Assessment of LV Performance

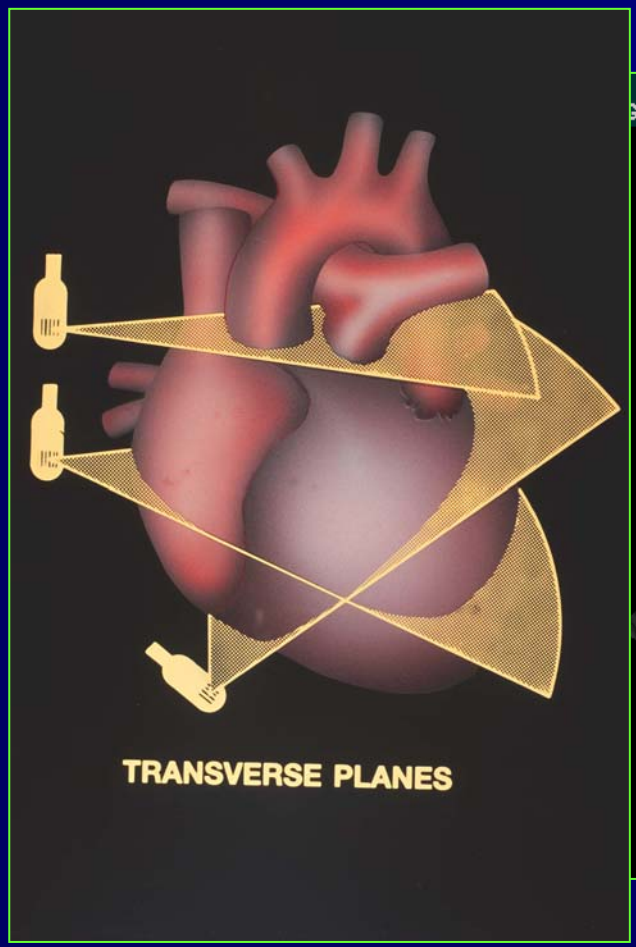
Jan Poelaert, MD, PhD

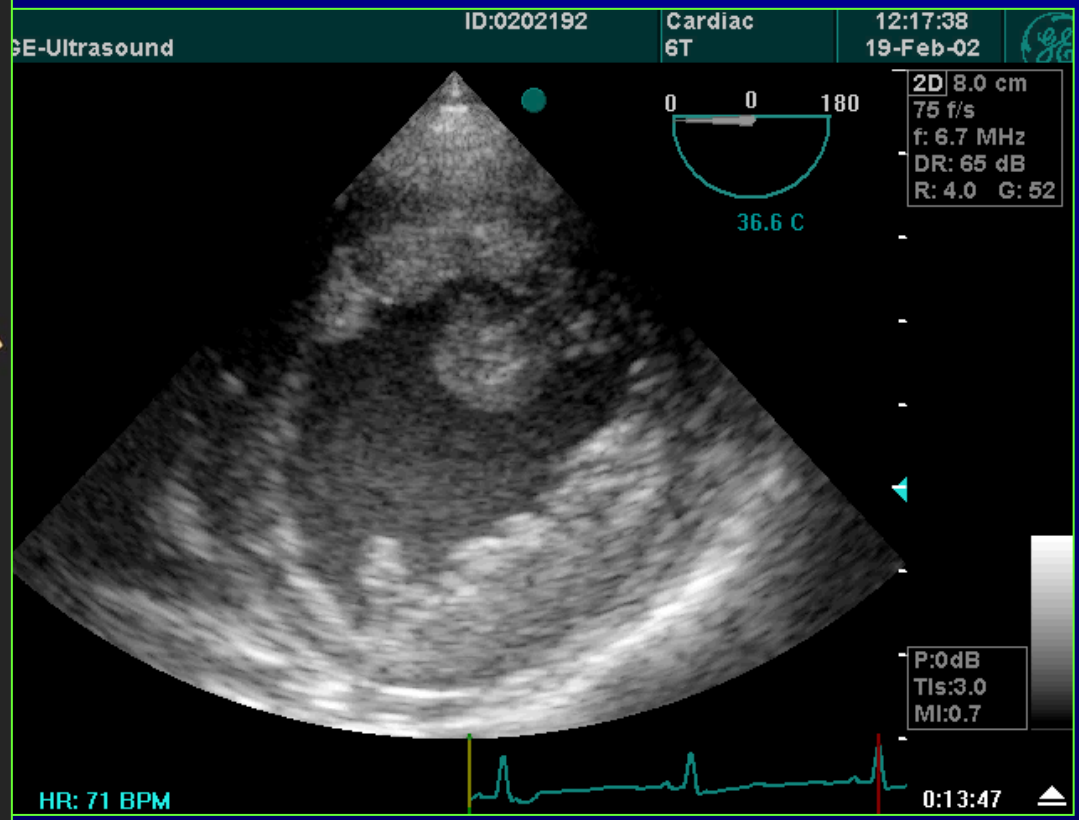
Cardiac Anaesthesia & Postoperative Cardiac Surgical ICU

Ghent University Hospital

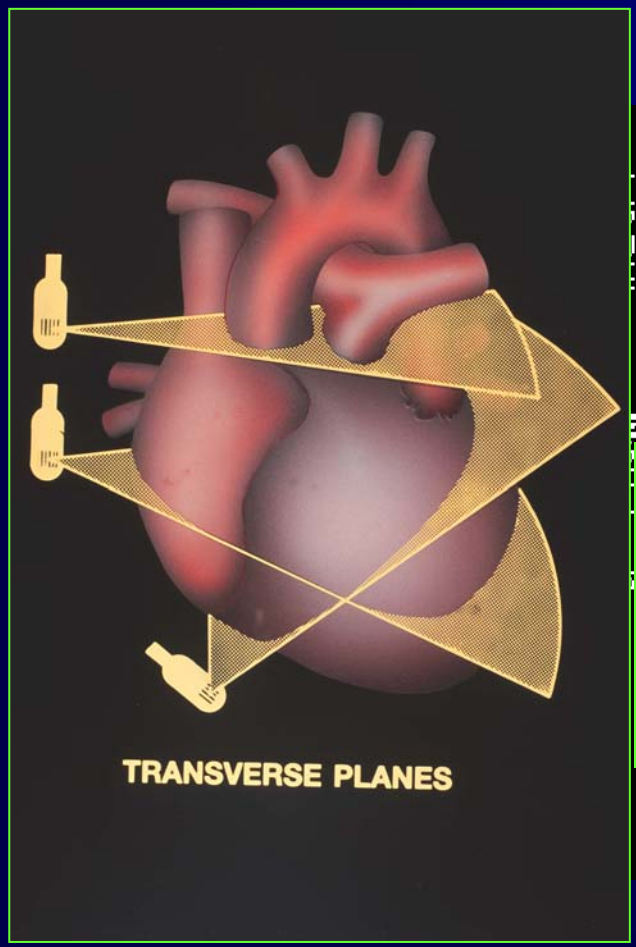
Gent, Belgium

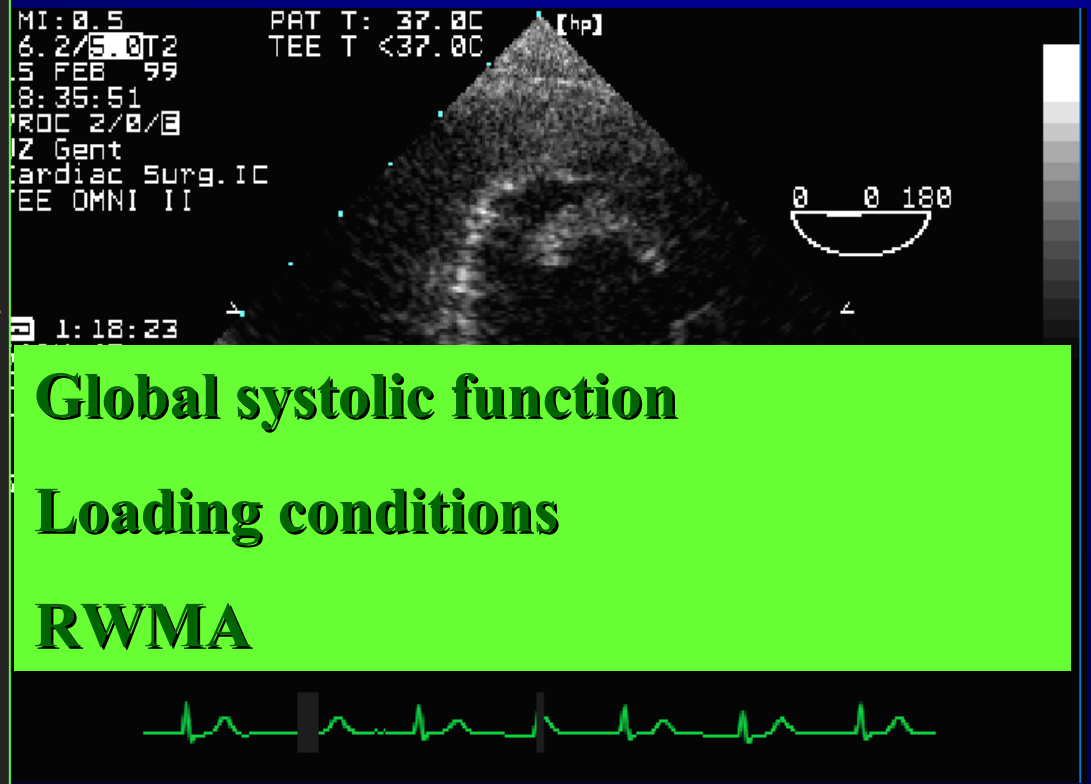
Assessment of LV Performance
Two-dimensional Imaging





