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ROMA 24-26 MAGGIO 2018

PRESENTAZIONE DEL PROTOCOLLO DI UNO STUDIO PILOTA PER LA GESTIONE EMODINAMICA EC

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PROTOCOLLO STUDIO

- Da aprile 2018 pazienti settici con ipotensione arteriosa ($PAS < 90$ mmHg o $MAP < 65$ mmHg)
- Monitoraggio clinico ed ecografico per la gestione del riempimento volemico con fluid challenge e della eventuale terapia con amine



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, PARAMETRI ECOGRAFICI STIMATI

- Eco cava inferiore
- Valutazione TAPSE tricuspidale
- Eco polmone per valutazione sovraccarico idrico
- Rapporto E/E' mitrale
- VTI aortico



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PARAMETRI EMODINAMICI DERIVATI

- CARDIAC OUTPUT
- RESISTENZE PERIFERICHE



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Pressione venosa centrale

Valutazione volemia

Valori isolati di PVC non hanno alcun significato

TEST DA CARICO

variazione dinamica di un parametro di riferimento

QUANDO: instabilità emodinamica

- risposta quantitativa del deficit
- correzione rapida
- riduzione rischi di sovraccarico dannoso (polmone!)



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Test da carico

Fluid challenge revisited

Crit Care Med 2006 Vol. 34, No. 5

Jean-Louis Vincent, MD, PhD, FCCM; Max Harry Weil, MD, PhD, ScD (Hon), FCCM

4 step:

- Tipo di fluidi (colloidi vs. cristalloidi)
 - Velocità di infusione (elevata!)
- Obiettivo (PA, QU, stato mentale, lattacidemia...)
- Limite di sicurezza (EPA → elevazione in WP o PVC)

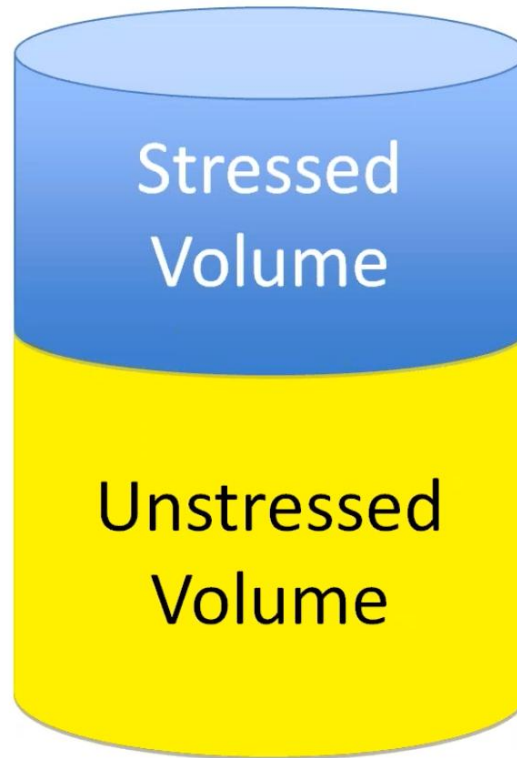


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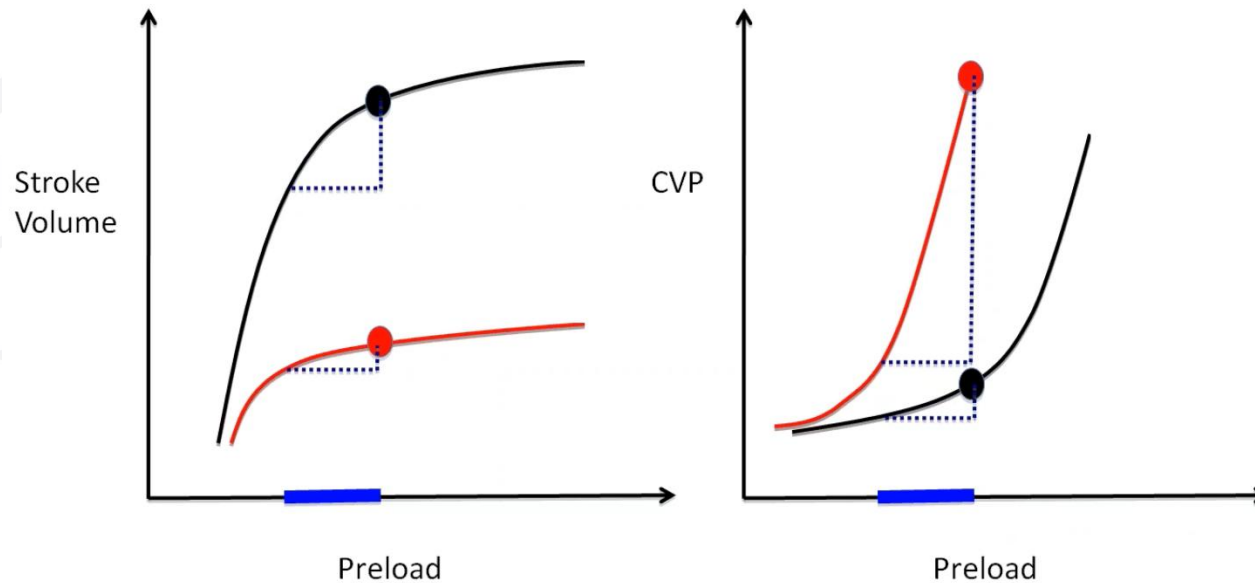
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CVP / CVP CHANGES PRELOAD AND PRELOAD RESPONSIVENESS



