



KLINIKA
ANESTEZIOLOGIE
A RESUSCITACE

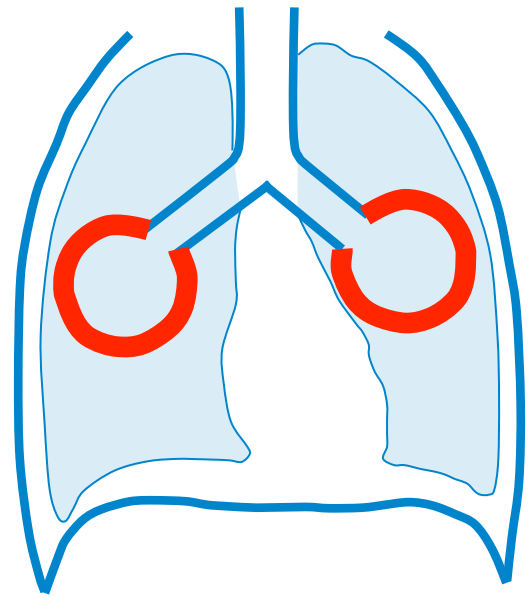
3. LF UK a FNKV

UPV u pacienta s bronchiální obstrukcí

Petr Waldauf
KAR FNKV

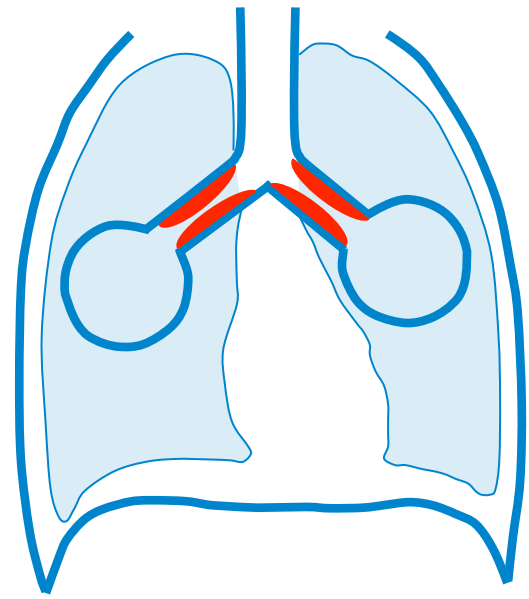
Onemocnění respiračního systému

Restriktivní onemocnění



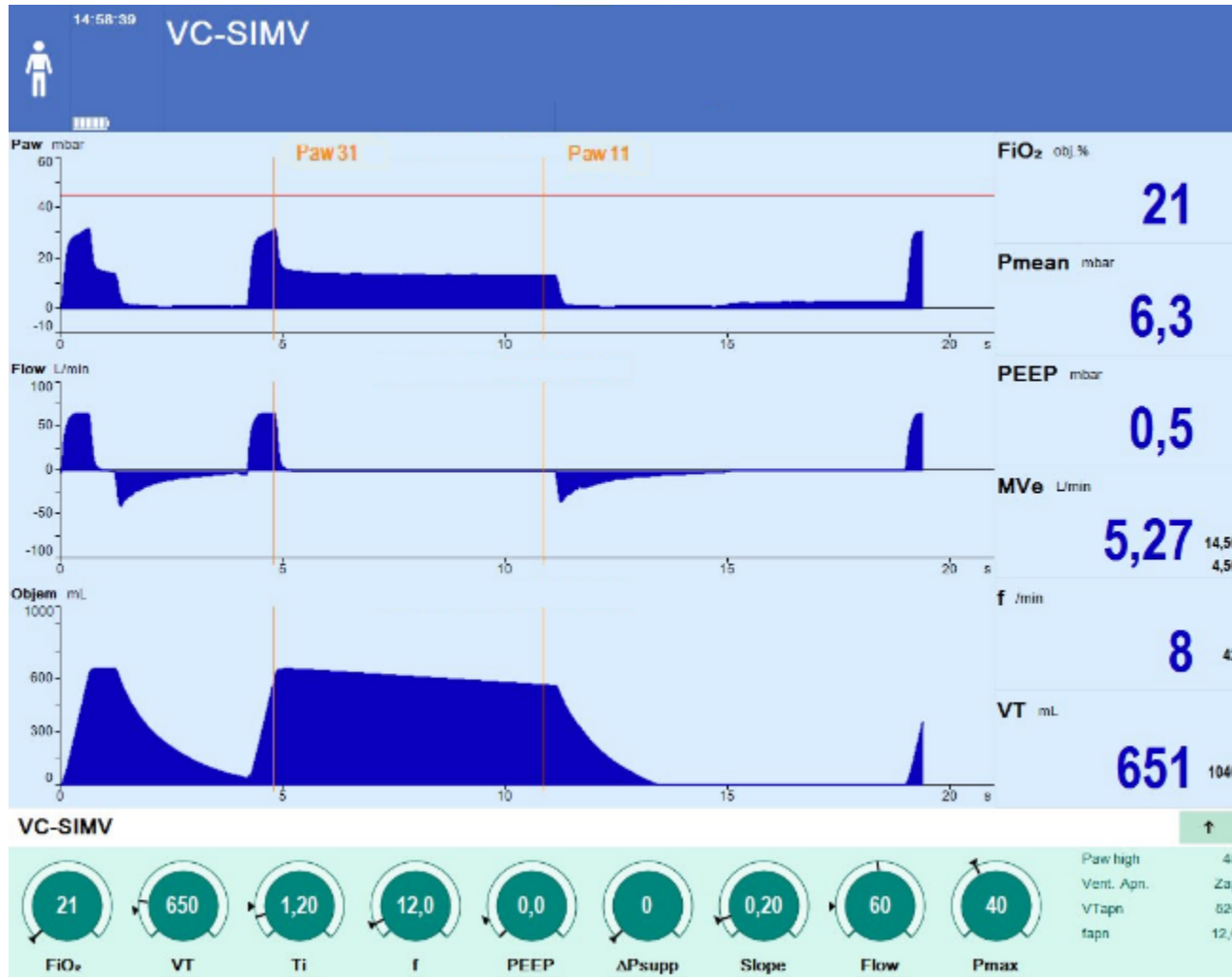
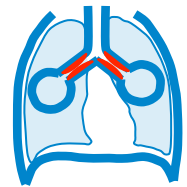
↓ C
ARDS

Obstruktivní onemocnění



↑ R (↑ C)
COPD/Asthma

Jaká je rezistence u tohoto pacienta?



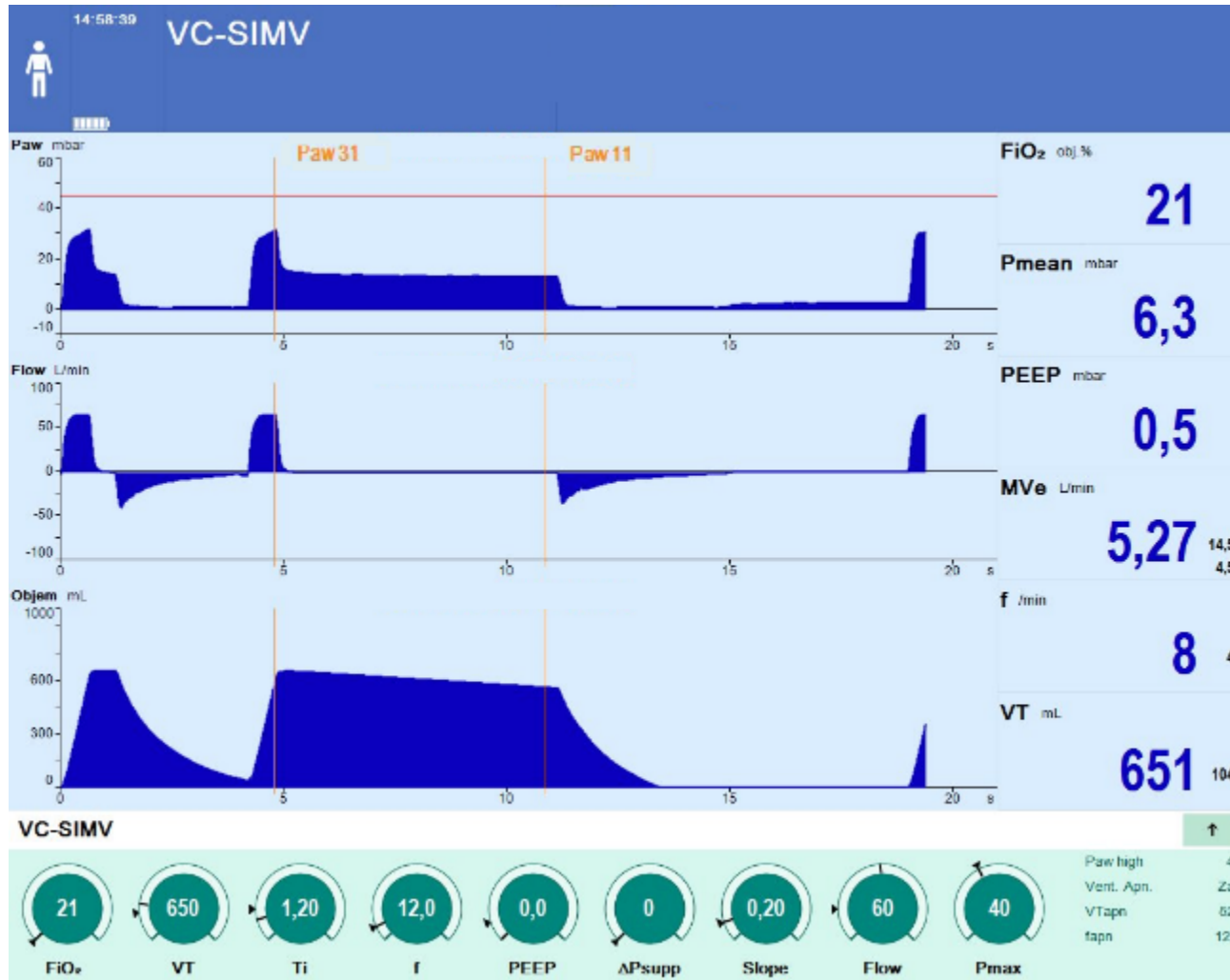
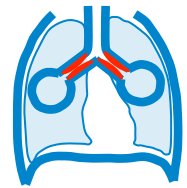
A: 20 mbar/L/s

