

ICUSD

# Stepdown Patient Surge Education

## Part II



**Join By Webex**

**See Email for login instructions**

**Wed April 1: 0800 or 1400**

**Thurs April 2: 1700**

**Friday April 3: 0730**

**Monday April 6: 0730**



FOR MORE INFO:  
CALL Savannah 2314

To Join Web Ex Call the number below

When asked to enter Access Code or Meeting Number, Enter 623 886 714,  
followed by #

It will then ask for your ID and goes on to say if you don't have one select #,  
You will not have an ID, Just Select #

### **Join by phone**

+1-408-418-9388 United States Toll

Access code: 623 886 714

# Arterial Lines



- Used for invasive blood pressure monitoring & lab draws ( Labs to be drawn by CCU Nurse)
- Should be present when using vasoactive drips

## Stepdown Nurse's Responsibility

- Monitor for appropriate waveform
- Call for help when line needs troubleshooting
- Verify pressure bag maintained at 300mmHg
- Ensure that CCU nurse zeros the line every shift
- Ensure that tubing is changed every 96 hours by a CCU nurse

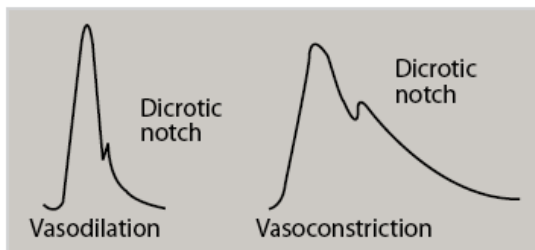
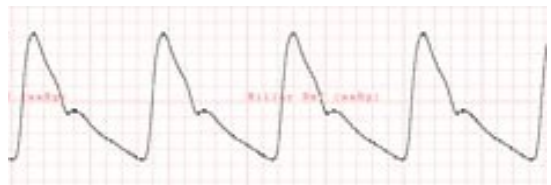
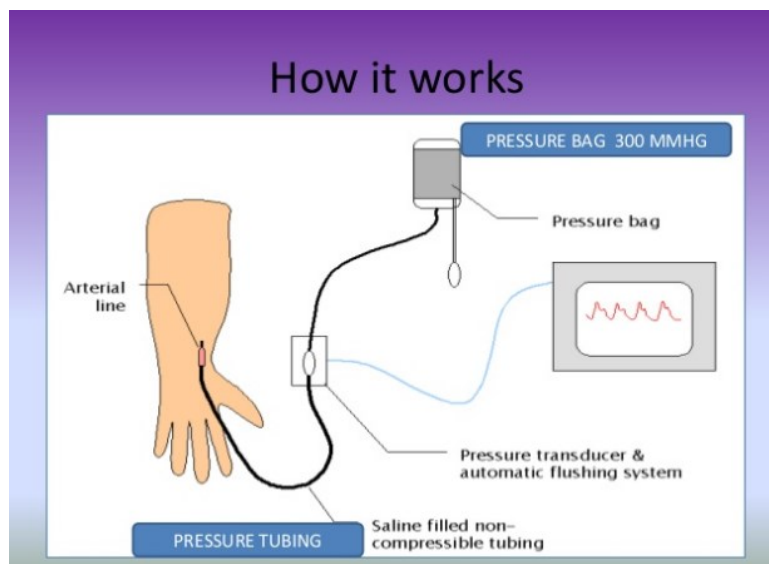


Figure 6. The effects of vasodilation and vasoconstriction are readily visible on the direct arterial blood pressure waveform.



## 1- What is an A-line?

A-line stands for Arterial line. Our teams use 20-gauge straight IV catheters, and insert them into – usually – the radial artery in one wrist or the other.

## 2- What are the parts of an a-line?

We start with a bag of saline. The bag is connected to a standard transducer setup: soft tubing from the bag to the transducer, and stiff tubing from the transducer to the patient. The stiff tubing goes from the transducer to the arterial catheter.

The bag of flush is pumped up to 300mm of pressure with a white pump bag – the transducer controls the forward flow of flush into the artery, keeping it open, at a rate of 3 cc per hour. If the line weren't pressurized this way, the arterial pressure would make the patient's blood climb right back up the line.

## 3- What are a-lines used for?

Two things mainly: blood pressure monitoring, and for patients who need frequent blood draws. Any patient on more than a small amount of any vasoactive drip really needs to have an a-line for proper BP management – if they're sick enough to be put in the unit and need pressors, then they're sick enough for an a-line. Non-invasive automatic blood pressure cuffs are useful, but if a person is labile – push for an a-line.

Certain situations absolutely require an a-line for BP monitoring: any use of any dose of nipride, for example. This is a truly powerful drug – it works very quickly, and your patient can rapidly get into all sorts of trouble unless you're monitoring BP continuously.

