

CASE REPORT

Implanting jejunostomy tube as conservative management of tracheoesophageal fistula in a COVID-19 patient

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Abstract

A 44-year-old woman with Behcet's disease experienced a severe COVID-19 infection and developed a tracheoesophageal fistula. Despite the need for surgical treatment, she did not consent. Therefore, the patient underwent supportive treatment with a jejunostomy tube. After four weeks of follow-up, the fistula was repaired spontaneously.

KEYWORDS

COVID-19, jejunostomy tube, tracheoesophageal fistula

1 | INTRODUCTION

The outbreak of COVID-19 disease commenced in Wuhan, China, in December 2019¹ and has continued to this day in different parts of the world. With its various manifestations and effects, it has led to increasing mortality. The respiratory symptoms are the main causes of hospitalization in patients suffering from COVID-19. In case of high intensity of respiratory symptoms, severe drop in oxygen saturation, and failure to respond to treatment, the patients must be transferred to an intensive care unit (ICU) and even undergo endotracheal intubation and mechanical ventilation. Endotracheal intubation is one of the therapeutic measures that, if used for a long time,

may cause complications including nasal injury, sinusitis, tongue damage, dental injury, mucosal rupture, vocal cord immobilization and laryngeal stenosis, as well as tracheomalacia, tracheoinnominate fistula, and tracheoesophageal fistula (TEF).²

Post-intubation TEF is usually caused by posterior tracheal wall ischemia which is usually initiated by the compressive effect of the endotracheal cuff or tracheostomy tube in contact with the nasogastric tube used to feed the patient or aspirate their gastric contents.³ TEF needs about 10 h to damage the epithelial cells of the trachea, destroy the basement membrane, and cause necrosis by the endotracheal tube. In some cases, after about 10 days, the damage leads to complete wall necrosis and perforation.⁴

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This case study presents a patient admitted to the ICU and then intubated due to severe COVID-19 pneumonia. The patient suffered from TEF after being weaned off the mechanical ventilator (MV). Her lesions healed without reconstructive surgery by using supportive care with a jejunostomy tube (J-tube).

2 | CASE PRESENTATION

The patient was a 44-year-old woman who suffered from nausea, vomiting, anorexia, anosmia, and dyspnea. The symptoms had started four days before she presented to the emergency ward with the exacerbation of dyspnea. The patient mentioned a three-year history of Behcet's disease and the use of prednisolone 5 mg/day for its treatment. At the time of hospitalization, the patient had a blood pressure of 120/80 mmHg, sinus tachycardia with a rate of 115 bpm, respiratory rate of 25 per minute, body temperature of 36.8°C, and oxygen saturation of 89%. Computed tomography (CT) showed evidence of severe patchy ground-glass opacities mainly in the peripheral areas, as well as crazy paving in the parenchyma of both lungs in favor of pneumonic changes with atypical infections such as coronavirus (Figure 1).

After nasopharyngeal and oropharyngeal sampling for a polymerase chain reaction (PCR) test, the patient was admitted to the COVID-19 ward. Table 1 shows the patient's initial lab results.

The treatment started with dexamethasone 8 mg daily and remdesivir 200 mg on the first day. Remdesivir was then administered at a 100 mg/day basis for up to five days. Supportive care was also provided. The result of her PCR test was positive on the third day of hospitalization. Since the patient's condition gradually deteriorated and her oxygen saturation decreased to 80%, she was transferred to the ICU. On the fourth day, she experienced lethargy, tachypnea (RR = 42), respiratory distress, and decreased oxygen saturation (to as low as 55%). She was thus maintained at a supine position, sedated, and intubated with a 7.5 mm endotracheal tube. The MV was set at $FI_{O_2} = 100\%$, $TV = 500$, $PEEP = 7$, $PS = 15$ and $F = 16$. An anesthesiology consultant re-evaluated and changed the MV settings to keep the oxygen saturation in the 88%–92% ($FI_{O_2} = 80\%$, $TV = 500$, $PEEP = 5$, $PS = 15$, and $F = 12$). On the sixth day, she suffered from constipation and abdominal distension. Imaging revealed no specific findings suggesting perforation in the abdomen. After prescribing laxatives, she defecated and her condition was relatively improved. Three days later, she experienced an oxygen saturation drop to 70% and the endotracheal tube was replaced as a result of tube obstruction. During this time, the patient's family did not give consent for tracheostomy.

