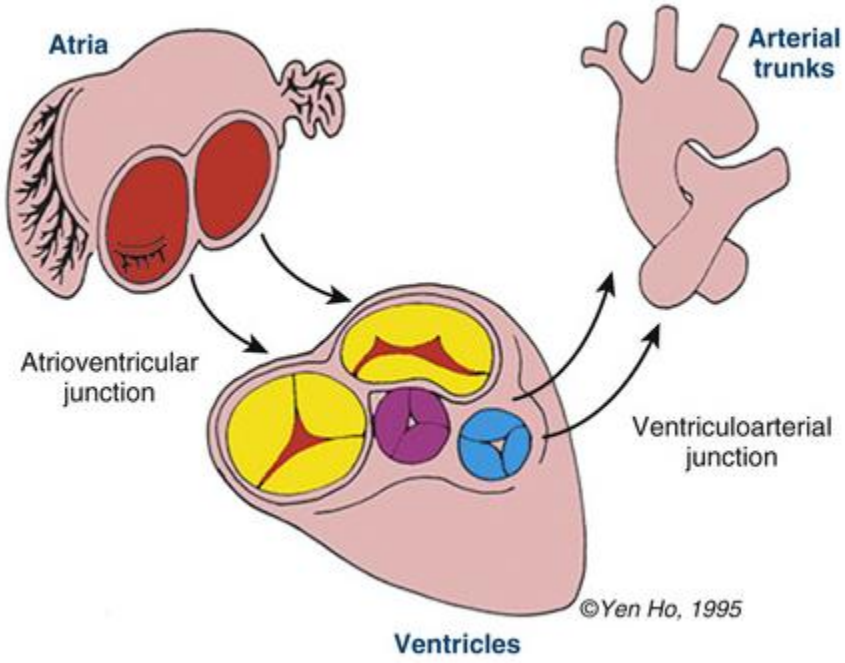
Herzerkrankungen auf der PICU

Herzfehler

Herzleistung

Herzversagen

Herzfehler – ich bin komplex

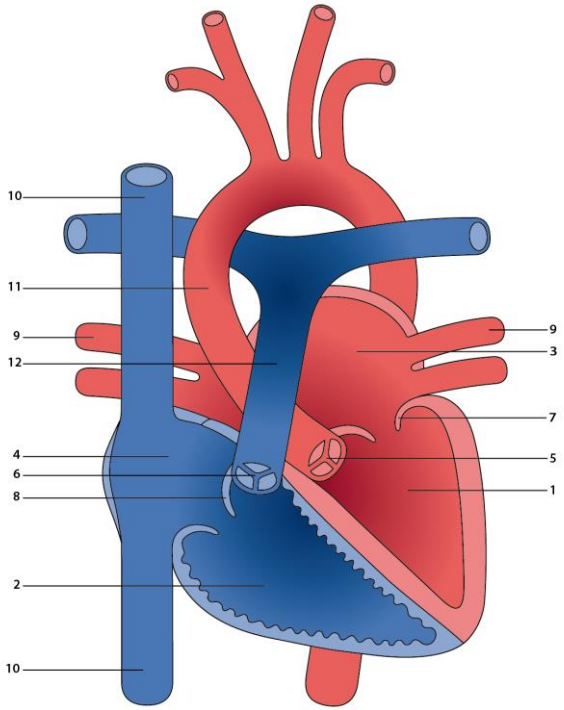


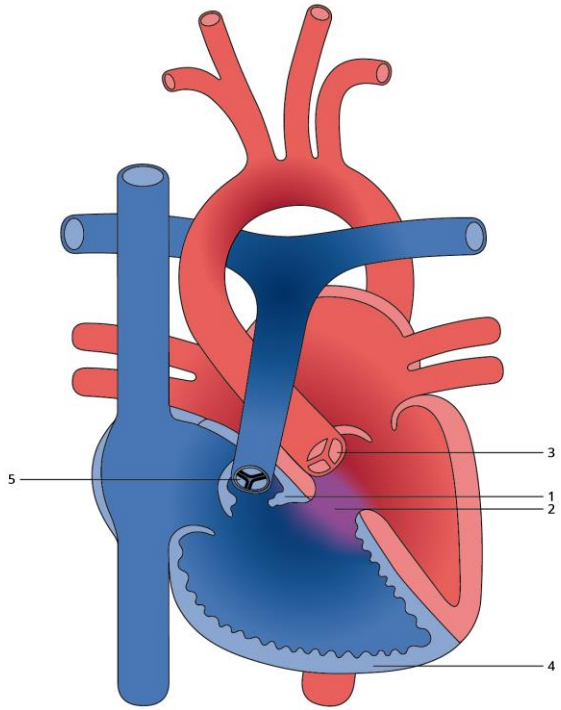
Segmentale Analyse

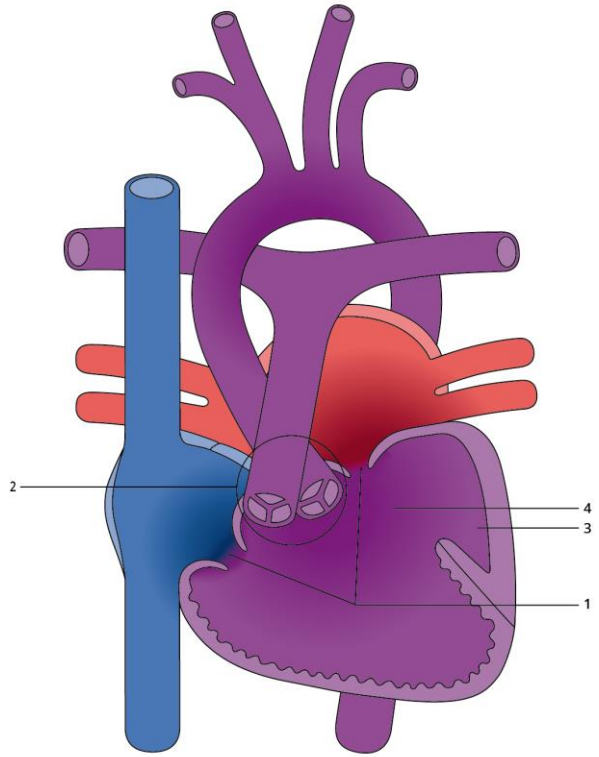
- Position des Herzens (und der anderen Organe
- Verbindungen der einzelnen Regionen (Venen, Vorhöfe, Kammern, Arterien)
- Single / Common

