Polypharmacy & the SLP during the COVID-19 Pandemic: Part 4

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- [Amy] Once again, welcome to our event today, "Polypharmacy & the SLP during the COVID-19 Pandemic." And this is Part 4 in a four-part series. And right now I would like to welcome our presenter Dr. Jeanna Winchester. Jeanna, I'm going to hand over the mic to you.

- [Jeanna] Thank you so much. It has really been a pleasure being able to present this series. When we first proposed this series earlier in the year, it was just sort looking at what was topical in the field. We had no idea just how important this series would end up being at this time. And so it has really been a pleasure to be able to speak with you guys over these past three hours, four hours by the time we get done with today. So we're going to continue looking at some of the bodily systems that are involved in the swallow. And particularly focus on the GI system, but before we get into the GI system, we're gonna do a bit of a review of the previous four parts, or the previous three parts, so we make sure that we have a strong foundation to then discuss the GI system of dysphasia. As a number of disclosures here, my name is Jeanna Winchester and I do receive an honorarium for this presentation.

I have a independently sole proprietor LLC, single-member LLC through which I do a number of different types of continuing education as well as some other adjunct educational positions. I don't have any other disclosures to report and so we can just get on to the content. For this course, we're going to help you be able to describe the relationship between reflux dysphasia, proton pump inhibitors and COVID-19. There's a relationship between reflux dysphasia and the use of PPIs because of GERD. We're gonna go into that GI system of dysphasia and tell you much more about GERD. But then we are seeing a bit of a relationship between PPIs and COVID-19 and we're just gonna be able to tease out only a little bit related to how those things come together because this information is brand new and that research is ongoing. We want you to be able to identify factors contributing to polypharmacy and patients with reflux dysphasia. We're gonna focus quite a bit on this. I'm gonna show you some of the

medication surrounding the gastrointestinal's system of dysphasia. And just like in the other parts, I'm gonna help you see the reason why it's so probable that individuals, especially as they age, are likely to be taking multiple kinds of medication for these conditions and then I'm gonna show you how these different systems all relate to each other, so it's likely that people are taking multiple medications for each bodily system of dysphasia. And describe the long-term effects of polypharmacy on the gastrointestinal system of dysphasia in patients recovering from COVID-19. To review polypharmacy across the bodily systems of dysphasia, the main point that we want to stress here is that the role of the therapy team, no matter who you interact with on the interdisciplinary health care team, in general the team is trying to prevent medical errors.

And so by you having a greater understanding of the role of polypharmacy, the role of dysphasia and the bodily systems involved in the swallow and how this can break down, you can help possibly improve, even if it's just a little bit, a patient's quality of life. Studies have shown that individuals are most likely to have a medication-related event where the individual is predominantly female. It's about 59% of the time or more. Individuals that have depression, and we've shown that in some of the previous parts, where individuals that are taking various types of psychotropic drugs or drugs related to psychiatry or psychology, they're more likely taking more than one medication especially if it involves depression. Patients with congestive heart failure, diabetes mellitus and end-stage renal disease are also very likely to be taking multiple medications and we will review again how this relates to polypharmacy among respiratory diagnosis and-or hypertension diagnosis. Patients are also likely to have dysphasia if they have these particular diagnoses. So it's a strong comorbidity and a strong correlational relationship between dysphasia and polypharmacy. Sometimes they are linked directly. Sometimes it's through a third comorbidity, for example depression, CHF, diabetes, renal disease, respiratory diagnosis, this might be the link between polypharmacy and dysphasia. At this point we're gonna do a small review to

make sure that we take the key points from the other three parts and the other three presentations and be able to have that information to help us understand how the GI system of dysphasia comes into play. Polypharmacy relates to the respiratory system of dysphasia because patients suffering from significant respiratory syndromes or respiratory stress are just at a high likelihood of having polypharmacy. They're very likely taking multiple medications. And when we looked at a general case study of COPD, we looked at the relationship between having a COPD diagnosis and polypharmacy.

This was linked to patients being most likely prescribed five to 12 medications in order to manage their respiratory syndromes or conditions. And certain medications were more likely, for example bronchodilators, mucolytics, antitussives, antibiotics, beta-2 agonists, corticosteroids, decongestants and vasoconstrictors, among others, were very likely to be described. And these medications are antibiotics of course, are treating a bacterial infection that may be present, but bronchodilators are trying to then increase the expanse of the upper and lower respiratory tract in order to take in more air. This might be inflamed when you have something that is tubular like the trachea. This will apply to the esophagus a little bit later here.

The central portion of the trachea, the place where the air actually goes through and if you were to take an axil slice, it will look a circle. The portion of the trachea that the air actually passes through, this is called a lumen and it's true in arteries and veins, it's also true in the esophagus. It's the name of that circle, the inner tube. And so bronchodilators, as you describe, try to dilate the bronchial system, try to open up those airways. Mucolytics, antitussives, decongestants, these are going to try to change the inflammatory response. Try to stimulate the cough response. Really facilitate eliminating some of the things that might be preventing that airway from being clear and having that airflow. Vasoconstrictors and corticosteroids and beta-2 agonists have a lot to do with other types of cardiovascular and pulmonary contributions as well

as some immune contributions and so you can see why logically it makes sense that if an individual has some severe type of respiratory syndrome, they're likely to be taking multiple types of medications to treat the various components of that severe respiratory syndrome. From a neurological standpoint, we wanna bring your attention back to that Oral Mech Exam. Whether you do this in person or you're starting to do this via telehealth, we want you to to take a look at that Oral Mech Exam again. This might be something that you do very regularly, but we wanna bring your attention back to it so you can really understand what is so important about the Oral Mech Exam. Well, the interesting thing about neurology is that very simple rudimentary tests can actually tell you very significant neurological things. So for example if you hold your finger in the middle of someone's visual field and you have them follow your finger and you move the finger around, the way that the eyes are able to hold on to their gaze and fixate on the finger while they move can be very important. The same is true of the Oral Mech Exam.