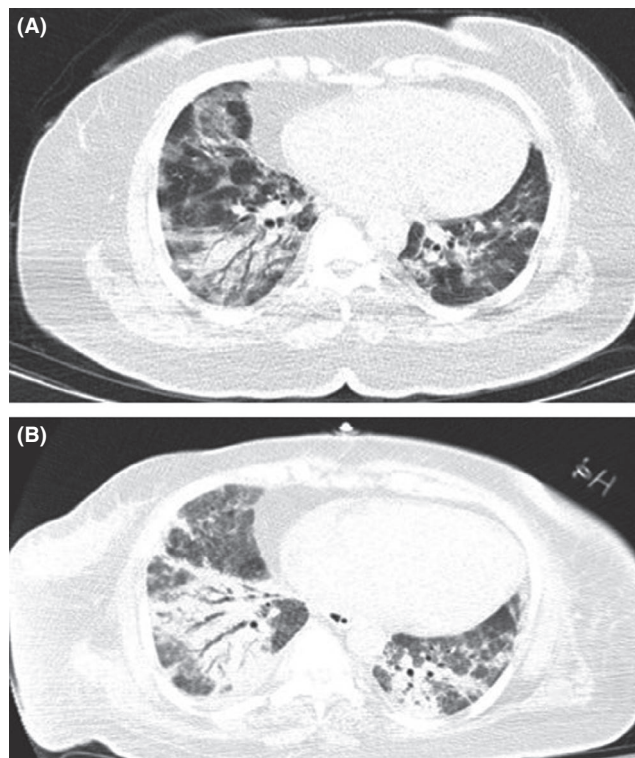


FIGURE 1 Chest imaging of the patient. (A) The initial CT scan of the patient showing patchy ground-glass opacities in favor of COVID-19 infection. (B) GGO region replaced by alveolar consolidation

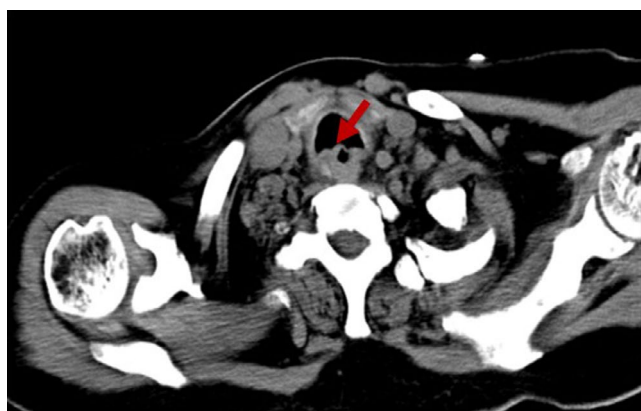
With partial recovery, she was weaned off the MV 30 days after admission. After extubation, she complained of hoarseness and coughing while swallowing fluids (not solid foods). Chest CT scan revealed signs of TEF in the proximal region of the thorax with obliteration of fat plane 30 mm distal to hypopharynx between tracheal and esophagus and indentation in posterior wall of trachea (Figure 2).

These symptoms and CT scan findings indicated the possibility of TEF. To confirm the diagnosis, after ensuring the absence of any history of allergy, she underwent esophagography using omnipaque 240 mg as the contrast medium. The esophagography revealed aspiration of the contrast and the diffusion of edible contrast material into the trachea, right and left bronchi, and lobar branches and thus confirmed the diagnosis of TEF (Figure 3).

