Disparate Nasopharyngeal and Tracheal COVID-19 Diagnostic Test Results in a Patient with Total Laryngectomy

Running Title: “COVID-19 Testing with Total Laryngectomy”

Tirth R. Patel, MD¹; Joshua E. Teitcher, CCC-SLP²; Bobby A. Tajudeen, MD¹; Peter C. Revenaugh, MD¹

1. Department of Otolaryngology—Head and Neck Surgery, Rush University Medical Center, Chicago, Illinois
2. Department of Hematology/Oncology, Rush University Medical Center, Chicago, Illinois

Corresponding Author:
Tirth R. Patel, MD
Department of Otolaryngology—Head and Neck Surgery
Rush University Medical Center
1650 West Harrison Street, Suite 550
Chicago, Illinois 60612
Phone: 312-942-6100
Email: Tirth_R_Patel@rush.edu

Keywords: COVID-19, coronavirus, laryngectomy

Sponsor or Funding Source: None

Conflicts of Interest: None

Author Contributions:
T.R.P.: Conception and design; data acquisition; drafting, revision, final approval of article
J.E.T.: Conception and design; data acquisition; drafting, revision, final approval of article
B.A.T.: Conception and design; drafting, revision, final approval of article
P.C.R.: Conception and design; drafting, revision, final approval of article
Introduction

Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2 virus, has been declared a pandemic by the World Health Organization. In the setting of this current pandemic, reliable diagnostic testing for COVID-19 is essential to healthcare institutions worldwide in order to appropriately treat those with the disease and to limit contagion to healthy patients and healthcare providers. Most diagnostic tests identify SARS-CoV-2 genetic material in patient samples of airway secretions. Specimens are most commonly obtained by swabbing the nasopharynx or oropharynx. Patients with a laryngectomy require special consideration for the site of diagnostic testing due to their surgically altered airway anatomy and may require sampling from multiple sites. Here, we report a case of a patient with a total laryngectomy who had a positive COVID-19 diagnostic test result from a nasopharyngeal swab and a negative result from a tracheal swab.

Case Report

This case report was waived from review by the Rush University institutional review board. A 54-year-old female with a history of salvage total laryngectomy 13 years ago for recurrent laryngeal cancer presented to the speech-language pathology clinic for evaluation of dysphagia with solid foods after a recent change in length of her tracheoesophageal prosthesis (TEP) which had been placed previously. Prior to the scheduled appointment, she received point-of-care testing for SARS-CoV-2 according to clinic protocol. The patient did not endorse symptoms of COVID-19 at the time of testing. Two separate specimens were obtained, one from a nasopharyngeal swab and another from a tracheal swab via the tracheostoma. The nasopharyngeal specimen tested positive for SARS-CoV-2 genetic material while the tracheal specimen tested negative. Because of the positive test result, the patient was interviewed and counseled by a provider wearing the appropriate personal protective equipment (PPE) as advised...
by our institution. Manipulation of the TEP and endoscopy were both deferred during the clinic visit due to the risk of aerosolization of infectious secretions. The patient was discharged home and given instructions to continue a diet of soft foods, self-isolate at home, and seek care urgently if experiencing severe symptoms of COVID-19.

Discussion

SARS-CoV-2 is primarily transmitted via inhalation of respiratory droplets containing the virus\textsuperscript{4,5}. Because patients with a total laryngectomy do not generate significant inspiratory airflow through the upper airway, it logically follows that specimens obtained from their nasopharynx are unlikely to contain SARS-CoV-2. The upper airway and the tracheostoma, however, may both be inoculated by contact with a contaminated surface such as one’s hands\textsuperscript{5}. This case supports authors who have recommended diagnostic testing of total laryngectomy patients using specimens from both the upper and lower airway\textsuperscript{3}.

The presence of a TEP is another important consideration in patients with a total laryngectomy. Placement of a TEP necessitates creation of a fistula connecting the trachea and esophagus. Due to this connection, it is plausible that the viral colonization or infection of the pharynx could propagate to the trachea and vice versa. As a result, a patient who only tests positive for COVID-19 in the nasopharynx—such as the patient presented here—may still be at risk for the more severe sequelae of the disease such as acute respiratory distress syndrome (ARDS). Many total laryngectomy patients are also at high risk of severe complications of COVID-19 due to history of smoking and pulmonary co-morbidities.

Patients who only test positive in the upper airway are at risk of transmitting the virus to others in certain circumstances. Esophageal or tracheoesophageal speech has the potential for creating aerosolized droplets containing virions. In a healthcare setting, aerosolizing procedures
of the nasal cavity, pharynx, or esophagus may also pose a risk for providers. Patients who communicate via tracheoesophageal speech require in-person visits for TEP management and failure, even during the current pandemic. Therefore, proper testing of total laryngectomy patients can inform appropriate PPE use for providers. This report highlights the case of a total laryngectomy patient who had a positive COVID-19 test result from a nasopharynx swab and a negative result from a tracheal swab obtained via the tracheostoma. The case supports previous recommendations for multiple-site testing in this patient group. Sampling of both the upper and lower airway should be strongly considered when performing COVID-19 diagnostic testing in patients with a total laryngectomy.
References


This manuscript has been accepted for publication in Otolaryngology-Head and Neck Surgery.

RUSH UNIVERSITY MEDICAL CENTER NON-HUMAN SUBJECT RESEARCH DETERMINATION

Thank you for submitting your 118 form request. This is an acknowledgement that your study does not meet the definition of human subjects research. You will not have to submit an IRB application in the Rush Research Portal.

We’re sorry, but this survey response cannot be modified because someone has locked the response to prevent any changes to it. It can only be unlocked by a survey administrator who has locking/unlocking privileges. If this seems incorrect, please contact your survey administrator for this survey.

1) Send
   - Yes
   - No

| Study Title: Diagnostic Testing for COVID-19 in Patients with Total Laryngectomy |
| Investigator Last Name: Patel |
| Investigator First Name: Tirth |

2) Date Request Received
   - must provide value
   - 05-13-2020

3) Date Reviewed by IRB Administration
   - must provide value
   - 05-14-2020

4) Date Investigator Notified
   - must provide value
   - 05-14-2020

5) Administrator Assigned
   - must provide value
   - Reva Wymbs

6) Notes
   - Based on the information provided, it has been determined that the proposed activity, as described, DOES NOT constitute Research or Human Subjects Research. Therefore, your project has been "Acknowledged" and Submission of an IRB application is not required nor will you have to submit this project within the Rush Research Portal.