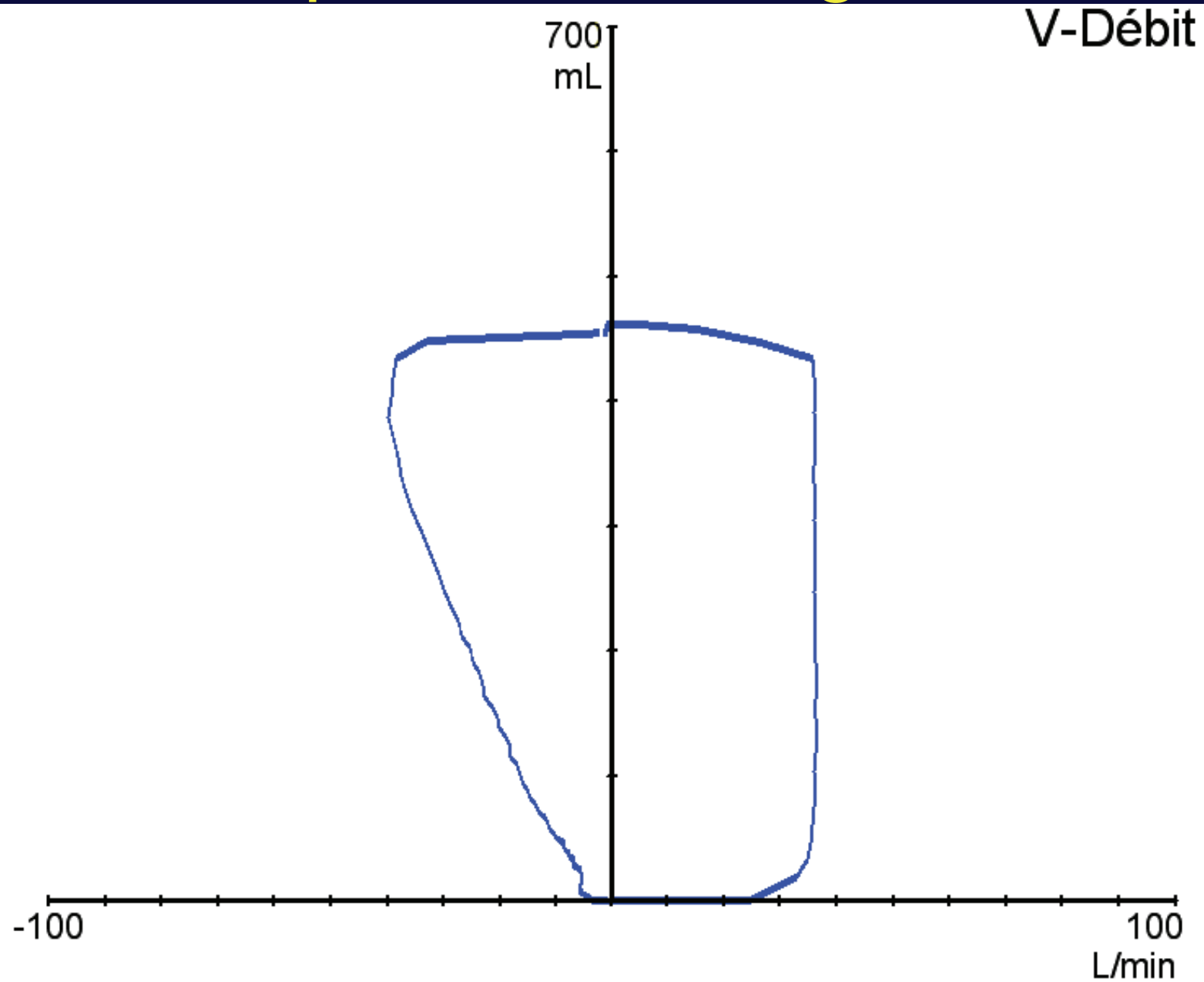


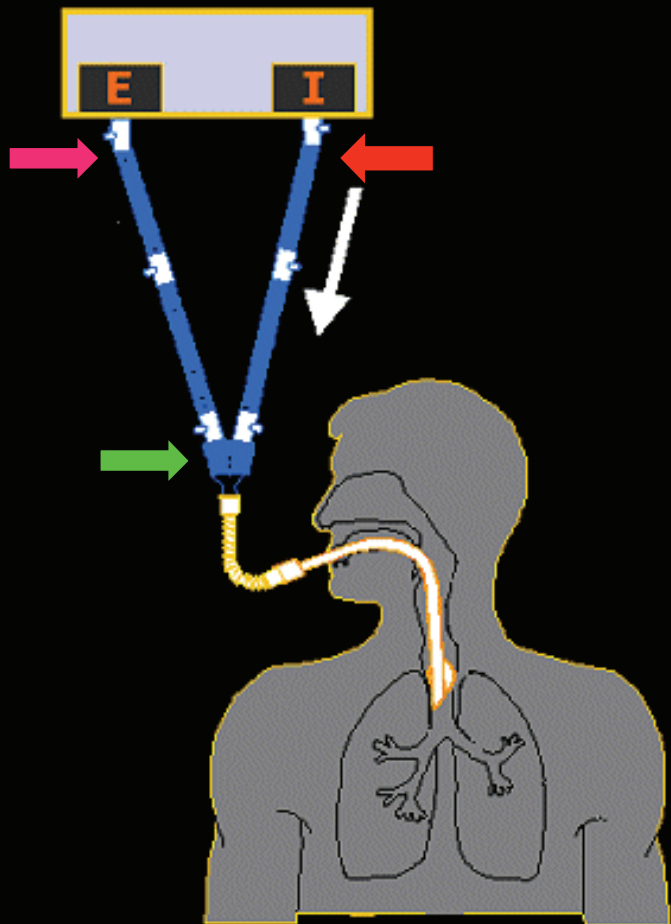
# Interprétation des courbes du ventilateur

Dr Jean-Michel Arnal  
Service de réanimation polyvalente  
Hôpital Font Pré  
Toulon

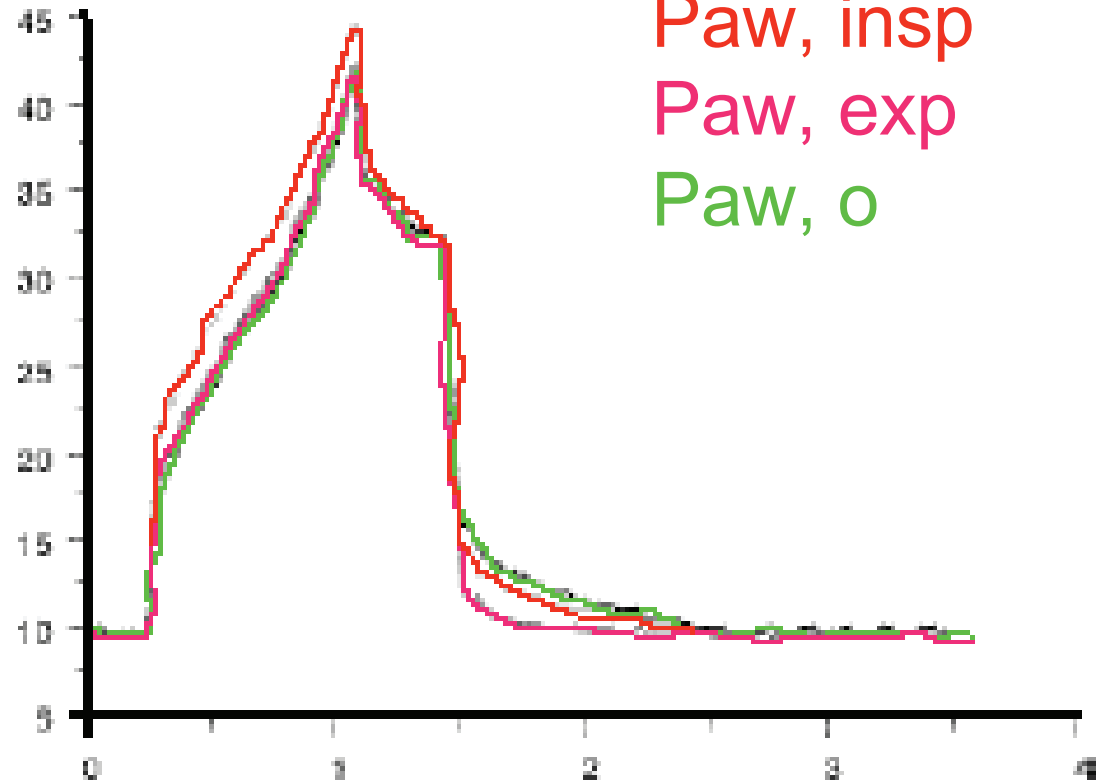
# Acquisition des signaux



# Mesure de la pression



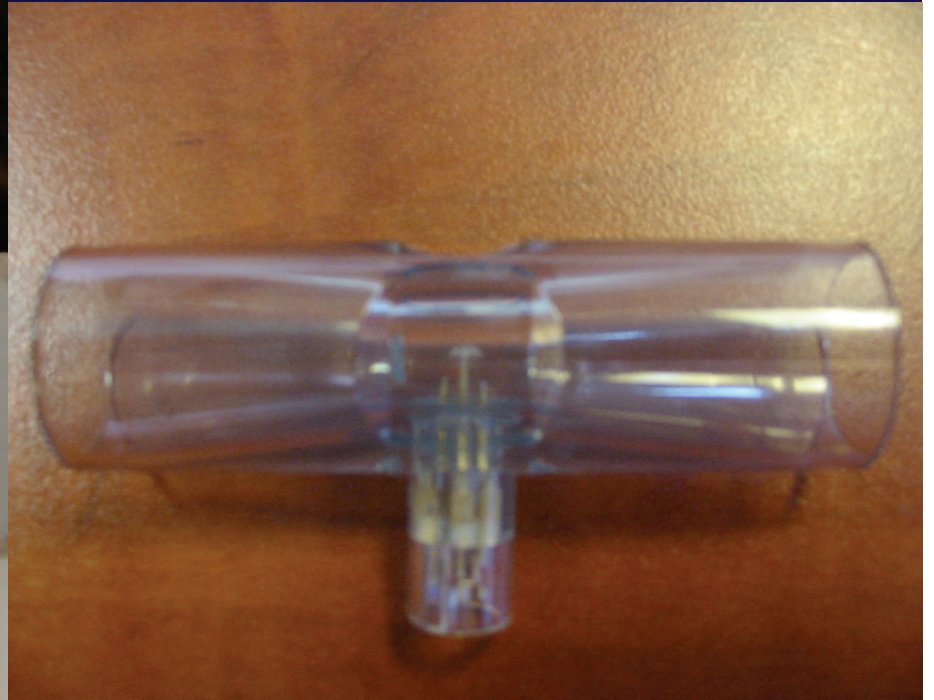
**Pression**



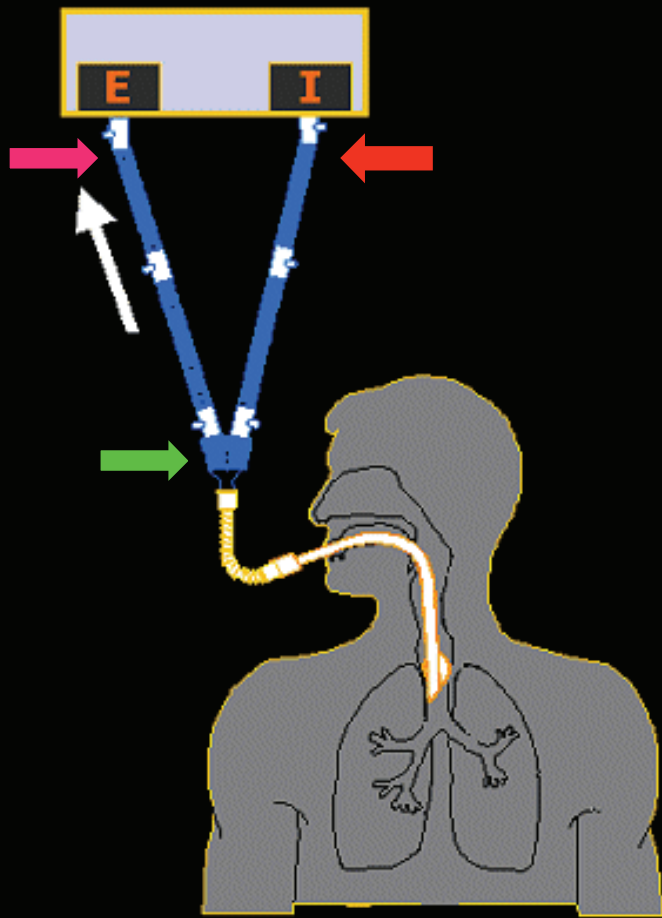
$P_{aw, insp}$   
 $P_{aw, exp}$   
 $P_{aw, o}$

