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Unusual cause of acute sinusitis and orbital abscess in COVID-19 positive patient: Case report

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ABSTRACT

BACKGROUND: Peptoniphilus indolicus is not usually seen in the eye or paranasal sinuses but is a commensal of the human vagina and gut. However, with COVID-19, eye infections and other unusual complications are possible with such unsuspected bacteria.

CASE PRESENTATION: The patient is a 76-year-old white male from a nursing home tested positive for COVID-19 and was sent from a nursing facility for left eye drainage and psychiatric evaluation. Upon presentation, the patient was not fully oriented and could not provide a history of the eye drainage. CT scan showed sinusitis with left orbital and periorbital abscess formation, cellulitis, and extensive osteomyelitis. He underwent endoscopic transnasal drainage and orbiotomy. Cultures returned positive for methicillin-resistant Staphylococcus aureus (MRSA), Streptococcus constellatus, and Peptoniphilus indolicus. He was maintained on several days of IV antibiotics and returned to the nursing home. He then presented 2 months later and required enucleation of his globe, due to the presence of multiple scleral perforations in the setting of orbital abscess, as well as removal of necrotic orbital bone.

CONCLUSIONS: Given the concomitant infection with COVID-19 and unusual presentation, the patient's sinus cultures support the notion that COVID-19 can affect the presence of bacteria within certain anatomical regions. Specifically, Peptoniphilus indolicus is not normally found outside of the vagina or gut biome. Avascular, pale mucosa and bone of the nasal cavity was noted during surgery of this COVID-19 infected patient, which is in contrast to the friable and edematous tissue typically found in acutely infected sinuses. Our patient's orbital abscess began to drain spontaneously through the skin, which is rare for orbital abscesses. Also uncommon with orbital abscesses is the need for enucleation, which in this case was deemed necessary given that the abscess had perforated the sclera in multiple locations.

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1. Background

Peptoniphilus indolicus is not usually seen in the eye but is a commensal of the human vagina and gut. However, with COVID-19, eye infections and other unusual complications are possible with such unsuspected bacteria. The patient presented here spontaneously drained through the skin, an uncommon occurrence with orbital abscesses.

2. Case presentation

The patient is a 76-year-old white male who tested positive for COVID-19 but was sent from a nursing facility for left eye drainage

and psychiatric evaluation. Upon presentation, the patient was not fully oriented and could not provide a history of the eye drainage. His past medical history is significant for hypertension, Type 2 diabetes mellitus requiring insulin, diabetic ketoacidosis, testicular cancer, and transient ischemic attack. CT scan upon presentation showed sinusitis with left orbital and periorbital abscess formation, cellulitis, and extensive osteomyelitis (Figs. 1–3). The margin of the orbital abscess was within the inferior margin of the globe, where there appeared to be an open defect within the globe itself. The patient also had a chest x-ray showing some patchy infiltrates, particularly in the right lung, consistent with a COVID-19 infection.

The patient was admitted, and Ophthalmology and Otolaryngology were consulted. On exam, the left eye was proptotic with palpable abscess of the medial orbit. He had a dense cataract. His pupil was slightly dilated. The orbit was not under tremendous pressure, surprisingly. His conjunctiva was quite injected.

He subsequently underwent endoscopic left middle turbinate reduction, endoscopic left maxillary antrostomy with tissue removal, and endoscopic anterior ethmoidectomy with the Oto-

Abbreviations: MRSA, methicillin resistant staph aureus; COVID-19, Coronavirus Disease 2019; CT, computed tomography; DM, diabetes mellitus; BSI, bloodstream infection; ALI, acute limb ischemia.

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Fig. 1. Axial sinus CT.



Fig. 2. Coronal Sinus CT.



Fig. 3. Sagittal Sinus CT.

laryngology service the following day. Concomitantly, the patient underwent left orbiotomy with drainage of the left orbital abscess with the Ophthalmology service. During surgery, his nasal cavity was oddly avascular (Fig. 4). The turbinate was edematous but pale.