With the negative PCR test result in the re-examination, the patient underwent bronchoscopy. The results showed an 8 mm perforation in the trachea 3 cm from the vocal cords on the left side of the posterior membrane with a one-way valve to the trachea. Since she did not provide consent for reconstructive fistula surgery or stent installation and considering the possibility of aspiration pneumonia, the surgery consultant decided to perform a jejunostomy in the operating room. After the surgery, air continuously inflated the

TABLE 1 the patient's initial lab results

Lab results	Result	Unite	Reference value
WBC	3200	cu/mm	4000–10,000
Neutrophil count	2400	cu/mm	1500–8000
Lymphocyte counts	704	cu/mm	1500–4500
Hemoglobin	13.2	g/dl	12–16
Platelet	106,000		150,000–450,000
Urea	31	mg/dl	15–45
Creatinine	0.8	mg/dl	0.5–1.4
Lactate dehydrogenase	967	IU/L	0–500
C-reactive protein	3+		Negative
Ferritin	223	ng/ml	4.6–204
Albumin	2.9	g/dl	3.5–5.5
Aspartate aminotransferase	55	u/L	5–40
Alanine aminotransferase	21	u/L	5–40
Alkaline phosphatase	100	u/L	64–306

**FIGURE 2** Chest CT scan showing the evidence of tracheoesophageal fistula. The red arrow shows the location of TEF, the upper region of thorax with obliteration of fat plane, and indentation in the posterior wall of the trachea

J-tube bag. After two months of admission in the ICU, the patient was discharged in good general condition with an oxygen saturation of 99%. She was recommended not to use oral feeding and to visit her pulmonologist fortnightly. After one month, her condition improved and as her symptoms subsided in the re-examination with esophagography, TEF was spontaneously repaired without surgery. Her J-tube was detached and she started eating without any problem.

3 | DISCUSSION

The use of an MV is one of the valuable interventions in patients with COVID-19 suffering from a failure in the cardiorespiratory system. However, patients need to

be intubated before being connected to the MV. During the intubation process, the endotracheal tube enters the endotracheal canal through the mouth and is fixed by an air cuff. Studies report the incidence of complications following endotracheal intubation between 0.5% and 7%.² One of these complications, which is associated with a lot of mortality and morbidity, is TEF. Therefore, patients who develop TEF should promptly undergo surgery. Conditions that predispose patients to TEF include excessive inflation of the cuff, excessive movement of the tracheostomy tube (if the diameter is less than required), restlessness, malnutrition, hypotension, nasogastric intubation, sepsis, chronic inflammation, steroid therapy, and diabetes.⁵

Clinically, TEF is diagnosed when the food travels through the esophagus into the trachea and the patient develops symptoms such as cough during feeding, shortness of breath, recurrent aspiration pneumonia, or gastric distention.⁶ Radiological methods, such as esophagograms and CT scan, or detection of lesions using bronchoscopy or esophagoscopy are diagnostic procedures used in TEF cases. Surgery is considered as the standard treatment for these patients because due to late diagnosis, TEF is usually too large at the time of diagnosis and spontaneous closure is virtually impossible.⁷

In the case introduced, the patient was under mechanical ventilation for one month and despite the numerous attempts of the medical team, she and her family did not consent for tracheostomy. The patient was diagnosed with TEF after she was weaned off MV. However, she did not consent to reconstructive surgery. In such cases, supportive treatments, which are more common in patients with non-surgical malignancies with TEF, include stent implantation