**Temps**

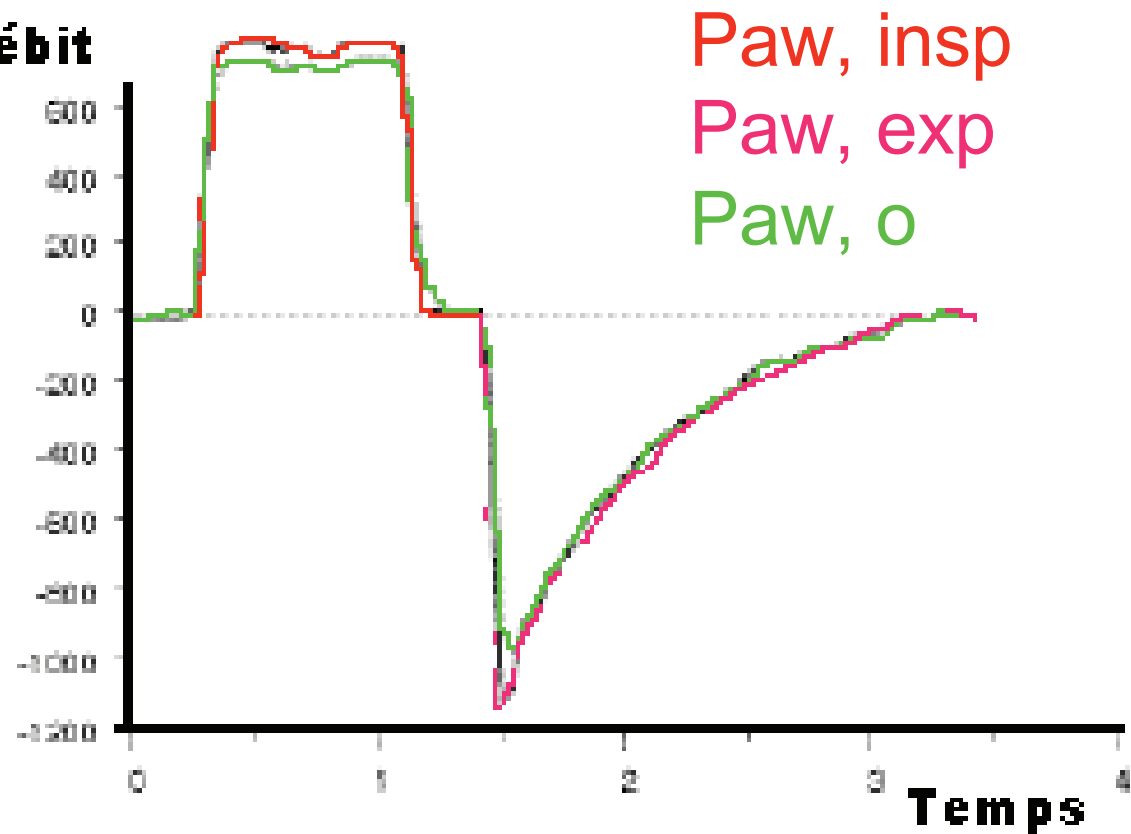
# Mesure du débit



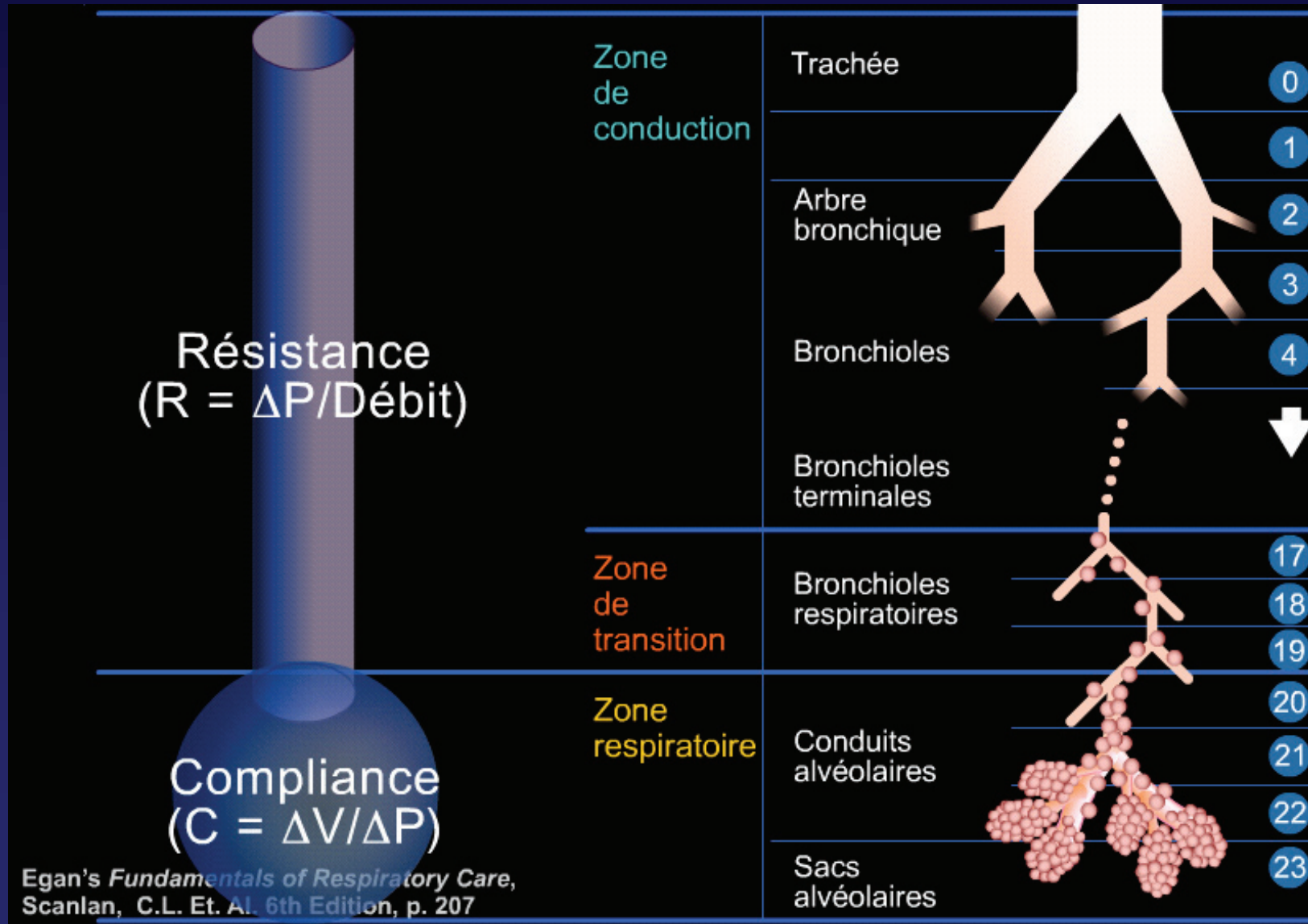
# Mesure du débit



Débit



# Modèle linéaire monocompartimental



# Equation du mouvement en ventilation contrôlée

$$P_{aw} = PEEP_t + P_{\text{él}} + P_{res}$$

$$P_{aw} = PEEP_t + V / C + V_{ins} \cdot R_{ins}$$

↑ ↑  
Dépendante Consigne

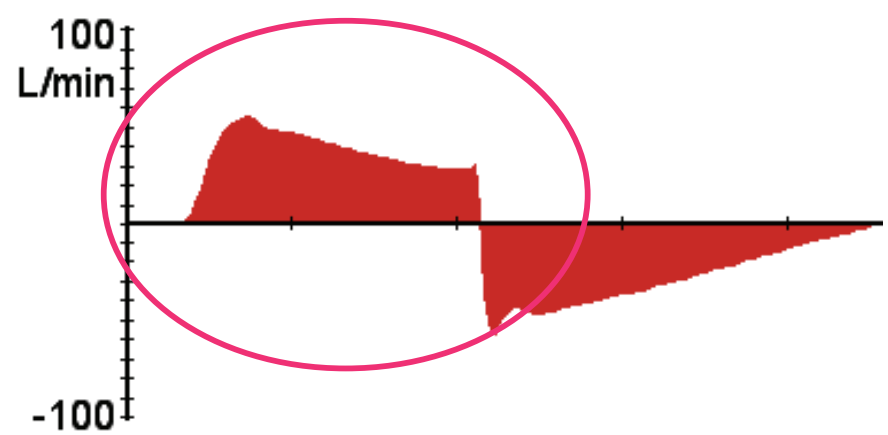
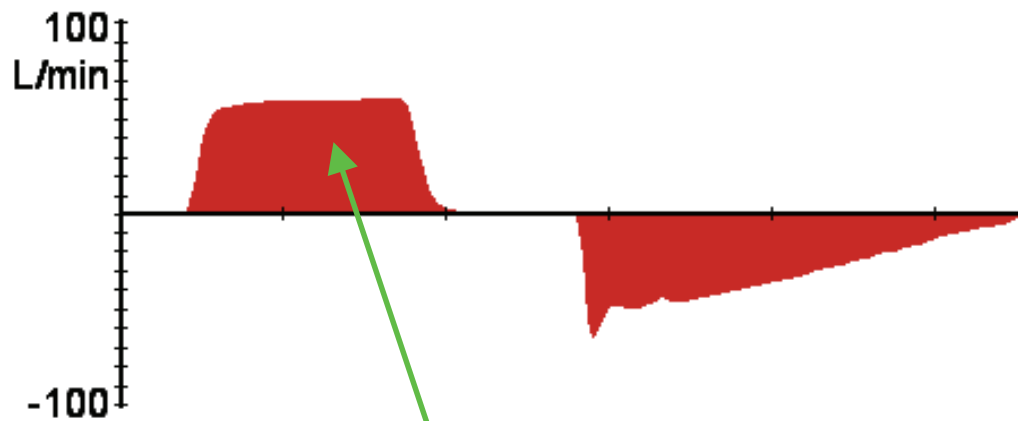
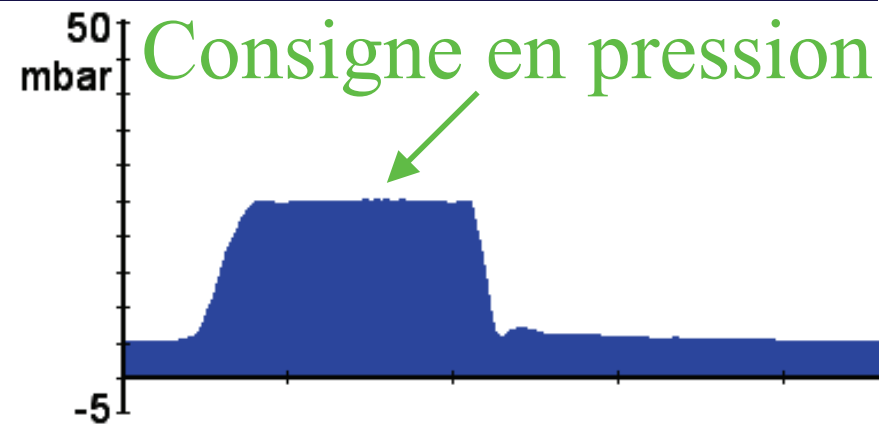
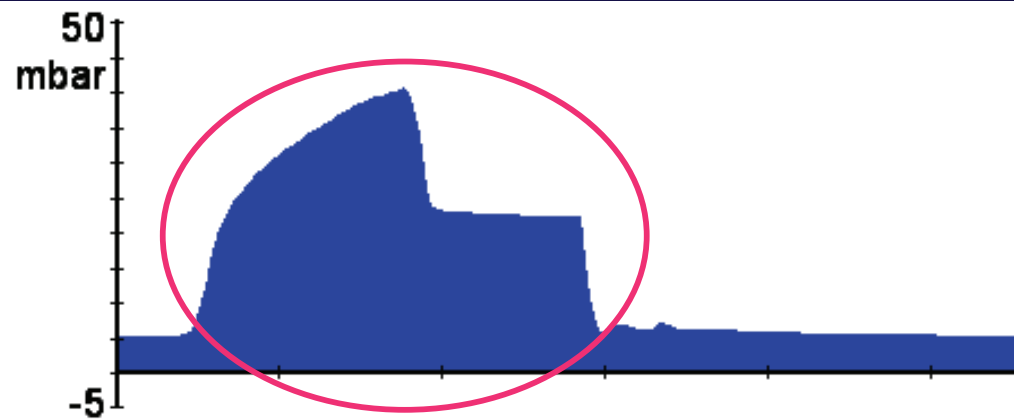
↑ ↑ ↑  
Dépendante Consigne



