

# COVID-19 and peritonsillar abscess co-infection: A case report

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**Abstract.** Coronavirus disease 2019 (COVID-19) generally presents with fever, shortness of breath and a sore throat. These symptoms are also common in oral and pharyngeal infections, such as peritonsillar abscess (PA). The present study describes a case of PA and COVID-19 co-infection. Although COVID-19 was initially suspected in the patient due to the presenting symptoms of fever, sore throat, dysgeusia and dysosmia, an oral examination and computed tomography scan detected PA. The patient was conservatively managed with intravenous antibiotics without transoral drainage of the abscess. Anti-COVID-19 medication was not administered as the COVID-19 infection in the patient was not severe. Laboratory findings revealed high levels of leukocytes, C-reactive protein (CRP) and procalcitonin. On the whole, the association between laboratory findings (including leukocyte count, CRP and procalcitonin levels) and bacterial co-infection with COVID-19 remains unclear, and further studies are warranted. Oral examinations and transoral procedures are often avoided due to the high risk of the aerosolisation of COVID-19 viral particles. However, an appropriate evaluation is essential in order to avoid the underdiagnosis of life-threatening bacterial infections that co-exist with COVID-19.

## Introduction

Coronavirus disease 2019 (COVID-19), which is caused by the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and mainly transmitted by

droplets and aerosols, has become a global health issue (1). As a preventive measure, oral procedures are limited to emergency treatment due to their propensity for aerosol transmission (2). Fever, cough, shortness of breath and a sore throat are the most common symptoms of COVID-19, which are also similar to the predominant symptoms of oral, pharyngeal and cervical infections, such as peritonsillar abscess (PA), tonsillitis, acute epiglottitis and deep neck abscess (1,3,4). Laboratory findings in patients with these diseases have revealed a high leukocyte count and C-reactive protein (CRP) level, which are indicators of bacterial infection (5). By contrast, laboratory findings in patients with COVID-19 have revealed low leukocyte, neutrophil and thrombocyte counts (6,7).

The present study describes a conservatively managed case of PA and COVID-19 co-infection which revealed unconventional laboratory findings.

## Case report

A 41-year-old female patient presented at Bellland General Hospital with a 3-day history of high fever and a severe sore throat, followed by dysgeusia and dysosmia. The patient had no relevant medical history and was not on any medication. Although the patient denied having a cough or dyspnoea, the symptoms were indicative of COVID-19. The nasopharyngeal swab specimen was positive for SARS-CoV-2 (cut off index, 35099.4), as determined using a quantitative antigen test (chemiluminescent enzyme immunoassay; HISCL™ SARS-CoV-2 Ag reagent, Sysmex Corporation). Furthermore, the patient exhibited a slight difficulty in opening her mouth and speaking. An oral examination revealed left-side peritonsillar swelling and reddening without laryngeal oedema. A computed tomography (CT) scan revealed left-sided PA (Fig. 1A). Consequently, the patient was diagnosed with PA and concurrent COVID-19, and was thus admitted to the isolation ward. The laboratory findings of the patient revealed a normal leukocyte count of 7,700/ $\mu$ l (reference range, 3,300-8,800/ $\mu$ l) and a normal procalcitonin level of <0.02 (reference range, <0.02). However, the CRP level was extraordinarily high at 9.42 (reference range, <0.14). PA was treated with intravenous ceftriaxone sodium hydrate (2 g/day) and clindamycin (600 mg/day) for 7 days. The patient was also conservatively managed for COVID-19, as the percutaneous oxygen saturation remained high without oxygen support and the patient did not exhibit any signs of dyspnoea. Transoral

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*Abbreviations:* COVID-19, coronavirus disease 2019; CRP, C-reactive protein; CT, computed tomography; PA, peritonsillar abscess; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2

*Key words:* COVID-19 co-infections, c-reactive protein, leucocyte, peritonsillar abscess, procalcitonin

