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Pearls & Pitfalls of Rapid Sequence Intubation

PEARLS AND PITFALLS OF RAPID SEQUENCE INTUBATION

Once the domain of anesthesiologist, rapid sequence intubation is now a skilled practice by emergency room physician. What are the pitfalls and the advances for your patients requiring intubation? Welcome to, The Clinician's Roundtable on ReachMD. I am your host, Dr. Shira Johnson, and joining us today to discuss rapid sequence intubation is Dr. Calvin Brown, III, from Brigham and Women's Hospital, Department of Emergency Medicine in Boston. Dr. Brown is an instructor in medicine at Harvard Medical School and an attending physician at Brigham. He is on the national faculty for difficult airway course for emergency physician.

DR. SHIRA JOHNSON:

Dr. Brown, welcome to ReachMD.

DR. CALVIN BROWN, III:

Thanks for having me.

DR. SHIRA JOHNSON:

So first of all for our listeners, remind them what is rapid sequence intubation and what type of patients need it outside of the OR?

DR. CALVIN BROWN, III:

Well, rapid sequence intubation is an intubation technique used by emergency physicians for patients that need emergency airway management and what it is technically is the use of a rapidly acting potent sedative induction agent to induce a sleep state followed immediately by a rapidly acting neuromuscular blocker after a period of preoxygenation and this is to induce the best intubating conditions for the physicians. So it is used specifically for endotracheal intubation.

DR. SHIRA JOHNSON:

Why did you as an ED physician have an interest in rapid sequence?

DR. CALVIN BROWN, III:

Well, the defining skill, I think, for emergency physicians is to be able to effectively perform emergency airway management and RSI is really the cornerstone of that skill set and so you can't really be a safe practicing emergency physician without having an intubate knowledge of emergency airway management and RSI is the cornerstone of that skill set.

DR. SHIRA JOHNSON:

So some of our listeners today may have heard it before, may have used it, or may not be familiar with it. Take us through a high level overview like you did in the beginning of some of the steps.

DR. CALVIN BROWN, III:

Sure, well, you can think of rapid sequence intubation as really a series of 7 steps which we call the 7 Ps of RSI and it starts with 1. A period of preparation where you sort of gather all of your equipment. The second step is a period of preoxygenation where you try to get the patient starting O2 saturation as high as possible. Third is a period of pretreatment in which you give either fentanyl or lidocaine for certain medical conditions that the patient is presenting with either asthma or presumed elevated intracranial pressure or cardiovascular emergencies. Fourth is the time at which you give your induction agent and your paralytic, that's the fourth P. The fifth P includes positioning where you place the patient's head in the proper position for laryngoscopy and sixth will be the placement of the endotracheal tube and then finally would be post intubation management where you set up ongoing sedation and you confirm endotracheal tube placement with chest x-ray and such and such.

DR. SHIRA JOHNSON:

So let's talk about some of the advances first. I mean the technique or techniques like, it has been around since the late 70s, so what's new?

DR. CALVIN BROWN, III:

Well, first from a pharmacologic standpoint there are many more pharmacologic agents that are available now especially for induction agents. I think that most emergency physicians use etomidate, which may not been widely available several years ago as the principal induction agent, its really a first line agent because it is rapidly acting, is easy to dose, its fairly reliable, and there is very few side effects and especially in the patient who has cardiovascular compromise it tends to be very stable in that respect. In addition, there is now a wider range of neuromuscular blockers that are available. Succinylcholine is probably still the widest used neuromuscular blocker, but now there are nondepolarizing neuromuscular blockers that are used fairly frequently such as rocuronium and then from a technical and procedure standpoint there have really been great strides made in terms of difficult airway equipment. For decades, people have used only a standard laryngoscope, either a Macintosh or Miller laryngoscope and if they got into trouble then they would have to resort to either an extra-glottic device like an LMA or in extreme cases have to resort to a surgical airway, but in the past few years, in fact the past several years there has been huge advances in video laryngoscopy, optical stylets, and a series of other devices that have really made it easier to manage especially difficult airways.

DR. SHIRA JOHNSON:

Now with something like a video laryngoscopy is that you use commonly in your ER by ER trained physicians or is that something for ENT?

