APRV
A PREVENTION MODE

R.D. LAWRENCE

OZARKS TECHNICAL COLLEGE

AIRWAY PRESSURE RELEASE VENTILATION

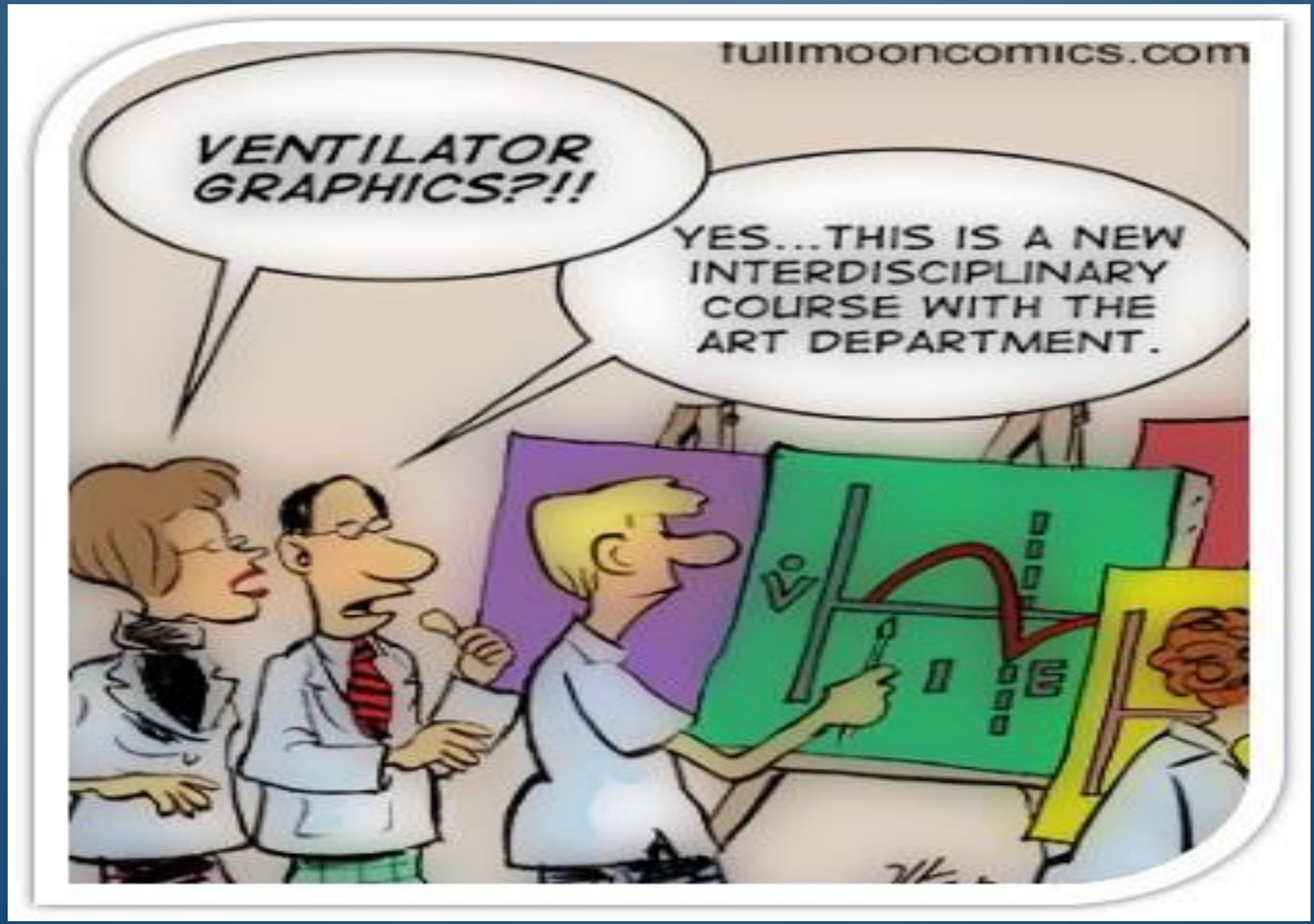
- KNOWN TO MOST AS A RESCUE MODE
- INVERSE RATIO WITH CPAP
- EXPIRATORY BREATHE "RELEASED" FOR <1 SEC