## 4- What do I have to think about before the a-line goes in?

First – unless the patient is unresponsive, or has no proxy at hand – the team should get informed consent for this procedure. You need to remember that you're putting something in one of the two vessels that supply the hand with blood. Is the patient hypotensive – are you going to need a Doppler to find the pulse in the first place? Is the patient anticoagulated? Which hand does the patient use to write with? – get the team to use the other one. Is the patient very agitated, and likely to pull the line out – does she need some sedation?

Have a transducer setup ready to hook up to the new line. Hook the setup to the monitor with a cable, and zero the transducer so that you'll be able to see the waveform when the line goes in.

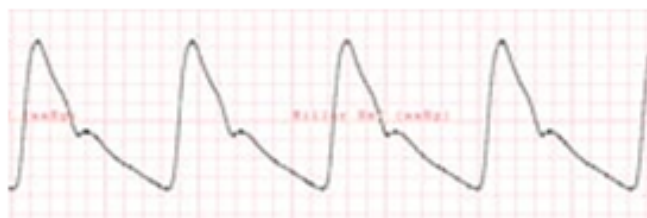
## 5- How do I use an a-line to monitor blood pressure?

A transducer is a device that reads the fluctuations in pressure – it doesn't matter if it's arterial, or central venous, or PA – the transducer reads the changing pressure, and changes it into an electrical signal that goes up and down as the pressure does. The transducer connects to the bedside monitor with a cable, and the wave shows up on the screen, going from left to right, the way EKG traces do.

A couple of things to remember:

- The transducer has to sit in a “transducer holder”.
- The transducer has to be levelled correctly. Use a level to make sure that it’s at the fourth intercostal space, at the mid-axillary line.
- Make sure there’s no air in the line before you hook it up to the patient – use the flusher to clear bubbles out of the tubing.
- Zero the line properly, and choose a screen scale that lets you see the waveform clearly. This can be really important in situations like balloon pumping.

Let’s take a second to look at a typical arterial waveform:



The highest point is the systolic pressure, the lowest is the diastolic. Everybody see the little notch on the diastolic downslope? – there’s one in each beat. A little after the beginning of diastole – the start of the downward wave – the aortic valve flips closed, generating a little back-pressure bump: called the “dicrotic notch”.

#### 6- How should I set the alarm limits?

Keep alarm limits appropriate for the patient’s HR & rhythm.

#### 7 - How often does the transducer setup have to be changed?

The routine now is 96 hours – Critical Care Resources will help with this, just make sure that it happens

#### 8 - What kind of dressing goes on an a-line site?

Cover with a small clear tegaderm dressing. Try to resist the temptation to reinforce the site dressing with tape – this can make it really hard to get the dressing off without almost losing the line.

#### 9 - What is the armboard for?



The armboard and roll holds the wrist in a (gently) dorsiflexed position, which keeps the catheter from kinking if the patient bends his wrist.

**10- Does the patient's arm have to be restrained?**

**Yes**, if there is any chance that they might lose the line by moving around. If the patient is chemically paralyzed, you'd be safe without a restraint.

**11- What does "dampened" mean?**

Dampening is what happens when the catheter can't see the patient's blood flow clearly –he's bent his wrist, kinked the catheter – sometimes the top of the catheter pushes up against the vessel wall. The waveform flattens out on the screen. The trick is to learn the difference between a dampened waveform and a hypotensive one! If straightening out the patient's wrist doesn't help, sometimes you can take the dressing down and readjust the angle of the catheter then retape.

**12. How often should I check the pulse at the a-line site?**

Every hour. In practice, if your patient has tolerated having the line in place for some time, this can be loosened up a little, but try to remember that a-lines are a lot more invasive than IV's. A vasculopathic patient whose extremities may be poorly perfused is always at risk, even if his arteries don't have catheters in them.

