

Approach to “difficult” airway scenarios

PACCM fellows core conference

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Case

- 65yo man with alcoholic cirrhosis p/w fatigue.
- One episode of vomiting at home.
- Saw some blood.
- VS: Afebrile, HR 110, BP 90/50, RR 22, SpO2 95
- Hgb 6.5
- He has a couple more episodes of vomiting with blood streaking in the ED

Airway in patient w hematemesis

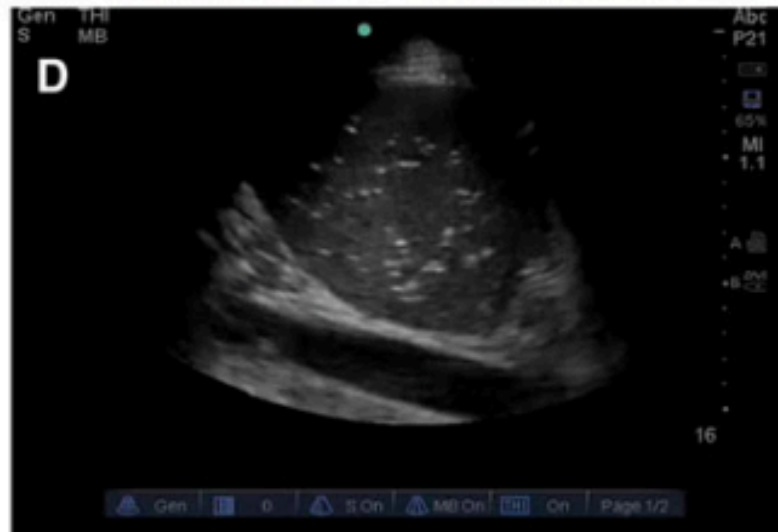
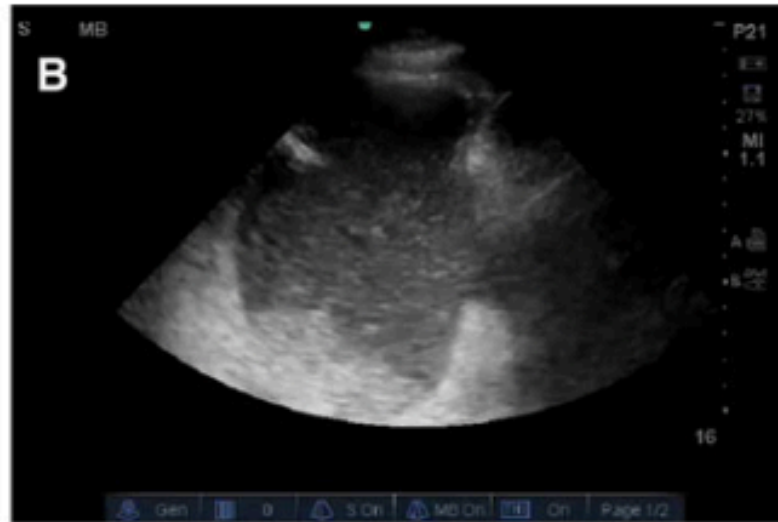
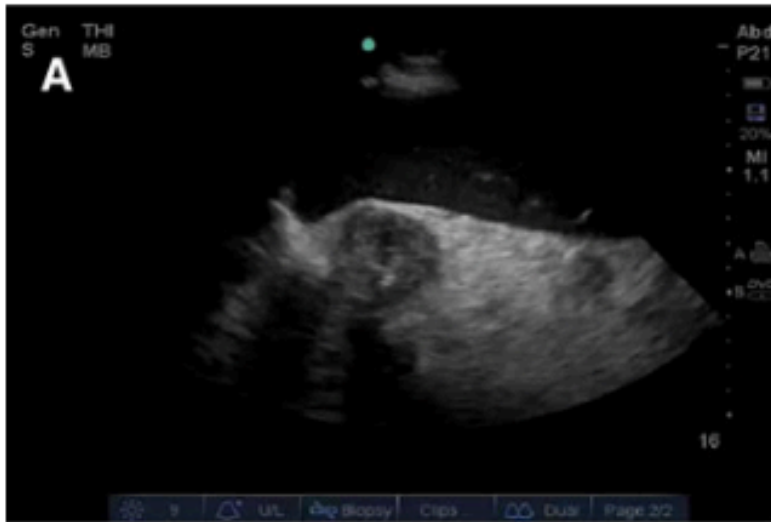
...or other vomiting or hemoptysis

