

Alyssa Smith:

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Dr. Jason Barnes:

Hey there, welcome to another episode of ENT in a Nutshell, my name's Jason Barnes and today we're joined by rhinologist and skull base surgeon, Dr. John Craig and we'll be discussing odontogenic sinusitis. Dr. Craig, thanks so much for being here.

Dr. Joh Craig:

Thanks so much, Jason. Great to be here.

Dr. Jason Barnes:

To start, we'll talk about presentation. In general, how do patients present when they come to your clinic with odontogenic sinusitis?

Dr. Joh Craig:

Yeah, that's a great question. I can't stress the following point enough and I'll say it slowly, unilateral. Patients present unilaterally in somewhere around 90% of these cases. When you see somebody with unilateral sinonasal complaints, you should start thinking about the teeth. All the symptoms of rhinosinusitis do pertain to odontogenic sinusitis, facial pressure, sometimes lack of smell, nasal obstruction, anterior and posterior drainage, but one that really sticks out and it's not in our cardinal sinusitis symptoms and guidelines is foul smell or foul taste. And this does seem to be specific for odontogenic sinusitis in the setting of unilateral sinusitis. I think that symptom really should be picked up on and asked every time you see a patient with these complaints. Arguably, anytime somebody has sinusitis, you should ask if they have a foul smell.

Dr. Jason Barnes:

Is there a typical length that people are experiencing these symptoms that are more specific to odontogenic sinusitis?

Dr. Joh Craig:

If you go based on the literature, it does seem that the overwhelming majority of these patients will present with chronic symptoms. We tend to think of chronic rhinosinusitis as three months or more. In my experience, and we've done a large review of the literature. The median is more around six months. These patients suffer with symptoms for a long time before seeing otolaryngologists.

Dr. Jason Barnes:

And how common is this?

Dr. Joh Craig:

If you go by the literature, it's, it's an interesting conundrum. Older literature will say it's 10 to 15% of all sinusitis, but I think that's a little misleading because if you focus more on the fact that this presents a unilaterally most common, there's a number of papers in the last four or five years that have shown it represents somewhere between 50 to 75% of all unilateral sinusitis. Highly prevalent condition when

patients present unilaterally. And then if you just look at overall sinusitis, there are some papers from 1986 and 2010, come to mind, that show somewhere between 25 to 40% of all maxillary sinusitis. But I think that number needs to be teased out better with better studies that actually use proper dental testing and imaging to really diagnose the condition better.

Dr. Jason Barnes:

And is there an age group or a sex that is particularly affected by this?

Dr. Joh Craig:

Age wise, it does tend to affect people in their fifties. I've seen some other papers in their forties and sixties, but it's definitely in that forties to sixties age group, more likely. There are reports in kids as well as people over 80, so it can affect anyone. But clearly the mean median is around the fifties. Now regarding gender, there's not really a gender predilection. There have been some papers suggesting males a little more than females, but if you go the overall literature, it's pretty even.

Dr. Jason Barnes:

You have a patient come to your clinic, we'll say a patient in their fifties, complaining of unilateral, foul smelling drainage for the past six months. What are some questions that you might ask them that might lead you to believe this is more odontogenic in origin?

Dr. Joh Craig:

I think what's interesting is regardless of any further history taking that screams at me, odontogenic sinusitis, but you always should ask if they've had prior dental work. You can ask if they have dental pain, the literature has done not the best job at teasing out dental pain and I think it's probably our fault. I don't think we ask patients routinely about their teeth so we don't have great data on the prevalence of tooth pain in this situation, but it's always worth asking if they have dental complaints. I would say my anecdotal experience in talking to some of my colleagues, most of these patients do not have dental complaints. A decent number of them will have had prior dental work. And I think it's important we start building our knowledge base on what patients can have done on the dental side, rather than just saying they had dental work.

They can have fillings, they can have crowns, they can have root canals, they can have periodontal work, they can have oroantral fistula repair, dental implants, bone grafts. There's a lot of different procedures and I think future research would be great at teasing out which of those dental procedures put patients at higher risk and so we could talk about that for a while, but those would be the other questions that would be helpful.

