

# Early percutaneous dilational tracheostomy in COVID-19 patients: A case report

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## Abstract

The need of intubation and mechanical ventilation is associated with poor prognosis in COVID-19 patients. Herein, we present two cases of patients with COVID-19 where intubation and mechanical ventilation failed, and therefore, percutaneous dilational tracheostomy was performed. The usage of PDT was associated with faster and better recovery in these patients.

## KEYWORDS

COVID-19, intubation, percutaneous dilational, tracheostomy

## 1 | INTRODUCTION

Patients suspected of having coronavirus disease (COVID-19) are differentially diagnosed from other viral diseases such as influenza, and it is necessary to use pharyngeal sampling for qRT-PCR (quantitative real-time polymerase chain reaction) for their differential diagnosis.<sup>1</sup> Manifestations of COVID-19 can range from asymptomatic to very serious illness presented by acute respiratory distress syndrome (ARDS) and death. Suspected cases of COVID-19 are presented with dry cough or chills or sore throat with shortness of breath with or without fever<sup>2,3</sup>. Altered mental state is also reported as an atypical manifestation of COVID-19.<sup>4</sup> Some high-risk individuals include immunocompromised patients, people with underlying diseases such as diabetes, high blood pressure, cardiovascular disease, liver and kidney disease, malignancies, respiratory diseases, and obesity.<sup>5</sup> Acute respiratory syndrome is the main indication of the disease, which

in severe cases includes 20%-41% of hospitalized patients.<sup>6</sup> Hypercoagulability, and pulmonary embolus along with increased D-dimer are associated with worse prognosis of the infection.<sup>7,8</sup>

Patients with COVID-19 presented with acute respiratory failure and severe pulmonary involvement require intubation<sup>9</sup>. Indications for intubation include severe hypoxia ( $\text{PaO}_2 < 40$ ,  $\text{SpO}_2 < 60$ ), severe respiratory distress, moderate-to-severe respiratory acidosis, respiratory rate greater than or equal to 36, and disturbed hemodynamics such as hypotension without response to fluid therapy and associated with bradycardia.<sup>10</sup>

Many patients with acute respiratory failure die despite intubation and ventilation (<sup>11</sup> During the Iran-Iraq War in Iran<sup>12</sup> percutaneous dilational tracheostomy (PDT) was used instead of intubation for a number of patients suffering from acute respiratory syndrome and pulmonary involvement due to chemical bombardment, which turned out to be an appropriate therapeutic response.<sup>13,14</sup> Due to the lack of response

to appropriate treatment in many patients with COVID-19, herein we present the cases of PDT after intubation failure.

Percutaneous dilatational tracheotomy can be used for patients who need intubation due to acute respiratory syndrome and progressive hypoxia. To perform PDT, after performing the necessary specialized consultations in terms of cardiac conditions, by placing the roll under the chest, the neck is placed hyperextension, where half of the trachea is outside the thoracic entrance. The patient is then placed under local anesthesia by injecting lidocaine in the anterior and middle-lower part of the neck. After lubricating tracheostomy tube and the dilator, a small gauge needle is inserted in the trachea between carotid cartilage and sternal notch. A sheath is passed over a guided wire, after which the guided wire is withdrawn. A 1-cm incision is made, where after dilation of the soft tissue, tracheostomy tube is placed. One skin suture is made on each side of the tube to secure it.

## 2 | CASE PRESENTATION

### 2.1 | Patient 1

A 81-year-old patient was referred to our emergency department with respiratory distress and high fever. She was admitted to the hospital and was tested positive for COVID-19 (diagnosed using PCR). The patient had a history of cardiovascular disease, hypertension, and hypothyroidism. Due to the worsening of the patient's respiratory symptoms and decrease in SpO<sub>2</sub>, the patient was intubated and treated. The patient was placed on spontaneous ventilation, but due to worsening of the condition, the patient was again placed on synchronized intermittent mandatory ventilation (SIMV). Finally, after 10 days, the patient underwent an early tracheostomy.