PRESSIONE ARTERIOSA

- **MAP = RESISTENZE PERIFERICHE X CARDIAC OUTPUT + PVC**



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Blood pressure, while important, does not tell the whole story about health of the circulation. CO and SVR are important too.

“Normal BP” = High SVR x Low CO
(e.g. Hemorrhagic or cardiogenic shock)



“Normal BP” = Low SVR x High CO
(e.g. Sepsis)



“Normal BP” = Normal SVR x Normal CO
(e.g. Healthy person)



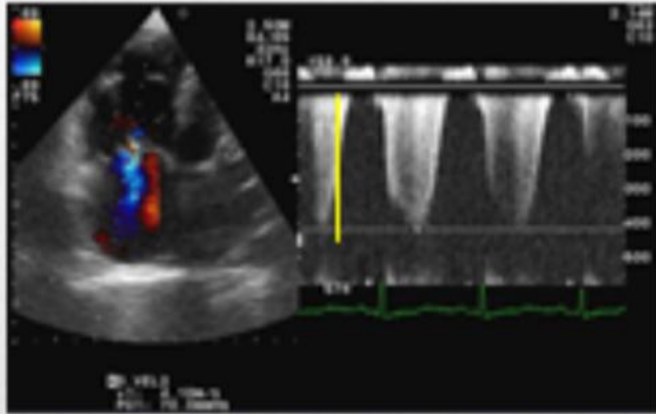
PUNTI CHIAVE SHOCK

	MAP	PAWP	CO	SVR	Svo ₂	LACTATE
HYPODYNAMIC						
Hypovolemic hemorrhage, dehydration	↓ 1	↓ 2	↓ 3	↑ 4	↓ 5	↑
Cardiogenic myocardial infarction	↓	↑	↓	↑	↓	↑
Obstructive pulmonary embolism, pericardial tamponade, tension pneumothorax	↓	↔↑	↓ 1	↑	↓	↑
HYPERDYNAMIC						
Distributive sepsis, adrenal insufficiency, anaphylaxis	↓	↔↓	↔↑	↓	↔↑	↑

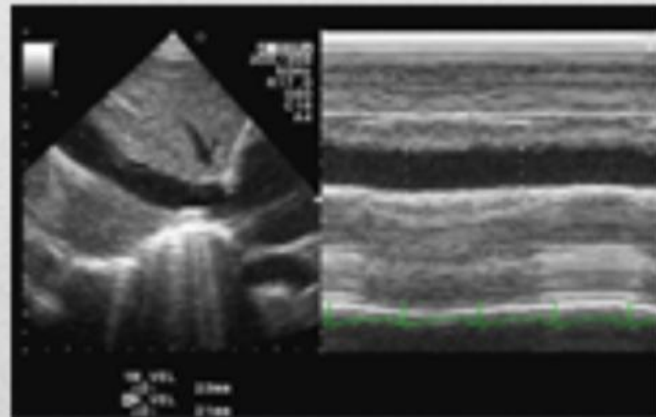
- 1) PRESSIONE ARTERIOSA
- 2) PRESSIONI DI RIEMPIMENTO
- 3) CARDIAC OUTPUT
- 4) RESISTENZE SISTEMICHE
- 5) INDICI METABOLICI