Assessment of LV Performance
Two-dimensional Imaging



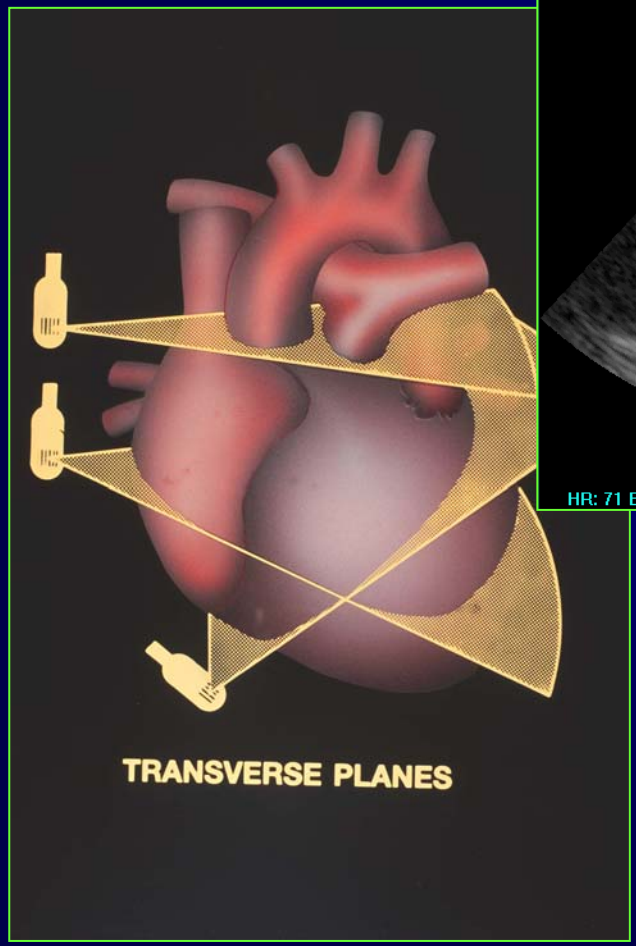


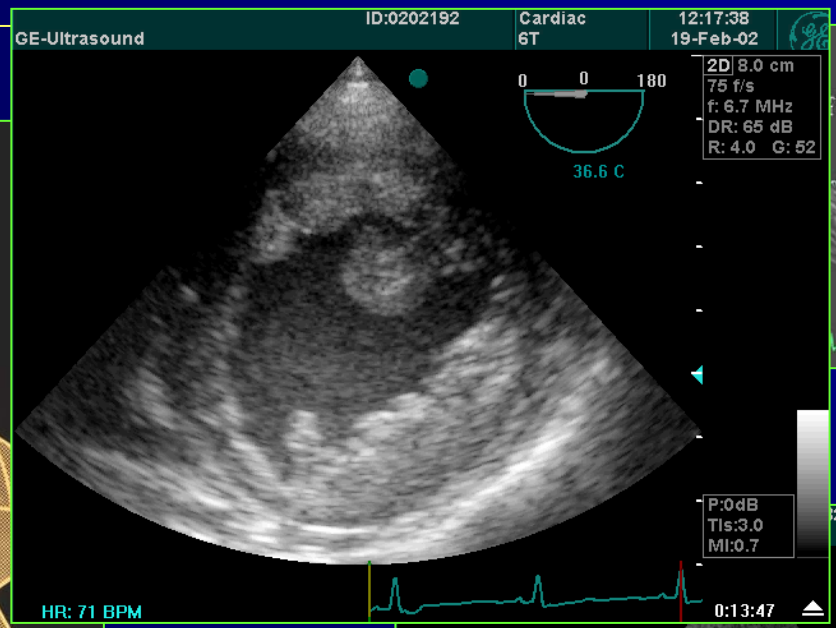
Global systolic function

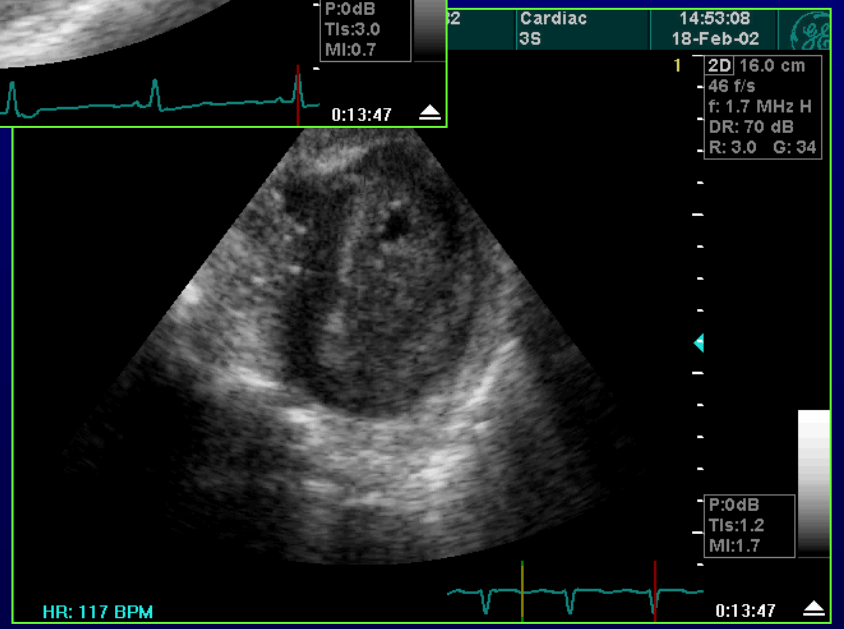
Loading conditions

RWMA

Assessment of LV Performance
Two-dimensional Imaging

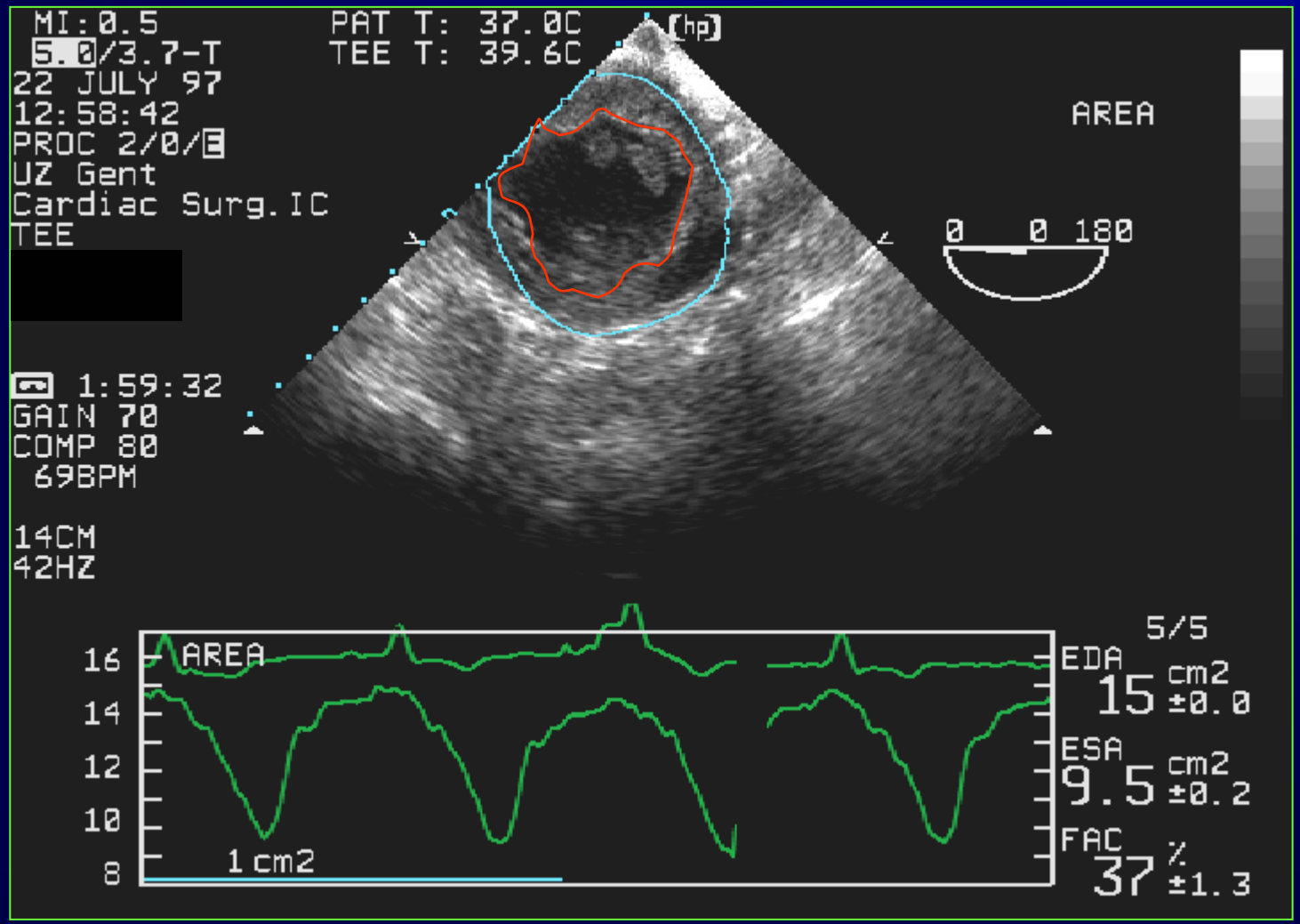






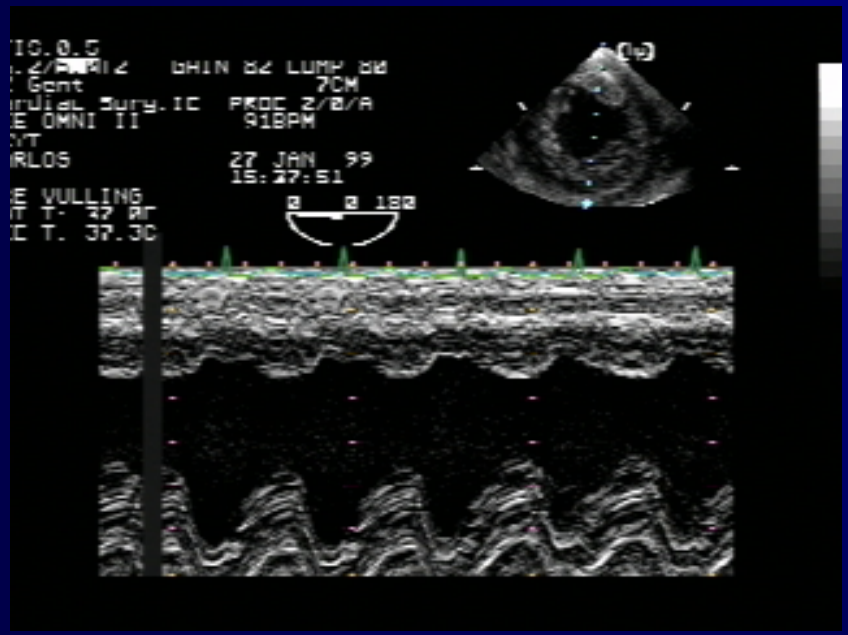
Assessment of LV Performance

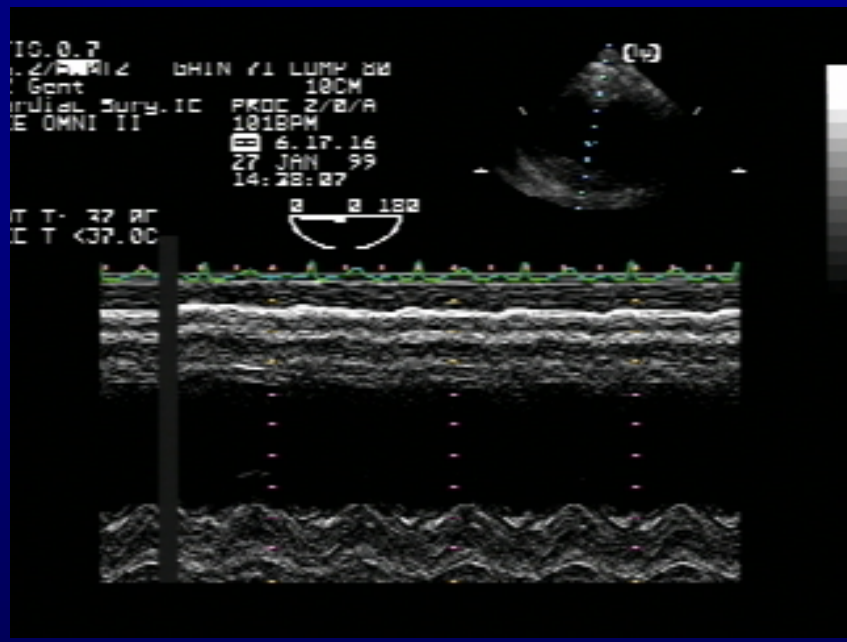
Measurement of Fractional Area Contraction



Assessment of LV Performance

Use of M mode





Fractional Shortening

Fractional area contraction

CO ?

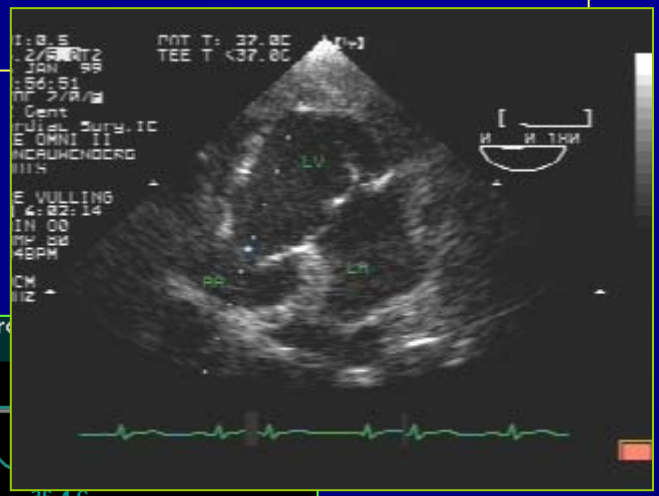
Assessment of LV Performance