What you're seeing with the face, with the lips and the oral cavity can really tell you a lot about some of the neurological function happening with this patient. And there are three cranial nerves that are particularly important with the swallow that can be, have that initial screening with the Oral Mech Exam and then hopefully if you see something that's neurologically based, you're able to follow some sort of instrumentation or further swallowing evaluation, maybe even a speech-language evaluation in order to tease out what neurologically and cognitively is happening. Specifically we wanna focus on cranial nerves five, seven and nine: the trigeminal nerve, the facial nerve and the glossopharyngeal nerve. The trigeminal nerve is very important in mastication and the preparation of the bolus and transit to the oral and the pharyngeal phases, basically what is happening in the oral cavity. The facial nerve is pretty easy to understand where the facial nerve is. Go ahead and rest your face in your hands, just lean on your hand. No matter what position you do, take your hand and lean on your hand so that it's on, your head is in your hand or your face is on your hand, basically wherever your hand

touches, the palm of your hand touches is gonna be the facial nerve. And it's easy to remember, it's going to affect your face, particularly your cheeks. But what's also important to remember is that it also affects saliva production and it is important when we think about respiratory and other pharmacological issues that might decrease salivary function. The oral and pharyngeal cavities need the saliva, it needs the lubrication in order to stay hydrated, in order to stay healthy as well as to be able to transit that bolus appropriately. And then the glossopharyngeal nerve has two very important speech and dysphasia related sections of the body in its very name. The glosso part refers to the glottis and the pharyngeal part obviously refers to the pharynx. So we're talking about the larynx to the pharynx.

This is going to be involved in taste, general sensation, the bolus continues. It's not just what's happening on your tongue, but what is happening as the bolus passes through the oral, pharyngeal and laryngeal cavities as well as elevation of the soft palate and the gag reflex because the entire palate, the tongue needs to make contact with the hard and soft palate. It needs to elevate. It needs to create a suction in order to propel that bolus towards the epiglottis, towards the pharynx. Otherwise the whole movement of it doesn't quite work and whenever that movement is interrupted, where the coordination is interrupted, you can end up with dysph, well, it's a breakdown so you automatically have dysphasia, but you can end up with aspiration and other dangerous situations.

Bringing it back to the cognitive system just to see polypharmacy and how just taking multiple medications can be an issue here, when individuals were taking dementia related medication, psychiatric related medications and other neurological related medications, there can be significant cognitive ramifications. Gait disturbances, decreases in mobility which can effect nutrition and sarcopenia. But it can also effect other components of the speech-language evaluation: attention, memory, concentration, global cognition and executive functioning. The case studies that we've

reviewed in the cognitive part demonstrate that even in individuals that were healthy and quote-unquote, normal for their age, these were older adults, these individuals tested at normal levels prior to the study. As they were taking more and more medications, these aspects of the speech and language eval and these cognates began to be impaired. And it wasn't so much one medication over another, like a certain type of medication was the root cause, it had more to do with the interactive effects that can occur by taking multiple medications at the same time.

So some tips that I wanted to give you just to reiterate here, when you're doing your chart review and you start to have these conversations with the nursing staff, don't be afraid to ask the nurses questions, the nurse practitioners. If the physician has time, their time is very limited, maybe you can snag a minute or two just to followup on what a particular medication is just so that you understand how that might impact an individual's cognition. But when you're looking at how you perform your own speech-language eval and how this might integrate into your evaluations, emphasizing attention, memory and compensation or comprehension are key. You can even build polypharmacy into that.

Asking them free recall without looking, write down or say out loud their medications. What are they used for? What part of the body is effected? What is this doing for you? How does this effect you? Talk to them about their medications. You'll be able to form that list. You can even look at the patient history. You might find that there are some repeats that the nursing staff or the physician staff didn't know about because maybe the patient didn't disclose it. But in addition to that, you can also look at their free speech recall, their memory, the way that they're able to pronounce the information and of course their comprehension. Do they understand why they're still doing this, why they're taking these medications? So you can utilize this, not only as a possible evaluation. It's a very real world application. It doesn't take very long, so you're still able to continue to evaluate in other dimensions, more formalized dimensions, but you

could also use it as a therapeutic tool. If you start to notice that there are issues, this will help you begin to then maybe, if you see a memory issue, an attention issue or a comprehension issue, global cognition, executive functioning, any of these other cognates that are effected, you might then be able to perform a more formalized battery of tests and then begin to move in a therapeutic direction. I really wanna emphasize how important it is to have a conversation with your patients. As I was starting out, some of the most, I would do these formalized tests and there was a long delay in the memory. So in the middle, I would have to try to occupy the person for about 20 minutes just to hit the right amount of time to do the long delay memory recall. So I would record these conversations and I would ask them these types of real world applications.

