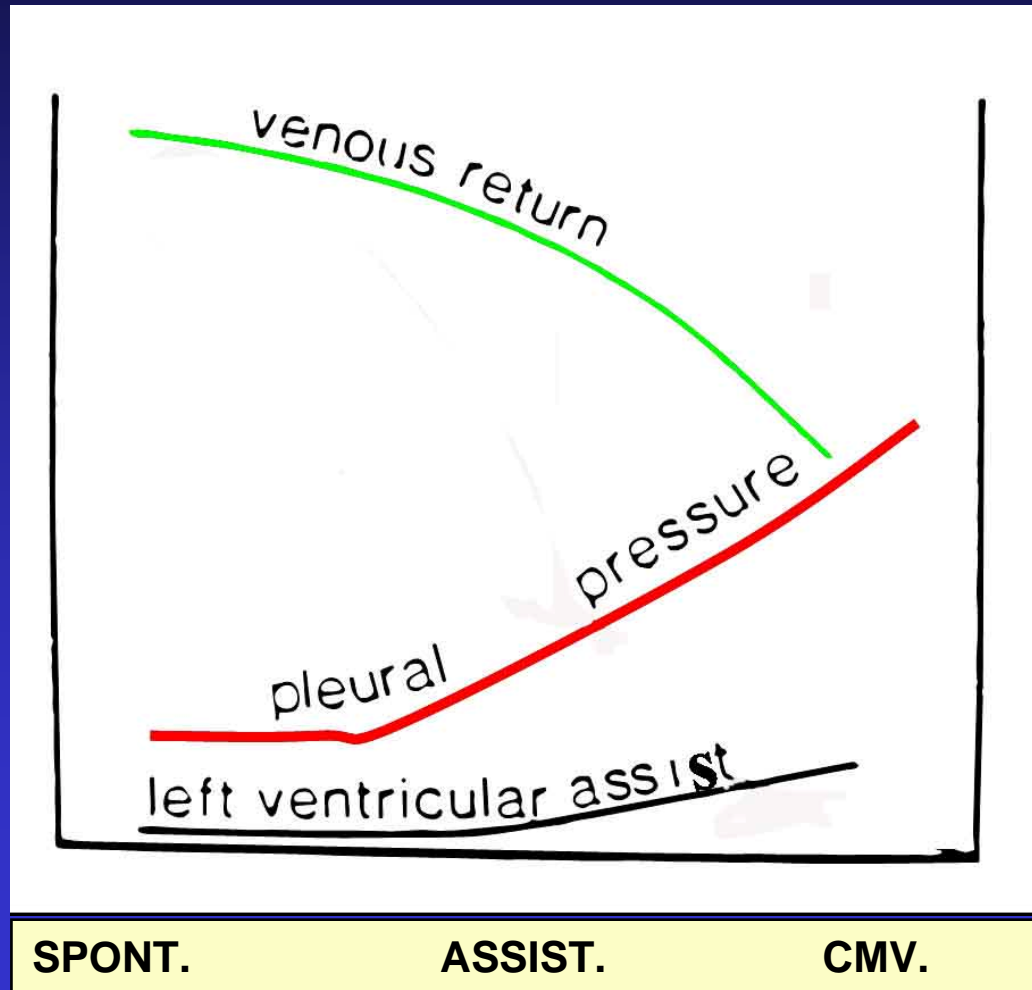


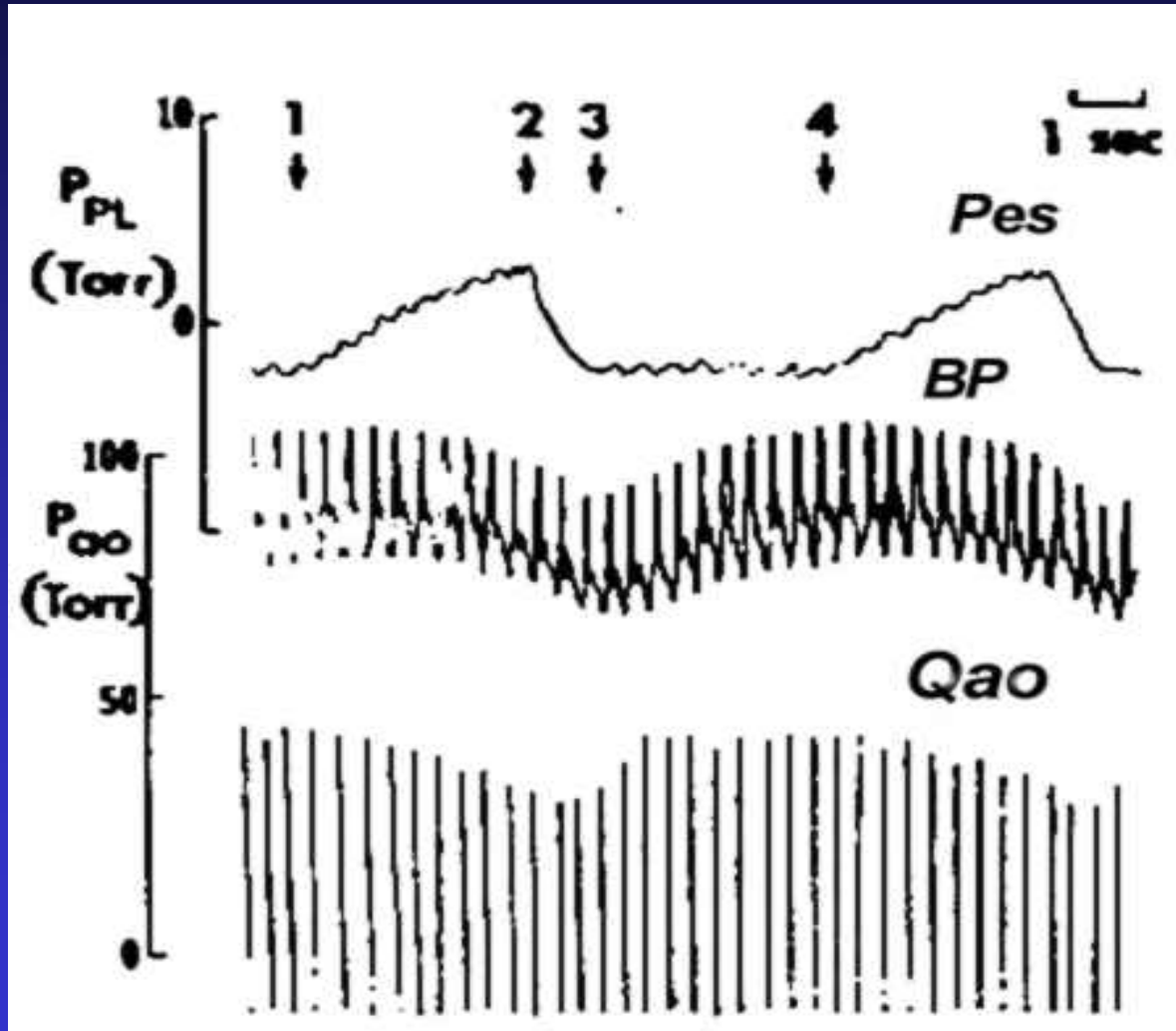
# Interferenze della Ventilazione meccanica sull'emodinamica