$$\text{PAPs} = dP_{\text{VD-AD}} + \text{PAD}$$



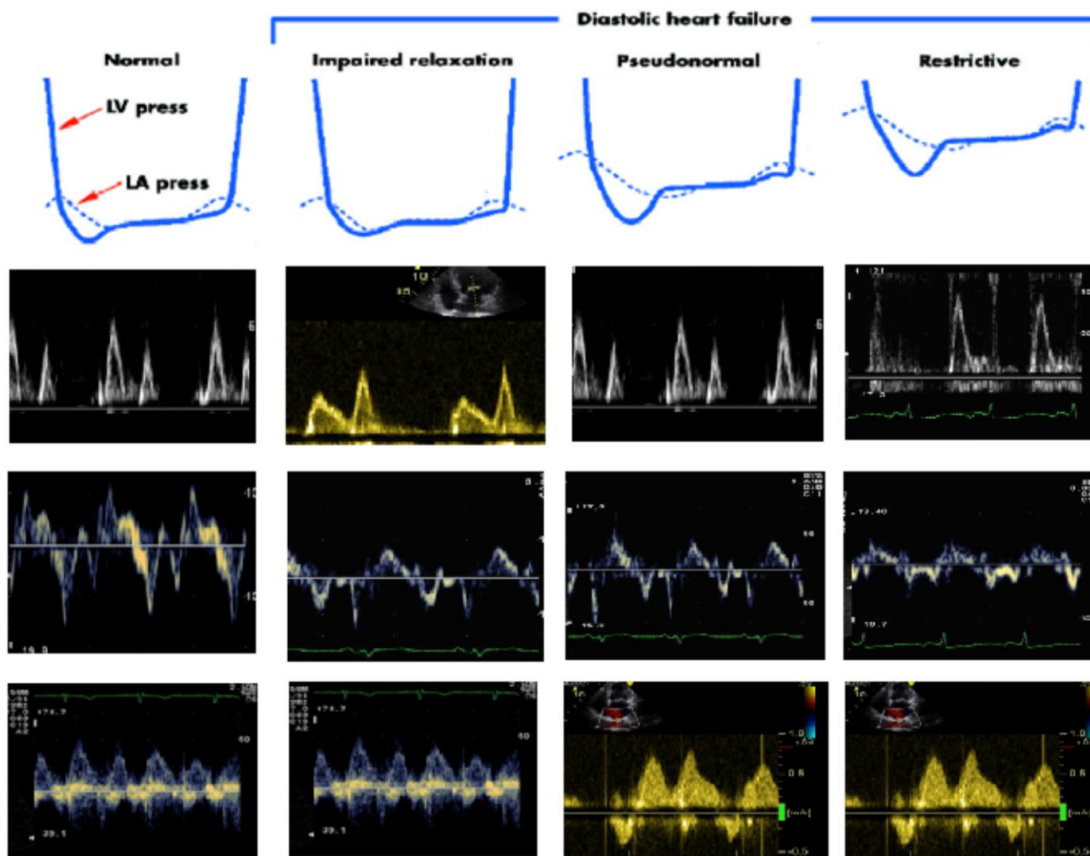
$$dP_{\text{VD-AD}} = 4 (V_{\text{Tr}})^2$$



Collasso inspiratorio v.cava inferiore

> 45%	PAD = 5 mmHg
35-45%	PAD = 10 mmHg
< 35%	PAD = 15 mmHg

Funzione diastolica VSx



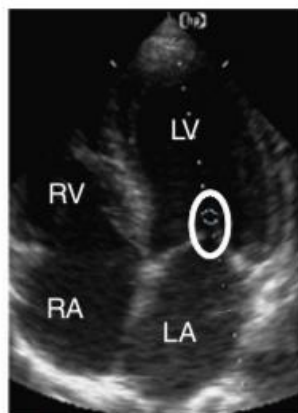
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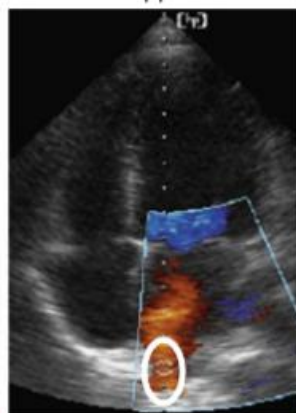
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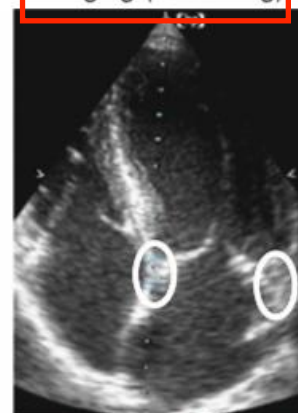
Mitral Doppler