And I found this is where the memory deficits, the attention deficits really started to come to play, because individuals can compensate. Patients start to get really used to being tested in a cognitive battery, especially if they're in the aging population. But when you started to ask them real world questions and you started to apply them and do this free speech, free associative recall, you could really start to see where the breakdown would occur. And then it was something that we could review later in context with the formalized battery. Together when the formalized battery started to indicate issues, the free recall became so important 'cause we could really see and hear how their cognition and their comprehension was breaking down. It also ensures that the patient receives individualized care. And this is probability one of the most significant things you can do in order to reduce repeat hospital admissions. Making sure that you understand the patient in front of you. There are, of course research is important and there's a bell curve and we have averages and we have expectations, but we have to remember that everybody is an individual and their particular situation might be a little bit different and providing that individualized care is going to increase the probability that you catch something, that you provide that comprehensive evaluation that might reduce a return-to-hospital admission and like we said, maybe

reduce a medical error or possibly improve their quality of life even if it's just a little bit. So let's take a brief review here and understand how all this comes into play now with COVID-19. It's very important with polypharmacy, but COVID-19 represents not only the current situation, but a broader understanding of major infections. A lot of what we talked about here can also be a applied to major bacterial or viral infections of other kinds. Think of very severe types of infections. Now they're not all gonna have the same specifics, they might not be respiratory, but you can derive some major themes here and be able to better understand how infections can affect the systems of dysphasia. But specific to COVID-19, we know that there is a significant respiratory dysfunction associated with this virus. It's noted in adults.

And while children and teens have not shown the same level of dysfunction, and we're not sure why, because it's brand new and it's illusive, as the individual gets older, this respiratory duress increases and especially in the older population and the sniff population. This particular infection and any major infection, whether viral or bacterial that is inhaled, is likely and it's particularly true here, going to cause dysfunction across the oral, pharyngeal, laryngeal, tracheal and bronchial areas.

And if it's a lower lobe infection, if it does enter the lungs, those lobar areas can be effected. This will impede, of course, speech, because we need to have enough breath support, not only to take the breath in but to expel it back it back out to produce those phonemes. But we also need to be able to hold our breath long enough in order to execute the swallow. So let me reiterate how the breath is held during the swallow. I'm gonna exaggerate it here just so that you can hear it. I'ma take a breath in. I have to hold my breath for one to two seconds, swallow my saliva. I'm gonna show you a little bit about my own dysphasia, so it might take two swallows. And then I'm going to go ahead and breathe back out a little bit loud so that you could really hear how I have to take it in, hold it, and then recuperate my respiratory function, so. You have to hold your breath for one to two seconds in order to execute the swallow and you have to be

able to recuperate that respiratory function. Well, we've seen patients across the board, COPD, significant viral and bacterial infections, other issues with head and neck cancer, individuals that have deficits in the respiratory system of dysphasia. The research has really shown that they're likely to try to sneak a breath in the middle. It's the one to two seconds that can be very difficult. And this is common, for example, in patients with motor disorders like Parkinson's disease and Huntington's disease. They can't hold it. So in the middle they'll try to breathe in. Well, pressure is going to bring the bolus into the lungs as well when they try to sneak that little bit of air. With COVID-19 there is the possibility of long-term consequences such as tissue scaring at different parts of the upper and lower respiratory tract, but there's also a higher probability in the older adults for thrush or other microbial infections to occur. This is common with any sort of major viral infection or bacterial infection.

It can throw of the balance of the oral and pharyngeal cavities and so other infections can occur. So there may be a temporary long-term or long-term aphasia. I'm sorry, long-term dysphasia possible with these patients. It may cause it, It may have already been there and was exacerbated. And the process of, especially if they were receiving invasive mechanical ventilation, the process of receiving mechanical ventilation can irritate these areas and then the tissues are not coordinating as they should and they may have dysphasia consequences. Overall there is an aspiration risk with any sort of major infection. With COVID-19 this is absolutely true. A virus or a major bacterial infection is basically gonna suck up all the nutrition. And especially if it's a type of infection that occurs along the respiratory tract, just irritation of the oral, pharyngeal and laryngeal cavities may result in a decreased desire to eat. When you feel sick, when anyone feels sick, the idea of eating just really doesn't sound like a good idea. It doesn't feel like a good idea. There are some foods that could be really helpful during a sickness and then other ones that you just don't want. Textures can change, our preferences can change. And an individual that's already experiencing polypharmacy and they're older adults or maybe they have a deficit in the neurocognitive systems of

dysphasia, their nutritional demands may change with this dysphasia diagnosis. We've also shown that there's a likelihood there could be decreased muscle tone, a loss of muscle mass, this may be related to the polypharmacy, underlying conditions, weight loss or gain. And especially as we talk here about the GI system of dysphasia, this can really related to nutrition and sarcopenia. There's also a high probability that these infections will occur if there's a recent admission to a skilled nursing facility or the use of mechanical ventilation, just the process of invasive ventilation is going to change the way that the structures coordinate.