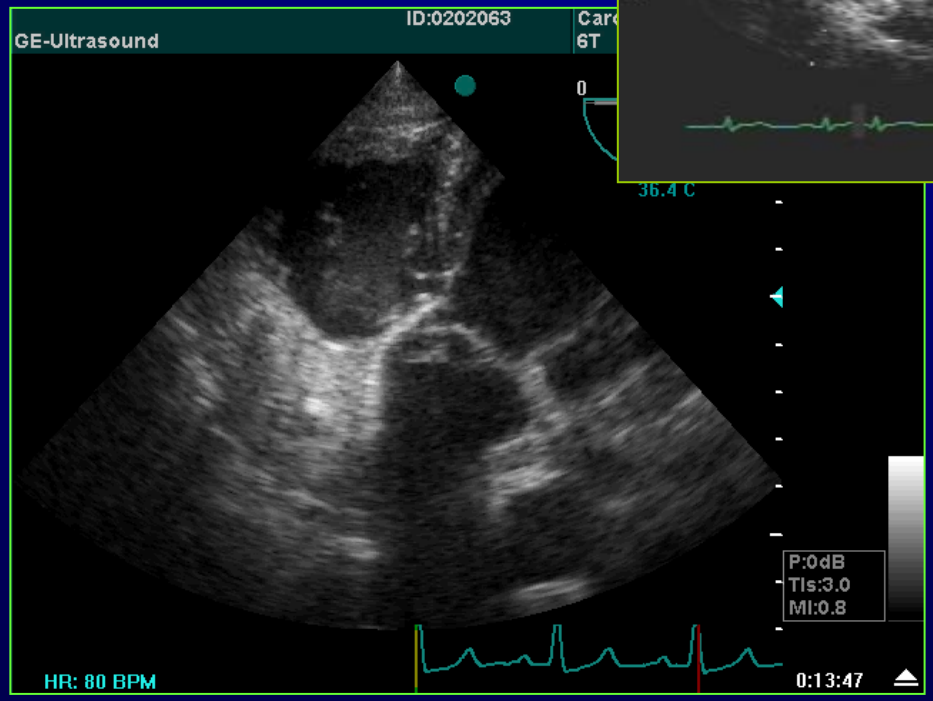
Estimation of Cardiac Output

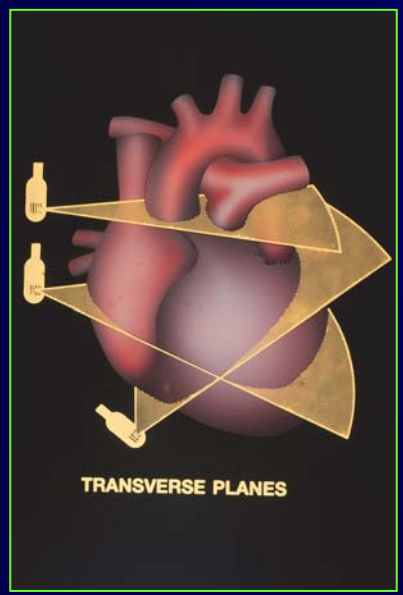
Site	author	n	failure	Doppler approach	r
PA	Savino	45	24	CW short axis	0,93
PA	Muhuideen	99	29	PW short axis	0,65
PA	Gorcsan III	15	13	PW short axis	0,83
PA	Izzat	19	10	PW short axis	0,95
MV	Shimamoto	65	NA	4-chamber view	NA
LVOT	Katz	57	12	CW transverse LA	0,91
LVOT	Darmon	109	2	CW transverse LA	0,98
LVOT	Feinberg	33	12	PW longitudinal LA	0,91
LVOT	Owen	64	9	PW transverse LA	0,95
LVOT	Poelaert	82	9	PW/CW transv./longitud. LA	0,87
AA	Descorps-Declère	28	7	PW transverse LA	0,98
RVOT	Maslow	45	16	PW longitudinal LA	0,98
LVOT	Perrino	33	3	CW multiplane LA	0,98

