

## Case Report

# COVID-19 laryngitis with localized whitish pseudomembranous change in supraglottis: a case report

Ayano Ono<sup>1)</sup>, Tomohiko Yamauchi<sup>2)</sup>, Takeharu Kanazawa<sup>3)</sup>

1) Department of Otolaryngology, Jichi Medical University, 3311-1 Yakushiji, Shimotsuke-shi, Tochigi, Japan

2) Department of Otolaryngology, Shin-Oyama city hospital, 2251-1 Hitotonoya, Oyama-shi, Tochigi, Japan

3) Division of laryngeal surgery, Department of Otolaryngology, Jichi Medical University, 3311-1 Yakushiji, Shimotsuke-shi, Tochigi, Japan

## Abstract

A 38-year-old woman with COVID-19 presented with fever and a sore throat. Her laryngeal mucosa was erythematous with localized whitish pseudomembranous change supraglottic lesion. The patient was treated with remdesivir, methylprednisolone, and ceftriaxone. Her laryngeal findings normalized on day seven of hospitalization. Although most patients with COVID-19 complain of a sore throat, laryngeal findings are rarely reported. Here, we describe specific laryngeal findings in patients with COVID-19. We also encountered other patients with COVID-19 laryngitis with similar findings. We suspect that airflow-induced viral exhalation by coughing may be the cause of this characteristic finding, in which the lesion does not appear on the glottis but is localized to the supraglottis. These cases with whitish supraglottic changes exhibited improvement in pharyngeal pain with the disappearance of the finding. COVID-19-positive patients with severe pharyngitis require laryngeal fiberoptic examination to assess their infectious status.

(Key words: COVID-19, laryngitis, supraglottis, whitish pseudomembranous change)

## Introduction

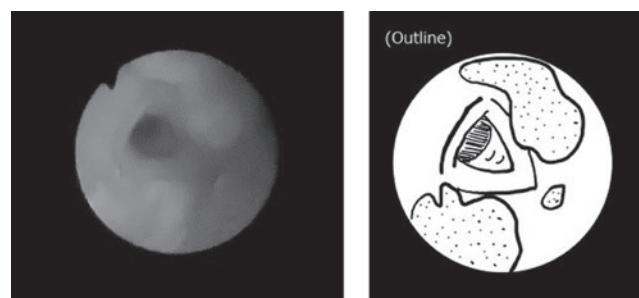
Coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has caused a global pandemic. Numerous case reports have identified sore throat as a major symptom of COVID-19<sup>1), 2)</sup>. However, there have been few photographic reports on laryngeal findings<sup>3), 4), 5)</sup>. This may be because most physicians do not use endoscopes with image storage capacities owing to infection control considerations. Moreover, endoscopic laryngeal observation is a high-risk procedure that can produce aerosols.

In contrast to existing laryngographic reports of epiglottitis with laryngeal edema, we describe a patient who exhibited a localized whitish pseudomembranous change on the supraglottis.

## Case

A 38-year-old woman with COVID-19 presented with a fever and a sore throat. Laryngeal observation was

performed using a portable endoscope (Figure 1). Following COVID-19 infection and exposure control protocols, the photographs were taken using a portable laryngoscope without a camera system, and an iPad, resulting in decreased picture clarity. Her laryngeal mucosa was erythematous with a whitish pseudomembranous change on the supraglottis. No symptoms of acute epiglottitis were



**Figure 1** Reddening of the laryngeal mucosa and a thick white coat over the glottis are observed. The photograph is unclear. Outline is shown on the right.

**Table 1**

case	age	sex	hospitalization	hospital days	white coat on the supraglottis	CRP	WBC	SpO <sub>2</sub> (room air)	treatment
A	38	F	(+)	11	(+)	25.3	9270	97%	Lemdecivir+steroids+antimicrobials
B	26	M	(-)		(-)	4	4330	99%	antipyretic
C	41	F	(+)	10	(-)	3.1	7870	98%	Lemdecivir+steroids+antimicrobials
D	21	M	(+)	7	(+)	0.7	5390	96%	Lemdecivir+steroids+antimicrobials
E	74	M	(-)		(+)	7.2	3720	98%	steroids
F	39	M	(-)		(+)	3.9	10340	97%	steroids
G	45	F	(+)	4	(+)	13.4	7250	96%	steroids
H	28	M	(+)	2	(+)	3.9	7180	97%	steroids

We have experienced eight cases of COVID-19-induced sore throat. Of the eight patients, six (75%) had localized whitish pseudomembranous changes in the supraglottis.

observed. The patient's white blood cell count was 9270/ $\mu$ l (neutrophil 86.3%), but the CRP level was high at 25.3. The findings of laryngitis in this case were different from those of common bacterial or viral laryngitis and more similar to the findings associated with pemphigus. Therefore, we tested for anti-desmoglein 1 and 3 antibodies and all results returned negative. This patient had normal oxygen saturation and respiratory status on physical examination. Thereafter, the patient was admitted to our hospital and was treated with remdesivir, methylprednisolone, and ceftriaxone. Her laryngeal findings normalized on day seven of hospitalization, and pharyngeal pain improved. The patient was discharged on day 11 of hospitalization.

At our hospital, we encountered eight cases of COVID-19-induced sore throat, including this case (Case A) (Table 1). Of the eight patients, six (75%) had a localized whitish pseudomembranous change on the supraglottis but not on the glottis, similar to Case A. No acute epiglottitis was found in any of our cases.