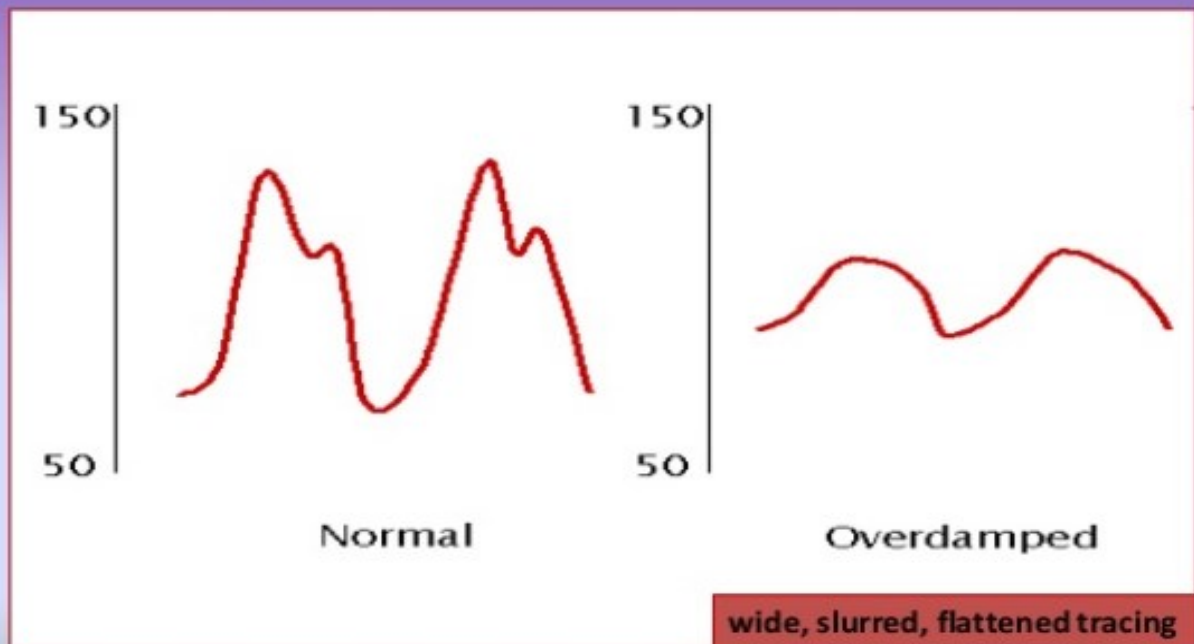
**13- How do I know if the patient's hand is at risk?**

The pulse will diminish, or go away altogether. The hand may look dusky, or be cold, or lose some sensation – remember to assess for coloring, sensation, motion, and capillary refill. If you think that the a-line is threatening the patient's hand, let the team know right away, and be ready to set up for another insertion somewhere else if the line is still necessary.

**14-What do I do if the patient pulls out her a-line?**

Compress the site with a sterile 4x4 for several minutes, longer if the patient is anticoagulated. Assess the perfusion of the hand. Try to see if the patient has ripped out her sutures or not...make sure you put the patient on the non-invasive cuff at meaningful intervals while you talk to the team about replacing the line

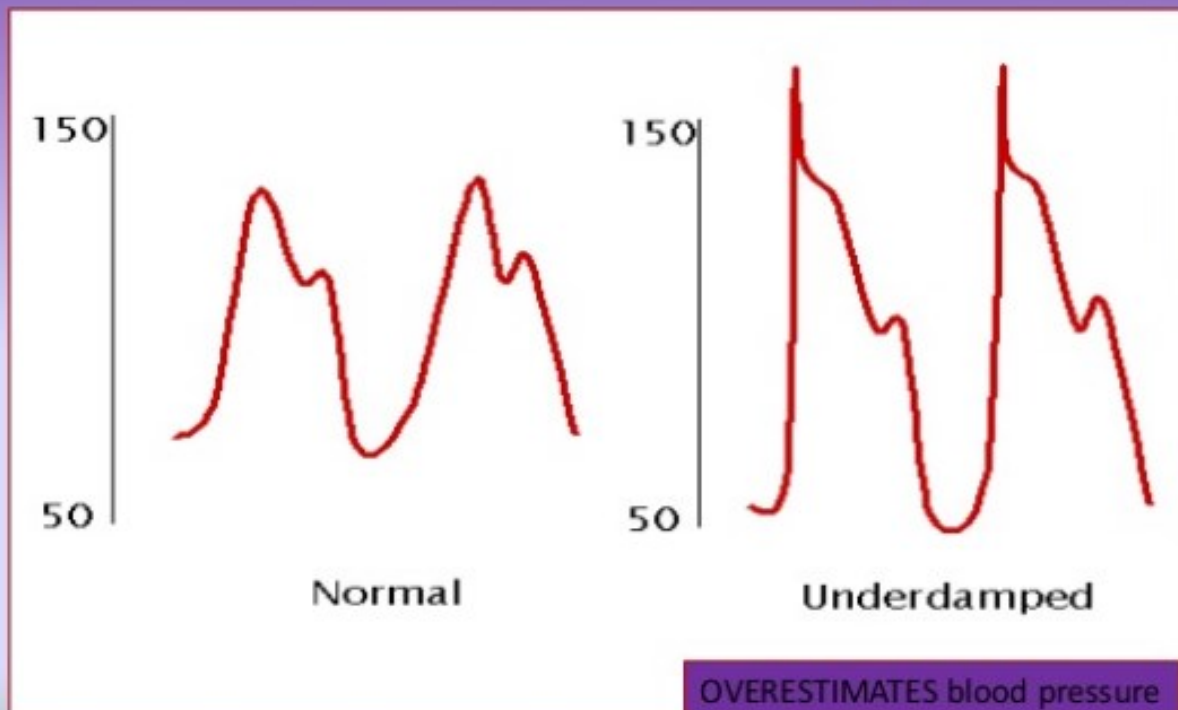
## • Dampened trace



wide, slurred, flattened tracing

UNDERESTIMATES blood pressure.

