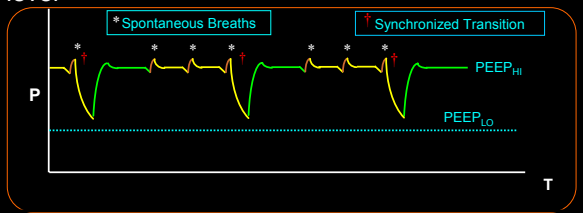
Airway Pressure Release Ventilation

FULL TIDAL VOLUME VENTILATION

Then What Is APRV?

- APRV - a form of BiLevel but utilizes a very short expiratory time for pressure release
- APRV always implies a severe inverse I:E ratio
- All spontaneous breathing is done at upper pressure level

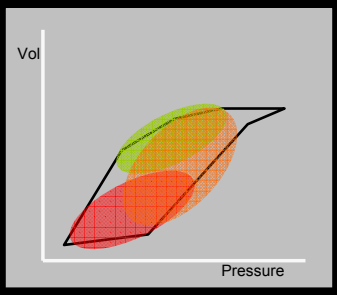


Bottom Line

- The patient does not need to be paralysed or deeply sedated to be placed on inverse ratio ventilation, with severe hypoxia
- Earlier weaning
- Preservation of respiratory muscle reserve

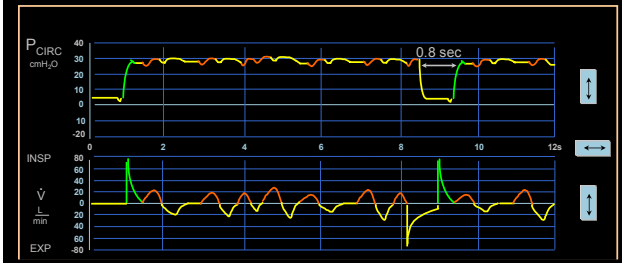
Where do we ventilate patients?

- Conventional strategies – inflate along lower limb of V/P curve
- Modern Strategies use the expiratory limb



APRV Clinical Application Guidelines

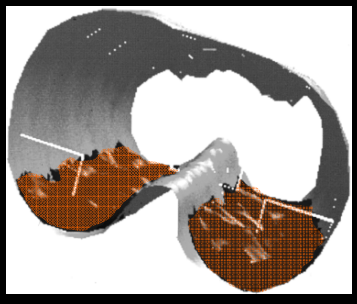
- Starting frequency commonly 6 - 10 breaths / min
- Time at upper pressure not important
- Time at lower pressure should be short enough so as not to allow complete exhalation - typically ~ 0.8 seconds



Does APRV

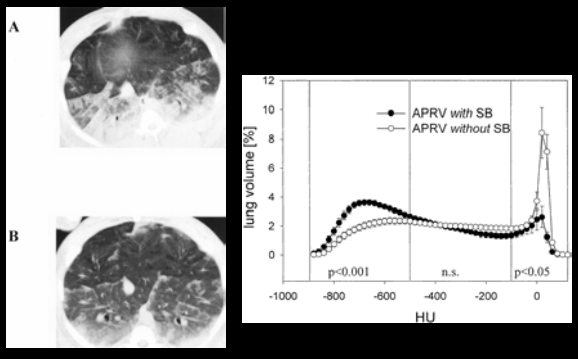
Make a difference?

Three-dimensional reconstructions of the chest wall and atelectatic regions in the dependent part of the lungs in an anaesthetized patient



Hedenstierna G. Clinical Physiology and Functional Imaging 23 (3), 123-129.

Spontaneous breathing during APRV improves lung areation in OA induced ALI



Wrigge et al. Anesthesiology 2003; 99:376-84

APRV & Spontaneous Breathing

- 24 patients with severe ARDS
- APRV with Spontaneous breathing vs PSV
  - Reduced shunt
  - Reduced dead space
  - Improved V/Q matching

Purensen C, AJCCM 159:1999

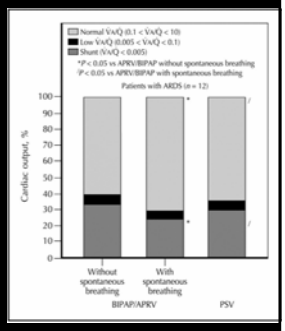
Long-term effects of spontaneous breathing during MV in ARDS

- 30 patients with ARDS following major trauma
- 15 managed with PCV (+NMB)
  - weaned with APRV
- 15 managed with APRV and spont. breath

Putensen AJRCCM 164: 2001

Long-term effects of spontaneous breathing during MV in ARDS

- Primary use of APRV was associated with:
- Increases
  - In respiratory system compliance
  - In arterial oxygen tension (PaO_2)
  - In cardiac index (CI)
  - In oxygen delivery (DO=)
- Reductions in
  - Venous admixture (QV_A/Q_T)
  - Oxygen extraction



Putensen AJRCCM 164: 2001

Long-term effects of spontaneous breathing during MV in ARDS

TABLE 2. OUTCOME DATA*

	APRV Group	PCV Group	p Value
Number of patients, n (%)	15 (100)	15 (100)	–
Survivors, n (%)	12 (80)	11 (74)	ns
ARDS, n (%)	3 (20)	11 (74)	0.015
ALI non ARDS, n (%)	8 (53)	4 (27)	0.019
Extrapulmonary organ failure, n (%)†			
1	8 (53)	10 (67)	ns
2	6 (38)	7 (47)	ns
≥ 3	1 (9)	0 (0)	ns
Sepsis, n (%)	9 (75)	10 (30)	ns
Length of ventilatory support, d	15 ± 2	21 ± 2	0.032
Length of intubation, d	18 ± 2	25 ± 2	0.011
Length of ICU stay, d	23 ± 2	30 ± 2	0.032

Definition of abbreviations: ALI = acute lung injury (13); ARDS = acute respiratory distress syndrome (13); F = female; M = male.
* Values are mean ± SEM.
† Defined by the multi-organ failure score described by Knaus and colleagues (15)

Putensen AJRCCM 164: 2001