# Effects of different ventilatory mode on cardiopulmonary performance

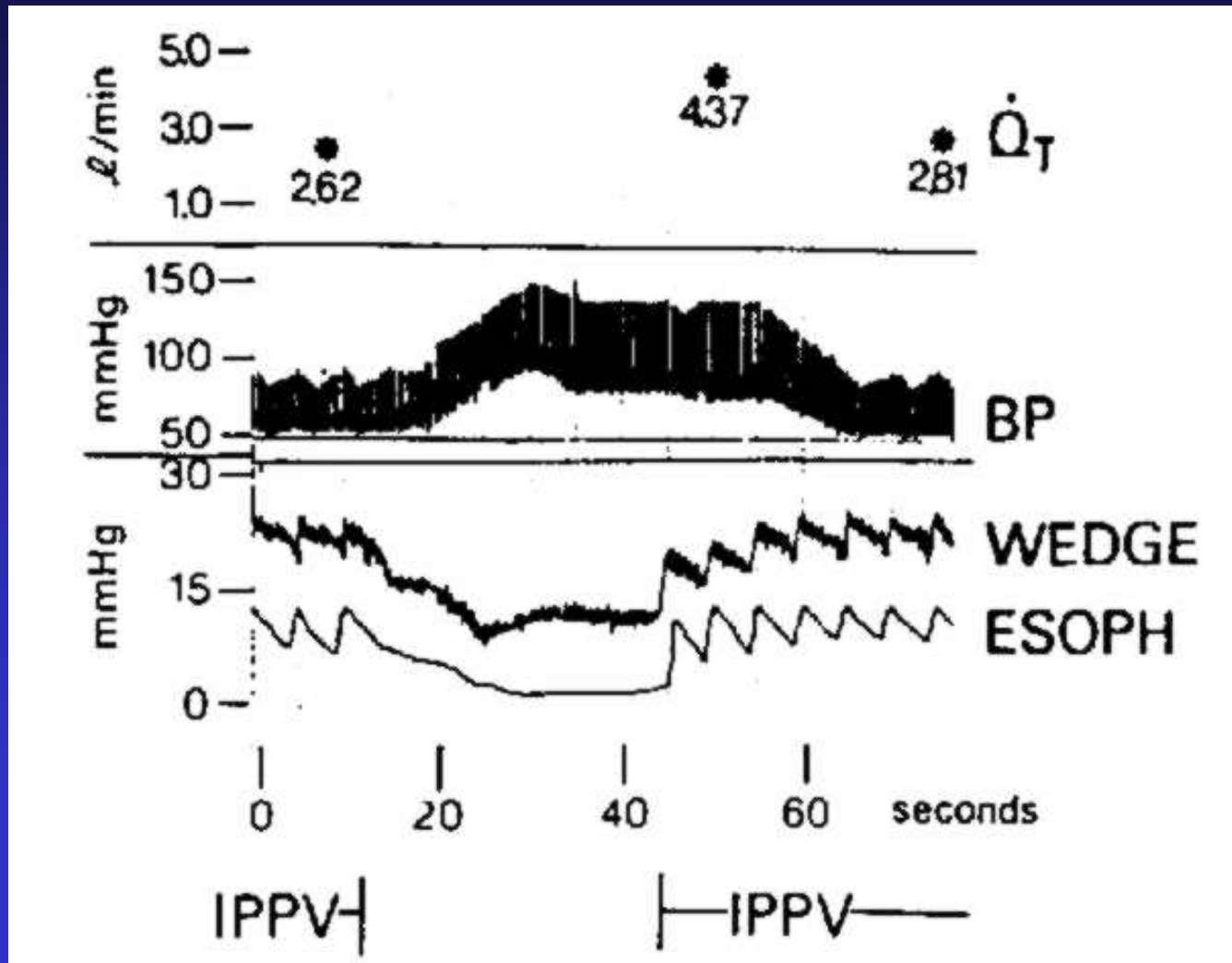


Modified from  
Synder 1984

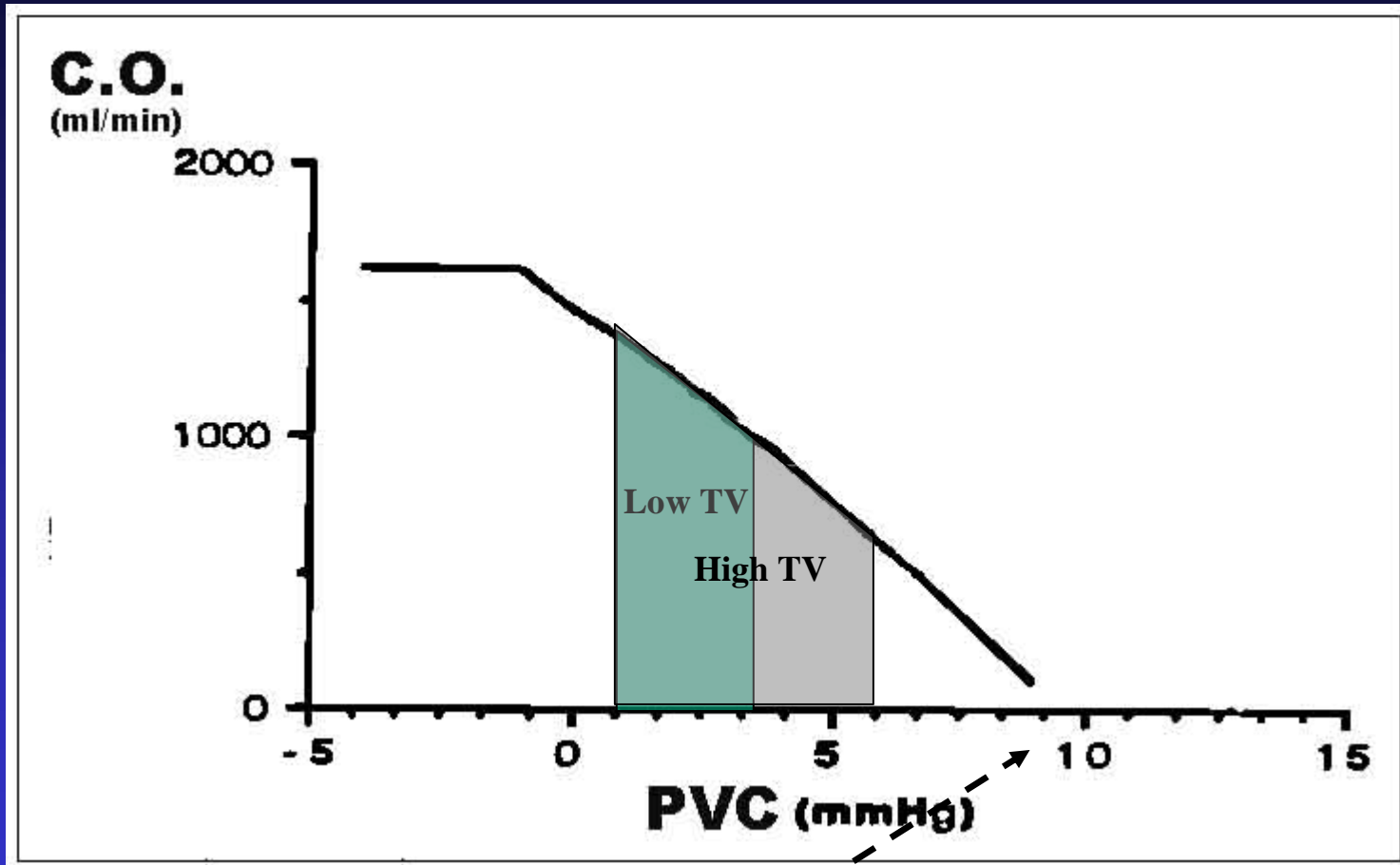
# ITP , Blood Pressure and Cardiac Output



# Attenzione alla PEEPi !



# MV & venous return: *effect of filling the Chest*



$P_{sf}$  = Mean Systemic Filling Pressure (9mmHg)