## • Resonant trace 'spiked'



OVERESTIMATES blood pressure

## Sedation Drugs

Titration Goal: RASS of 0 to -1

Drug	Standard Mix	Starting Dose	Max Dose	Titrate By:	Comments
Fentanyl	2000mcg/200ml	25mcg/hr	350mcg/hr	Titrate by 25 mcg/hr as often as every 10 minutes	You may give a bolus dose as ordered
Propofol (Diprivan)	1000mg/100ml	5mcg/kg/min	50mcg/kg/min	Titrate by 5 mcg/kg/min as often as every 5 minutes	****DO NOT BOLUS DOSE ** Not used unless mechanically ventilated
Dexmedetomidine (Precedex)	400mcg/100ml	0.5mcg/kg/hr	1.4mcg/kg/hr	Titrate by 0.1 mcg/kg/hr as often as every 15 minutes	* Sometimes used post- extubation for delirium

## Neuromuscular Blockade:

Cisatracurium (Nimbex):

Standard Mix: 200/mg/100ml

Rate: 37.5mg/hr \*\* Do not change rate without MD order

\*\*\*If using a neuromuscular blockade, the patient needs constant sedation\*\*\*

## Critical-Care Pain Observation Tool (CPOT)

Score Range: 0 (little/no pain) to 8 (severe pain)

Indicator	Description	Select 1 score for each category	Score
Facial Expression	▪ No muscular tension observed	Relaxed, neutral	0
	▪ Frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	▪ All facial movements above, plus eyelid tightly closed	Grimacing	2
Body Movements	▪ Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	▪ Slow, cautious movements, touching or rubbing pain site, seeking attention through movements	Protection	1
	▪ Pulling tube, attempting to sit up, moving limbs, thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle Tension	▪ No resistance to passive movements	Relaxed	0
	▪ Resistance to passive movements	Tense, rigid	1
	▪ Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance With Ventilator (intubated patients)	▪ Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	▪ Alarms stop spontaneously	Coughing but tolerating	1
	▪ Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
Vocalization (extubated patients)	▪ Talking in normal tone or no sound	Talking in normal tone or no sound	0
	▪ Sighing, moaning	Sighing, moaning	1
	▪ Crying out, sobbing	Crying out, sobbing	2



**TOTAL SCORE:**



## 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 non-purposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressive vigorous	
0	Alert and calm		
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to <i>voice</i> ( $\geq 10$ seconds)	} Verbal Stimulation
-2	Light sedation	Briefly awakens with eye contact to <i>voice</i> ( $< 10$ seconds)	
-3	Moderate sedation	Movement or eye opening to <i>voice</i> (but no eye contact)	
-4	Deep sedation	No response to voice, but movement or eye opening to <i>physical</i> stimulation	} Physical Stimulation
-5	Unarousable	No response to <i>voice or physical</i> stimulation	

### Procedure for RASS Assessment

1. Observe patient
  - a. 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.
  - b. Patient awakens with sustained eye opening and eye contact. (score -1)
  - c. Patient awakens with eye opening and eye contact, but not sustained. (score -2)
  - d. 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.
  - e. Patient has any movement to physical stimulation. (score -4)
  - f. Patient has no response to any stimulation. (score -5)

\* Sessler CN, Gosnell M, Grap MJ, Brophy GT, O'Neal PV, Keane KA et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. *Am J Respir Crit Care Med* 2002; 166:1338-1344.

\* Ely EW, Truman B, Shintani A, Thomason JWW, Wheeler AP, Gordon S et al. Monitoring sedation status over time in ICU patients: the reliability and validity of the Richmond Agitation Sedation Scale (RASS). *JAMA* 2003; 289:2983-2991.

## SAT/SBT Weaning Protocol Worksheet – Page One

### SPONTANEOUS AWAKENING TRIAL (SAT)

#### STEP 1: SAT Screen

**Complete screening assessment by 0600 each AM.**

- Sedation for active seizure or ETOH withdrawal
- Escalating sedation due to ongoing agitation
- Receiving neuromuscular blockade agents
- Any evidence of active myocardial ischemia in past 24 hr
- Any evidence of increased intracranial pressure

**Complete a CAM Assessment**

- FAIL if ANY criteria are checked. **Notify Provider** for orders to continue screening or resume SAT/SBT in am.
- PASS if NO criteria are checked – Go to **STEP 2**

#### STEP 2: SAT Test

**Stop ALL sedation and pain meds by 0730.**

NOTE: Any IV meds used for specific underlying condition (i.e benzo diazepam for ETOH withdrawal or narcotics for severe pain) are NOT withheld.