Dr. Jason Barnes:

And once you see these patients, you've asked these more specific questions that lead you down the thought process of thinking this is odontogenic, what are you looking for on physical exam?

Dr. Joh Craig:

I do more and more, I'm trying to teach myself to look at teeth more. I don't know that we're at a point yet where the dental exam helps us a whole lot and so bottom line is, we're going to perform nasal endoscopy. And when I scope somebody now and I see unilateral pus, that screams at me, odontogenic sinusitis. And we showed that relationship in a recent study. Somewhere in the realm of 80, 90% of

these patients will have pus draining from their middle meatus. Also, I think it's important to realize these patients have polypoid disease in the middle meatus, sometimes frank polyps can even look like a tumor at times. And a study of mine, this was present about one third of patients. I think we think of this condition as an infectious problem and maybe I've even seen it in some older studies that it's considered non-polypoid disease, but it's important we don't overlook unilateral polyps as a possible odontogenic source. Most of these patients will also have concurrent pus so that might be an added hint that this is an odontogenic source.

Dr. Jason Barnes:

Great. We've talked about presentation. I next wanted to talk about pathophysiology. Before we get too deep into the pathophysiology, could you briefly tell us what exactly is odontogenic sinusitis?

Dr. Joh Craig:

Yeah. We've been trying to establish a definition through our recent consensus statement and subsequent papers. It's a little wordy, but this is maxillary sinusitis with or without extension to other paranasal sinuses secondary to either adjacent maxillary dental infection or iatrogenic injury from dental procedures.

Dr. Jason Barnes:

And with that definition of odontogenic sinusitis, what are the main causes when we talk about quote unquote, dental infection or iatrogenic injury?

Dr. Joh Craig:

I would say we don't know the true incidences of each of these entities. I think it's important that we just understand each of them can cause odontogenic sinusitis. And so in my practice, I see more endodontic disease and this is a very interesting entity that I've had to learn about. And I don't think we get much teaching in otolaryngology and that is an entity called apical periodontitis and that is inflammation or infection around the apex of a tooth, around a tooth root. And this is due to infection or necrosis of the pulp chamber. We call it pulpal necrosis. This can then variably cause what we call a periapical lesion. What I want to stress here is that it's pulpal necrosis driving atypical periodontitis that may or may not cause a radiographically evident periapical lesion.

This is a point of confusion I think in the literature. If you go to the dental literature, they sometimes use these two terms synonymously. The periapical lesion is just a radiographic finding in the setting of apical periodontitis. That's the type of endodontic disease that typically would cause odontogenic sinusitis. When they form the periapical lesion, that's the entity that a lot of us are familiar with. You see this periapical cystic looking lesion, might be expanding the bone, may be eroding the bone. Doesn't necessarily have to erode the bone to cause a sinusitis but that's what we're talking about when we talk about endodontic disease. Another common situation would be an oroantral communication or a fistula. I distinguish the two because a communication is something that would happen temporarily after a dental extraction or other procedure so you have a temporary communication to the oral cavity and the sinus lumen that could lead to bacterial colonization, infection. If that communication, obviously doesn't heal, then you could end up with a fistula and ongoing communication between those two spaces.

And so those are probably the two most common entities that cause odontogenic sinusitis, there are others. And if you go by some reviews out there, you'll hear periodontitis, the terms are chronic or marginal periodontitis but the studies that talk about that condition, don't describe the cases

very well. And I personally, I have a couple cases that are true periodontitis that have led to sinusitis, but that's a less common condition overall. And then I think the last one to think about is anytime you have a foreign body displaced into the maxillary sinus from a dental procedure. Dental implants, maybe a tooth extraction where the tooth root gets dislodged into the sinus, but that also hasn't been studied thoroughly so whether it's the foreign body or the temporary oroantral communication that caused it, we'll have to figure that one out over time.