B: 10 mbar/L/s

C: 30 mbar/L/s

D: 15 mbar/L/s

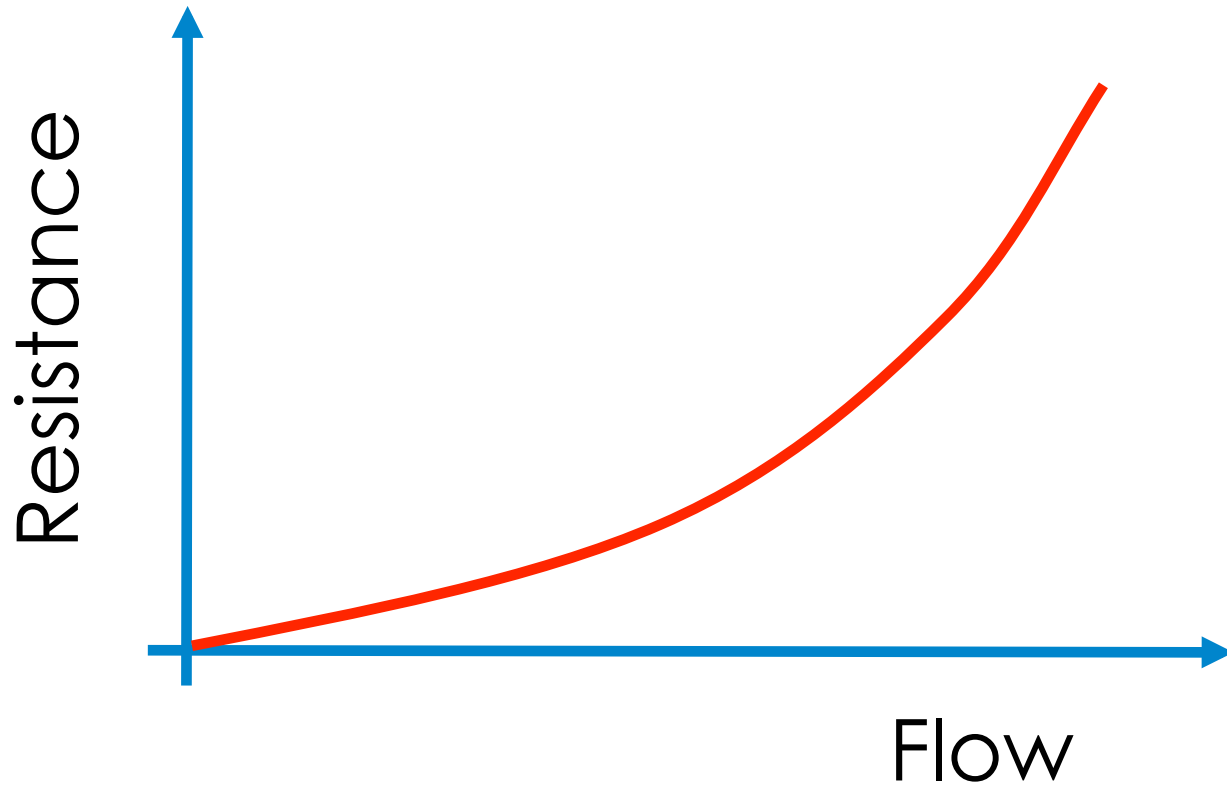
Jaká je rezistence u tohoto pacienta?



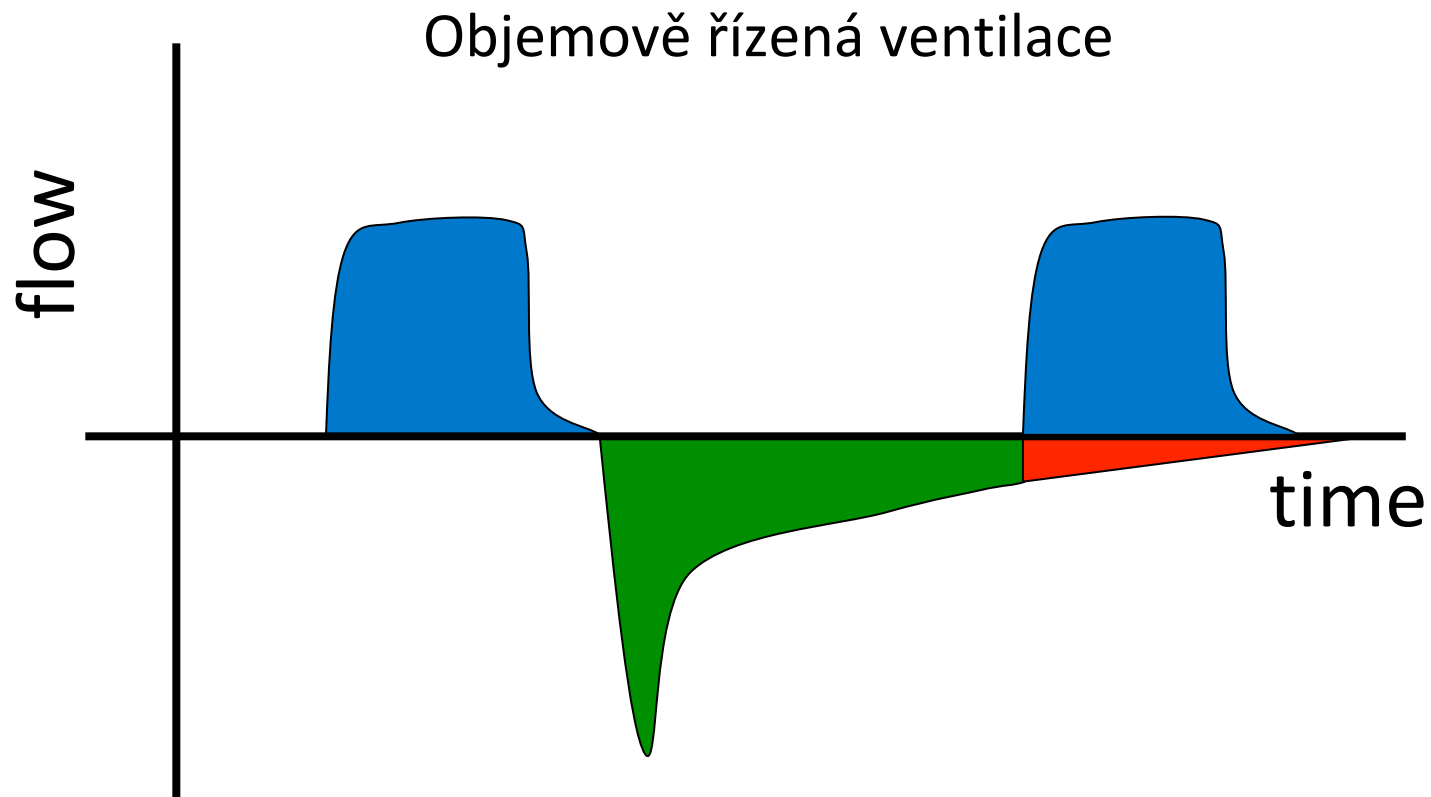
$$R = \frac{PIP - Pplat}{flow} [L/s]$$

$$\begin{aligned} &= (31 - 11) / 60 \text{ L/min} / 60(s) \\ &= 20 / 1 \\ &= 20 \text{ mbar/L/s} \end{aligned}$$

Exponenciální vztah mezi R a Flow



Dynamická plicní hyperinflace



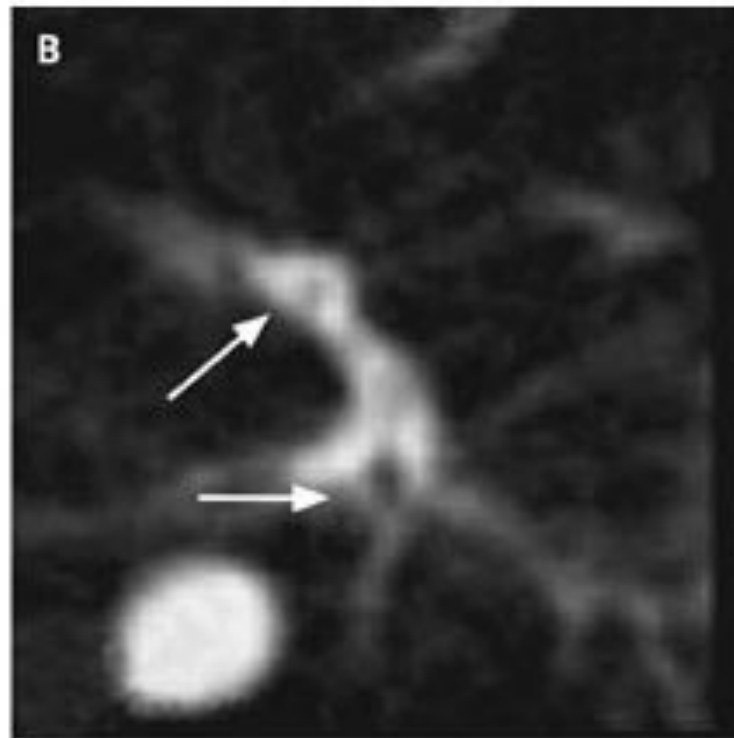
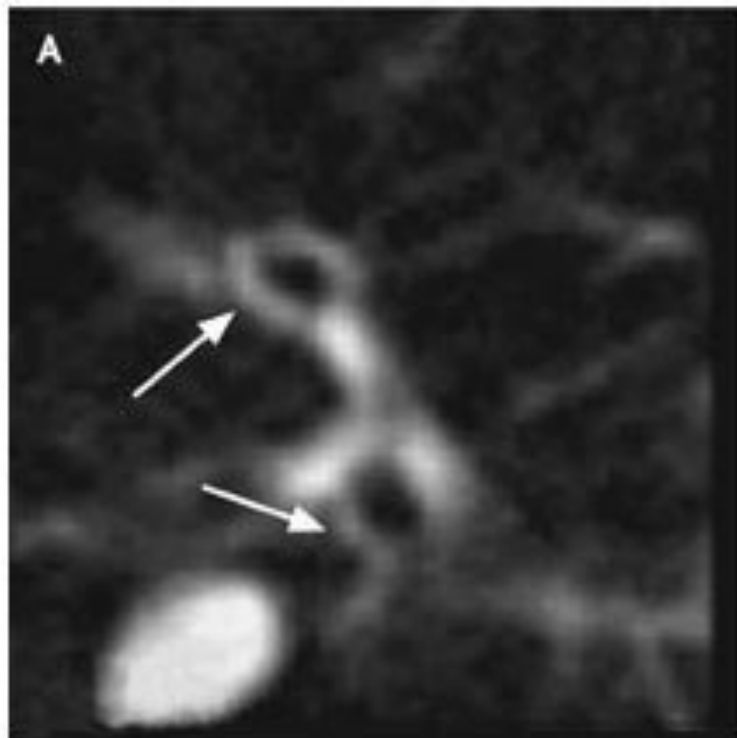
Dynamic Airway Narrowing



Hajime Kurosawa, M.D., and Masahiro Kohzuki,
M.D.