**Evaluate patient for tolerance of sedation cessation and respiratory status:**

- Sustained anxiety, agitation or pain
- Respirations >30/min for  $\geq 5$  minutes
- SpO<sub>2</sub> <90% for  $\geq 5$  minutes
- Acute cardiac arrhythmias or HR >120 or <50 or change of 20 beats/min from baseline
- $\geq 2$  signs of resp distress: marked dyspnea, diaphoresis, use of accessory muscles
- Other: \_\_\_\_\_
- FAIL if ANY criteria are checked – Go to **STEP 3**
- PASS if ONE of the following met – Go to **STEP 4**
  - Opens eyes to verbal stimuli **without failure criteria**
  - Tolerates sedation interruption w/o failure criteria

#### STEP 3: SAT Test Failure

**Notify MD of patient status and criteria not met. Obtain further orders.**

- Resume SAT/SBT in AM. Restart sedation as follows, unless otherwise ordered:
  - Restart sedation at 50% of the original dose.
  - If showing intolerance, increase dose to 1.5 times 50% of the original dose.
  - If still intolerant, increase dose to 1.75 times 50% of the original dose.
  - If remains intolerant, return to original dose.
- Proceed with SBT per order – Go to **STEP 4**

Patient Label \_\_\_\_\_

Date: \_\_\_\_\_ MD \_\_\_\_\_  
RN \_\_\_\_\_ RT \_\_\_\_\_

## SAT/STB Weaning Protocol - Page Two SPONTANEOUS BREATHING TRIAL (STB)

### STEP 4: STB Screen Criteria

Maintain tube feeding.

- MAP <65
  - ABG OR SpO<sub>2</sub> ≤ 90%
  - Ph ≤ 7.32, PaO<sub>2</sub> ≤ 65, FiO<sub>2</sub> > 0.5
  - PEEP ≥ 8
  - Frequency/TV ratio ≥ 105
  - Secretions NOT easily managed
  - No acute cardiac arrhythmias
  - No signs of myocardial ischemia
- FAIL if ANY criteria checked – Go to *STEP 5*
- PASS if NO criteria are checked – Go to *STEP 6*

### STEP 5: STB Screen Failure

Notify MD of STB outcome and criteria failure to obtain further sedation and weaning orders.

- Resume reduced sedation per Step 3. Resume SAT/STB in AM.
- Proceed with STB Test screen per order – Go to *STEP 6*

### STEP 6: STB Test

Reassess within 1 hr for **Failure Criteria**.

With 1 hr assessment, draw ABG's, unless on full dose of lovenox or IV anticoagulants w/o arterial line.

#### **FAILURE CRITERIA:**

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li><input type="checkbox"/> MAP &lt; 65</li><li><input type="checkbox"/> Frequency/TV ratio ≥ 105</li><li><input type="checkbox"/> Ph ≤ 7.32, PaO<sub>2</sub> ≤ 65, FiO<sub>2</sub> &gt; 0.5</li><li><input type="checkbox"/> RR &lt; 8 or &gt; 30 for ≥ 5 minutes</li><li><input type="checkbox"/> SpO<sub>2</sub> ≤ 90 on 50% FiO<sub>2</sub></li><li><input type="checkbox"/> Secretions not easily managed</li></ul> | <ul style="list-style-type: none"><li><input type="checkbox"/> Increased work of breathing</li><li><input type="checkbox"/> SBP &gt; 170</li><li><input type="checkbox"/> Altered mental status</li><li><input type="checkbox"/> Acute cardiac arrhythmias</li><li><input type="checkbox"/> HR &gt; 120 or &lt; 50 beats/min from baseline</li></ul> |
|---|--|
- FAIL if ANY criteria checked OR change in condition.
- Return to previous vent settings and **notify MD**.
  - Resume reduced sedation per Step 3. Resume SAT/STB
- PASS if NO criteria are checked
- Obtain weaning parameters and NIF.
  - Assess ability to follow commands and patient tolerance.
  - Place pt on CPAP 5/5.
  - Contact Provider for extubation orders or to discuss concerns
  - **Extubate per order. Prior to extubation, stop tube feeding and apply suction to remove stomach contents. DO NOT suction small bowel feeding tubes.**

# Critical Care Patient Care Protocols

## Universal Decolonization

- Initiate first chlorohexadine (CHG) bath within 4 hours of admission
- CHG bath must be completed daily, not to exceed a 24-hour interval from last CHG bath
- Any invasive line (IV, CVC, foley, CT) is wiped to patient to approximately 6" distal down line
- Personal hygiene and deodorant products will deactivate CHG and are not allowed
- Mupirocin nasal inoculation dosing BID X 5 days

## Glucose Management

- Target glucose is 125 to 175 mg/dL for critically-ill patients to promote optimal healing
- FSBG monitoring is hourly upon admission X 4, then every 4 hours
- Insulin drips are initiated when blood glucose exceeds the target range
- Once insulin drip titration has normalized, consult Provider re: conversion to bolus dosing
- CHO coverage when not NPO is maintained
- Glucostabilizer can be utilized for Insulin drip titration as directed through computer software analysis to promote early glucose stabilization