### 2.2 | Patient 2

The patient was a 36-year-old woman who was admitted to the ICU with a diagnosis of COVID-19 presented with acute respiratory syndrome. The patient was intubated and pharmacologically treated. Due to the progression of the disease and lack of improvement, the patient underwent PDT. After 24 hours, the patient's symptoms improved dramatically. Two weeks following the improvement of the symptoms, the patient was released from SIMV and placed on spontaneous breathing. Finally, after using T piece, the patient underwent tracheostomy and was transferred to the corona ward with oxygen mask and PO<sub>2</sub> 96% and was discharged in healthy condition Table 1.

## 3 | DISCUSSION

Of the 48 patients who were admitted to the ICU in one of the specialized hospitals in Tehran (Iran) from the beginning of the outbreak of the new coronavirus, 39 were treated with a definitive diagnosis of COVID-19 aged between 50 and 93 years. Of these, 31 died and eight were transferred to the ward or discharged. Of the eight patients who recovered, four were not intubated, one underwent intubation, and three underwent intubation followed by tracheostomy. All patients who died of COVID-19 in the ICU underwent intubation.

In another subspecialty hospital in Tehran (Iran), 2 months after the outbreak of the disease in Iran, 64 patients had a positive PCR test, of which 10 were in the ward. Among patients in ICU, six were males and four were females. Of these, eight died, four of whom were intubated, and two patients recovered and were discharged. According to these statistics, patients with COVID-19 who undergo

**TABLE 1** Laboratory factors investigated in this study

Laboratory tests	Patient 1				Patient 2				
	Date	13.3.2020	28.3.2020	99/1/17	4.5.2020	3.3.2020	14.3.2020	21.3.2020	7.4.2020
WBC (10 <sup>3</sup> /mm <sup>3</sup> )	5.52	11.97	7.26	4.9	8.8	12	3.1	6	
Hemoglobin (gr/dL)	10.8	8.6	7.6	7.4	10	9.7	9.5	9.2	
Neut %	80.4	83.7	88	87.4	78	75	85	73	
Lymp %	9.6	3.7	3.1	5.4	13	13	11	19	
CRP (NL <6.6)	55.9								
LDH (135-214)	254								
Troponin (NL <0.15)	2.48								
GCS					12				15

Note: Glasgow Coma Scale.

intubation do not have a good prognosis. Other studies have also indicated similar outcomes among these patients. Tracheotomy through PDT is recommended in patients with COVID following 21 days of intubation and/or mechanical ventilation in order to minimize transmission and risk of poor prognosis.<sup>15</sup>

Percutaneous dilatational tracheotomy is recommended instead of intubation for the following reasons:

Due to positive pressure ventilation in pulmonary insufficiency for a long time, ease, and reduced suction time, for patients who need endotracheal intubation or long-term ventilator support.

Early tracheostomy (<10 days) reduces sedation time to tolerate endotracheal intubation.

Reduced respiratory dead space, continued oral feeding, and verbal communication with the patient are provided in the PDT.

Reduction in pulmonary complications in tracheostomy compared with gastric catheter for gavage in intubated patients such as aspiration, pneumonia, and its resulting pleurisy (VAP), and tracheostomy can be performed completely safely outside the operating room.

## 4 | CONCLUSION

Percutaneous dilatational tracheotomy can be safely performed in patients with COVID-19 when indicated. The risk of bleeding and damage to the membranous trachea and open tracheostomy is reported in PDT. There is no specific contraindication for tracheostomy other than hemodynamic disturbances or intolerance to short-term apnea during the procedure. Additionally, conditions such as substernal goiter, severe kyphosis, and anatomical problems or tracheostomy infections should also be considered.

## CONFLICT OF INTEREST

The authors deny any conflict of interest in any terms or by any means during the study.

## AUTHOR CONTRIBUTIONS

Dr SM-R: conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. Dr PS and MHM: designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. Dr GA: coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

## ETHICAL APPROVAL

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the

1964 Helsinki Declaration and its later amendments or comparable ethical standards.

## CONSENT TO PARTICIPATE

From the under 16 years old was given by a parent or legal guardian.

## DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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