https://congenital-heart-disease.ch/heart-disease

Herzfehler – ich bin komplex







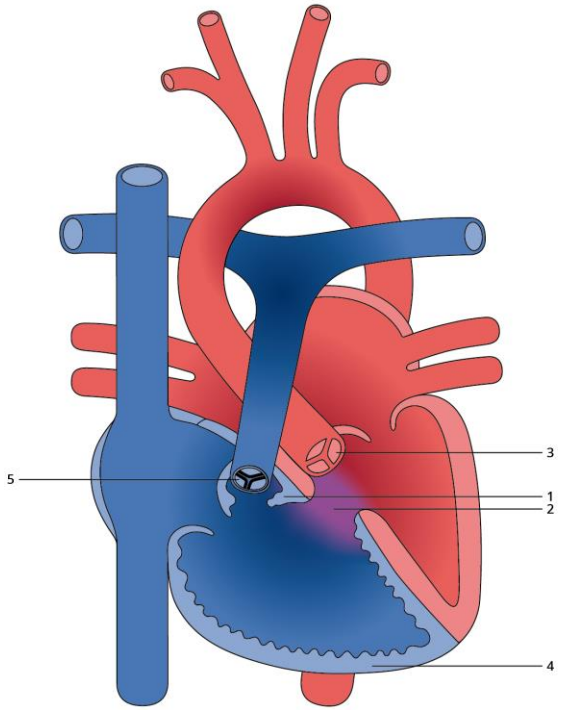
https://congenital-heart-disease.ch/heart-disease

Klassifizierung von Herzfehlern

Azyanotisch	Zyanotisch
Erhöhter Pulmonaler Blutfluß • Septale Defekte (ASD, VSD, AV Kanal) • Verbindungen großer Gefäße (PDA, AoPulm Verbindung)	**Erhöhter Pulmonaler Blutfluß** • D-TGA • Truncus arteriosus • TAPVR • HLHS
Normaler Pulmonaler Blutfluß • Aortenstenose • Coarctatio der Aorta • PS	**Verminderter pulmonaler Blutfluß** • TOF • Trikuspidalatresie mit PS • Ebstein Anomalie • Kritische PS

$$Q_P / Q_S$$

Q_P / Q_S



University of Basel
New Media Center

slido

Please download and install the Slido app on all computers you use

Welches der folgenden ist nicht ein direkter Faktor für das Herzzeitvolumen?

ⓘ Start presenting to display the poll results on this slide.