# Equation du mouvement en ventilation assistée ou spontanée

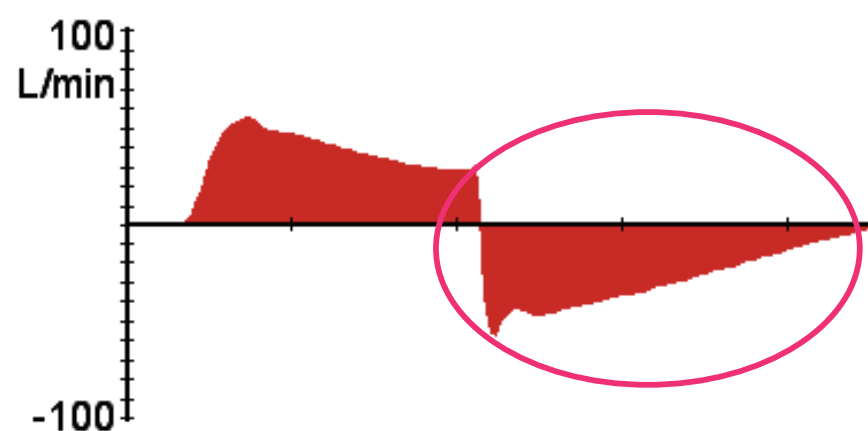
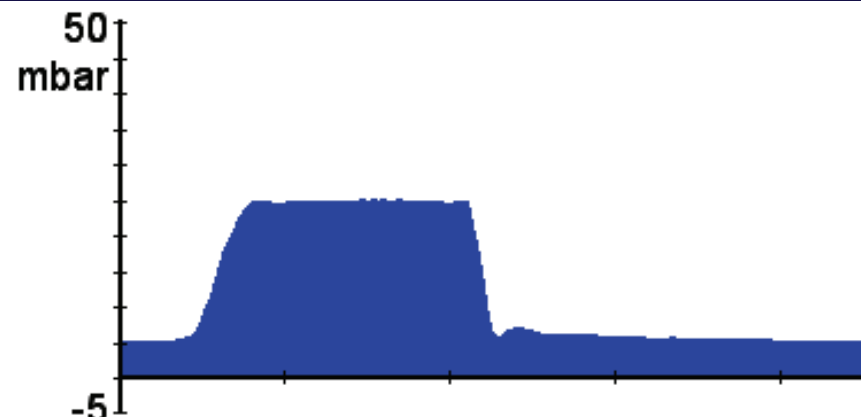
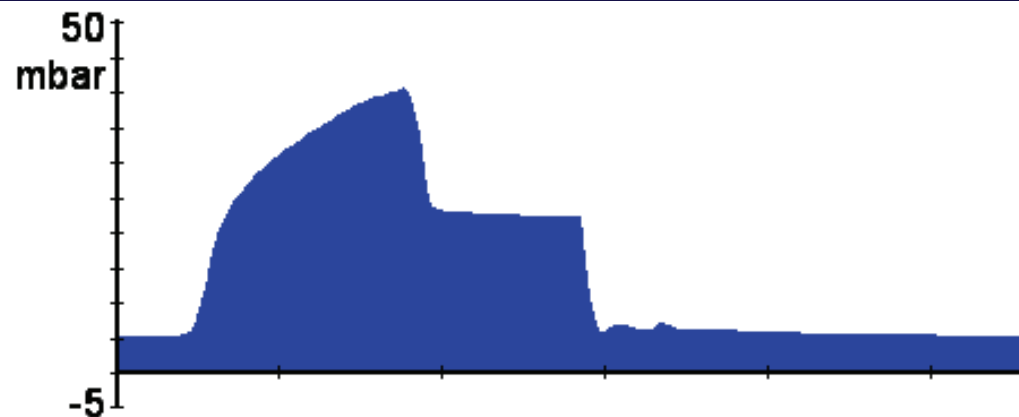
$$P_{\text{mus}} + P_{\text{aw}} = \text{PEEP}_t + V / C + V_{\text{ins}} \cdot R_{\text{ins}}$$

# Variable contrôlée – variable dépendante



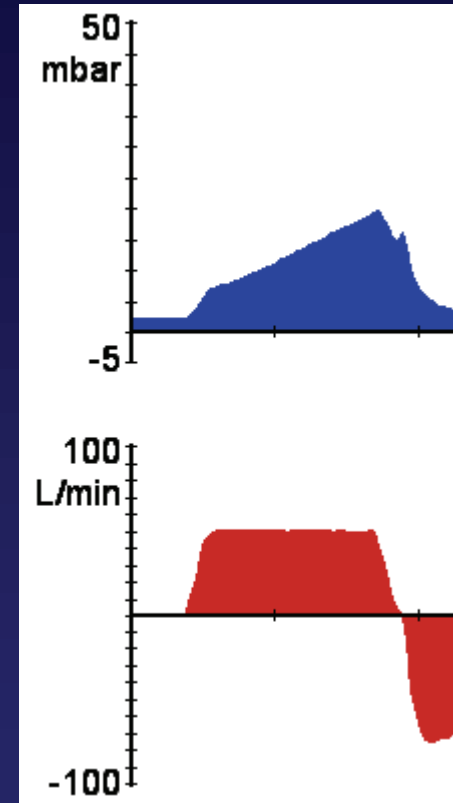
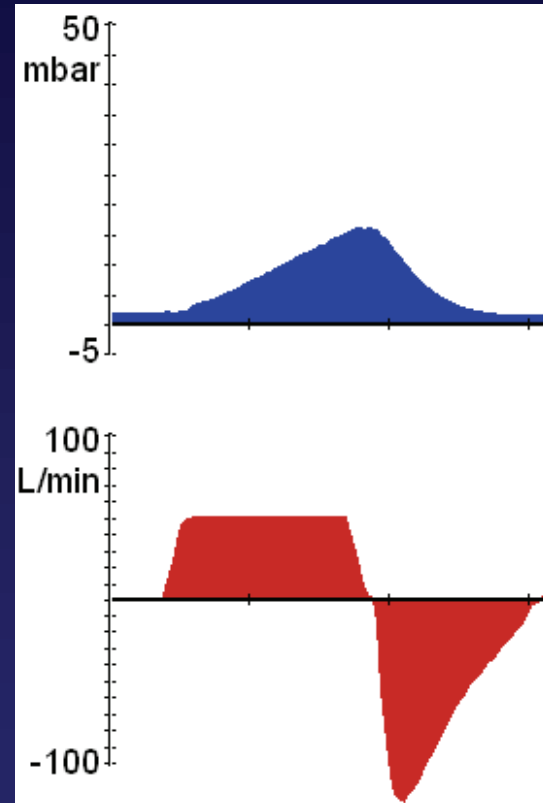
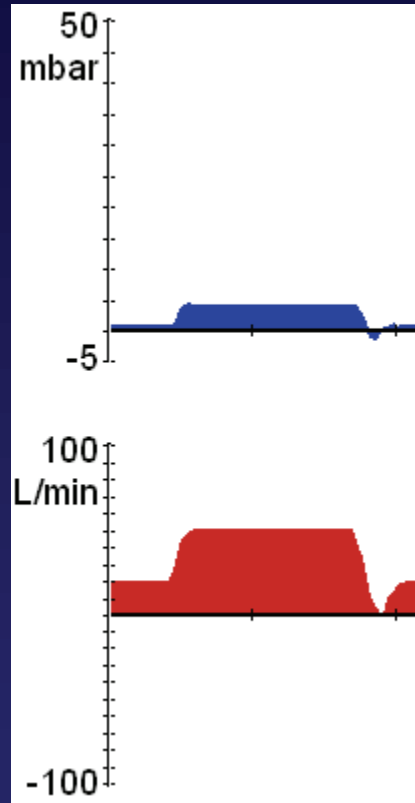
Consigne en débit