Poelaert et al. Anaesthesia 1999;54:128-36

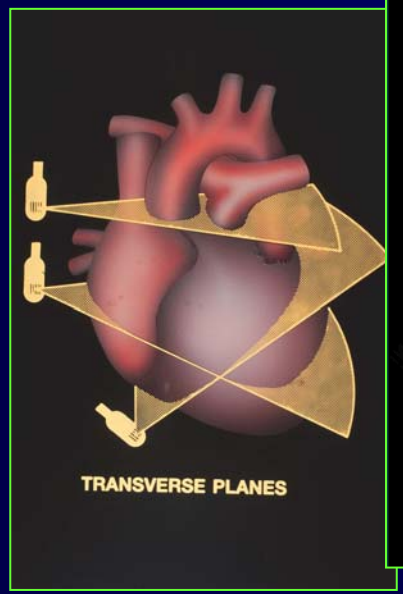
Assessment of LV Performance

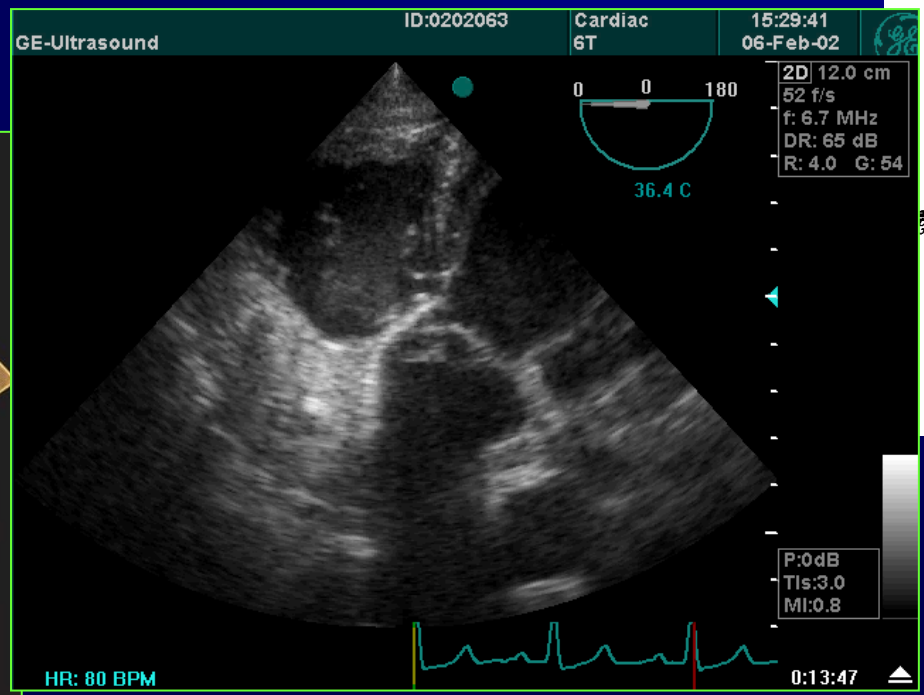


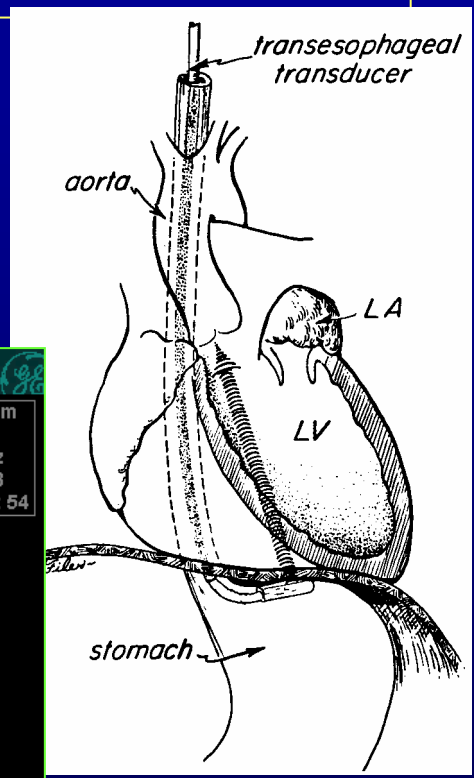




Assessment of LV Performance







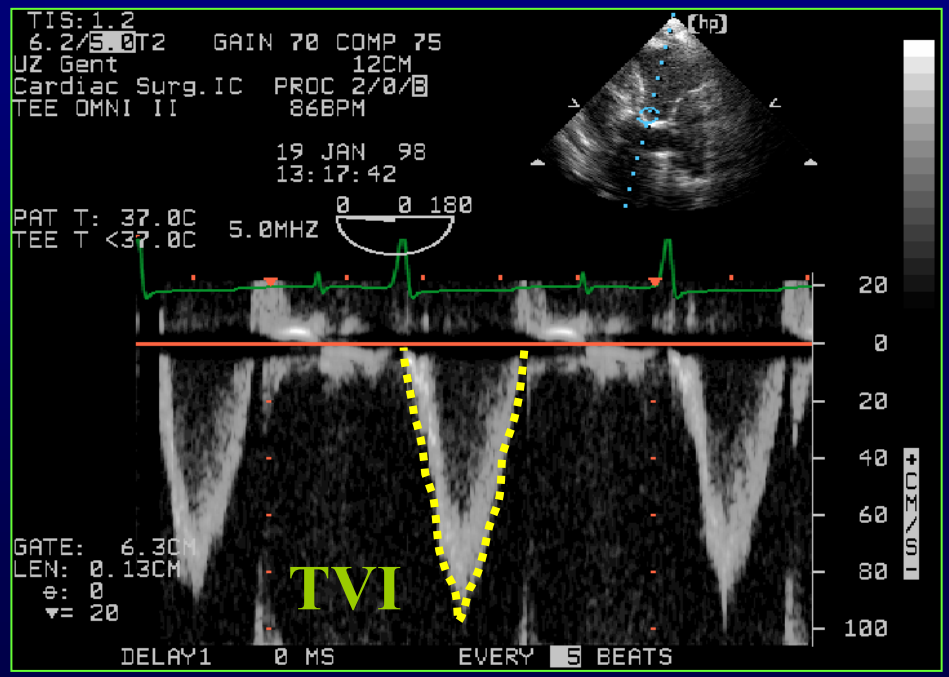
Assessment of LV Performance

Estimation of Cardiac Output

- **EF, FAC**
  - **preload and afterload dependent**
- **SV, CO**

CO = SV * HR

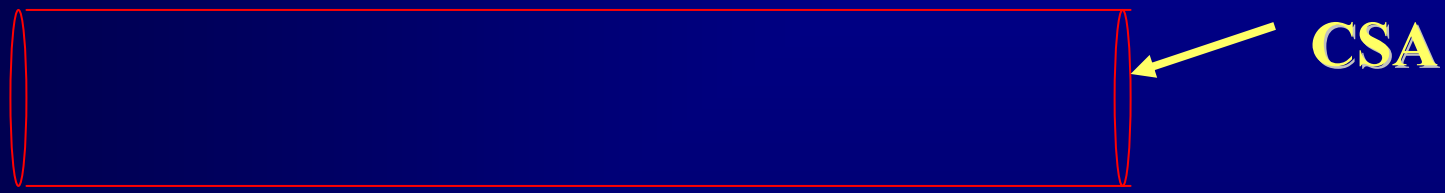
CO = TVI * CSA * HR



Assessment of LV Performance

Estimation of Cardiac Output

SV (ml) = TVI (cm) * CSA (cm^2)

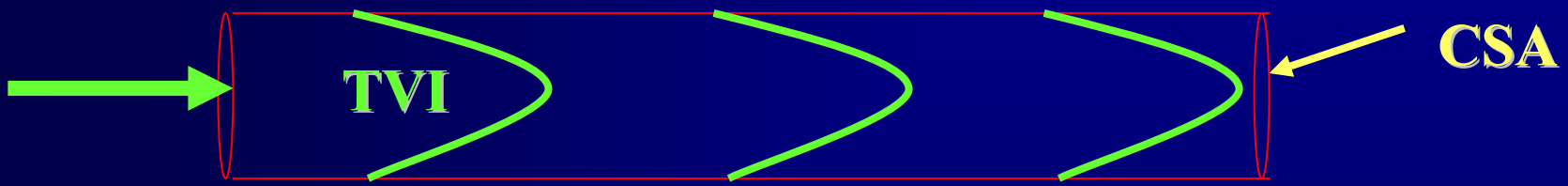


CO (l/min) = SV (ml) * HR (bpm)