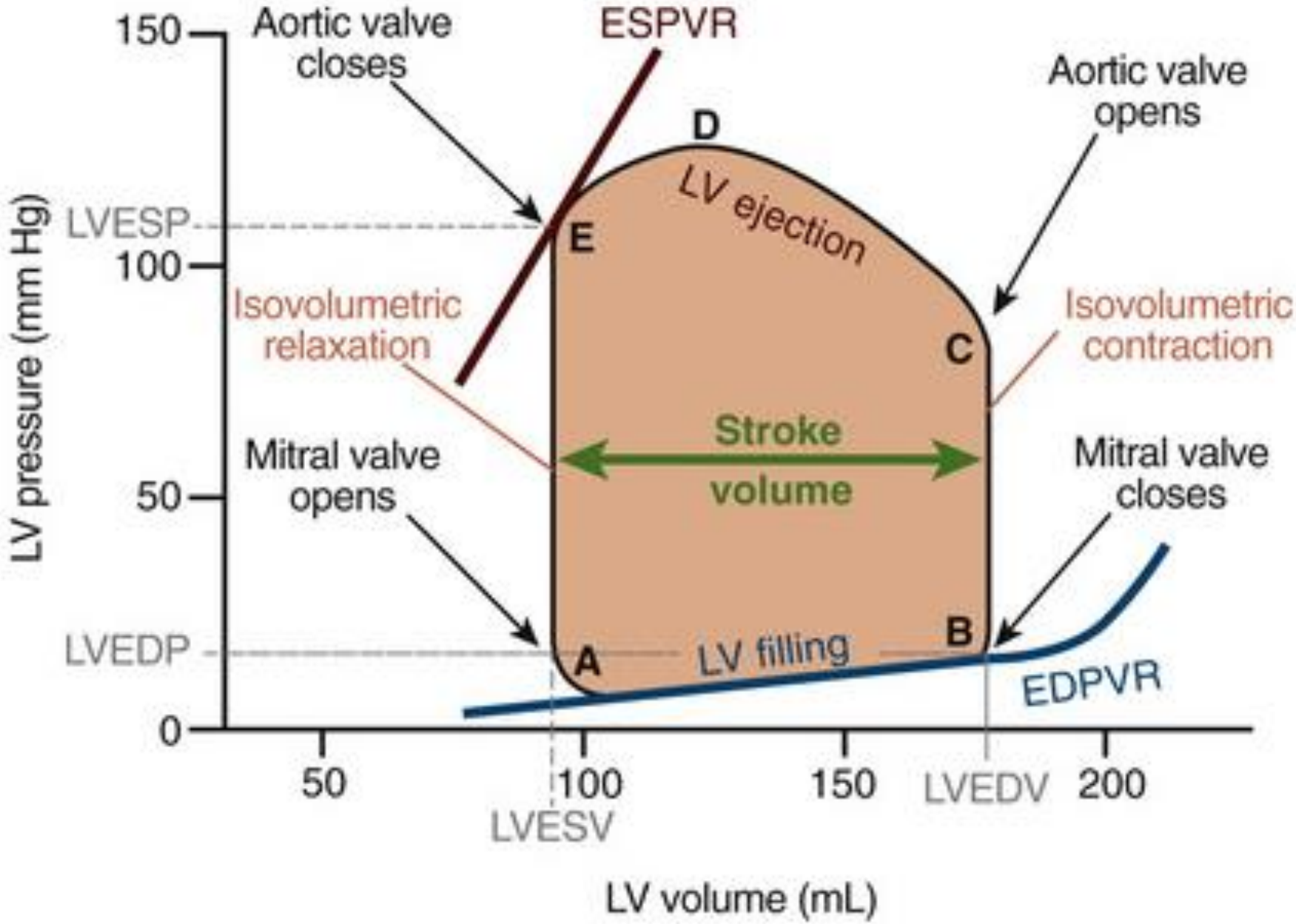
CO = HR x SV

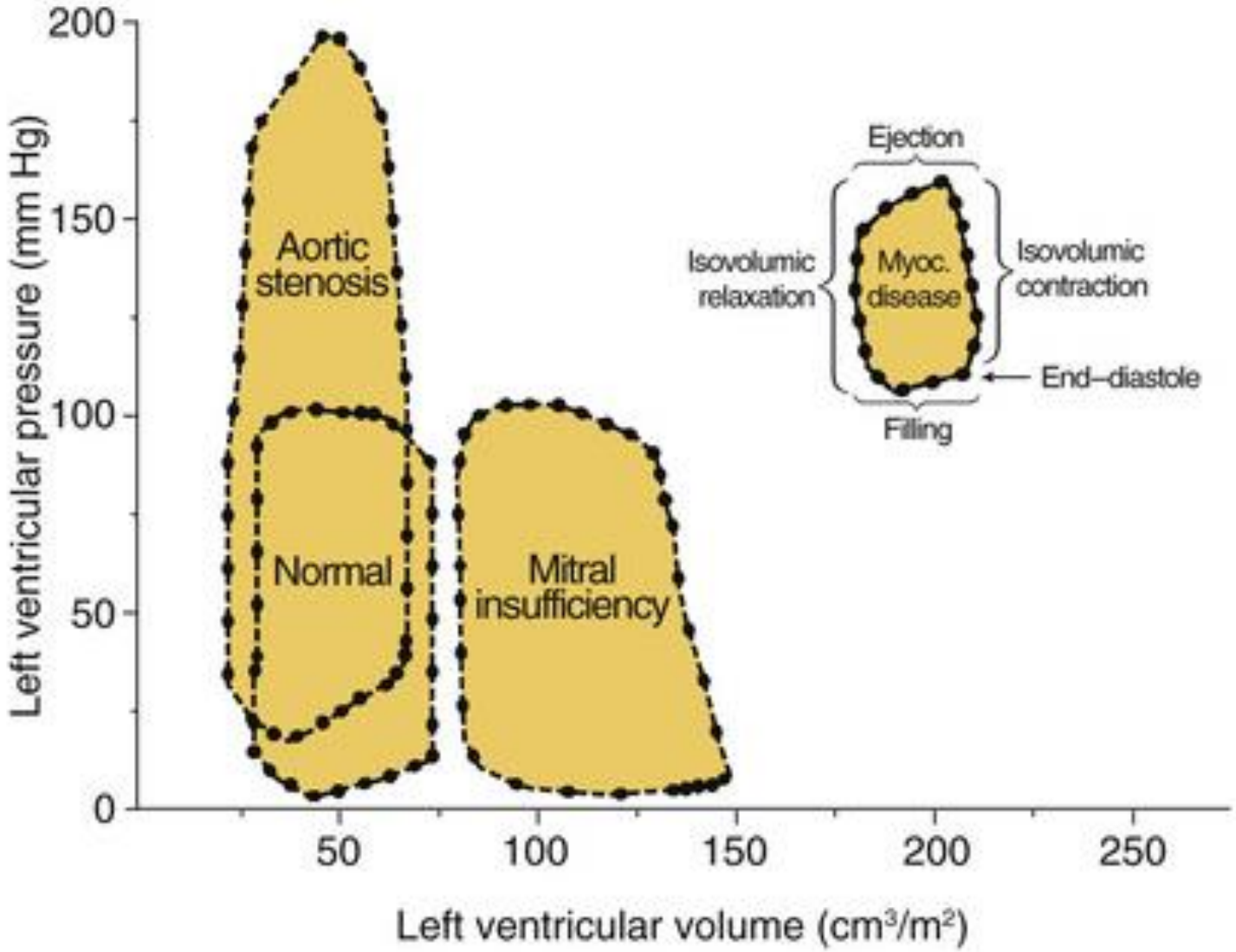
Cardiac output = heart rate x stroke volume

[Einheit: l / min]

