<u>**Online Data Supplement**</u>


**Impact of Simulation-based Mastery Learning on Resident Skill Managing Mechanical Ventilators**

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**Ventilator management: Normal Physiology (Pretest) – Checklist questions 1-22**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for ideal/predicted body weight tidal volumes, a normal chest x-ray

**Learner case** (to be printed on separate sheet and provided to the learner):

Pat Burns is a 52 year old man without significant medical history who presented to the ED with likely heroin overdose. He has received multiple doses of narcan with some improvement but quickly becomes obtunded again. He is unresponsive to sternal rub and without a gag reflex. A narcan drip is ordered and he is intubated for airway protection.

Prior to intubation:

CXR: Image provided

Vital signs: Height 6', Weight 100 kg, Temp 98.4, HR 86, BP 110/65, RR agonal breathing, oxygen saturation 89% on RA

ABG on room air: 7.16/70/55

The respiratory therapist needs your assistance with the ventilator. Additional information will be provided on request.

**Ventilator management: Normal Physiology (Pretest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done Incorrectly |
|---|---|---|
| **Note for RT:** At the start of the case, the ventilator should be off and the RT will set the ventilator with the settings that the learner requests. Set ASL to "healthy patient, apneic" at the start of the case. | | |
| **1-4. RT:** "I've placed the patient on AC/VC mode with a flow of 70 L/min and a down ramp. What additional ventilator settings would you like?" <br><br> • Respiratory rate: any value 8-30 | | |
| • Tidal volume: Learner must provide a tidal volume between 466-775 mL (6-10 cc/kg) **and** explain how they determined that volume. RT may prompt: "How did you get that tidal volume?" Acceptable ways to determine the tidal volume: <br><br> 1.) Ideal body weight (man) = 50 kg + 2.3 kg (height in inches – 60)  OR <br><br> 2.) Requests ideal/predicted body weight chart | | |
| • Oxygen or FiO2: any value between 21% and 100% | | |

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| • PEEP: 5-8 | | |
| **Note for RT:** Set the ventilator to the settings requested by the learner. If the learner does not provide settings, set the ventilator to RR 10, TV 650, FiO2 40%, PEEP 5, 70 ramp.) | | |
| **5. RT:** "What is the patient's actual respiratory rate?" (Note: The patient will not be overbreathing the set rate so the actual rate equals the set rate)<br><br>• Rate that was set by learner | | |
| **6. RT:** "What is one way to know if a patient is overbreathing the ventilator or initiating his/her own breaths?" Acceptable responses (correct if any one correct response is given)<br><br>• The actual rate (f tot) is greater than the set rate<br><br>• The left upper corner of the ventilator says "S" for spontaneous or "A" for assisted breaths, instead of "C" for controlled breaths.<br><br>• There is a "dip" in the flow tracing<br><br>• Count patient's respiratory rate | | |
| **7. RT:** "For this patient, what is triggering the ventilator to deliver a breath?"<br><br>• Time | | |

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| **8. RT:** "For this patient, what is the minute ventilation?" Acceptable responses (correct if either response is given)<br><br>&bull; Reads the minute ventilation displayed on the ventilator **OR**<br><br>&bull; Calculates minute ventilation (RR x TV) and provides answer | | |
| **9-11. RT:** "What is the airway resistance?"<br><br>&bull; Step 1: Learner changes the ventilator, or asks that it be changed, to a square waveform | | |
| &bull; Step 2: Learner performs or requests an inspiratory hold maneuver | | |
| &bull; Step 3: Learner calculates the airway resistance (peak P – plateau P/flow) **or** reads the resistance off the display screen (if steps 1 and 2 not done, step 3 should be marked incorrect) | | |
| **12. RT:** "What is a generally acceptable airway resistance for a patient on a ventilator?"<br><br>&bull; 15 or less | | |
| **13-14. RT:** "What is the static compliance?" | | |

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| • Step 1: Learner performs or requests an inspiratory hold maneuver (can be done on any flow/pattern) | | |
| • Step 2: Learner calculates the static compliance (TV/plateau-PEEP) **or** reads the compliance off the display screen (if step 1 not done, step 2 should be marked incorrect) | | |
| **15. RT:** "A normal compliance in a mechanically ventilated patient should be greater than or equal to what?"<br><br>• 60 | | |
| **Note:** ASL software should be taken off apneic setting and set to "medium" (leading to a RR of 15) | | |
| **16-19. RT:** "Three days later the patient remains intubated for hypoxemic respiratory failure secondary to aspiration pneumonia that occurred around the time of intubation. For this patient, or any intubated patient, what factors determine safety to undergo a spontaneous breathing trial?" (additional responses may be provided but give credit only for those listed below)<br><br>• Patient is hemodynamically stable (not on vasopressors or on a low dose of vasopressors) | | |

