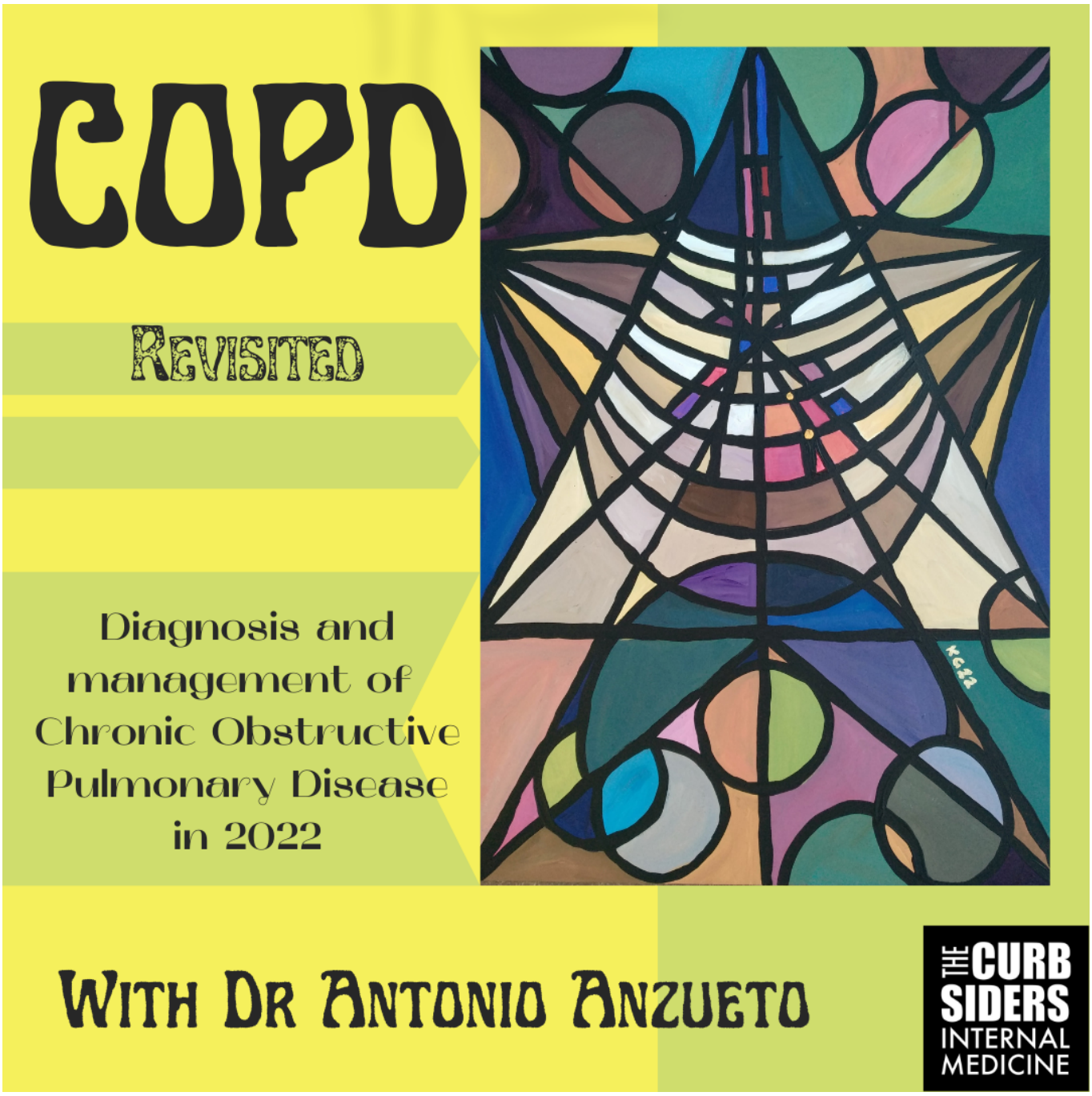
#356 Chronic Obstructive Pulmonary Disease (COPD) Update with Dr. Antonio Anzueto



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[The Curbsiders Podcast theme]

Matt: Welcome back to the Curbsiders. I'm Dr. Matthew Watto, trying to keep the energy up. It's late at night. [Paul chuckles] Paul's watching me, I'm always nervous. This is a great episode tonight, Paul. We talked with a fantastic guest about COPD. This was a little bit of an update because we done a COPD episode, but it was high time, we had another COPD update. And our guest is Dr. Antonio Anzueto, and he was just lovely to talk to and had so many great pearls. Paul, before we introduce our guest fully and our cohost, can you tell the audience what is it that we do on the Curbsiders?

Paul: Happy to as always, Matt. It feels like it's been a while. We are *the* Internal Medicine Podcast. We use expert interviews to bring your clinical pearls and practice changing knowledge. And as you alluded to, we have another cohost joining us producer extraordinaire, master pulmonologist, medical education Wizkid Dr. Cyrus Askin. Cyrus, how are you?

Cyrus: I'm doing great, Paul. How are you?

Paul: Good. I'm great. Thank you so much for asking. Matt could have asked me, but he didn't.

Matt: [chuckles] Cyrus, I heard you recently moved to El Paso.

Cyrus: Matt, you're correct.

Matt: Yeah. El Paso, Paul. I spent a month there one night. You remember that *Seinfeld* episode, Paul? No? Nothing? Kramer makes that joke. Yeah, it's good.

Cyrus: Oh, gosh.

Paul: You know I get 99% of *Seinfeld* jokes. That one-- [crosstalk].

Matt: I can't remember the episode but Kramer definitely makes the-- and then he laughs like way too hard. So anyway, [Paul laughs] thought I'd give it a shot. Sorry, audience.

Paul: No, I mean, you have almost the exact comic timing of original, but I'm surprised it didn't work out.

Matt: Okay, Cyrus sorry to interrupt. Please tell the audience [Paul laughs] what is it that we talked about on this episode and tell them about our guest?

Cyrus: You got it, Matt. So, for this episode, we're very excited to host Dr. Antonio R. Anzueto, so Dr. Anzueto, he is a professor of Pulmonary Critical Care at UT Health San Antonio. He's also Chief of the Pulmonary Section for the South Texas Veterans Healthcare System, at Audie L. Murphy Memorial Veterans Hospital, where his additional responsibilities include medical director for the Respiratory Therapy Department and Medical Director for the Pulmonary Function Lab. In addition to all of this, Dr. Anzueto is a fellow of the European Respiratory Society, The American Thoracic Society, and is a long-standing member of the gold scientific committee responsible for publishing the annual COPD guidelines followed by clinicians around the world. So, it should come as no surprise to our audience that we had him on to talk about updates in COPD. And so really during this episode, we reviewed

some of the long-established tenets of COPD management and discuss some updates since our last recording in 2018 with Dr. Denitza Blagev.

Matt: Cyrus, did you have a pun?

Cyrus: Matt, how did the beef brisket develop COPD?

Matt: I don't know, Cyrus, how?

Cyrus: Well, it's smoked for too long.

Matt: I kind of like it, Paul. I kind of like it.

Cyrus: [groans] I tried.

Paul: All right.

[laughter]

Matt: I think [Paul laughs] I think I'm not going to attempt any more puns after I fell way flat on my face with my El Paso joke, but I'll have to see if I could chase down that *Seinfeld* clip for the show notes. All right, let's get to it.

A reminder that this and most episodes will be available for free CME credit for all healthcare professionals through VCU Health at *curbsiders.vcuhealth.org*.

Let's get started. Antonio, we've been talking for a little while here. I'm really excited for the audience to hear all about COPD, but first, I think they just want to know a little bit about you. They've heard your formal bio at this point. But can you tell them like a little bit about yourself and maybe a hobby or interest that you enjoy outside of medicine?

