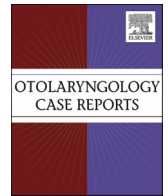




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Retropharyngeal abscess- An unusual complication in a COVID-19 patient

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic has generated many challenges for physicians, including multiple long-term effects that are still being studied. We report a CASE of patient who developed a retropharyngeal abscess post-COVID19 infection.

We report a CASE of a female who was diagnosed with COVID19 pneumonia and hospitalized for a week at an outside institute. Approximately 3 weeks post discharge she developed neck pain, dysphagia, voice change and odynophagia for which she went to an outside emergency department. A soft tissue neck CT was performed and was concerning for retropharyngeal abscess. The patient was then transferred to our institution. On arrival, a CT scan of the neck and nasopharyngoscopy were performed and biopsies of the epiglottis and right inferior tonsillar pole were taken. Biopsies of the epiglottis and tonsil showed acute inflammation, spongiosis, edema and marked dilation of the lymphatics. Her clinical course was complicated by persistent infection requiring multiple washouts, hyperglycemia, tube feed intolerance, dysphagia and deconditioning. A multi-disciplinary approach was instituted for appropriate management.

This case report highlights the necessity for close follow up after recovery from COVID-19 infection, particularly in patients with multiple comorbidities.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been a major topic of discussion around the world since it was first identified in Wuhan, China. As of December 27, 2020, the World Health Organization (WHO) reported 79,231,893 cases of COVID-19 worldwide, with 34,493,371 of those confirmed in the United States of America [1]. While most patients with COVID-19 are asymptomatic or suffer minor morbidity, a significant number of patients experience life-threatening symptoms including acute respiratory distress syndrome (ARDS) and multi-organ failure [2]. We report a case of retropharyngeal abscess in a patient with a recent history of COVID-19 pneumonia and share our findings on the histopathology of laryngeal and tonsillar biopsies obtained during her hospitalization.

Case report

A 60-year-old woman presented to an outside hospital with shortness of breath and cough where she was admitted and diagnosed with COVID

19 pneumonia following a positive COVID-19 PCR test. She did not require intubation and was discharged with improvement of symptoms. She was isolated home and her symptoms continued to improve. However, 3 weeks later, she developed sore throat, right neck pain, voice change, odynophagia with associated drooling and acute onset shortness of breath. She returned to the outside hospital with these symptoms. On examination, trachea was midline and right sternocleidomastoid muscle was tender. Increased pain was noted on rotation of head to the left. Lungs were clear on auscultation. Oxygen saturation was 95%. A soft tissue neck computed tomography (CT) scan without contrast showed a large retropharyngeal space fluid collection from mid C2 through C6–C7 disc space level with mild epiglottitis inflammation. Right palatine tonsil ulceration along with soft tissue thickening of the right neck and multiple foci of soft tissue emphysema was noted. Her total white blood cell count (WBC) count was 24.33 x K/mcL. IV piperacillin-tazobactam and IV vancomycin were initiated. She tested positive again for COVID-19 by PCR. Due to concern of retropharyngeal abscess, she was transferred to our hospital. Her comorbidities include hypertension, hyperlipidemia, diabetes and chronic kidney disease. She had no prior history of similar symptoms.

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Hospital course

On arrival at our institution, a repeat non-contrast soft tissue neck CT confirmed an asymmetric prominence of the right palatine tonsil with an edematous appearance of the right lateral pharynx and larynx, as well as focal hemorrhage and displacement of the supraglottic larynx to the left with narrowing of the airway. Flexible fiberoptic laryngoscopy was performed which demonstrated swelling of pharynx, larynx and deviation of airway to the left. The epiglottis was enlarged and omega-shaped with complete obstruction of the vocal folds. She was continued on IV vancomycin and IV piperacillin-tazobactam. Due to concern of impending airway obstruction, she was taken to operating room (OR) for nasopharyngeal intubation. During the procedure, diffuse edema with papular changes of the epiglottic tip were noted, but no retropharyngeal abscess was identified and aspiration was unsuccessful. Biopsies of the edematous epiglottis and right inferior tonsillar pole were taken (Fig. 1 & Fig. 2). Hematoxylin and eosin-stained sections of the biopsies showed acute inflammation, suprabasal blister and marked spongiosis of the squamous mucosa with marked dilation of the lymphatics in the submucosa suggestive of early stages of abscess formation.