Assessment of LV Performance

Estimation of Cardiac Output

SV (ml) = TVI (cm) * CSA (cm²)

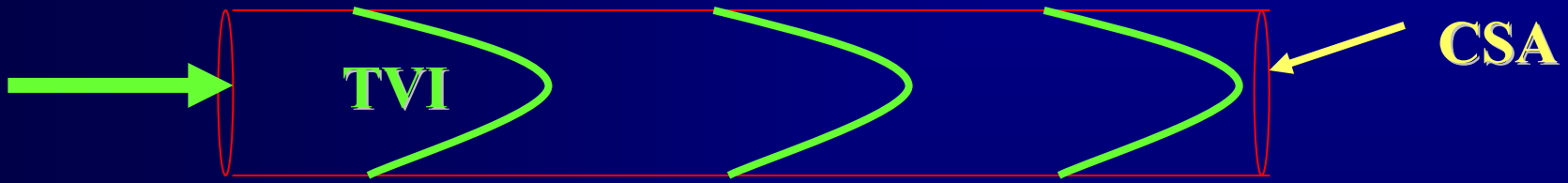


CO (l/min) = SV (ml) * HR (bpm)

Assessment of LV Performance

Estimation of Cardiac Output

SV (ml) = TVI (cm) * CSA (cm^2)



CO (l/min) = SV (ml) * HR (bpm)

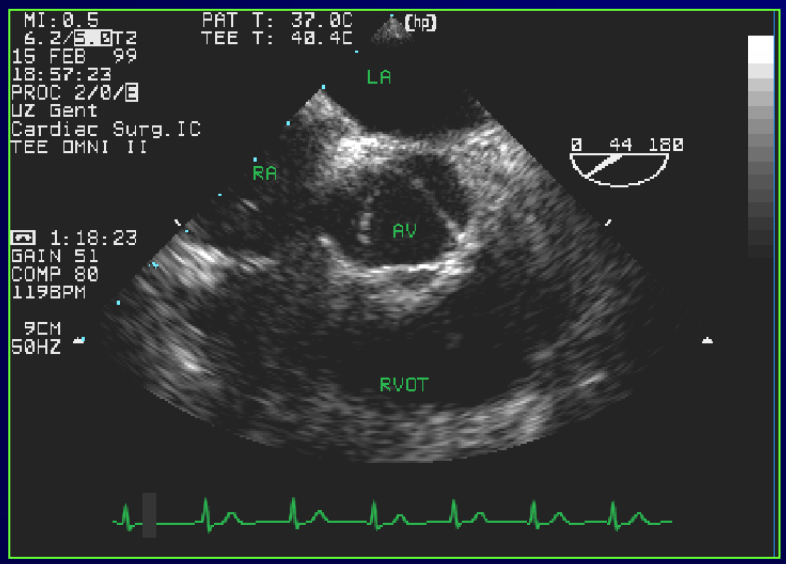
Pitfalls:

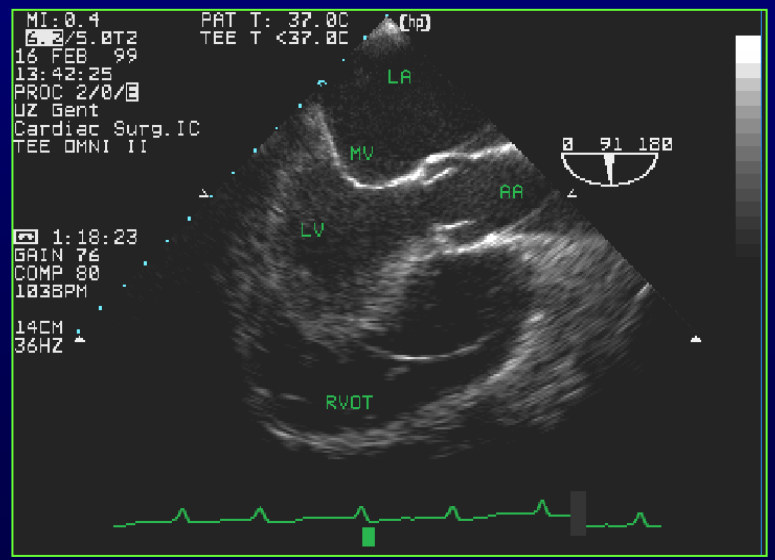
1. **Estimation of velocity(alignment, outline, not maximal velocity, number of beats)**
2. **Inappropriate velocity (stenosis, regurgitation)**
3. **Area measurement**