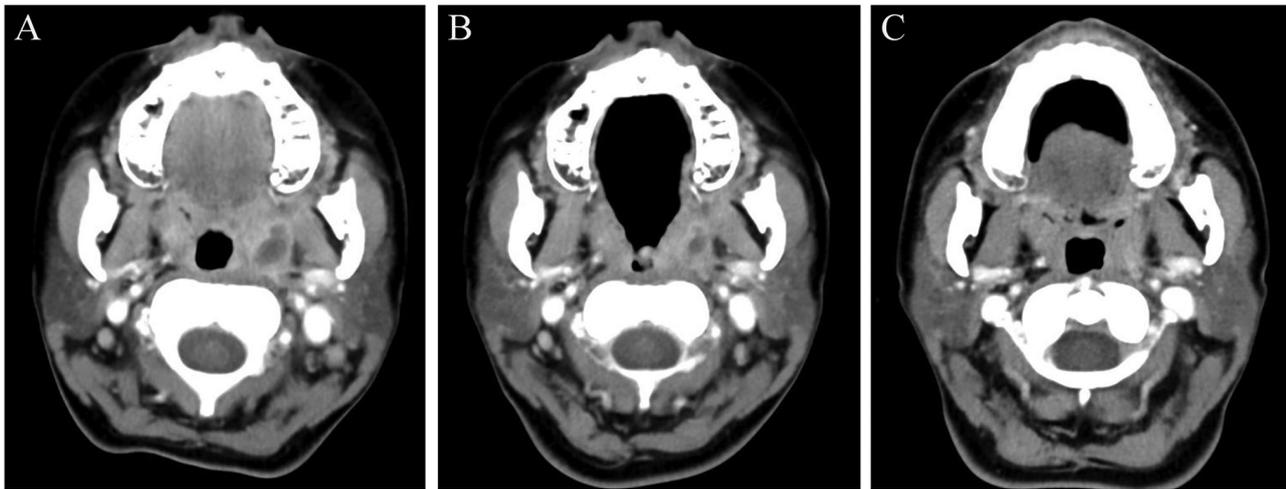


Figure 1. Results of the computed tomography scans. (A) Day 1: A peritonsillar abscess was revealed on the left side. (B) Day 3: The abscess cavity was reduced. (C) Day 14: No abscess was observed.

drainage by aspiration and incision was not performed due to the risk of SARS-CoV-2 aerosolisation. At 2 days after hospitalisation, the CRP level, leukocyte count and procalcitonin level of the patient were 3.76, 5,100/ $\mu$ l and  $<0.02$ , respectively. The patient began the oral intake of food and water following an improvement in the severity of the sore throat. At 3 days after hospitalisation, the CRP level was 2.17 and the leukocyte count was 4,700/ $\mu$ l. A CT scan at this time point revealed a reduction in the left-side PA cavity (Fig. 1B). At 7 days after hospitalisation, the patient recovered and was discharged.

At the 1-week postoperative follow-up (14 days after the initial visit to Belland General Hospital), the patient's condition was stable without fever or a sore throat. A CT scan at this time point confirmed the absence of an abscess cavity (Fig. 1C).

## Discussion

COVID-19 is a highly infectious disease, and the pandemic has changed the style of medical care and oral examinations. The use of personal protective equipment, including facial masks, shields, glasses, gloves, caps and gowns is essential to reduce the risk of aerosol exposure to SARS-CoV-2 (1,2). The diagnosis of COVID-19 has become increasingly rapid and simple due to the widespread use of various SARS-CoV-2 tests (8). However, oral, pharyngeal and cervical infections (e.g., PA, tonsillitis, acute epiglottitis, deep neck abscess) may be overlooked if a thorough oral and pharyngo-laryngeal evaluation is avoided due to the high transmissibility of COVID-19. Akiyama *et al* (9) reported the necessity of careful evaluation for life-threatening diseases in cases with fever during the COVID-19 pandemic era.