# Monitorage expiratoire



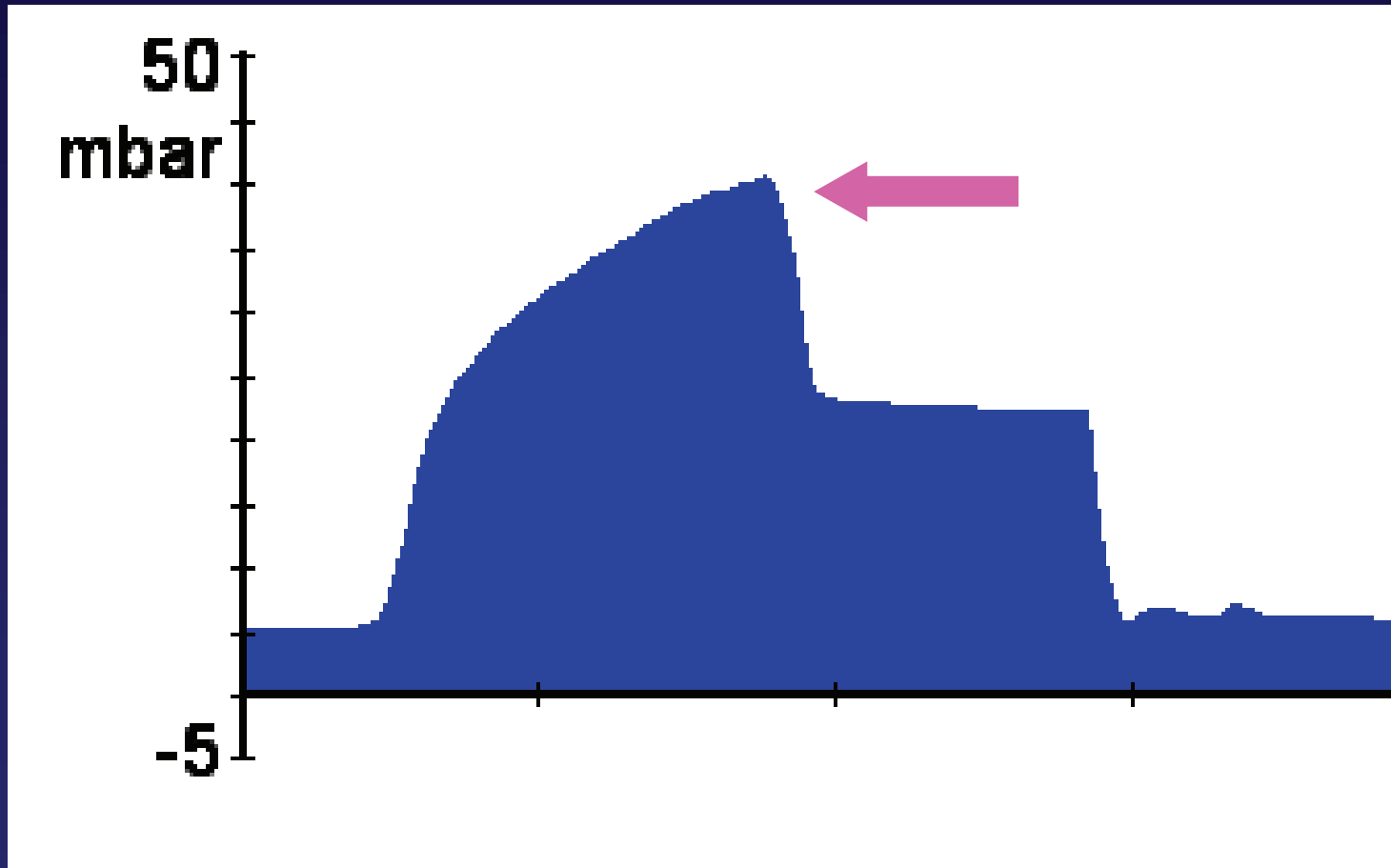
# VC

## Construction de la courbe



VC

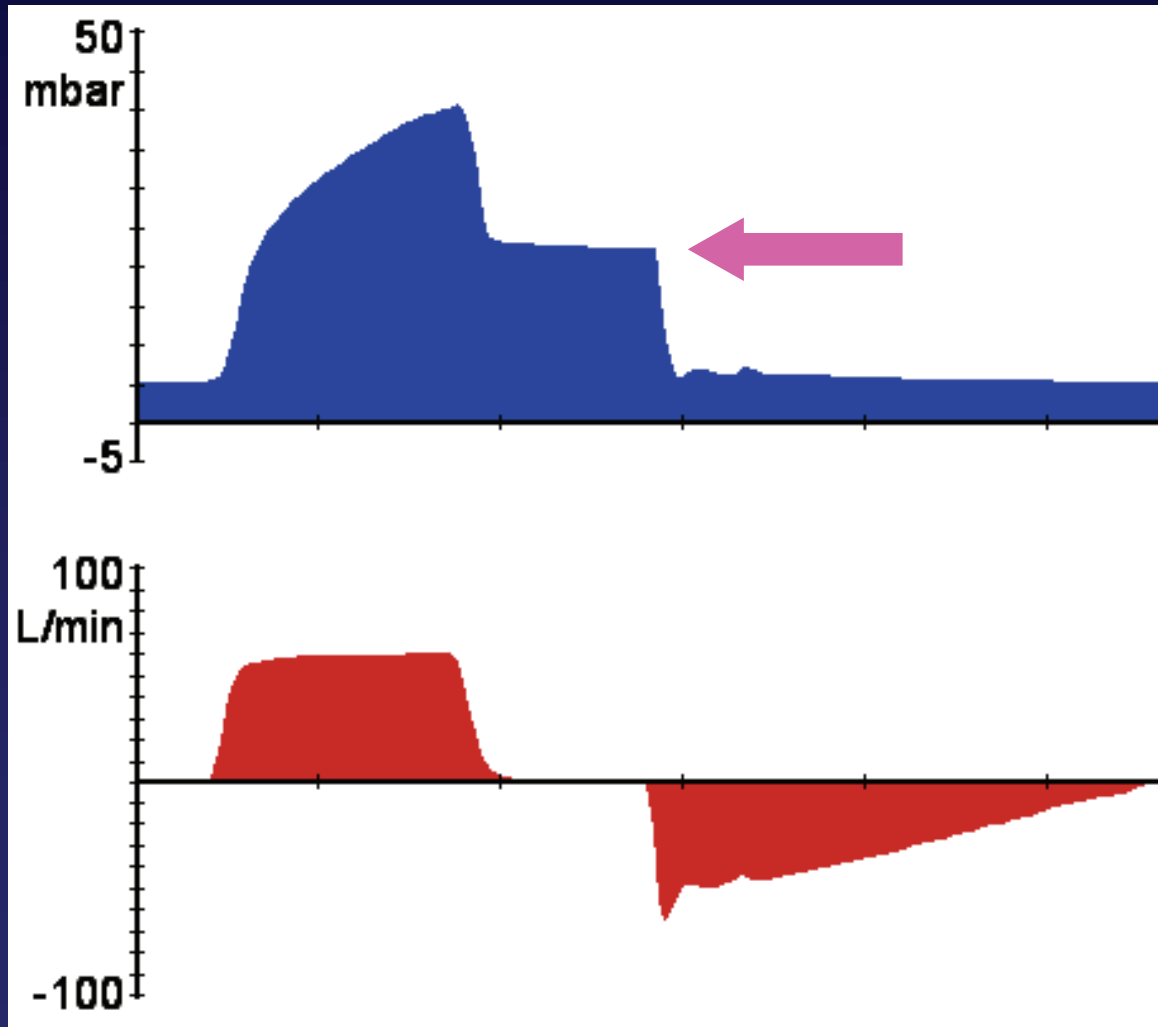
Pression de pic



$$P_{pic} = PEEP_t + P_{él} + P_{res}$$

VC

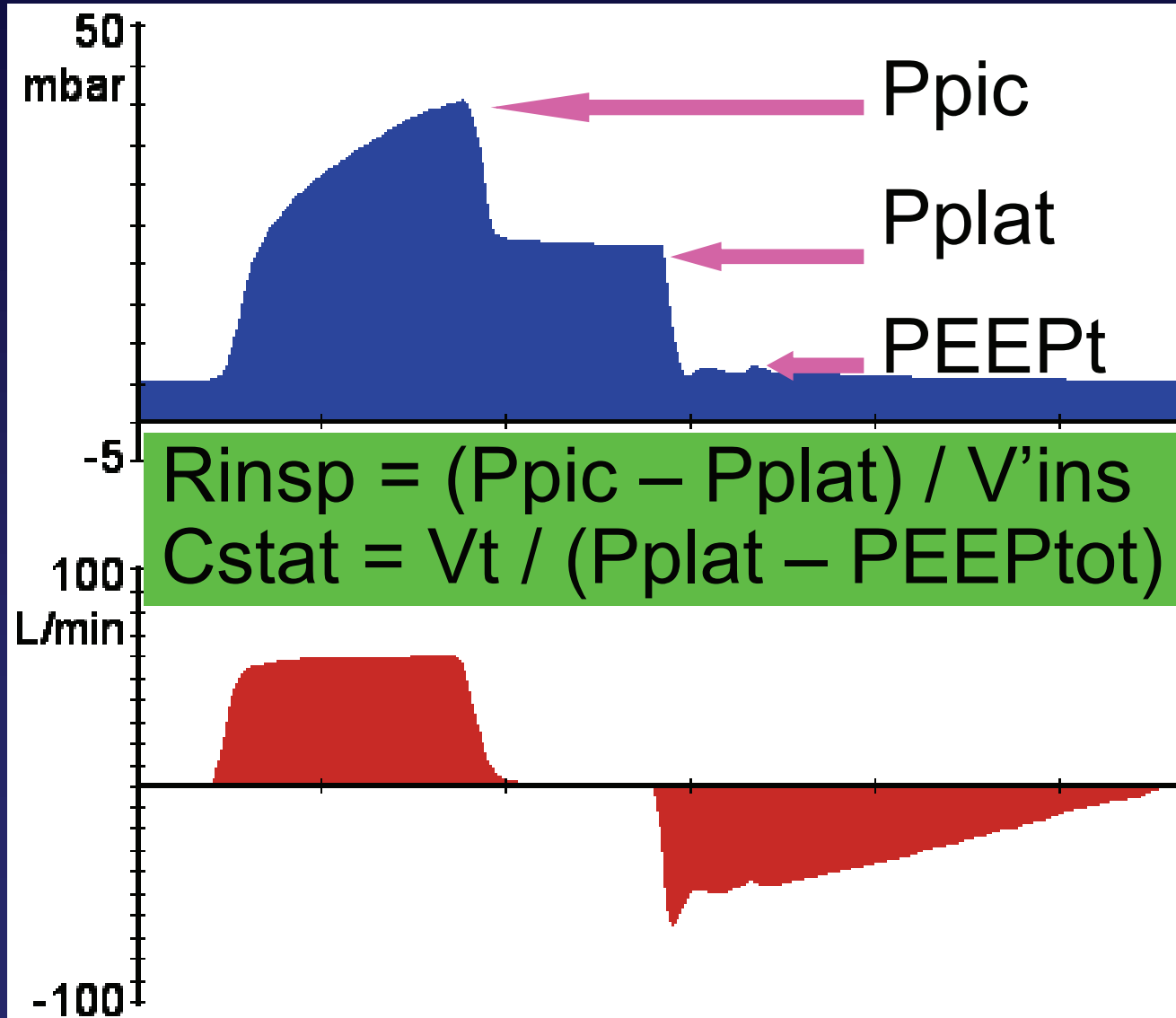
# Pression de plateau



$$P_{\text{pause}} \approx P_{\text{occlteleinsp}} = PEEP_t + P_{\text{él}}$$

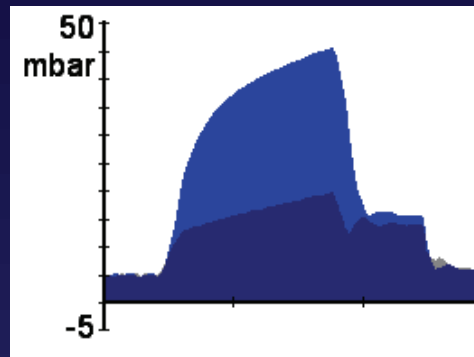
# VC

## Mécanique ventilatoire



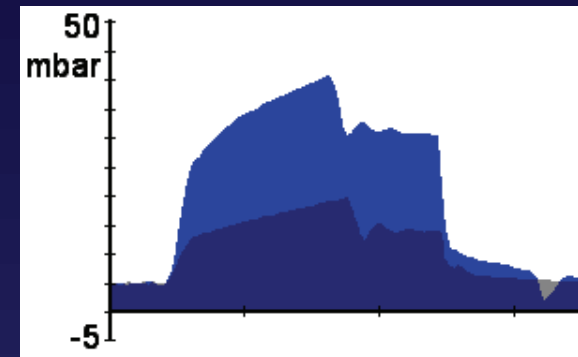
# VC

## Démarche diagnostique



↑ P<sub>pic</sub>