P high: Set Pplat coming from conventional vent mode or set at Mean Pressure + 3-5mmHg (<30mmHg)

P low: Set at 0

T high: Start with 4-6 seconds

T low: 50-75% of PEFR (0.5-0.8 seconds)

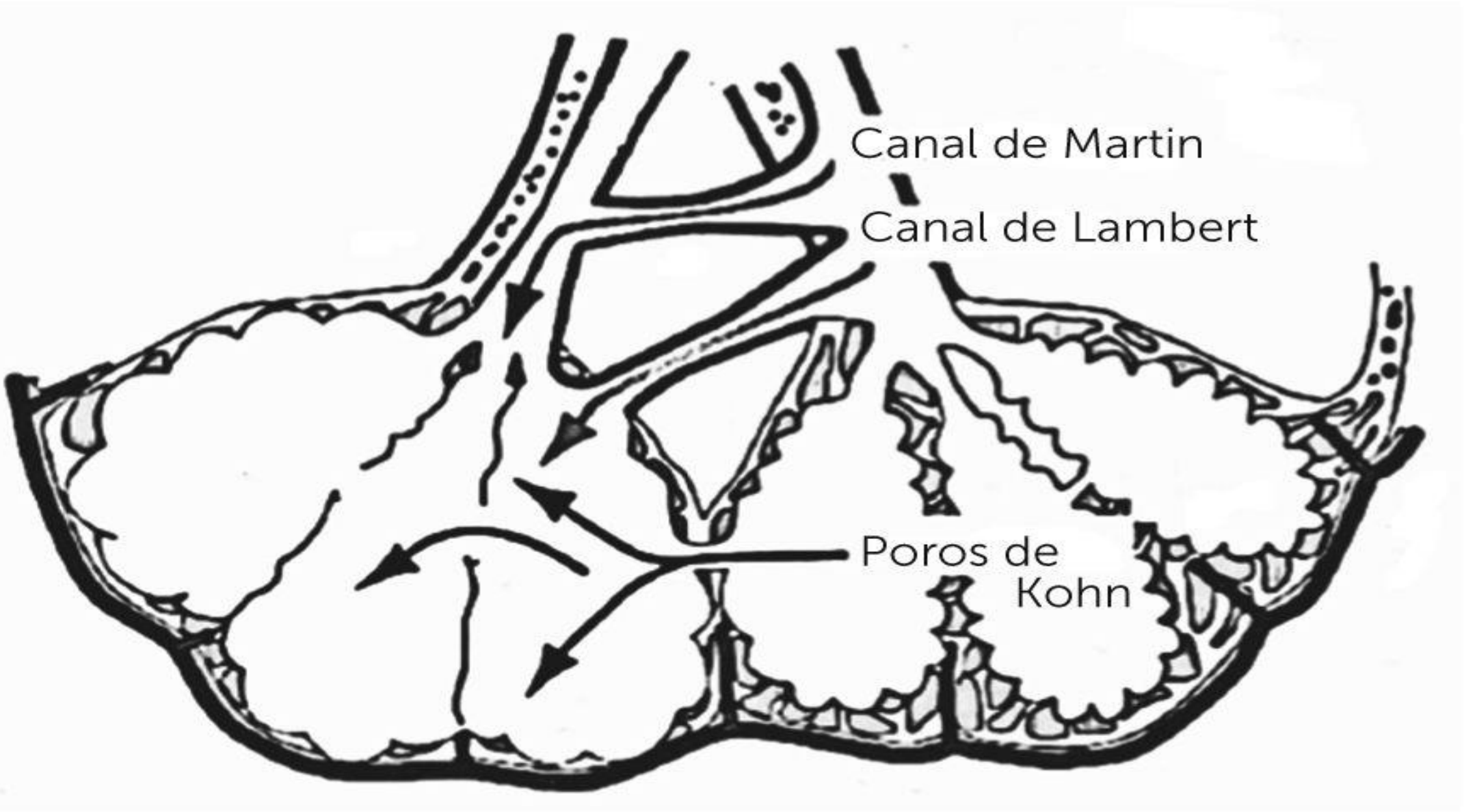

fullmooncomics.com
VENTILATOR GRAPHICS?!!
YES...THIS IS A NEW INTERDISCIPLINARY COURSE WITH THE ART DEPARTMENT.

