Case Report
DOI: 10.5455/amaj.2019.01.002

Tracheal stenosis after tracheotomy requiring two plastic surgeries

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Background: Tracheal stenosis is rarely encountered by otolaryngologists and its treatment is difficult.

Material & methods: This study was conducted in accordance with the Declaration of Helsinki. We experienced a case of tracheal stenosis after a tracheostomy in a 74-year-old male patient. First, tracheostomy was performed under the constricted part. The procedure was observed from above using a laryngoscope, and a narrowed part was caught by forceps. After half a year, stenosis reappeared, and another tracheoplasty was performed in August 2016. In the second surgery, we made a local skin flap, and formed the trachea wall. In the two years that have passed since the last surgery, restenosis has not appeared and the patient follows a good course.

Results: We successfully treated a patient with tracheal stenosis using two types of tracheoplasty, and the postoperative course was satisfactory.

Conclusion: Tracheal stenosis suspected when respiratory distress occurs following tracheotomy. It is necessary to select the procedure based on the shape of the stenosis.

Keywords: tracheal stenosis, surgery, tracheotomy, skin flap, restenosis

Introduction

Tracheal stenosis is rare, but it can be fatal. In recent years, the use of tracheostomy has increased due to the advancement in medical care, the use of tracheostomy has increased for treatment of tracheal injuries caused due to long-term ventilator use. Here, we report the case of a patient who required resection of tracheal stenosis and trachea formation using a local flap 10 years after undergoing a tracheotomy.

Case Presentation

A 74-year-old male presented to our department complaining nighttime respiratory distress and cough. He had undergone a right lung upper lobectomy due to lung cancer at 60 years old. When he was 62 years old, he underwent tracheostomy due to pneumonia. 10 years after tracheotomy, he complained of respiratory distress. He was referred to our department in July 2015. Laryngeal fiber examination and CT revealed tracheal stenosis due to scar tissue on the mouth side about 87.5 mm from the tracheal branch. (fig. 1a, b)

The first surgery was performed on August 24, 2015. Ventilation was possible by oral intubation. Skin incision was placed just above the previous tracheostomy. The anterior tracheal wall covered with scar tissue was identified. The trachea was fenestrated right under the stenotic area and ventilation from tracheostomy was switched. The stenotic area was visible above the fenestration. To confirm the stenosis from the mouth side, a direct laryngoscope for laryngo-microsurgery was inserted. Scar tissue in the stricture was excised with a stanze while confirming the stenosis from the fenestration and mouth sides. (fig. 1c, d)

Figure 1. a. The narrowed portion in the slit state is located 87.54 mm from the mouth side of the tracheal branch; b. An image of the reconstructed 3DCT when the narrowed portion is viewed from the mouth side; c. Ventilation was possible by oral intubation. A skin incision was placed in the longitudinal direction and the trachea was fenestrated on the caudal side of the last tracheostomy; d: The intubation tube was replaced with a tracheostoma and a laryngoscope was inserted for observation. Thereafter, the mucosa of the stenosis was excised using a forceps.

After that treatment, he was followed-up on an outpatient basis. There was a relapse of respiratory distress, and fibroscopic examination confirmed stenosis again 7 months after the surgery (fig. 2a, b). We scheduled a second surgery, aiming to open the right side of the stenosed portion. If the effect was insufficient, we planned to adopt the same procedure on the left side. Specifically, we designed the local flap as shown in fig. 2c, d, e cutting off the right side of the restenosis area together with the cricoid cartilage, sewing the skin on the collarbone into the prepared space, and finally inserting the cuffed cannula. Endotracheal closure was performed 2 weeks later.

The postoperative course was satisfactory without the reappearance of respiratory distress 3 years after the second operation.

Discussion

Tracheal stenosis can be caused due to congenital, inflammatory, neoplastic, and traumatic causes. The case reported in the present study is classified as traumatic based on the incision of the duct. In cases where there is no emergency tracheotomy or otolaryngological intervention, as in the present case, caution must be exercised in cases where neck extension is challenging. Stenosis after tracheotomy was observed in 27 patients (25.7%) of the 105 patients with tracheal stenosis. [1]

Maeda et al. classified tracheal stenosis after tracheotomy as 1) cricoid stenosis, 2) infracricoid stenosis, 3) stomal stenosis, 4) cuff stenosis, or 5) tube tip stenosis. In our case, classified as cricoid stenosis, the history of upper lung lobectomy may also have influenced the damage of the cricoid cartilage. Laryngeal fiber examination and CT were useful for diagnosis. In high stenosis cases, surgical treatment should be performed. Especially, the partial stenosis cases, it is required that the narrowed part should be resected and sutured directly. On the other hand, some kinds of artificial tracheas have been applied for reconstruction of the trachea. [2,3] Regarding end-to-end anastomosis after tracheal tubular resection, end-to-end anastomosis is reportedly possible even if the trachea is resected tubularly up to 6.4 cm.2 Tracheal tubular resection and end-to-end anastomosis of about 7.5–9 cm was considered to be possible by passive movement of the cervical and thoracic trachea. Although trachea can be reportedly safely constructed up to 8 cartilage rings, Suzuki et al, reported the resection and reconstruction of 12 trabeculae. [3]

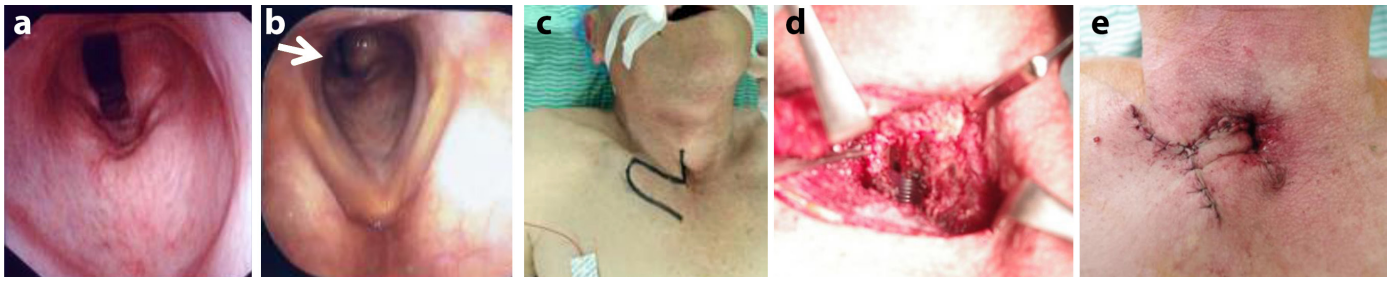

Figure 2. a. The condition of the trachea one month after surgery. The narrowed part is sufficiently expanded; b. The state 7 months after the surgery. The arrow portion is re-stenosed; c. The design of the local flap made on the collarbone; d. A state in which the right annular cartilage has been cut off; e. The state where the local flap is sewn to the trachea wall and to close the wound.

Conclusion

We present the case of a patient with a tracheal stenosis 10 years after tracheotomy. The findings of this case suggest that tracheal stenosis should always be considered respiratory distress emerges following tracheotomy. In addition, the results emphasize that it is necessary to select the procedure based on the shape of the stenosis. However, to verify these findings, studies involving larger sample sizes should be conducted in the future.

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