Mesure P<sub>plat</sub>



Normale

Elevée

Mesure PEEP<sub>t</sub>

Normale

Elevée

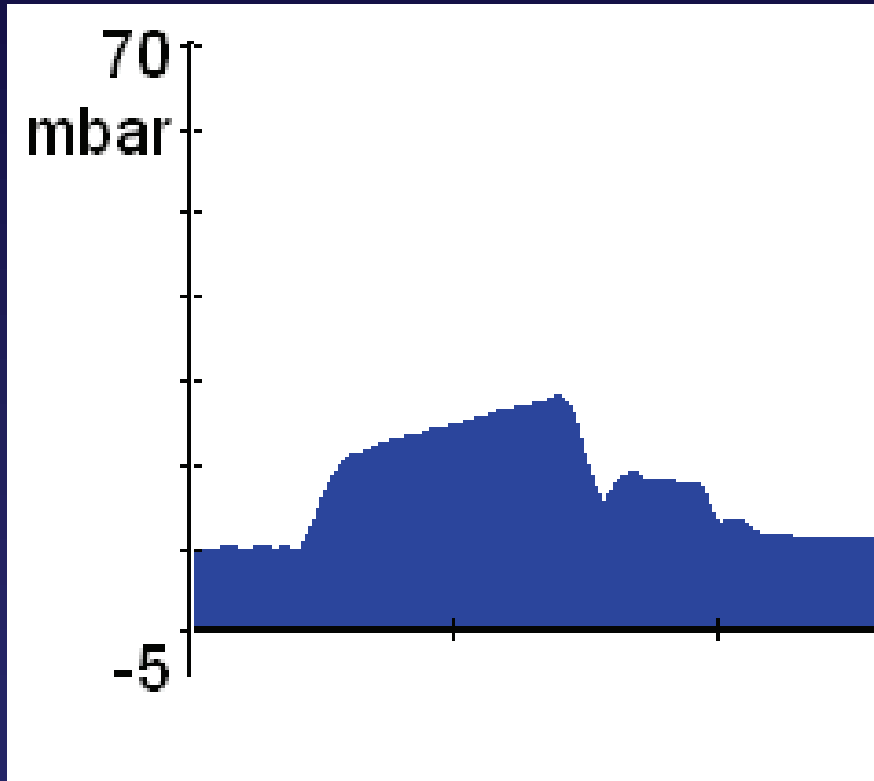
↑ Résistances

↓ Compliance

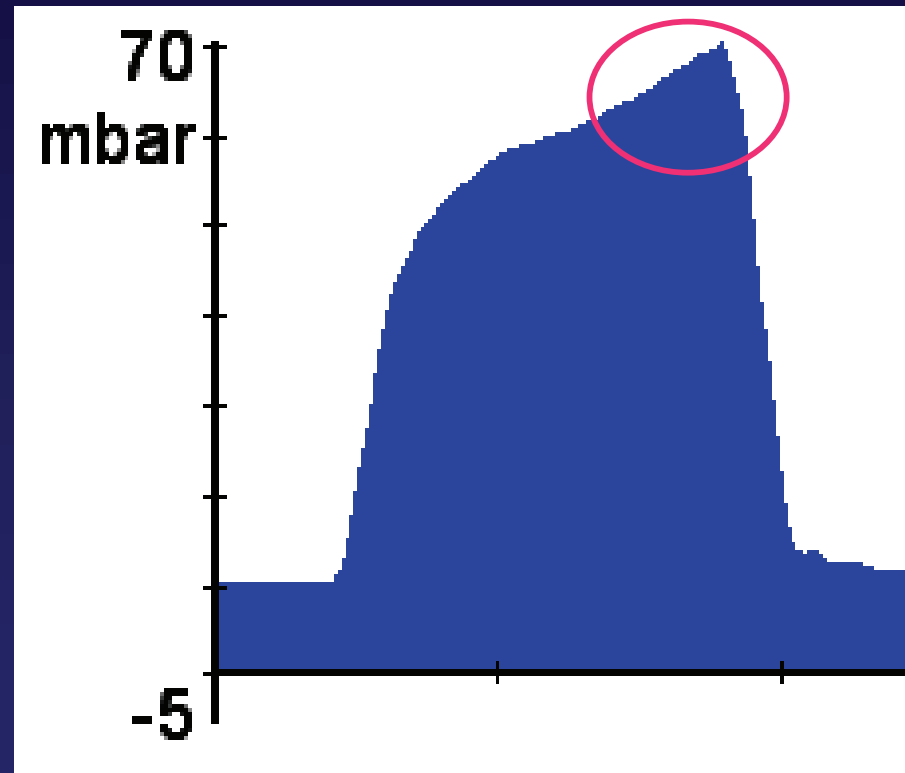
Hyperinflation  
dynamique



# VC Surdistension

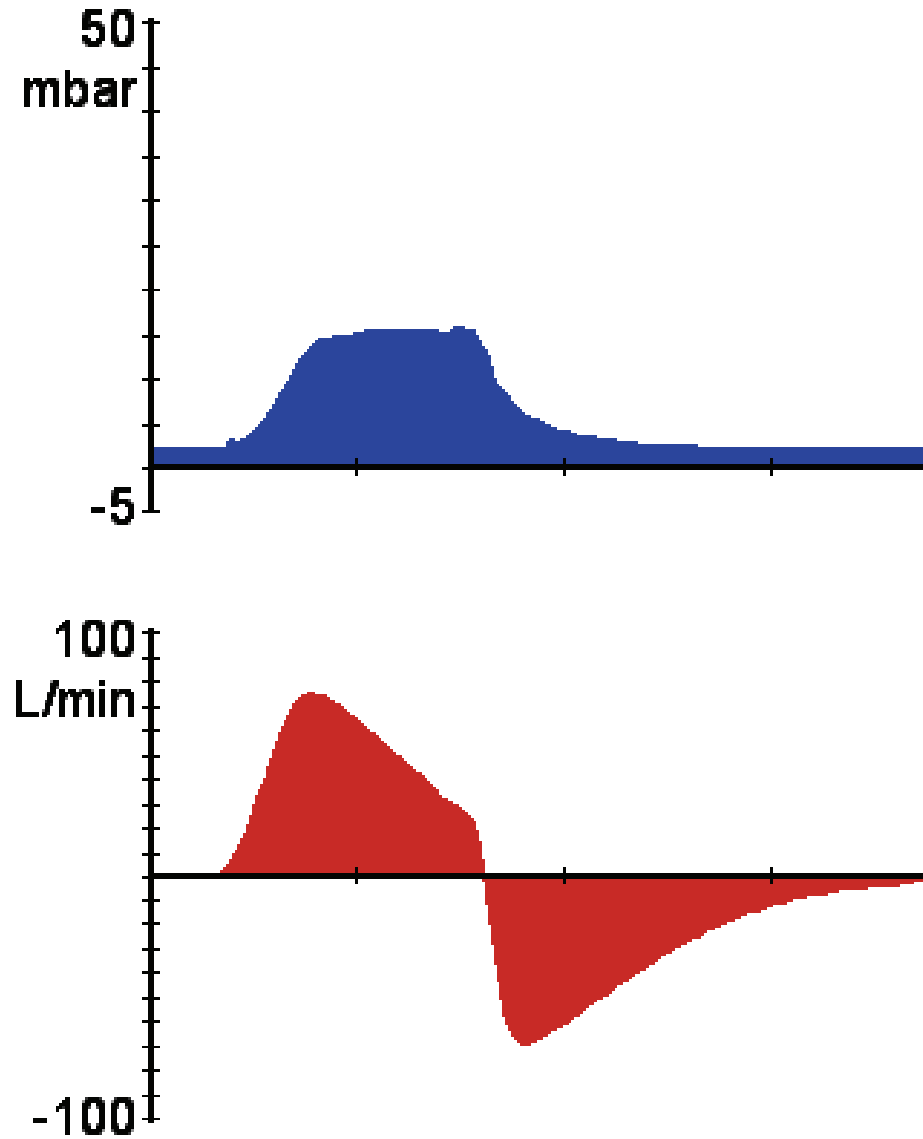


Normal



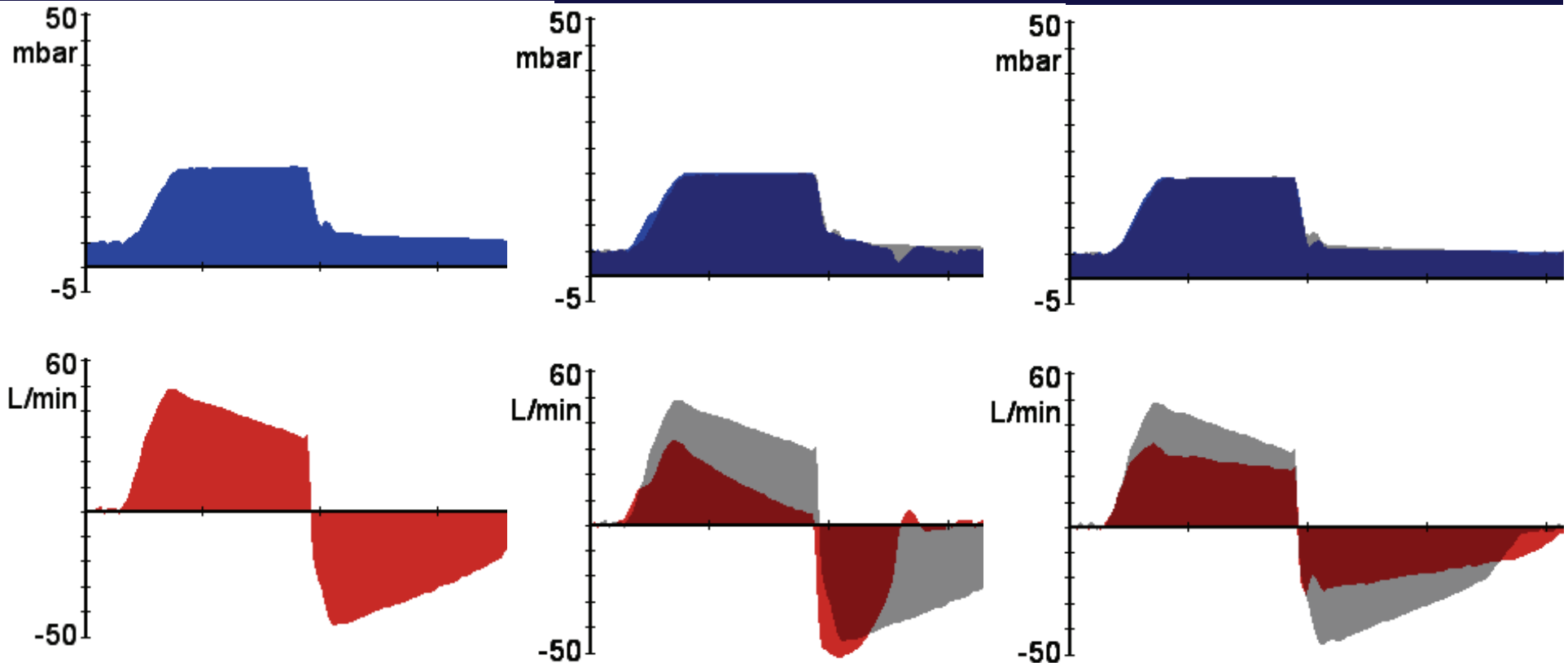
Surdistension

# PC



# PC

## Modification de la mécanique ventilatoire



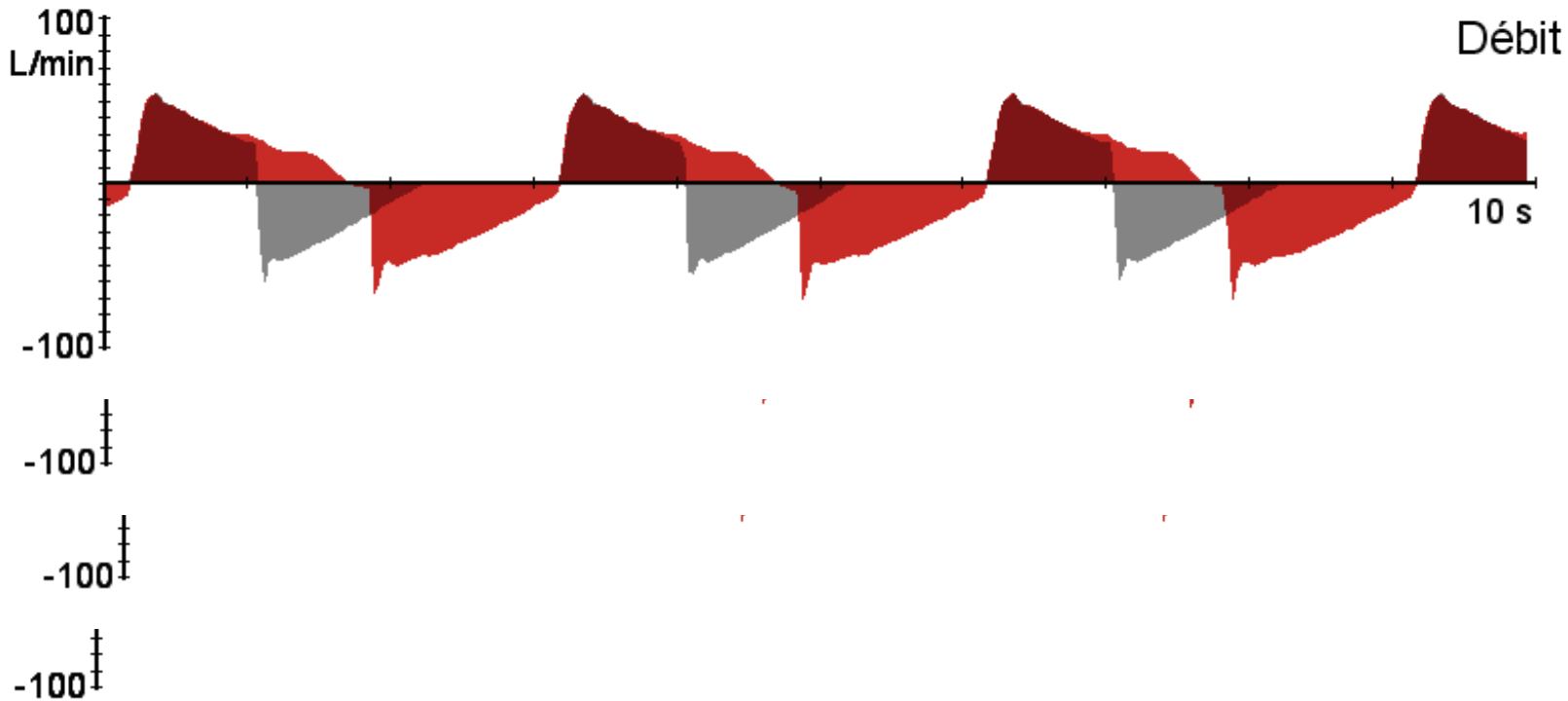
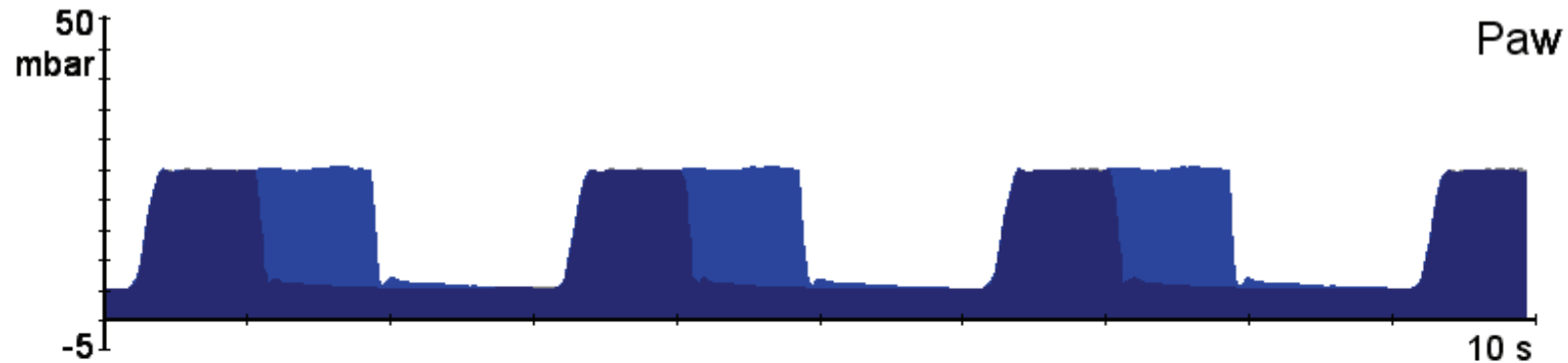
Normal