Nádech

Forsírovaný výdech



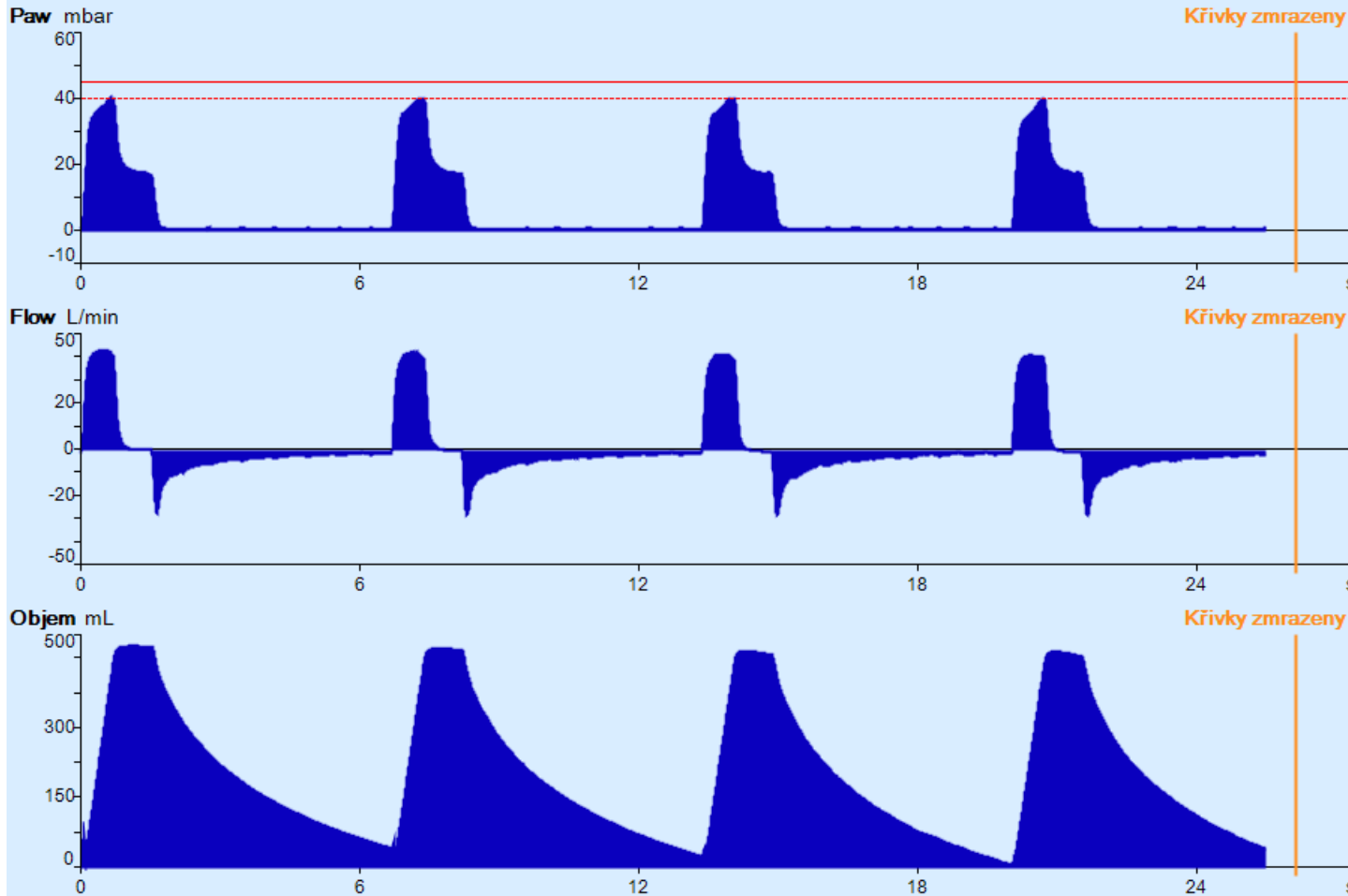
cca 3 mm brochioly

High-speed electron-beam CT

08:06:04

VC-SIMV

PS



Křivky zmrazeny

FiO₂ obj.%

65

Pmean mbar

6,4

PEEP mbar

0,5

MVe L/min

3,88

14,40
2,00

f /min

9

40

VT mL

464

1000

VC-SIMV



| | |
|-------------|------|
| Paw high | 45 |
| Vent. Aprn. | Zap |
| VTapn | 500 |
| fapn | 12,0 |