Assessment of LV Performance

Load Dependent Indices: Cardiac Output

- **CSA**
  - **mean AVA**
  - **calculated: 0,785*d²**

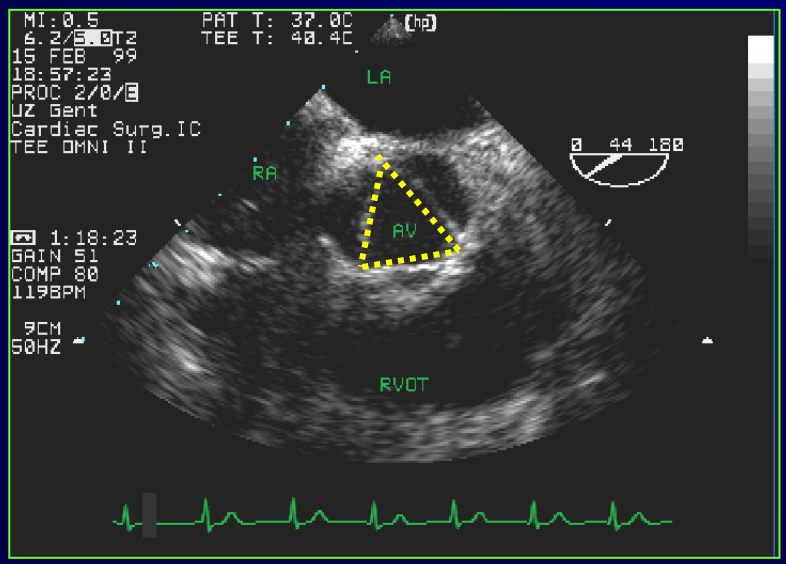


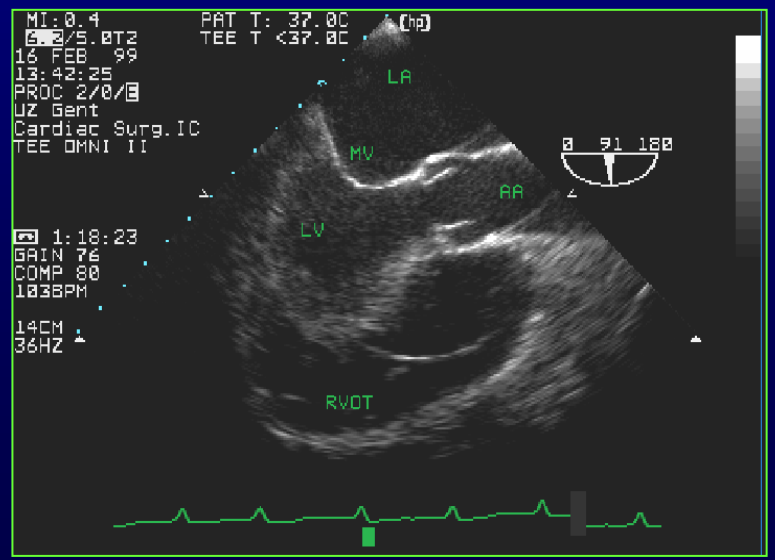


Assessment of LV Performance

Load Dependent Indices: Cardiac Output

- **CSA**
  - **mean AVA**
  - **calculated: 0,785*d²**

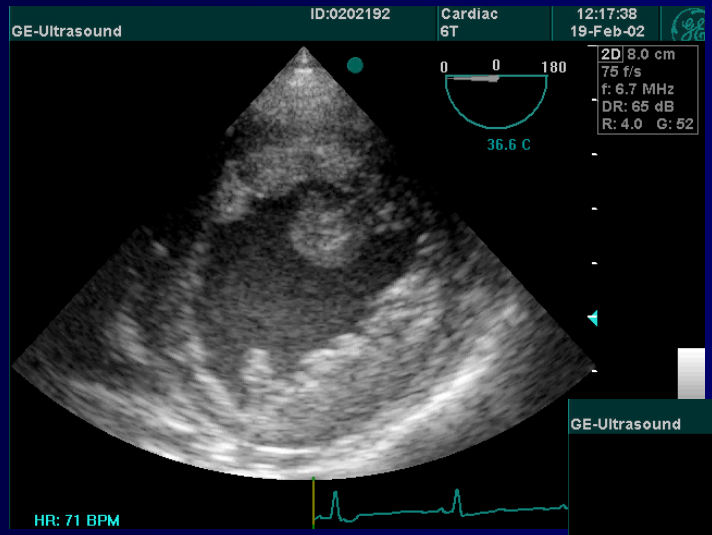


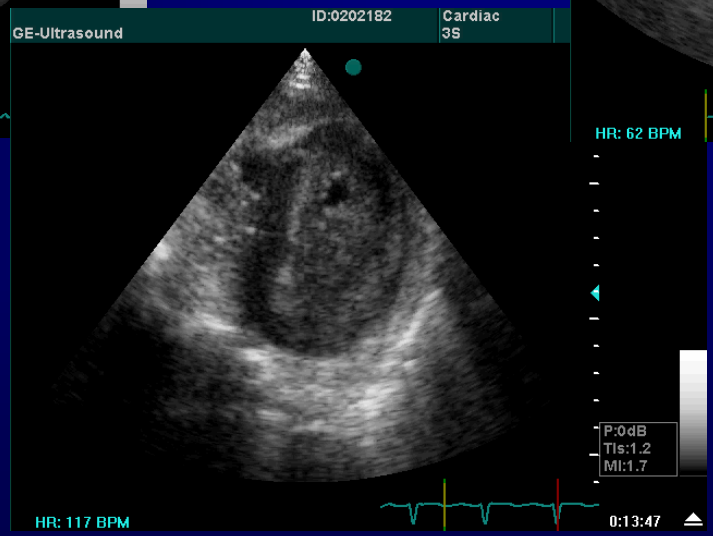


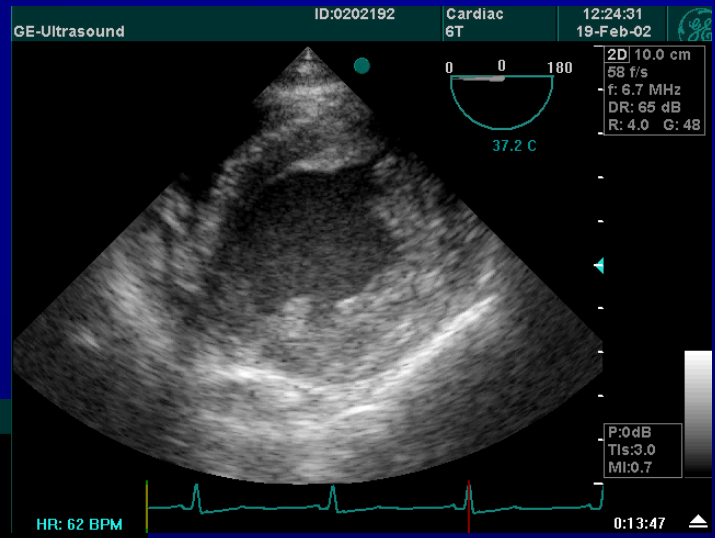
Assessment of LV Performance

Perform TTE / TEE

SAX: normal ↗ function ↘ function





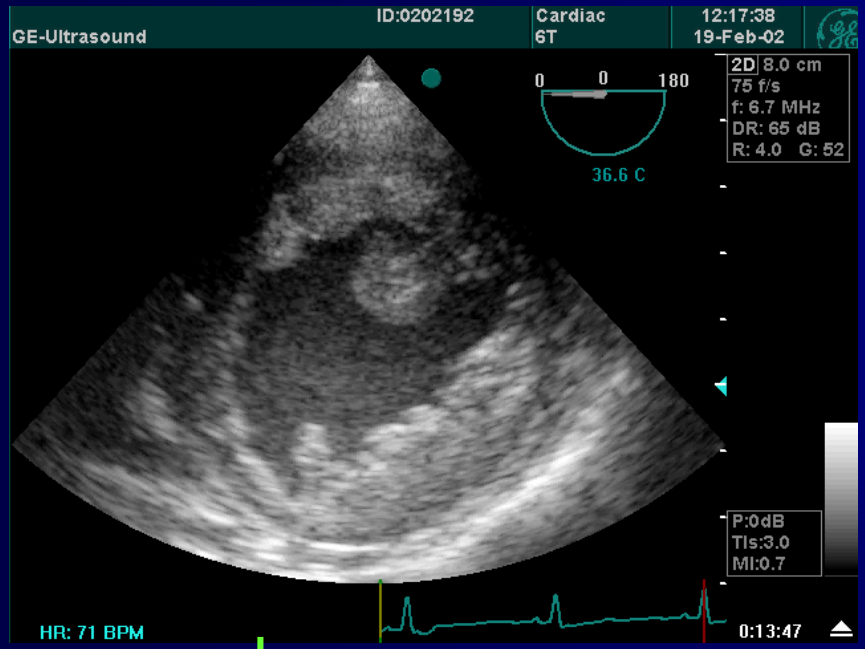


Assessment of LV Performance

Perform TTE / TEE

SAX: normal

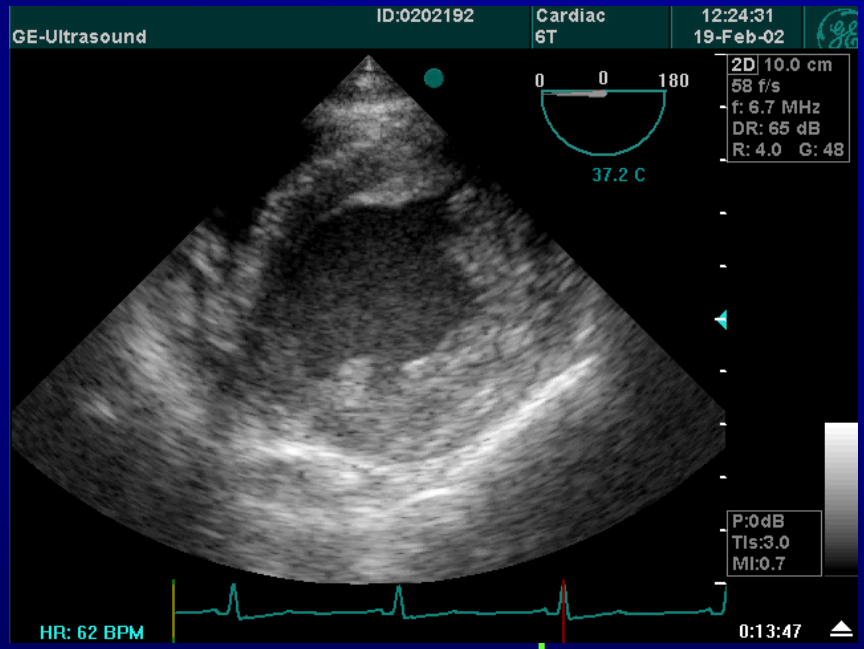
↗ function



Correct measurement ?