Fig. 4. Endoscopic view of avascular tissue of the left middle meatus. Diamond – left middle turbinate, Star – left maxillary os.



Fig. 5. Orbital abscess drainage – eye open.

The mucosa did not bleed when manipulated. When the bone of the middle turbinate and medial wall of the maxilla were removed with Tru cut forceps, they did not bleed. The fat of the orbit was pale. Sinus and orbital ultures were taken during surgery and returned positive for MRSA, *Streptococcus constellatus*, and *Peptoniphilus indolicus*. Blood cultures were negative, and therefore the infection was felt to originate from the sinuses and not the bloodstream. He completed several days of intravenous antibiotics during the hospitalization but continued to have drainage from his left eye (Figs. 5 and 6). Otolaryngology evaluated him daily and had no plans to do further surgery. He was deemed hemodynamically and neurologically stable and was transferred back to his nursing facility for completion of intravenous antibiotics. He did not return for follow up.

Two months later, he presented to the emergency department with a large laceration of his left medial canthus, reported by his nursing home to be secondary to “multiple falls” and extensive orbital abscess. Ophthalmic exam (Fig. 7) revealed that he had no-light perception vision of the left eye with an afferent pupillary defect. His globe was soft on palpation, which was concerning for open globe.

Repeat CT imaging demonstrated persistent medial left orbital abscess, sinusitis and osteomyelitis, similar in configuration to the prior exam, with evident deformity of the left globe.

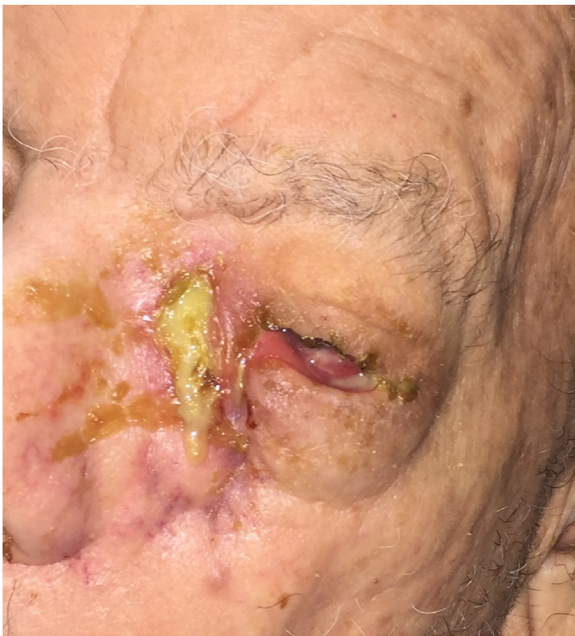


Fig. 6. Orbital abscess drainage – eye closed.



Fig. 8. Repair of medial cheek wound as well as enucleation defect.



Fig. 7. Preoperative exam before second surgery.



Fig. 9. Necrotic maxilla of medial inferior orbit.

He was taken to the operating room for left external ethmoidectomy, left orbitotomy with exploration and excision of necrotic tissue, and extensive facial laceration repair (Fig. 8). Intraoperatively, he was found to have left medial orbital abscess with necrotic periosteum, maxilla, periorbital, and globe tissue (Fig. 9), and the abscess tracked along the floor of the orbit, to the lateral wall, and posteriorly to the superior and inferior orbital fissures. The abscess had also perforated the left globe in multiple locations, prompting us to perform enucleation. Given our concern for extension to the brain, neurosurgery was consulted and an MRI of the brain and orbit was obtained. Although MRI demonstrated extensive skull base osteomyelitis, no extension was present in the cavernous sinus.

The collective decision thus was made to continue the patient on medical therapy for six weeks.