Antonio: Well, first thank you for inviting me. I think it's very excited to be here with you all. I had a really weird hobby. Since I was a kid, I memorize airlines timetables. I know who flies where. And now these days with the internet, and when I need to go anywhere, I tell the travel agencies what I want. I already have plan B and C, if anything happens, I just go to the desk or I call the help desk and say, "I need you to book this flight, this, flight and this flight and this is what I need." So, it's a weird hobby but on the other hand, it's very handy when you have to travel. Sometimes it doesn't seem to be that many options for you to take. An international, it's very handy.

Paul: I will ordinarily ask about like a book recommendation. I have to ask what transpired in your childhood [Matthew laughs] that you began memorizing airline tables? Can you just talk me through how this all started because I am, of course, fascinated?

Antonio: Well, when I was 15,16 years old, I always love of aviation. And I love more the airlines. The airlines are very similar to a hospital. It's very similar to health care. It really there for that plane to leave that gate requires hundreds of people to make it, it's like a hospital. It is an incredible coordination and everybody does their jobs. So that's the reason I like it. And over time, I was fascinated to see how people would go places, I was fascinated to see how these has grown. As a matter of fact, I have predicted 80% of the bankruptcies, the merges. I can be considered Wall Street airline analyst. I predict

everything is going to happen. My wife already knows about it from me. I get a couple of blogs every day, I read about Airlines Economics. I know a lot of other airlines.

Matt: Paul, should we pivot the show topic into the airlines?

[laughter]

Paul: And start taking more aggressive notes.

Matt: [laughs] Let's all get into airline futures. Antonio, you're going to make us all rich. Well, Cyrus the younger, as we sometimes call you, did you want to ask anything to Antonio, I know you both know each other professionally. Now that you've got him on the hot seat here, did you want to ask him anything before we get into the topic?

Cyrus: Yeah. I kind of want to know about the next get rich quick scheme, I guess. But in actuality, I'm always looking for advice from peers and colleagues and mentors. So, any meaningful or important advice, Antonio, that you received at any point in your career that you'd be willing to pass on to us here?

Antonio: I think the advice that I got from the person as working with was, "Keep your eyes open and be open mind." I have a friend every time he says to me, "Antonio, well, you want to focus on something. You alliance COPD, you are in pneumonia, you're in sepsis, you're in mechanical ventilation, you are part of the Berlin Conference of ARDS, you are everywhere." A lot of things are linked together. Hypoxemia, respiratory failure, but my advice is, have your eyes open. If anything you like, just go for it. Just go do it and go for it. You now been in El Paso, you're in a very unique situation, is probably will be not much support in certain areas in pulmonary. Pulmonary has grown tremendously. I don't know how much support you have in pulmonary hypertension or interstitial lung disease. When you say why is not too much support about that? I will lead the expert on pulmonary hypertension. And have you become the director of the pulmonary hypertension clinic or the pulmonary fibrosis clinic, did you name yourself? I'm the director of the pulmonary hypertension planning. And everybody will believe you after that.

Cyrus: Man, now I'm ready to take over the world now. I'm ready to go.

Matt: Well, Cyrus let's start to take over the COPD road because we need a case from Kashlak.

Cyrus: With pleasure, I think we can roll one for Dr. Anzueto. Our case from Kashlak Memorial is Ms. Vanessa Rodriguez who is a new patient coming into established care with us. She's a 58-year-old with a long-standing history of smoking, averaging a pack per day since she was 24. She recently retired from the military having served about 30 years. Her military career included several deployments to the Middle East. Since retirement around four years ago, she's gained about 30 pounds or so and her current BMI is 32. During review of systems questioning, she reluctantly admits that she continues to smoke and over the last few years has noticed increasing dyspnea, worse with exertion, which has kind of limited her ability to get back into an exercise routine. She also notes the development of a productive cough. So, of course, this is all sounding potentially maybe like it could be a COPD, a new diagnosis. But before we carry on with the case and continue to unravel things here, over the last few

years, has the definition of COPD or understanding of COPD changed appreciably specifically regarding things like biomarkers or pathophysiology, things like that.

Antonio: Before I answer your question, I think it's very important to emphasize, this is a lady in her 50s. Most of the people won't suspect that she may have COPD. The image that we have is a COPD 78-year-old man, that is coughing there, keep smoking, because he smoked all his life. But that's not true. A newly diagnosed COPD, over 50% of the newly diagnosed patients are under the age of 60. And around 60% are females. I think it's very important to emphasize that women, and women in their 50s can have COPD, and this is a number urgency, because this lady if she doesn't get diagnosed, what's going happen is when she's 60 to 63, her disease will be advanced to the point that she would have very severe disease and it had to diagnose.

So, going back to your question that this was picked by history that may have COPD, the diagnosis has to be made with the spirometry, but one of the challenges that we have, and this is something we work on goal 2022 and keep your eyes open for 2023. But we are going to refine this is because we discuss about early COPD, pre-COPD, COPD in young patient. Why is all these coming around? This is because we are understanding that COPD, it starts as a child. Kid, who grows in an area there is a lot of pollution, has a lot of infectious process, develop asthma at that point when he or she turns into her 30s and 40s and start smoking. It already has an underlying process that is going to make the develop and have the COPD. So, it's early COPD, how much is early? At the end of the day, it doesn't matter. At the end of the day is, you identify with the spirometry, to have a fixed ratio, less than 70. You knew if you have these obstruction; you have a disease.

Matt: Paul, this kind of reminds me we talked about lipids a while back and they were talking about like primordial prevention of heart disease, you got to start from birth and maybe protecting your lungs from pollution and infections and things like that from birth. Easier said than done, depending on where you're born and grow up.

Antonio: And the mother is smoking. The mother is exposed to environmental conditions, she is going to fake her offerings, her children. And her children are going to have the potential to have a pro genetic abnormalities, can have the potential to develop a disease.

Paul: This may be a big question, but can you talk to us about the importance of spirometry to make the diagnosis? I think we have a common scenario is you have a patient with decades of tobacco use who has the right symptoms. Maybe they have a CT scan done for another reason that shows some emphysema. And so maybe you'll start this person presumptively on long acting muscarinic or something. But I guess how critical is it that we actually have the objective markers of COPD? So how important is spirometry to make the diagnosis?

Antonio: So, let me turn the table to your question. How important is to get Hemoglobin A1C to diagnose diabetes? Or how important is to measure the blood pressure to make a diagnosis and make a treatment? I know spirometry is not the fanciest tool, the tool that it has a stigma. I understand, I am with you. When I get those reports, I have like 50 numbers over there. The truth I have to confess to you, nobody knows what those 48 numbers mean. You are invited to come to the National Conference American Thoracic Society, The American College of Chest Physicians. There are endless sessions about FEV/6 and FEF25-75. The truth is that we don't know what a lot of those numbers mean. But

what we know, if you do a spirometry, and I tell my team, there is three things that you have to pay attention. First, look at the demographics of the report, be sure the person who's sitting in front of you, if it says the report, the male is a male, is a female, is a female, because those demographic factors are the ones who determine the predictors. So, if you have a male, CDIN says female, the report, so the predictors are all off. So that by itself is wrong. So just look at the demographics. Then ask yourself, this is a good test. Look at this flow volume curves, nice shaped curves, nice smooth lines, you had a good test. And then you look at the fixed ratio, the actual fixed ratio of FEV1/FVC, is less than 70 or more than 70? That's the question that you have to answer. If there is less than 70, you have a fixed structure. You have COPD and that's end of the story. Doesn't matter what the FEV1 is because that will tell you more severity and that less than 70, doesn't matter that is 65 or 60 or is 45 is obstruction. There is fixed obstruction.