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| • FiO2 is less than or equal to 50% (FiO2 of 40% is acceptable) | | |
| • PEEP less than or equal to 8 (PEEP of 5 is acceptable) | | |
| • Patient can initiate an inspiratory effort | | |
| **20. RT:** "When the patient meets criteria for a spontaneous breathing trial, how would you perform it?" (correct if either response is given)<br><br>• Pressure support trial **or**<br><br>• T-piece trial / Blow-by | | |
| **21. RT:** "The patient is placed on pressure support at 5 over 5. How long would you like him to remain on pressure support before you evaluate for extubation?"<br><br>• Any value between 30 minutes and 2 hours is acceptable | | |
| **Note for RT:** Set the ventilator as follows: PS 5/5, 40% (will simulate RR 15, TV 480) | | |
| **22. RT:** "He has been on pressure support of 5 over 5 for 1 hour. His HR is 115 (stable) and BP is 160/82. He is calm and has an O2 saturation of 97%. Do you recommend extubation?"<br><br>• Yes | | |

**Ventilator management: Restrictive Physiology (Pretest) – Checklist questions 23-36**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for ideal/predicted body weight tidal volumes, CXR with bilateral opacities consistent with ARDS, lab sheet with ABG 7.43/35/130.

**Learner case** (to be printed on a separate sheet and provided to the learner)

Mike Stone is a 63 year old man with a history of hypertension who was admitted to the general medicine service with community acquired pneumonia. He was started on ceftriaxone and azithromycin. He initially required 3L NC but has had increasing oxygen requirements and is now desaturating despite 100% non-rebreather. He is transferred to the MICU and intubated for hypoxemic respiratory failure.

Prior to intubation:

CXR: Image provided

Vital signs: Height 5'10", Weight 75 kg, Temp 101.1, HR 122, BP 110/65, RR 28, oxygen saturation 90% on 100% NRB

The respiratory therapist needs your assistance with the ventilator. Additional information will be provided on request.

**Ventilator Management: Restrictive Physiology (Pretest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done Incorrectly |
|---|---|---|
| **Note for RT:** Set ASL to "ARDS moderate, apneic". Set the ventilator to 14/650/100/5 at the start of this exercise. | | |
| **23. RT:** "What is the plateau pressure?" (Learner must perform an inspiratory hold) <br><br> • Reads plateau pressure | | |
| **24. RT:** "What is the goal plateau pressure for this patient?" <br><br> • Less than or equal to 30 | | |
| **25-26. RT:** "Here is the most recent ABG on the current ventilator settings (hand learner the ABG lab sheet – 7.43/35/130). Do you want to make any ventilator changes?" (If the learner would like to lower the TV to 6 cc/kg, prompt the learner as to how this can be accomplished) <br><br> • Used chart of ideal/predicted body weight or IBW calculation to arrive at TV ≤ 440 | | |
| • Decrease FiO2 to 60 - 90% | | |
| **27. RT:** In addition to gender, what patient parameter do you need to appropriately select a TV for a patient with ARDS? | | |

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| • Height | | |
| **Note for RT:** Adjust the ventilator as directed by the resident but leave the FiO2 at 100%; if no settings or inappropriate settings are selected, set the ventilator at 20/440/100/5. | | |
| **28-29. RT:** "I've adjusted the ventilator but could not lower the FiO2. The patient is now saturating 85% on 100% FiO2. What would you like to do?" (If asked, the patient is appropriately sedated and synchronous with the ventilator.)<br><br>**Note for RT:** Saturation will not improve to > 88% until PEEP is increased to ≥ 10. If learner increases PEEP but to < 10, tell them saturation improved to 87% and ask if they want to do anything else.)<br><br>• Increase PEEP to at least 10 | | |
| • Recheck plateau pressure after PEEP is increased | | |
| **30. RT:** "It is now the following morning. The nurse said the patient is desaturating and dyssynchronous with the ventilator. What do you want to do?"<br><br>• Order sedation OR increase the tidal volume to no more than 8cc/kg ideal/predicted body weight | | |