## Potassium / Magnesium / Phosphorus Replacement

- Prophylactic monitoring is utilized to prevent the patient complications R/T depletion of normal electrolyte levels
- Provides replacement therapy guidelines to correct deficits.
- Electrolytes replacement is initiated as follows:
  - Potassium  $\leq 3.5$  meq/dL (MUST check serum Magnesium)
  - Magnesium  $\leq 1.6$  meq/dL (MUST check serum Potassium)
  - Phosphorus  $\leq 3.0$  mg/dL

## VAP Protocol – Prevention of “Ventilator Acquired Pneumonia

- Handwashing
- Elevate HOB at least 30°
- Mouthcare every two hours
- Chlorohexadine swab every 6 hours x 48 hours, then every 12 hours
- Brush teeth every 12 hours
- Subglottic suctioning as needed
- Progressive mobility is expected in coordination with PT and RT

## Spontaneous Awakening Trial/Spontaneous Breathing Trial (SAT/SBT)

- All ventilator patients are evaluated daily for CPAP trials and readiness to extubate
- Each day at 0600, the SAT Screen is completed.

- Each AM IV sedation is withheld at 0730 to assess awakening and potential to initiate CPAP trials.
- The SBT screen is completed after patient has awoken to evaluate readiness to attempt extubation.

### **Sepsis Protocol**

- Evidence-based care bundles are implemented for the patient with Severe Sepsis/Septic Shock
- The 3-hour bundle includes: culture, serum lactate, and broad-spectrum antibiotics
- The 6-hour bundle of care includes: ongoing correction of fluid status and repeat lactate
- Aggressive fluid resuscitation within one hour is required at 30ml/kg when hypotensive (SBP < 90mmHg/MAP < 65mmHg)
- Vasopressors administration may be added to maintain prescribed BP parameters (Norepinephrine, Phenylephrine, Dopamine, or Epinephrine)

### **Manual Proning**

- Indicated for ARDS patient unresponsive to ventilator therapy
- The therapy may promote recruitment of posterior aveoli and improved overall ventilation
- 16 hours of pronation position is alternated with 4 hours supine position
- CVP monitoring and use of vasopressor medications are used to maintain BP
- Sedation and Neuromuscular blockade therapy is indicated to prevent shivering
- A Prone Kit is obtained from CSR to guide patient preparation to begin manual proning

### **Induced Hypothermia**

- Indicated for patient that remains comatose post cardiac arrest
- Patient's temperature is manually cooled to 32° C within 4-6 hours of the event
- Hypothermia is maintained for 24 hours
- CVP monitoring and use of vasopressor medications are used to maintain BP
- Sedation and Neuromuscular blockade therapy is indicated to prevent shivering
- Rewarming is initiated after 24 hours of induced hypothermia
- Patient is rewarmed to approximately 36.1°C over a 6 – 8 hour timeframe
- Neurologic recovery is evaluated after hypothermia, sedation, and paralysis is reversed

# Common Ventilator Alarms

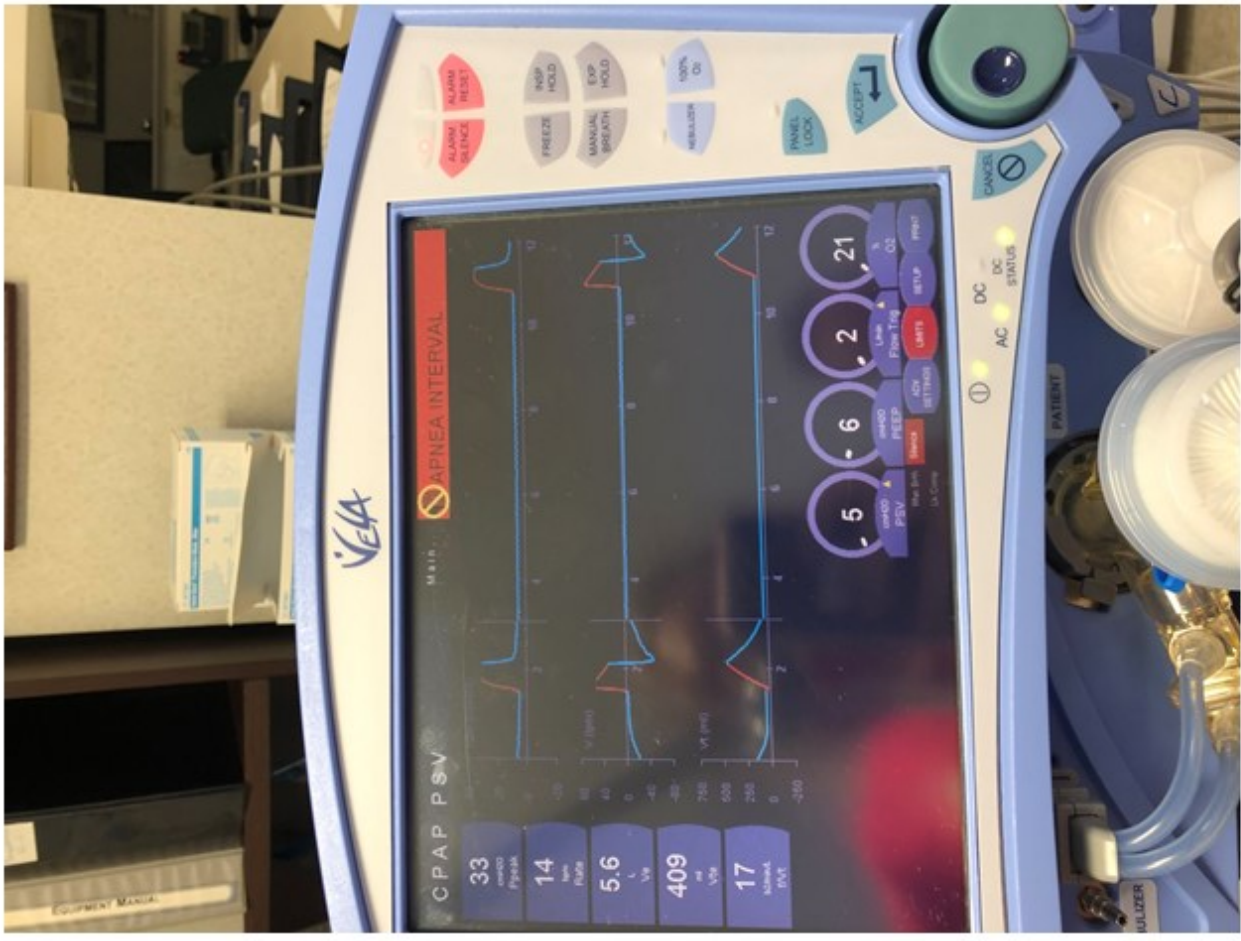
The following alarms listed below are some of the most common but are not limited to the 4 that are in outline.