# Effect of MV on CO depends from

↑ PVC



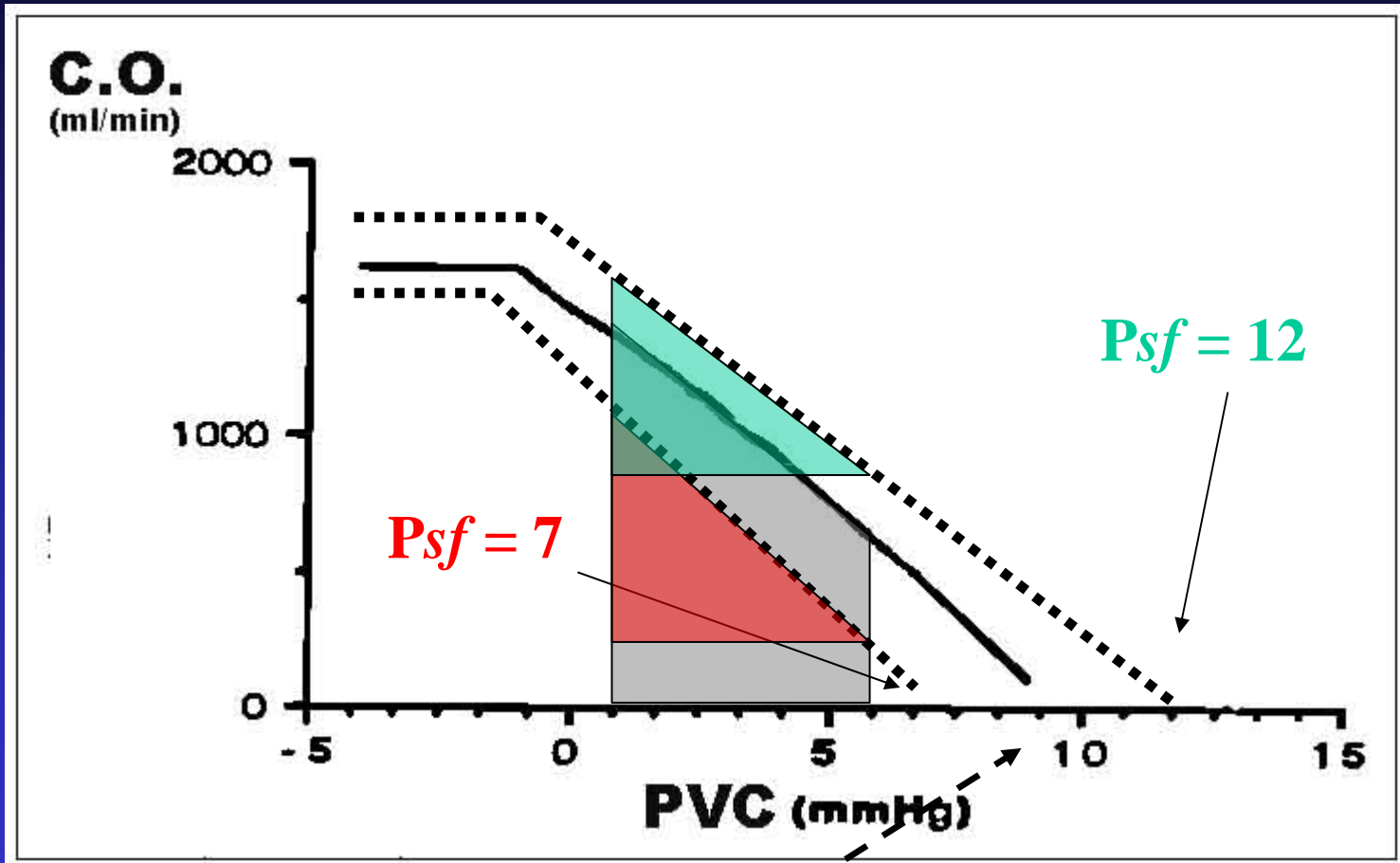
↑ Lung Volume  
(*PEEP, TV*)

↓ Chest Wall Cpl

Clinical consequence:

*Be carefull when ventilating with high Pressure/Volume patients with stiff chest wall (obese, scoliosis, ↑IntraAbdominalPressure etc.)*

# MV & venous return: effect of filling status



$P_{sf}$  = Mean Systemic Filling Pressure (9mmHg)

# Effect of MV on CO depends from

# Filling Status



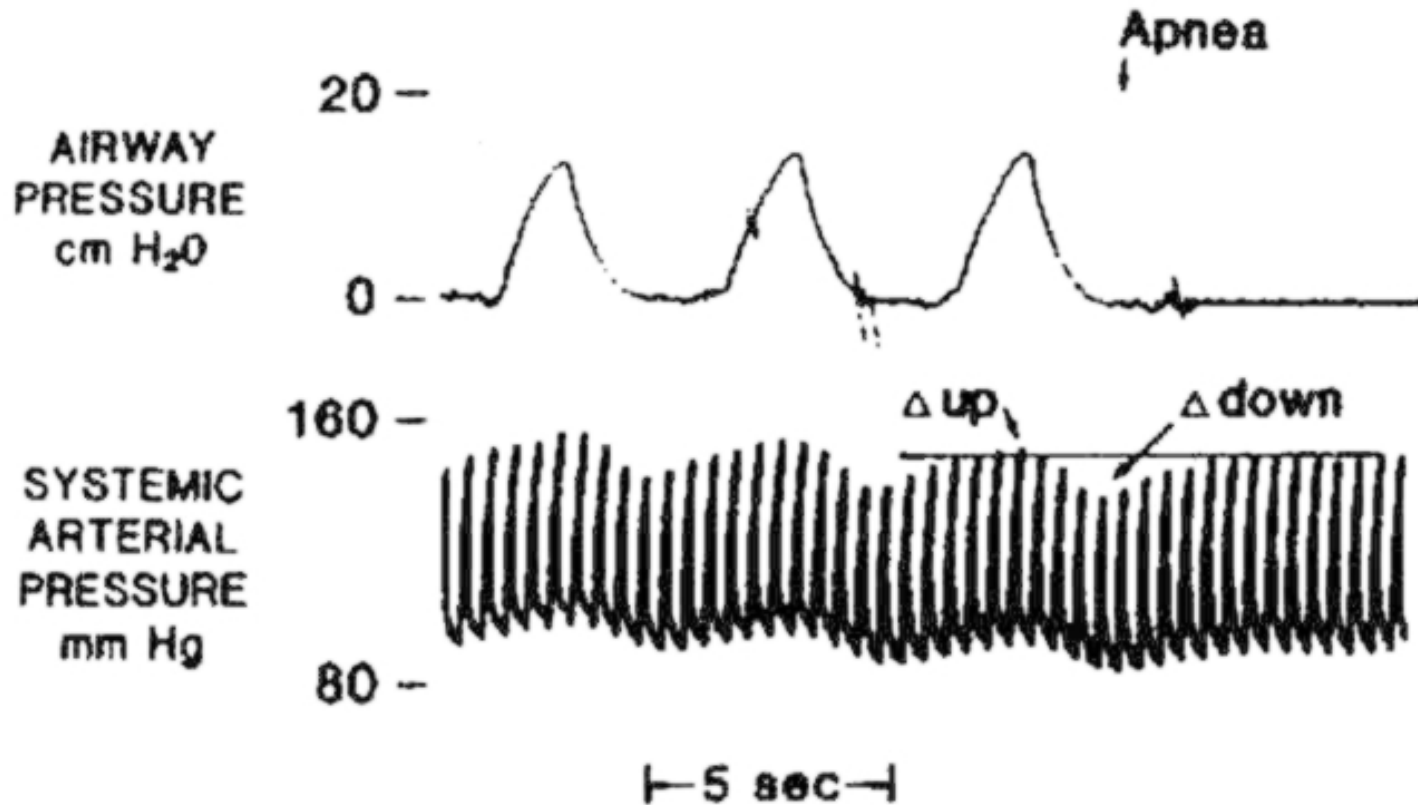
Clinical consequence:

*Be careful when ventilating Hypovolemic patients with reduced vascular tone*

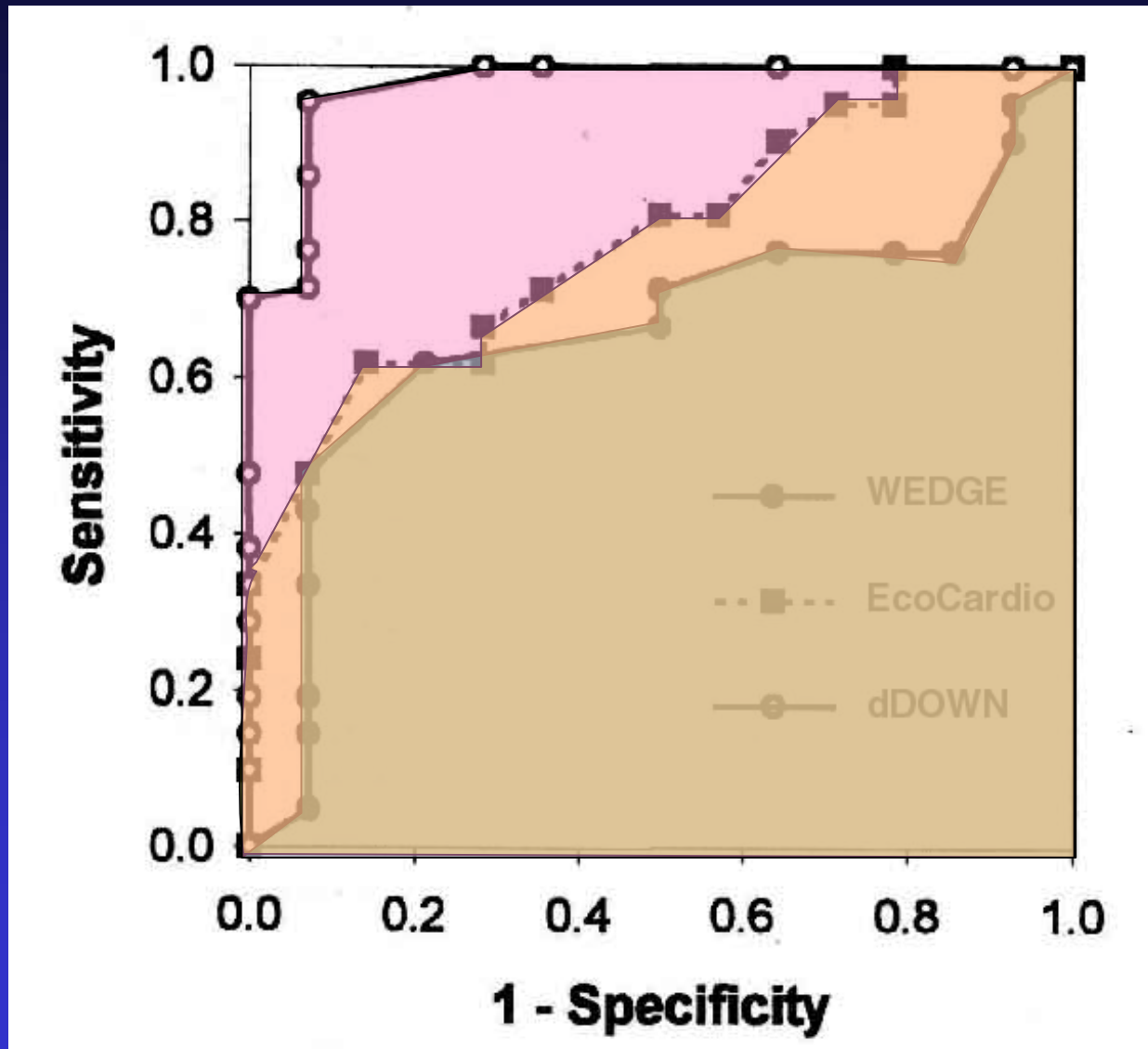
*(Hemorrhage, spinal trauma, CNS depression, sedation etc.)*



# dUP and dDOWN to estimate cardiac filling



# dDown è meglio di EchoCardio e WP



# Physical Exam and Hypovolemia

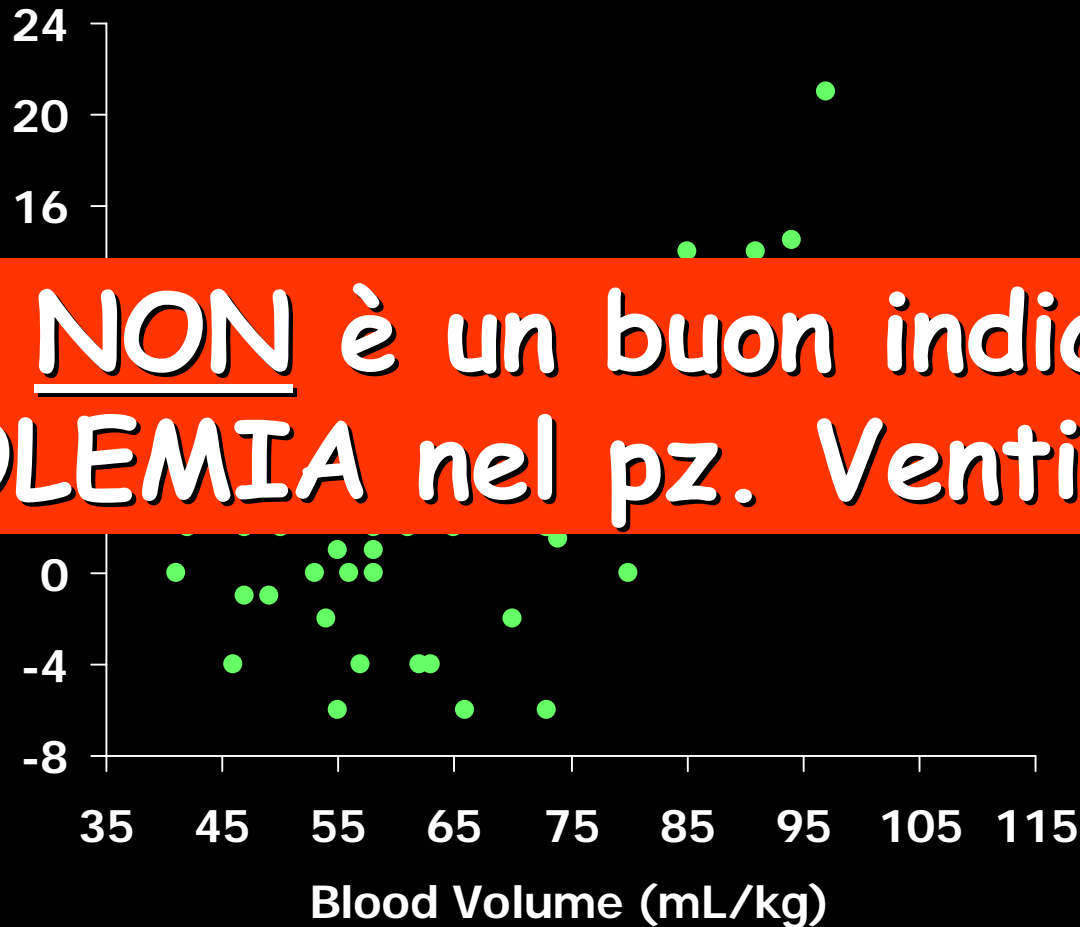
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<u>Signs</u>	<u>Sensitivity</u>	<u>Specificity</u>
1. Skin, mucous membranes	85	58
2. Mental status	57	73
3. Capillary refill	34	95

(McGee, JAMA, 1999)