Two days later, she was taken back to OR and on direct laryngoscopy, significant swelling of supraglottic airspace and obstruction of true vocal cord was noted. Turbid material was aspirated and sent for microbiology cultures (culture #1). Her WBC count at this time was 16.19 K/mL. A repeat CT scan at four days post-intubation showed an abscess extending from right base of tongue/lingual tonsil through supraglottic larynx, right strap neck musculature and anterior aspect of right thyroid lobe with increased narrowing of the airway. She was taken back to the OR for a repeat incision and drainage and neck drain placement with abscess contents sent for microbiology culture (culture #2). Eight days post intubation, her WBC increased to 27.79 K/mL resulting in another direct laryngoscopic examination which showed improvement in supraglottic edema. A washout of right neck incision and drainage site was performed with bacitracin and saline. However, due to persistent leukocytosis, she was taken back to the OR again and micro-direct laryngoscopy was performed which showed worsening of epiglottic and arytenoid edema. At this time, a tracheostomy was performed. Frank purulence was noted in the retropharyngeal space and base of skull which was irrigated with saline and betadine. Twelve days post-

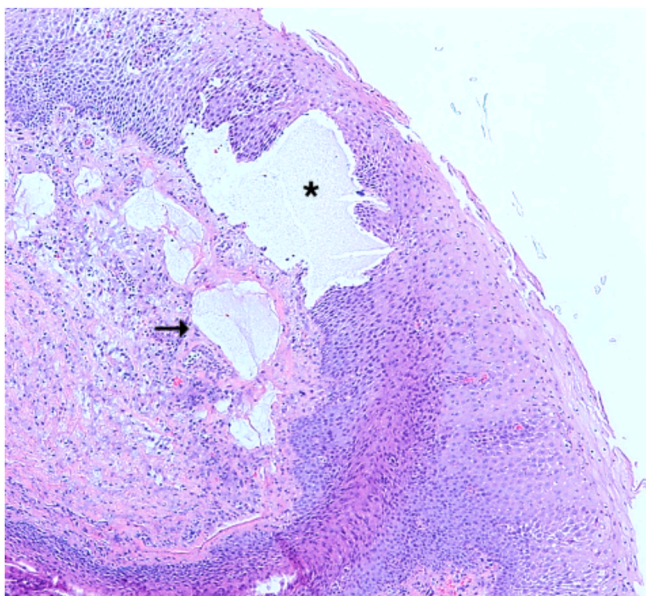


Fig. 1. Laryngeal biopsy showing lymphatic dilation in the submucosa (→) and suprabasal blister (*) in the epithelium, Hematoxylin and eosin stain, magnification x100

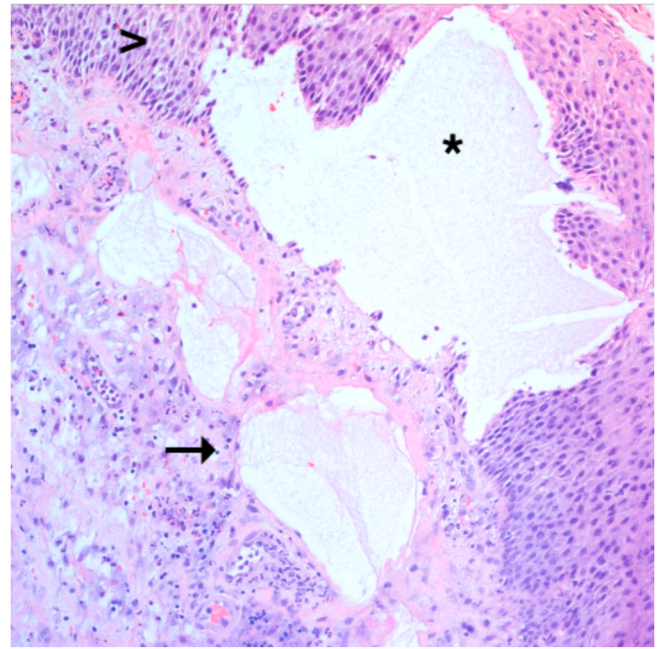


Fig. 2. Higher magnification of laryngeal epithelium showing suprabasal blister (*) and spongiosis (>), and submucosa showing lymphatic dilation (→), stromal edema and acute inflammation, Hematoxylin and eosin, magnification x200.

intubation, her WBC was still at 21.10 K/mL and she had to be taken back to OR for another incision and drainage. A repeat CT scan of the neck showed an increase in ill-defined retropharyngeal/prevertebral collection and decrease in right parapharyngeal and visceral space collection as compared to CT scan from 13 days prior. She was then put on twice daily wound irrigation followed by wound packs.