CO = HR x SV

ESV - EDV

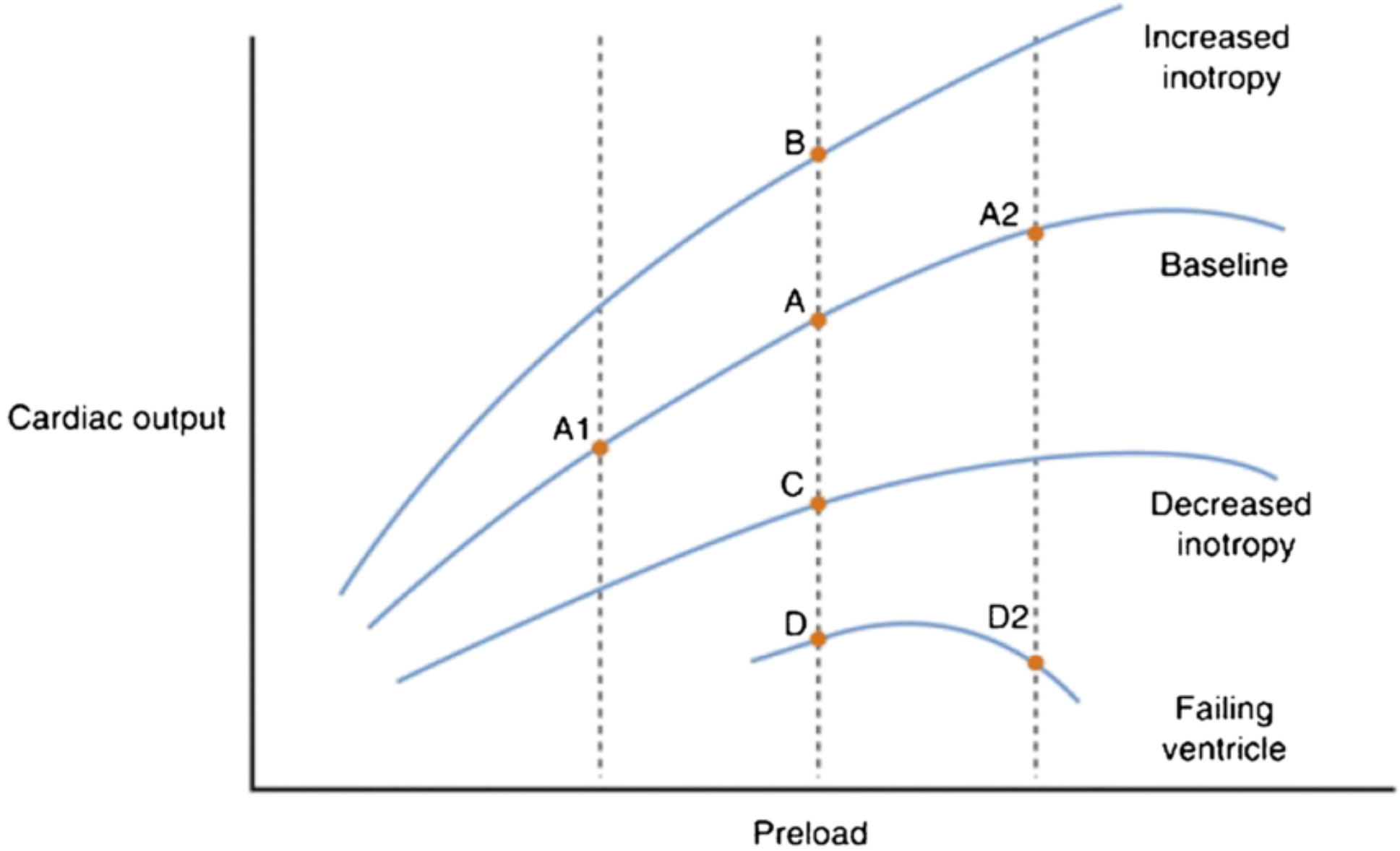

150
100
50
0
LV pressure (mm Hg)
LVESP
LVEDP
Aortic valve closes
ESPVR
D
LV ejection
E
Aortic valve opens
Isovolumetric relaxation
C
Isovolumetric contraction
Stroke volume
Mitral valve opens
Mitral valve closes
A
LV filling
B
EDPVR
50
100
150
200
LVESV
LVEDV
LV volume (mL)


200
150
100
50
0
Left ventricular pressure (mm Hg)
Aortic stenosis
Normal
Mitral insufficiency
Ejection
Isovolumic relaxation
Myoc. disease
Isovolumic contraction
End–diastole
Filling
50
100
150
200
250
Left ventricular volume (cm³/m²)

VORLAST (Frank Starling!)

CO = HR x SV

NACHLAST
KONTRAKTILITÄT


Increased inotropy
B
A2
Baseline
A
A1
C
Decreased inotropy
D
D2
Failing ventricle
Cardiac output
Preload

Cardiac Index

4.0-5.0 l/min/m2 (neonate/infant)

3.0-4.5 l/min/m2 (child)

2.5-4 l/min/m2 (adolescent/adult)

LCOS < 2.0 l/min/m2

$$\text{DuBois Formula: BSA } (m^2) = \sqrt{\frac{\text{Height (cm)} \times \text{Weight (kg)}}{3{,}600}}$$

Cardiac Index

4.0-5.0 l/min/m2 (neonate/infant)

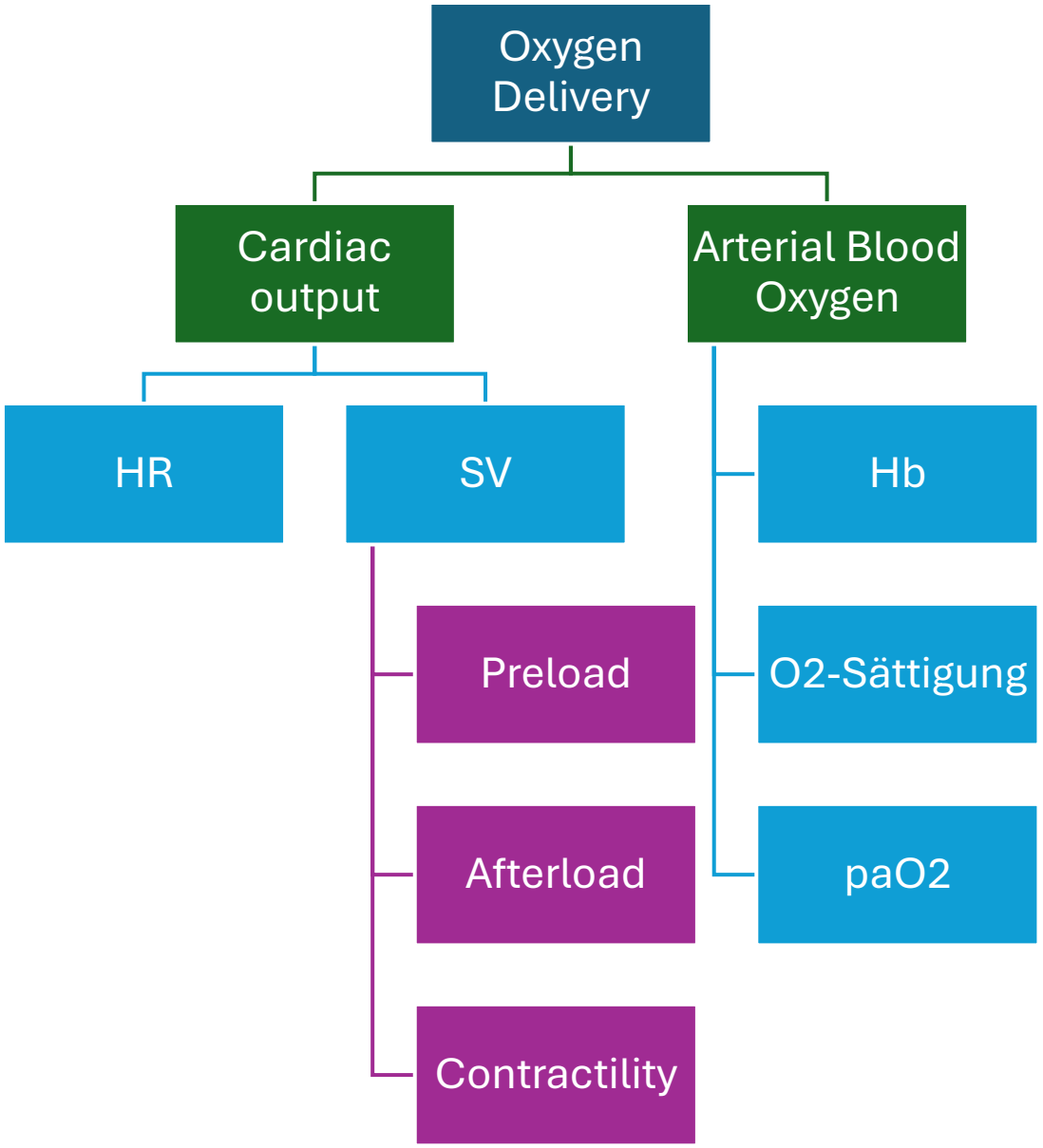
3.0-4.5 l/min/m2 (child)

