

Case Report

Unusual Case of a Patient with Tracheal Stenosis

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Abstract:

We report a case of tracheal stenosis that required the creation of a uniquely adapted permanent tracheostomy. The patient's case was especially challenging because she had multiple disabilities causing limited movement in her upper extremities that prevented her from active involvement in self-care activities. Co-ordinated efforts by an interdisciplinary team in a Czech health care environment helped the patient to gain as much independence as possible despite her multiple disabilities.

Key Words: Tracheal Stenosis, Nursing Care, Tracheostomy, Disabled Patient, Quality of Life

Introduction:

Permanent placement of a tracheostomy tube following total laryngectomy affects the patient in multiple and profound ways.(1,2) Many other patients with constant and surgically incurable laryngeal or tracheal stenosis require a tracheostomy tube for the rest of their lives. These patients usually master

basic tracheostomy care after having an opportunity to practice changing the tracheostomy tube and to adjust to their new situation emotionally and psychologically. Some cases, however, can be unique and challenging.

Case Report:

We report the case of a 64-year-old female patient living in the Czech Republic. Since her youth, she has had progressive polyarthritis (Figure 1), allowing her to walk only on crutches. Despite this, she lived a life that was as close to normal as possible until November 14, 1998 when she fell and sustained a basal skull fracture with a loss of consciousness. She was admitted to the intensive care unit of a regional hospital and was intubated and artificially ventilated. After six days, a tracheostomy was performed to allow continued ventilation. Three weeks later, her condition was stabilized, and she was decannulated and several days later, she was discharged home.



Figure 1. Upper limbs (deformed by progressive polyarthritis) in maximum flexion of the hands. An intubation cannula without a plug is shown (standard position). The unplugged cannula enables free breathing but no phonation. Patient holds the pointed plastic plug, which is attached to a string for easier manipulation.

Over the next two months, she developed worsening breathlessness, interfering with her activities of daily life. She was readmitted to the hospital and a new tracheotomy was performed. However, subsequent decannulation attempts failed, mainly due to the presence of a stenosis in the middle part of her trachea. Tracheal stenosis has always presented a serious problem to health care professionals, especially in cases of tracheal narrowing that occurs in the middle part or above the carina.(2,3) The location of the stenosis corresponded to the point where the end of an initially plastic and later a metallic cannula had been located during her first admission in the fall of 1998. At that time, the cannulae irritated the deformed tracheal wall (the deformation was the result of a serious kyphoscoliosis) during coughing. In fact, a metallic cannula had induced cough, pain, and an increased production of sputum, often containing blood.

After a consultation with a surgeon, it was concluded that a resection of the trachea (with a subsequent end-to-end anastomosis or with another modification) or stent placement (3) were not appropriate methods to resolve her problem. Instead, the following treatments were attempted: a) dilatation of the tracheostomy, b) placing squares of gauze under the tracheal cannula, and finally, c) repeated tracheoscopy and tracheal dilatations. However, even these strategies did not produce the desired outcomes.

Because even after a long-term placement of an adapted endotracheal tube, the collapsed tracheal

wall was not strengthened, the authors attempted to use a method that would enable the patient to breathe by supporting the collapsed trachea and at the same time, allow her to phonate. Such methods have been described in the literature, with the best known one being the creation of a silicone T-tube, described by Montgomery in 1974.(4) Moreover, Huang has recently reported on his experience with providing treatment to 11 patients using the above method.(3) However, changing the T-tube may be difficult, especially in long-term T-tube carriers, which is a disadvantage of this method.

As it was planned to create a permanent tracheostomy in our patient, the above method was modified by simply creating an opening in a shortened endotracheal tube and by smoothing out the edges of the opening (Figure 2). The opening was created in a place that corresponded to the subglottic space to ensure air passage to the larynx. Phonation, which is very important for these patients from a psychological point of view,(3) was then enabled on the same principle as the mentioned Montgomery's method whereby a plug was used to occlude the outer opening of the endotracheal tube. The adapted cannula then enabled our patient to breathe and phonate when the cannula was plugged. Patients with a tracheostomy, who have their larynx preserved, are able to communicate by occluding the cannula with a finger; however, they have to remove the finger for each inspiration. Instead, specialized cannulae with a speaking valve are a more sophisticated phonation method.(5)