Compliance  
diminuée

Résistances  
augmentées

# PC

## Recherche du Ti optimal



BIPAF

Pcrête

26

Pmoy

15

Vte

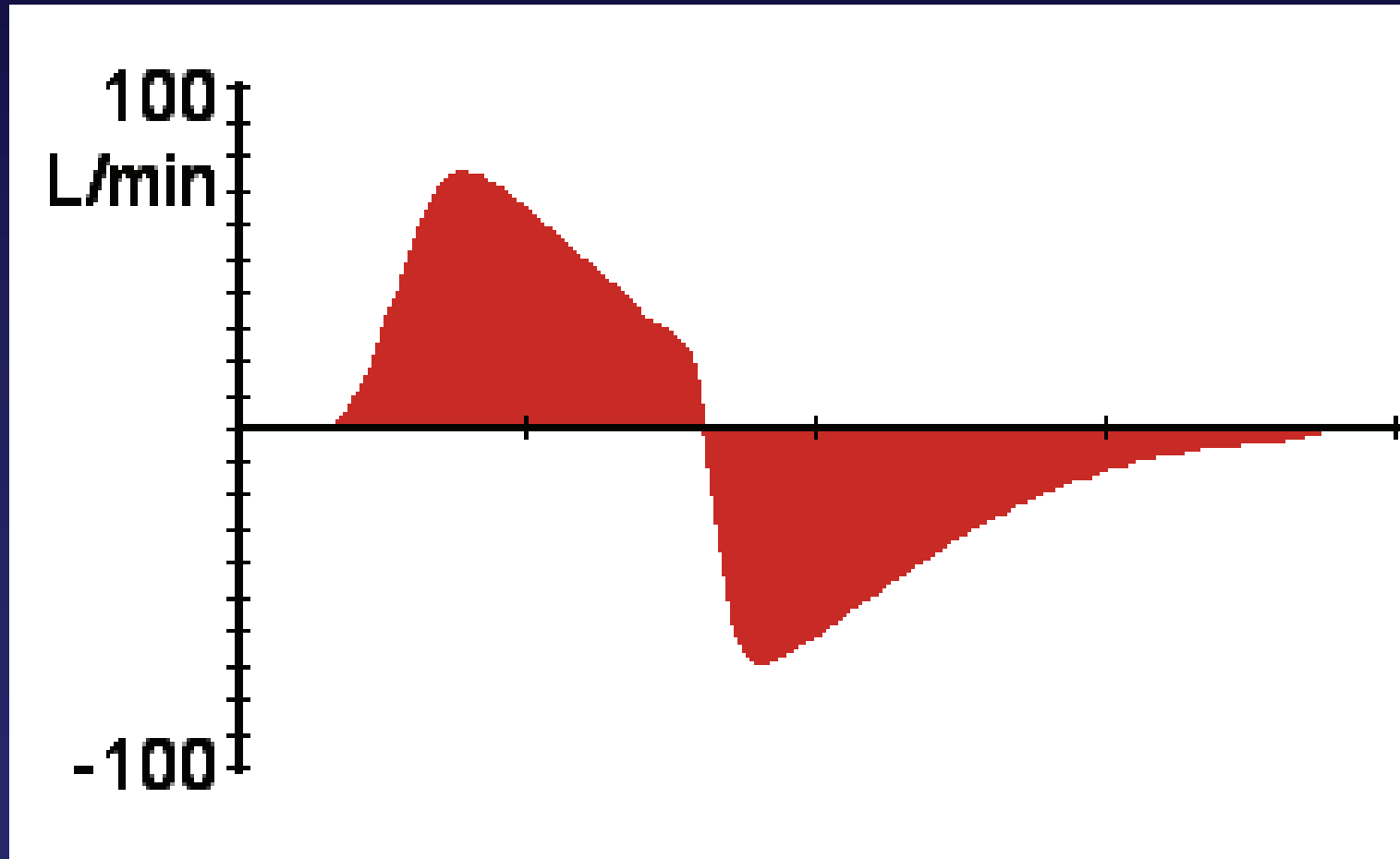
0,71

0,69

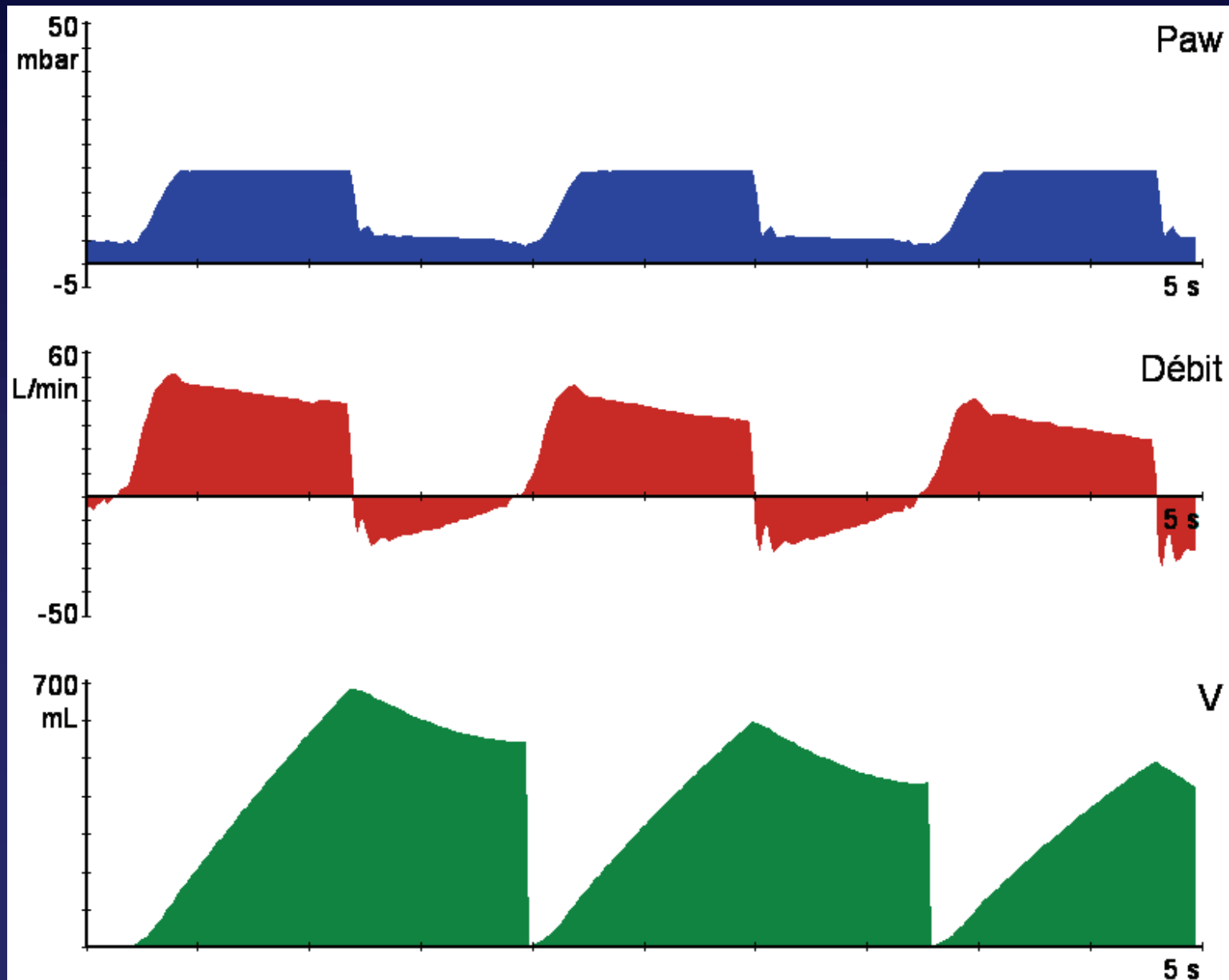
0,63

0,52

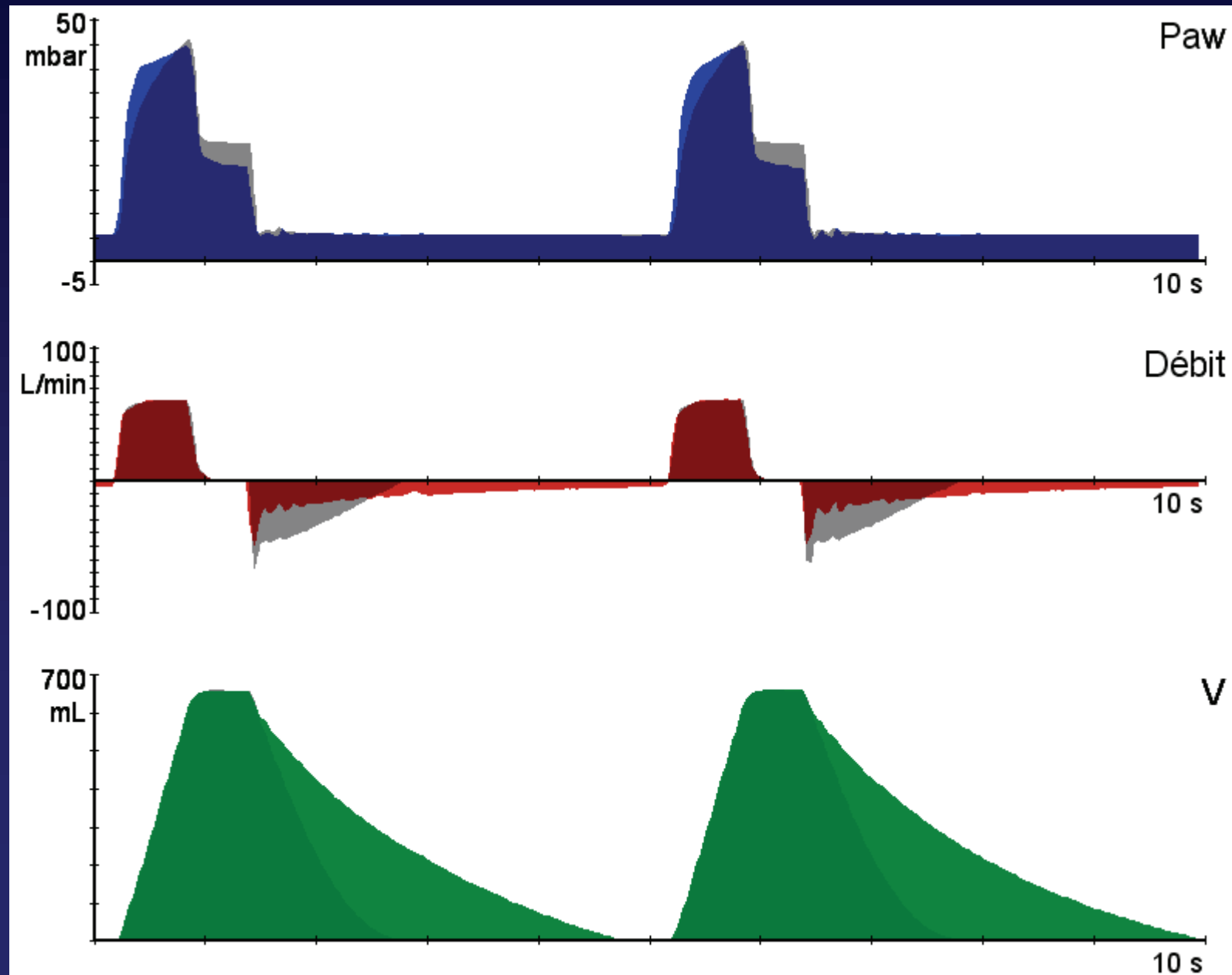
# Expiration passive



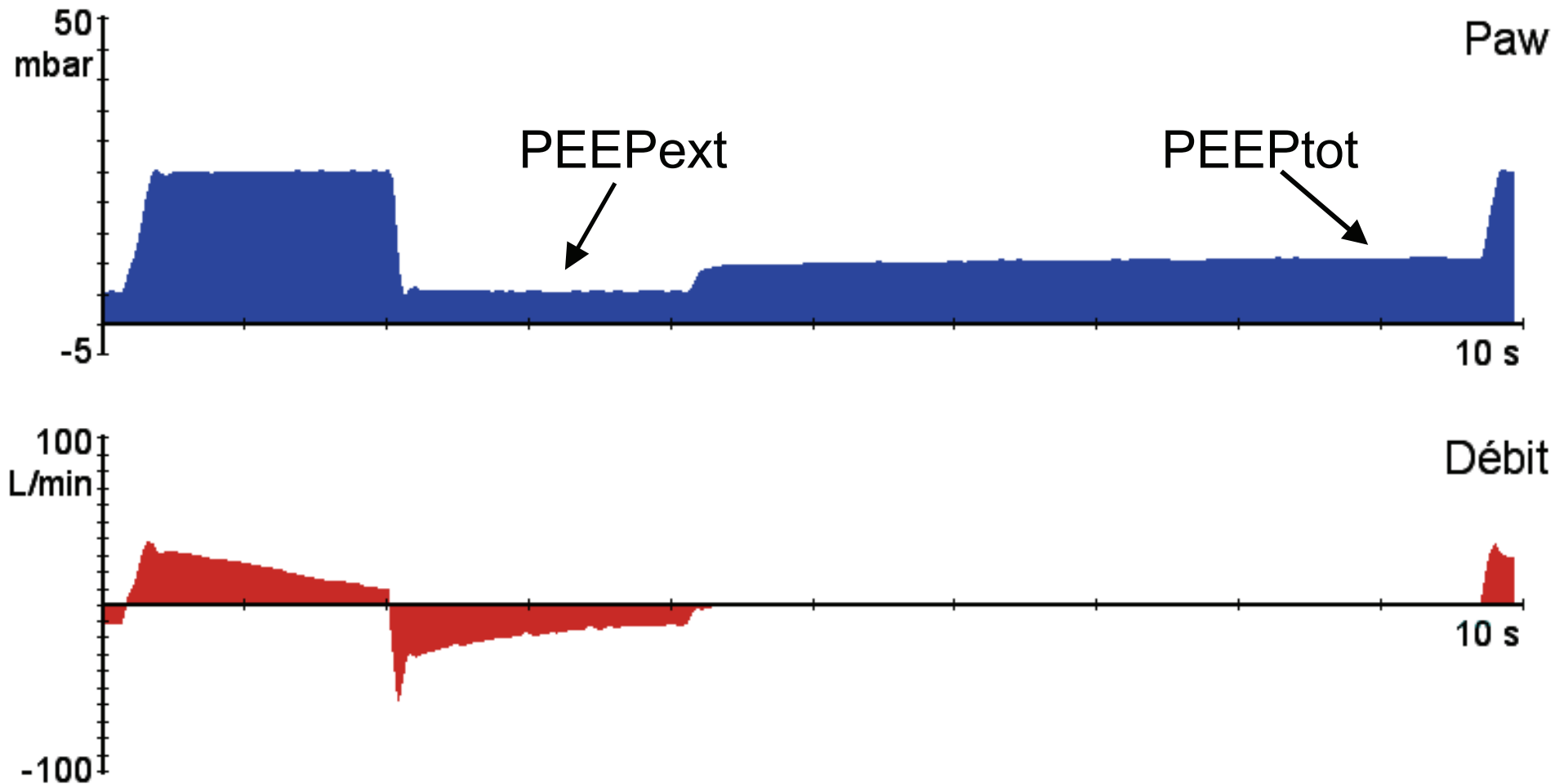
# Détection des fuites



# Hyperinflation dynamique

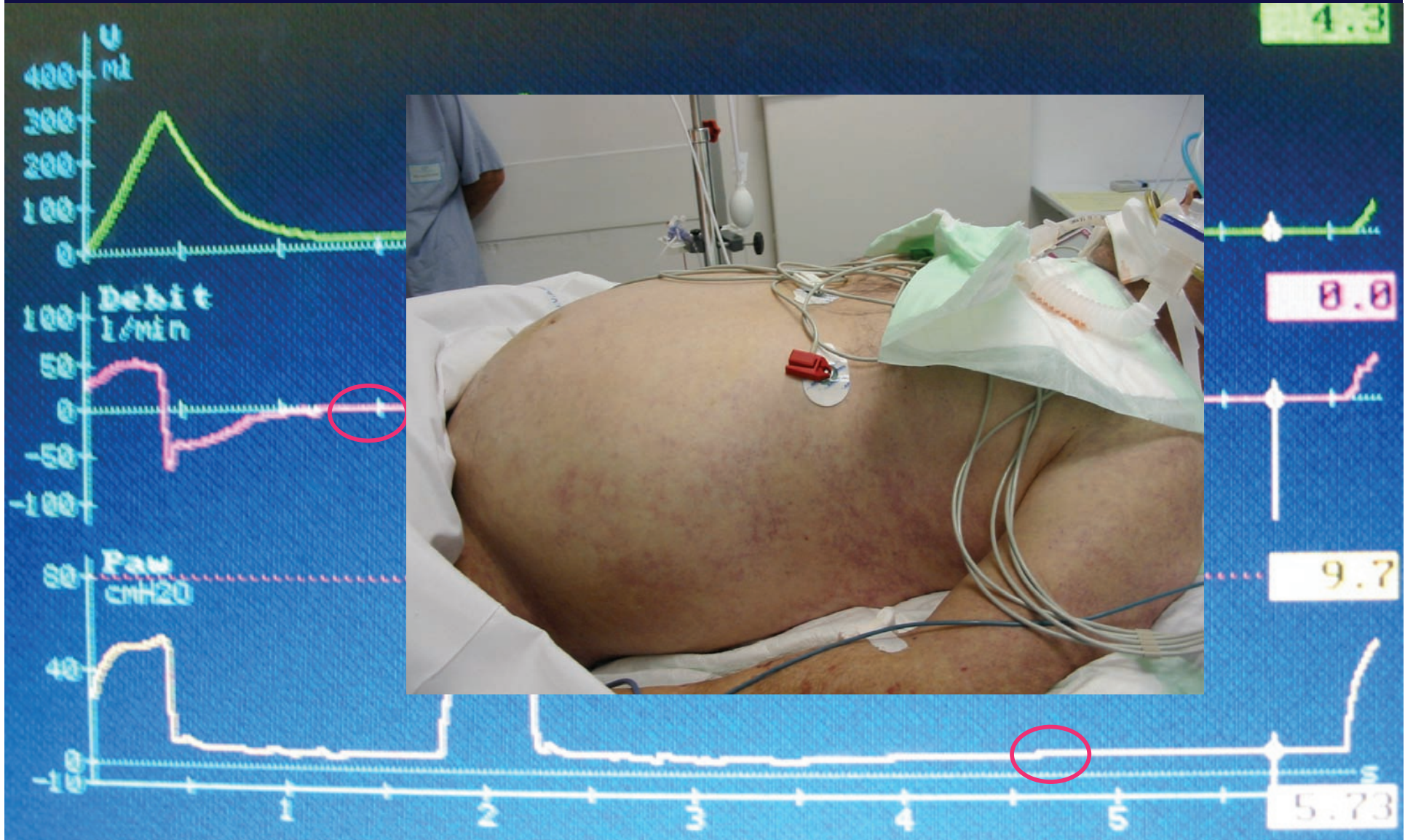