2.5-4 l/min/m2 (adolescent/adult)

~~LCOS < 2.0 l/min/m2~~

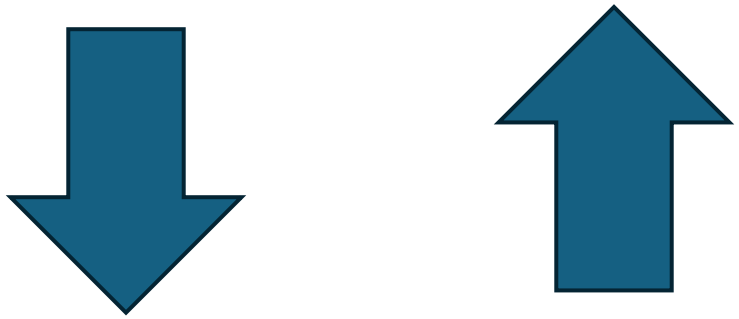
$$\text{DuBois Formula: BSA } (m^2) = \sqrt{\frac{\text{Height (cm)} \times \text{Weight (kg)}}{3{,}600}}$$

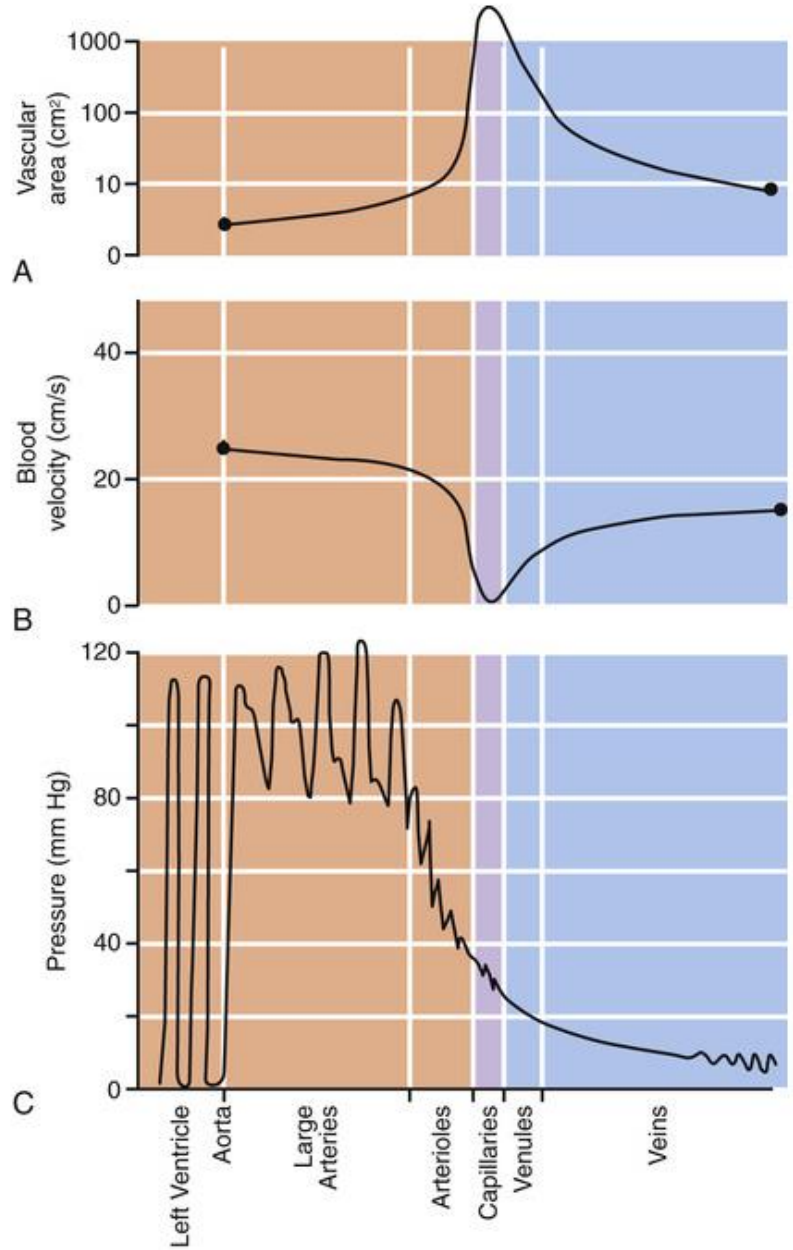
Oxygen Delivery [ml/min]

