SAT &SBT: TODAYS WEANING STRATEGIES

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OPTIMAL PEEP STUDY

ATELECTATIC

OPTIMAL

OVER-DISTENSIO

WEANING

…is the liberation of a patient from mechanical ventilatory support. Conti et.al. mrmjournal 2014, 9:45

…refers to the process of gradually or abruptly withdrawing mechanical ventilation. Lateira et.al. The Cochrane Library 2014:5

TYPES OF WEANING

Simple: 70% extubate on 1st SBT

Difficult: 2-7 days after initial assessment

Prolonged: multiple SBT failures

BALANCE OF WEANING

Waiting to wean/extubate leads to excess stay, iatrogenic lung injury and higher mortality

Premature wean/extubation leads to muscle fatigue, dangerous gas impairment, loss of airway protection and higher mortality

MacIntyre, Resp Care 2013

SEDATION AWAKING TRIAL

Daily assessment of the need for sedation after sedation is discontinued

If sedation is required re-start with ½ the previous dose

Daily interruption of sedation decreases the duration of mechanical ventilation and length of stay in the ICU.

Kress et.at. NEJM 2009

PAIN

Endotracheal Tube

Immobility

Invasive Lines

Analgesics

Morphine & Fentanyl

Always Consider Pain in Your Patient!!

SEDATIVES

Benzodiazepine

Versed & Ativan

Propofol

(milk of amnesia)

Dexmedetomidine

(Precedex)

SEDATION

Goal for most patients is co-operative sedation

Sedation scales are very helpful

Intermittent doses often suffice

SEDATION SCALES

Table 1. The Richmond Agitation-Sedation Scale (RASS)

Score	Term	Description	
+4	Combative	Overtly combative, violent, immediate danger to staff	
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive	
+2	Agitated	Frequent nonpurposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressive or vigorous	
0	Alert and calm		
−1	Drowsy	Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (>10 seconds)	Verbal stimulation
−2	Light sedation	Briefly awakens with eye contact to voice (<10 seconds)	
−3	Moderate sedation	Movement or eye opening to voice (but no eye contact)	
−4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation	Physical stimulation
−5	Unarousable	No response to voice or physical stimulation	

Procedure for RASS Assessment

1. Observe patient
   - Patient is alert, restless, or agitated. — Score 0 to +4
2. If not alert, state patient's name and say to open eyes and look at speaker.
   - Patient awakens with sustained eye opening and eye contact. — Score −1
   - Patient awakens with eye opening and eye contact, but not sustained. — Score −2
   - Patient has any movement in response to voice but no eye contact. — Score −3
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   - Patient has any movement to physical stimulation. — Score −4
   - Patient has no response to any stimulation. — Score −5

Adapted with permission.[29]

SEDATION COMPLICATIONS

Under-sedation

asynchronous breathing, invasive lines lost

Over-sedation

Delayed awakening, muscle weakness

DELIRIUM

Hyper-active

Hypo-active

PTSD

WAKE UP SAFETY CHECK

No active seizures

No active withdrawal

No active agitation

No paralytics

No myocardial ischemia (24hrs)

Normal intracranial pressure

BREATHE SAFETY CHECK

Oxygen saturation $\geq$ 88%

FiO2 $\leq$ 50%

PEEP $\leq$ 8

No active agitation

No significant vasopressor Use

SPONTANEOUS BREATHING TRIAL

Varies by institution

PSV $\leq$7

Automatic Tube Compensation

"T"-piece

SAT & SBT

Wake Up and Breathe

Paired SAT/SBT gives better outcomes compared to usual sedation/SBT

Girard et.al. Lancet
2008

SBT FAILURE
"THE USUAL SUSPECTS"

Hypoxemia ($SpO_2 < 90\%$)

Tachypnea (RR > 35 bpm for > 5 minutes)

Tachycardia (> 140 bpm or 20% above baseline)

Bradycardia

Hypertension

Hypotension

Agitation

Diaphoresis

Anxiety

AUTOMATIC TUBE COMPENSATION

In theory should work,

Data shows equal to T-piece and PSV

PSV 5-8 cm H2O covers the airway resistance of a majority of situations

ETT properties change after intubation

Tanios, Epstein
Resp Care 2010

EXTUBATION WITHOUT SBT

Patients that were ready to wean (≤50% and ≤8 peep)

had the same result outcomes for extubation or SBT/extubation

139 patients enrolled, successful extubation rates (97.8%%)SBT/(90.0%)no SBT

Wang et.al. CCN 2013

PROLONGED MECHANICAL VENTILATION

1) 35% mortality, ½ of survivors wean by day 90

After day 90 poor chance of liberation

MacIntyre et.al. Chest 2005;128(6):3937-3954

Ineffective cough best predictor of extubation failure

Huang, Yu respcare 2013

PROLONGED MECHANICAL VENTILATION WEAN STRATEGY

Gradual decrease in pressure support with a increase of wean time

trach mask for longer periods

EXTUBATION

Separate from the SAT/SBT

Can the patient have the ETT removed

effective cough, protect airway(mental status)