Now, I will say that, we'll recognize now, there is a group of individuals and all these has been evolving as we have cohorts, our smokers. And we had followed these individuals. There is a group called COPDGene, originally was 12,000 people that bring them of the age of 45, 10 pack smoking, they have all Hispanics and African Americans, because this is a genetic study. And NIH tells, "We don't have money to include Hispanic, Hispanics are too complicated. We almost have to double up the sample size. So, let's just stay with Caucasians and African Americans." And says, "Fine." So, it was a onetime, bring everybody, take a picture, smile a shot, what's going on their condition. But to our surprise, 50% of those individuals how everything was normal, and 20% have interstitial lung disease. So, then we went back to NIH and said, "Listen, we would like to follow them for five years, and now we have gone 10 years. So, we're going 15 years." So, we're getting a picture of what's going on. And you can have preserved ratio, that means you are a smoker, your ratio, their spirometry was 75 is not less than 70. But guess what, if that person continued to smoke, five years later, is going to be either obstructed or is going to become restricted. And is going to develop interstitial lung disease. And 10 years later, he can be more severe he continues to smoke. So, the bottom line is, yes, spirometry, we need for the diagnosis, we know what we're dealing with. But it could have been people who falls on the sides of that.

Matt: And when we order the spirometry as in primary care, we're ordering just spirometry, and do we need the pre and post bronchodilator to prove that it's a fixed obstruction?

Antonio: No, actually, you do the pre or post bronchodilator not to see there is a fixed obstruction, because it doesn't matter. We know that patients who have COPD has fixed obstruction, they can have some bronchodilator response today. Three months later, have no bronchodilator response. Six months later, he had 20% bronchodilator later response. There is a lot of variability in the bronchodilator response. I think it's important to do it with post bronchodilator is because by definition of COPD, is the severity, is the FEV1 post bronchodilator. So, this is like, you want to see if your individual has high blood pressure, but what you want to understand is, I want to watch your blood pressure while you're already on medication. Oh, your blood pressure's still high already on medication. Then, I need to fine tune, I need to adjust, that’s the rationale to do the post bronchodilator spirometry numbers to make a diagnosis. But it's also handy, you get a lot of response. And if you add other markers in all my patients, what I do is I get IG, I get CBC with differential.

I don’t know how's in Philadelphia. Well, let me tell you in San Antonio, if you order CBC in any primary care or any specialty practice, you don't get a differential or you get a computer, neutrophil, lymphocyte, monocytes. I had a lady who came to me, a little older this patient because mid-60s, she's been in the emergency room, she has seen a bunch of people in town, even a specialist. And I could not find eosinophil count and it's this fake, her charter was this fake. So, I say, "What I'm supposed to do?" Well, I send a CBC with differential, she got 45% eosinophils. So, she really has this-- her condition is an entity that is a completely different story, what we need to do. So, this helps you not only to diagnose COPD by itself, but also to exclude other conditions. So, you pretty much excluding eosinophil group, you're excluding IGE group, you look at bronchodilator response. So pretty much you're getting a much clearer picture of what you're dealing with.

Matt: So, I want to try to recap just real quick, and then, Cyrus, I'm going throw it to you in a second here. So, we're getting spirometry, we're looking for this fixed ratio of less than 0.7 to make our diagnosis of COPD. And we're going to look it for the pre and post bronchodilator. What's helpful to look at is the post bronchodilator FEV1, because if that's severe, that's a predictor of severity. And then you like to get an IGE level and a CBC with differential because you're looking to see eosinophil counts and does this person have high IGE levels? This is all going to be helpful to you as you're making your treatment plan.

Antonio: This is very important. You know why? Because we do have all these biologicals. And this person may fall in a category of asthmatic. And these biologicals, change their life. These biologicals are a life changing for the patient. The same that we saw with biologicals in rheumatoid arthritis and all those conditions, biologicals in asthma and the particular phenotypes of patients are life changing. So that's what I want to know is try to understand it, if anything of this, that my patient may have.

Cyrus: And that sort of brings me to one thing I wanted to touch on before we continue the case was, you mentioned, Antonio, about the PFTs and the ratio, obviously, less than point seven is concerning for obstruction. But we do use that in asthma as well. And I know that when our listeners hear this, there might be some confusion. So, from a pulmonary function test standpoint, in your practice, how do you differentiate the two?

Antonio: Certainly, the bronchodilator response is going to help a lot to make a differentiation. But asthma has other features. Asthma is not only that individuals smoke, asthma has atopy, allergic reactions, environmental conditions. I love to ask my patients about strong odors, perfumes, cleaning products, and they will tell you, "Listen, I can walk into a room and somebody has a perfume, I have to walk out of that place, or I have to be changing whether the products are used for cleaning, because the odors are so strong." So, asthma has its other feature that are part of the phenotype that the patient will present. And also there are some types of patients that will add some of the phenotypes of COPD. This person is exacerbated, this seems to be the hospital all the time. That's an individual that in 2022, those patients don't exist anymore. The one we used to see 10-15 years ago, that they will come in a hospital and come back and have this recurrent bronchitis exacerbation. So, if the patient has that you really have to size yourself, "What's going on here? Why is this patient having that?" And look at medication compliance.

One of my practices is fully funded clinic, everybody has insurance. But those Insurance copayments can go from 10 to 150 bucks, and the patients don’t take it. And I had patients who don't care to spend

300 bucks on a bottle of wine, but they will not spend 300 bucks in an inhaler. I mean, that is a fact. So, however as they--

Matt: It's less fun, Antonio, come on. [crosstalk]

Antonio: Yeah, it's real.

Matt: A nice bottle of wine or inhaler? I might go for the bottle of wine as well.

Antonio: They have to breathe, you know.

Matt: Yeah, that's true.

Antonio: I always remind myself to ask them about it through medications. And there is another caveat that you have in respiratory, is not a pill. I mean, anybody can swallow a pill as you choke. And pharmacokinetics and all that I will defy. But in respiratory, we have 28 different medications approved for COPD today and come in 10 different delivery systems. And so on you have to take a deep breath, and so on you have to take a slow breath, and so on you have to hold the breath, and so on you have to go. So, the technique is something that I think it's very important to emphasize that you speak to your patient, you spend two minutes and ask, "Well, what inhaler do you use? How do you use? Do you have any questions? How have you been asking? Because those variables are crucial before you make any changes or any interventions in your patients.

Paul: Any resources that you'd like for teaching those things? I feel like that is especially in the primary care setting that is I think sometimes a nuance that goes unappreciated or we just don't know exactly what to tell the patient. Do you have any online resources that you refer patients to or any handouts that you go over to actually make sure that their technique is appropriate?

Antonio: Yes, CHEST, it's useful website, there is a website, it's called Asthma [unintelligible 00:23:47] COPD. Those have a lot of graphics, techniques, reminder, helps to the patients to use the delivery devices.

Matt: And I believe National Jewish has a website as well that has some videos on inhalers, so we can link to those in the show notes for the audience for sure. For interest of time, I think we should move on a little bit. And I know, Cyrus, we were going to give a little bit more other case. Yeah, so why don't you go on in the case and take us where you want to go next with this.

Cyrus: Absolutely. Antonio dropped a thousand knowledge bombs right up front. There may be a little bit of redundancy here but we'll work through it, I'm sure. After our discussion, again with Ms. Rodriguez, we start our exam, she's well appearing, she's not in any distress, she appears comfortable. You do notice some centripetal obesity and some tissue redundancy around her neck, chin and face. On cardiopulmonary exam, you don't notice any abnormal heart sounds or any evidence of elevated CVP or elevated JVP. You don't really appreciate any wheezing but she does seem to have a prolonged expiratory time. And then in regards to vitals, she does have a resting oxygen saturation of 94% on room air. So, as we're putting it all together, we talked about some pearls from the workup in terms of pulmonary function testing, potentially CBC with differential, IGE. We've got those things in the back of our mind, but in terms of the history of the exam, is there anything with Ms. Rodriguez is particularly

worrisome? And then also, if we could touch on aside from COPD, what else might be in your differential as you're working through this case?

