

The Anesthesia Resident's On-Call Guide

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Summary

Introduction

So, you've never been on call by yourself before? That's okay. Intubations on the ward or in the ICU are pretty much like in the O.R., right? As simple as 1,2,3 – Pent, Sux, Tube, right?

WRONG!!

You have a lot of experience managing airways and hemodynamics in the operating room, but the rest of the hospital is a whole different world. Almost every aspect of the clinical scenario will be different than the typical O.R. scenario at the start of elective surgery. Suction, oxygen, monitoring, lighting, even the patient's bed is different (and not as user-friendly) as those in the O.R. More importantly, the patient who you are called to manage is not as healthy as one coming for elective surgery (or else you would not be called to help manage them!)

Here are some practical tips to help you (and your patients) survive those first few nights on call.

1. Called to a code

When you arrive at the scene of a code blue, take 2 seconds and assess the situation:

First, the patient: Is he breathing, or being hand-ventilated (or both)?
 Is his heart rhythm monitored?
 Is he awake or asleep? What is his blood pressure?

You should quickly determine if this was a cardiac or respiratory arrest. If it was cardiac, i.e. V-fib, then the life-saving measure is defibrillation. The length of time from arrest to first shock is the most predictive of survival. Meanwhile, charge through the crowd and get to the head of the bed so that you can take over management of the airway.

Practical Tip: Be sure the ambu bag is connected to OXYGEN!! As soon as possible, convert to a Jackson-Rees bag to allow assessment of spontaneous ventilation and to confirm continuous flow of oxygen.

Next, assess the people in the room: Is there a Medicine resident running the Code?
Has someone been designated to perform chest compressions?

If the answer to either of these questions is no, then after you have secured the airway, YOU must take over managing the resuscitation until someone with more experience arrives.

2. Airway management

Remember, the key intervention in a patient who is not breathing is to OXYGENATE their lungs. You can do this most quickly and easily by MASK VENTILATION. Intubation is nice, but not immediately essential. Ventilation to a normal pH is also nice, but not a first priority.

Once you've decided that intubation is appropriate, there are a lot of factors to consider before deciding just how to go about it. First, decide how urgently the patient needs to be intubated. If they have a blood pressure, are breathing, and have reasonable gas exchange, STRONGLY consider moving to the ICU prior to intubation. In the ICU, while equipment, monitoring, and skilled assistance are not as complete as in the OR, they are vastly superior to those on the ward.

Next, the mechanics: assuming you're planning an asleep, oral intubation (by far the most common scenario) you'll need a laryngoscope and endotracheal tube--that's obvious. But don't forget to confirm that you have suction, a Jackson-Rees circuit with face mask, towels for under the head, a free flowing iv, pulse ox, blood pressure, and EKG monitoring. Arterial line monitoring is superior, but when using a cuff, set it to q1min readings. You may have to do this yourself. Don't take any of these things for granted, as you do in the operating room.

Practical tip: Be sure that the BP cuff is not on the same arm as the iv you are using. Also, take the iv tubing out of the infusion pump and let it drip due to gravity. This will insure a patent iv so that your induction drugs don't go subcutaneously due to an unrecognized infiltrated iv.

If you're not rushed, have the RT bring in the ventilator, set up the tape for taping the ETT,

and bring in a suction catheter for the ETT after intubation. Usually you'll need it. Also consider having them bring the mobile pulse oximeter with capnography. It takes 2 minutes to warm up, so you have to think of it BEFORE the intubation if you want to confirm CO₂ after the tube goes in.

If the airway looks difficult or the patient's hemodynamics are precarious (e.g. tight aortic stenosis), remember that you can do an awake nasal intubation – either blindly, or with a fiber.

3. Choosing drugs

Most patients who you are called to intubate outside of a code situation are VERY sick. They frequently have severe metabolic acidosis (sepsis, cardiogenic shock, hypovolemic shock) or respiratory acidosis (COPD, obtundation from drug OD or stroke). It is quite rare to intubate someone for pure hypoxemia (ARDS, severe pulmonary edema, bilateral pneumonia). In almost every case, they will be hypotensive and tachycardic. **NONE of the patients who you are called to intubate will tolerate a typical induction dose of pentothal or propofol.**

Take a minute to think about why we give these drugs prior to intubation in the first place. We want to insure amnesia during laryngoscopy, right? Well, many of these patients are already so delirious that they won't remember the day's events anyway. And even a small dose like 25-100 mg of pentothal will probably provide amnesia. Unresponsive patients are amnestic to begin with. They should not get **any** induction agent.

Consider the major downside of too MUCH pentothal. >200 mg will reliably reduce preload and lower blood pressure dramatically. Combine that with the further reduction in preload from the conversion to positive pressure ventilation, and your patient could quickly be in deep trouble! An alternative is to use etomidate, but even etomidate can cause hypotension if you give too much. **AMNESIA IS NOT AS IMPORTANT AS BLOOD PRESSURE.**

<p>Practical tip: Use the smallest dose of induction agent that you think will insure amnesia without significantly lowering the blood pressure. That dose might very well be ZERO!!</p>

It is definitely okay to intubate someone without putting them to sleep first if that is the only way to save their life. Most patients will appreciate your telling them what you are going to do and why. It will be a lot easier for them to understand why they are paralyzed and having someone ram a tube down their throat if you tell them about it first. Reassure them that succinylcholine only lasts 5-10 minutes.