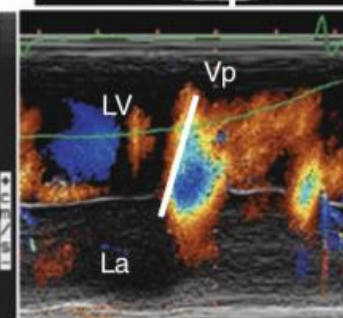
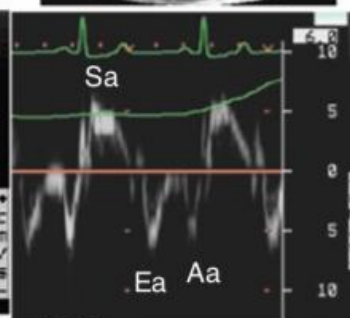
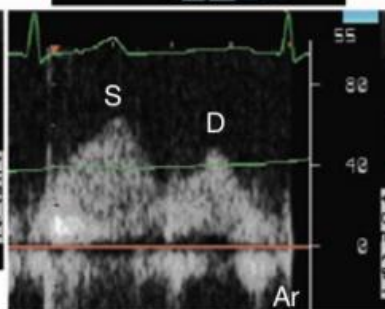
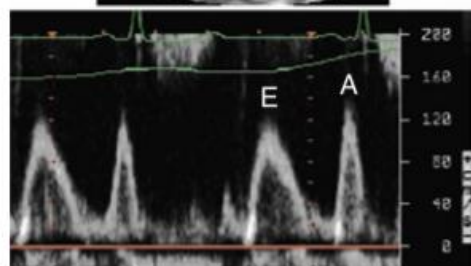
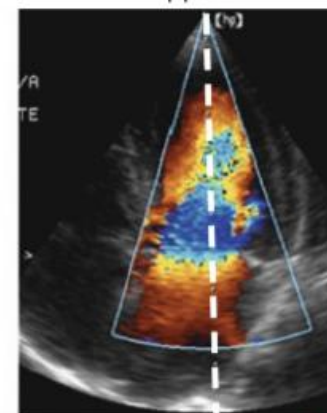
Pulmonary vein Doppler



Tissue Doppler imaging (mitral ring)



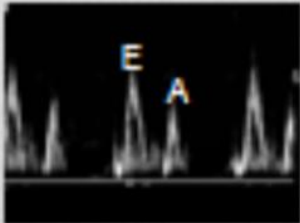
M-mode color Doppler



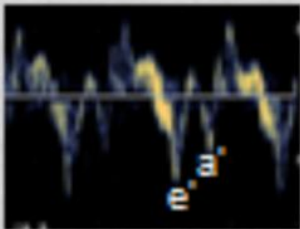
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PRESSIONE di RIEMPIMENTO VSx ~ PRESSIONE ATRIALE sx



$E / e' < 8$ → normale



$E / e' > 15$ → pressione riempimento > 15 mmHg



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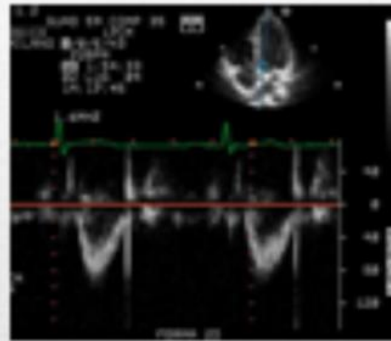
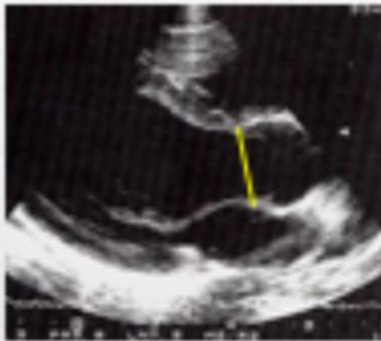
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STIMA DELLA GETTATA SISTOLICA ATTRAVERSO IL VTI AORTICO

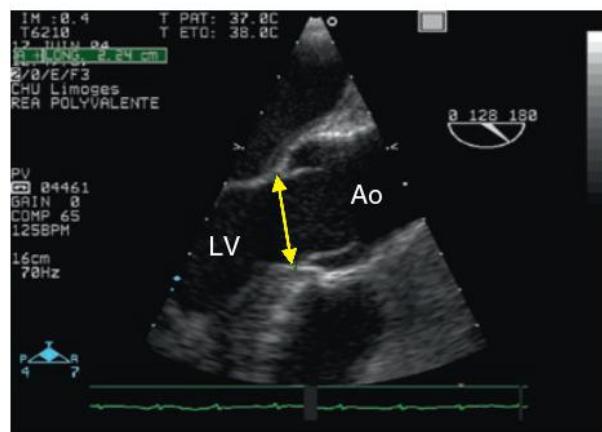
PARAMETRI EMODINAMICI

$$\text{GETTATA SISTOLICA} = \text{CSA}_{\text{TEVS}} \times \text{VTI}_{\text{TEVS}} \longrightarrow \text{PORTATA C.} = \text{GS} \times \text{FC}$$