Antonio: It's worrisome for me the weight gain. It's worrisome for me the description of this features of obesity. I would like to know she had been treated for asthma. Has she gone to emergency rooms? Had she been in systemic steroids? Certainly, the young person, she's relatively young. I will worry about vocal cord dysfunction, I will worry about upper airway abnormalities, very often case, look like asthma, sound like asthma. And patients go to emergency rooms so seek help, what they do they receive steroids, and it remind me a lady that I have, that she was around 40s. She started having these asthma attacks. And it happened it was, after she had a C-section for a pregnancy that got a little complicated, she got intubated. What the lady had is subglottic stenosis secondary for the intubation. So, I will worry about that. And I will pay a lot of attention in here is spirometry at the flow volume loop. I want to have that flow volume loop to be very nice and smooth. If the flow volume loop shows anything flattening, certainly having COPD with sleep apnea concomitant. In her physical exam, I will take a look at that mouth, her Mallampati. If I can see her uvula when she opens her mouth, I will be happy. If I don't see anything, let's say, she probably has some as sleep apnea. And I will pursue that path too. And I will now recognize that her chronic disease is asthma COPD and sleep apnea, they live hand by hand, and they can grow. But I will be worried about her weight gain, why she has gained that weight and the distribution of the weight too.

Matt: That's interesting, because with COPD, I'm used to thinking about weight more from the other. And oftentimes I'm seeing patients who are having trouble maintaining weight, probably when they get the pulmonary cachexia syndrome later in the course. But it sounds like early on the patients with weight gain that may be part of the treatment. I know we did a prior episode on obesity hypoventilation and talk about weight loss. And of course, we've done episodes on sleep apnea as well. But it sounds like just recognizing that maybe they're diagnosing and treating that is going to be something you're keying into.

Antonio: And this gaining weight, is she having respiratory symptoms? Has she been or systemic steroids? Has she got to emergency room? Can the steroids sounds steroids for that? I will be very concerned about that why she gained that much weight.

Matt: Got it. Okay. Cyrus, what's next?

Cyrus: Yeah. In this case, you, of course, identify that weight gain and on exam you're seeing it and she says, it really has just come on as she's had more and more difficulty, exercising, which she feels is secondary to her shortness of breath. And so she's now living a more sedentary lifestyle, whereas before, when she was active-duty military, she was doing PT regularly. And I guess maybe she didn't have a significant dyspnea, as she does now. You examine that a little bit, she not been on systemic steroids, she hasn't had a lot of ER visits. It just sounds like her symptoms have been smoldering for quite a while. And she just has been not able to address them until now. And at this point, we've talked about differential diagnosis. And so we're going to send her to the PFT lab, as you said, we're going to get some pulmonary function tests. And it looks like she was able to get in actually, same day, you got super lucky. And we have an FEV1 of 65% of predicted with an FEC of 98% predicted. Resulting in FEV1 to FEC ratio of 0.62, so that's her true ratio, not the percent predicted.

She then was given bronchodilator, and her FEV1 actually improved a little bit from 65% to 70%. And the ratio also improved slightly from 0.62 to 0.65. So, she comes back to the PFT clinic to talk to you and now she wants to know, what do we make of these results? Antonio, how would you interpret them and how would you discuss this with our patients?

Antonio: She clearly has a fixed obstruction. I would tell her, I will be very suspicious that she may have COPD, she has fixed obstruction. And the moderate obstruction with the level of the FEV1, FVC. Some of my concerns, especially had been in the military and she was deployed in the Middle East. We've seen all these coming there that we don't fully understand. Certainly, at the beginning, in the early 90s and 2000s where people were exposed to the burn pits, that was American symbol. There is other environmental conditions. So, I would like to understand that she doesn't have some restriction component, will ask her DLCO. So, I will tell her, I will recommend for her to do full PFTs, I would like to see the whole panel, I mean, the whole spectrum a lung volumes and diffusion capacity. If I will do anything, I will go for a CT, not for as much for cancer. Look if there is any other abnormality in her lungs, suspecting that she may end up having some mix restricted obstructed process.

Matt: So, this patient we're talking about, just to recap for the audience. She's in her late 50s, she smoked for 34 Pack year; she been having this weight gain is coming to us with Dyspnea. And then Cyrus mentioned she was in the military. And these burn pits in case people haven't heard about them, essentially, the military bases, it's not like there's trash removal necessarily. So. they would just have these giant pits, or they would burn waste and trash right next to the base. So, people were getting exposed to this. And we already talked about pollution on this episode. So, she's got multiple types of potential smoke exposure throughout her life. And then the CAT scan here, I guess she would probably qualify for the low-dose CT as well with her age. But is there a difference in the way you would order with the low-dose CT suffice for her? Or would you order the regular non-contrast CT?

Antonio: I think there's two things here, I will order a regular non-contrast CT. Basically to understand her lung condition as a baseline. The GOLD committee and the USPSTF, now there is a strong recommendation to do the low-dose CT on the regular basis. And I know you have discussed that here in the program. But the only word of caution about this, this is a trip that the patient has to be willing to take, because the benefit of the low-dose CT, if the patient is willing to do the full-time doctor follow up, if the patient drops halfway through after three years, or doesn't want to continue doing, any benefit will be completely lost. I think that's something that I emphasize to my patients before they are willing to embark in low-dose CT as screening for malignancy. And, of course, smoking cessation here will be the most, we'll have to emphasize as she has to stop smoking.

Matt: Paul, you remember in CHEST in 2020, I think we talked about that a little bit and saying that it's not enough to just get the first CT but it seems like--

Paul: Right.

Matt: I'm not sure about you, Paul, do most of your patients get the follow up CTs, you're a great doctor, so probably but--

Paul: I will say there tends to be diminishing returns after they get that first sort of negative report a lot of times. It requires a little bit more cell after you have one that is kind of reassuring, which is not the way they're supposed to work. So, I'm picking up what you're putting down.

Matt: Okay, thank you for making that distinction. And that's a great point that you got to tell the patients, this is a long game, we have to keep checking. That's why we're doing these low-dose CT's every year, because you have to be screened for that whole period.

Paul: But I guess just from a practical standpoint, just so that I'm understanding because I feel like this comes up a lot. Let's say this is a new patient. So. you would order first A non-con CT just to get a sense of lung parenchyma and then follow up say the following year for low-dose CT if you're doing lung cancer screening is that in practicality what that would look like? I just want to be sure I'm understanding.

Antonio: Yes, she's going to go to a lung cancer screening. Yes, sir.

Paul: Okay, very good. Thank you.

Antonio: Yeah. And it's not unusual in South Texas. A lot of people have nodules or little stuff in the chest that we have to follow. She's a smoker, she's an active smoker. We have to follow those nodules. And this is something we have to be very obsessive, compulsive because I have seen after a year and a half those nodules are changing and their malignancies. Even in former smokers. I learned many years ago, you cannot bet against cancer because you're going to lost. So, you have to tap to be on top of that.

Matt: Can you talk about Alpha-1 antitrypsin? That's something that I saw was in the guidelines thinking about it. Is that for everybody, do you send that or is it just for select patients?