These COVID-19 positive patients, who presented with white pseudomembranous changes, complained of severe sore throat. Although the patients were previously treated with NSAIDs, the severe pain caused poor oral intake and dehydration. Therefore, steroids were required to treat the severe inflammation and ease pain.

## Discussion

Most COVID-19 patients complain of sore throat, cough, and hoarseness. Several cases of epiglottitis have been reported<sup>(3),(4),(5)</sup>. Although some previous reports have described redness and swelling of the laryngeal mucosa to be important findings for COVID-19 laryngitis, the pseudomembranous change in the supraglottis was added as a more specific finding, not previously reported, for laryngitis in this report. We suspect that this characteristic finding may be caused by airflow-induced viral exhalation caused by coughing.

SARS-CoV-2 infection is mediated by angiotensin-converting enzyme 2 (ACE2), which is distributed in the upper respiratory tract, including the pharyngeal mucosa and nasopharynx, and in the lower respiratory tract, including alveolar cells<sup>(6)</sup>. This distribution is reflected in the variety of upper and lower respiratory tract symptoms that are present in patients with COVID-19. Existing reports have shown that the PCR-positivity rate of SARS-CoV-2 is higher in sputum specimens than in nasopharyngeal swab samples<sup>(7)</sup>. Viral load has also been reported to be higher in specimens from the lower respiratory tract than in those from the upper respiratory tract<sup>(8)</sup>. With coughing as a lower respiratory tract symptom, it is likely that particles containing SARS-CoV-2 in the lower respiratory tract are coughed up through the glottis and then adhere to the supraglottis resulting in the whitish pseudomembranous change.

Laryngitis with localized whitish pseudomembranous changes in the supraglottis may be characteristic of COVID-19. It is unclear whether these laryngeal findings reflect the whole course of treatment and observation; however, the whitish pseudomembranous change was related to the sore throat, at least in the case presented. Therefore, the findings may be useful in assessing the status of the COVID-19 infection. In this study, we were unable to obtain clear laryngeal photographs due to infection and exposure control protocols. In the future, we will carry out a more detailed study using a better-quality camera and equipment.

## Declaration of interest

The authors declare that they have no conflict of interest.

## References

- 1) Krajewska J, Krajewski W, Zub K, Zatoński T, et al. COVID-19 in otolaryngologist practice: a review of current knowledge. *KrajewEur Arch Otorhinolaryngol*.

2020 Jul; 277(7): 1885-1897.

- 2) Weng LM, Su X, Wang XQ. Pain Symptoms in Patients with Coronavirus Disease (COVID-19): A Literature Review. *Journal of Pain Research*. 2021; **14**: 147-159.
- 3) Iwamoto S, Sato MP, Hoshi Y, Otsuki N, Doi K. COVID-19 presenting as acute epiglottitis: A case report and literature review. *Auris Nasus Larynx*. 2021 Dec 18: S0385-8146(21)00283-2.
- 4) Emberey J, Velala SS, Marshall B, Hassan A, Meghjee SP, Malik MJ, Hussain M. Acute Epiglottitis Due to COVID-19 Infection. *Eur J Case Rep Intern Med*. 2021 Mar 3; 8(3): 002280.
- 5) Renner A, Lamminmäki S, Ilmarinen T, Khawaja T, Paajanen J. Acute epiglottitis after COVID-19 infection. *Clinical Case Reports*. 2021 Jul; 9(7): e04419.
- 6) Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 2020 Mar; 579(7798): 270-273.
- 7) Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. *JAMA*. 2020 May; 323(18): 1843-1844.
- 8) Yu F, Yan L, Wang N, et al. Quantitative Detection and Viral Load Analysis of SARS-CoV-2 in Infected Patients. *Clinical Infectious Diseases: an Official Publication of the Infectious Diseases Society of America*. 2020 Jul; 71(15): 793-798.

## 声門上に限局する喉頭炎所見を呈したCOVID-19患者

小野 綾乃<sup>1)</sup>, 山内 智彦<sup>2)</sup>, 金澤 丈治<sup>3)</sup>

- 1) 自治医科大学附属病院 耳鼻咽喉科 栃木県下野市薬師寺3311-1
- 2) 新小山市民病院 耳鼻咽喉科 栃木県小山市大字神鳥谷2251-1
- 3) 自治医科大学附属病院 喉頭機能外科 栃木県下野市薬師寺3311-1

### 要 約

これまでに報告されているCOVID-19陽性患者の喉頭写真は少なく、その多くは急性喉頭蓋炎様の所見を呈している。今回我々が経験したCOVID-19陽性症例は、声門上に限局する白苔所見を呈し、喉頭蓋炎は認めなかった。入院の上で抗菌薬、レムデシビル、ステロイド投与による加療を行い所見は改善した。同様の喉頭所見を、咽頭痛を訴えるCOVID-19陽性患者8例のうち6例に認めており、COVID-19喉頭炎に特徴的な所見である可能性を考える。COVID-19は上気道と比較して下気道の検体で陽性率が高い傾向にあり、咳嗽による気流でウイルス粒子を含むエアロゾルが声門上に付着することで、このような喉頭炎所見を呈するのではないかと考察した。

(キーワード: COVID-19, 喉頭炎, 声門上)