CASE REPORT

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Sudden Deep Neck Abscess Formation in a Patient with COVID-19

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ABSTRACT Treatment of coronavirus disease-2019 (COVID-19) in quarantine at home may cause some disruptions in various other health problems. If surgical intervention for deep neck abscess is delayed, morbidity and mortality increase. A 45-year-old male patient was admitted with persistent fever, sweating, weakness; inability to open his mouth due to 80x100 mm centrally softened hyperemic mass on the left submandibular region. In neck tomography; it was extending from the inferior of the mandibular arch to the parapharyngeal and peritonsillar area obliterating airway asymmetrically on the left side of the vallecula. Huge purulent material with thrombus drained from the abscess under general anesthesia. During COVID-19 disease, it is possible for upper respiratory tract and tooth infections to rapidly transform into abscess formation due to the possible reduced immunity. To avoid these situations with high mortality and morbidity, such as deep neck infection, is only possible to closely monitor the patient during the COVID-19 disease with the help of technology.

Keywords: COVID-19; deep neck abscess; odontogenic infection

The 2019 novel coronavirus disease (COVID-19) is a pandemic disease with rapid transmission and high hospitalization rates.[1] In case of mild and moderate cases, the quarantine at home is applied and the patients are followed by medical teams resulting some disruptions in various other health problems in patients.[2]

Deep neck abscess is a condition that is encountered in both adults and pediatric groups, which we see more frequently due to tooth origin.[3] Cramer et al. reported that if surgical intervention for deep neck abscess is delayed, morbidity and mortality increase statistically.[4]

In this text; we wanted to discuss the relationship between COVID-19 and the sudden formation of a giant abscess in the neck in the light of the literature.

CASE REPORT

A 45-year-old male patient was admitted to the otorhinolaryngology outpatient clinic with persistent fever, weakness, inability to open his mouth, and swelling on the left chin extending to the neck. From the national health database notification system, it was understood that the patient left the quarantine of COVID-19 without permission. He said that a small lymph node on the neck under the left jaw started with pre-quarantine toothache and had grown gradually for five days. In the examination; there was an 80x100 mm centrally softened hyperemic mass filling the left upper submandibular region with hyperemia and swelling in the left lateral pharynx wall, and narrowing the airway. In neck computed tomography (CT) examination, there was a collection with

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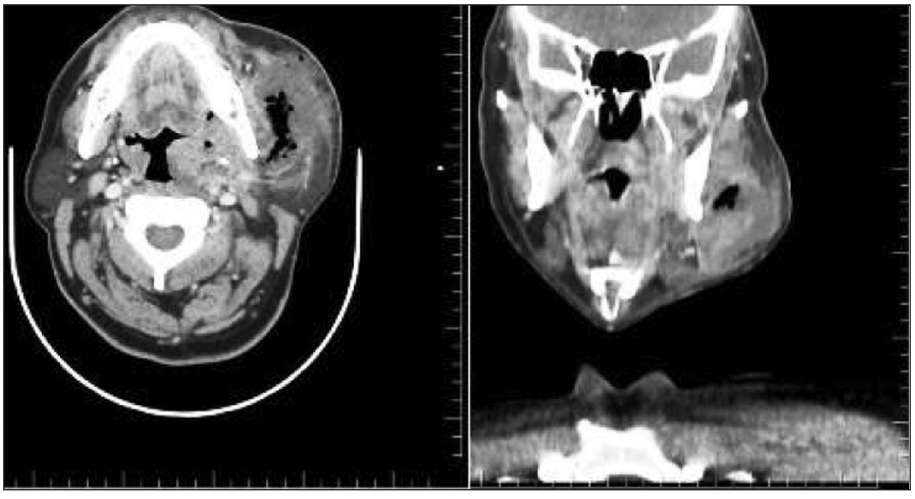

FIGURE 1: The patients' neck computed tomography images.

air densities of 90 mm and starting from the left buccal area to the parapharyngeal and peritonsillar area obliterating airway asymmetrically on the left side of the vallecula (Figure 1). The patient's laboratory results with positive polymerase chain reaction (PCR) test result and multi-focal ground glass densities on thorax CT are shown in Table 1 and Figure 2.

