

Lung Isolation: Clinical Challenges and Strategies for Success

2017

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Dr. Alan Jay Schwartz: Hello. This is Alan Jay Schwartz, Editor-in-Chief of the American Society of Anesthesiologists' 2017 *Refresher Courses in Anesthesiology*, the latest research and educational findings. The focus of the *Refresher Courses in Anesthesiology*'s CME program and the modules featured is to educate learners on current developments in the science and clinical practice of the specialty of anesthesiology. Returning for a second year, we will be speaking directly with individual authors to learn about their expertise, perspective and insight regarding the featured module.

Today, we are pleased to present the following one-on-one conversation with fellow RCA editor Dr. Laurence Torsher and author Dr. Jerome Klafta. They will be highlighting the module titled "Lung Isolation: Clinical Challenges and Strategies for Success."

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Dr. Laurence Torsher: Hello. My name is Dr. Laurence Torsher. I'm an anesthesiologist at the Mayo Clinic in Rochester, Minnesota, and one of the editors of the *Refresher Courses in Anesthesiology*. Our guest today is Dr. Jerome Klafta. Dr. Klafta is a Professor and Vice Chair for Education and Academic Affairs at the University of Chicago Department of Anesthesia and Critical Care. A former residency program director and medical student clerkship director, his academic interests focus on both medical education and anesthesia for thoracic

surgery. Dr. Klafta has been an examiner for the American Board of Anesthesiology since 2006. He is the author of a chapter in the newest edition of the *Refresher Courses in Anesthesiology* entitled “Lung Isolation: Clinical Challenges and Strategies for Success.” Welcome, Dr. Klafta.

Dr. Jerome Klafta: Thank you very much.

Dr. Laurence Torsher: Let me start by asking, what are the options for lung separation that are available today that did not exist 15 or 20 years ago, like when I was a resident?

Dr. Jerome Klafta: Well, going back 15 or 20 years, things have expanded a bit. Even more recently, though, there has been an expansion in our options. There’s more bronchial blockers that are available to us, including most recently one with a novel Y-shaped design that puts a blocker balloon in both main stem bronchi. A double-lumen tube with an integrated camera in its tip is another new option in the past couple of years; and really, the ubiquity of video laryngoscopy for not only initial placement of double-lumen tubes but also for use as an adjuvant in exchanging single-lumen tubes for double-lumen tubes with an airway exchange catheter.

I think there’s also, aside from the devices, an improved understanding of a number of things that affect our ability to provide successful lung isolation. These would include an improved understanding of some of the nuances of placement technique of double-lumen tubes, of sizing of double-lumen tubes, and some comparative data on various methods of lung separation regarding the efficacy and complications that we see; believe it or not, even some new insights into anatomy that have been gleaned from cadaver studies and from radiologic imaging.

Lastly, while it's not an – well, it is an option for lung separation, that there's a growing published experience primarily in the surgical literature of intrathoracic procedures that are being done without lung separation or, believe it or not, even without intubation. So, these various options have expanded our repertoire considerably.

Dr. Laurence Torsher: Of the various newer strategies that have come onto the market, which of those have you integrated into your own personal practice?

Dr. Jerome Klafta: Well, certainly, bronchial blockers have become a larger part of my practice, especially in the setting of a difficult airway. It allows us to secure the airway with a single-lumen tube, a skill that most anesthesiologists, even those who don't do cases regularly involving lung separation, typically have a broad repertoire of techniques for securing a difficult airway with a single-lumen tube, so this opens up lots of options.

Dr. Laurence Torsher: So, I'm just kind of curious. In your experience, and as well as from your review of the literature, what are some of the common causes of lung separation failure, and are there some strategies that we should be adopting to help to remedy those situations?

Dr. Jerome Klafta: Sure. Well, certainly, getting the lung separation device, whether it's a double-lumen tube or bronchial blocker, into the appropriate anatomic position, can be challenging even with a normal upper and lower airway. So that, I think, is probably the first and most common cause of lung separation—not being able to get that device into the right place.

An interesting paper that probably goes back about ten years now – it was an interventional – an educational interventional study looking at the success or failure of anesthesiologists putting several different devices into patients with normal airways. And they found that despite a relatively robust educational

intervention, about a third of them were unable to put the device into its appropriate position. The main opportunities for improvement that they found—and I – this is certainly consistent in my experience as well—is a deeper familiarity, a more confident familiarity, with the tracheobronchial anatomy beyond just, is this a left or right main stem bronchus? I liken this to the pediatrician who has to get a – often just a fleeting view of the eardrum of a screaming and squirming two-year-old. We don't often have the luxury of a long, lingering look, so we need to be very familiar with the anatomy of which we may only get a brief glimpse.