Clinical Status

↘ function

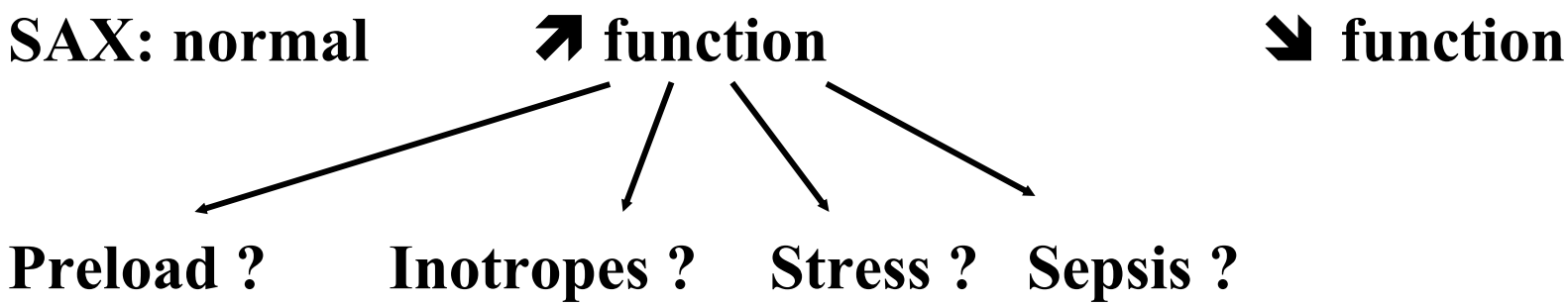


Arterial pressure monitoring

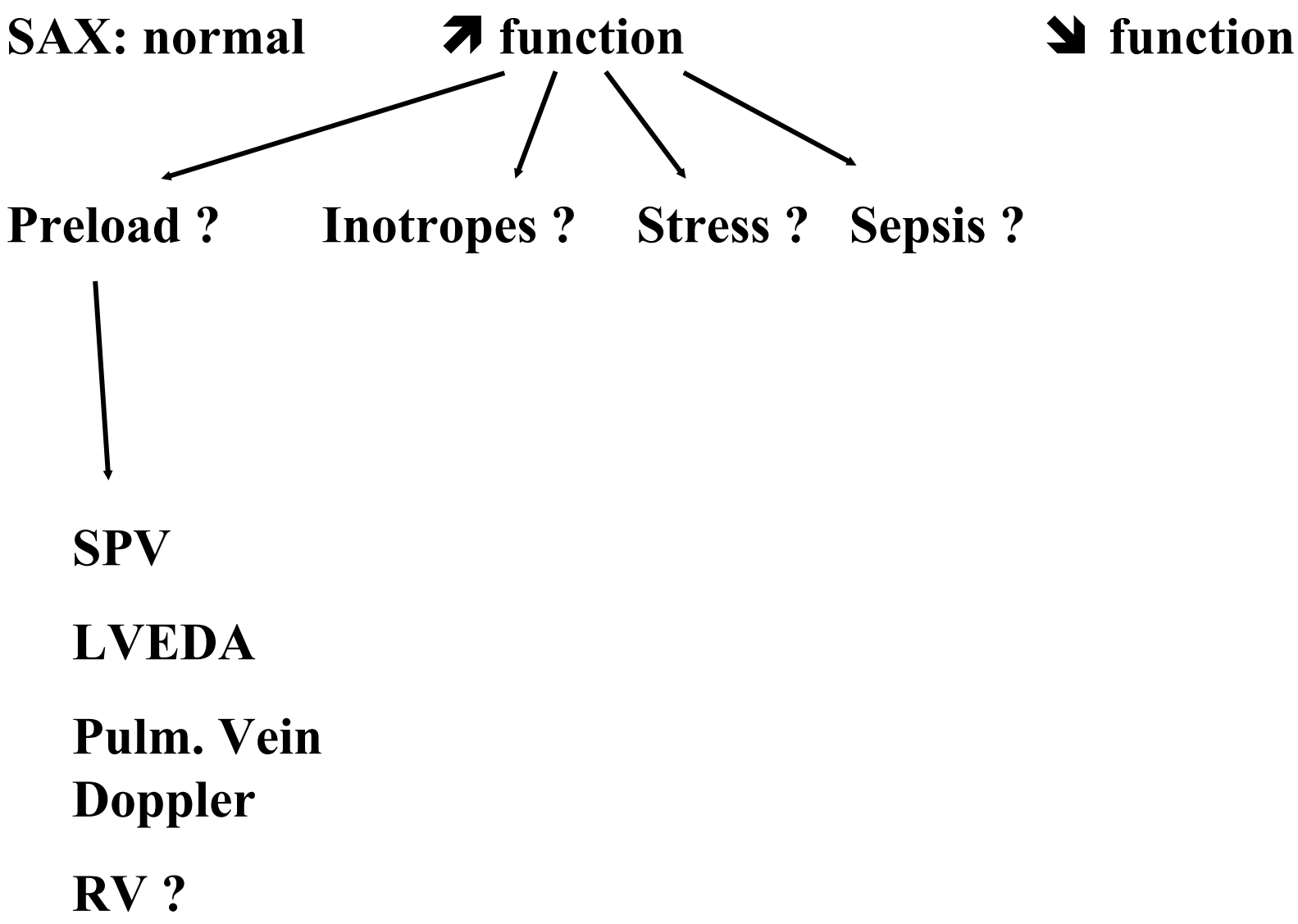
Confirmation ?

Pressure waveform ?