I think that there's a lot of research that could be done to distinguish the difference in sinusitis perhaps that's generated by these two conditions. And when I say two conditions, I mean endodontic disease or an oroantral communication. With endodontic disease, we don't totally know the spread of bacterial mechanism, but we do know that we've seen cultures from tooth roots representing the same bacteria that we culture from the sinuses in those cases of sinusitis. And so the most likely mechanism would be bacteria spreading from tooth roots through venous channels, the marrow spaces of the alveolar bone and then getting through the sinus mucosa and causing an intraluminal infection. Now, there are some other theories that haven't been discussed as much, but it's also possible that the odontogenic focus of infection could lead to a sinus mucosal inflammation, ostial obstruction and a secondary sinusitis in that manner. These are all things that would be worth studying in the future.

Dr. Jason Barnes:

And when we talk about bacteria, I know that there are some suggestions that there are certain types of bacteria that grow in these instances of odontogenic sinusitis. Could you speak more to the type of bacteria that has grown in these situations?

Dr. Joh Craig:

Yeah, I think, and it's intuitive, which is always nice. We just published a study this year that's similar to findings from other studies. We just did more speciation, but I think it's very clear that oral streptococcal species specifically alpha hemolytic strep, such as strep intermedius, anginosus, strep constellatus and there's a whole slew of other strep species. And then as we all know, anaerobes are also very common fusobacterium, peptostreptococcus, eikenella, so if you're seeing these organisms in the sinus, it's much more common from an odontogenic source. Unfortunately it's not a 100% guarantee. In our study, you do see small percentages of these odontogenic organisms in a non-odontogenic case and vice versa. You can see non-odontogenic organisms in an odontogenic case, but it was nice to show a direct comparison in our recent study between chronic rhinosinusitis patients and chronic, if you will, odontogenic sinusitis cases and there's just certain bugs that should tip you off that if you haven't thought about it already, if you see those bugs that we just mentioned, look for a dental source.

Dr. Jason Barnes:

Now that we've talked about pathophysiology, I wanted to quickly touch on differential diagnosis. We'll talk about workup and how odontogenic sinusitis might be more in a sense easily identified compared to other pathologies, but could you quickly run through what else you're thinking about when someone presents with unilateral disease?

Dr. Joh Craig:

For sure. This is extremely important and I always tell myself, I'm very interested in odontogenic sinusitis, but we can't get tunnel vision because unilateral sinus disease, the differential is a bit broader than bilateral disease. Of course you have acute and chronic rhinosinusitis, although it'll be interesting over time to figure out how often that's the case in unilateral sinus disease compared to just frankly

odontogenic. You've got antrochoanal polyps, you've got maxillary sinus atelectasis, you got a maxillary sinus mucocele, which overall is uncommon, but definitely happens, fungus ball or fungal ball, invasive fungal sinusitis, unilateral polyps in the setting of allergic fungal rhinosinusitis and benign or malignant neoplasms. And so, like I said before, these cases can look like polyps or even frankly a polypoid lesion and so you really have to tease out whether this is a tumor before you go in for surgery. And so I can't stress that point enough, but it's a pretty broad differential.

Dr. Jason Barnes:

Now moving on to workup, we've talked about the presentation, someone presents with a unilateral likely foul smelling drainage, what's next on your workup when you see these folks?

Dr. Joh Craig:

Yeah. When I see unilateral purulence, I pretty much go straight to a CT scan and sinus CT scan, high resolution, fine cut tri planar, very important to get the proper scan. And this does get even with a perfect system with your radiologist, it can get fouled up. I would talk to radiologist, make sure they're capturing the maxillary dentition, specifically the tooth roots. And so, yeah, I look for the pattern of sinus disease and specifically at the tooth roots. And with regard to sinus disease, it's interesting with this condition and it does make sense, you're going to see maxillary sinus opacification, most of the time, subtotal if not total opacification and you'll see essentially anterior ethmoid and or frontal disease when the disease has spread outside the maxillary with relative sparing of the posterior ethmoid and sphenoid cavities.

Dr. Jason Barnes:

And when you look at the tooth roots, could you explain to us what might be some tip offs or what you're looking for on a sinus CT scan when you're evaluating the teeth?