3. Discussion

Rare disease processes and manifestations have been reported in COVID-19 positive patients. *Peptoniphilus indolicus*, a type of bacteria normally found in the vagina and stomach [1], was found within our patient's orbit. There are now more than 15 *Peptoniphilus* species within the genus, seven of which were discovered in 2012 [2–9]. At this juncture, no *Peptoniphilus* species have been reported in the orbit; *Peptoniphilus* species have most commonly been associated with diabetic skin and soft tissue infections, bone and joint infections, surgical site infections, and

chorioamnionitis [10–14]. Recently, a case series of *Peptoniphilus* was reported, wherein the organism caused bloodstream infection (BSI), either alone or as part of a polymicrobial infection [15]. We believe that our case is the first to document *Peptoniphilus* within the orbit. Physicians should therefore add it to their differential when COVID-19 patients present with sinusitis and orbital abscess. An Infectious Disease team should also be a part of the care team in order to adequately cover unusual organisms.

Of note, the avascularity of the nasal tissue was of significant interest and very peculiar to the surgeons involved with the case. Limb ischemia and avascular surgical fields have been noted during the COVID-19 pandemic, as evidenced in the Italian Lombardy region [16]. In Lombardy, the incidence of acute limb ischemia (ALI) significantly increased during the COVID-19 pandemic and successful revascularization was lower than expected, believed to be due to a virus-related hypercoagulable state [16]. As reported by Silinardi and colleagues, the increased thromboembolic complications in COVID-19 patients have been reported even in those receiving anticoagulant therapy and in nonatherosclerotic patients [16–19]. In turn, precautions must be taken when performing surgery on COVID-19 positive patients, specifically from a vascular standpoint.

Finally, the Ophthalmology service made note of the peculiarity of the spontaneously-draining orbital abscess. Typical orbital abscess presentations include red eye, proptosis, ophthalmoplegia, and pain [20,21]. In severe cases, the optic nerve can become compressed, leading to compressive optic neuropathy [21]. The incidence of abscess formation among sinus disease patients varies from 6.25% to 20%, to as high as 78.6% [22–25]. Rarely, however, does an orbital abscess drain on its own. According to the American Academy of Ophthalmology, current guidelines recommend surgical drainage in conjunction with intravenous antibiotics to achieve complete resolution of the infection in patients over the age of fourteen [26]. Still, there are very few studies with high power looking at orbital abscess drainage in adults. For example, from a study by Kayhan and colleagues with ten total patients, external drainage of the abscess was needed in six of the patients in the study [27]. Nevertheless, zero of the six orbital abscesses that needed draining did so spontaneously, further supporting the rarity of the type of orbital abscess found in the COVID-19 positive patient in our study.

4. Conclusions

Given the concomitant infection with COVID-19 and unusual presentation, the patient's cultures support the notion that COVID-19 can affect the presence of bacteria within certain anatomical regions. Specifically, *Peptoniphilus indolicus* is not normally found outside of the vagina or gut biome. Like other parts of the body, the sinonasal cavity can become avascular as a result of COVID infections. It is also rare for orbital abscesses to drain spontaneously or require enucleation, as this abscess did.

5. Key clinical message

COVID-19 can affect the presence of bacteria within certain anatomical regions. Specifically, *Peptoniphilus indolicus* is not normally found outside of the vagina or gut biome, but it was found in the sinus and orbit of our patient. Significant avascularity was noted of the nasal cavity and orbit.

Declaration of Competing Interest

None.

Funding

None.

Ethical approval

Exemption from approval has been received.

Consent

Informed consent was obtained by the study patient, beneficence was made a top priority, and respect for confidentiality and privacy were upheld during the study and its various analysis and information assertion components.

Authors contribution

Courtney B. Shires, MD, FACS: Collected data, wrote and edited article.

Theodore Klug, MD, MPH: Collected data, wrote and edited article.

Stephen Dryden, MD: Collected data, wrote and edited article.

Joshua Ford, MD: Collected data, wrote and edited article.

Registration of research studies

Not Applicable.

Guarantor

Theodore Klug.

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