- What things do you want to consider?
- What are our priorities?
- Aspiration was the single most common cause of death in peri-intubation in the NAP4 cohort

Minimize stomach contents



Minimize stomach contents



Minimize stomach contents

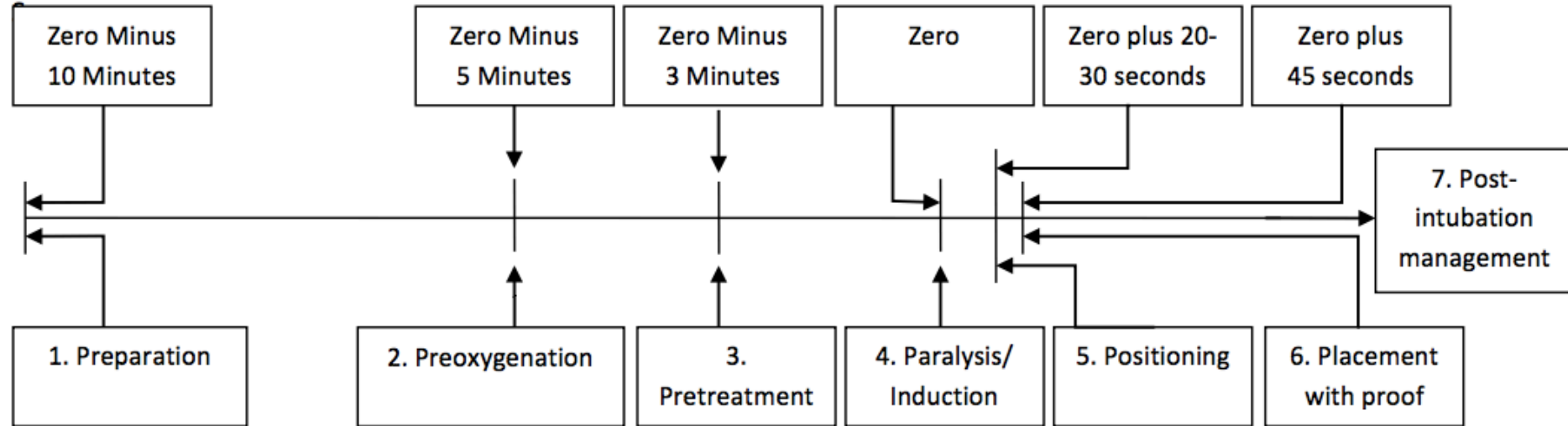


Minimize stomach contents

- Ultrasound stomach
- NG decompression
- Goal is to limit aspiration risk after giving drugs, laying flat
- Still preoxygenate and position prior to giving drugs
 - Need good bag-mask ventilation technique to limit insufflating the stomach

What is RSI?