And the second thing that these authors found was – is facility with the fiberoptic bronchoscope, and being able to put its tip exactly where we want, is also very important; and challenging, because often deal with secretions and blood, and we're often on our knees, and a patient who's in the lateral position. So, a lot of things are working against us.

Another area that is a common pitfall is not appreciating some of the nuanced aspects of the design characteristics of double-lumen tubes and blockers. For example, many practitioners don't appreciate that double-lumen tubes of varying diameters—so, 35-French, 41-French, 32-French—they all have the same length. And that's, you know, a little factoid that's very important, because sometimes people will choose a tube based upon the length that they need.

And also, just generally speaking, practical issues around placement of bronchial blockers. They are conceptually easy. They're not technically demanding; but there's many subtle, practical issues that make the difference between success and failure.

And then lastly, I think that using some method of testing for actual separation of the lungs once we have our device in place is really important. Obviously,

if the lung quickly becomes atelectatic, it's not in question whether we have excellent separation; but many times the lung does not collapse quickly, and it's critically important to be able to confidently say the lungs are separated, lest we be lured into manipulating its position.

Dr. Laurence Torsher: That's fascinating. I've often found that to be one of my biggest challenges is – personally, is when I'm not completely satisfied or the surgeon's not satisfied with lung separation, and then having to go through and do the troubleshooting. One of the things...

Dr. Jerome Klafta: And that is an important triaging point.

Dr. Laurence Torsher: Thank you. One of the other questions that I've often had in my own practice as well is, what's a rational approach to lung separation in the patient who has a known difficult airway?

Dr. Jerome Klafta: Well, the best approach, and I think the one that most people use, is when lung separation is not in the mix, in addition to the anatomic features that may render an airway difficult there's also the aspiration risk, the patient's apneic reserve, the feasibility of bag-mask ventilation, or supraglottic airway, or even a surgical airway as a contingency. So, all of these things factor into our initial choice of an awake or an asleep intubation.

And so, in the setting of a need for lung separation, we always have to remember that securing the airway safely is the primary goal, and lung separation is subordinate to that. Certainly, I think the fewer paths of retreat that I have as I plan for airway management, the more likely I am to start with a single-lumen tube and then go from there. Starting with a single-lumen tube—and again, most anesthesiologists have a pretty broad repertoire of techniques for placing single-lumen tubes in difficult airways—that allows us a couple of main options. We can exchange that tube for a double-lumen tube using an airway

exchange catheter. And as I mentioned earlier, doing so with video laryngoscopy takes a little bit of the guesswork out of it. If it's hanging up at the glottic opening, we have a sense by inspecting – by watching the screen, where it's hanging up and how we can manipulate the tube in the catheter.

The second option, as I mentioned earlier, is placing a bronchial blocker. Gaining familiarity with this technique in cases where we don't necessarily need it is really important, because like with anything, we don't want to use a technique that we're less familiar or less comfortable with when it matters the most. We want to force ourselves to move out of our comfort zone, use blockers or techniques that we don't normally do, when we have a little more leeway.

Lastly, I think that, like with the baseball pitcher who's facing a formidable hitter, the broader the repertoire, the more pitches that he has in his – or arrows in his quiver, the better positioned he is to be successful. Likewise, as anesthesiologists, the more techniques that we have in our repertoire, the more easily we can adapt our technique for a difficult airway according to the nuances of that airway.

Dr. Laurence Torsher: I find it kind of interesting that as the video laryngoscope has become almost our go-to tool for difficult intubations, I sometimes wonder whether the facility and skill that people at one time developed with fiber-optic bronchoscopy is beginning to wane.

Dr. Jerome Klafta: I think that's absolutely true. Certainly, there is considerable literature on using video laryngoscopy of all sorts with double-lumen tubes, and I do think that that's becoming more common. Again, the gold standard, though, for positioning the tubes in the lower airway is a bronchoscope, and if we lose our familiarity with that, our facility with the bronchoscope, I think that won't be a good thing.

Dr. Laurence Torsher: Well, Dr. Klafta, thank you very much for spending some time with us today. Today, Dr. Klafta shared with us some new options for lung separation; some strategies for dealing with failures of lung separation; and finally, an approach and some comments on providing lung separation in the patient with a difficult airway. Thank you very much, Dr. Klafta.

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Dr. Jerome Klafta: Thank you for the opportunity.

Dr. Laurence Torsher: And now back to you, Dr. Schwartz.

Dr. Alan Jay Schwartz: Thank you for joining us today and participating in this insightful conversation with this month's featured author. Be sure to join us for next month's one-on-one author interview. To purchase the full subscription of the 2017 *Refresher Courses in Anesthesiology* program, please visit www.asahq.org, click on the Shop ASA link, and search for RCA.

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