1. Apnea Alarm
2. High Rate Alarm
3. High PIP (Peak Inspiratory Pressure) Alarm
4. Circuit Fault Alarm

The patient and alarm should **ALWAYS** be assessed prior to calling RT. There may be times that RT can not come right away so all the information that you have will help us trouble shoot on the phone.

# Apnea Alarms

- When the ventilator detects 20 seconds of apnea or lack of patient effort, the “Apnea Interval” alarm will be activated.
- If the “Apnea Interval” alarms is triggered, the ventilator will immediately default to the back up rate set by the Respiratory Therapist.
- Stay with patient and assess that this is truly apnea and notify RT ASAP.
- **Never silence alarm without knowing and correcting reason for alarm.**

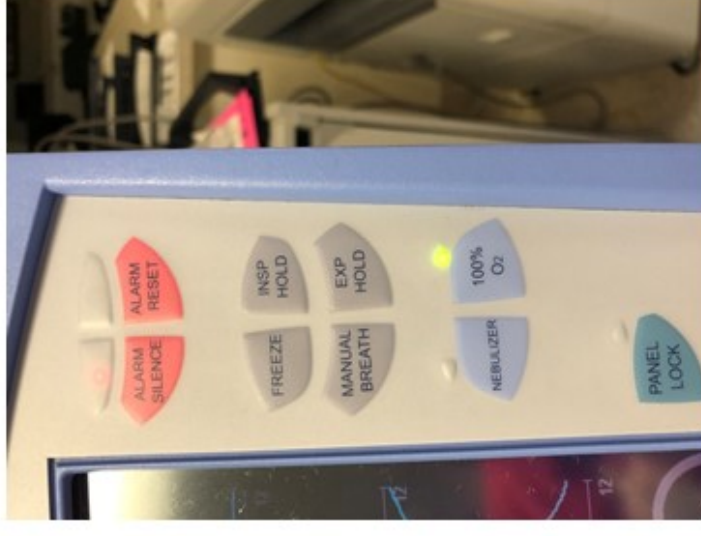
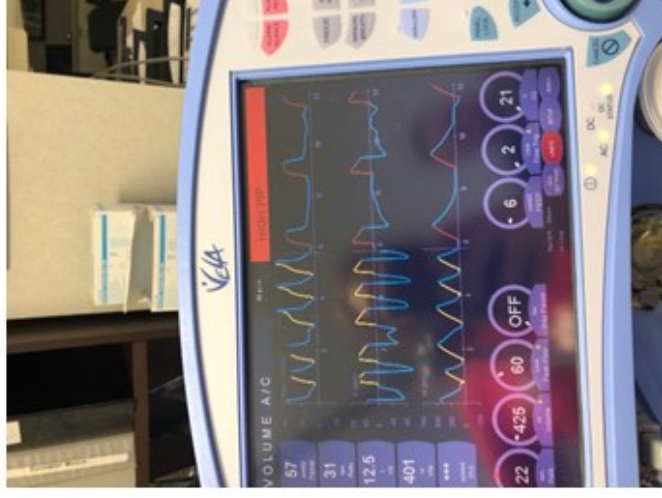
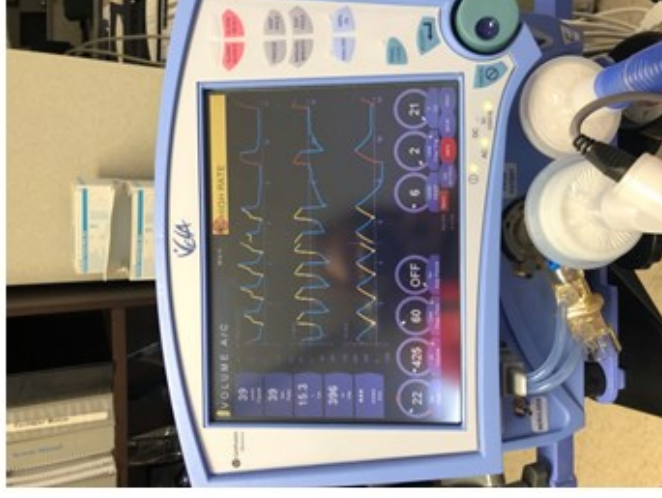