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| **31-35. RT:** "The patient is now adequately sedated but is still desaturating and dyssynchronous. I talked to the fellow – she ordered a paralytic and she wants you to switch the patient to pressure control ventilation. What settings do you want me to use to provide a **similar** level of support in pressure control mode while still providing guideline recommended ventilation for an ARDS patient? Please provide settings as you would order them" <br><br> • Inspiratory driving pressure: 10-16 | | |
| • PEEP: 14 | | |
| • FiO2: 100% | | |
| • Rate: 14-35 | | |
| • Ti: 0.8-1.2 | | |
| **36. RT:** "In pressure control ventilation, what parameter will change as the compliance of the lung changes?" <br><br> • Tidal volume | | |

**Ventilator management: Obstructive Lung Disease (Pretest) – Checklist questions 37-47**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for ideal/predicted body weight tidal volumes

**Learner case** (to be printed on separate sheet and provided to the learner)

Sarah Jones is a 31 year old woman with history of asthma who came to the ED 3 hours ago with worsening dyspnea. On exam, she had decreased breath sounds with faint wheezing and tachypnea with a respiratory rate in the mid-30s. Her CXR showed hyperinflated lungs and was otherwise clear. She was given an hour-long albuterol/ipratropium nebulizer, solumedrol 125 mg IV, and magnesium sulfate 2 g IV. She remained tachypneic and was started on non-invasive ventilation with an inspiratory pressure of 10, an expiratory pressure of 5, and 30% FiO2. She was admitted to the MICU.

Vitals: Height 5'3", Weight 59 kg, Temp 100.2, HR 135, BP 135/76, RR 32, oxygen saturation 98% on NIV 10/5 with 30% FiO2

Despite NIV, she remained in distress and was intubated for impending respiratory failure secondary to an asthma exacerbation.

The respiratory therapist has the chosen the initial ventilator settings but will need your assistance with ongoing management of the ventilator. Additional information will be provided on request.

**Ventilator Management: Obstructive Lung Disease (Pretest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done incorrectly |
|---|---|---|
| **Note for RT:** Set ASL to "asthma, moderate, apneic". Ventilator to be set at 18/420/100/5 with flow of 60 square at the start of this exercise. | | |
| **37. RT:** "What is the peak pressure?" <br><br> • Read value off of the ventilator | | |
| **38. RT:** "What parameter should you check first when a patient has a high peak pressure?" <br><br> • Plateau pressure | | |
| **39. RT:** Check patient's plateau pressure for learner. "What is the problem with this patient's ventilator mechanics?" <br><br> • Must note elevated airway resistance | | |
| **40. RT:** "Assuming there is no issue with the endotracheal tube and the patient does not have significant secretions, what is most likely causing this patient's elevated airway resistance?" <br><br> • Bronchospasm or asthma | | |
| **41. RT:** "It is now the next morning and the nurse has paged that the patient is agitated and has a peak pressure in the 50s. The plateau pressure has | | |

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| increased to the 40s. What is the new problem with this patient's ventilator mechanics?" <br><br> • Decreased/worsening compliance | | |
| **42. RT:** "How do you assess for the presence of autoPEEP?" <br><br> • Do an expiratory hold maneuver OR note that the expiratory flow tracing does not return to zero before the next inspiration | | |
| **43. RT:** "Does this patient have autoPEEP?" <br><br> • Yes | | |
| **44. RT:** "How much autoPEEP does this patient have?" (If learner said no to prior question, skip this question and mark incorrect) <br><br> • Read off monitor after expiratory hold | | |
| **45. RT:** "The patient's blood pressure dropped to 75/50. The patient has bilateral breath sounds. What do you want to do with the ventilator **first**?" <br><br> • Disconnect the patient from the ventilator | | |
| **46-47. RT:** (if the learner did not disconnect the patient from the ventilator, say "the patient was disconnected from the ventilator and the BP improved"). "I've reconnected the patient to the | | |

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| ventilator. What are two other things you can do to help decrease autoPEEP?"<br><br>    • <span style="color:red">Decrease the set respiratory rate</span> | | |
|     • <span style="color:red">Sedate patient (if patient breathing over set rate)</span> | | |

**Ventilator management: Normal Physiology (Posttest) – Checklist questions 1-22**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for

ideal/predicted body weight tidal volumes, a normal chest x-ray

**Learner case** (to be printed on separate sheet and provided to the learner)

Emily Slate is a 22 year old female without significant medical history who presented to the ED via EMS

after being found unconscious at a party. She has received multiple doses of narcan with some

improvement but quickly becomes obtunded again. She is unresponsive to sternal rub and without a gag

reflex. A narcan drip is ordered and she is intubated for airway protection.

