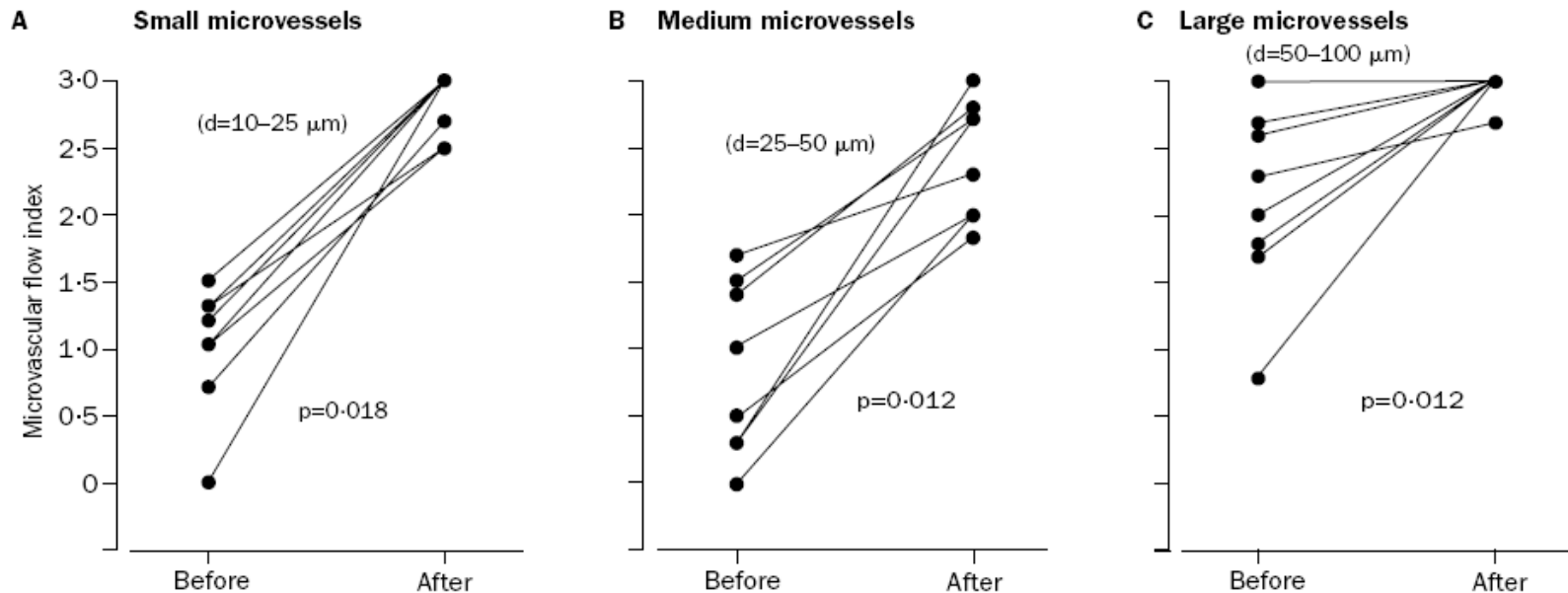
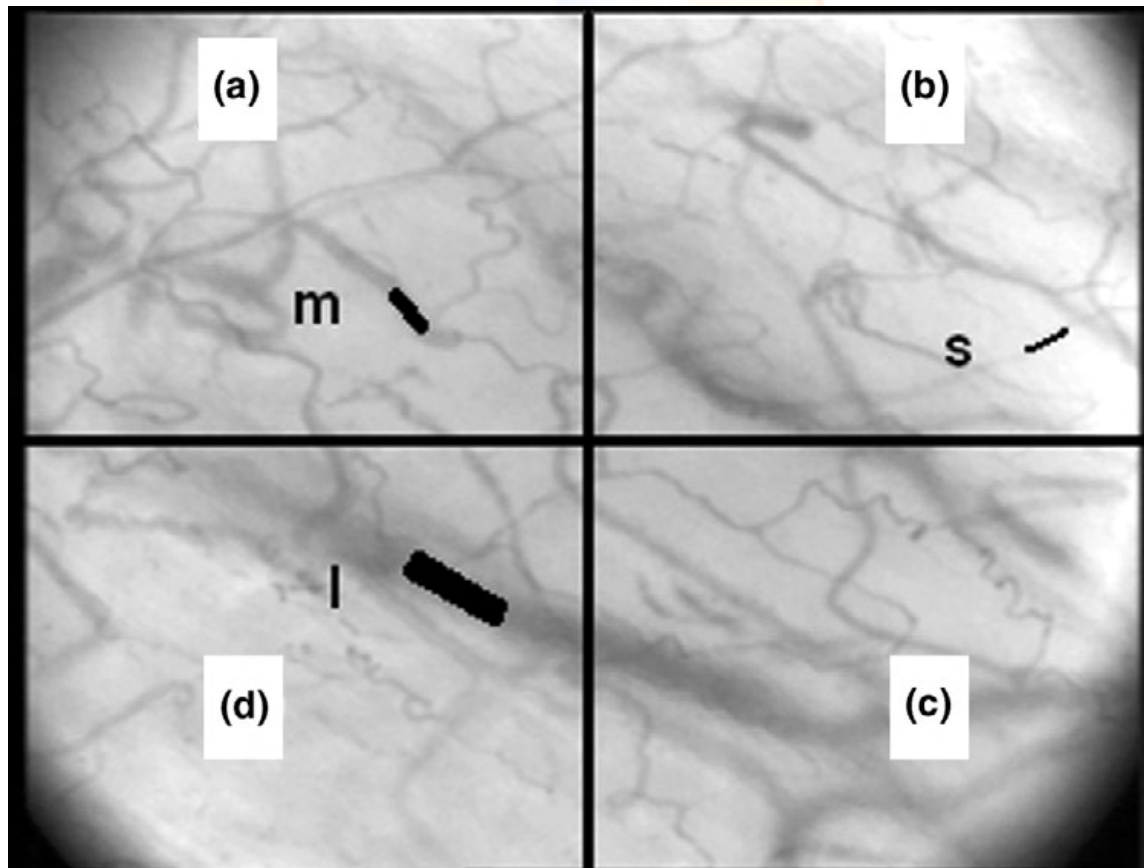