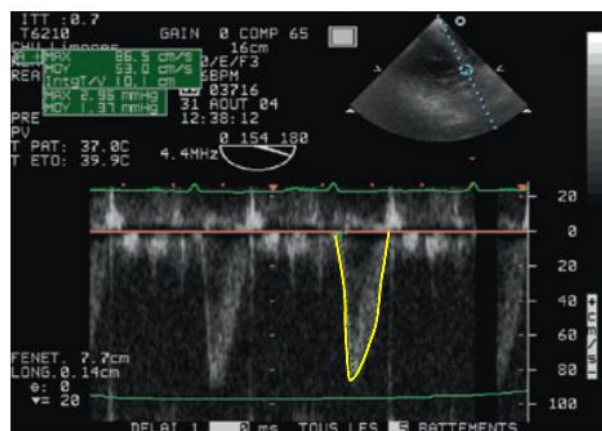


$$\text{CSA} = \pi \left(\frac{D}{2} \right)^2$$

Baseline

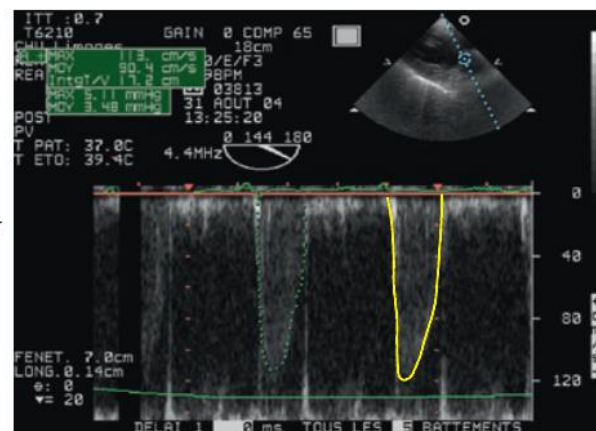


500 mL



Stroke volume: 38 mL

Fluid challenge

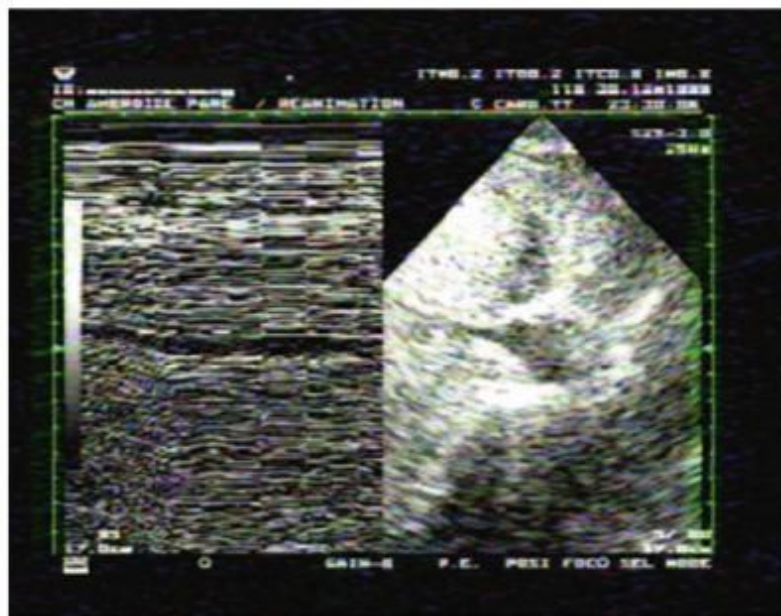


Stroke volume: 65 mL



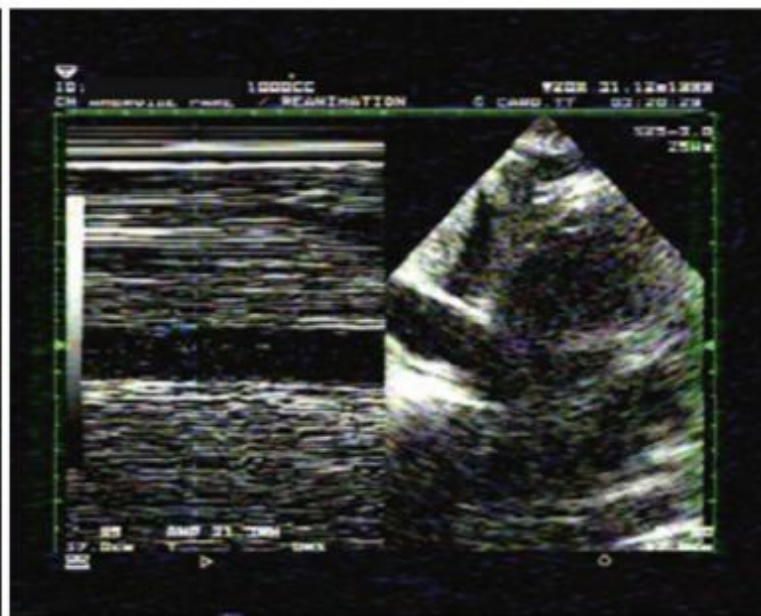
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Baseline