PA is the most common deep infection of the head and neck and is a life-threatening disease. PA is diagnosed by an oral and pharyngeal examination, as well as through a CT scan and endoscopic findings (4). Fever and a sore throat are the predominant symptoms in patients with PA; however, these symptoms have also been identified in patients with COVID-19 (1,3). In the case described herein, COVID-19 was

suspected due to the characteristic symptoms of the patient. Moreover, the patient was tested for and diagnosed with COVID-19. Furthermore, the slight difficulty exhibited by the patient in opening her mouth and speaking was indicative of airway obstruction caused by oral, pharyngeal and/or laryngeal oedema. Both the oropharyngeal examination and CT scan revealed PA; the patient was finally diagnosed with PA co-existing with COVID-19. Although transoral drainage of abscesses is effective for patients with PA, this procedure poses a high risk of COVID-19 transmission (4). The ENT UK guidelines recommend restricting abscess drainage to severe cases with airway compromise, sepsis, or those that do not improve with initial medical therapy (2). The patient in the present study was managed conservatively. Intravenous antibiotics were administered without providing transoral drainage or anti-COVID-19 medication, as dyspnoea and sepsis were not observed and the COVID-19 symptoms of the patient were not severe. The patient's condition improved, which was verified using a CT scan.

Laboratory findings in the patient described herein indicated that the CRP level was elevated, whereas the leukocyte count had remained at normal levels since the initial examination. The leukocyte count and CRP levels have been shown to be positively associated in patients with PA (10). The unconventional laboratory findings in the case in the present study may have been induced by the simultaneous presence of PA and COVID-19, although there is no clear evidence of an association between these diseases. Moreover, the procalcitonin levels were normal during treatment. Procalcitonin levels are elevated by bacterial infection and are a reliable marker of sepsis, whereas a lack of an increase in procalcitonin levels is observed in viral infections due to the inhibition of tumour necrosis factor- $\alpha$  in the immune response (11). Hu *et al* (12) reported that procalcitonin played the role of an indicator, determining the disease severity of patients infected with SARS-CoV-2. Considering these previous findings, the level of procalcitonin in the case in the present study suggested that the patient was moderately affected with PA and COVID-19. The association between laboratory findings (e.g., leukocyte count, CRP and procalcitonin levels) and bacterial co-infection

in COVID-19 has not yet been established. To the best of our knowledge, this is the first case report study featuring laboratory findings in a patient with PA and COVID-19 co-infection. Further studies are thus required in this area.

The importance of using personal protective equipment and isolation to prevent exposure to aerosols containing SARS-CoV-2, as well as the restriction of transoral procedures to severe cases (e.g., airway obstruction) has been highlighted in the COVID-19 pandemic era (2). Although COVID-19 can be easily diagnosed with rapid tests, co-infection with life-threatening oral, pharyngeal and laryngeal infections may be underdiagnosed due to insufficient oral examination (9). These diseases should not be overlooked due to the lack of appropriate evaluation.

In conclusion, the present study described a case of a patient with PA and COVID-19 co-infection. The conservative treatment of PA may be effective during the COVID-19 pandemic. A careful examination is warranted in order to avoid the underdiagnosis of life-threatening diseases co-existing with COVID-19. While unconventional laboratory findings may indicate bacterial co-infections with COVID-19, further studies are warranted for confirmation.

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#### Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

#### Authors' contributions

AT made substantial contributions to the conception of the study and the acquisition of data, and drafted the manuscript. SM, NK, TN, TI and TK provided related scientific input and collected the clinical data. SM, TI and TK critically revised the manuscript. AT and TN confirm the authenticity of all the raw data. All authors have accepted responsibility for the entire content of this manuscript and have approved the submission. All authors have read and approved the final manuscript.

#### Ethics approval and consent to participate

Written informed consent was obtained from the patient.

#### Patient consent for publication

Written informed consent was obtained from the patient for the publication of this case report, including any accompanying images.

#### Competing interests

The authors declare that they have no competing interests.

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