The patient was taken to the specially prepared negative pressure operating room. Under general anesthesia, 25 cc of purulent material with clotted blood and thrombus from neck was drained. Real-Time Reverse Transcriptase–Polymerase Chain Reaction (RT-PCR) test from the cavity was found to be negative. The abscess area was washed with oxygenated water and povidone-iodine 10% and a penrose drain was placed on the neck with pressure dressing.

The patient was followed up in the isolated ward for approximately 7 days to receive intravenous (IV) antibiotics with meropenem 3x1 (Merrem® I.V., Pfizer Inc. All, NY, USA). For the COVID-19 effects in the

TABLE 1: Clinical laboratory results.

Variable	Reference range	Hospital day 1 (day 5 after onset of symptoms)
White cell count (x109/L)	4,500-11,000	13,750*
Haemoglobin (g/dL)	13-18	11.24
Haematocrit (%)	36-50	34.52
Platelet count (x109/L)	50-400	617.50
Absolute neutrophil count (x109/L)	1.7-7.0	7.82*
Absolute lymphocyte count (x109/L)	0.90-5.06	4.36
Absolute monocyte count (x109/L)	0.1-0.8	0.78
CRP (mg/L)	<5.0	72.30*
D-Dimer (ng/mL)	<500	1.520.00*
Procalcitonin (µg/mL)	<0.10	0.31*
Urea (mmol/L)	8.90-20.60	20
Creatinine (mg/dL)	0.72-1.25	0.69
Alanine aminotransferase (U/L)	<55	52
Aspartate aminotransferase (U/L)	<34	33
Nasopharyngeal SARS-CoV-2 RNA	Not detected	Detected

CRP: C-reactive protein; SARS-CoV-2: Severe acute respiratory syndrome-coronavirus-2. *abnormally increased values.

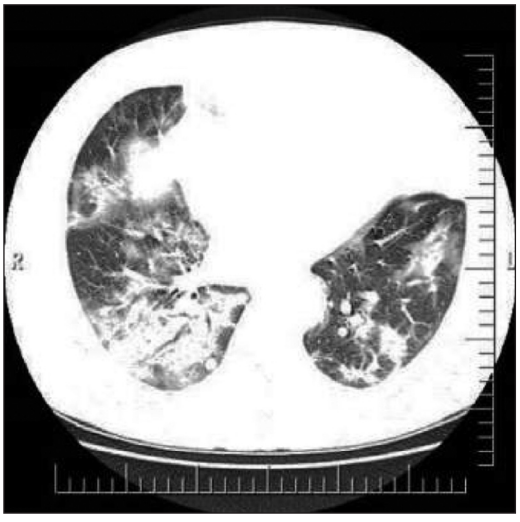

FIGURE 2: The patients' thorax computed tomography images.

lung, metilprednisolone 40 mg IV (Prednol®, Mustafa Nevzat, Turkey), enoxaparin sodium 40 mg/0.4 mL subcutaneous (Clexan®, Sanofi Aventis Pharma, India) were applied. Drainage from the surgical area was provided by daily dressing. In the clinical and ultrasonographic examination performed 10 days later and one month follow-up was not remarkable.

"Informed consent form for scientific research" was taken from the patient.

DISCUSSION

While patients are at the quarantine for their COVID-19 treatment at home, it is planned to be controlled daily by the healthcare team, but with the intensity caused by the pandemic, this daily control is often not possible or done by phone. Krajewska et al. stated that there is a consensus in the literature for elective ear, nose and throat problems those should be solved with the help of telemedicine unless it is urgent.[5] The purpose of this cancellation is to significantly increase critical care capacity, prioritize the reception of patients with COVID-19 and to reduce the risks of patient contamination within hospital.[6]

In our country, an application developed by the Ministry of Health is used to determine the risk status and contact status of the person related to COVID-19 disease with advisory guidance by questioning the symptoms of COVID-19. This application does not ask questions about other signs and symptoms of other diseases rather than COVID-19. Therefore, patients may pose the risk of causing delays in an emergency, especially during the peak period of the pandemic. This is especially important in oncological patients and elderly patients.[7] Our case was diagnosed with COVID-19 at a time when he was suffering from a toothache, and his neck abscess developed rapidly in 5 days and was not applied antibiotics. As a result, we certainly advise an application including a survey about urgent symptoms of many chronic diseases and this application should direct the patient to a tertiary health center for ensuring an emergency approach.