Antonio: Thank you for bringing this up, Matt. I think this is very, very important. This is the only, I had already tell you, a condition that we know can be associated with chronic lung disease. What I do with the Alpha-1 testing, I get from the Alpha-1 foundation and you can get also to some of the companies who make the supplement and therapy, you can get the diagnostic kits. The reason I do that is because you get the blood level and you get the phenotype. You basically get name and last name together. If the blood levels are normal, but the phenotype is abnormal. So is somebody during the family that other people has to be tested. If the blood level of the phenotypes is MM, there is no abnormality, that's the end of the story for the patient. So, here you only thinking about the individual you're talking to in front of you, that lady will sit in front of you. You're also thinking about this chronic lung disease that she has, could be anybody else in her family who have a condition.

And the Alpha-1 Foundation has done a terrific job in understanding, in partnership with their companies make supplement therapy. And we know now one factor, there is no age. You should test anybody regardless of the age for Alpha-1. To be sure that the Alpha-1 level and the phenotypes are normal. So, it should be done on everybody who has any kind of chronic lung disease.

Matt: Are you running into cost issues with that? That would be my only concern with that plan would just be the-- making sure the patient doesn't get like a $2,000 bill for genetic testing.

Antonio: I've told you the trick. The trick is you call the COPD Foundation from your office, you can call to any other kind of-- COPD Foundation will put you in contact with the different companies who-- the companies who make augmentation therapy. They have developed reference labs around the country, they work in partnership with the Alpha-1 Foundation. So basically, they send you all through the kits. Some of the test is a blood drop, like an Accu-Chek. That you put a little panel, you just sign, put some of the information, you mail it, and then you'll get it fax, the results. On some there is a little swab, a mouth swab, depending what company, but it's 100% free for a patient. And if there is anybody in the family that needs to be tested, you can do the same. It will be a 100% free.

Matt: And then I guess the reason they do that is because if we find people that need treatment, then these companies also provide treatment.

Antonio: Yes. Furthermore, you have Alpha-1 deficiency or any kind of genetic abnormality, your insurance can go off the roof, and nobody may insurance you. Through the Alpha-1 Foundation, they have a system that can be anonymous. And if the person is efficient and can receive anonymous augmentation therapy, but your insurance company never finds out that, it never shows in the records.

Matt: Wow, and that therapy is the just replacement of the Alpha-1--

Antonio: Right.

Matt: Like the deficiency.

Antonio: Yeah, that's augmentation therapy that can cause 70 to 80k a year.

Matt: Oh, my gosh.

Antonio: Yeah, that can be very expensive. And insurance may just-- but all the companies and the Alpha-1 Foundation have developed systems for patient. Alpha-1 Foundation is unbelievable what they have done for this.

Matt: All right. Okay. We will link to that for the audience. That's a hot tip there. Okay, Cyrus, where are we going to next?

Cyrus: We've talked a lot about some of the workup elements. The one thing we hadn't mentioned, I don't know, Antonio, how do you feel about those aeroallergens panels those, like IGE, allergy screens that you can get?

Antonio: In South Texas, I do it, because there's a lot of allergies here. It's different times of the year. But I was in Chicago a couple of weeks ago, I was crying, I'm back and allergies there. I think it's all over the country. We talk about South or South Texas, but it seems to me that it's all over the country. And again, I do it because you wanted to better characterize your patient and you have an a better understand what other alternatives to give. I want to say something, montelukast is given fixed 50% of patient with COPD montelukast, there is not a single clinical trial to use montelukast in COPD. So, the assumption is because they have allergies, but the truth is, we have no evidence, you don't have allergy or asthma, but it will work. And in COPD, there is no a single clinical study.

Matt: What would you advise for our audience? And how do you handle that in practice? Do you think that's overuse of that medication? I mean, there's cost, there's potential side effects.

Antonio: I think it's tremendously overused. I recommend to my patients, yes, you have allergies. Well, rotate your over-the-counter loratadine, rotate your over-the-counter allergy medications. I tell them don't go and buy the 100-bottle pills, because over time you make come with system. So go and buy the generic loratadine, the 12 pack, 20 pack, and when you run out of that by the one is next to different class, just rotate those, because that will make you work better for you and use it when you have a lot of symptoms.

Matt: Great. Okay.

Cyrus: I've never done that.

Paul: Because those don't have a black box warning.

[laughter]

Cyrus: That's really interesting. I think that's super helpful and very clinically relevant, I think. One other thing I wanted to ask about was sort of the different tools, the MMRC, or the CAT, those questionnaires that we can use with our patients. How often are using those with patients? And how important is that when you're trying to assess their sort of day-to-day limitations?

Antonio: One of the big challenge with COPD, is how do we develop objective tools to communicate with the patients. With blood pressure, when the patient comes, your system takes a blood pressure outside. When you see the patient and you ask the patient, "Hey, Mr. Johnson, how you doing?" "I'm doing wonderful". "Are you taking your medication?" "Yes, Doc, I'm taking all my pills and everything." But that blood pressure he was taking before you saw him, he was 280 over 200. So, you know that is something is wrong there. Either, he's not taking the medication, you really have to intervene. Now how can we do that in COPD?

In COPD, what we need is an objective tool. The MRC is the simple score. He said this one question is a dyspnoea score, how do you feel short of breath? What I do in my practice is when the patients register, they handle to them on a piece of paper in one size MRC, the other side of the CAT score, eight questions, you just added on anything above 10 is bad, above 15 is very bad, above 20 is really bad. It's very symptomatic. It's very sensitive, also to look at interventions. So clinical studies have demonstrated that you can improve the CAT score from 20 to 10 with interventions. So, you have here a win-win, you have a baseline and then you use it later on when the patient comes. And you know what's happening with his or her symptoms. Furthermore, I don't know you guys, you guys are really efficient, and I always run half an hour an hour late in my office, in my clinic. When I walk in at 3 o'clock with a 2:00 PM appointment, they give me this ugly look and say "Hey, Mr. Johnson. Oh, you did this paper when you wait outside, see. You really have gained all this. You gave me all this information. So, they will help me to catch up with my time delay that we are having. So, it's objective tools, I'm very strongly supported that we should be used on a regular basis.

Matt: I think this is good. So, the MMRC is the Modified Medical Research Council dyspnoea scale. Paul, I like this one. It's easy. This is just like, is do they have dyspnoea with strenuous exercise, or is it

like breathlessness when they're just getting dressed? And that's the extremes of the scale. And then the CAT score, which you said a little bit longer, but it can quantify. And it almost sounds like you track that over time like we do with the scores for depression or anxiety where we're trying to figure out if we've got the person in remission, that sounds pretty useful to do.

Antonio: Yeah, exactly that. And also the important of the CAT score also says, what does it mean for the patient to be short of breath in the sense of their social interactions, their activities, going out with friends. "I'm so short of breath. I feel so bad. I didn't go anywhere." So that says a little bit of depression and social interaction. So not only takes a look at pulmonary related symptoms, take a look at what does that impact on his or her life.

Matt: In the GOLD guidelines, Cyrus, there's this two-by-two table. And I think we might have already given one to Vanessa, our patient. But basically, the two-by-two table says like how many exacerbations have they had and how many hospitalizations. And then on the other axis is the MMRC or the CAT score. And that kind of puts them in these groups A, B, C or D COPD. So, the FEV1 gives them part of that. And then there's this other based on exacerbations and hospitalizations and these scores we're talking about, and I think this is a perfect time to go into talking about treatment. So, do we have another piece of the case to bring us into that?

Cyrus: Absolutely, you read my mind, I think, excellent dovetails really well. In our sort of discussion with Ms. Rodriguez, she tells us that unfortunately, she's not able to keep up with her peers when they go on morning walks, often having to stop on flat terrain for a few moments just to catch her breath. And so that kind of does get to what, Antonio, you were talking about in terms of things like social isolation and impacts on patient centered outcomes. And so she's certainly having some issues there. And so you put all that together with her FEV1, and you come up using that table that Matt referenced, you come up with her being GOLD to be in terms of her designation. And I think now we should talk about therapeutic options for her because she has COPD, and she has symptoms. So, Antonio, can you walk us through what is available? What we should be doing for our patients? How would you approach a patient like Ms. Rodriguez, given these findings.