Timeline of Rapid Sequence Intubation



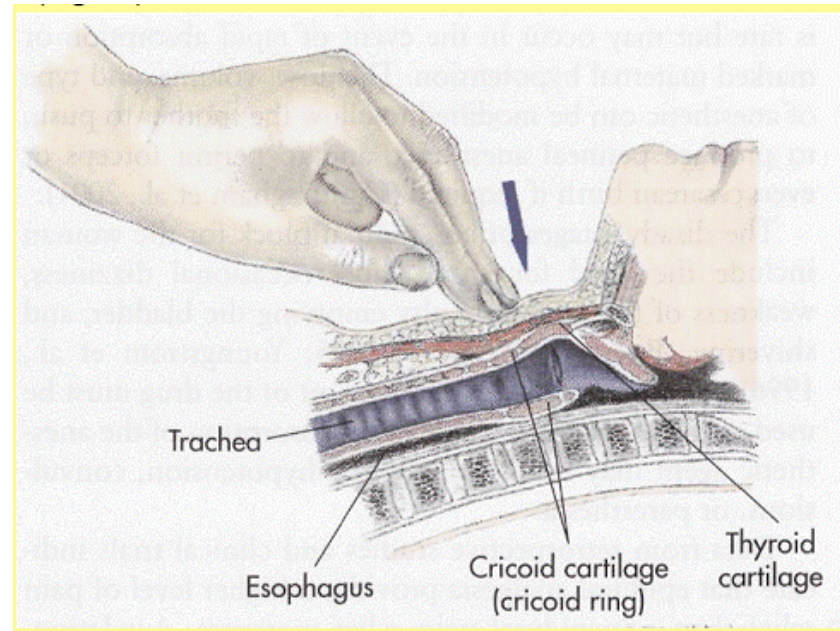
To bag or not to bag

- *Gentle* bag mask ventilation appears to be OK
- Weigh the risk of hypoxia vs risk of aspiration
- Always use it for “rescue”



Cricoid pressure debate

- Sellick, 1961: no regurgitation into pharynx by 26 high aspiration risk patients
- Effect not consistently reported in the literature, not validated
- Nonstandard/inappropriate application—when to apply, how much pressure, untrained, might obstruct view or tube delivery



Drugs



- Rapid sequence intubation:
 - Induction agent
 - Etomidate 0.3mg/kg TBW
 - Ketamine 1.5mg/kg IBW (dissociative dosing)
 - Propofol 1.5mg/kg TBW
 - + NMB
 - Succinylcholine 1.5mg/kg TBW
 - Rocuronium 1.2mg/kg IBW
 - Vecuronium 0.15mg/kg IBW
- Goal is also to limit aspiration and more vomiting
- Note that there is no data great data for “RSI”...

Succ vs Roc

Cochrane meta-analysis

- Succ:
 - Onset 45-60s; Duration 6-10min
 - Contraindications: malignant hyperthermia, muscular dystrophy, neuromuscular disease with denervation, old CVA, rhabdo, old burn, hyperkalemia
 - Benefit: Faster, ok in MG
- Roc
 - 60-75s; Duration 45min

Method

- Sometimes video laryngoscopy/glidescope/bronchoscope does not work
 - Direct laryngoscopy
- Always have SUCTION available and working
- Use biggest tube you can fit in
 - May need to do more procedures (possible endobronchial blocker or bronchoscopic suctioning any aspirated material)

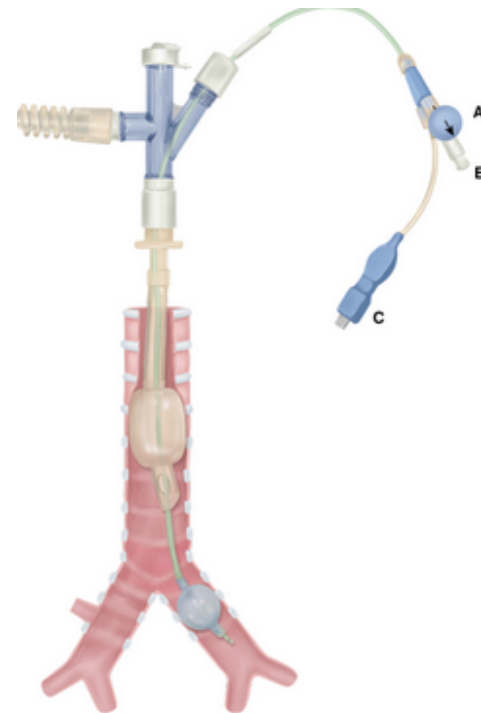
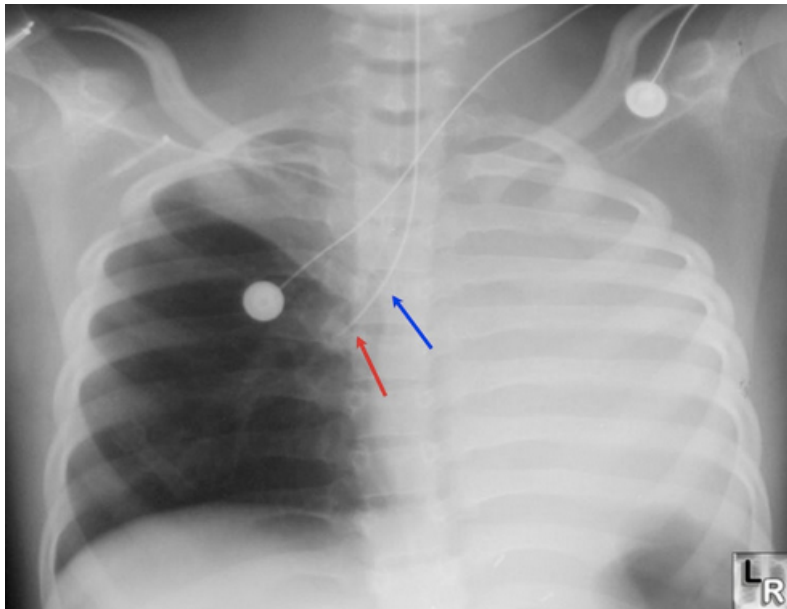
When to secure the airway in vomiting/ hemoptysis?