EXTUBATION TO NIVV FOR SELECTED PATIENTS

Acute on Chronic Respiratory Failure

Chronic Obstructive Pulmonary Disease

Ferrer et.al Am J Resp Crit Care Med 2003

EXTUBATION TO NPPV FOR OTHERS

NPPV in non selected patients increased mortality

Did not decrease need to re-intubate

Esteban et.al. NEJM 2004

RE-INTUBATION

Approximately 15% of extubation failures are unidentified in SBT's (Airway Issue)

Failed extubation leading to re-intubation 30-40% hospital mortality (Non-airway Issues)

Greater the time to re-intubation worse outcome

Epstein, Ciubotaru Am J Crit Care Med 1998

CONCLUSION

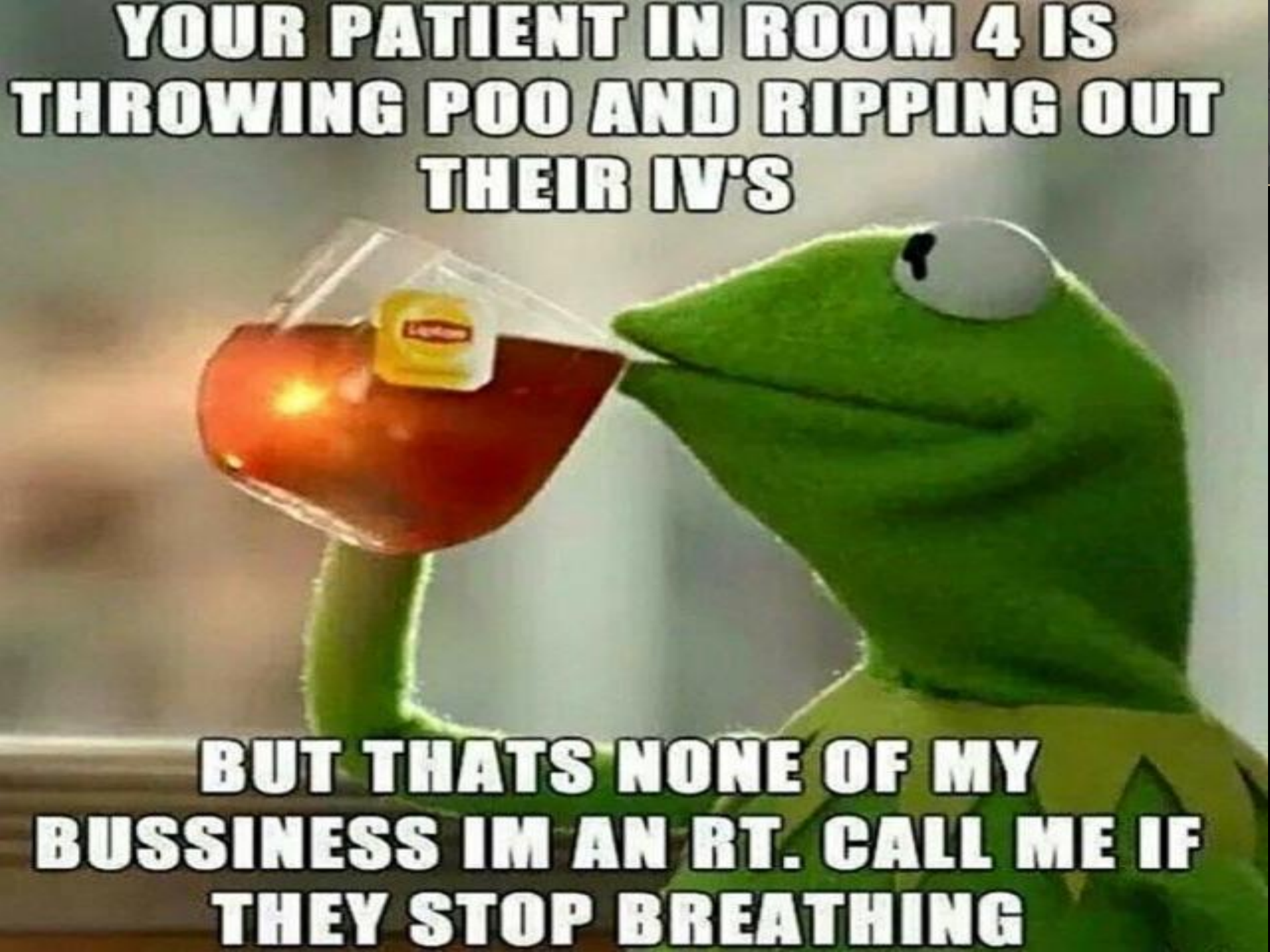
Daily awakening and breathing trials

Decrease days on ventilator

Decrease post-traumatic stress syndrome

Does not increase self extubation rates

Is the gold standard for weaning


YOUR PATIENT IN ROOM 4 IS THROWING POO AND RIPPING OUT THEIR IV'S
BUT THATS NONE OF MY BUSSINESS IM AN RT. CALL ME IF THEY STOP BREATHING