When choosing a muscle relaxant, use succinylcholine unless it is absolutely contraindicated (stroke with paralysis, spinal cord injury, burn, current hyperkalemia). Nothing is faster, and you don't have time to wait. Consider all patients to have full stomachs, and use cricoid pressure. Remember that acidosis causes K⁺ to shift out of cells, and a normal value from the morning labs may not be accurate now. Check the T-waves on telemetry for peaking – that will indicate if the serum K⁺ is currently elevated. After intubation, check the T-waves again. If they start to peak and the QRS starts to widen, give a gram of calcium over a couple of minutes.

If you just can't give succinylcholine, then use rocuronium (or rapacuronium if available). Remember that it will last an hour, and if possible, you should insure amnesia for that entire period. And only use a muscle relaxant if you need it. Most apneic, pulseless patients should be intubated without medications.

4. Hypotension

Hypotension in the hospital is not too different than hypotension in the OR. The cause is most often hypovolemia and decreased SVR. It is quite rare to see a hypotensive patient with a heart rate under 100 (unless they are paced, beta-blocked, or have severe conduction system disease). Consequently, inotropes have less utility than vasoconstrictors. **Phenylephrine** is the first-line agent for any hypotension that you encounter outside of the OR. Ephedrine is rarely more effective than phenylephrine, and frequently, not effective at all. Also, remember that hypovolemia must eventually be treated with fluid. First get the pressure up with drugs, then keep it up with fluid. Use blood if appropriate.

It is possible (and common) with rapid positive pressure ventilation to obstruct venous return and cause hemodynamic collapse. When a patient is hypotensive immediately after intubation, add hyperventilation to the differential. If the oxygen saturation is normal, STOP VENTILATING and put the patient in Trendelenburg until you get the pressure back up. Use fluid and phenylephrine.

5. Dosing epinephrine

As a last critical point, know the difference between giving **epinephrine** as an inotrope/bronchial relaxant, and giving it as an adjunct to defibrillation. When a patient is in full cardiac arrest and has NO blood pressure, then **1 mg** of epinephrine iv is a reasonable starting dose. If a patient has a perfusing rhythm and a) needs more inotropy, or b) has a severe allergic reaction with bronchospasm and hypotension, then **10 micrograms** is an appropriate starting dose. 1 mg might kill them.

6. Difficult airway

If you are asked to intubate a patient who appears to have a difficult airway, then assess the acuity of the situation. In an emergency, do the best you can while calling for a cricothyrotomy tray, 14g angiocath, and a surgeon. If you have time, call your attending right away to discuss the situation and together come up with a plan.

7. Central line placement

If you are asked to help another service (usually medicine) with central line placement, you should assess the situation before agreeing to help. If after seeing the patient and learning the history, you feel capable of inserting the central line yourself, then you should take the following steps:

1. Call your attending to let him/her know about the patient and your plans for central line placement.
2. Write a note documenting your plan and the patient's consent to line placement.
3. Only place a central line in the ICU with appropriate monitoring.
4. Only place the line **yourself**. DO NOT supervise anyone else.

5. The primary service resident **must** remain at the bedside throughout your entire line placement to assist with monitoring the patient while he is under the drape (and to resume care of the patient if you are called emergently to a code).

If at any point you feel uncomfortable with the situation, **stop**, and call your attending for support. Other physicians who can be consulted for central lines after hours are the surgery resident on call, the Cardiology fellow, and the MICU attending.

8. Ventilator/Sedation management in the SICU

The anesthesia service manages ventilators on SICU patients who are on the Neurosurgery, Orthopedics, ENT, Urology, Plastics, Ophthalmology, and Maxillofacial services (i.e. all surgical services besides General, Vascular, and Cardiothoracic). This is because these services do not have a resident in the hospital at night and because they have less experience with ICU patients. On these ventilated patients, we are also responsible for analgesia and sedation until they are weaned from the vent. This facilitates coordination of weaning sedation and ventilation. Once the patient has been weaned from mechanical ventilation, then responsibility for analgesia/sedation reverts back to the primary service.

We should be sure to write all orders for ventilation, analgesia, and sedation on these patients. Whenever appropriate (i.e. whenever a change in management of the vent or level of sedation is planned) a note should be written documenting the goal of therapy and the plan. Frequent communication with the primary service is essential for this combined management system to work smoothly.

9. When to call your Attending

The Anesthesiology Attending Faculty are by law responsible for all anesthesia care delivered by residents. Whenever you feel uncomfortable with a situation, you should not hesitate to call your Attending. Some specific examples of situations when you **must** call your attending are:

- 1) Prior to any **operation** (your Attending must come in to the hospital)
- 2) Prior to any **central line** that you intend to place via the IJ or SC routes (see section 7)
- 3) Prior to any **planned intubation** in the ICU, when time permits
- 4) For any formal anesthesia **consultation**
- 5) In the event of a significant **disagreement** between you and a resident/attending on another service (regarding airway, fluid, pressor management, etc.)
- 6) Whenever you have a **significant question** regarding appropriate management of mechanical ventilation, analgesia, or sedation.

Summary

Remember that you have the most experience managing airways of anyone in the hospital – even in the 3rd month of your first year of anesthesia residency. Use your knowledge, but apply it to a different class of patients. Hospital ward/ICU patients are not the same as patients having elective surgery. Treat each situation individually; don't just use a cook-book formula. Don't be

afraid of giving little to no drug. And don't be afraid to call your attending for advice.

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