Dr. Joh Craig:

Yes. We mentioned before periapical lesions. If you have intact dentition, most of the time if it's an odontogenic sinusitis, you'll see some kind of periapical lesion around the tooth apex. Now, what that means is widening, sometimes a smooth expansile process but not always and then sometimes widening of the periodontal ligament space, which is the space adjacent to the length of the tooth root. That's the area that you're looking for. Sometimes you'll see adjacent alveolar bone erosion, if there's a significant periodontal component but I would say by far the most common would be the periapical widening or the periodontal ligament space widening. That's if you have intact tooth roots. Obviously if you had a prior dental extraction or you're missing the tooth, you're going to be looking for absent bone there that may be consistent with an oroantral communication or fistula.

I think one thing to keep in mind is that absent bone does not mean an oroantral fistula, even though it often gets read that way by a reading radiologist. Obviously it's a clinical exam finding. You look in the mouth, in the gingiva and see if there's actually a communication because frequently the bone will be gone after dental extraction, but you won't have the actual fistula.

Dr. Jason Barnes:

When you see these patients who have undergone CT scan. Do you find that dental imaging such as a panorex scan often agrees with the findings of a CT scan?

Dr. Joh Craig:

I think the type of dental imaging is absolutely critical to understand here. If patients get panorex, basically any x-ray modality, the sensitivity specificity is extremely low for detecting this periapical disease, the endodontic disease. Dental x-rays first off should not be considered in the diagnostic workup. If you send a patient to a dental provider, you're going to want to make sure they at least get what's called a periapical x-ray that covers the whole extent of the tooth up to the tooth root or ideally a cone beam CT scan. But a lot of dental providers won't have that in the office. If they got a dental x-ray, no good. Needs to get redone. Panorex, sometimes the panorex we'll cover adequately the tooth roots, but the resolution's poor and so I wouldn't recommend that. And there are some other x-ray modalities, more commonly performed I believe in other countries, but I'm not that familiar with them, but definitely the periapical x-ray should be considered a minimum and then cone beam CT scan, ideally.

Dr. Jason Barnes:

And apart from imaging, I guess, as a resident, my reflex, when I see purulence on exam is to take a culture. Do you find that you culture these patients regularly?

Dr. Joh Craig:

I always prefer to. I would say the problem is, so if you're going to take a culture in the office, I have Lukens traps in the office and I take sterilely obtained cultures. If you don't have that set up, you do run the risk of a contaminated specimen. But I think it's always a good idea to try. I would say one problem is that you don't always have copious pus draining from the middle meatus and instrumenting in there in some patients with severe edema and inflammation is not that comfortable. I always try and if I get a legitimate specimen, great, but I don't always trust the in office culture a 100%. Just because you don't say pick up odontogenic organisms on that in office culture, I wouldn't rule out odontogenic sinusitis, if that makes sense. But I do think it's very helpful in the diagnosis. I want to stress that as opposed to treatment.

Dr. Jason Barnes:

Next that's a great point. We'll move on to treatment and globally we'll talk about medical therapy and then dental intervention versus sinus intervention. And just to start, can you speak a little bit to medical therapy and the effectiveness of antibiotics in this situation?

Dr. Joh Craig:

We only have case series to go on with regard to efficacy of antibiotics, but case series unanimously show that this is a temporizing measure. It does not cure the condition. It's temporary benefit at best. That's been my anecdotal experience as well. I've never seen somebody resolve with antibiotics and I've talked to my other colleagues and that's the same. It should be studied better because there could be certain conditions that could be amenable to antibiotics. For instance, maybe after certain dental treatments or if they have certain types of dental conditions that might not be irreversible at that point, maybe the body will heal the dental process while you're on antibiotics. We just don't know the answer to that, but it seems as a general answer for now, antibiotics without treating the dental source are not going to work.

Dr. Jason Barnes:

We've talked about medical therapy and about how antibiotics don't particularly work well so we'll now move into the treatment modalities of dental intervention and sinus intervention. Could you talk about

what the dental interventions are, how you think about sinus intervention and also the timing of the two, which one comes first and why?