With improvement of the neck wound, WBC back to normal (10.16 K/mL), completion of antibiotic and antifungal course and resolution of infection, she was discharged to an inpatient rehabilitation facility for deconditioning and dysphagia.

Her clinical course was complicated by hyperglycemia, tube feed intolerance, dysphagia and deconditioning. A multi-disciplinary approach was instituted for appropriate management which included internal medicine for diabetes management, ENT for retropharyngeal abscess treatment, infectious disease for persistent leukocytosis, rehabilitation team for deconditioning and dysphagia.

Microbiology culture results

Culture #1: *Streptococcus anginosus* group

Culture #2: *Klebsiella pneumonia* and *Candida albicans*. *Klebsiella pneumonia* was resistant to ampicillin, ampicillin sulbactam, cefazolin and cefotetan.

Discussion

COVID-19 is the cause of significant morbidity and mortality in the ongoing pandemic. Laryngeal symptoms in patients with COVID-19 disease include pharyngodynia, nasal congestion, rhinorrhea, smell and taste dysfunction [3]. Laryngeal complications in COVID-19 patients affects voice, airway and swallowing [4].

Deep neck space abscesses can develop rapidly and potentially cause life threatening complications, therefore early diagnosis is imperative in the management of these patients. Majority of deep neck space abscesses and infections arise from septic foci involving mucosal surfaces of the upper airway, digestive tracts and mandibular teeth. They occur via direct extension and develop in the potential spaces between the layers

of deep cervical fascia [5].

The most common presenting symptoms include fever, neck swelling, sore throat, dysphagia, dyspnea, odynophagia, torticollis, otalgia, drooling and respiratory distress [5,6].

Precipitating factors for deep neck infections and abscesses include dental infections, trauma, tonsillitis, foreign body and head and neck malignancies [6]. Deep neck infections in immunocompromised patients with underlying systemic diseases such as diabetes and chronic renal failure have been described to have a higher complication rate [7].

Retropharyngeal abscesses are rarely identified in adults and more commonly seen in infants and young children due to abundance of retropharyngeal lymph nodes in this patient population [8]. Risk factors for retropharyngeal abscesses in adults mostly include dental infections, tuberculosis cervical spine osteomyelitis and trauma by foreign body ingestion or instrumentation such as intubation and laryngoscopy. Clinical diagnosis of retropharyngeal abscess can pose a challenge due to the non-specificity of symptoms. Studies have described difficulties with using CT modality to differentiate between cellulitis involving the retropharyngeal space and retropharyngeal abscess formation [8].

Bacterial cultures from deep neck infections are usually polymicrobial, with aerobic gram-positive *Streptococcus* organisms being most commonly isolated [9]. Other aerobic gram-positive organisms such as *Staphylococcus epidermidis* and *Staphylococcus aureus* have been reported as the next most commonly isolated organism. Aerobic gram-negative pathogens were *Escherichia coli* and *Hemophilus influenzae* have also been isolated but less commonly [10].

In our patient, *Streptococcus anginosus*, a viridans-group streptococci was isolated from aspirated purulent fluid from the abscess. These catalase-negative gram-positive cocci are part of the normal oropharyngeal, digestive and urogenital flora but can cause pyogenic infections with a propensity for abscess formation [11].

Retropharyngeal abscesses can develop following a nasopharyngeal viral infection. Rhinovirus has been reported to lead to a secondary bacterial oropharyngeal infection that subsequently caused the development of a retropharyngeal abscess in a one month-old infant [12]. Epstein-Barr virus infection has been suggested to be associated with retropharyngeal abscess formation in children [13]. A retropharyngeal abscess can develop as either a co-infection or a secondary complication of influenza virus infection [14].

Conclusion

Retropharyngeal abscess formation as a severe and emergent complication of SARS-CoV-2 viral infection is plausible and needs to be reported. Despite the patient in our case being discharged a week after initial COVID-19 infection, she suffered significant morbidity with prolonged hospitalization (35 days), tracheostomy and intubation due to development of retropharyngeal abscess as a complication of COVID-19. This case report highlights the importance of close follow up after

recovery from COVID-19 infection, especially in patients with multiple comorbidities.

Ethical statement

All procedures performed in the case report were in accordance with the ethical standards of the University of Texas Science Center at San Antonio. No identifiable information is provided in the displayed graphics nor case narrative. IRB approval was not obtained as this was a case report of a single patient.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Acknowledgments

All authors contributed equally to the production of this manuscript.

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