It is unclear if severe acute respiratory syndrome-CoV-2 (SARS-CoV-2) is coincidental or a contributing factor to the pathogenesis and/or rapid progress of neck abscess in this case. The patient suffered from toothache and a small submandibular lymphadenopathy before PCR positivity and then has progressed to an abscess in a few days. So that, the abscess formation may be coincidence with a delay in the treatment of tooth and neck infection due to COVID-19. The other cause of rapid progression to abscess may be increased endothelial transmission of viral infection and easy transition of bacterial flora due to the reduced immunity during COVID-19.[8] Qin et al. found an increase of neutrophil-to-lymphocyte ratio in the severe group with COVID-19 compared to the mild group.[8] They claimed that COVID-19 might damage lymphocytes, especially T lymphocytes, and the immune system was impaired during the period of disease.[8] Our case also had increased neutrophil-to-lymphocyte ratio. T cells, especially CD4+ and CD8+ T cells play an important role in weakening or dampening overactive immune responses during viral infection.[9] In addition to lymphopenia, it is observed that the number of both helper T lymphocytes and suppressor T lymphocytes are significantly decreased in COVID-19 disease.[8] Unfortunately, we could not examine the level of T cells of our case, but reduced immunity at mucosal level during COVID-19 may be a crucial factor in the progression of abscess. COVID-19 may consist of a complex clinical situation including disseminated micro-embolisms, diffuse vasculitis, and autoimmune

aggression with decreased antibacterial defense.[10] Deep neck abscess content with thrombotic coagulum with purulent material in the operation of our patient was made us think also about vasculitis and embolisms as well as the reduced immunity.

In the literature, abscess in various parts of the body during COVID-19 disease such as peritonsillar abscess, spinal abscess, intraabdominal abscess due to appendicitis have been published.[10-12] However, we could not find any reports of giant abscesses in the neck due to the progression of odontogenic infection together with COVID-19. Sideris et al. published the association of COVID-19 and peritonsillar abscess and recommended to maintain a high degree of suspicion of peritonsillar abcess presentation of upper respiratory tract infection in era of COVID-19.[11]

Wang et al. examined different clinical specimens for SARS-CoV-2 and they also found positive from feces, urine and blood as well as pharyngeal, nasal and bronchoalveolar specimens.[13] Although it is a virus that adheres to the mucosa and enters the tissue, this virus has been shown in various fluids in the body.[13] The control of the purulent material for RT-PCR was firstly done in the literature in this case.

In conclusion, during COVID-19 disease, reduced innate immunity could easily cause an abscess formation in a few days from upper respiratory tract and tooth infections. To avoid these situations with high mortality and morbidity, closely monitoring the patient during the COVID- 19 disease is essential. When such a situation occurs, providing the necessary isolation conditions and emergent management of the patient is life-saving.

Source of Finance

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Fulya Özer;* ***Design:*** *Fulya Özer, Özlem Alkan, Şule Akın;* ***Control/Supervision:*** *Şule Akın;* ***Data Collection and/or Processing:*** *Fulya Özer, Özlem Alkan;* ***Analysis and/or Interpretation:*** *Fulya Özer;* ***Literature Review:*** *Fulya Özer, Özlem Alkan, Şule Akın;* ***Writing the Article:*** *Fulya Özer;* ***Critical Review:*** *Özlem Alkan, Şule Akın;* ***References and Fundings:*** *Şule Akın, Fulya Özer;* ***Materials:*** *Fulya Özer, Özlem Alkan.*

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