Dr. Joh Craig:

A very important question that is near and dear to my heart right now. I think the first step in my mind is the timing component. And I think what's great about this condition is it's highly successful. When you treat it properly these patients resolve, they're thrilled. We're looking at 90 to a 100% success rates with some form of combined therapy. Now, as far as which comes first, what we did here was last year, we published a paper looking at a prospective cohort study of patients who got dental treatment primarily versus sinus surgery primarily. And it is intuitive, but patients who are highly symptomatic from the sinusitis got better dramatically faster if they got upfront sinus surgery. The way we take that, and then we posed that question in our recent consensus statement and it seems that other authors agreed, when patients are miserable from their sinus disease, upfront sinus surgery is at least an option that you can offer patients to resolve their symptoms. And then if they have treatable dental pathology, they still need to have that evaluated and treated by a dental provider.

I think that really helps with the timing component. When we're trying to educate patients in the office, we can always give them the option of getting their dental work first and then they may very well need sinus surgery eventually because there are a number of studies showing that primary dental treatment for whatever reason only resolves the problem usually in about 50% of cases and in our study, the timing after primary dental treatment, somewhere one to two months before the people who actually do resolve, actually resolve. With regard to primary dental treatment, we would strongly recommend this to patients who have minimal sinus symptoms upon presentation or in patients who just are scared of sinus surgery. It's totally reasonable to try dental treatment first. I think it's critical to follow those patients.

This is something that I've seen be a problem. Patients sent to a dental provider and they just get lost. And then they may or may not show up six months later with ongoing symptoms. I would recommend, and we reached this on our consensus as well, patients be followed somewhere around one to two months after dental treatment to ensure that their sinusitis resolved and use the nasal endoscopy as well as their symptoms to sort of guide therapy at that point. Now with regard to dental treatments, this is extremely important and we don't really learn much about this in otolaryngology.

This is going to come down to who do you send patients to? And I have been working very closely with dental specialists, such as endodontists, periodontists and oral surgeons and there's a number of reasons for that. But maxillary, if we're talking about native intact dentition with endodontic disease, maxillary molars actually have the most complex anatomy and higher root canal failure rates. My preference is to get these patients to an endodontist for appropriate dental testing and if they need a root canal, then I'm going to get that done by those providers because there's not an insignificant failure rate of a root canal. Yes, root canal is one option. There are some other endodontic procedures for failed root canals that I don't think we need to go into for this, but just know that a root canal or some kind of a pulpal obliteration is one tactic. Dental extraction, of course, is an age old tactic.

If a patient had periodontal disease, then I would get a periodontist involved to consider different periodontal management strategies. Again, that's an area that really needs to be studied more thoroughly. And then of course, if they have an oroantral fistula or there's a patient that's going to consider both extraction and dental implant, I'm going to get that patient to an oral surgeon or a periodontist. Just so everyone knows, both periodontists and oral surgeons do bone grafting and dental implants. And so that all covers the general dental procedures you're going to have for these patients.



Dr. Jason Barnes:

And in talking about sinus surgery, so the kind of the part that we do, how do you approach which sinuses to open up and why?

Dr. Joh Craig:

This is going to be a question that's going to get more answers, I think, in the next five years or so. If you go by the literature to date, most studies and these are case series for the most part, surgeons are opening all the diseased sinuses on a CT scan. If you just go by what's reported out there. That would mean based on a CT, you see anterior ethmoid frontal disease, you're going to open anterior ethmoid and frontal. And that's what we reported in my initial study, prospective cohort study, comparing sinus surgery to dental treatment. But some interesting work is come out from a European group where they looked at patients specifically with frontal disease in the setting of odontogenic sinusitis and only performed maxillary antrostomy with or without concurrent dental treatment. And I believe it's, they saw a 100% success rate. I think there's clearly something to that. And that's probably, that's really the reason why in our consensus statement, we could not reach a consensus on the extent of sinus surgery for patients with extra maxillary extension, whether they got maxillary anterior ethmoidectomy frontal.

I think at this point there's no strong recommendation. Part of that is going to be a surgeon comfort level, surgeon individualized patient decision. I think there are some situations where patients have tight frontal outflow tracks. Those are very inflamed cases. I think it probably is wise not to do a frontal sinusotomy in those situations, but again, a lot of this is just patient to patient surgeon judgment.

