# Grade IV subglottic stenosis after percutaneous tracheotomy

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## Abstract

**Objectives:** Percutaneous tracheotomy is a common alternative to open surgical tracheostomy. We report two cases of grade IV subglottic stenosis after percutaneous tracheotomy that required tracheal resection. **Study design:** Retrospective case series. **Methods:** Review of two adult cases at a tertiary medical center during 2015. **Results:** One patient was unable to tolerate a speaking valve after percutaneous tracheotomy at another institution for management of a gunshot wound to her thorax. Tracheoscopy identified firm stenosis of the proximal trachea that was 1cm long and just above the stoma on imaging. She underwent tracheal resection with decannulation and two subsequent endoscopic debridements of granulation at the anastomosis. She achieved an adequate voice and ability to perform all activities of daily living. The second patient had quadriplegia after a gunshot wound to his cervical spine. He underwent percutaneous tracheostomy and was not able to tolerate a speaking valve. Tracheoscopy identified firm stenosis from the first tracheal ring to just above the stoma. Since his quadriplegia prevented using his hands for communication, he elected for tracheal resection for phonation, although he required continued tracheostomy for ventilator support. He had two debridements of anastomosis granulation postoperatively and now uses a speaking valve. **Conclusion:** Complete subglottic stenosis can occur after percutaneous tracheotomy even in the absence of a prolonged intubation. Those who care for patients who have undergone percutaneous tracheotomy must remain aware of this potential complication. Tracheal resection can be effective for phonation and decannulation. Close monitoring postoperatively with debridement of granulation is important to prevent restenosis.

## Introduction

- Percutaneous tracheotomy is considered a safe and cost-effective alternative to open surgical tracheostomy in certain patients
- Percutaneous tracheotomy may have fewer immediate complications[1-3]
- Tracheal/subglottic stenosis occurs more frequently as a late complication after percutaneous tracheotomy, in up to 50%[4-6]
- Most studies evaluating incidence of stenosis only include those who were successfully decannulated, so true is incidence unknown
- Stenosis may develop from prolonged intubation prior to tracheotomy, high cuff pressures, tracheal back-wall injury or anterior cartilage fracture at the time of the procedure (Figure 1)

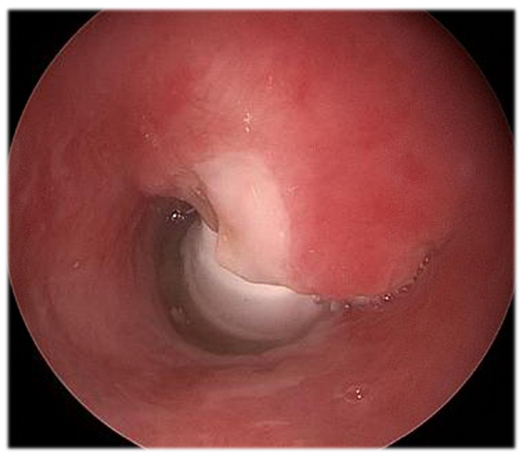

**Figure 1**. Tracheoscopy with obstruction from anterior tracheal wall shortly after percutaneous tracheotomy

## Case #1

- 47yo smoker with a gunshot wound to her thorax.
- Percutaneous tracheotomy performed at another institution after 3 weeks of intubation
- She never tolerated a speaking valve
- Tracheoscopy and CT (Figure 2) identified 1cm segment of complete, firm stenosis just above the stoma
- Underwent tracheal resection of the segment with decannulation
- Required 2 subsequent endoscopic debridements of partially obstructive granulation at the anastomosis
- Achieved an adequate voice and ability to perform all ADLs