DR. CALVIN BROWN, III:

No, the video laryngoscopes have been partly designed by emergency physicians, but we use them pretty routinely for the vast majority of our intubations. They are really most beneficial for intubations that turn out to be difficult and difficult from the standpoint that when you perform laryngoscopy if you are unable to see the vocal cords, a video-assisted device really improves your laryngeal view dramatically and if you are able to see vocal cords and you are usually able to put the endotracheal tube in. So that's been the real limitation to direct laryngoscopy and I think that hurdle is for the most part been overcome by these new devices.

DR. SHIRA JOHNSON:

You mentioned one of the first steps besides planning is the preoxygenation. What's the few caveats about preoxygenation that maybe people in the emergency situation don't remember or don't always practice?

DR. CALVIN BROWN, III:

The first thing is that you need to have the highest starting sat that you can because your ability to effectively preoxygenate the patient gives you what's called a period of safe apnea. So as soon as you render the patient apneic by giving neuromuscular blockers that time from which you give the neuromuscular blockers to the point where their oxygen sat reaches 90% is called your safe apnea. So you can extend that period dramatically by giving a good preoxygenation period. And that is done most effectively by giving the patient 100% oxygen and have the patient tidal breathe that 100% oxygen for 3 minutes.

DR. SHIRA JOHNSON:

You mentioned pretreatment. What's some of the controversy around the use of lidocaine for example?

DR. CALVIN BROWN, III:

Well, there are 2 drugs currently that we recommend for pretreatment. One would be lidocaine as you mentioned, the other would be fentanyl. Lidocaine is given predominantly in the setting of reactive airways disease. The literature out there is not strong in this respect, but what we do know is that in certain types of patients, patients with irritated airways, patients with preexisting reactive airways disease, and when you manipulate the larynx and place an endotracheal tube they are likely to have a bronchospastic response to that. So lidocaine has been shown to attenuate those types of airway reflexes when stimulated, cough reflexes, and things of that nature, so in the absence of a contraindication it is reasonable to give lidocaine as a pretreatment in that condition. We tend to give it also for presumed elevated intracranial pressure, but again it is not necessary in that respect.

DR. SHIRA JOHNSON:

Is there a controversy?

DR. CALVIN BROWN, III:

The only controversy being that giving pretreatment drugs does tend to complicate the pharmacologic regimen as you go through RSI because in addition to giving induction agents and paralytics you are now also adding a pretreatment agent, so that's now a third drug, sometimes a fourth drug you have to get out, and in addition in order for those drugs to work effectively they really need to be in the system for 2 to 3 minutes and so that prolongs your time. It's built in to the RSI sequence but it does a. make things little more complicated and B. will prolong RSI. So if there is a reason not to give it we actually tell people to avoid it, but in the absence of a strong contraindication and you have the right clinical scenario it's perfectly appropriate to give those drugs. It is not a huge controversy at this point.

DR. SHIRA JOHNSON:

If you are just tuning in you are listening to, The Clinician's Roundtable on ReachMD, the Channel for Medical Professionals. I am your host, Dr. Shira Johnson and joining me today to discuss rapid sequence intubation is Dr. Calvin Brown from Brigham and Women's Hospital in Boston.

Now, I mentioned pitfalls. Tell us about some of the pitfalls of RSI. What happens when something goes wrong and how can a practitioner prevent it?

DR. CALVIN BROWN, III:

Well, the first thing is that if you are going to use RSI you have to be fairly well versed in the pharmacology of the drugs that you are using and 2. RSI is not appropriate for every patient and patient selection is the key. So when we teach emergency physicians to use RSI what we really stress is that they do a good difficult airway assessment because the patients that are predicted to be very difficult to either intubate or to mask ventilate probably should not be paralyzed because if at that point you can't get the endotracheal tube in and then they desat and you are unable to bag them up you end up very quickly in a can't intubate, can't oxygenate scenario. So RSI is perfect as long as the patients are screened for airway difficulty. So the one pitfall I would say is giving neuromuscular blockers in a patient in whom a difficult airway assessment was either not performed or was done in an incomplete fashion.

DR. SHIRA JOHNSON:

And you have seen this.