Antonio: I think there is anything from this conversation that we having, the take home message is COPD is a treatable disease. We can change the natural history of the disease with pharmacotherapy. And the treatment of COPD are long-acting bronchodilators. It's very easy for me to talk about these in 2022. We have 23 years of development of these medications. So, we know the efficacy, we know the safety, we know a separator, we know it combined, how do they work. So pretty much and the whole staff has been put together, we serve in a silver plate, because we don't have to worry about all the stuff. And furthermore, we know if we start bad interventions, we can change the natural history of the disease. This is treatable disease. You can have slow progression, a decline in lung function with long-acting bronchodilators. You can improve symptoms for long-acting bronchodilators, you can decrease exacerbations for long-acting bronchodilators, you can even decrease mortality for long-acting bronchodilators. The objective of the treatment is not to make a brief better for two to four hours and be able to do what she wants to do.

Short-acting bronchodilators should be used as a rescue medication only. And we're doing a good job. If the patient comes back to you and Ms. Rodriguez come back to you and said, "Listen, you gave me this inhaler. I haven't use it at all. It's going to expire because I haven't used it." And you say we're

doing a good job because she had no require to risk. So, the bottom line is long-acting bronchodilators most of the time will start with the long-acting anticholinergic in patients who are symptomatic, and Ms. Rodriguez, starting with a fixed combination of two long-acting bronchodilators may not be a bad idea. Long-acting beta 2 agonist with the long-acting anticholinergic, given the medications combined in a single inhaler, actually you don't get one plus one equals two, to get one plus one equals three. You get some opening of the proximal airway with the anticholinergic and allows the beta 2 agonist to penetrate further down in the distal airway. In patients who are more severe or hospitalized, who got high eosinophils, like when you're going to use corticosteroids, we know that give them combined with the other bronchodilators, you'll get better efficacy. So yeah, the treatment on here is long-acting bronchodilators. If she's very symptomatic, I will start with the fixed LAMA-LABA combination.

Matt: Yeah, that brings up an interesting point about potentially de-escalation. I guess maybe before we get to that, though, just define terms. The short-acting agents, those would be ipratropium or albuterol. That's classically in the US anyway, that the two that I think of, and then the long-acting muscarinic is tiotropium is the one that seems to be most available in the US and then the long-acting beta-agonists, that's your salmeterol, formoterol, I guess, fenoterol, those agents.

Antonio: And we can also make [unintelligible 00:49:16] glycopyrronium are available, the long-acting anticholinergics too.

Matt: Okay. Yeah, Paul, do you get confused by the inhalers as well?

Paul: Yeah, no. And I'm always grateful for the yearly formulary change where just everything becomes suddenly new expensive, you have to choose a different one. It's always a treat to learn some new trade names.

Antonio: And once you remember the medications, that insurance company is going to take care of you to change it to, switch it. So, your patient is in a formulation A, they will get it later on next month, you're not going to get A, you're going to get B. And then and six months later, you go back to A. I tell my patients, "This life. We just have to navigate through that and be sure you get your medication."

Matt: Okay, so it sounds like we're pairing in the intensity of initial therapy to the degree of the patient's symptoms, and so for a patient who's not doing well, we would potentially be starting them on a combination LABA/LAMA. What about de-escalation? Is that something you think it's a good idea? Or is this something like once you get it under control, you should just keep hammering away at the same intensity.

Paul: So, with the fixed for long-acting bronchodilators, there are no studies can look at the escalation. And the truth is, while you're aiming to maintain lung function and sustain over time, it can be achieved with having maximum bronchodilation. I think it's important to remember, there is a ceiling effect, we can improve our lung function forever. So, it's going to be a level that they're going to go and just going to stay there. And they're going to stay there over time in the GOLD report last year, we have a section about lung function decline, that there is a couple of meta-analyses and put some studies together that used long-acting bronchodilators sooner. And one talking about FEV1 60%, 70%, what it's going to do is going to preserve 60%, 70% for years and years and years to come, because the people who loses more lung function is not a patient who has FEV1 that is 40%. If the patient who has FEV1 of 70%, the

person who has more has more to lose, so they're going to lose more and much faster sooner. So, if you don't start intervening now, when it's 65%, 70%, when you start intervene when he's 40%, it's going to be two, three years down the road, you really lost a lot of ground. So those are the point to start the long-acting bronchodilators is sooner, the one who start is strong, that's going result in improvement in symptoms. And that's another challenge that you have in a patient like this. You say, you're relatively young lady, but once she can improve her quality of life, can she able to do more? She's going to stay on the medication. So, compliance is not going to be an issue because she's going to feel the difference taking the medication.

Cyrus: That's awesome. Those are great, very clinically relevant pearls. There are two things I wanted to ask about before we continue with the case. One is in regards to that mortality benefit that you mentioned. When I was being trained, even recently, the kind of party line, so to speak, is that the inhalers help symptoms, but there really isn't a mortality benefit. I was wondering if you can speak to any of emerging trends in data or publications that suggest actually there may be a mortality benefit that we're just capturing. And then the other thing, which is kind of unrelated, is just talking through some of the different delivery systems, because I know that that's something that a lot of our listeners are going to be interested in whether you use like a mist inhaler, or a standard HFA or something like that.

Antonio: Let me address the delivery system first. I think the challenge that we have with our insurance system is we don't get to choose the delivery system. The insurance company has chosen that for us. So, I love the soft mist, I think it's all the delivery systems, the one that gives you better lump penetration is probably the soft mist, you have less precipitation in the mouth. But if it's not in the patient formulary, it's not going to work. What we need to do is we need to work with what we have. For example, if the insurance company uses the HFA, I will use the chamber, a spacer. A spacer will allow the medication to be able to penetrate better into the lungs. Either insurance, whether approved for the patient is out of medications, I tell them to take the medications right before their meals. So right before breakfast, take the medication, eat breakfast and rinse your mouth. That will significantly decrease two things.

One is the sensation of a chalk or powder in the back of their throat. And second, it will decrease the possibility of candida infection. I think with each of the delivery system, we have for that. And to just remind our audience that we do have nebulized medications now. Long-acting bronchodilators available in a nebulized formulation. So, we have Long-Acting Beta-Agonist, long-active anticholinergic, inhaled corticosteroids, nebulized. The new nebulizer machine is not what my grandmother had. These machines first are much more-cheaper. Most of the insurance will pay for it nice portable small to get three to five minutes nebulization. And you can use long-acting bronchodilators. This is an alternative for many of our patients that we can mimic the inhale medication in a nebulizer are for.

Matt: And that's probably good. I'm sure that's good for people who can't do the breath hold and people who can't coordinate or can't do the breath hold-- [crosstalk]

Antonio: A spacer.

Matt: Aren't having success with the regular inhalers, yeah.

Antonio: Aren't using the nebulizer. So, the second question is mortality. What we know for a fact, the only intervention decrease in mortality in COPD is supplemental oxygen if you are hypoxic. This is studies when they were done in the 60s and 70s. Today, there is not going to be a single IRB that will approve this study, because the truth, people will die. But it clearly shows, if you are hypoxic, and you need supplemental oxygen. Having say that, we've been intrigued for many years, that the bronchodilators may have some effect in mortality. We just saw in the last three years two large different studies that are with a fixed triple therapy combination. And this comes down to who are the patients who were enrolled in a clinical studies, who are the ones who were benefit from the potential benefit in mortality for these formulations.