This can last for a short while. In individuals that are at risk, this can last a long while. It could not only be days, it could be weeks, it could be months. And depending on their other comorbidities, their age and what is happening with that patient, that patient that's in front of you, that individualized care, this could result in some significant aspiration risks. So we want to make sure to emphasize that there is an aspiration risk, not only with COVID-19, but major infections in general, viral or bacterial, especially as it relates to other super infections.

Individuals that might be in the skilled nursing facility or other community acquired infections, we do have bacteria and other organisms that live in our body, especially in the oral cavity. So there can be other super infections that can come secondary to a major viral or bacterial infection. For example MRSA, C. diff., SIBO. SIBO effects the small intestines. C. diff. is another GI issue. MRSA lives in a lot of places on the body, but it can also enter through the nasal cavity. And these can begin to take hold when an individual's immune system is compromised and so this individual may just be having a really, really hard time. It's important to understand that as the number of infection starts to increase, this person has a harder and harder time, their aspiration risk is going to increase as well. From the neurological standpoint, COVID-19 has had a significant cerebro and cardiovascular component to it that has been found across the lifespan. It increases as everything else does, as among individuals as they get older,

so individuals in long-term care are the greatest risk and they have shown an age related difference. However, it's hard to know if this is a true difference, it might be a bias of the clinicians. So for example in part three, we discussed that younger adults, individuals between the ages of 20 and 40 years old were likely to be diagnosed with significant psychiatric related issues to having a viral infection, but older adults were likely to be given the delirium diagnosis. The difference between delirium and dementia, dementia is progressive, it's degenerative and it's ongoing. Delirium, even if delirium lasts for weeks or months, it is temporary and possibly could change. Dementia is gonna continue and it's unrelenting.

So it's interesting that older adults are likely to be given the delirium diagnosis. Is that truly a difference by age? Maybe, however, it also could be implicit bias by the clinicians and the researchers who just believe that younger adults are not having cognitive impairments or that older adults are likely to have cognitive impairments.

And they could be assigning these diagnosis basis, diagnoses based on their biases. This is brand new, it's ongoing and it's hard to know. That is an important caveat though to remember with all infections. In general, the clinical community has a tendency to bias their judgment of older adults towards a cognitive decline because of their age. I hope that you won't be that individual. Make sure that you're given the battery of tests that you are trying to tease out what those conditions might be, because just because they are older, does not mean they're cognitively impaired. And if you have someone's who's younger, let's say, that has a traumatic brain injury or a car accident or something else, they might have a cognitive impairment due to an injury. Again, it's important to make sure that you stay unbiased and that you perform those evaluations with a clear view of the patient in front of you because it will make a difference and you possibly could reduce that medical error, maybe even improve their quality of life just a little bit by catching some of these things. From a cognitive standpoint, even children experience the hyper inflammatory syndrome. They can be

hospitalized from anywhere from a few days to a week. And anytime you're hospitalized, especially for longer periods, it increases the likelihood of polypharmacy even among children which might effect their development. Polypharmacy in younger children, in teens, is just not as studied as it is in older adults. And in truth, older adults and polypharmacy was not even really investigated to the level that it is now 10 years ago. So this is newer fields of research. It's important to understand polypharmacy across the lifespan. For older adults, it can effect a generation. For younger adults and teens, it can change development.

And some of those implications can be lifelong, because they're likely to continue that polypharmacy for the rest of their life. From the reverse side, remember your patients. Some of them may have been taking multiple medications for 10, 15, 20 years and that could be effecting the current state as they come across your case load. It just helps you see them a little bit better.

The cardiovascular and cerebrovascular damage and pulmonary issues can cause or exacerbate dysphasia in adults as well as children, but the caveat here is children may recuperate their function and return to a more active lifestyle faster than adults, but that doesn't mean you shouldn't provide rehabilitation. So if you're in the school system, having this understanding, especially of dysphasia, cognition and the bodily systems related to dysphasia, that child may be on your case load for a shorter period of time than, let's say, an older adult. However, that child still needs you and it could be so important, because as we've shown, neurology, cognition, respiratory function, all of these can be effected. Nutritional demands, growth and muscular function, all of this could be effected in those children as well. It just might change how long they're on your case load. They may recuperate and compensate faster, but it's still very important. So one last review of the cognitive system. We just wanna remind you, swallowing is a multiregional, multisensory experiencing. People experience the swallow beyond just what's happening in the pharynx. And it encompasses more than

just the swallow itself, so it's important to ask questions. How do they feel about the eating experience? Does it hurt? Is it uncomfortable? Are they having a good experience? Is it aversive? If they have any sort neuropsychiatric condition, this can really effect that individual's perception of eating. This effects behavior. The worst that is, the least likely they are to keep doing it. And again this comes back to nutrition and sarcopenia. So these emotional cognitive, motor and multisensory integration factors all can effect that eating experience. And eating is highly associated with quality of life. There's a lot of research out there that being able to eat, eat in a group, eat with other people, enjoy the eating experience, being able to swallow effectively, being able to drink fluids that provide, not only sustenance but pleasure, this can be highly correlated with quality of life.

And here we may not be able to fix everything, but if we can even improve quality of life just a little bit, it's a win. So understanding how this all relates to dysphasia can be so helpful. So let's get to the meat of this Part 4. So we've done this review and it's important to understand each of those systems of dysphasia because they interact. And likely an individual that has dysphasia will have an issue across multiple systems. It's gonna be one, it's probably not gonna be two, chances are it's gonna be three, four or more of them.