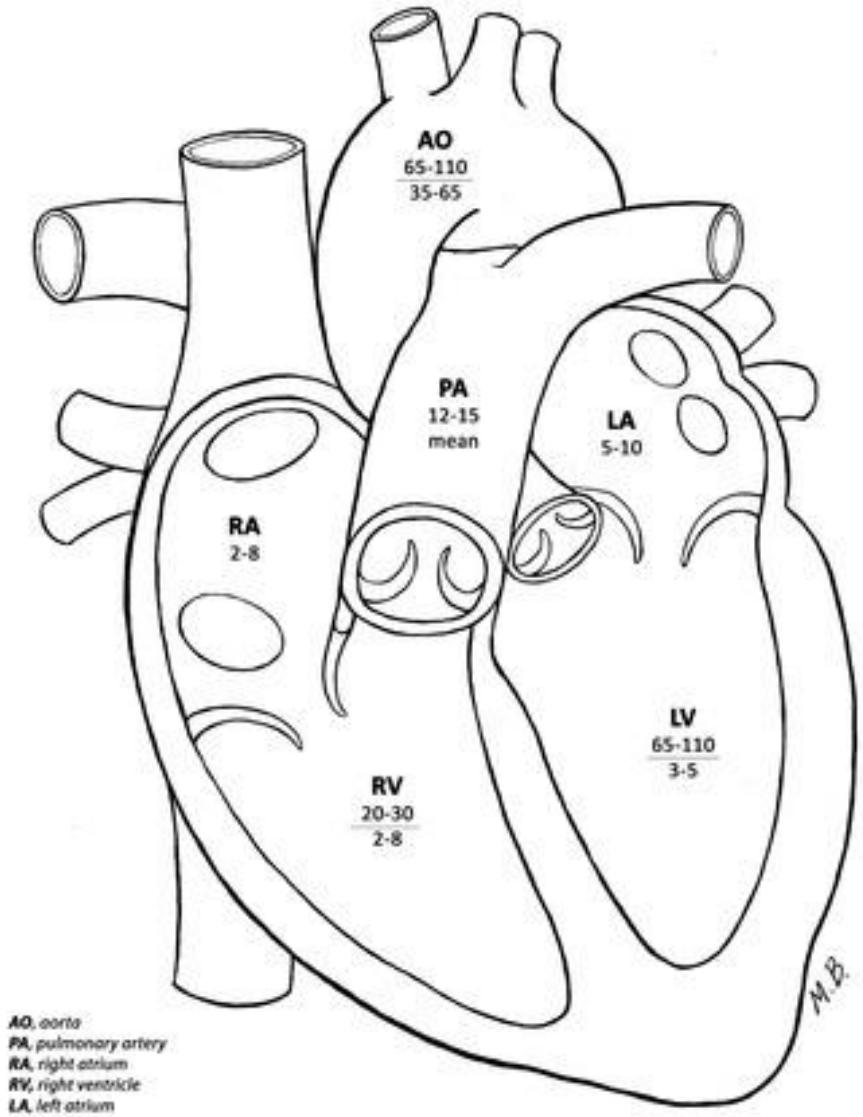


BP = CO x SVR

Blutdruck = Cardiac Output x Gefäßwiderstand

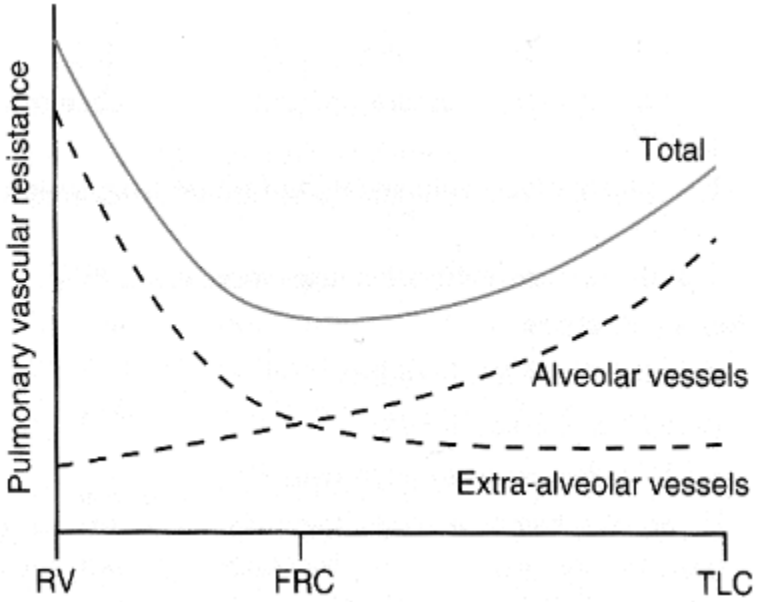



1000
100
10
0
Vascular area (cm²)
A
40
20
0
Blood velocity (cm/s)
B
120
80
40
0
Pressure (mm Hg)
C
Left Ventricle
Aorta
Large Arteries
Arterioles
Capillaries
Venules
Veins



***AO**, aorta*
***PA**, pulmonary artery*
***RA**, right atrium*
***RV**, right ventricle*
***LA**, left atrium*
***LV**, left ventricle*
All pressures in mmHg

Kardiopulmonale Interaktion



slido

Please download and install the Slido app on all computers you use

Wann tritt das LCOS bei Kindern postoperativ nach Herzchirurgie auf?

ⓘ Start presenting to display the poll results on this slide.