These were patients who had exacerbation, who were hospitalized or had frequent exacerbations, who have moderate COPD. And in these patients, give them the triple therapy, not only decrease exacerbations, but also there is a signal, there is a reduction in mortality, and probably has to do a reduction of the risk of cardiovascular mortality. That's as far as we got today. We're not going to see the FDA level approval, because there's still a lot of holes. Still, we need to have randomized studies, we need to better understand why there is a cardiovascular protection, we need to be sure that the cardiovascular treatment in all the groups were similar. It's a lot of stuff that we need to see. But over and over, we continue to see, have some data suggests, yes, we may be doing more that improve lung function quality of life, we may be impacting mortality.

Matt: Antonio, you reminded me mentioning the triple therapy there, you reminded me. The inhaled corticosteroid when I was coming up-- Paul, we used to put everyone on inhaled corticosteroids and a long-acting [Paul laughs] beta-agonist, right?

Paul: Right. But we would also do this simultaneously while blasting them with systemic steroids [Matt chuckles]. So, like maybe it like we're tickling their lungs with steroid and they're getting like these whopping doses of medical steroids.

Matt: Yeah.

Paul: But, yes, Matt that is correct.

Matt: And probably fluoroquinolones as well. But we're not talking exacerbations here. I just mean for a chronic COPD treatment, the inhaled corticosteroid adding that component on, it seems like that's now sort of been pushed towards the back. And then this new guideline, I thought it was interesting. It said if the absolute eosinophil count is greater than 100, consider inhaled corticosteroids or if the eosinophil count is greater than 300, it might be a good choice for the patient. Can you talk a little bit about that because I know there's increased risk of pneumonia with it and maybe that's why?

Antonio: Everything we do in life; we pay a price, or we make our patients pay a price. So, my patients come and tell me, "You give me this medication but, in the TV, says this medication can increase the risk of pneumonia." And I say, "Yes, I give you this medication because you have higher eosinophil. You had an exacerbation, you were hospitalized with exacerbation, and you have three times last year they need to have antibiotics and systemic steroids so exacerbate with that." In those individuals have inhaled corticosteroids, the risk benefit on the reduction in exacerbation is much higher than the risk of developing pneumonia, osteoporosis, all the other side effects of critical service. Having said that, in

GOLD we talk about that this intervention should be a two-way street. What I mean is, yes, we added two years ago you were having the exacerbation, you have your eosinophil, so you don't have that anymore. Do you need to continue to be in that? And there are eight clinical studies that have shown that individual used the escalate, removing help corticosteroids and you leave the patient, the person with a fixed LAMA/LABA combination that efficacy in lung function and the efficacy in quality of life and exacerbation prevention is going to be preserved.

So, you're going to deescalate inhaled corticosteroids, should escalate fixed LAMA/LABA combinations. When the person has got high eosinophil that person will have to stay and they will fall into this group asthma-COPD overlap.

Matt: And these are blood eosinophils that we're talking about for the audience. And its figure 3.1 in the GOLD guidelines has a nice a stoplight format like green, yellow and red. And it reminds you who should be potentially prescribed may benefit from ICS treatment. And so, I found that really helpful and something that was a new concept for me. I know we're probably towards the end of the things here. As far as the interview goes, because it's getting late. We want to be respectful of your time.

Cyrus: So, Antonio, we've talked about medications that we can use with Ms. Rodriguez. But while we were off air in timeout, we've talked about this COPD tripod, if you will, and really the pharmacologics are just one leg of that tripod. The other two legs being pulmonary rehabilitation, and in smoking cessation. So, do you think you could talk to us and our audience about how you approach these topics and the importance of these topics with our patients?

Antonio: Yes. What I approach is, I would love my patients to go to pulmonary rehab, has an endangered species in San Antonio. There is two sides in the whole city. I tell my patients, "Listen, I needed to move, I need to get out of the house, I need to walk to the mailbox, I need one day to do it for five minutes, maybe next week to do 15 minutes, then you may go to half an hour, you will slowly prolong, you will build up. Furthermore, leave your phone at home. Disconnect from the world. This is your time, for you to do something for yourself." I think rehab or some form of exercise is very important.

The second area that I think is very important is a smoking cessation. And smoking cessation is being a place that has been underestimated because, "Ah, I know he smokes." I have a gentleman have [unintelligible [01:01:56] his pocket all the time. "Mr. Jay, you got to stop. We need to get real, [unintelligible [01:02:02]." And one day he came without [unintelligible [01:02:05] and he said, "Doc, I had a heart attack and I thought this stuff is going to kill me." I'm 100% convinced that every single person who continues to smoke, he wants to stop. They understand they have to do it. But this is probably one of the most horrible addictions.

My patients asked me, "Well, I stopped smoking, should I go on try electronic cigarettes?" "No, don't do that. Don’t electronic cigarettes, don't do that stuff. We don't know how bad they can be. All we know how bad smoking is, so stay with that. Try to work into stopping and to cut." Our people tell you, "Oh, my uncle's smoker, he was 90 years of age." Yes, I had a friend who quit smoking when he turned 100. He buried three wives. He says, "Oh, Mary, she was an old lady, [unintelligible [01:02:51] she died." The guy died at 103, the gentleman used to do square dancing, he fell, broke his hip and died of PE, but he had good genes. And what we don't know is who had good genes or bad genes. So, I told my patients,

"I don’t know if you have good genes to be able to smoke and to be 100 years old. So that's why you must stop smoking."

Matt: Antonio, and we've done smoking cessation shows, which we can put link to in the episode description in the show notes for this one. So, our audience is definitely familiar with a lot of great tactics for smoking cessation. We talked about like endless [unintelligible [01:03:28], right, Paul, that's one of my favorites.

Paul: Yep, in perpetuity.

Matt: The pulmonary rehab, I love how you said, you're sort of like, because not everyone can get into it, you're just encouraging them to have this graded exercise where they're gradually increasing the amount that they're doing. That's one of the things. I wasn't sure exactly, if you get to a formal pulmonary rehab, is there a big education come on? Or they teaching people about inhalers there as well and exercising them? Or is it mainly just focused on the exercise?

Antonio: I think the most important aspect of having been going to a pulmonary rehab, and that's the reason I'd really love my patients to go, because they're sitting next to another person who's dealing with life on the same circumstances. I can tell patients about, "Ah, do these, do that." But when they sit there, they talk to people, that’s their day-to-day activities is huge. And patients actually learn some tricks to deal with life. I think that's what it's more important to rehab. Of course, they teach them how to take the inhalers. They trained them how to use their medications. They train they have to gain more strength. All that is a plus, plus, plus, but the most important is the daily interaction with other people that have the same condition that they have.

Matt: I think we should start to wrap up our case here. I know we did want to talk a little bit more. Well, Cyrus, I know you wanted to talk about oxygen and non-invasive ventilation. So how does that factor in for our patient Vanessa? Is she headed towards either of those things? Maybe we'd have to roll the clock forward if she doesn't stop smoking, but tell us how you want to wrap this up?

Cyrus: Yeah. I think for Vanessa, we probably shouldn't lose sight of two factors. One is that she does have obesity, and she has some kind of evidence of maybe upper airway obstruction. And then, of course, she had that resting oxygen saturation and 94%. When you see those two things in regards to oxygen therapy, and then in regards to positive pressure pap therapy, how do you tackle those, Antonio?

Antonio: I think she needs her sleep study. She needs her sleep study. I have been doing a lot of portable sleep studies at home, the pandemic has allowed us to do that. It preserves the patient's privacy, we get that information that we need. And some patients that absolutely don't want to do that, I will use a continuous nocturnal oxygen monitoring. This is pretty much non-invasive that you're going to get huge amount of information. So, I want to understand if she's hypoxic during the night, or very likely she's going to have obstruction. So, what we would like to do is to offer her the possibility of a CPAP, dental device, anyways to try to improve airway obstruction, because she's pretty young. We need to buy her 20, 30 years good quality of life, unless she's going to start having pulmonary hypertension and other complications.