Dr. Jason Barnes:

And another specific setting of odontogenic sinusitis is that caused by a dental implant. Could you briefly talk about how you approach a sinusitis that's caused by a dental implant?

Dr. Joh Craig:

When I see a dental implant and a sinusitis, I no longer think it must be from the dental implant. There's many steps that go into placing a dental implant that are helpful to understand. One big question is, did they have a bone graft performed or what somebody would call a maxillary sinus lift or a sinus augmentation procedure. During those procedures, if you go to their literature, they'll report a 10% incidence of sinus mucosal tearing and it could be higher. I've talked to periodontists and oral surgeons and it's basically not uncommon to get a tear during that. Now it would be uncommon to get a massive tear and have the bone graft extrude. But the point here is that you can get a temporary oroantral communication during the bone graft procedure. You can also get it during the dental implant procedure.

Some step of the process probably caused that sinusitis, but we don't have that information in the literature to really say what the cause is. It's the point here is that it's probably less likely some foreign body reaction to the implant currently. And this is why many oral surgeons would recommend against removing a dental implant in general. Unless the dental implant is mobile or you see active pus or infection draining around the dental implant, the dental implant's probably taken into whatever bone stock or bone graft it was placed. And so we just, as surgeons, we just have to drain that sinus, get rid of the infection. Again, presuming I think it's worth trying one course of antibiotics, see if it helps, but if it doesn't you maxillary antrostomy, drain that sinus and just leave the implant alone.

There are issues with removing a dental implant. If you, during the removal process, you can cause an oroantral communication, possibly a fistula. And that would require closure. There's a significant cost to patients when you remove dental implant. And it actually is more challenging to



replace a dental implant after removal. Those types of variables just, we're probably the reason we were able to reach consensus between both ENTs and dental providers that with a dental implant, try to leave it in place unless it's infected or mobile.

Dr. Jason Barnes:

And we've now kind of talked about treatment requiring dental intervention and ENT intervention. You've talked about this a little bit, but could you tell us about the outcomes and expectations that you give to patients and how you follow up with them?

Dr. Joh Craig:

For sure. This is one of my favorite types of sinusitis to manage because when treated properly, it's a 100%. Well, you know how surgery is so let's say 99% successful. I think it really comes down to shared decision making between you, the ENT surgeon, the patient and the dental provider. I can't stress it enough, this is a multidisciplinary condition. It requires buy in from all three of those parties, because there are a lot of factors on each side of this that play in. Patient's cost is a huge factor in these conditions, as well as just their general views on invasive procedures versus dental treatment. And so those have to be weighed with the dental provider's expectations for success of a given dental treatment and so that's going to require you calling and talking to these dental providers, which is not always the simplest thing to do, anyone that's tried to do this.

But I think if you adhere to those tenets of multidisciplinary communication, shared decision-making, you can tell these patients almost certainly they're going to have an amazing response. Initially I would follow them like any other sinusitis patient, but I'm going to follow them definitely until they get their dental source treated. And I bring that up because sometimes patients will opt for sinus surgery and then frequently, remember these patients don't have dental symptoms, so they don't have dental pain, why would they go get their tooth treated? I just make sure to follow them in the immediate post-op period, just to make sure sinuses stay patent, once they're patent, and healed, I'm going to follow them every six months for the first year until I'm convinced that they've gotten their tooth treated and there's no recurrence of their sinusitis. And then, like I said before, once they get that tooth treated, I'll see them around one to two months after that treatment, just to make sure everything looks nice.

But I would say that if you don't get them to get that tooth treated, we actually don't know what happens to their sinuses long term at least from literature standards. Intuitively it would make sense that these sinusitis situations will not resolve. But what I found in a group of my endodontic disease patients in our prospective cohort study, so there were 14 of those patients, seven of them got their teeth treated like they were expected, the other seven just said, "Nah, I don't want to get my teeth treated." I followed them along and I should follow them up now. But they were followed in that study, I think for a mean around seven months and they didn't have recurrence of their sinusitis. Now by no means would I suggest not getting patients' teeth treated, but I think this would be another area worth studying, could there be some dental conditions that resolve on their own and perhaps just treating the sinusitis in those rare situations could resolve the condition? But until that study comes out, we need to make sure that these patients are following with their dental provider and getting those teeth treated.