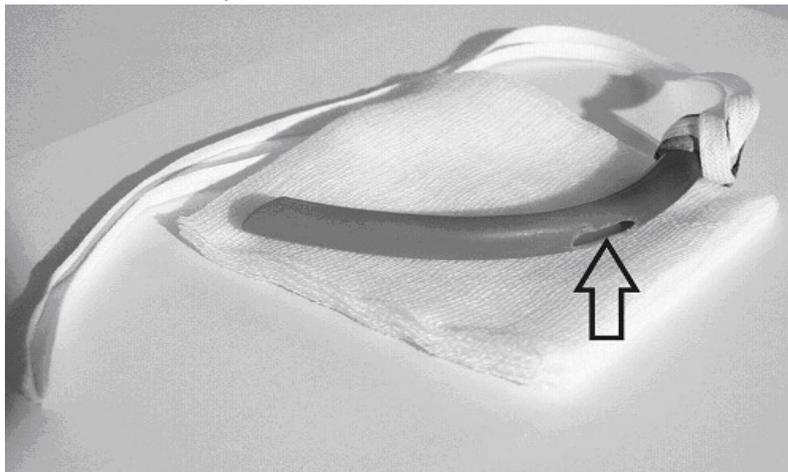


Figure 2. An adapted intubation cannula with an opening (marked by an arrow), which enables air movement from the larynx upwards and phonation if the upper end of the cannula is plugged.

The adapted cannula was changed regularly at an interval of several months each time. Despite this, the lumen of her trachea did not keep sufficient width and her general health status and the local anatomical situation precluded the possibility of performing surgery to remove the tracheotomy.

Her adaptation was made difficult by the other disabilities that she had. The limited movement of her hands and fingers made it difficult for her to take care of the tracheostomy independently. Furthermore, she needed to get used to the idea of living at a permanent risk of possible suffocation due to any loosening of the inserted intubation cannula. Regular follow-up appointments with the healthcare team after her discharge from the hospital were important to ensure that her physical, psychological, and emotional condition remained stable. Nurses caring for her were aware of all the actual and potential nursing diagnoses that included self-care deficit, impaired self-sufficiency, disturbed body image, and fear of the future.(6) Gradually, she was assisted to acquire more self-care skills. At present, she cleans and disinfects the cannula herself (by boiling) and is able to suction lung secretions by trained movement.

Discussion:

Our patient's journey to adaptation to a life with a permanent tracheostomy was unique for several reasons. She had a stenosis in the middle part of the trachea that could not be removed by techniques such as surgical intervention or an introduction of a stent or by any other technique and such situations require that the airways are permanently opened using a special tracheal cannula or an adapted tracheostomy cannula. Severe anomalies of the thoracic cage and the thoracic spine, combined with a pathological course of the trachea and the presence of nanism contributed to the formation of tracheal stenosis. She also experienced a severe form of progressive polyarthritis that significantly limited her mobility of the upper limbs, and, to a lesser extent, of her lower limbs. This unique combination of disabilities and complications required a highly individualized team approach and the use of creative solutions to her care, such as the use of a tracheostomy plug with a string. The plug equipped with a string helped her to overcome the challenge of limited mobility in her upper extremities (which made it difficult for her to manipulate her cannula and the plug). In the event

of shortness of breath, the string would enable her to remove the plug by a single move of the arm (Figure 1).

The health care team must have creative solutions at hand in both the acute and the chronic phase of the patient's illness and needs to realize that acquiring a 'new' disability—in addition to having 'old' disabilities—may lead to a variety of challenges. The 'new' disability may be a major blow to the patient's well-being and self-esteem.(7) Meaningful life and a feeling of success are possible despite multiple or severe disabilities.(8,9)

To conclude, while the entire health care team and the patient are involved in choosing and implementing the best treatment method (for example, a permanent tracheostomy) for complicated conditions accompanied by multiple permanent disabilities, nurses and other health care workers need to know about the implications of such conditions for the patient's future life. Only then are they able to assist the patient to adapt to the new situation as best as possible.

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