- Early vs when they desaturate?
 - It is too late when they are desaturating, needing to dial up O2 b/c coagulated blood is now obstructing the airway



Additional techniques for hemoptysis

- RMSB intubation if bleeding on the left
- Endobronchial blocker placement
- Activate IR...



Case

- 54yo woman with scleroderma and severe PH, listed for lung transplant
- Starting to have longer periods of desaturation on 80L 100%
- VS: Afeb, HR 99, BP 90/50, RR 35, SpO2 86-90% on high flow
- What are you thinking about, concerned about

Airway in patient w hemodynamic risk

- What things do you want to consider?
- What are our priorities?

How to not kill the shock patient by intubating him/her...



- PLAN AHEAD
- Consider **AWAKE FIBEROPTIC**: maintain adrenergic tone
- ALL sedatives affect patients in shock
- Negative to positive pressure effects

Pre-intubation

- Make the BP HIGH
 - PUSH dose pressors
 - Start drip pressor beforehand
 - Get fluids with pressure bag
- Have good ACCESS
 - Don't forget IO option
 - It's worth it to get the arterial line



Push dose pressors

EPINEPHRINE

Has alpha and beta_{1/2} effects so it is an inopressor

Do not give cardiac arrest doses (1 mg) to patients with a pulse

Mixing Instructions:

- Take a 10 ml syringe with 9 ml of normal saline
- Into this syringe, draw up 1 ml of epinephrine from the cardiac amp (Cardiac amp contains Epinephrine 100 mcg/ml)
- Now you have 10 mls of Epinephrine 10 mcg/ml

Onset-1 minute

Duration-5-10 minutes

Dose-0.5-2 ml every 2-5 minutes (5-20 mcg)



Push dose pressors

PHENYLEPHRINE

It is pure alpha, so no intrinsic inotropy, and *no increase in heart rate*, but increases in coronary perfusion can improve cardiac output.

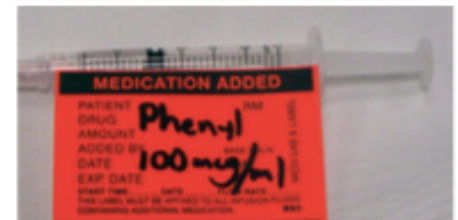
Mixing Instructions:

- Take a 3 ml syringe and draw up 1 ml of phenylephrine from the vial (vial contains phenylephrine 10 mg/ml)
- Inject this into a 100 ml bag of NS
- Now you have 100 mls of phenylephrine 100 mcg/ml
- Draw up some into a syringe; each ml in the syringe is 100 mcg/ml

Onset-1 minute

Duration- 10-20 minutes

Dose-0.5-2 ml every 2-5 minutes (50-200 mcg)



Drugs

- What's the deal w etomidate? Alternatives?
- ALL sedatives will drop the BP if already hemodynamically unstable → adjust your dose
- Err on the side of LOWER DOSES of sedative:
 - Ketamine 0.5mg/kg– actually augments BP
 - Etomidate dose probably the same
- And HIGHER DOSES of paralytic: (takes longer, need more)
 - Roc 1.6mg/kg
 - Succ 2mg/kg