Paul: I think that's a great point. I like to see my patients with a set of 100%. So, should I just slap oxygen on this patient out the door? Or, what are we doing with that, sat at 94% at rest?

Antonio: We know that even that she will desaturate on exertion and drops to [unintelligible [01:07:03] supplemental oxygen is not going to impact her life. It's not going to do anything. I feel what we need to go to the bottom to understand why she's hypoxic and what happened when she does. And she may not be hypoxic during the day, but she's hypoxic at night.

Matt: Yeah. When you get the home sleep test, because that seems to be in the past couple years-- Paul has this reverted for you too or most patients just defaulting to home sleep tests now?

Paul: Yeah, absolutely.

Matt: Yeah, and so you get these reports back that it gives you the apnea, hypopnea index, and then it also gives you the ODI, the oxygen desaturation index, and it tells you how much time they spent below 90% in various-- what are you looking at there? What's significant when you're reading those reports? What's a significant amount of hypoxia?

Antonio: Well, basically, if the amount of time and they stay with oxygen saturation below 90%. So, if the personal has a couple of minutes here, a couple a couple seconds there, little dips, that's probably not relevant. But if a person has 30% of her time, and this lady of her time, at least below 88%, she has severe hypoxemia. Basically, what you want to do is you want to put someone in the bank to start treating her and to prevent pulmonary hypertension, to prevent cor pulmonale, and very significant progression of her condition.

Matt: Yeah. And then for these people are you recommending non-invasive ventilation CPAP, because if they have just the AHI, that's elevated, you're going to treat with CPAP, right?

Antonio: Right.

Matt: But if they have the AHI that's elevated and 30% of their time, where they're below 88%, you're also giving them oxygen with that, because couldn't the CPAP as well just overcome, and I guess you wouldn't know without an in-lab study.

Antonio: Those patients, I do a CPAP titration if the patient don't want to do it for X or Y reason. What I do is I give them the supplemental oxygen. And then later on after a couple of months, I made sure they are nocturnal oxygen monitoring with and without oxygen. So in that way I can get. One night with oxygen, one night without oxygen, so I can better understand what's going on. And I can show the patient, "This is what happening, that's the reason you should do this," or, "You should not do this."

Matt: Right, so they'd still wear the CPAP, but just with or without oxygen-

Antonio: Yes, sir.

Matt: -you'd repeat the test and then you-- okay, that makes sense.

Cyrus: I think that's a good point too, because I think like really, if they have obstruction, and you have them on PAP therapy and their AHI is ablated. They shouldn't need supplemental oxygen unless there

is another contributing factor that you're missing. And I think that that approaching it that way is the same way I approach it, where I'll test my PAP therapy and make sure that it's working with oxygen desaturation studies on PAP. And if they're still desaturating, that either means my PAP is not effective, or it means that maybe this is a person that has heart failure as well. And I have to be more aggressive with their diuretics. And I think those are important points to remember. I think the other thing that I was trying to get out of the case is someone's got a resting saturation 93%, 94%, and you're giving them a diagnosis of COPD, is this someone who should be getting a walking desaturation study, and exertional test of some sort? Is that what you would do with someone like this, Antonio?

Antonio: Yeah, I do six-minute walks and those patients, and I'll tell you about our techniques of the six-minute walk, meet all the exclusion, have been doing a six-minute walk. There's been a lot of obsessive and into the pulmonary, especially in the COPD community it's has been very obsessive how the three-minute walk, six-minute walk has to be down the hallway. The truth is that doesn't matter. We use a hallway, we use that for our patients with ILD with our patients with pulmonary hypertension or our COPD. You will just sat, and you knew it you have a problem. I do six-minute walks. And this is something we do routinely in our practice, and also help the patients to realize, what's the severity of his or her condition. "I know my sats really dropped, I got very short of breath, I'm only able to do this much." And also you get some idea how their cardiac function are responding.

Matt: Before we leave this discussion about non-invasive ventilation, Cyrus, I think you wanted to make one point about the BiPAP for people who are hypercapnic. I mean, oftentimes, our patients with COPD have resting bicarb in the 50s or mid-50s, high 50s. Do those patients need to be on BiPAP? I guess would be the question, and is there any benefit to reversing that?

Antonio: Yes. I think those patients BiPAP ventilators, the APAPs. We can mimic and make the machine to be more friendly for our patients to use. And once the patient's ventilator is working, the APAPs and you can titrate the pressures appropriately, the patients love it. And they tell you, "I can sleep very well. I feel rested. And I can see a significant change in my life."

Matt: And those are auto titrating BiPAPs, it's similar to an auto titrating CPAP. And those tend to be more comfortable with sounds like for the patient.

Antonio: Yes, And also remember the other important issue and I tell my patients is very often when you get any form of non-invasive ventilation CPAP, BiPAP, you go to a place they tell you, "This is your machine, this is your mask, go home." And I tell them, "No, no, it doesn't work that way." You go over there, and you tell them, "I want to see all the devices." They make pink devices, because woman's face are different, smaller than men. So, we should give you a pink one, you are a lady, and finally only the nose, the nose and the mouth, underneath the nose, underneath the nose and the mouth. I mean, we have so many alternatives because at the end of the day, what we would like is to be a device that the individual would say, "I love this. I need to sleep with this." So that's the most important part.

Matt: Well, I think we could talk for hours. We've already decided in our timeout that we probably need to do a follow up episode with the hospital medicine crew on acute exacerbations of COPD. But this has been just fantastic. So, at this point, Antonio, I'd like to thank you for all your time. And can you give us a couple of take-home points, maybe two or three take-home points that you really want the audience to remember from what we talked about tonight?

Antonio: Well, thank you, Matt. Thank you again for inviting me. So, my take home points is, one make a diagnosis. Not everything who smoke, nobody who's smoke develop obstruction, not everything who cough is COPD. So, make a diagnosis. Do spirometry, be sure that the FEV1, FVC ratio is less than 70. You have a lady in front of you that has COPD, has fixed obstruction. Take on the face of COPD has changed. We have to suspect COPD in early in people patients less than 60 years of age, and woman more than men. My third point is this is a treatable disease. You can make a difference using long-acting bronchodilators. Try to adjust the delivery device to be there, and the patient is able to use but the treatment is long-acting bronchodilators for this condition.

[Curbsiders theme]

Paul: This has been another episode of the Curbsiders bringing you a little knowledge food for your brain hole.

Cyrus: Yummy.

Paul: Great. Get your show notes at the *curbsiders.com*, and while you're there, sign up for our mailing list to get our weekly show notes in your inbox, plus twice each month you'll get our new Curbsiders Digest recapping the latest practice changing articles, guidelines, and news in internal medicine.

Matt: We're committed to high value practice changing knowledge. And to do that, we want your feedback, so please subscribe, rate, and review the show on Apple Podcast or on Spotify. You can also send an email to *thecurbsiders@gmail.com*. A reminder that this and episode are available for CME credit through VCU health at *curbsiders.vcuhealth.org.* A special thanks to our writer and producer for this episode, Dr. Cyrus Askin and Dr. Deb Gorth and to our whole team. The Curbsiders is produced and edited by the team at PodPaste. Elizabeth Proto runs our social media, and Stuart Brigham composed our theme music. And, Paul, with all that, until next time, I've been Dr. Matthew Frank Watto.

Cyrus: And I've been Dr. Cyrus Askin.

Paul: I remain Dr. Paul Nelson Williams. Thank you, and goodbye.

[Curbsiders music]

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