# CVP as guide to Volume

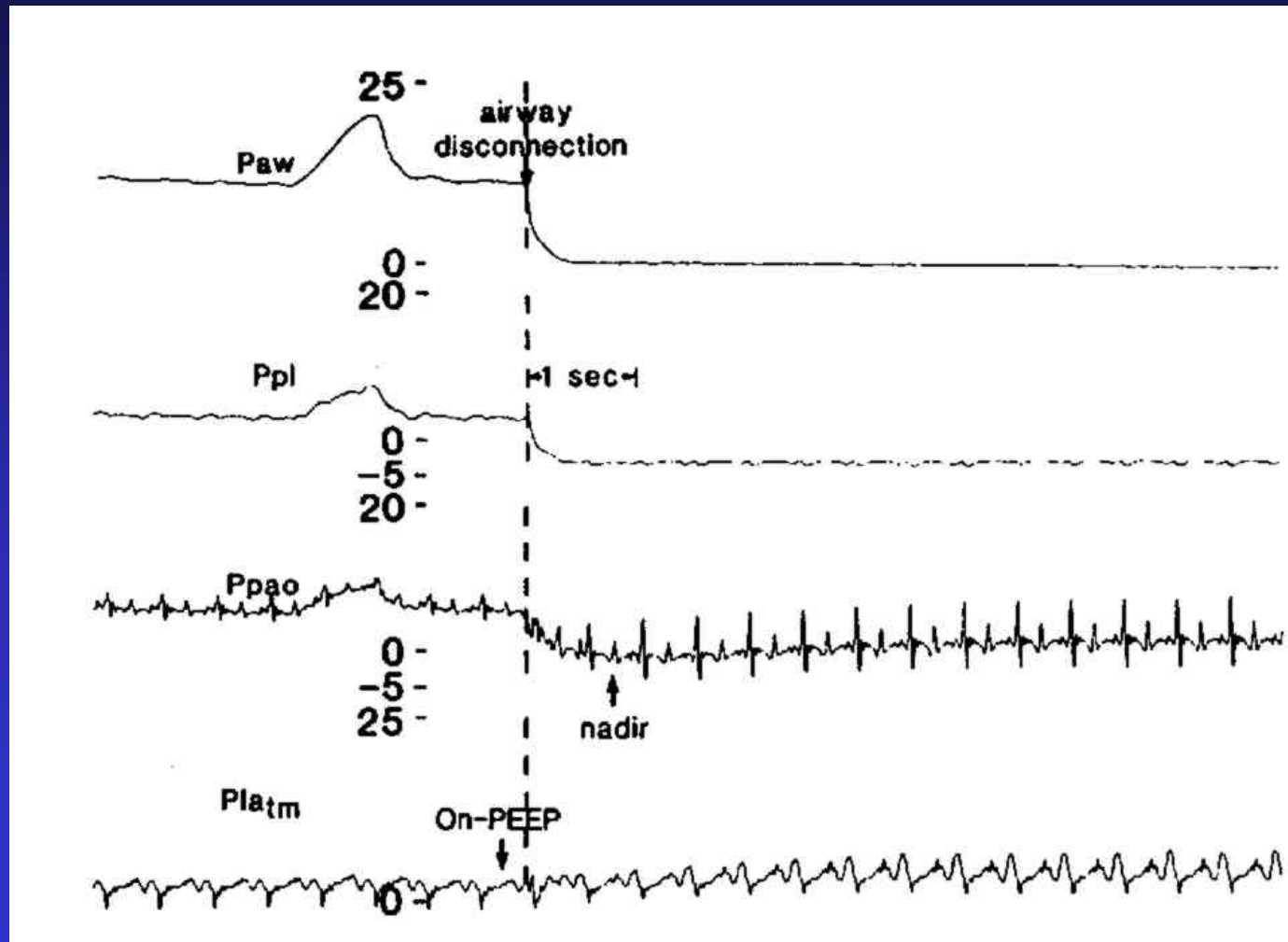
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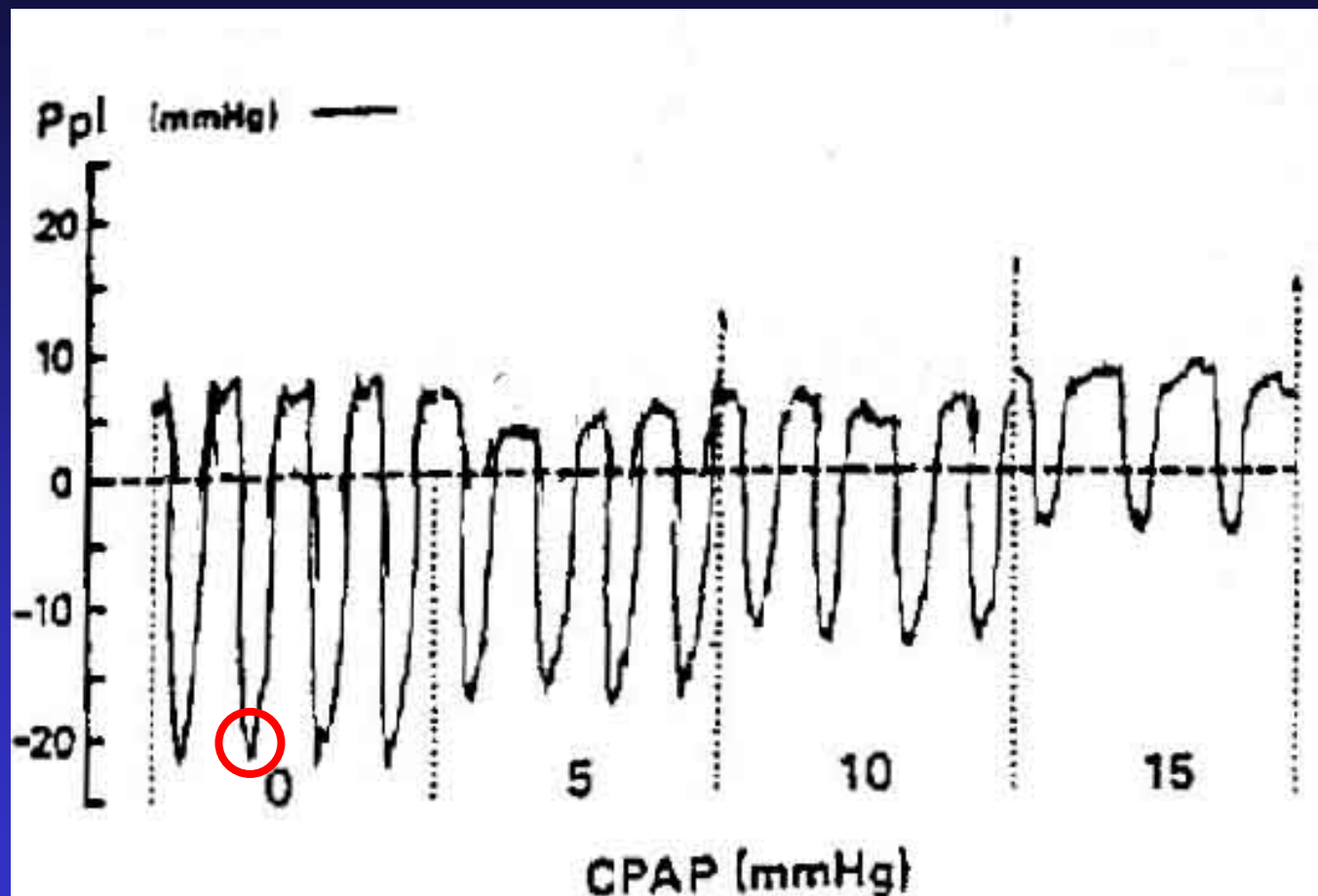
**La PVC NON è un buon indicatore di VOLEMIA nel pz. Ventilato!**

(Cohn JN: *Ann Int Med*, 1967;66:1283)

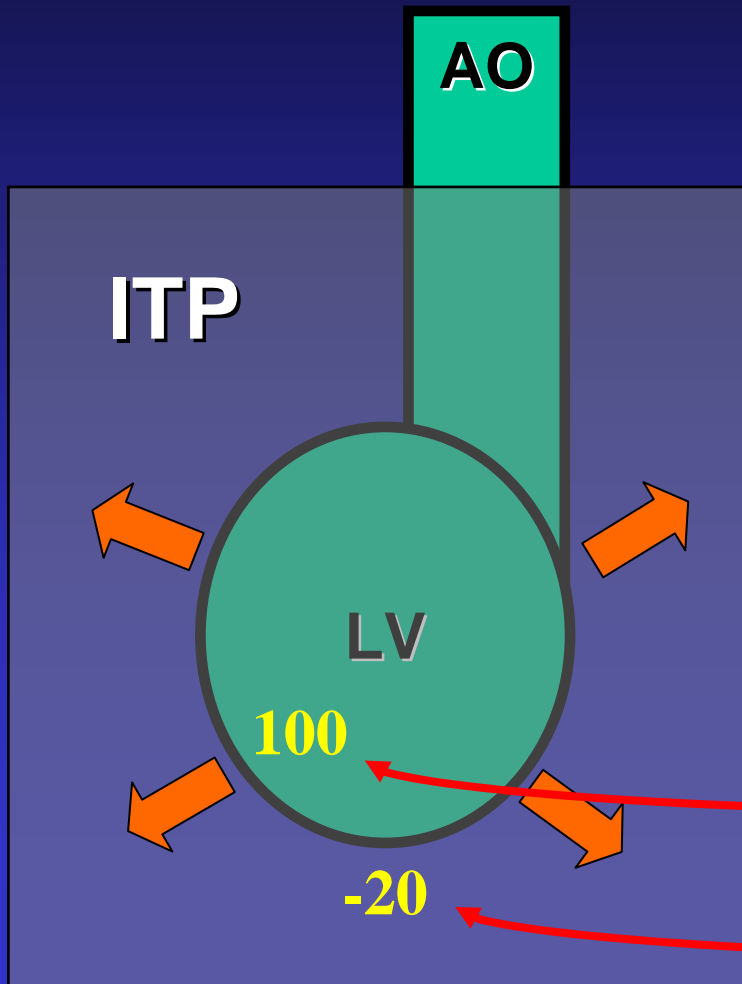
# Come valutare l'interferenza della MV sulle pressioni di riempimento