VTI 10 cm



1,000 mL

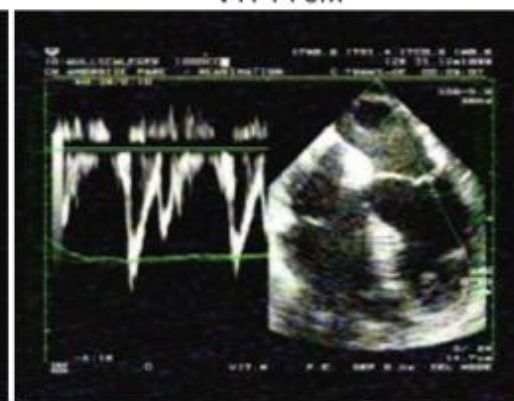
VTI 13 cm



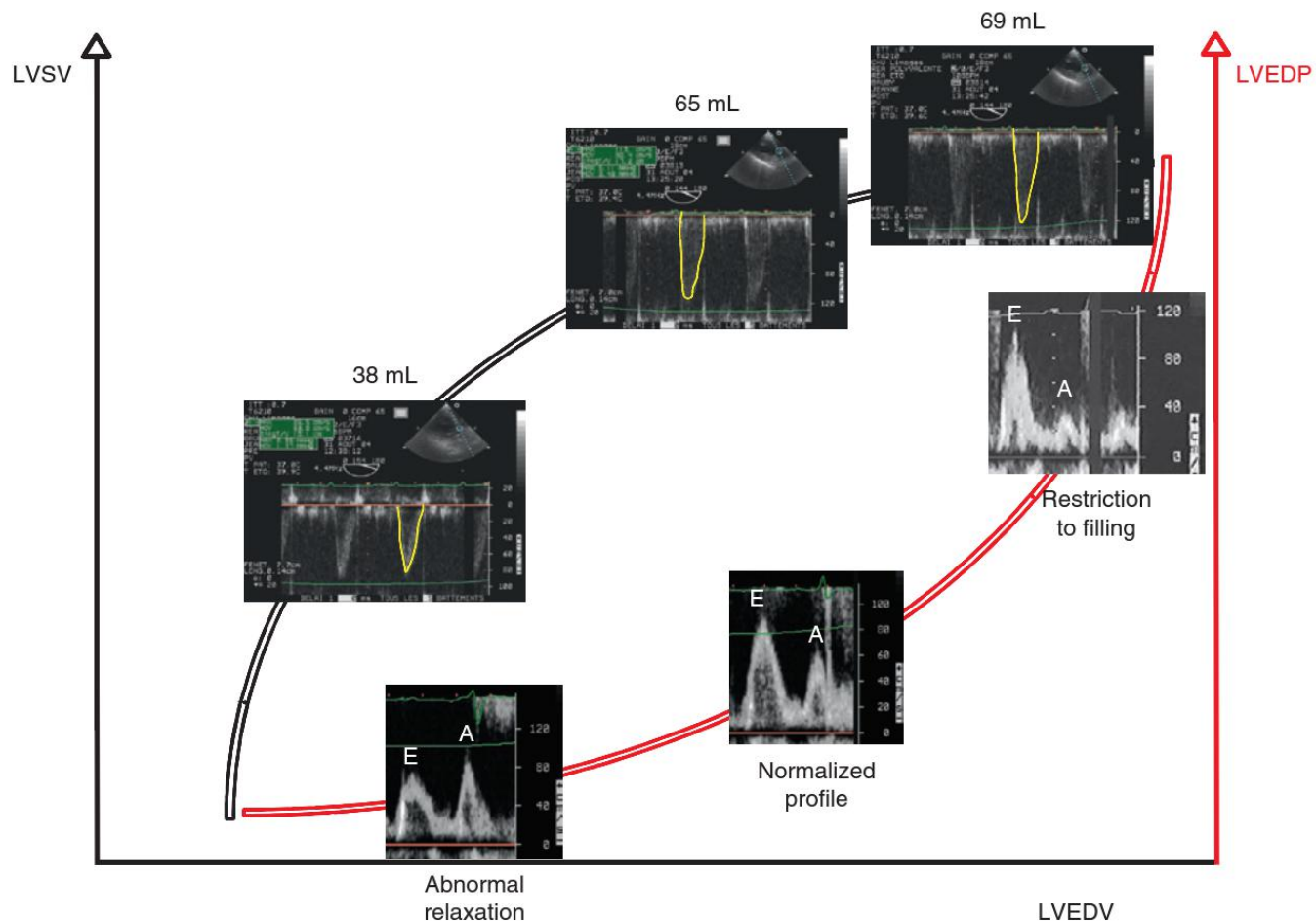
Baseline



500 mL



1,000 mL



,

- RESISTENZE SISTEMICHE:
(PAM/CARDIAC OUTPUT) X 80
- VALORI: 800-1400 dyne x sec/cm