Prior to intubation:

CXR: Image provided

Vital signs: Height 5'4", Weight 72 kg, Temp 98.8, HR 89, BP 110/65, RR 8, oxygen saturation 90% on RA

ABG on room air prior to intubation: 7.18/65/60

The respiratory therapist needs your assistance with the ventilator. Additional information will be

provided on request.

**Ventilator management: Normal Physiology (Posttest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done Incorrectly |
|---|---|---|
| **Note for RT:** At the start of the case, the ventilator should be off and the RT will set the ventilator with the settings that the learner requests. Set ASL to "healthy patient, apneic" at the start of the case. | | |
| **1-4. RT:** "I've placed the patient on AC/VC mode with a flow of 70 L/min and a down ramp. What additional ventilator settings would you like?"<br><br>• <span style="color:red">Respiratory rate: any value 8-30</span> | | |
| • <span style="color:red">Tidal volume: Learner must provide a tidal volume between 328-548 mL (6-10 cc/kg) **and** explain how they determined that volume.</span> RT may prompt: "How did you get that tidal volume?" Acceptable ways to determine the tidal volume:<br><br>3.) Ideal body weight (women) = 45.5 kg + 2.3 kg (height in inches – 60)  <u>OR</u><br><br>4.) Requests ideal/predicted body weight chart | | |
| • <span style="color:red">Oxygen or FiO2: any value between 21% and 100%</span> | | |
| • <span style="color:red">PEEP: 5-8</span> | | |

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| **Note for RT:** Set the ventilator to the settings requested by the learner. If the learner does not provide settings, set the ventilator to RR 10, TV 500, FiO2 40%, PEEP 5, 70 ramp.) | | |
| **5. RT:** "What is the patient's actual respiratory rate?" (Note: The patient will not be overbreathing the set rate so the actual rate equals the set rate)<br><br>• Rate that was set by learner | | |
| **6. RT:** "What is one way to know if a patient is overbreathing the ventilator or initiating his/her own breaths?"<br><br>Acceptable responses (correct if any one correct response is given)<br><br>• The actual rate (f tot) is greater than the set rate<br><br>• The left upper corner of the ventilator says "S" for spontaneous or "A" for assisted breaths, instead of "C" for controlled breaths.<br><br>• There is a "dip" in the flow tracing<br><br>• Count patient's respiratory rate | | |
| **7. RT:** "For this patient, what is triggering the ventilator to deliver a breath?"<br><br>• Time | | |
| **8. RT:** "For this patient, what is the minute ventilation?" | | |

| | | |
|---|---|---|
| Acceptable responses (correct if either response is given) <br><br> • Reads the minute ventilation displayed on the ventilator **OR** <br><br> • Calculates minute ventilation (RR x TV) and provides answer | | |
| **9-11. RT:** "What is the airway resistance?" <br><br> • Step 1: Learner changes the ventilator, or asks that it be changed, to a square waveform | | |
| • Step 2: Learner performs or requests an inspiratory hold maneuver | | |
| • Step 3: Learner calculates the airway resistance (peak P – plateau P/flow) **or** reads the resistance off the display screen (if steps 1 and 2 not done, step 3 should be marked incorrect) | | |
| **12. RT:** "What is a generally acceptable airway resistance for a patient on a ventilator?" <br><br> • 15 or less | | |
| **13-14. RT:** "What is the static compliance?" | | |

| | | |
|---|---|---|
| • Step 1: Learner performs or requests an inspiratory hold maneuver (can be done on any flow/pattern) | | |
| • Step 2: Learner calculates the static compliance (TV/plateau-PEEP) **or** reads the compliance off the display screen (if step 1 not done, step 2 should be marked incorrect) | | |
| **15. RT:** "A normal compliance in a mechanically ventilated patient should be greater than or equal to what?"<br><br>• 60 | | |
| **Note:** ASL software should be taken off apneic setting and set to "medium" (leading to a RR of 15) | | |
| **16-19. RT:** "Three days later the patient remains intubated for hypoxemic respiratory failure secondary to aspiration pneumonia that occurred around the time of intubation. For this patient, or any intubated patient, what factors determine safety to undergo a spontaneous breathing trial?" (additional responses may be provided but give credit only for those listed below)<br><br>• Patient is hemodynamically stable (not on vasopressors or on a low dose of vasopressors) | | |