## Case #2

- 28 yo with quadriplegia after a gunshot wound to cervical spine
- Percutaneous tracheotomy with #8 shiley after 4 days of intubation
- He never tolerated a speaking valve
- Tracheoscopy identified stenosis from 1st tracheal ring down to the stoma
- CT (Figure 3 green arrow) identified cartilage component of stenosis, indicating displaced tracheal cartilage similar to Figure 1
- He required continued tracheotomy for night-time vent support
- But since the quadriplegia prevented use of his hands for alternative communication, he elected for tracheal resection for phonation
- Required 2 subsequent endoscopic debridements of partially obstructive granulation at the anastomosis
- Now uses a speaking valve effectively

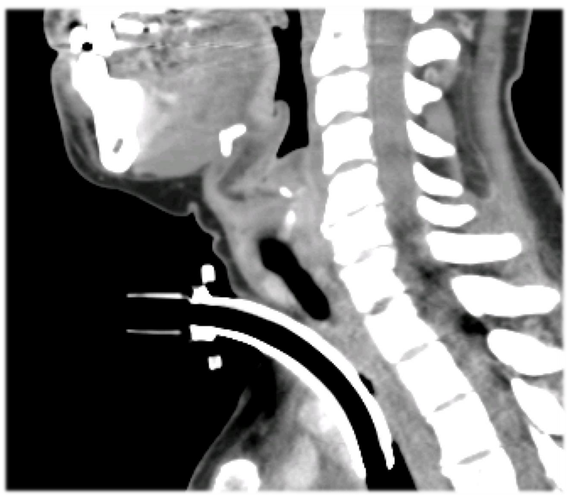

**Figure 2**. Sagittal CT with 1cm of soft tissue stenosis above the stoma

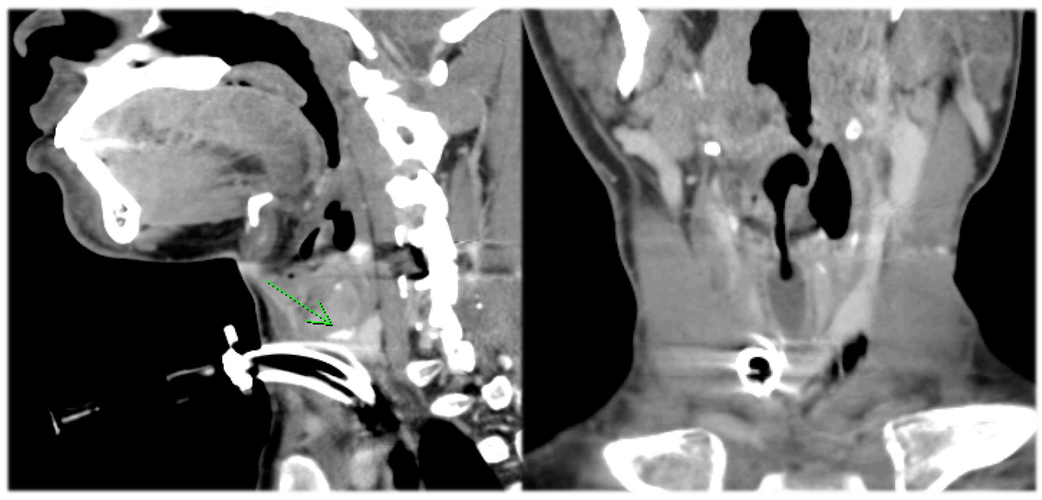

**Figure 3**. Sagittal and coronal CT with cartilaginous stenosis superior to the stoma

## Conclusions

- We must remain aware of the risk of subglottic/tracheal stenosis after percutaneous tracheotomy, even in the absence of a prolonged intubation
- Long-term as well as short-term risks should be considered when comparing surgical vs. percutaneous tracheotomy
- Reduced ability to communicate without phonation (hand impairment, vision impairment, illiteracy) should be considered when weighing the risk of potential stenosis after tracheotomy
- Tracheal resection of tracheotomy related stenosis can be effective for phonation and decannulation
- Close monitoring and debridement post-resection are important to prevent restenosis

## Contact

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