**DONNA 82 ANNI IN PS PER IPOTENSIONE
PER COLANGITE E SUBOCCLUSIONE
INTESTINALE**

PA 80/50 RS 115/min

Infusi 4500 ml in 8 h + da 2 h dopamina

A 8 gamma

VTI

25

20

15

10

5

A

**SV 45 ml
CO 3,4 L/min
Res 1100**

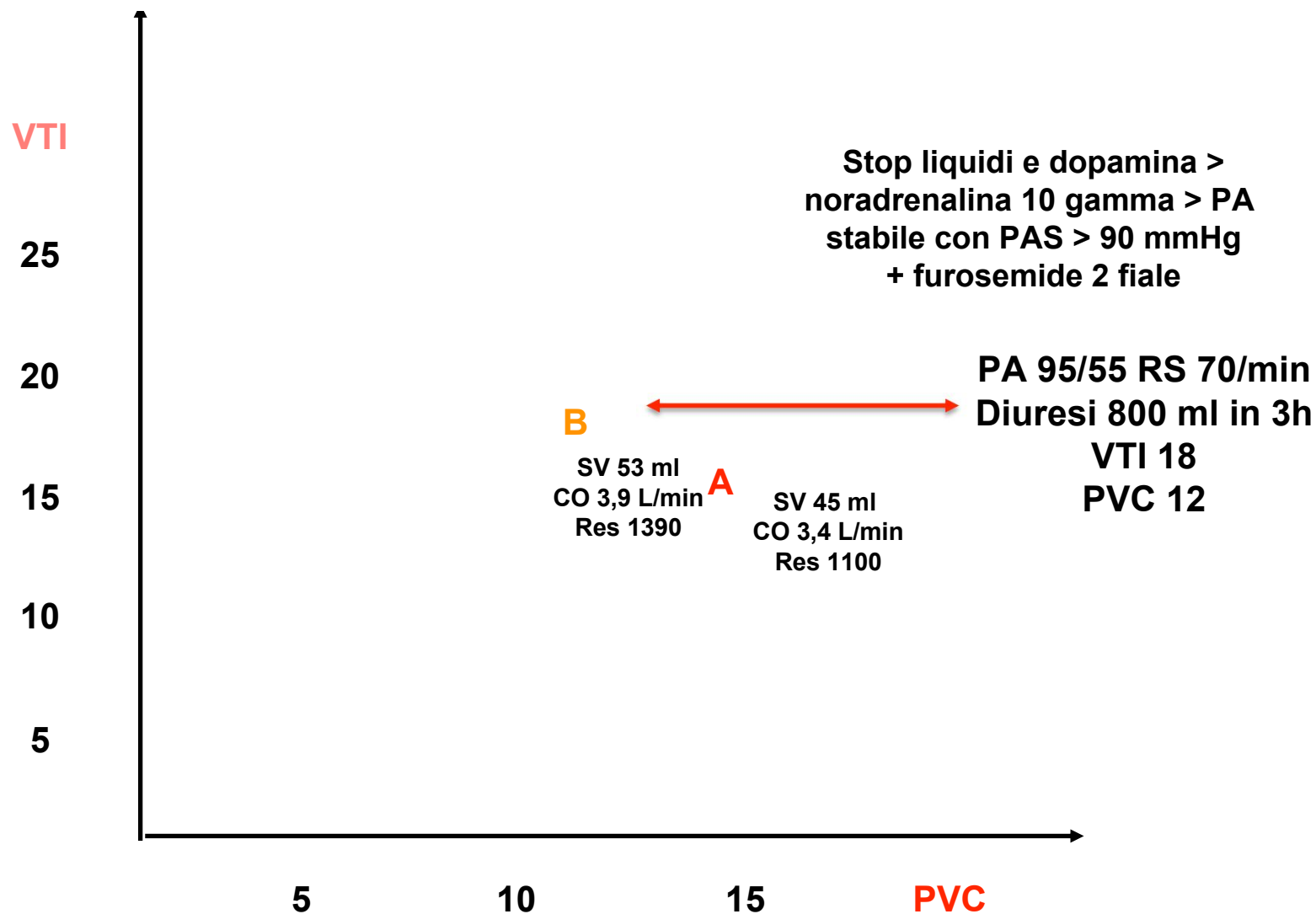
**VTI 14
PVC 15
E/E' 18**