slido

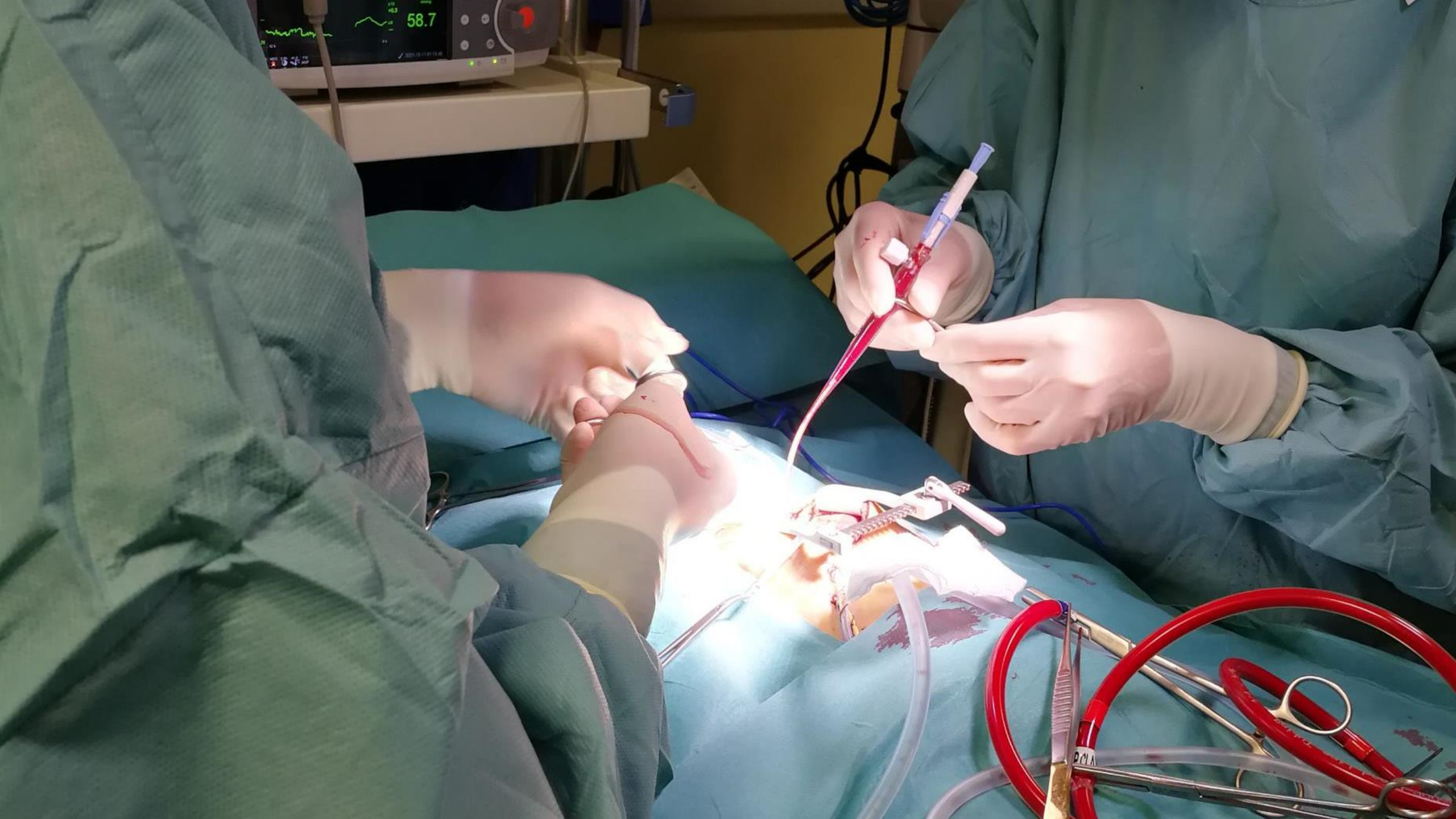
Please download and install the Slido app on all computers you use

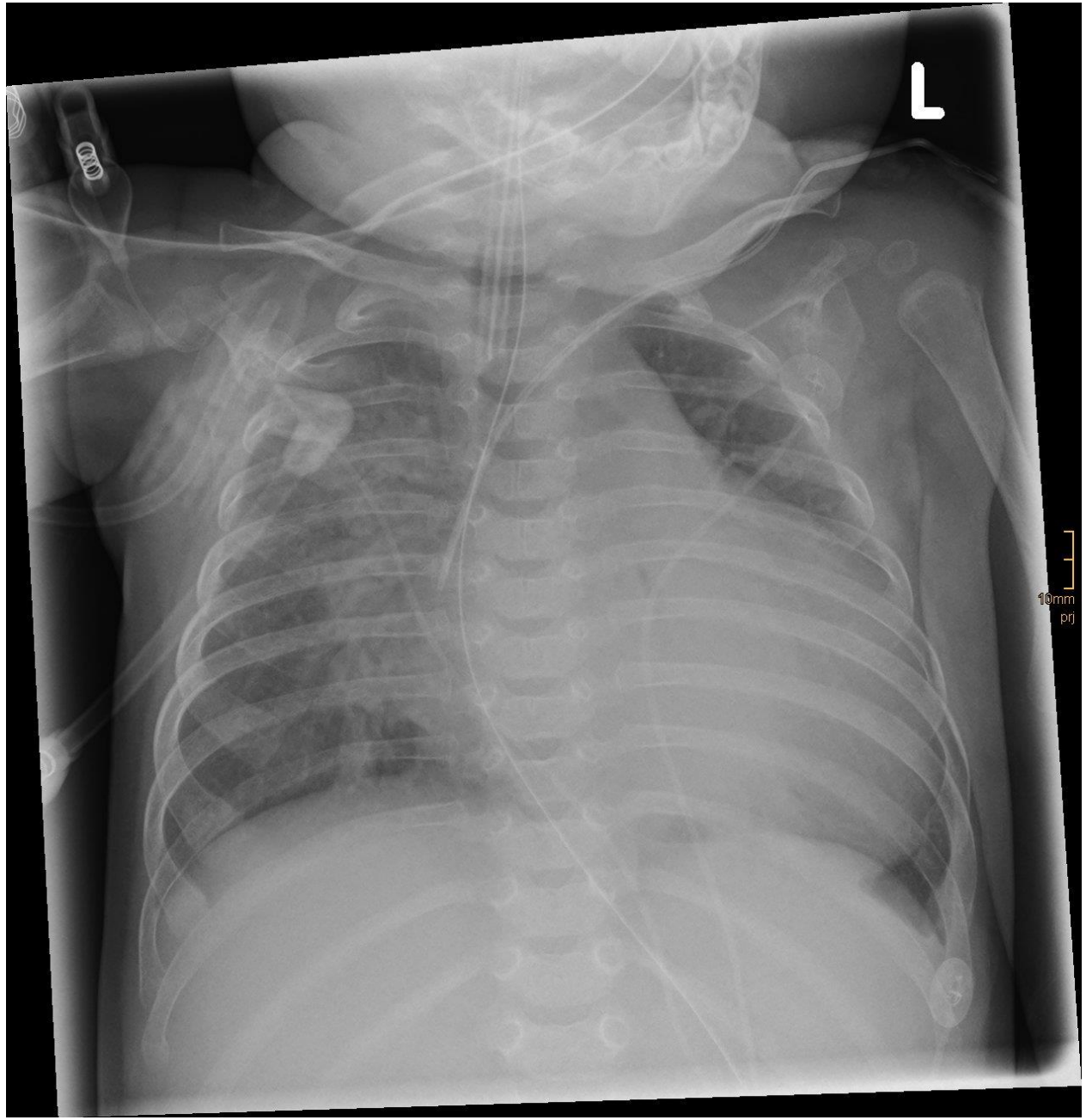
Alle der folgenden Punkte sind Anzeichen eines low cardiac output AUSSER