# PEEP AND LV AFTERLOAD



# IntraThoracicPressure and LV function

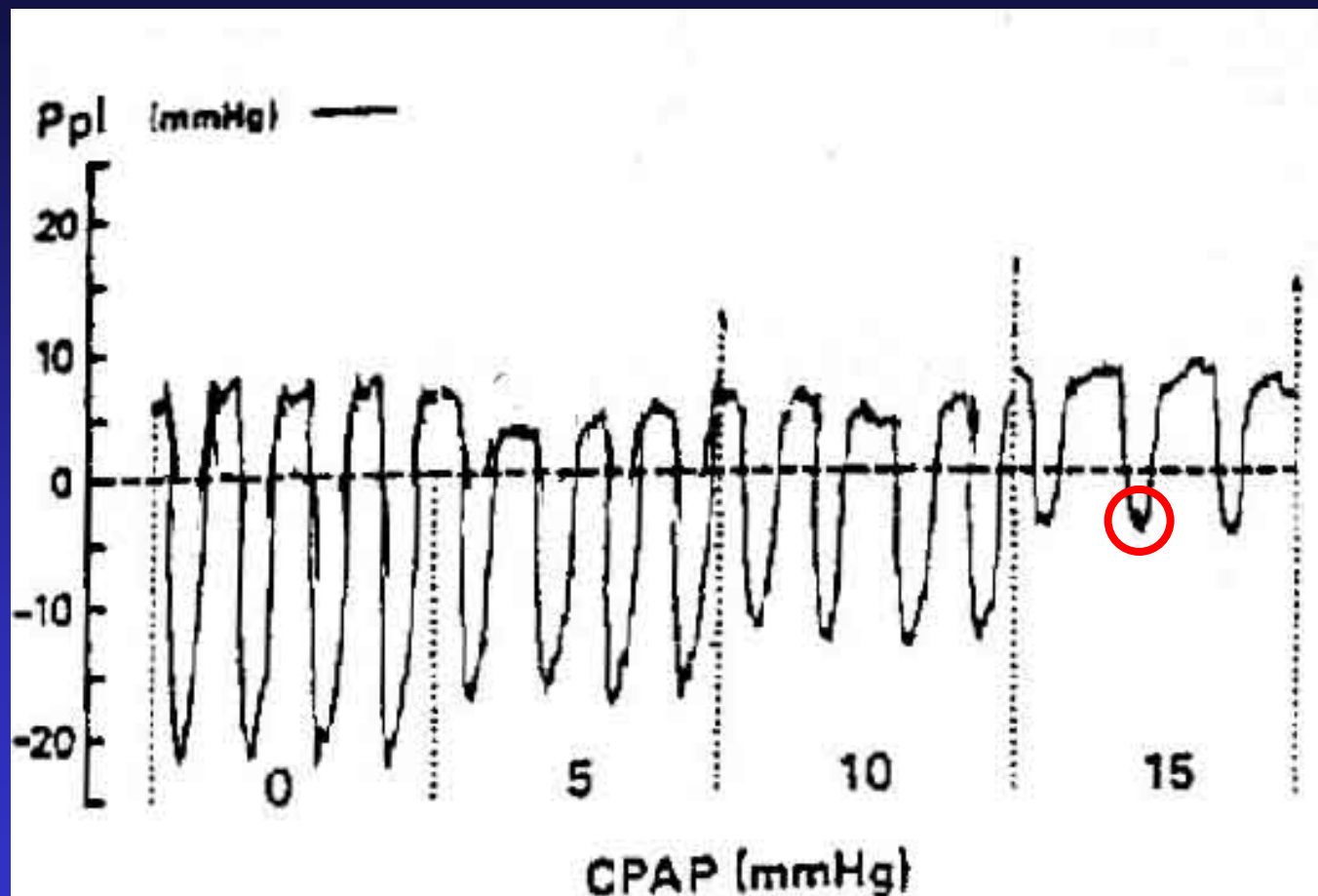


$$P_{tm} = 100 - (-20) = 120$$

effort =  $\downarrow$  ITP =  $\uparrow$  P<sub>tm</sub>

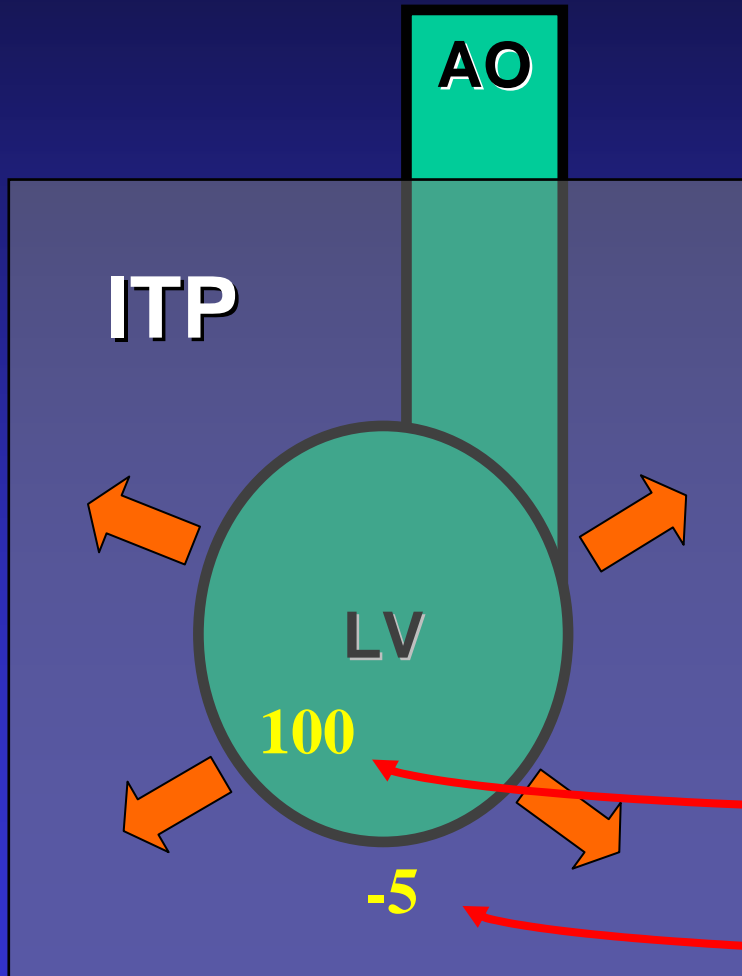
$\downarrow$   
 $\uparrow$  LV afterload