So on the gastrointestinal system, we know how it proceeds through oral phase and it's moving to the gastroesophageal phases where the GI is gonna break down the bolus into its smaller particles. It's also gonna focus a lot on absorption in the small intestines and then elimination by the time it gets to the large intestines. Most of the nutrients are gonna be absorbed in the small intestines, but some of that leftover waste is gonna be absorbed in the large intestines and water and hydration is important in the large intestines. This is where the hydrational component really is found. These are going to be controlled by the neurological system. No surprise, everything in your body is controlled by the nervous system. The parasympathetic nervous system is the rest

and digest. It's gonna stimulate secretions and motility via the vagus nerve. So the vagus nerve is very important. That cranial nerve that is everything below the neck. So you're gonna have that when you eat a big meal and you wanna sit and then your body has to work. That's gonna be that parasympathetic nervous system. Also notice you're not really inspired to get up and go run a mile after you eat a large amount of food, because you need to sit there and then your GI system needs to take over, secrete and have motility. The sympathetic nervous system is your fight-fright reflex. Do I stand here and be afraid or should I do something when I am stressed out? So if you're patient or you yourself may have experienced this when you were going through your CFY year or when you were studying for those boards. When you get nervous, chances are your GI tract is gonna shut off. So stress and other psychiatric conditions and neurological conditions can effect nutritional demands.

Specifically we understand this is the group that absolutely understands the oral to the pharyngeal phases, but as it gets to the esophageal phase, this begins to go a little bit about out of the realm of a speech pathologist. It's important to know what happens in general in case that comes back up and we're gonna talk about GERD and backflow. So in the esophagus you have one third, the upper one third of the esophagus that is largely gonna be innervated by the nervous system and specifically muscles that are considered striated muscle. The lower two thirds of the esophageal tract as it gets closer to the stomach are going to be made up of smooth muscle. These are gonna be innervated by motor neurons of the brainstem and some autonomic innervation from what's called the myenteric plexus. Your enteric neurons of the gut actually outnumber all the other neurons of the rest of your body including the cortex. There are more neurons that sense the GI tract than anything else in your body. Because it has to sense the chemistry, the movement, all sorts of stuff. So there's a lot of autonomic innervation there and it's very important that these all connect to the central nervous system. The myenteric system is peripheral. All of this has to connect and be able to pull the nutrition out of the items that you eat. When it comes to GERD, there are four

protective mucosal systems. The gastroesophageal system of dysphasia has these bodily systems in place to be able to protect you. So we have mucus that forms a protective barrier against hydrochloric acid and pepsin. Pepsin is a particular chemical. It's a protease that breaks down protein. It's what's called an enzyme. And so enzymes are going to take those proteins and begin to break them down. We also have bicarbonate in the GI system. And bicarbonate is very important in terms of being able to neutralize acid, acid and bases. And acid is somethings that's going to break down the food and bases are basically gonna slow it up. When you combine an acid, a base together, they neutralize each other.

And this is something that you guys probably learned about in your high school chemistry class and you probably haven't thought about it since then. Well, here in the GI system it's important that acid-base balance has to be in balance in the GI system. And a lot of the Western diet can throw that out of balance. So bicarbonate is something that is secreted by the epithelium of the mouth, the stomach and the duodenum of the small intestines and it's trapped in a mucus layer in order to neutralize the acid. It's a backup to the pancreas.

The pancreas is also involved here. And this all occurs right around the area where the stomach ends, the small intestine begins. The liver has a contribution here, the gallbladder has a contribution here at this junction as does the pancreas. This is a major component of the GI tract. It helps us metabolize, helps us break down what we eat so that it can enter the small intestines and the small intestines then can pull nutrients out, actually help us be nourished. Prostaglandins are another protective layer and they coordinate mucus, that bicarbonate we just talked about, as well as blood flow. Because this whole area has a huge cardiovascular supply as well as that hydrochloric acid formation. Hydrochloric acid is the acid of the stomach. It is what takes a solid food and makes it into something that is kind of mushy so that it can move more easily through the rest of the small intestines. When it's all mushy, then the

small intestines can continue to absorb and break it down and pull out all those important nutrients that we need in order to function. This is the reason why the GI tract is sensitive to an NSAID. You've probably seen this label. You've probably heard about it, but had no idea why you need to be careful about NSAIDs. And this is a drug. This is an over-the-counter drug. It's a common antiinflammatory drug that people take frequently and they give themself GI disease because the prostaglandins and the way that NSAIDs interact with prostaglandins. There's also the lining of the GI tract and its integrity. So we need good blood flow to maintain mucosal cellular integrity in order to have that protection. So GI ischemia increases the risk for ulcers. GI ischemia is any sort of issue with the cardiovascular component in the GI tract. So if they have some edema and I'm gonna show some pictures of edema, this can increase the risk for ulcers. Bleeding ulcers are a very bad thing.