Intravenous induction agent	Effector site equilibration and $t_{1/2} K_{eo}$	Haemodynamic effects in vivo	Comments and idiosyncratic reactions (see text)
Ketamine	Undetermined (see text), but probably ~2 min	↑CO, ↑HR, ↑ABP Sympathomimetic	→ or ↑CPP and →ICP with standard anaesthetic management
Thiopentone	1.5 min	↑HR, →CO, ↓ABP →laryngeal reflexes, ↓inotrope, vasodilates	Haemodynamically compromised patients unlikely to tolerate induction dose > 3 mg.kg ⁻¹
Propofol	≤20 min	→HR, ↓CO, ↓ABP Vagotonic, ↓laryngeal reflexes	Haemodynamic compromise marked in elderly, ASA 3 or more or hypovolaemic patients with 'standard' induction dose
Etomidate	~2.5 min	→CO, →ABP Minimal dose adjustment in shock	Prolonged inhibition of steroid synthesis in the critically ill; withdrawn from number of countries
Benzodiazepenes	~9 min (e.g. lorazepam)	→CO, →HR	Induction time of anaesthesia incompatible with RSI
Phenylpiperidenes	~6 min (e.g. fentanyl)	Vagotonic, ↓CO, ↓HR, ↓ABP Vagotonic, ↓laryngeal reflexes	Potent vagally mediated bradycardia can compound effects of hypovolaemia

PH/Right heart failure

- Prepare, prepare, prepare
- Access and A-line
- Prepare the push dose pressors
- Maximize preoxygenation
- Assess for any anatomic issues and choose your method carefully (Small mouth? Obese?)
- Anything else?
- **Prepare inhaled pulmonary vasodilators**
 - **Epoprostenol vs NO**