Figure 1: Microvascular flow index before and 2 min after administration of nitroglycerin
d=diameter. 0.5 mg bolus nitroglycerin given intravenously.



Interpreteren SDF beelden



Interpreteren OPS beelden

- **0 = Geen flow**
- **1 = Intermitterende flow**
- **2 = Trage flow (sluggish)**
- **3 = Goede doorstroming**



Score OPS

Table 1

Example of microvascular flow index calculation for a (sublingual) microvascular network

Flow	Quadrant A	Quadrant B	Quadrant C	Quadrant D	MFI
Small	2	3	3	2	$10/4 = 2.5$
Medium	1	3	3	3	$10/4 = 2.5$
Large	-	3	3	-	$6/2 = 3$

MFI, microvascular flow index.



Naam:
Zis nummer:
Datum/tijd:

Nr.	A	B	C	D	MFI
Large					
Medium					
Small					

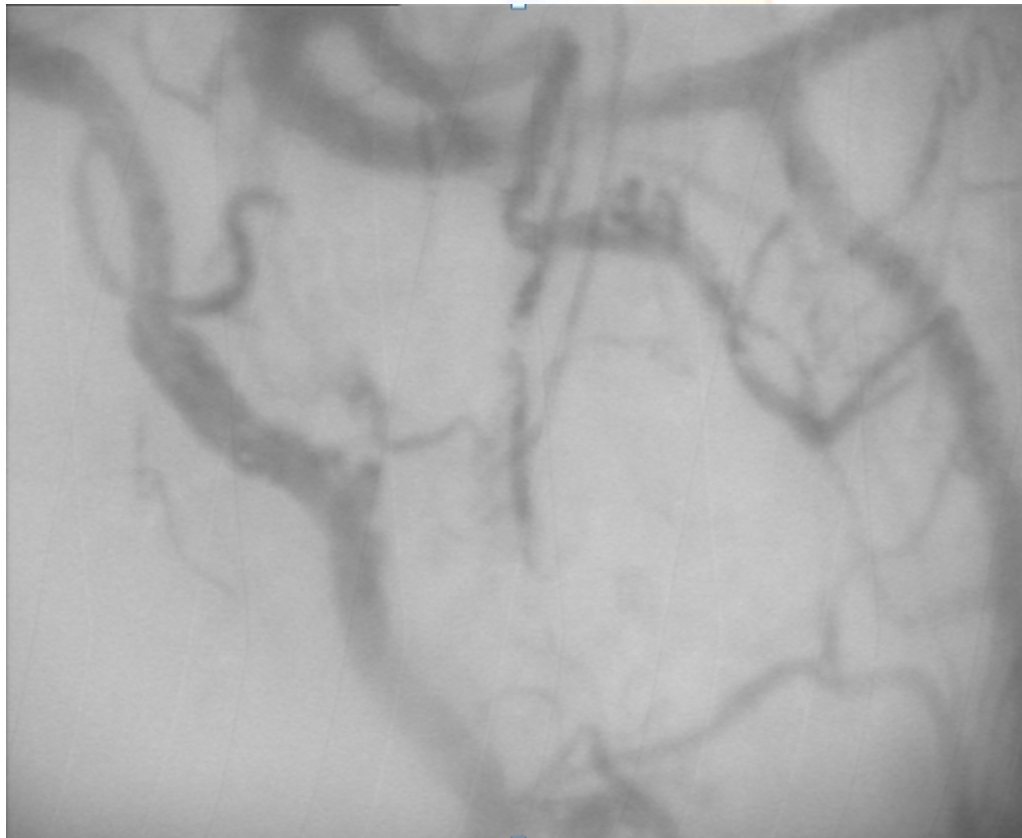
Nr.	A	B	C	D	MFI
Large					
Medium					
Small					

Nr.	A	B	C	D	MFI
Large					
Medium					
Small					

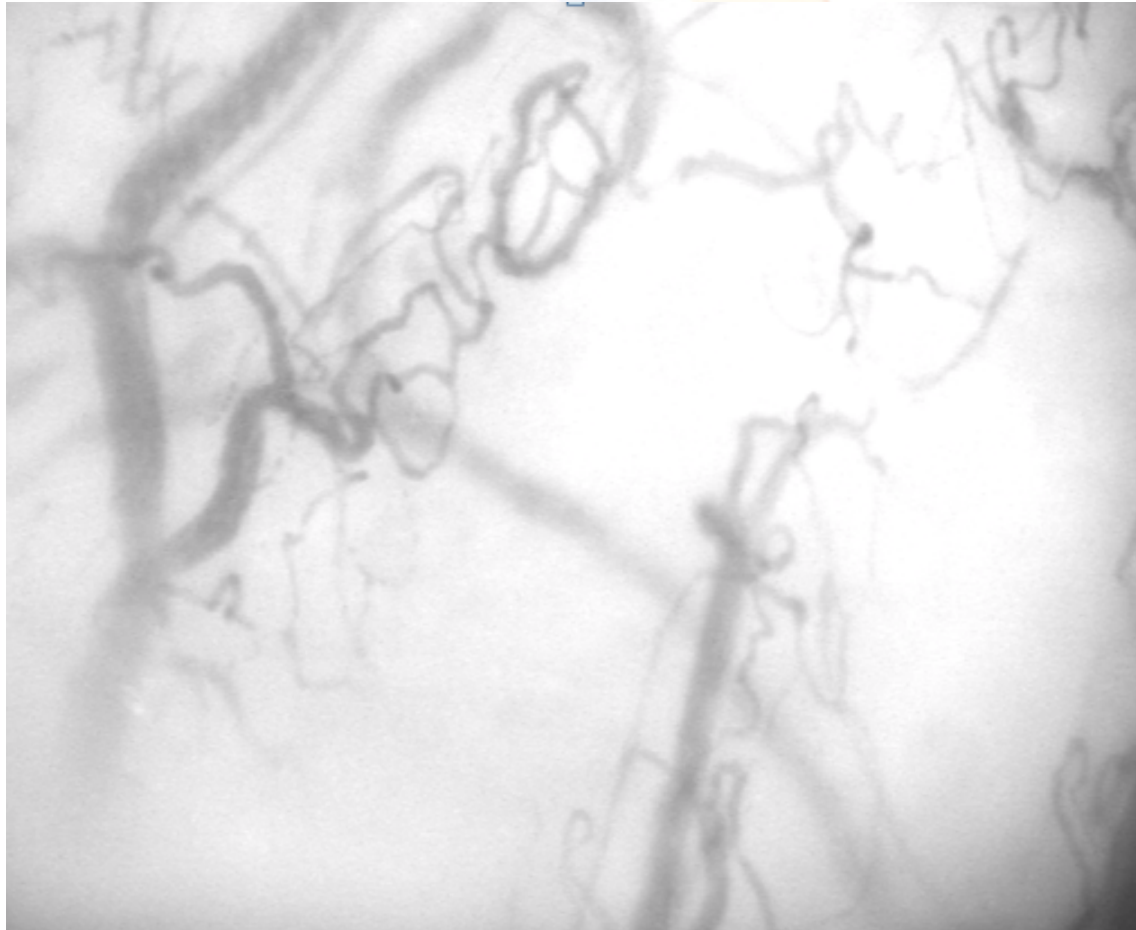
Large MFI gemiddeld :
Medium MFI gemiddeld:
Small MFI gemiddeld:

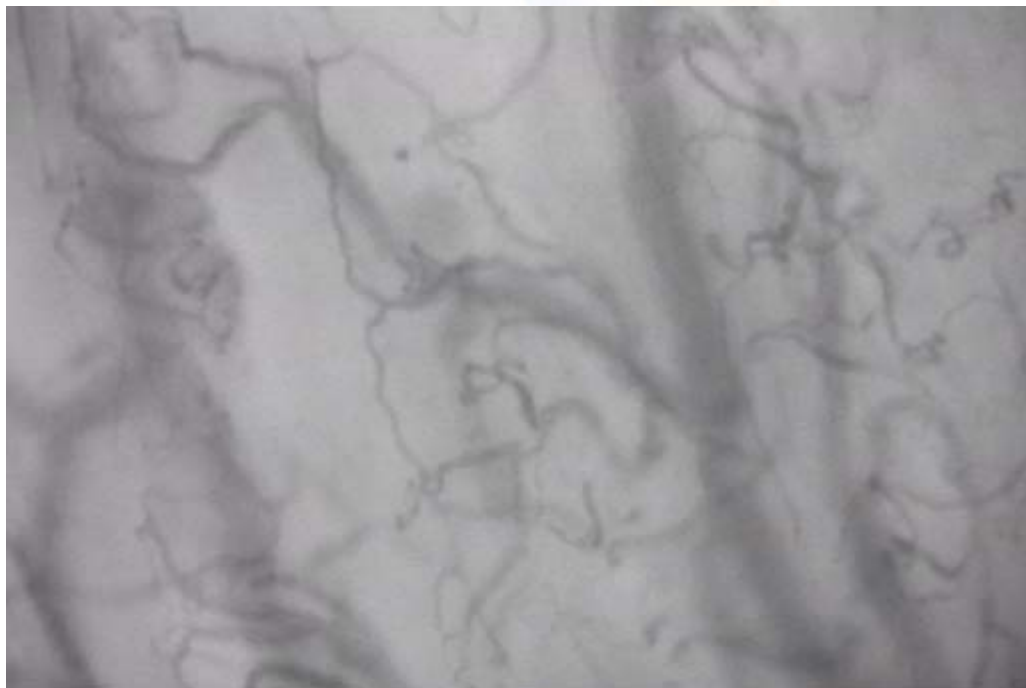


Beoordeel OPS

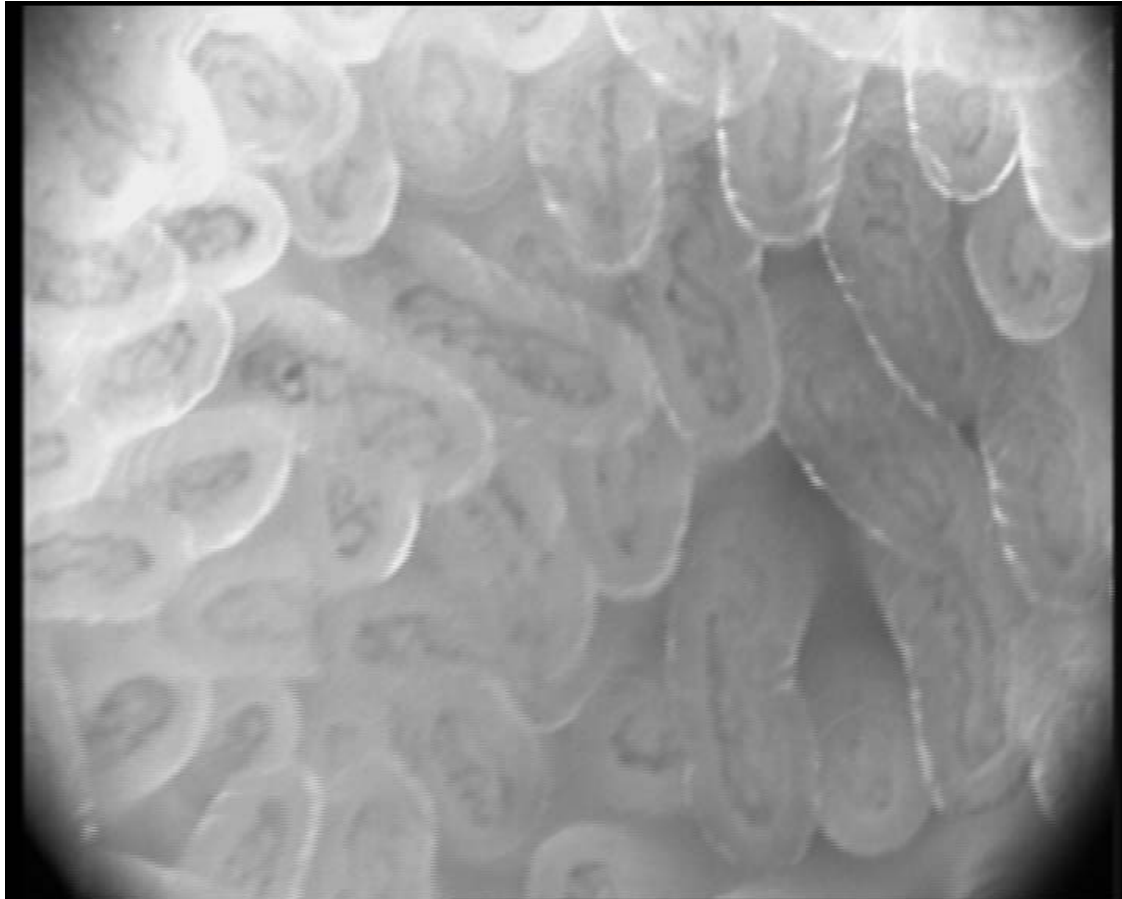