Dr. Jason Barnes:

Well Dr. Craig, this has been a great discussion about odontogenic sinusitis. Before I move into our summary, is there anything else you'd like to add?

Dr. Joh Craig:

One thing I wanted to add that I forgot to talk about was endodontic disease that does not show up on a sinus CT scan. I think it's important that we all realize just because you don't see a periapical lesion on the CT does not necessarily mean it's as not odontogenic sinusitis. And this is extremely important because you may not opt to get that patient evaluated by a dental provider before sinus surgery and then sinus surgeons wonder why these patients continue to have purulence draining from their sinus. And then they go the route of in a rhinologist's world, the refractory chronic rhinosinusitis. And so they may try different topical therapies. These all take months before you think you're seeing a result and that whole time could have been avoided by just getting the dental provider involved.

Now I personally for almost all unilateral maxillary opacification, unless it's very clearly something like a tumor, antrochoanal polyp, fungal ball, maxillary sinus atelectasis, things that are obvious on a CT, I get them seen by my dental colleagues. And so I think we do need to tease out better over time, which patients need dental evaluation, but for now, I think it's very interesting if you see maxillary opacification and some tooth roots that maybe they don't have bone over them or there's something suspicious, but you don't see a true periapical lesion, I think it's worth your time and the patient's time to get those patients evaluated by a dental provider and specifically an endodontist.

And one more time, this is a unilateral condition most likely, and it is distinct from rhinosinusitis. completely different disease process so it's going to take more research and us thinking about it more and more to think about how we as a field can recognize this more frequently and basically spread the word to other fields.

Dr. Jason Barnes:

In summary, patients with odontogenic sinusitis often present with unilateral foul smelling drainage and may or may not have a history of dental issues. Endoscopy will demonstrate purulence in the middle meatus. The pathophysiology stems from adjacent tooth disease, either in the form of endodontic or periodontal disease causing inflammation and infection in the maxillary sinus. The vast majority of these infections are caused by anaerobic bacteria, but alpha hemolytic strep should also be considered. Workup includes CT scan imaging that will demonstrate unilateral maxillary, sinus opacification and likely demonstrate adjacent tooth disease as well as possible adjacent sinus disease. Treatment consists of two main modalities addressing the tooth disease and the sinus disease. Dental treatment should be performed by an expert such as an endodontist or periodontist, depending on the tooth pathology and sinus treatment relies on treatment of the maxillary sinus with maxillary and antrostomy and potential addressing of adjacent sinuses, such as the frontal sinus and the anterior ethmoid sinuses. Almost all patients when treated correctly, have complete resolution of their disease.

Well, Dr. Craig, thanks so much for being here.

Dr. Joh Craig:

Thank you so much, Jason.

Dr. Jason Barnes:

I'll now move on to the question asking portion of our time together. As a reminder, I'll ask a question, wait a few seconds to give you some time to think about the answer and then give the answer.

The first question is, what is the common presentation of a odontogenic sinusitis? The common presentation of odontogenic sinusitis is unilateral purulent drainage that is foul smelling.

For our second question, what imaging findings might you see in patients with odontogenic sinusitis? Common imaging findings on a sinus CT scan include unilateral maxillary sinus opacification

with possible extension into adjacent sinuses, though it usually spares the posterior ethmoids. Additionally, you can likely identify a dental pathology, including a periapical lucency of a tooth root.

For our third question, what are the common culture results of odontogenic sinusitis? Those with odontogenic sinusitis are likely to culture alpha hemolytic strep species or anaerobic bacteria species.

And for our final question, what is the appropriate treatment for odontogenic sinusitis? While timing and order of intervention can be argued, it's recommended that all patients benefit from addressing the sinus disease in the form of maxillary enterostomy and intervention of dental pathology, which can be in the form of root canal or tooth extraction, for example.

Thanks so much for listening and we'll see you next time.