All of this increases some very, not very good situations. Some things that can really effect quality of life and increase the likelihood for return to hospital admissions. Now again this is a little bit outside of what is happening in the pharynx. However, that hydrochloric acid I'm gonna show as we go on can come back into the pharynx. When these mucosal protection systems begin to break down, we can see an imbalance of acids and bases. That acid can travel up the esophagus, up the upper oesophageal sphincter and enter the pharynx again. A place that should not have acid. The pharynx and the larynx are not lined with these protective systems. So the pharynx cannot tolerate what the stomach and esophagus can tolerate, because the pharynx does not have these systems. So this takes us back to the idea of a lumen. The esophageal lumen which is the part of the esophagus that the bolus actually passes through. This can be narrowed by a number of things. Inflammation is a major one, also called erosive reflux disease or EoE. A neoplasia is any sort of growth that might be occurring or a fibrous structure. It can also be compressed externally by the lymph nodes. So if an individual has lymphoma or other issues with the lymph nodes that are adjacent to the sternum or to the esophagus, there's a major bundle of lymph nodes that go along

the sternum. And if these are inflamed, just because of their relative body position, they can begin to press on the esophagus. But just like a cervical osteophyte may change the relative position of the pharynx as you descend into the neck, where the neck begins to meet the shoulder girdle, cervical spinal degenerative disease can also begin to press externally on the posterior portion of the esophagus and this can be shown in an EGD. This may increase the likelihood that that acid will come back up into the pharynx and cause that GERD that can erode the pharynx.

So there's some medications that a physician might prescribe. I'm showing them to you here just like any of the other medications I've shown you so far, because I want you to be able to recognize them in a chart review. You're not going to be a part of the prescription process, but patients are likely to be taking multiple, multiple types of GERD medication if they have GERD, they may take it over the counter. Many of these can be found over the counter in addition to what's been prescribed. And they may be, they may not be helping as much anymore. So again when you're doing that review with your patient, why are you still taking this? What part of you is it effecting? How do you feel? How many times a day are you taking it?

It helps you take down the information so that you can do a thorough review, but you can build it into that patient's interaction and their free recall to see if they understand why they're taking both antacids and PPIs. So an antacid in general is going to be a base, because we need a base to offset an acid. A base is gonna have an oxygen and an hydrogen together and acids have a lot of extra hydrogen. When you combine them it makes H2O and water. Water is the ultimate neutralizing agent. It also can act as an acid or a base. And we are made of so much water. Water is so important. So individuals might be taking antacids and they may be taking them frequently. And we're gonna show some of the possible adverse drug reactions on the next slide. They also may be taking what's called an anticholinergic. Acetylcholine is the neurotransmitter at the neuromuscular junction. And so if they have too much contraction, too many

spasms, they may be taking an anticholinergic. In general the idea is that these would decrease acid, because it wouldn't squeeze up into the pharynx quite as much, it might not be stirring up the acid. They could be taking what's called an H2 inhibitor, an histamine inhibitor. Again, this is also going to try to decrease the immune response, the inflammatory response and decrease the amount of acid. Proton pump inhibitors are the same idea. They're trying to decrease the acid through a molecular component and we're gonna talk a little about possible ADRs for PPIs. Mucosa protective agents are actually trying to facilitate lining of the GI tract to protect against the acid. It's not really changing the acid production or release, but it's increasing the lining of the tract so that it's not quite as caustic on the tract. Now this is called Carafate is one example. There are many of them and this is a possible protective agent. We also have the opposite to anticholinergics.

We might have GI stimulants. Individuals that are not actually, they have decreased motility and when the motility is decreased, that food might be sitting in the stomach and it's not moving and it's rotting in the stomach. The food shouldn't stay in the stomach. It should be there for a time and it begins to break down because of acid production, becomes mushy and then it should move on. It's not supposed to stay there. And if there's decreased GI motility, the food can just stay there and it can just rot and so GI stimulants might try to increase the muscular contraction in order to push that food along so it can begin to be processed and decrease some of the distension. And they might need antibiotics or other medications, for example if there's H. pylori bacteria in the stomach. I'm going back to SIBO, the other super infection we were just talking about. SIBO is in the small intestines, a small intestine bacterial overgrowth, just the bacteria of the small intestines can become out of balance. And C. diff. not surprisingly clostridium difficile is a type of bacteria that can be in that GI tract that can cause all sorts of issues. If these other bacterias are present, there's going to be major antibiotics involved to try to kill the bacteria which is gonna throw the GI tract out of balance, may end up with that acid coming back into the pharynx and eroding parts of

the pharynx. So some of the adverse drug reactions that can be found. If an individual, ask them about antacids. This is one that's likely to be overused. People pop TUMS, they take antacids very frequently, because it can help with an immediate issue and they may not be realizing how much they're taking, especially if they have other cognitive comorbidities. Because you can end up with an electrolyte abnormality. And then a rebound hyperacidity. So when you add too much of the base, the oxygen and they hydrogen, the body will try to compensate by releasing a lot more acid because it's supposed to be a balance. It's supposed to be in a certain relative amount to each other.

So if you have too much of one, the body can actually rebound with the opposite to try to balance it out. So then they keep popping more antacids, because they keep getting hyperacidity and this terrible cycle can continue. anticholinergics can actually decrease motility too much and increase production for a completely different reason. And there's other anticholinergic effects that actually dry out the mouth. So can end, anticholinergics can, we've shown some other issues with the muscular issues. It can effect dysphasia and saliva production in the pharynx as well. H2 inhibitors aren't, there aren't too many reactions, because again it's a histamine response. So this is relatively decent, although it's not really as applicable as the other types of drugs that are used.