# PEEP AND LV AFTERLOAD





# IntraThoracicPressure and LV function



$$P_{tm} = 100 - (-5) = 105$$

↑ effort = ↓ ITP = ↑ P<sub>tm</sub>



↑ LV afterload

-5

# Razionale dell'uso della CPAP nell'EPA

**CPAP**

**↑ ITP**

**↑ FRC**

**↓ Rit. Ven.**

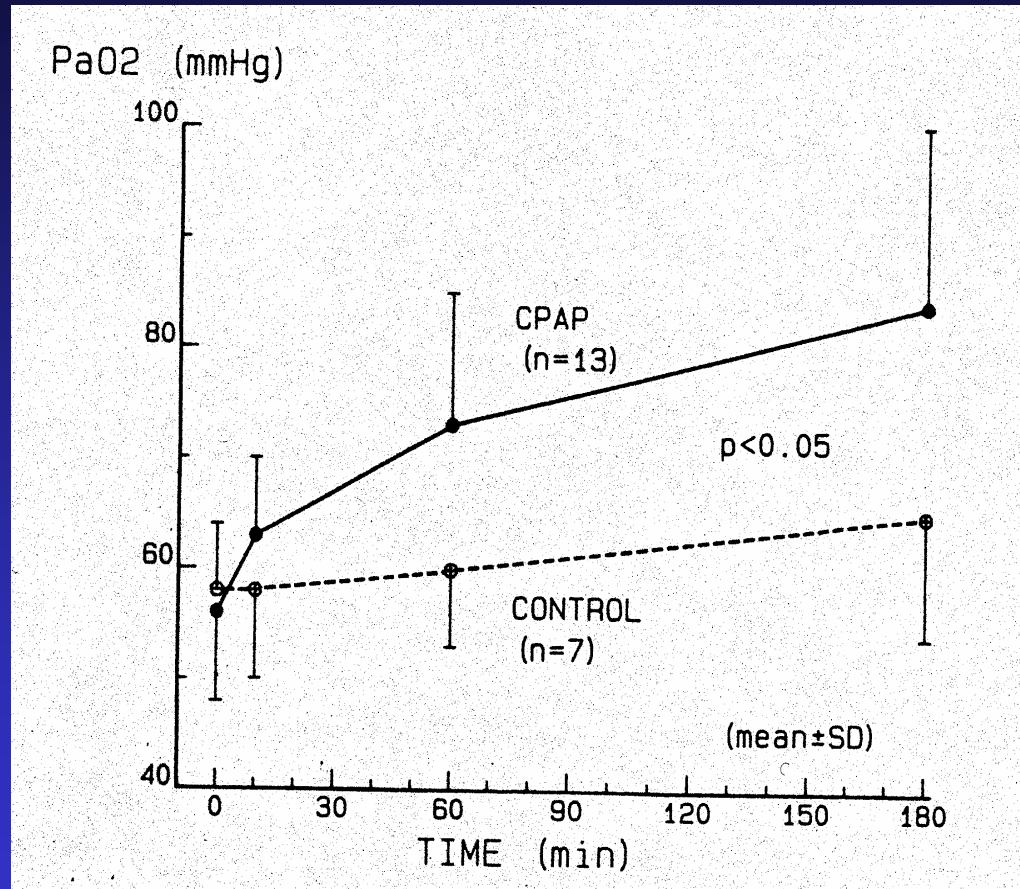
**↓ LV<sub>afterload</sub>**

**↑ PaO<sub>2</sub>**

**↓ WOB**

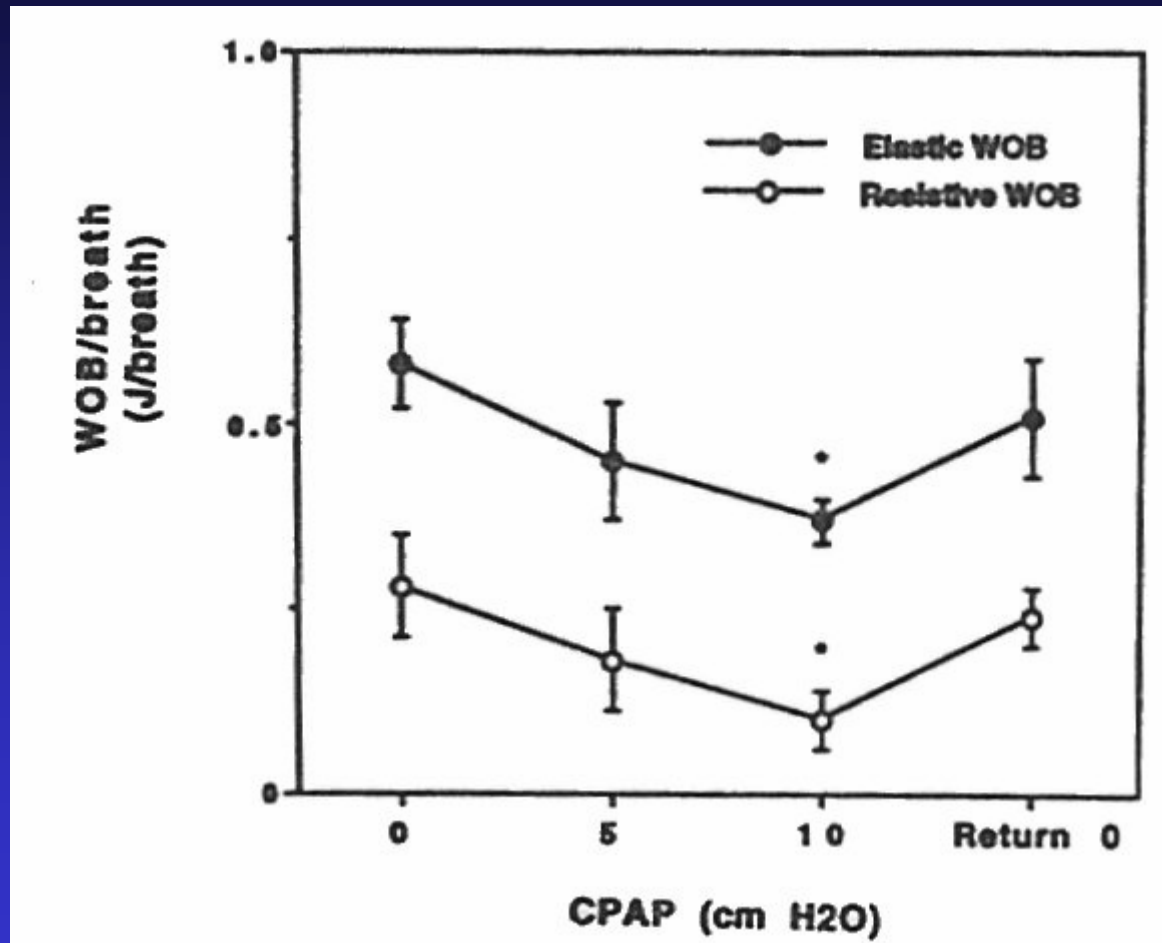
**↑ Cardiac performance**  
**↓ pulmonary congestion**

# CPAP IN CARDIOGENIC PULMONARY EDEMA



Rasen et al: Am J Cardiol 1985; 55: 296-300

# CPAP IN CARDIOGENIC PULMONARY EDEMA



# **Out of hospital treatment of Acute Pulmonary Edema by non invasive CPAP**

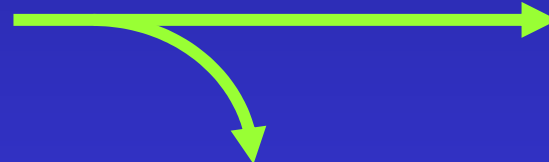
**G. Foti, M. Cazzaniga, E. Valle, M. Sabato, F. Apicella,  
V. Casartelli, G. Fontana, GP Rossi, S. Vesconi, A.  
Pesenti.**

- **Istituto di Anestesia e Rianimazione, Università degli Studi,  
H. S. Gerardo - Monza - Italy**
- **Servizio di Emergenza Territoriale, presidi di Carate e Desio**
- **SSUEm 118 Brianza**

# Entry criteria:

- ALS team availability
- Pulmonary Edema diagnosis based on history and clinical findings
- SpO<sub>2</sub> < 95% in O<sub>2</sub> by reservoir mask