Beoordeel OPS

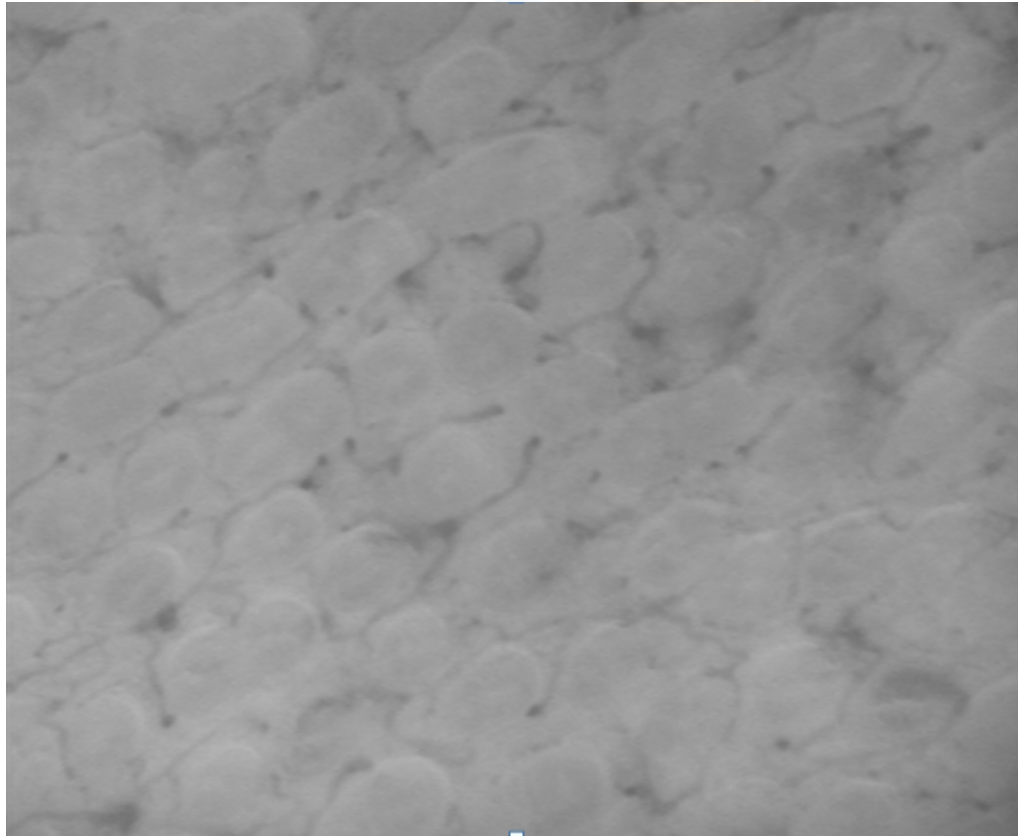




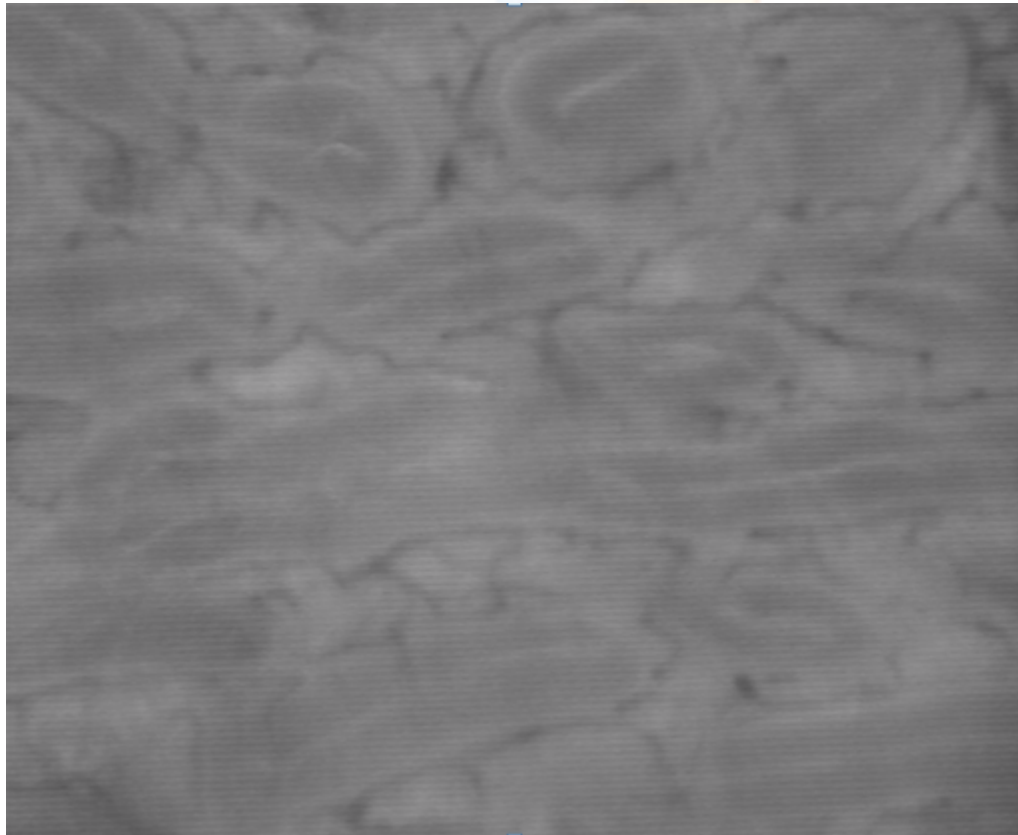
Sub-linguaal circulatie =
darm circulatie?



AP



Rectaal



De Backer methode