Purpose of APRV

Lung Opening Tool For Recruitment
Increases Oxygenation
Spontaneous Breathing at any time
Lung Protection

Lung Opening Tool

- Already open alveoli that are filled with inspired gas give derecruited alveoli a shared exchange through the pores of Kohn, canals of Lambert, and channels of Martin causing recruitment of atelectatic alveoli


Canal de Martin
Canal de Lambert
Poros de
Kohn

Increasing Oxygenation

- Better V/Q match due to spontaneous breathing and lung recruitment. Helps improve venous return due to pleural pressures decreasing in turn increasing cardiac output

(Ann Thorac Med. 2007 Oct-Dec; 2(4): 176-179)

Benefits of Spontaneous Breathing

- Causes intrathoracic pressure to decrease
- Allows the patient to cough, which contributes to mucous clearance.
- Enables patient towards weaning

(Respiratory Care Feb. 2012 Vol 57 No.2)


2012-03-05
14:00:51
INTELLiVENT
APRV
Adult
Backup
Patient
Additions
Modes
40
15
26
Ppeak
cmH2O
23
Pmean
cmH2O
Pplateau
cmH2O
30
10
30
fTotal
b/min
1700
Off
19
VTE
ml
Paw
cmH2O
26.2
11.70
4.4
Flow
l/min
Flow
l/min
V
ml
V
ml
Paw
cmH2O
1 / 8
0.70
s
T low
26
cmH2O
P high
0
cmH2O
P low
50
%
Oxygen
Controls
Alarms
Monitoring
Graphics
Tools
Events
System
USB
INT
AC