# Mesure de la PEEP intrinsèque



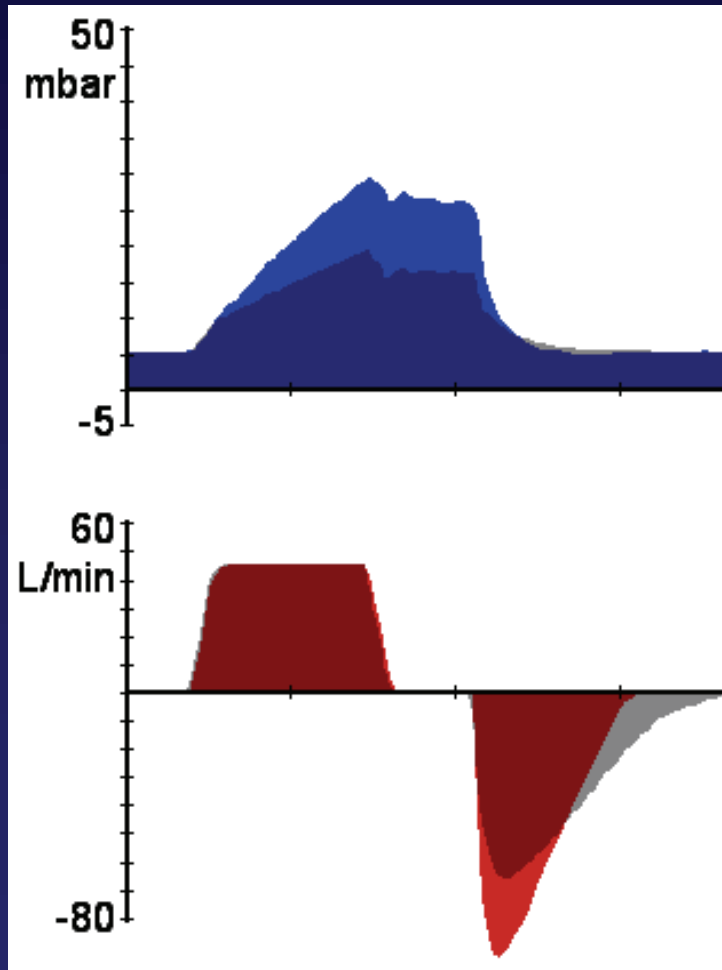
$$PEEP_i = PEEP_{tot} - PEEP_{ext}$$

# PEEPi sans hyperinflation dynamique

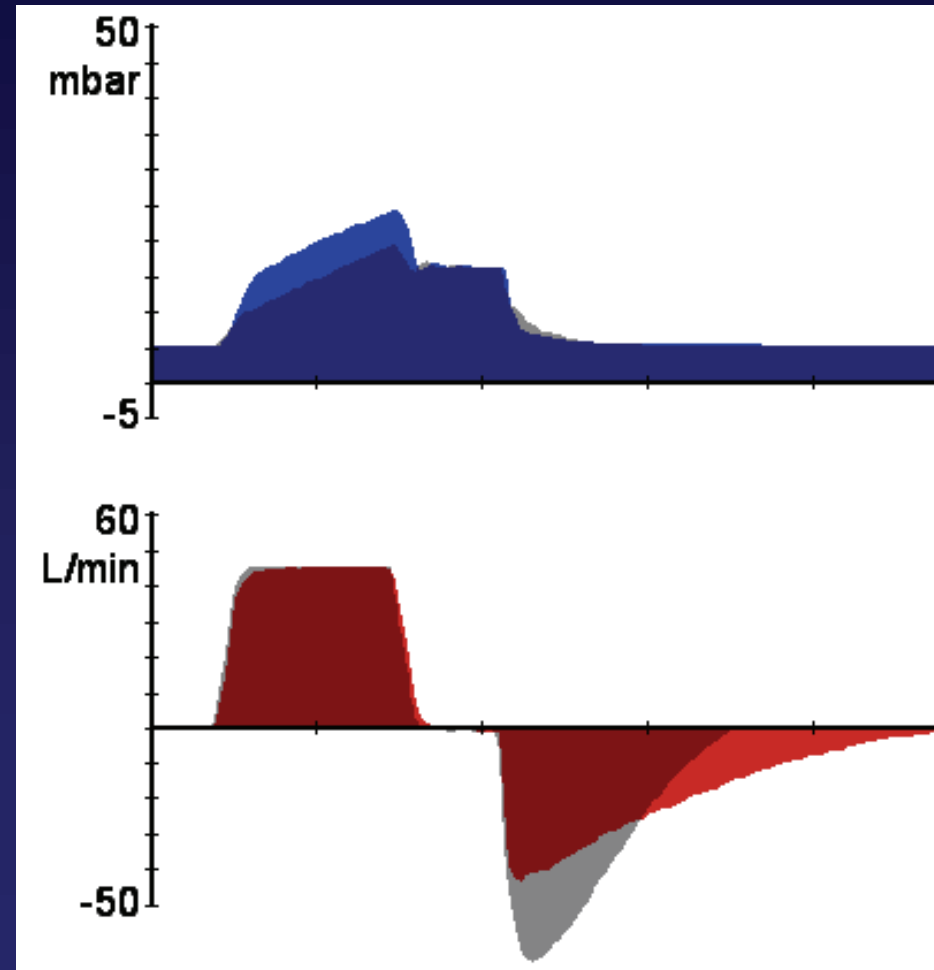


# Expiration passive

## Modification de la mécanique ventilatoire

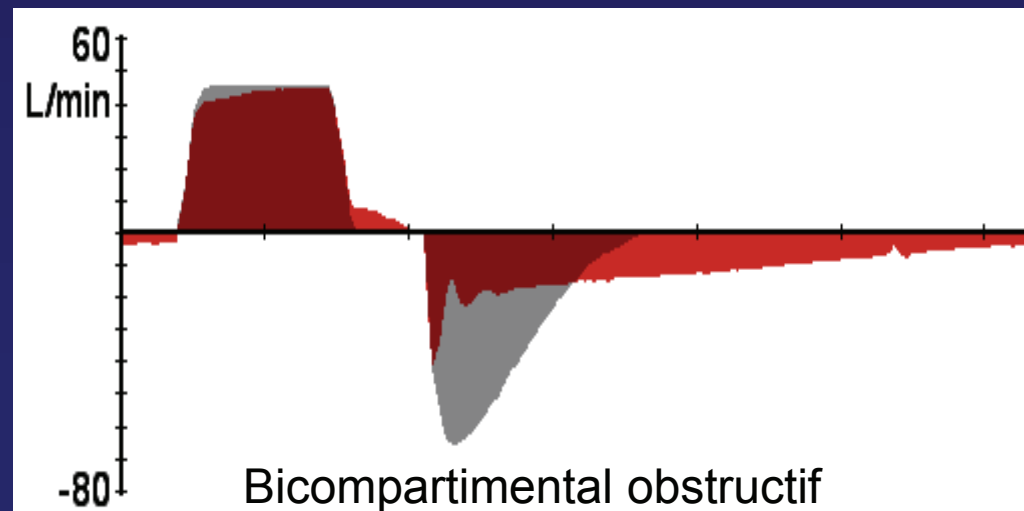
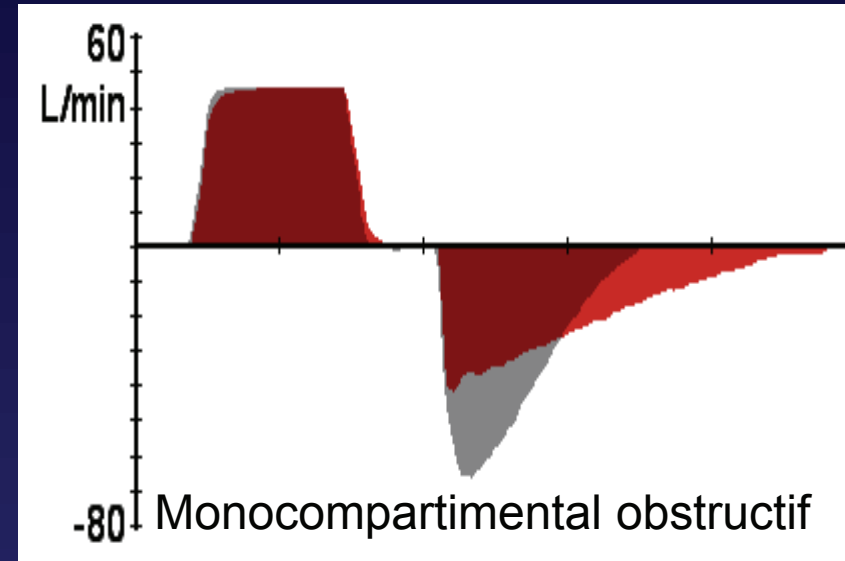
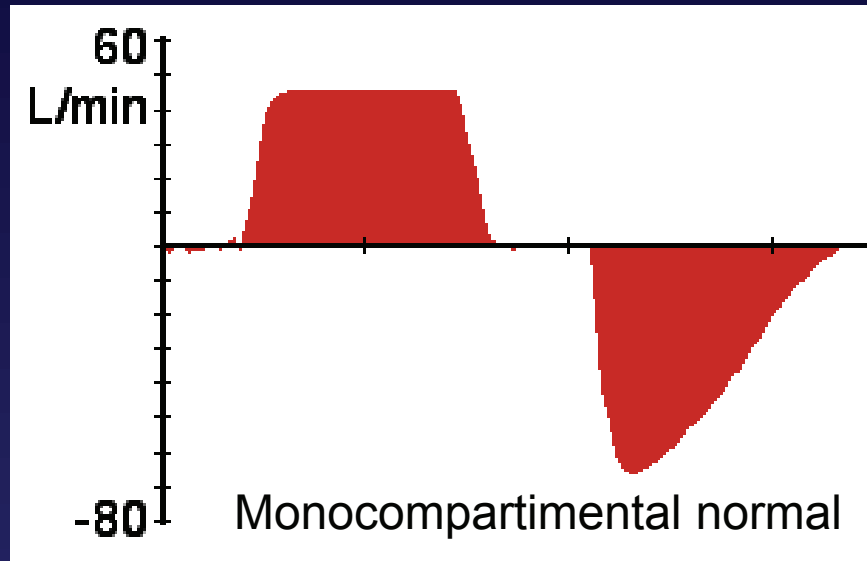