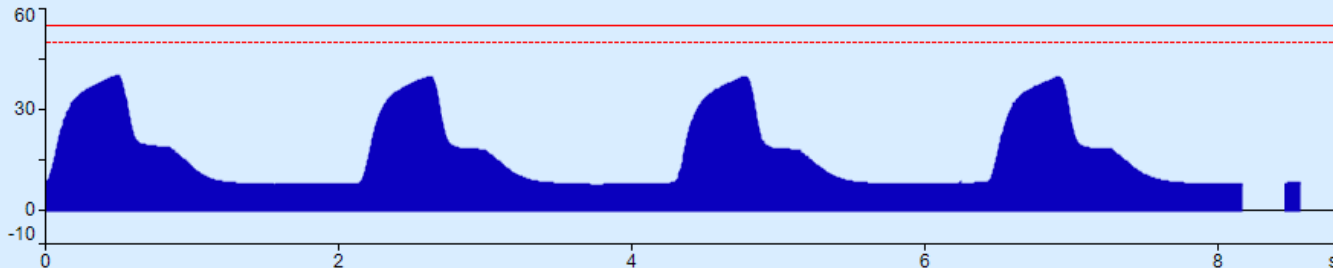
12:53:43

VC-MMV

PS



Paw mbar



FiO₂ Vol%

45

PIP mbar

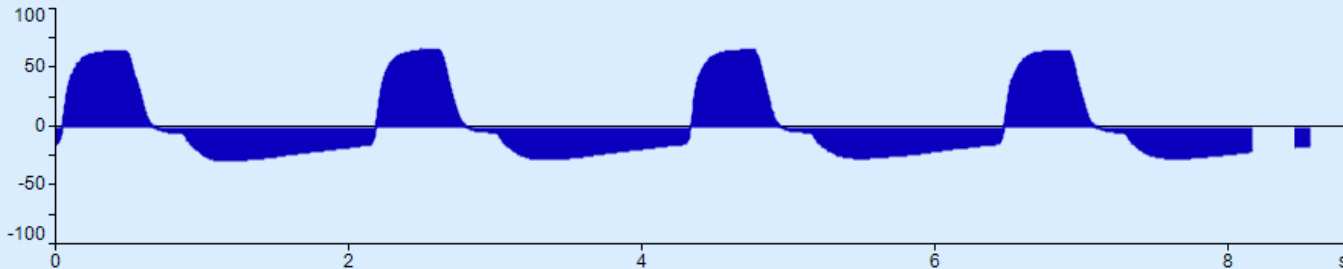
40

55

EIP mbar

18

Flow L/min



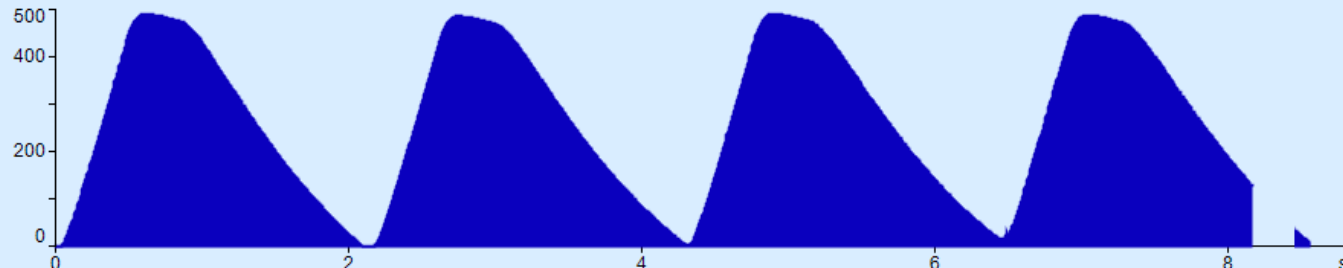
MVe L/min

11.5

12.60

4.80

Volume mL



RR /min

28

25

VT mL

491

1000

VC-MMV



FiO₂



VT



Ti



RR



PEEP



ΔPsupp



Slope



Flow

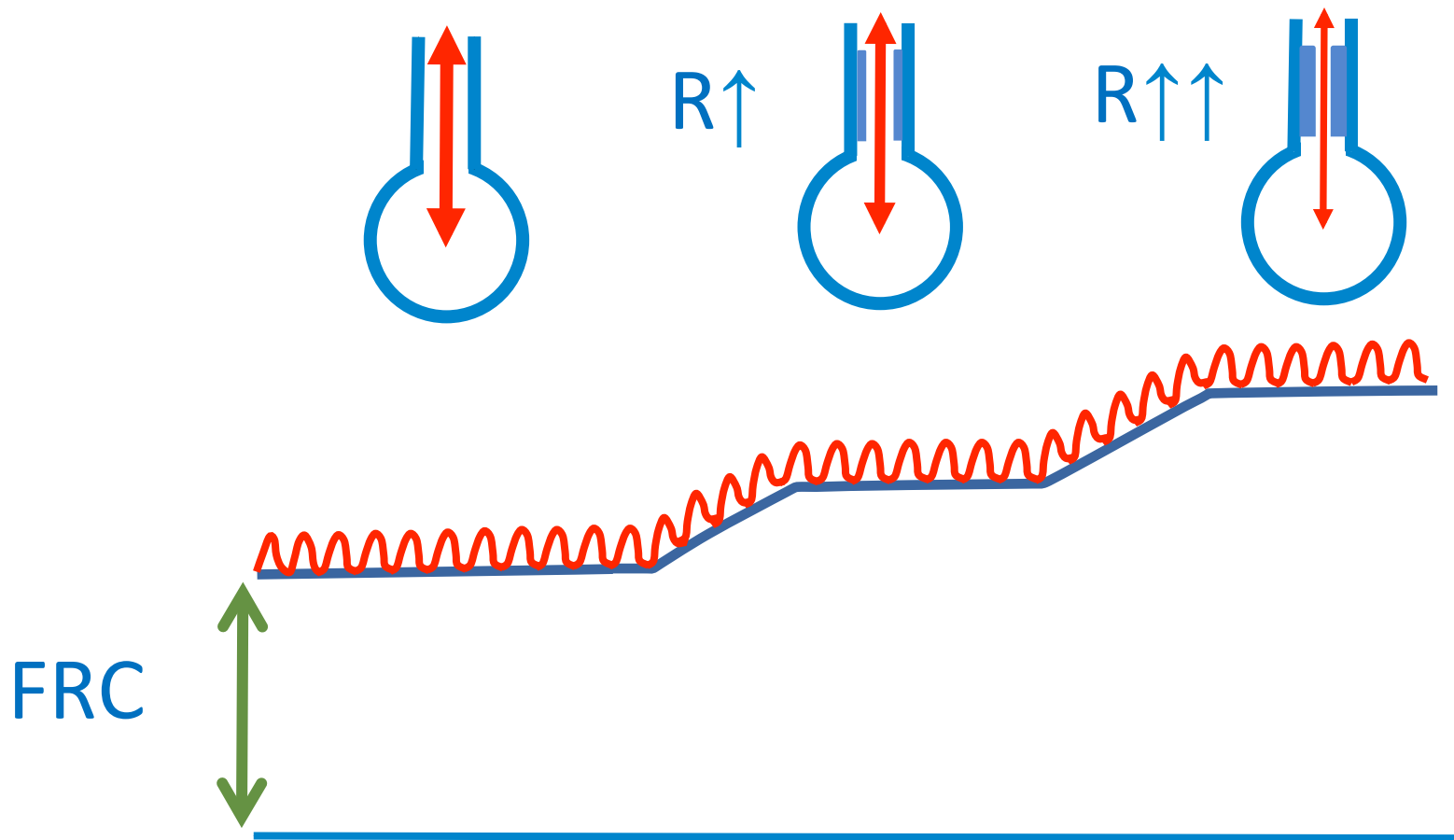


Pmax

Paw high

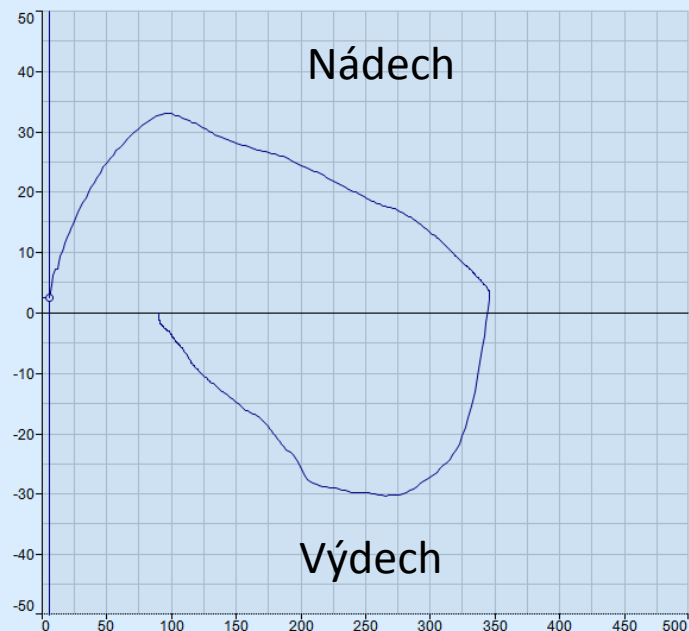
55

Dynamická plicní hyperinflace

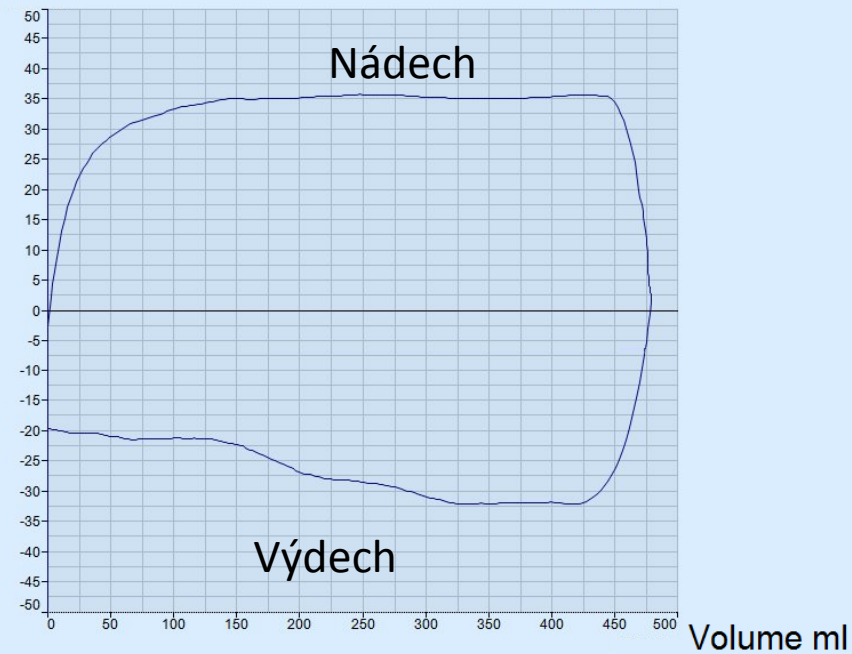