And then proton pump inhibitors PPIs, we're gonna talk about in the next slide, because we need to talk about this one all by itself. Carafate, another mucosal protective agents. Again, that's just one example. There are several different kinds. Just like H2 inhibitor, these are pretty okay. It's not as likely to be over utilized. There aren't as many adverse drug reactions. And GI stimulants, just like anticholinergics, you can have the opposite find. So you can actually have way too much stimulation. And then this individual might have issues with diarrhea or drowsiness because they're losing their electrolytes to much. Antibiotics and other medications have their adverse drug reactions and we're just not gonna focus on them too much here. That goes a

little bit outside of what we're trying to show you here. So when you do your comprehensive chart review, when you see these things listed or when you start to have that conversation with your patient, you can begin to just take stock of how many medications they are taking. And if they're complaining that they taste their food, they have heartburn, if you have instrumentation and signs of GERD, these may be some of the contributing factors and they may be telling you and not the nurses and not the physicians just because with the nurses and the physicians, they may be focusing on other things. So it is also important to ask, 'cause you never know what they're gonna tell you that they haven't told somebody else and being able to bring that back to the interdisciplinary care team might be that little thing that makes a change. Focusing on PPIs and then we're gonna come back to it later when we talk about PPIs in COVID-19. PPIs are kind of a mainstay of treatment for GERD in recent history, but they do have some adverse drug reactions.

The main problem is that people take them for way too long. The truth is it's intended for only short-term use and I mean like two weeks. It is not supposed to be taken for more than a couple of weeks. People have a tenden, 'cause you can get PPIs now over the counter just like antacids. They could take it too frequently and way too long. It's not intended to be used as a maintenance drug and so the adverse drug reactions are starting to be shown in order to, they're coming about, because people have a tendency to use these PPIs in ways that they were not initially intended. And the problem is is that a PPI may inhibit nutrient absorption. It can also increase the likelihood for fractures. It can result in B12 deficiency. A reduction in magnesium absorption and there's a loose correlation with dementia status that is still not quite figured out. But again, it's likely related to the fact that people take it for longer than it was prescribed. And they may go to multiple physicians and they may have that polypharmacy issue. So it's important to note that patients taking antidiarrheal drugs may present with their tongue as a darker color or tone. And this is a major adverse drug reaction due to the fact that there is an opioid in some of these antidiarrheal

drugs. So again if you notice this when you're doing your Oral Mech Exam and you notice a discoloration of the tongue, it is important to report that back to the nursing team and the physicians team. Again, it just may have been something that you came across that someone else didn't for whatever reason. Bringing that back to the team is so important. It will effect their cognitive function and could be a sign of issues related to the opioid. And GERD is not just an age related disease. GERD is a major cause of dysphasia in younger adults between the ages of 18 and 40 years. It has to do with the fact that there is more and more acidity in the Western diet. In the 70s there was an outbreak of some foodborne issues and in order to make sure that canning and other storage processes were safe against these types of foodborne illnesses, they increased the acidity, because a higher acid content means that bacteria can't grow and so you won't then eat the bacteria along with the food and the food can last longer on the shelf, it's transported better, makes sense.

Well, as a result of the last 30-40 years, there is an increased number of younger adults, teens and young adults, individuals under the age of 40 that are beginning to show GERD and GERD related issues. And it has to do a lot with our diet. This risk increases as the individual gets older, especially if they were in their 40s in the 80s, now in 2020 they may be in their 80s and they have had age relates issues associated with GERD as well as some of the dietary issues associated with GERD. Another greater risk of that reflux dysphasia that we'll talk about here in a second. There are some surgical procedures for GERD and it can include providing what's called a flat valve. It's created by wrapping the gastric fundus at the part of the stomach, the stomach that's a little bit closer to the esophagus. And this can be wrapped around the area where the esophagus meets the stomach called the gastroesophageal junction. The goal is to reduce the acid entering the esophagus again and possibly making its way to the pharynx which we call a reflex dysphasia. But the problem is it can also result in poorer reflux control. It is surgery, so it can work, sometimes it doesn't work. And again a lot of this is continuing to be developed and to be finalized. It's important

to note that if you see this fundoplication on the patient's history, it should let you know that you should still look further for the science of reflux dysphasia, because even though we have issues with the surgical procedure, then we have a likelihood that individuals could still have reflux dysphasia. So here's reflux dysphasia. Reflux dysphasia whenever acid enters the GI tract, it can erode the pharynx and result in dysfunction. I'm gonna show you pictures from my pharynx. I'm an individual that had some issues with spinal injury and I have had significant GERD and other forms of reflux dysphasia. I've been working with a speech therapist now for about 18 months, so I have had instrumentation myself. And the role of the speech therapist, I cannot tell you, it is so important. I'm not only a researcher, I'm also a client.

And that is just so you know how important it is and that it is very personal, because I can tell you from my own experience, speech therapists make a huge difference. There are issues with reflux dysphasia, aspiration, I've had some bilateral issues related to paresis. I did not have complete paralysis, but I did have significant cord impairment. Issues with vocal cords adducting, so they did not protect my airway. And this was a little more predominant on the left side. I'm gonna show you incidences on both sides, and significant epiglottic paresis. I had compression of the vagus nerve and other issues. So I wanna show you here.