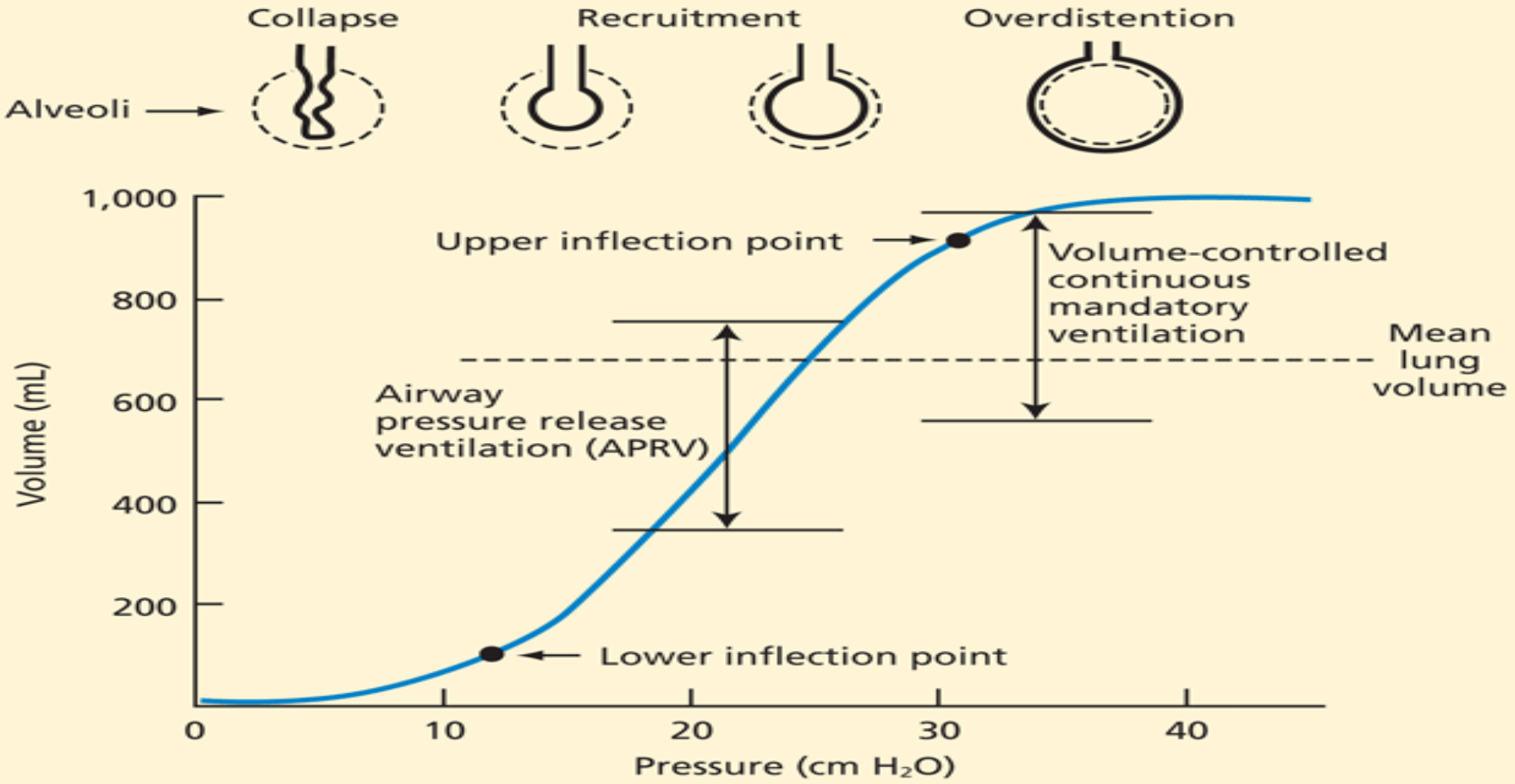
Lung Protection

- When lungs are consistently opening and closing from ventilator assisted breathing, the tissues and alveoli are subjected to trauma. Alveolar damage can occur, called shearing, and alveolar edema begins.

- Some alveoli may not recruit open while some may over-inflate. This is called dynamic alveolar heterogeneity

(JAMA Surg. 2016; 151(1):64-72) , (Shock. 2013 January; 39(1): 28-38)

Compliance curve of the lung with its lower and upper inflection points



REPRINTED FROM PAPADAKOS PJ, LACHMANN B. THE OPEN LUNG CONCEPT OF MECHANICAL VENTILATION: THE ROLE OF RECRUITMENT AND STABILIZATION. CRIT CARE CLIN 2007; 23:241–250, WITH PERMISSION FROM ELSEVIER.

APRV vs. Conventional Ventilation

- Promotes Spontaneous Breathing
- Prevents Lung Damage
- Provides Increase in Oxygenation/Compliance
- Phases out Sedation Faster-Less Days on a Vent/In ICU

(Intensive Care Med 2017 43:1648-1659)

Proper training and exercise of the mode should be taken into consideration with caution with any lung disease that requires and extended length of time for exhalation or already have hyperinflation challenges, such as COPD, Emphysema, or severe Asthma

A good model to follow is Adams Cowley Shock Trauma Center in Maryland, who uses APRV as their "initial and sole model of ventilation". This promotes and incorporates the practice of APRV as a prevention mode, which has proven successful

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3539171/

SUMMARY OF APRV

Airway Pressure Release Ventilation is a mode that is proven to open up the lungs, increase oxygenation while contributing to protection as it recruits open and keeps open the lungs allowing the patient to spontaneously breathe anytime

With the right knowledge and training, APRV has the potential to serve patients as not only a rescue mode, yet as a prevention mode

Copy of references used are available

- JAMA Surg. 2016; 151(1): 64-72. doi: 10.1001/jamasurg.2015.2683
- The Journal of Heart and Lung Transplantation Volume 36, Issue 4, Supplement, April 2017, Pages S318-S319
- Doi:10.3949/ccjm.78a.10032
- Special Techniques in Ventilatory Support Ch.23 Mech Vent Book Susan Pilbeam, J.M. Cairo, Paul Barraza
- Intensive Care Med (2017) 43: 1648-1659 DOI 10.1007/s00134-017-4912-z
- Shock. 2013 Jan; 39(1): 28-38. Doi: 10.1097/SHK.0b013e31827b47bb

- J Am Coll Surg. 2014 November; 219 (5): 968-976. Doi: 10.1016/j.jamcollsurg.2014.09.011
- Jainet al. Intensive Care Medicine Experimental (2016) 4:11
- Resp Care February 2012 Vol 57 No 2
- Resp Care June 2016 Vol 61 No 6
- Resp Care April 2007 Vol 52 No 4
- Ann Thorac Med 2007 Oct-Dec; 2(4): 176-179
- Can Respir J Vol 20 No 5 Sept/Oct 2013