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|---|---|---|
| • FiO2 is less than or equal to 50% (FiO2 of 40% is acceptable) | | |
| • PEEP less than or equal to 8 (PEEP of 5 is acceptable) | | |
| • Patient can initiate an inspiratory effort | | |
| **20. RT:** "When the patient meets criteria for a spontaneous breathing trial, how would you perform it?" (correct if either response is given)<br><br>• Pressure support trial **or**<br><br>• T-piece trial / Blow-by | | |
| **21. RT:** "The patient is placed on pressure support at 5 over 5. How long would you like her to remain on pressure support before you evaluate for extubation?"<br><br>• Any value between 30 minutes and 2 hours is acceptable | | |
| **Note for RT:** Set the ventilator as follows: PS 5/5, 40% (will simulate RR 15, TV 420) | | |
| **22. RT:** "She has been on pressure support of 5 over 5 for 1 hour. Her HR is 82 and BP is 125/76. She is calm and has an O2 saturation of 96%. Do you recommend extubation?"<br><br>• Yes | | |

**Ventilator management: Restrictive Physiology (Posttest) – Checklist questions 23-36**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for ideal/predicted body weight tidal volumes, CXR with bilateral opacities consistent with ARDS, lab sheet with ABG 7.45/37/122

**Learner case** (to be printed on a separate sheet and provided to the learner)

Eleanor Curtis is an 82 year old woman with a history of hypertension who was admitted to the general medicine service with delirium and a UTI. She has been treated with ceftriaxone and her delirium has been slowly improving. This morning, she vomited and likely aspirated. She has increasing oxygen requirements and is now requiring 100% non-rebreather to maintain a saturation of 89%. She is transferred to the MICU and intubated for hypoxemic respiratory failure.

Prior to intubation:

CXR: Image provided

Vital signs: Height 5'2", Weight 62 kg, Temp 100.6, HR 115, BP 125/62, RR 24, oxygen saturation 88% on 100% NRB

The respiratory therapist needs your assistance with the ventilator. Additional information will be provided on request.

**Ventilator Management: Restrictive Physiology (Posttest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done Incorrectly |
|---|---|---|
| **Note for RT:** Set ASL to "ARDS moderate, apneic". Set the ventilator to 14/450/100/5 at the start of this exercise. | | |
| **23. RT:** "What is the plateau pressure?" (Learner must perform an inspiratory hold)<br><br>• Reads plateau pressure | | |
| **24. RT:** "What is the goal plateau pressure for this patient?"<br><br>• Less than or equal to 30 | | |
| **25-26. RT:** "Here is the most recent ABG on the current ventilator settings (hand learner the ABG lab sheet – 7.45/37/122). Do you want to make any ventilator changes?" (If the learner would like to lower the TV to 6 cc/kg, prompt the learner as to how this can be accomplished)<br><br>• Used chart of ideal/predicted body weight or IBW calculation to arrive at TV ≤ 301 | | |
| • Decrease FiO2 to 60 - 90% | | |
| **27. RT:** In addition to gender, what patient parameter do you need to appropriately select a TV for a patient with ARDS? | | |

| | | |
|---|---|---|
| • Height | | |
| **Note for RT:** Adjust the ventilator as directed by the resident but leave the FiO2 at 100%; if no settings or inappropriate settings are selected, set the ventilator at 20/300/100/5. | | |
| **28-29. RT:** "I've adjusted the ventilator but could not lower the FiO2. The patient is now saturating 85% on 100% FiO2. What would you like to do?" (If asked, the patient is appropriately sedated and synchronous with the ventilator.) **Note for RT:** Saturation will not improve to > 88% until PEEP is increased to ≥ 10. If learner increases PEEP but to < 10, tell them saturation improved to 87% and ask if they want to do anything else.) <br> • Increase PEEP to at least 10 | | |
| • Recheck plateau pressure after PEEP is increased | | |
| **30. RT:** "It is now the following morning. The nurse said the patient is desaturating and dyssynchronous with the ventilator. What do you want to do?" <br> • Order sedation OR increase the tidal volume to no more than 8cc/kg ideal/predicted body weight | | |