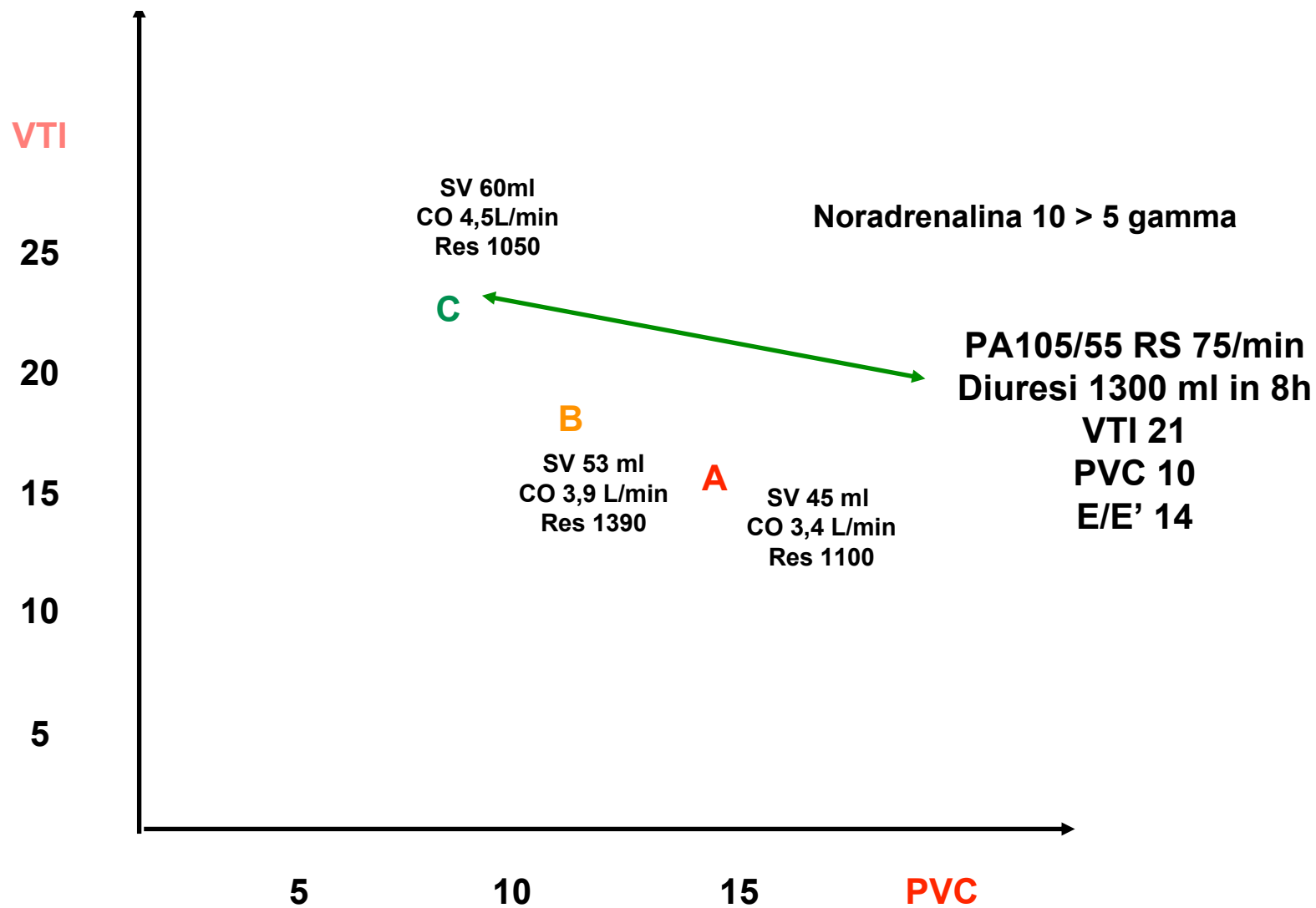
PVC

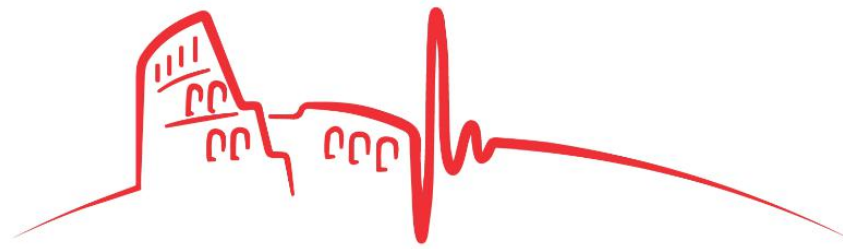
5

10

15







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GESTIONE EMODINAMICA ECOGUIDATA DEL PAZIENTE SETTICO IPOTESO IN PRONTO SOCCORSO

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