Flow-Volume smyčky u dynamické plicní hyperinflace

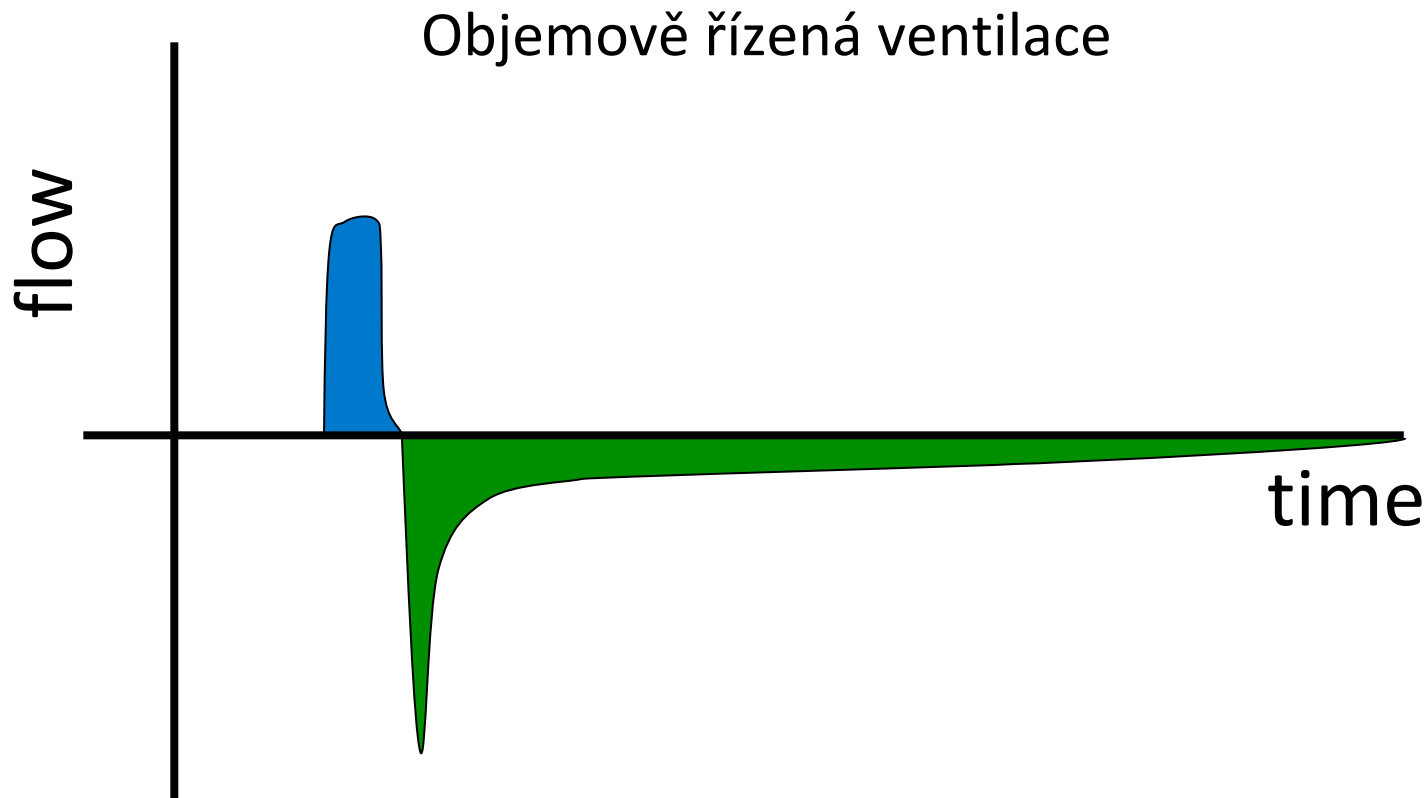
Flow l/min



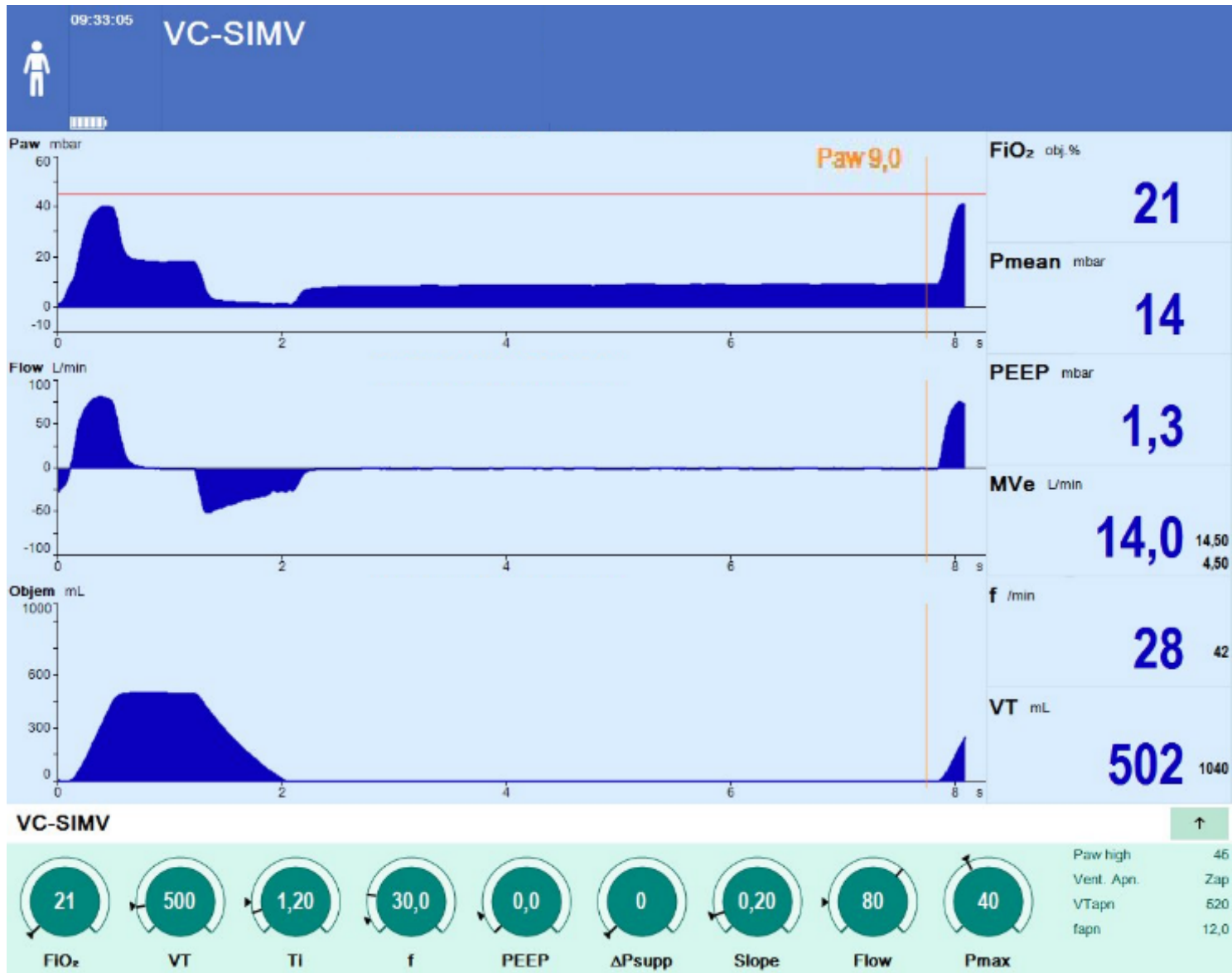
Flow l/min



Manévr pro snížení dynamické plicní hyperinflace

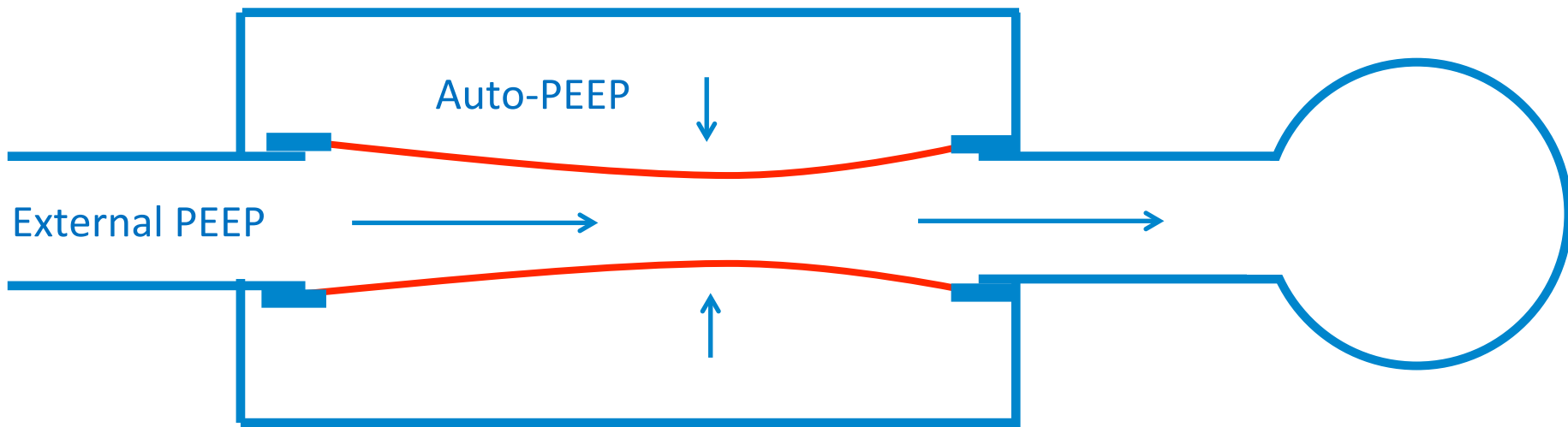


Auto-PEEP



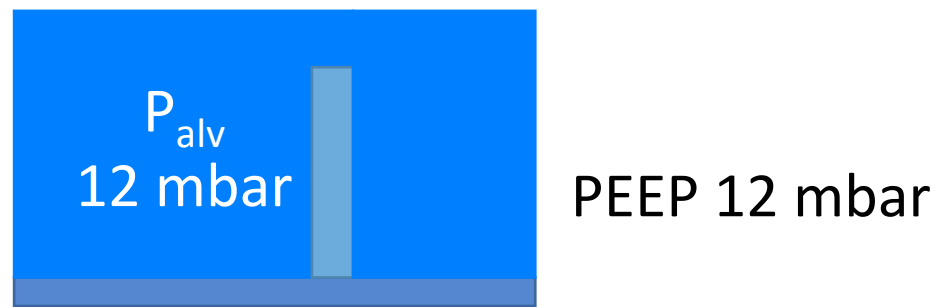
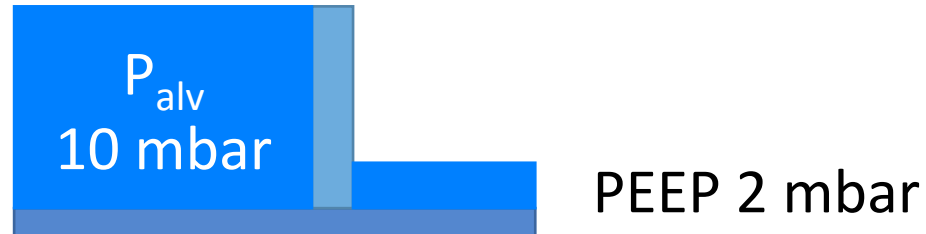
Auto-PEEP a řízná ventilace

Starlingův resistor

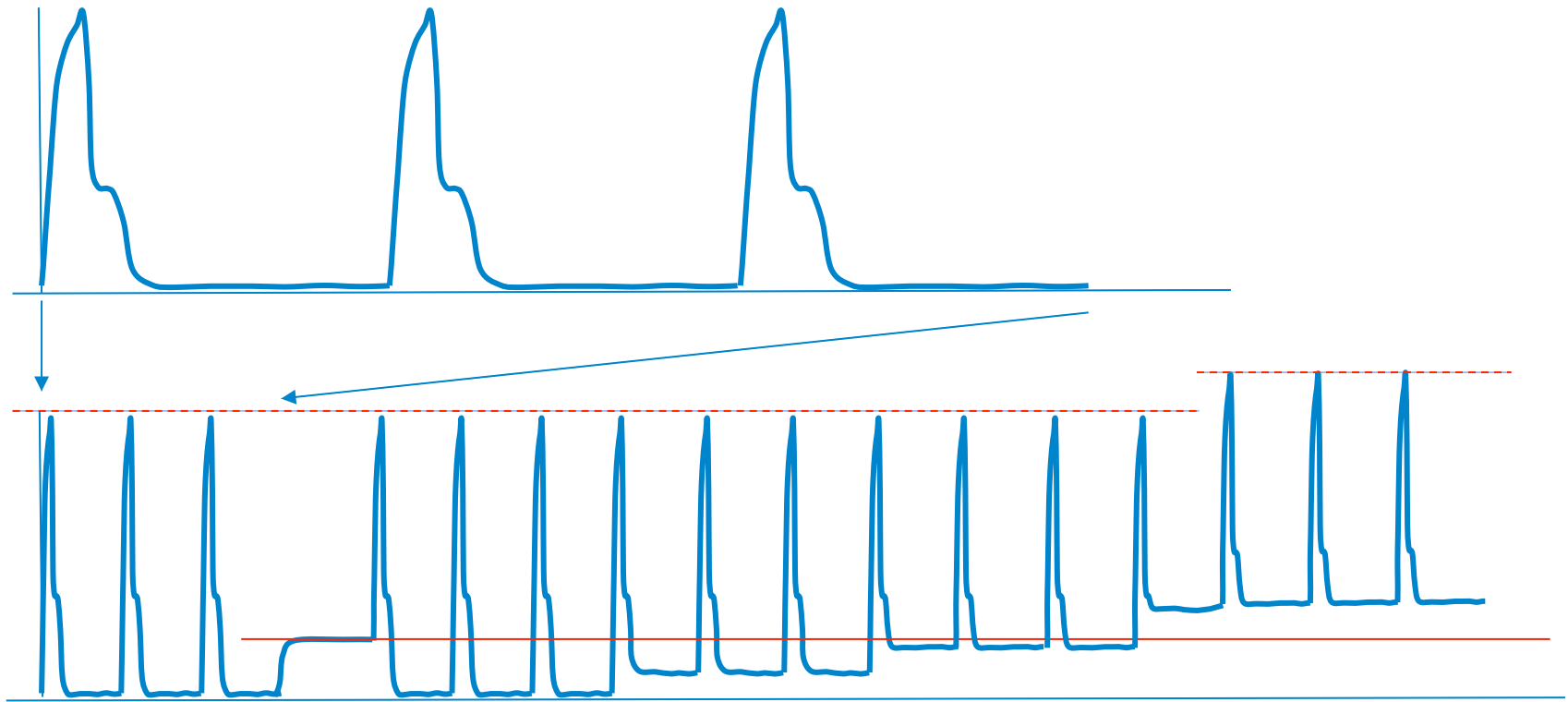


Waterfall effect

(pouze jiné vyjádření Starlingova resistoru)

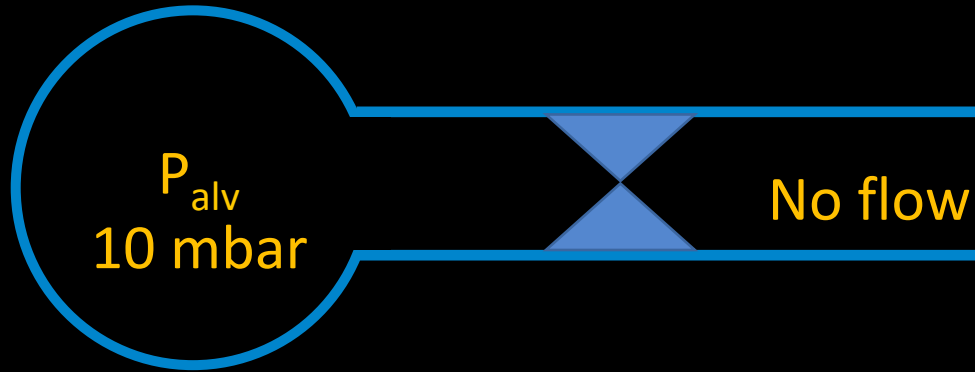


Auto-PEEP (řízená ventilace)