PH physiology in MV

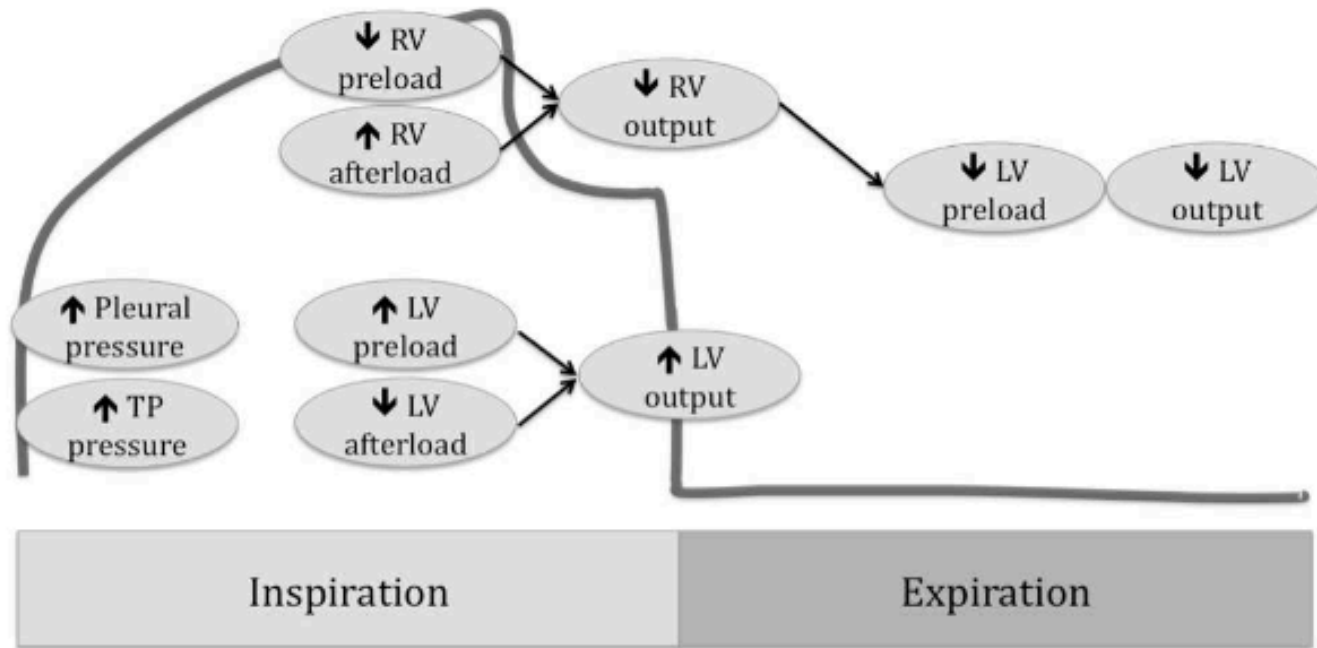
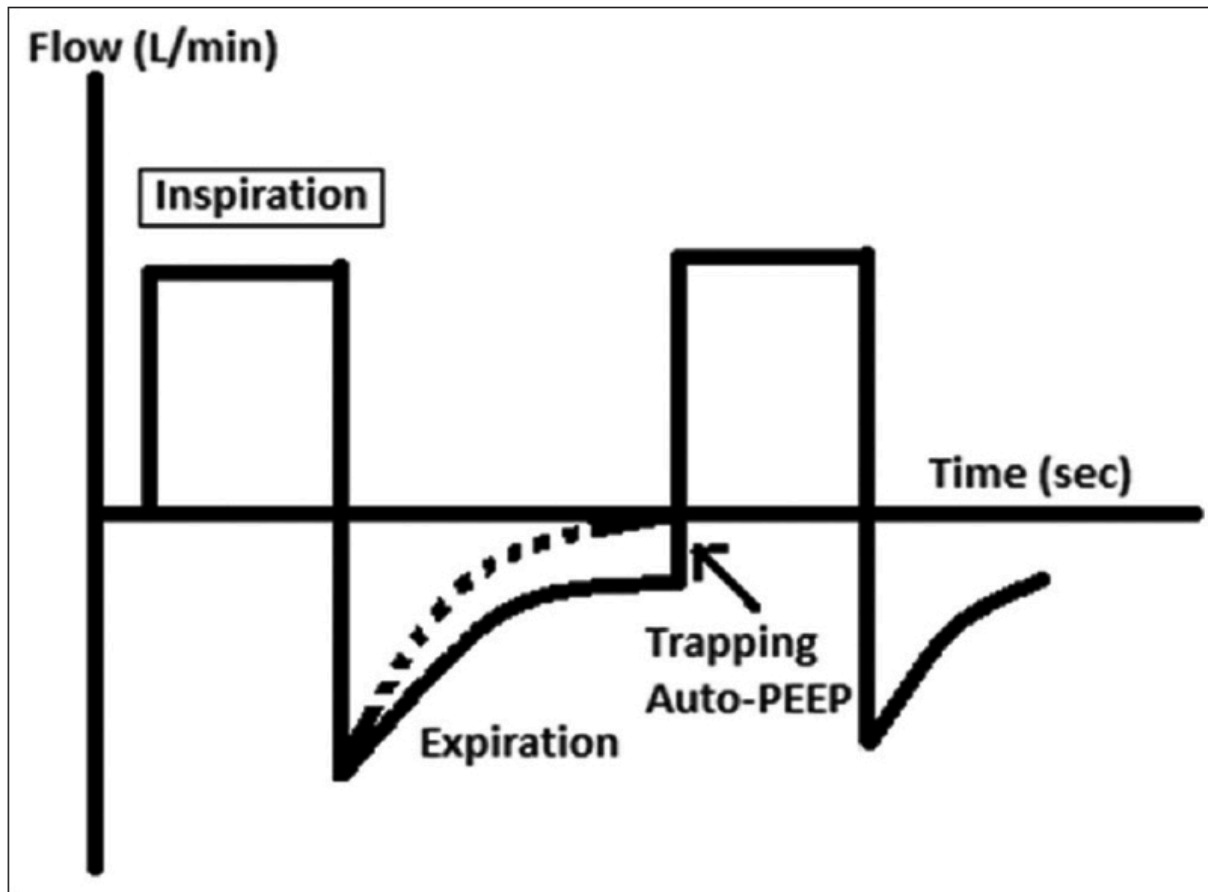


Fig. 3. Heart-lung interactions - effects of mechanical ventilation. Increased transpulmonary pressure due to positive pressure ventilation increases RV afterload, whilst RV preload is decreased due to the decreased venous return. During the inspiratory phase, LV preload is transiently increased due to a 'squeezing' effect from pulmonary vasculature into the left atrium. Ultimately however, the decrease in RV filling leads to decreased LV filling and output. TP=transpulmonary pressure=alveolar-pleural pressure. Adapted from Michard & Teboul (2000).

Obstructive lung disease

- Beware air trapping, aggressive bagging



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