63  
pts eligible

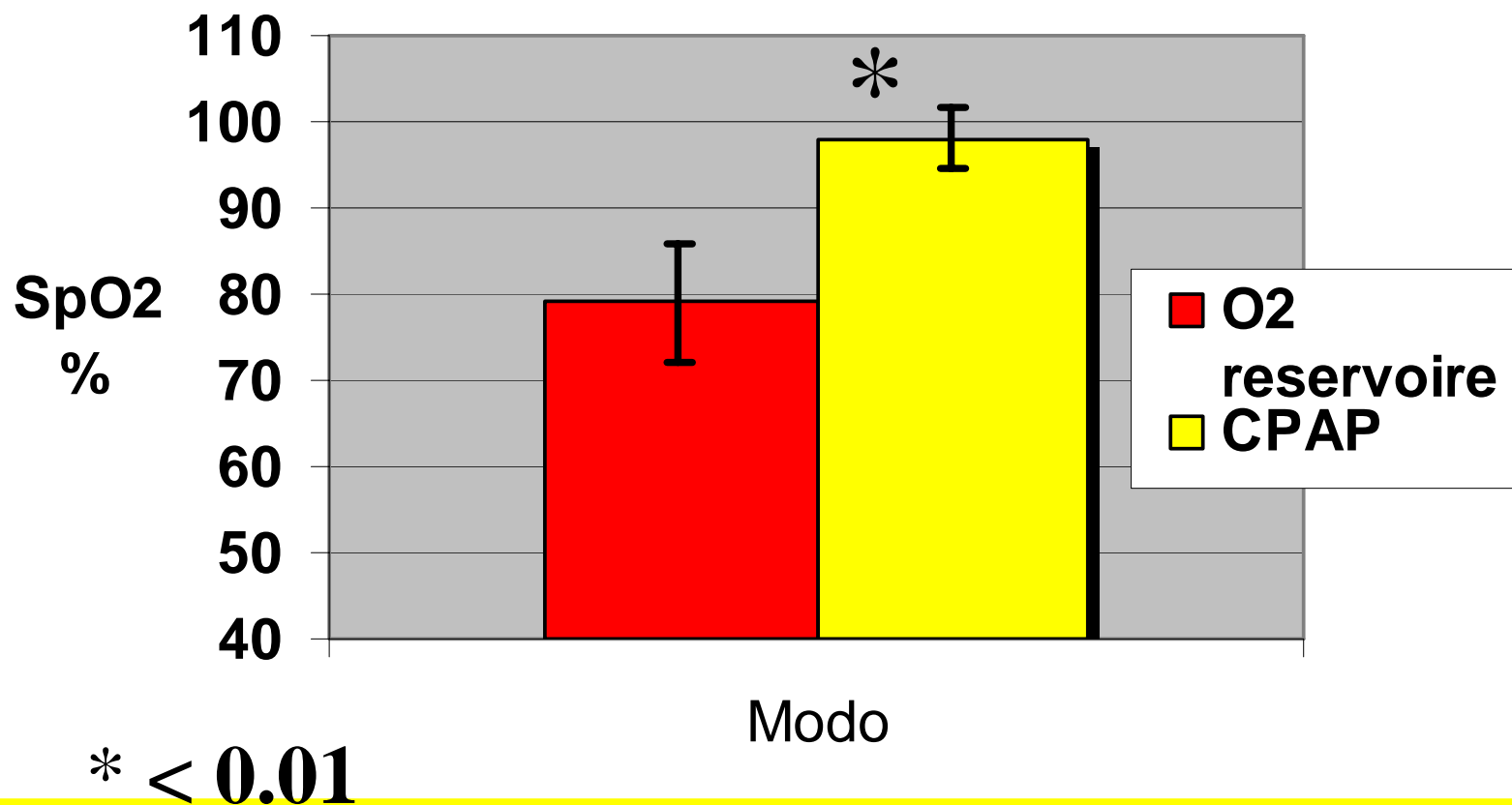


1

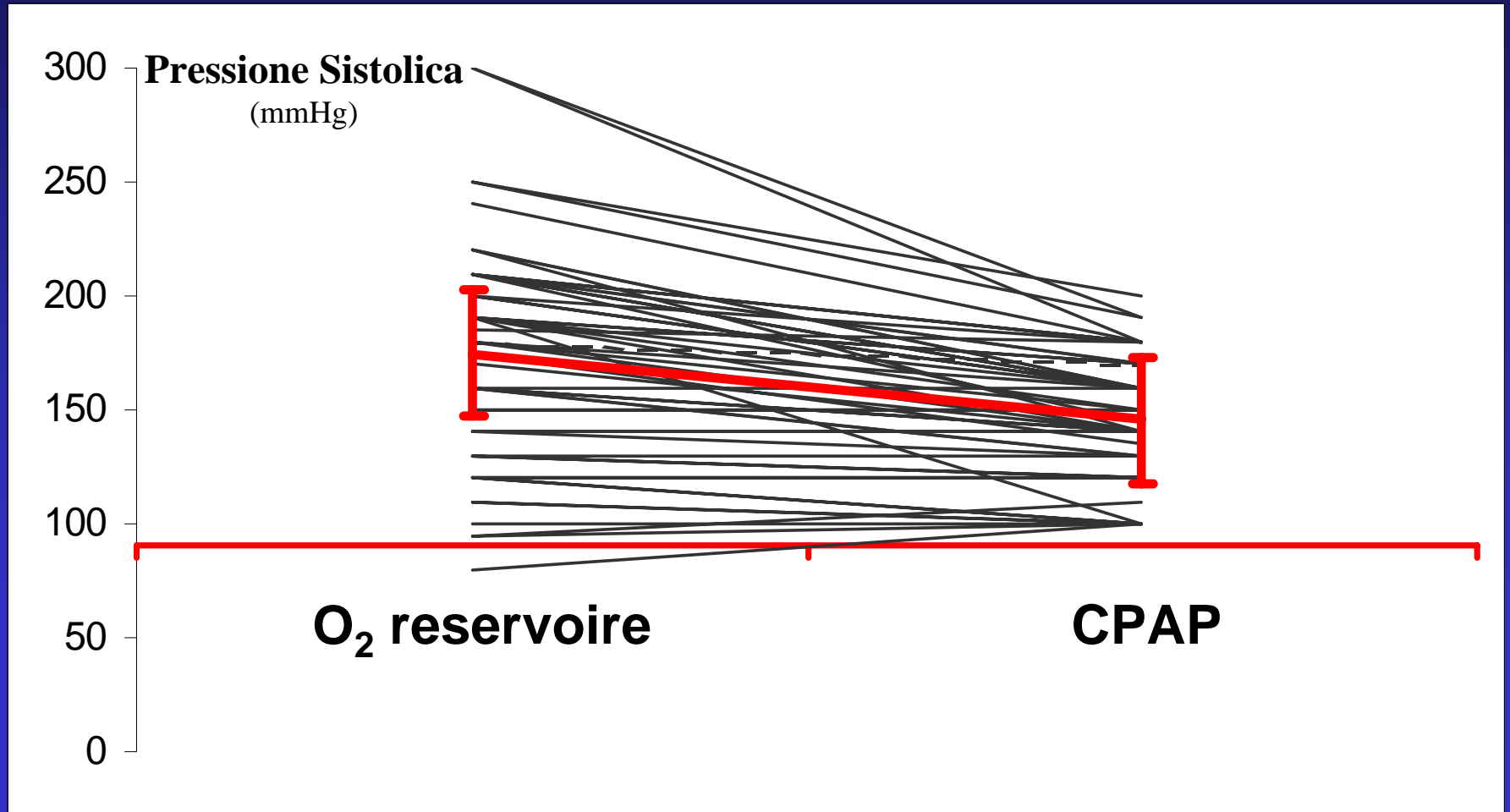
hypotension

62  
entered the study

# Oxygenation



# Pressione Arteriosa durante CPAP





# Results:

	<i>O2 Reservoir</i>	<i>CPAP</i>	
<i>HR</i>	111±24	103±15	< .01
<i>MAP</i>	115±30	101±18	< .01
<i>Wet rales score</i>	3.6±0.7	1.7±0.8	<.01

# Outcome of ACPE pts:

- Intubation rate
  - during transport **0%**
  - hospital **2.2%**
- Admission
  - ICU **0%**
  - CCU **15.6%**
  - General ward **84.4%**
- Hospital stay
  - **10 ± 8** days

CPAP should be  
utilized as **FIRST-LINE  
INTERVENTION** in the  
treatment of Acute  
Pulmonary Edema