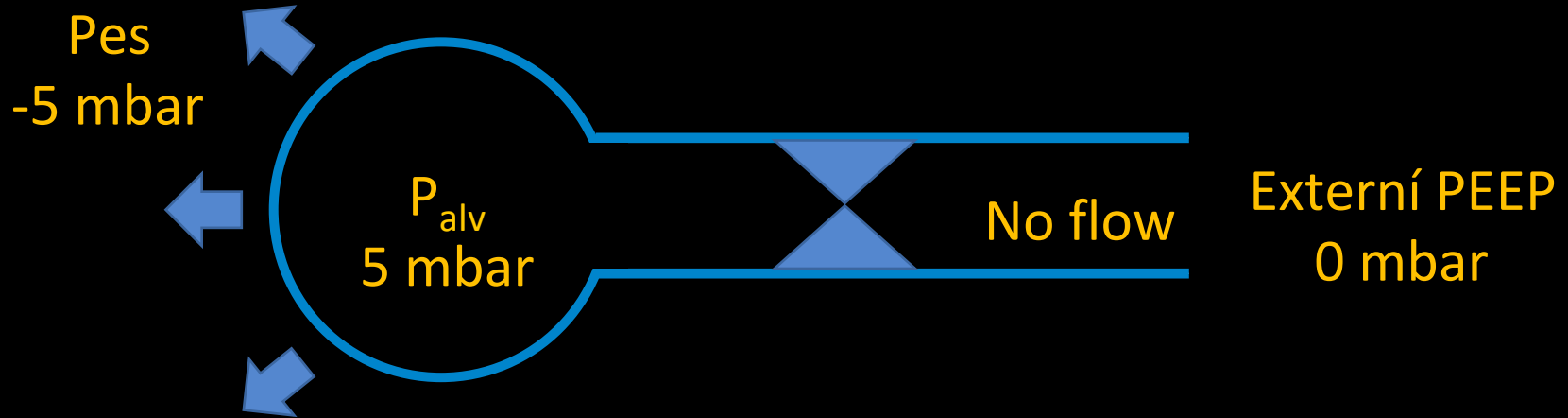
Auto-PEEP a spont. ventilace

P_{es}
0 mbar

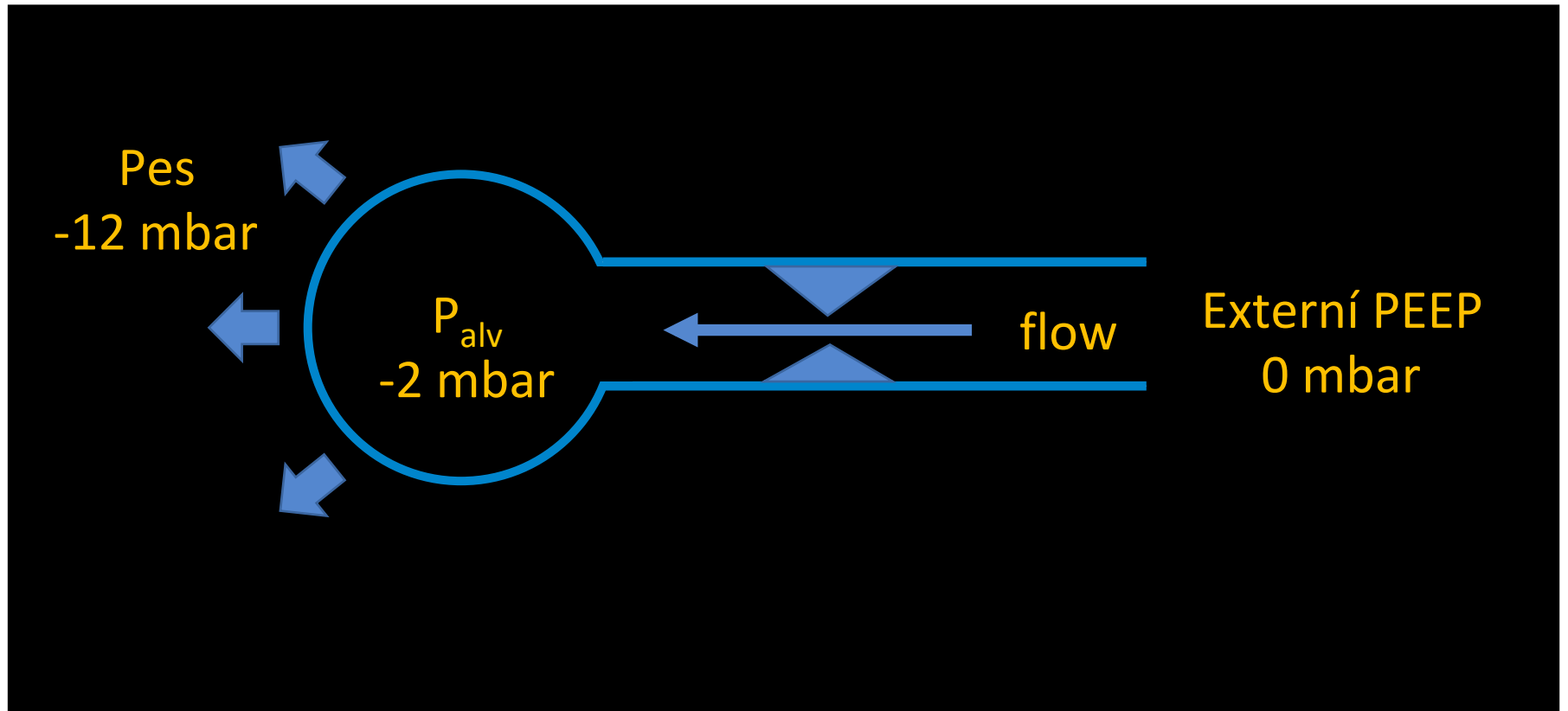


Externí PEEP
0 mbar

Auto-PEEP a spont. ventilace

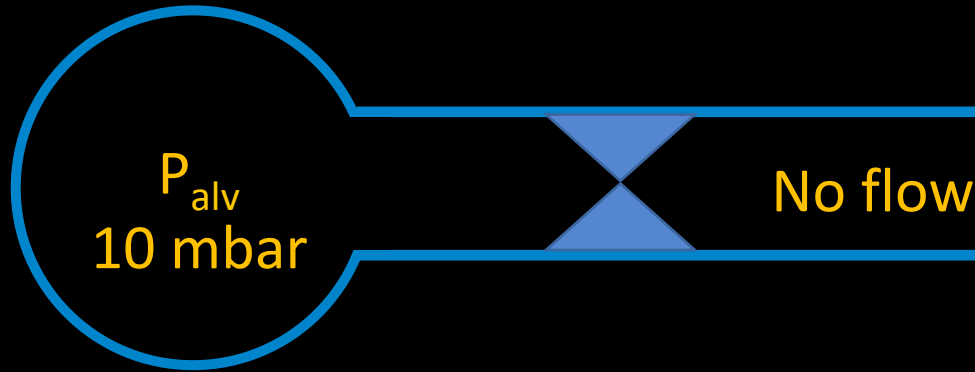


Auto-PEEP a spont. ventilace



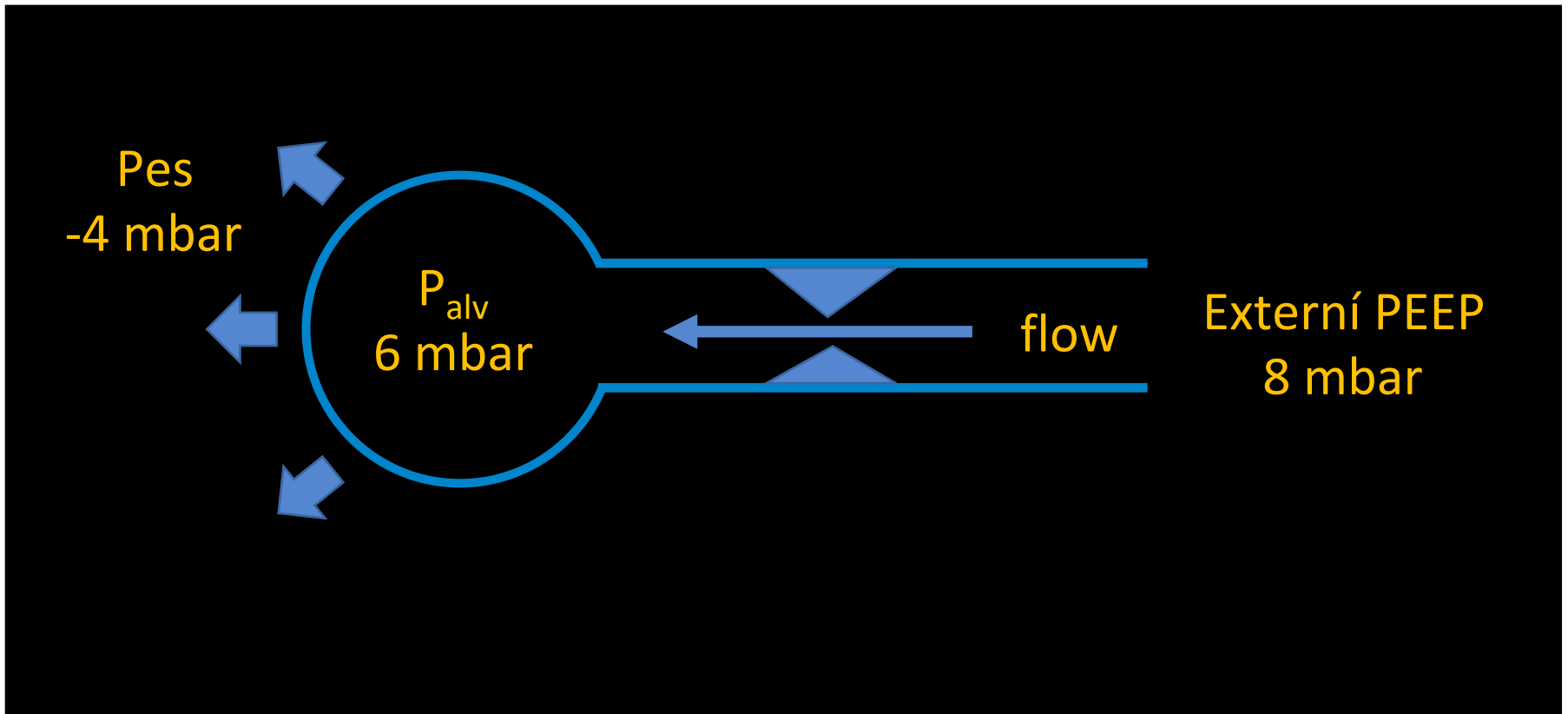
Auto-PEEP a spont. ventilace

P_{es}
0 mbar



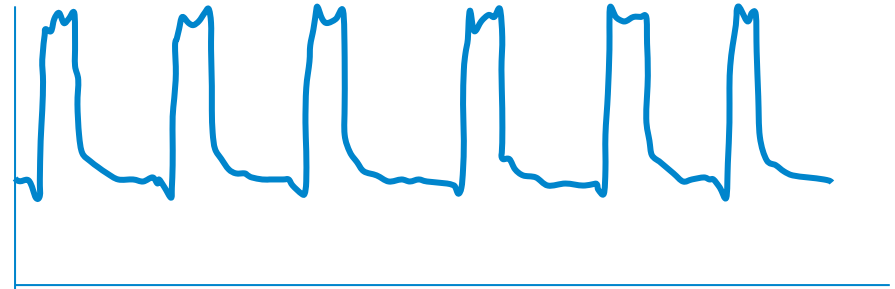
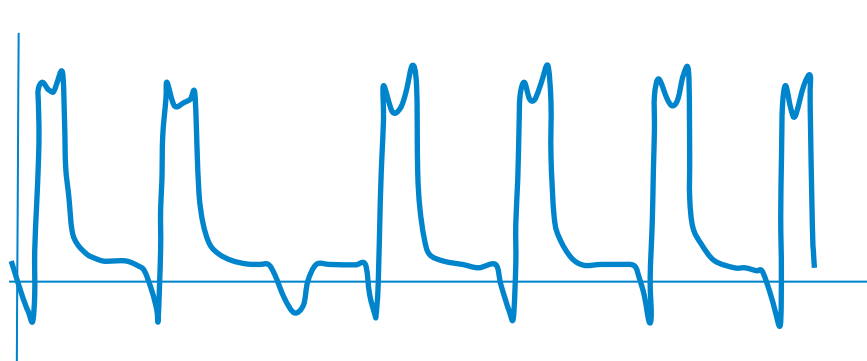
Externí PEEP
8 mbar

Auto-PEEP a spont. ventilace

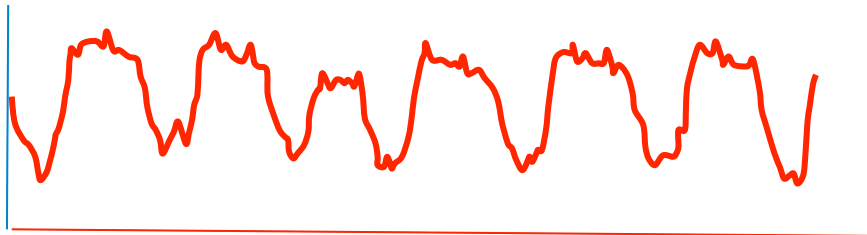


Auto-PEEP (prohlubovaná ventilace)