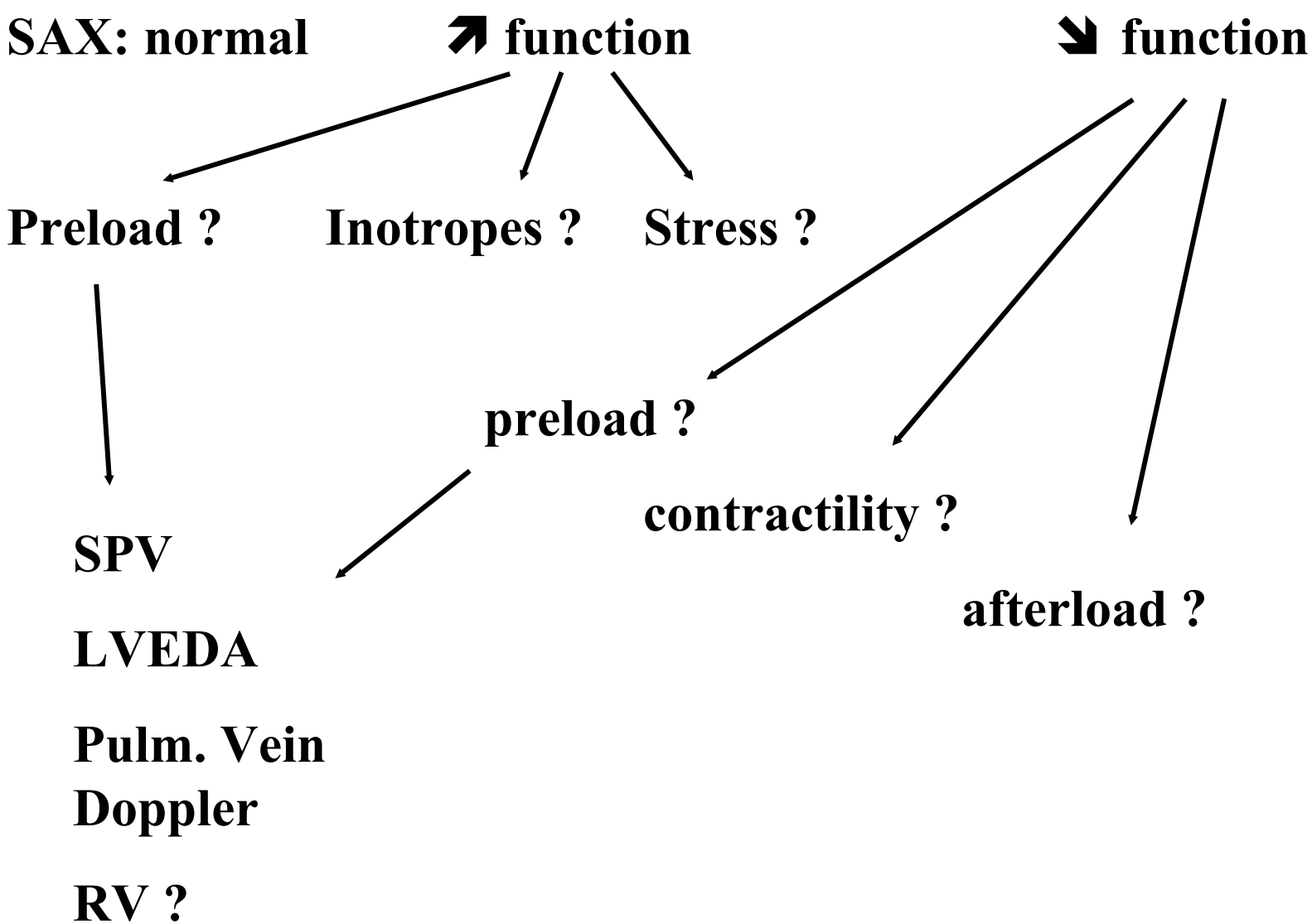
Haemodynamic Monitoring



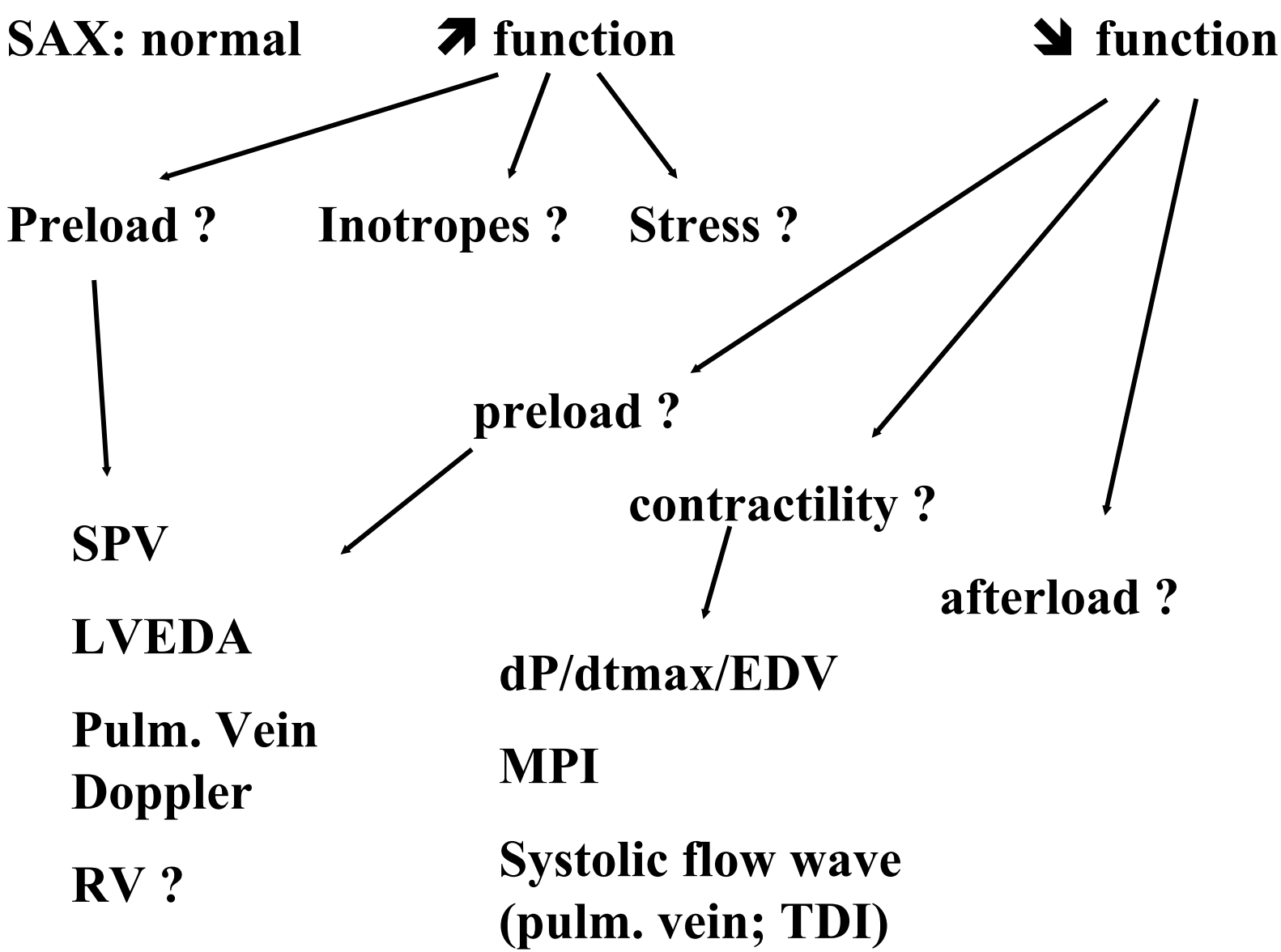
Haemodynamic Monitoring



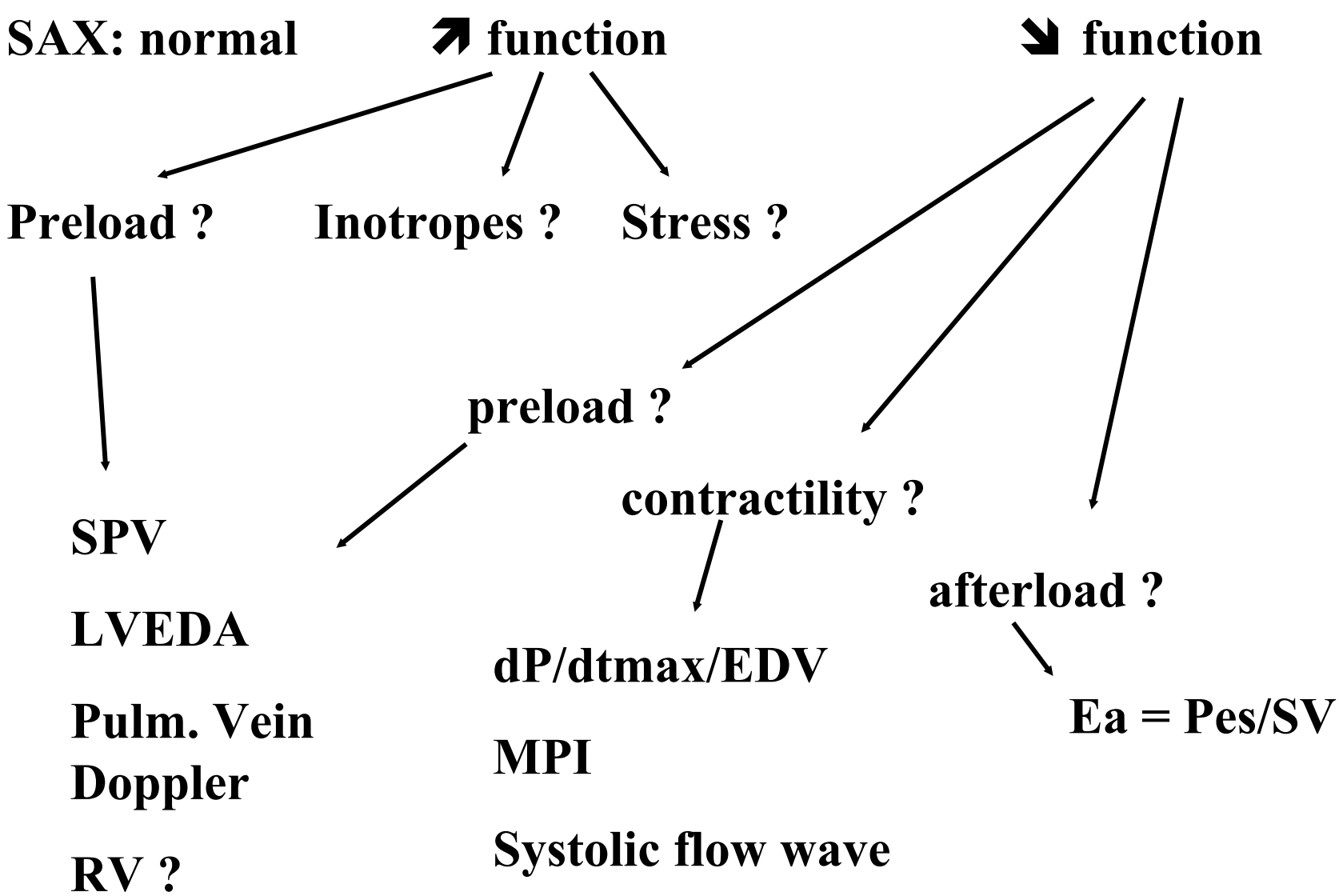
Haemodynamic Monitoring



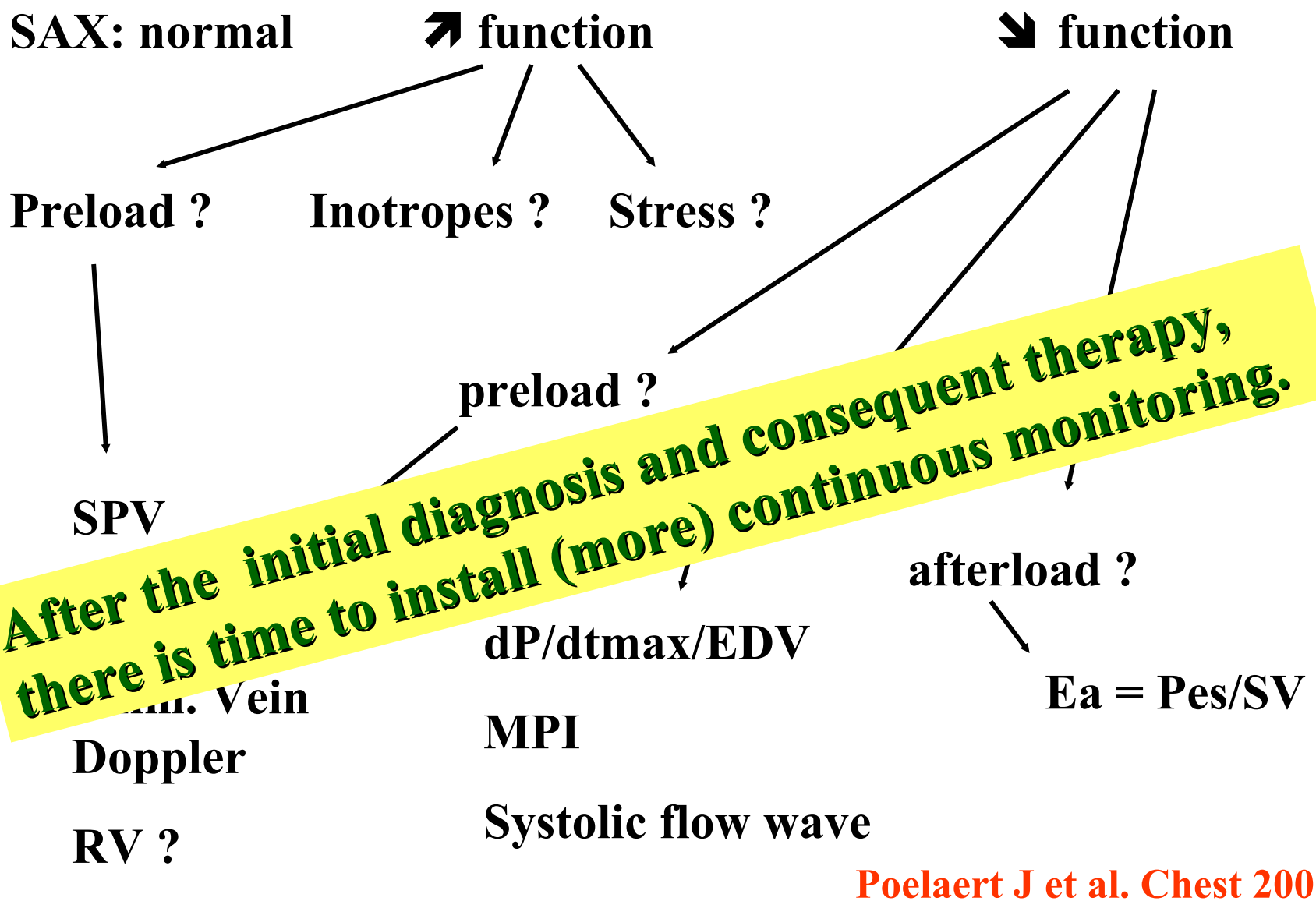
Haemodynamic Monitoring



Haemodynamic Monitoring



Haemodynamic Monitoring



Poelaert J et al. Chest 2005

Thank You !