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|---|---|---|
| **31-35. RT:** "The patient is now adequately sedated but is still desaturating and dyssynchronous. I talked to the fellow – she ordered a paralytic and she wants you to switch the patient to pressure control ventilation. What settings do you want me to use to provide a **similar** level of support in pressure control mode while still providing guideline recommended ventilation for an ARDS patient? Please provide settings as you would order them" <br><br> • Inspiratory driving pressure: 10-16 | | |
| • PEEP: 14 | | |
| • FiO2: 80-100% | | |
| • Rate: 14-35 | | |
| • Ti: 0.8-1.2 | | |
| **36. RT:** "In pressure control ventilation, what parameter will change as the compliance of the lung changes?" <br><br> • Tidal volume | | |

**Ventilator management: Obstructive Lung Disease (Posttest) – Checklist questions 37-47**

**Requirements:** 1 learner, 1 faculty playing the role of respiratory therapist, reference values for ideal/predicted body weight tidal volumes

**Learner case** (to be printed on separate sheet and provided to the learner)

Mike Johnson is a 65 year old man with history of COPD who presented to the ED 3 hours ago with worsening dyspnea. On exam, he had diffuse expiratory wheezing and tachypnea with a respiratory rate in the mid-30s. His CXR showed hyperinflated lungs and was otherwise clear.  He was given an hour-long albuterol/ipratropium nebulizer, solumedrol 125 mg IV, and azithromycin. He remained tachypnic and was started on non-invasive ventilation with an inspiratory pressure of 10, an expiratory pressure of 5, and 40% FiO2.  He was admitted to the MICU.

Vitals: Height 5'10", Weight 83 kg, Temp 98.8, HR 128, BP 124/76, RR 34, oxygen saturation 91% on NIV 10/5 with 40% FiO2

Despite NIV, his respiratory rate remained 35 with accessory muscle use.  He was intubated for impending respiratory failure due to a COPD exacerbation.

The respiratory therapist has the chosen the initial ventilator settings but will need your assistance with ongoing management of the ventilator. Additional information will be provided on request.

**Ventilator Management: Obstructive Lung Disease (Posttest)**

| Checklist Item (with correct answers) | Done Correctly | Not Done or Done incorrectly |
|---|---|---|
| **Note for RT:** Set ASL to "asthma, moderate, apneic". Ventilator to be set at 18/580/100/5 with flow of 60 square at the start of this exercise. | | |
| **37. RT:** "What is the peak pressure?" <br><br> • Read value off of the ventilator | | |
| **38. RT:** "What parameter should you check first when a patient has a high peak pressure?" <br><br> • Plateau pressure | | |
| **39. RT:** Check patient's plateau pressure for learner. "What is the problem with this patient's ventilator mechanics?" <br><br> • Must note elevated airway resistance | | |
| **40. RT:** "Assuming there is no issue with the endotracheal tube and the patient does not have significant secretions, what is most likely causing this patient's elevated airway resistance?" <br><br> • Bronchospasm or COPD | | |
| **41. RT:** "It is now the next morning and the nurse has paged that the patient is agitated and has a peak pressure in the 50s. The plateau pressure has | | |

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|---|---|---|
| increased to the 40s. What is the new problem with this patient's ventilator mechanics?"<br><br>• Decreased/worsening compliance | | |
| **42. RT:** "How do you assess for the presence of autoPEEP?"<br><br>• Do an expiratory hold maneuver OR note that the expiratory flow tracing does not return to zero before the next inspiration | | |
| **43. RT:** "Does this patient have autoPEEP?"<br><br>• Yes | | |
| **44. RT:** "How much autoPEEP does this patient have?" (If learner said no to prior question, skip this question and mark incorrect)<br><br>• Read off monitor after expiratory hold | | |
| **45. RT:** "The patient's blood pressure dropped to 75/50. The patient has bilateral breath sounds. What do you want to do with the ventilator **first**?"<br><br>• Disconnect the patient from the ventilator | | |
| **46-47. RT:** (if the learner did not disconnect the patient from the ventilator, say "the patient was disconnected from the ventilator and the BP improved"). "I've reconnected the patient to the | | |

| | | |
|---|---|---|
| ventilator. What are two other things you can do to help decrease autoPEEP?"<br><br>• <span style="color:red">Decrease the set respiratory rate</span> | | |
| • <span style="color:red">Sedate patient (if patient breathing over set rate)</span> | | |