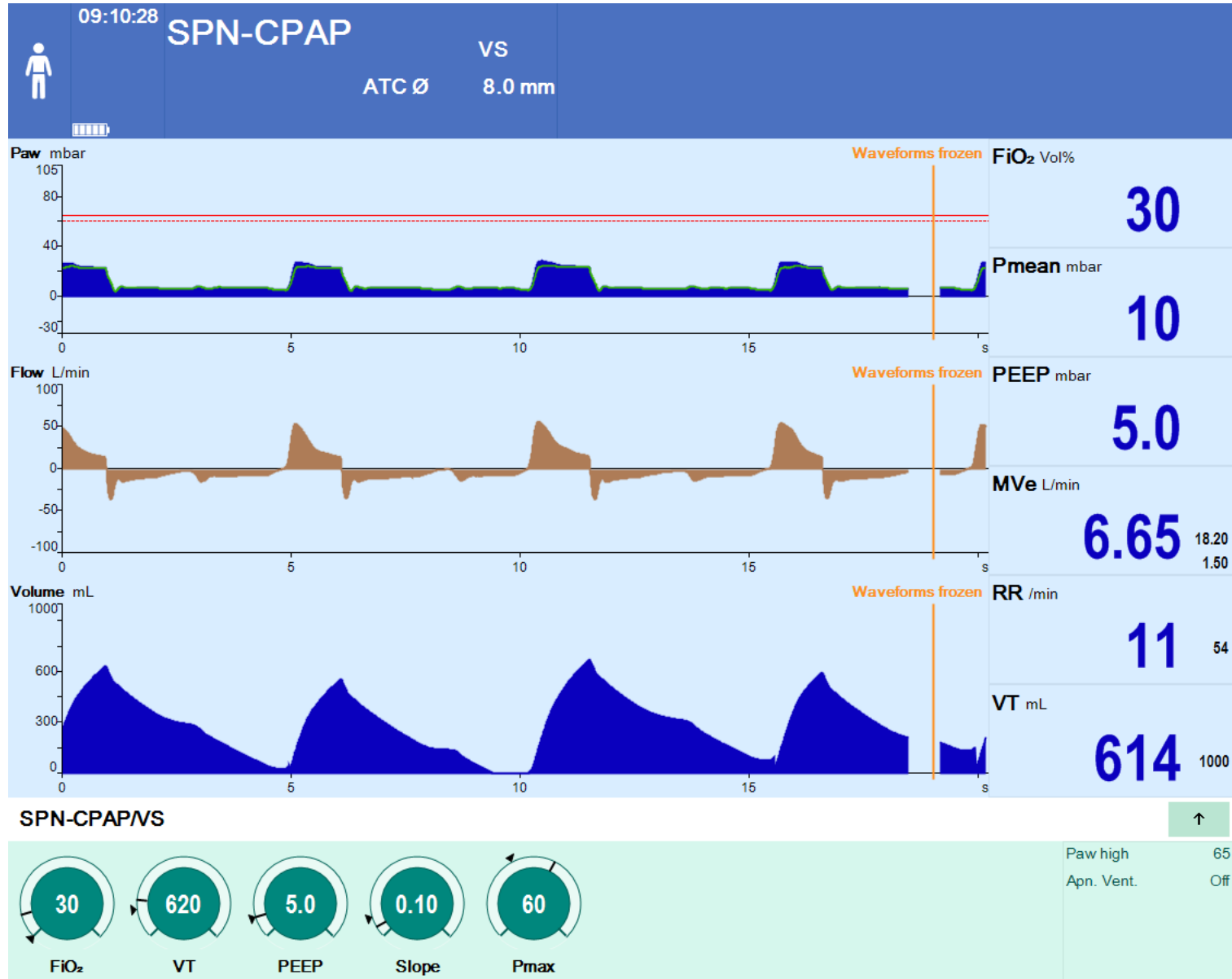
P



Pes



Missed triggers

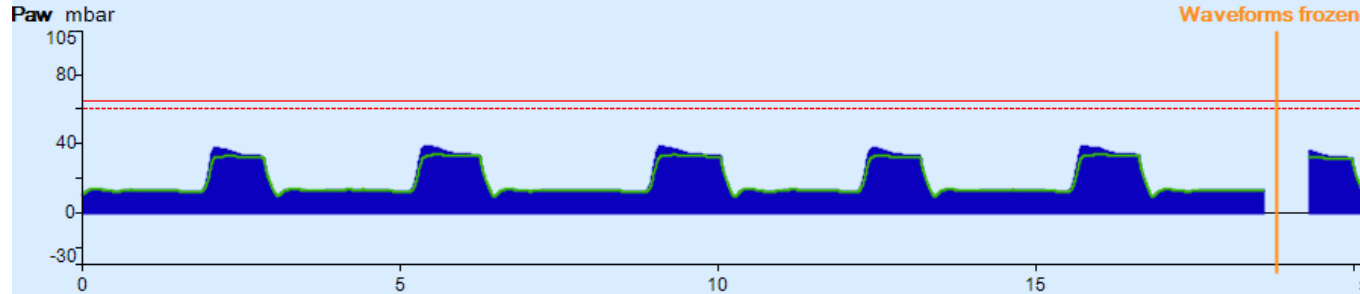


09:16:48

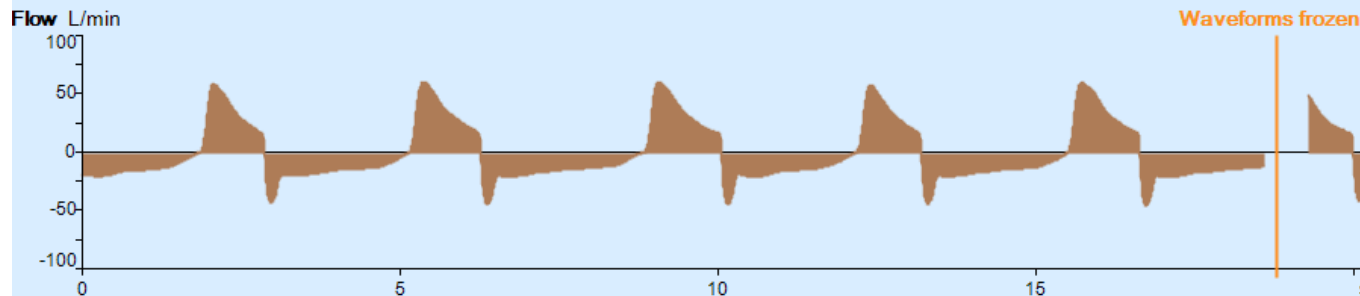
SPN-CPAP



VS
ATC Ø 8.0 mm

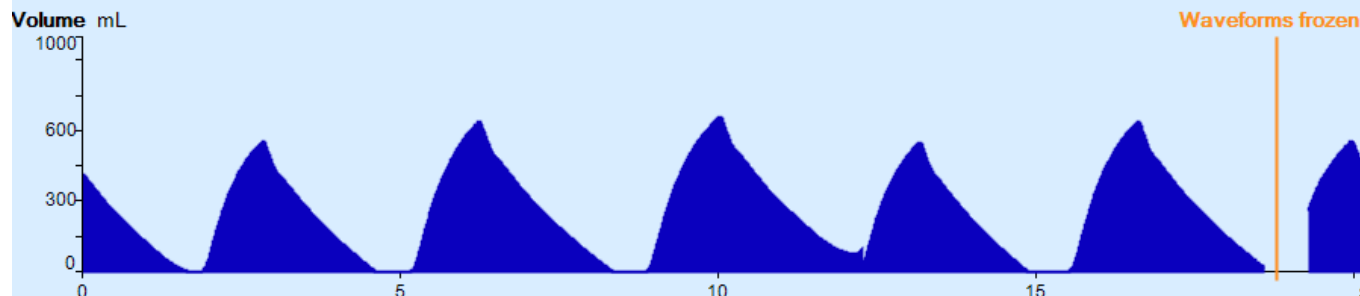


FiO₂ Vol%
30



Pmean mbar
19

PEEP mbar
12



MVe L/min
9.98 18.20
1.50

RR /min
19 54

VT mL
640 1000

SPN-CPAP/VS

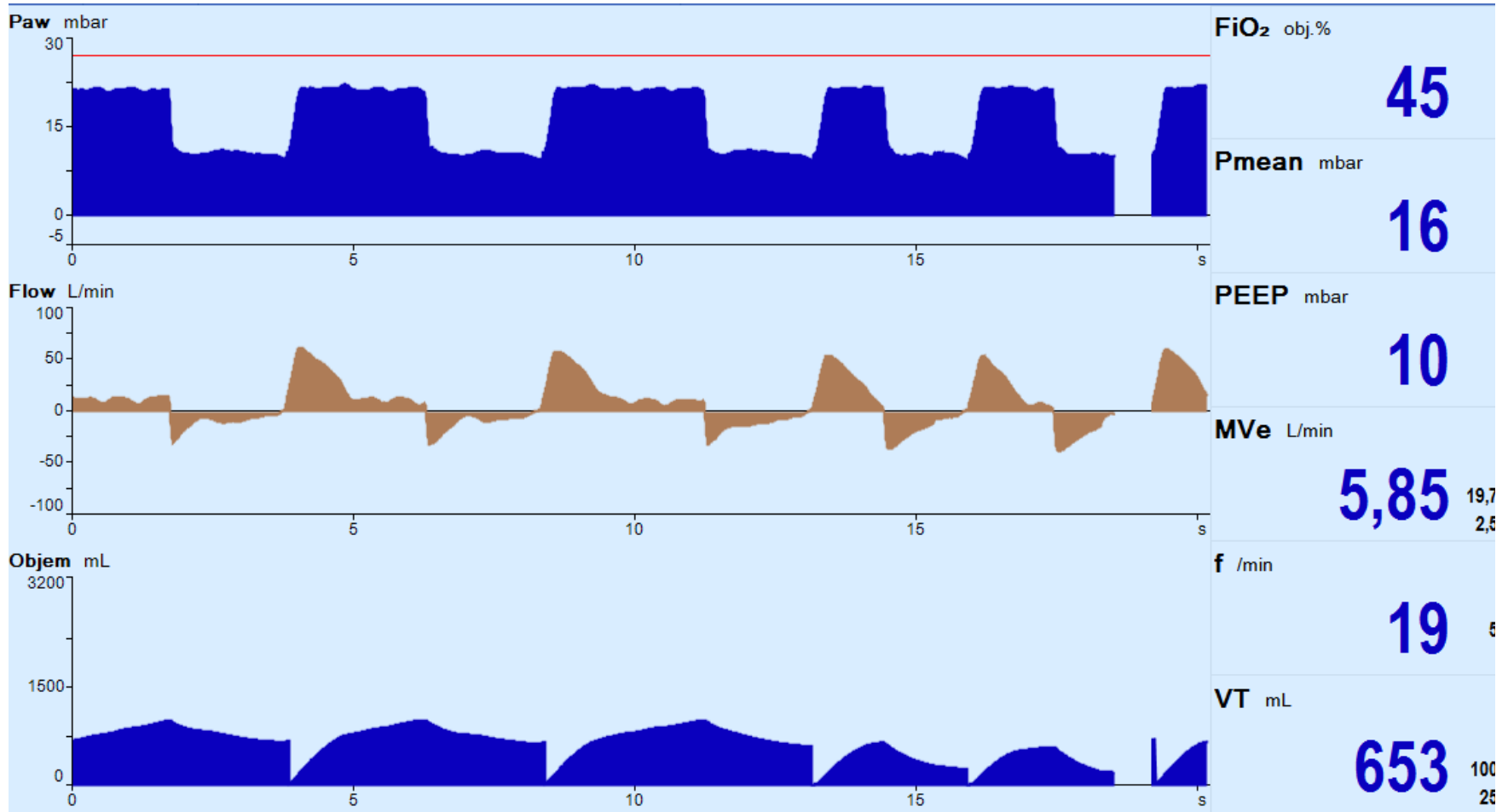


Control panel with five dials:

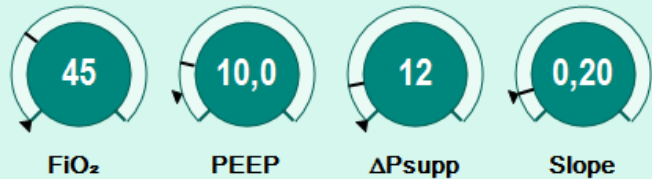
- FiO₂**: 30
- VT**: 620