# High Rate &

## High PIP Alarms (Peak Inspiratory Pressure)

- When a **“High Rate”** and/or **“High PIP”** alarm is triggered, you need to assess patient for these common reasons for alarms:

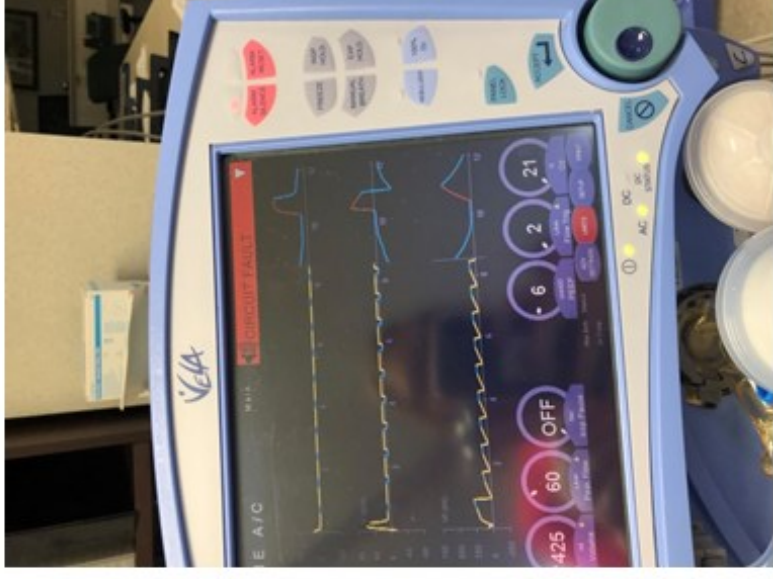
1. Coughing
  2. Secretions – consider suctioning ETT via inline suction catheter.
  3. Patient biting endotracheal tube (calm patient and/or consider sedation)
  4. Patient agitated (increased sedation may be indicated)
  5. Patient trying to talk
- If you have identified one of these causes, corrected it or it is an isolated event no need to call Respiratory Therapist. **ALWAYS LOOK AT PATIENT & ASSESS.**
  - Call RT ASAP if you are unsure.
  - **Never silence alarm without knowing and correcting reason for alarm.**





# Circuit Fault Alarm

- A **“Circuit Fault”** alarm should be taken **VERY SERIOUSLY!** This indicates that there has been a disconnection from the ventilator. The 2 pictures below are just a couple of common areas that become disconnected.
- If you can not find where the disconnection is quickly, you need to prepare to manually ventilate the patient with Ambu bag via ETT with Oxygen and have someone call RT ASAP.
- **Never silence alarm without knowing and correcting reason for alarm.**



# In-Line Suctioning

- **In-Line suctioning is a closed system. Gloves must be worn but doesn't require a sterile process.**
- **Always pre-oxygenate patient by pressing "100% O2" button.**
- **Advance catheter until patient coughs, secretions visible in ETT or resistance is met. DO NOT BE FORCEFUL! Trauma can occur and cause bleeding.**
- **Withdraw catheter at a steady pace with suction button pressed. This should take no longer than 10 seconds.**
- **Catheter should be fully withdrawn from ETT until catheter tip is past valve.**
- **Monitor patients heart rate , Spo2 and tolerance of suctioning. Be sure to let patient rest between suction attempts.**

## Indications for suctioning:

- **That is why pre-oxygenation is vital.**
  - **Coughing with or without visible secretions in Endotracheal Tube**
  - **Coarse crackles/Rhonchi breath sounds**
- \*\*\*\* Do not suction patient just because they are desaturating. Remember that suctioning not only removes secretions but oxygen as well. That is why pre-oxygenation is vital. \*\*\*\***