We only have a few more minutes, so I will, just because of issues with the slides, so I'm gonna go ahead and go through these pretty quickly just so that we can go forward and you can look at them. Here are some issues where show vocal cord adduction and issues with the pharynx. We can see the airway. And we see reflux dysphasia here, the reflux coming out of the esophagus and back into the airway and issues where the bolus was continuing to sit in the airway. Here's another example of reflux dysphasia where we see the secretions and the bolus being trapped and the epiglottis laying flat at the base of the tongue. And here again we can see that the reflux is coming out of the esophagus. And it can actually, before the epiglottis retroverts, it can enter the

airway. And if there's an impairment of the respiratory system, it is unable to protect that airway. So we've seen here now a number of situations where the neuropsychiatric drugs, particularly anxiety drugs related to norepinephrine, other lithium and mood stabilizers and antidepressants can have significant effects on GERD and increase the likelihood of GERD. It can cause GERD or even cause the dysphasia or exacerbate the existing dysphasia. And antipsychotics can also cause other issues with the oral mechanism and the oral stage of dysphasia. Drugs that might be involved in reversing anesthesia can not only cause GERD, but the can cause dysphasia itself. And overall other issues related to benzodiazepines and other neuropsychiatric drugs can have significant effects on the lower esophageal sphincter and GI motility. Some of 'em can actually cause dysfunction of the LES and can cause some GI bleeding. Amphetamines like Adderall can actually exacerbate GERD if GERD is present. Anticonvulsants and opioids are likely to cause GI dysfunction.

They can even cause things associated with sedation and other cognitive effects. In general, you're the particular group that is very skilled on the muscular system of dysphasia and so you already that its impairment of the UES and LES can increase the likelihood that that acid is gonna come back into the pharynx. It may also cause the patient to become more sedentary and effect things like nutritional issues and sarcopenia. Barret's esophagus is found in more than 80% of individuals that have chronic GERD, but only about 1 to 8% of patients that have Barret's are likely to be predisposed to adenocarcinoma. The relationship is not quite clear, but they can end up with that increased risk of esophageal cancer, it's a smaller percentage of the population. Barret's can be found in a lot of individuals with GERD so if you see these in your comprehensive patient review, you know that there's a lot that you can do to probably help that individual be able to reduce their chances of GERD and maybe improve that quality of life. In general Barret's can cause some of the erosive and edema that you see here. It can effect the lumen and increase the swelling of that lumen. And while you will not be evaluating it, you may see that a patient has a AGD

from their physician and shows some of those symptoms in their chart which will tell you that there's a likelihood that individuals are more likely to have reflux dysphasia. For example, I've had these issues in a mild form and there are some other ways that individuals can try to treat this. For example an ablation or what's called a stretta. So finishing up here, laparoscopic surgical fundoplication is common, but it can cause an abdominal distention. So stretta radiofrequency is a non-invasive version. Basically they use sound waves to try to stimulate the growth of the LES and the UES. Other similar anti-reflex and long-term effects again a lot of this is still being developed. But if you see those in your chart review, you know that your patient is likely to have more reflux and it may begin to erode the pharynx. COVID-19 and the risk of PPIs.

This particular virus can result in gastritis, enteritis and colitis. It can effect many parts of the GI tract. And there is this generic risk between PPIs and COVID-19, especially if patients were taking PPIs twice a day. They don't know if there was silent issues or if possibly there is a actual GI relationship. Again, this is not quite understood. They just know that it might be there. There was this correlation and there might be a direct relationship or there might be a third factor.

So overall I just wanna remind you that reflux is dysphasia. It has been clearly demonstrated that when you return the gastric contents with or without the bolus into the pharynx as I've shown you in these pictures, it can effect the system of the swallow. Any breakdown of the swallow is considered dysphasia, so by its very nature, reflux is dysphasia. So you can be essential in working with that GI in order to help get the patient's reflux dysphasia under control. And I can tell you from my own personal experience, my speech therapist was so helpful and my dysphasia expert was so helpful. So just to finish up here and see if there's any questions. I know we had some time issues. In general, I just want you to know, anytime there's reflux, it is a breakdown of the swallow. This is dysphasia. Polypharmacy can have serious consequences on the GI system of dysphasia and COVID-19 increases the risk of

polypharmacy and it's associated disruption to the GI tract. The long-term consequences of GERD and reflux dysphasia can include that Barret's esophagus and in a small percentage of that population, a predisposition for cancer.

- [Amy] Once again I just wanted to reiterated that this was the fourth in our four-part series from Dr. Winchester. All of the recordings for these four events should be available on our website probably within two or three days, so I would think by the end of this week, they will all be available. So if you did miss any of the earlier parts in the series, you'll be able to catch up by watching the recordings. So I'm waiting to see if there's any questions. And I'm not seeing any come in. So, Jeanna, thank you so much. I really appreciate all the work that I know went into this four-part series, so we very much appreciate it and it's been extremely informative and obviously very timely. So thank you and, yeah, and thanks to our participants for spending your time with us today. I hope everybody has a great day and I'm gonna go ahead and wrap up the meeting, thanks, everybody.