- PEEP**: 12.0
- Slope**: 0.10
- Pmax**: 60

| | |
|------------|-----|
| Paw high | 65 |
| Apr. Vent. | Off |

Prolonged cycling



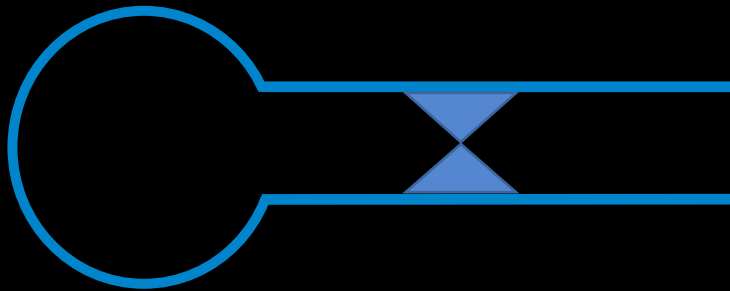
SPN-CPAP/PS



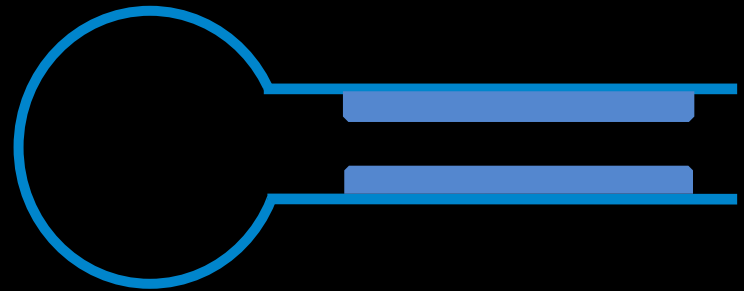
Paw high 2
Vent. Apn. Vy

COPD vs Asthma

COPD



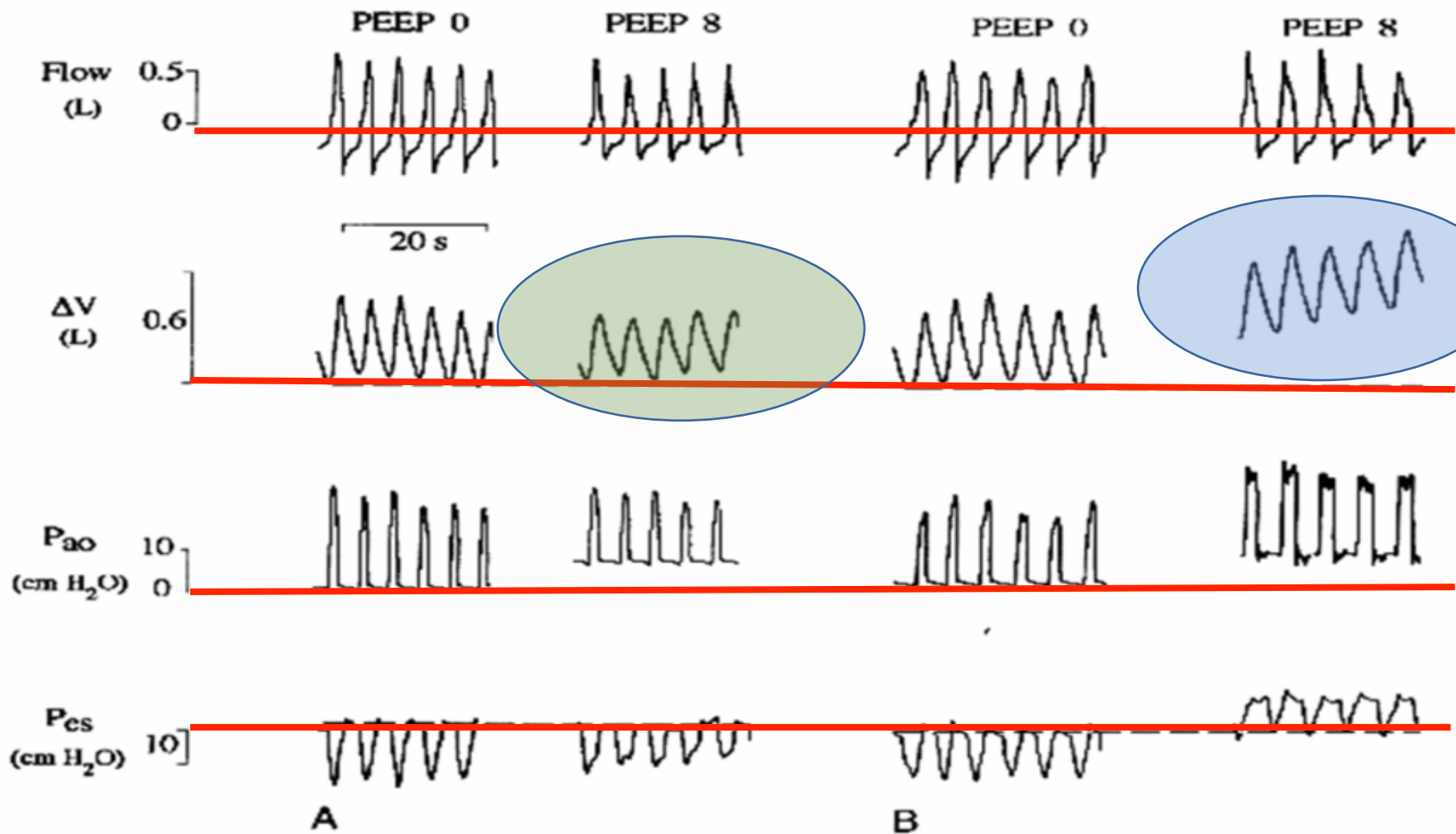
Asthma



$PEEP_{i\text{ stat}} = 10\text{ cm H}_2\text{O}$

#1 (COPD)

#2 (ASTHMA)





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3. LF UK a FNKV

Děkuji za pozornost