Compliance  
diminuée

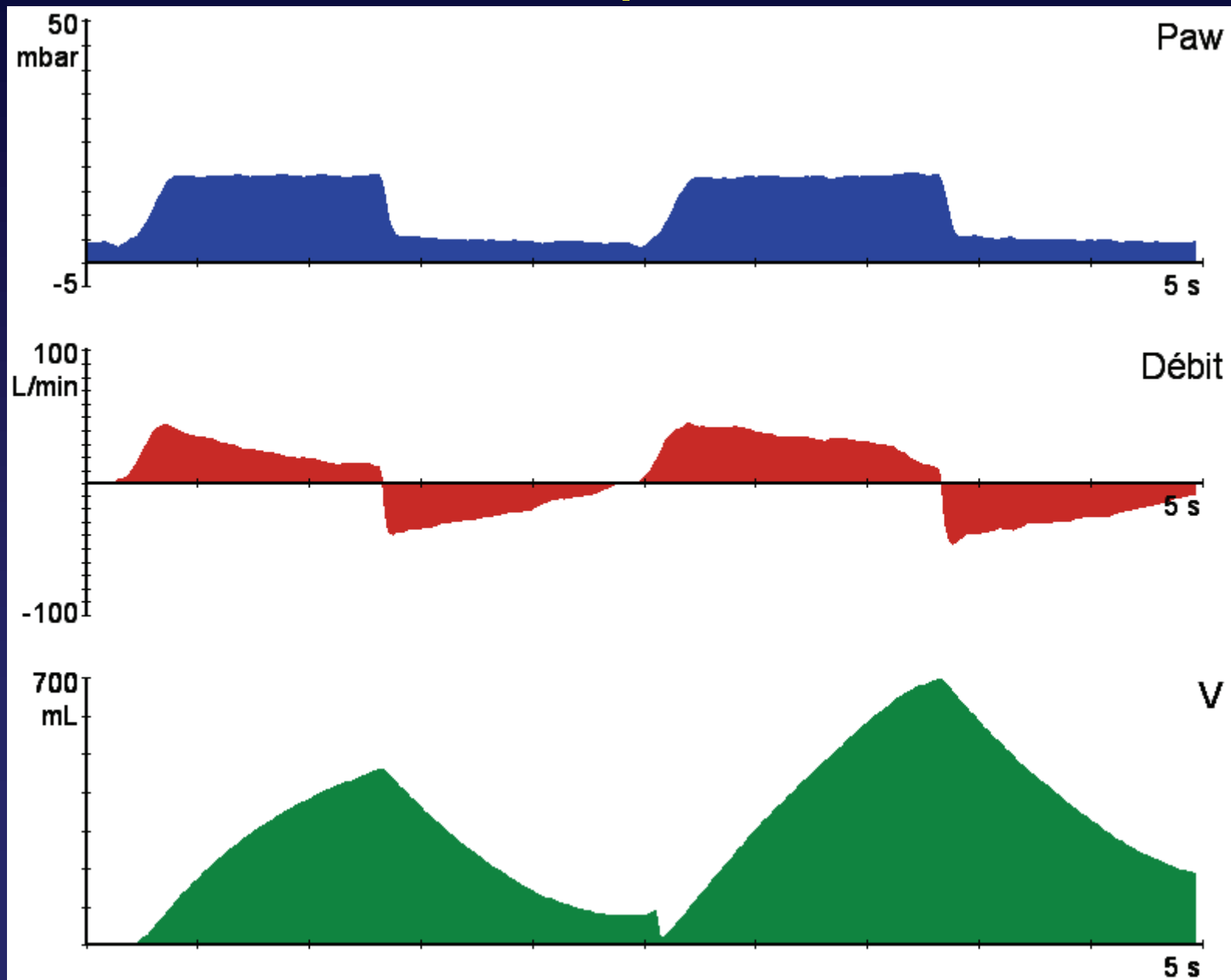


Résistances  
augmentées

# Analyse du modèle expiratoire

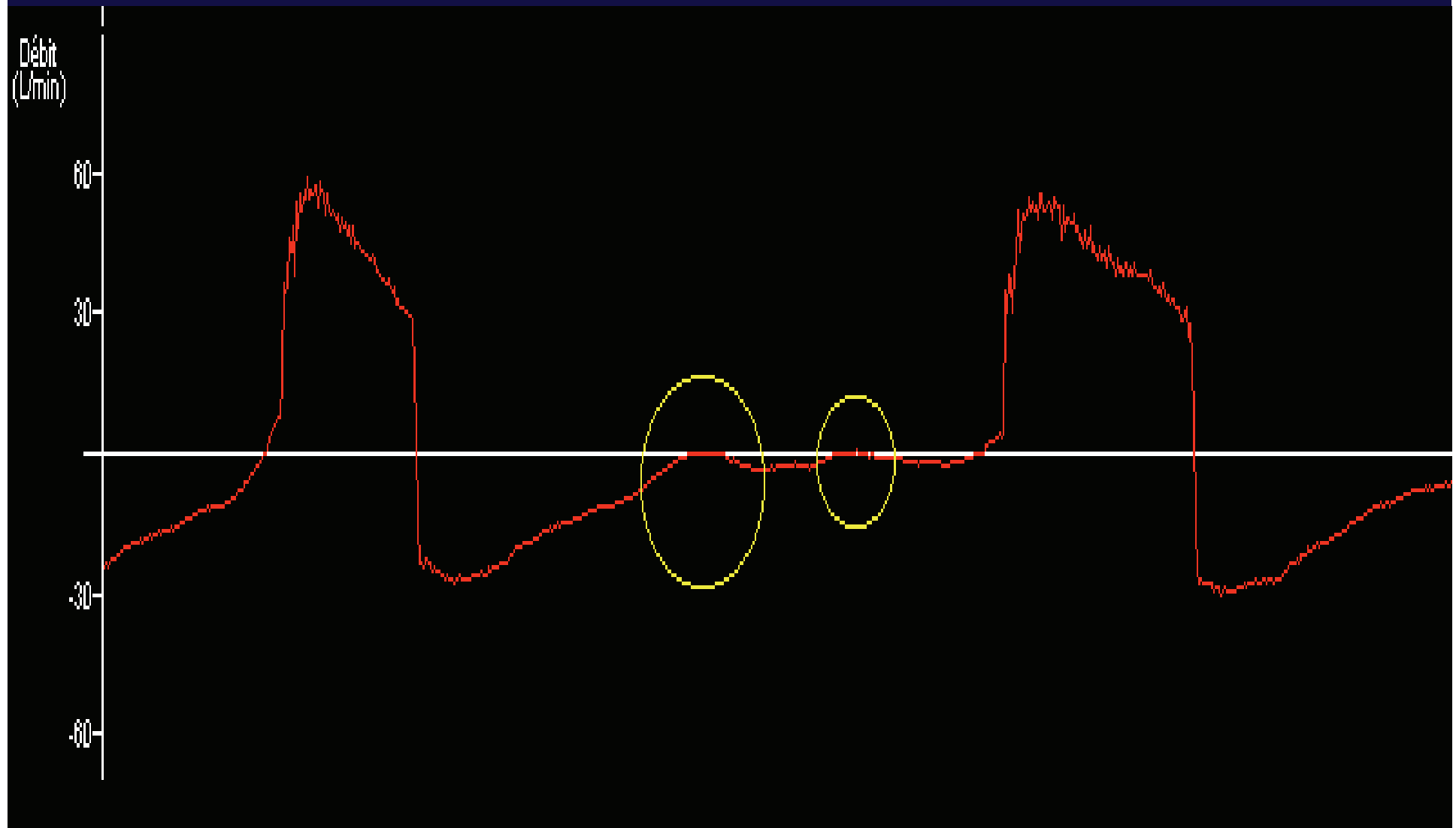


# Aide inspiratoire

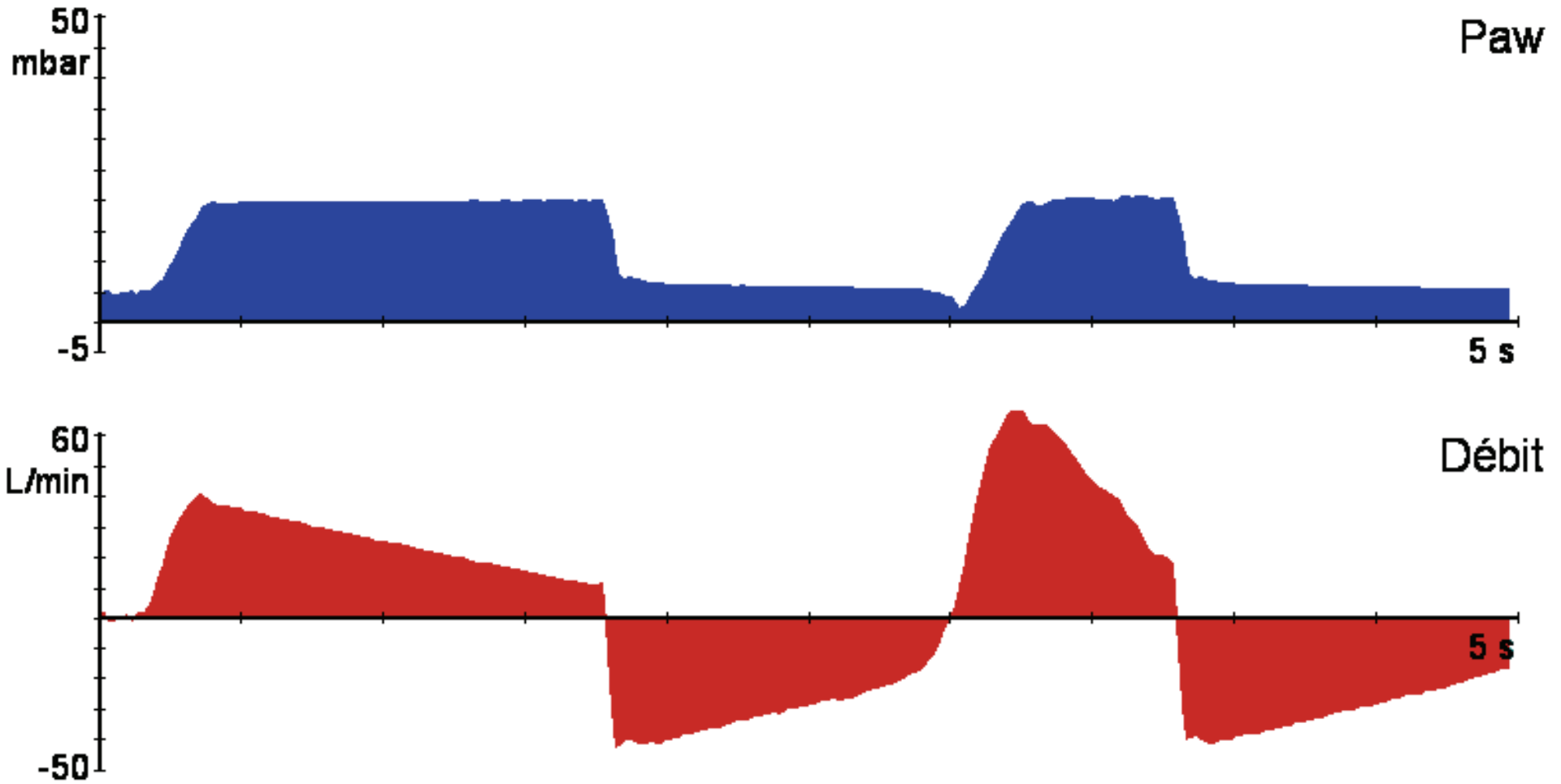


# Aide inspiratoire

## Efforts inspiratoires inefficaces



# Aide inspiratoire Autodéclenchement

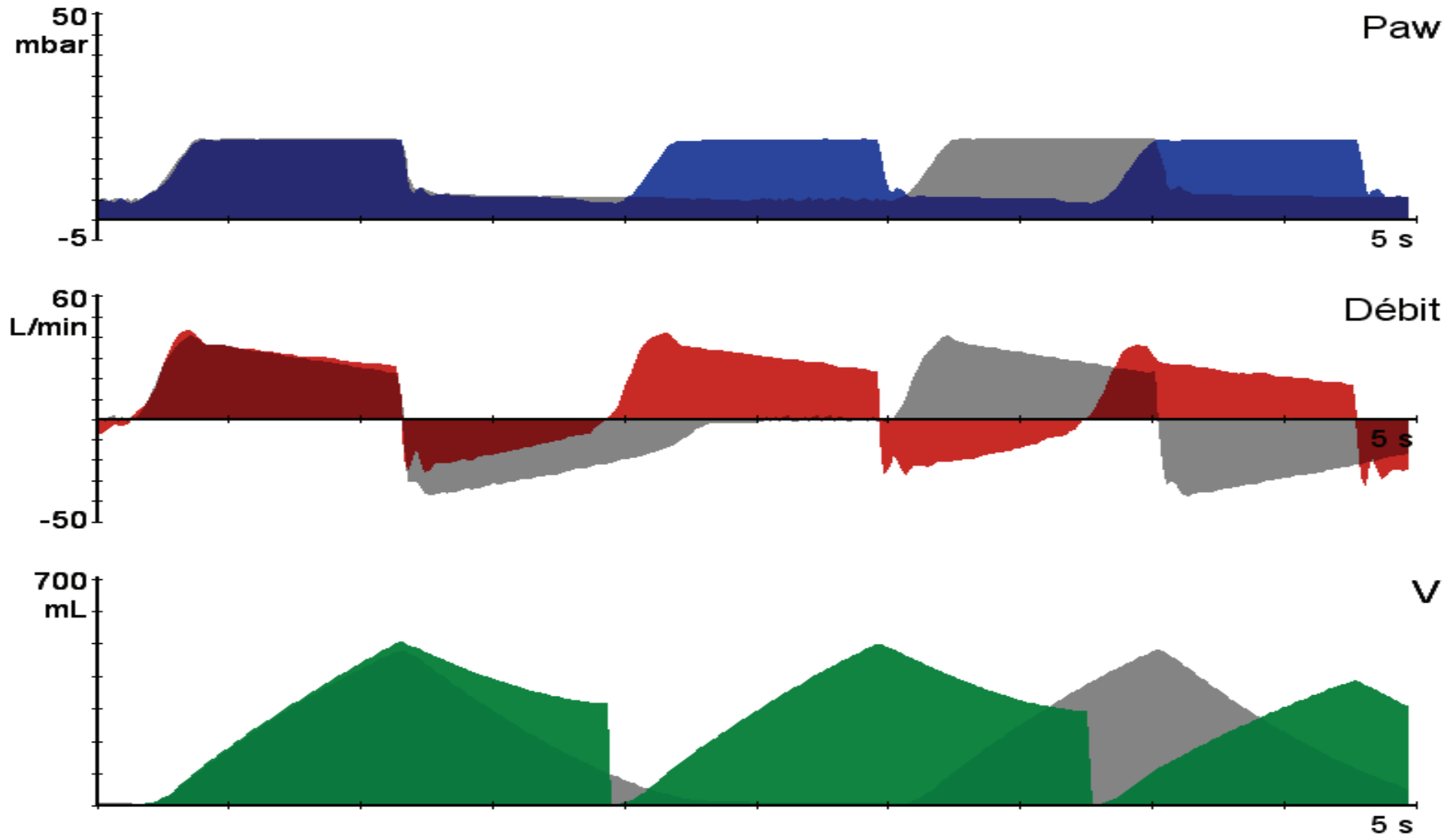


# Aide inspiratoire Trigger expiratoire



# Aide inspiratoire en VNI

## Analyse des fuites





## Conclusions

- Observer la courbe de la variable dépendante à l'inspiration
- Observer la courbe de débit à l'expiration
- Confronter les informations insp/exp pour caractériser le modèle mécanique
- Mesurer la  $P_{plat}$  chez les ALI/SDRA
- Mesurer la  $PEEP_i$  chez les obstructifs

Merci...