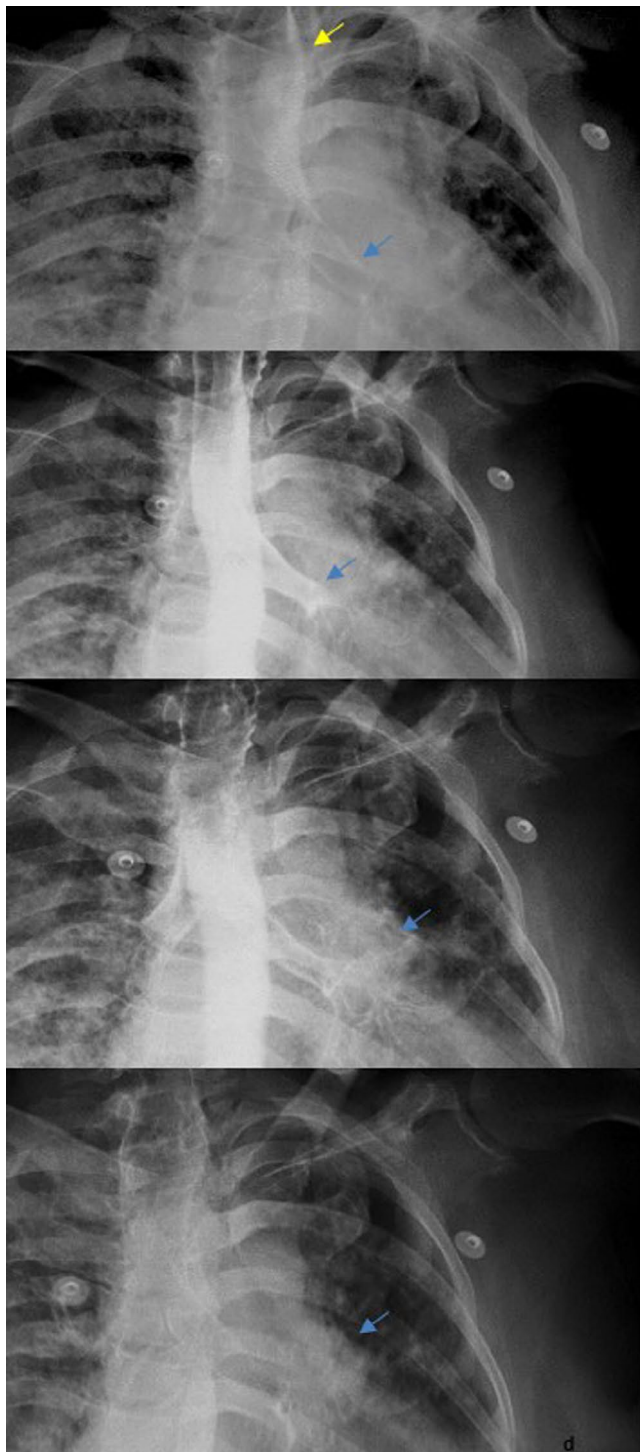


FIGURE 3 Stages of patient esophagography with oral contrast. Opacification of the tracheal wall as well as diffusion of contrast material into the bronchial ducts due to the presence of a tracheoesophageal fistula. The yellow arrow indicates opacification of the tracheal wall and the blue arrow indicates the diffusion of contrast material into the bronchial tree and lung parenchyma

or gastrostomy/jejunostomy.⁸ Since our patient did not consent to stent implantation, jejunostomy was performed.

Regarding the cause of TEF in this patient, it appears that the patient's previous use of steroids along with

prolonged mechanical ventilation predisposed her to TEF. In addition, it is suggested that involvement of the pharyngeal region in patients with COVID-19 predisposes them to complications.⁹ The absence of tracheostomy and prolonged use of the endotracheal tube for ventilation can be other causes for TEF development.

Although corticosteroids increase the risk of epithelial cell atrophy and impaired mucosal lesion healing, their use has been shown effective in the treatment of patients with COVID-19 and a reduction in attributed mortality.¹⁰ The patient's previous use of corticosteroids and the need to prescribe a stress dose due to respiratory failure could have worsened the complications of corticosteroid use in our case.

4 | CONCLUSION

In cases of COVID-19 with respiratory failure, a history of corticosteroid use, and prolonged endotracheal intubation, the possibility of TEF should be considered. In such cases of TEF, jejunostomy can be recommended as an alternative to surgery.

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Not applicable.

CONFLICT OF INTEREST

The authors declare that they have no competing interest to disclose.

AUTHOR CONTRIBUTIONS

MN visited the patient at night shifts and drafted the manuscript. SH visited the patient in the COVID-19 ward of the hospital on a daily basis, checked and revised the manuscript. AHST visited the patient in the COVID-19 ward of the hospital on a daily basis, checked and revised the manuscript. IFK performed the surgery, implanted jejunostomy tube, and visited the patient on a daily basis after the surgery, checked and revised the manuscript. BMG interpreted the radiologic findings, checked and revised the manuscript. HG visited the patient in the COVID-19 ward of the hospital on a daily basis, checked and revised the manuscript.

ETHICAL APPROVAL

Not applicable.

CONSENT

Written informed consent was obtained from the patient's legal guardians for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

DATA AVAILABILITY STATEMENT

The datasets generated and/or analyzed during the current study are not publicly available due to the restrictions imposed by the Ethics Committee of Ardabil University of Medical Sciences. However, they are available from the corresponding author on reasonable request.

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