DR. CALVIN BROWN, III:

I have seen this.

DR. SHIRA JOHNSON:

And the alternative is at that point.

DR. CALVIN BROWN, III:

If you end up in a can't intubate, can't oxygenate scenario then you are rapidly looking at a surgical airway.

DR. SHIRA JOHNSON:

What other advances in airway management may our listeners not know about? You mentioned that the video laryngoscopy isn't common every place, what else?

DR. CALVIN BROWN, III:

Right, I think that honestly most of the advances are on the technology front. There are more than video laryngoscopes out there. There is a whole host of both video-assisted devices of all shapes and also fiberoptic and what we call optical stylets which also aid in managing difficult airways, but most of it is on the technology front. In other words, something that can help the emergency physician see the vocal cords in the setting of a difficult airway.

DR. SHIRA JOHNSON:

Are most ED physicians, you think, comfortable with RSI or is it a special skill and the other institutions use it. It is a state-of-the-art with ER physicians today, but you think people are using it everywhere?

DR. CALVIN BROWN, III:

Well, no I don't think people are using it everywhere. I think its definitely becoming standard of care for emergency airway management. There are still a handful of people out there, I think, who are not familiar with the procedure, maybe just that that when they went through their training it was not commonplace to give neuromuscular blockers outside of the OR, but in modern training programs for anyone who has gone through residency in the past probably 10 to 20 years they feel pretty comfortable using RSI and I would say that the majority in my experience asking around the majority of emergency physicians A. are using RSI and B. feel pretty comfortable with it, but no its definitely not universal at this point.

DR. SHIRA JOHNSON:

Can paramedics in the field use RSI in your EMS system with a medical control device?

DR. CALVIN BROWN, III:

Certain paramedic systems can. There is a lot of literature out there looking at pre-hospital rapid sequence intubation and some of it is not good. It all depends on how skilled the paramedics are. So in paramedic companies where they don't see very many airways and they don't perform very many airways that RSI in some studies has shown worsened outcomes for patients especially head injury patients, but in certain paramedic companies especially in urban centers, large cities where they happen to take care of a lot of difficult

airways in the field they actually tend to be highly skilled. Our Boston EMS system actually has a fairly high intubation rate in the field and its pretty safe in those types of highly skilled paramedics, but across the board it is actually not a good story.

DR. SHIRA JOHNSON:

Suppose, going back to something you mentioned before, if you have done your residency in the last maybe 10 or 20 years and it wasn't part of your training back then you are practicing now, can you get training on this. This is something you advocate this, experienced physicians get this training themselves. Where they can go for it?

DR. CALVIN BROWN, III:

Yeah, I think that even if you have used RSI before if you are not completely comfortable with it and this means that you are using it either infrequently or you are on a low volume ED I would say that every probably 2 or 3 years you should take a formal CME training program in airway management. There are several of them available and those airway courses should focus on both basic airway management as well as managing difficult airways and specifically the use of RSI. So, if you are going to be in an emergency environment and you don't feel like you are fully trained there are plenty of training programs out there to take and you should probably stay updated every 2 to 3 years.

DR. SHIRA JOHNSON:

So what is the future for RSI? What's on the horizon? Where is this going?

DR. CALVIN BROWN, III:

I think what we hope is that anybody who is going to be a modern practicing emergency physician that the method of intubation using either sedation alone or intubation with no meds is really abandoned and people really pick up and start using RSI in appropriate fashion widespread across the country, but as we mentioned earlier that's really predicated upon the practitioners knowledge base in terms of RSI pharmacology, indications, appropriate patient screening for airway difficulty and of course that they stay up-to-date on their skills taking a difficult airway course every 2 to 3 years.

DR. SHIRA JOHNSON:

Excellent. Thank you Dr. Brown.

DR. CALVIN BROWN, III:

Thank you.

DR. SHIRA JOHNSON:

We would like to thank our guest today, Dr. Calvin Brown, III, for joining us to discuss advancements and pitfalls in rapid sequence intubation in the ED.

You have been listening to The Clinician's Roundtable on ReachMD, The Channel for Medical Professionals. For a complete program guide and pod cast, visit www.reachmd.com and thank you as always for listening.