ⓘ Start presenting to display the poll results on this slide.

Management / post-operatives LCOS

- Ausschluss residualer oder nicht korrigierter Defekte
- Adäquate Vorlast
- Unterstützung der myokardialen Kontraktilität
- Nachlastsenker
- Rhythmuskontrolle
- Vermeide erhöhten Sauerstoffverbrauch (Temp/MV/Schmerz)
- Beatmung
- Beobachten ob Besserung
- ECMO

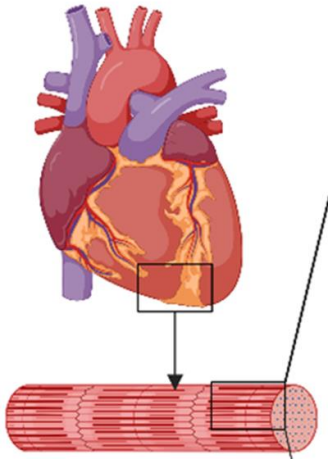

58.7

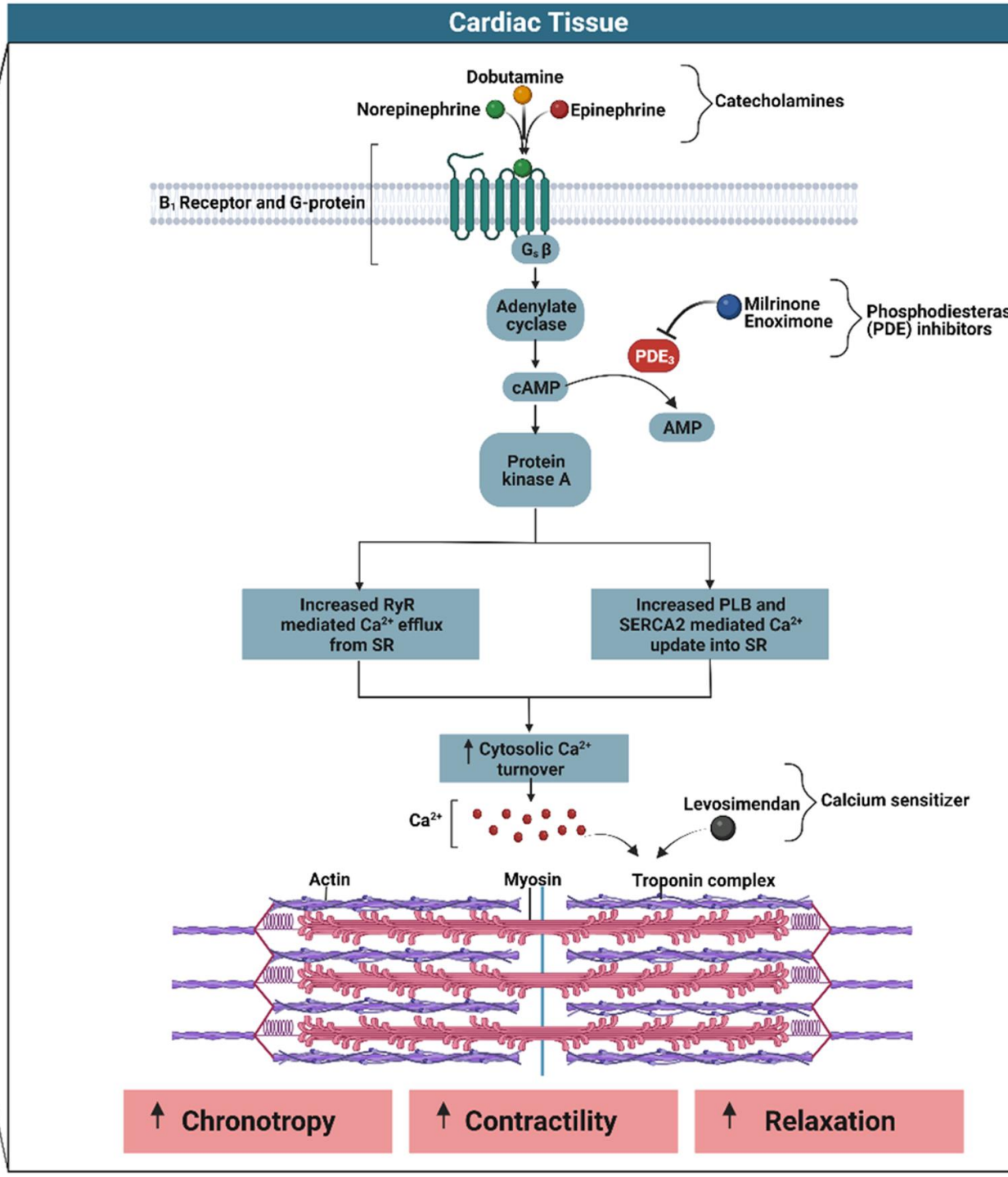

L
10mm
prj

Verbesserung Systolische Funktion

- Adrenalin
- Noradrenalin
- Dopamin
- Dobutamin
- (Calcium)

Diastolische Funktion





Afterload Reduktion

- Natrium Nitroprussid
- Nitroglyzerin
- Ca-Kanal Blocker

Take home

- BP ≠ CO
- Vergiss das rechte Herz nicht