

## A Permanent Tube-Free Tracheostomy in a Morbidly Obese Patient with Severe Obstructive Sleep Apnea Syndrome

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Permanent tube-free tracheostomy is a surgical technique to create a skin-lined, non-collapsing, non-stenosing and self-sustaining stoma that does not require a cannula to maintain the tract open. A morbidly obese man who suffered from a very severe obstructive sleep apnea syndrome benefited greatly from the creation of a PTFT. The surgical technique is briefly described and its potential advantages are discussed.

### Patient Description

A 52 year old morbidly obese man suffered from a very severe obstructive sleep apnea syndrome. After an unsuccessful attempt with nasal continuous positive airway pressure due to low compliance, followed by the patient's refusal to undergo geni-hyoid advancement and uvulopalatopharyngoplasty, a temporary tracheotomy for relieving upper airway obstruction was performed in another hospital. A long custom-made tracheotomy tube was inserted in order to keep the tracheo-cutaneous tract from collapsing. However, although different kinds of tracheotomy tubes were used, the patient suffered continuously from infections, granulation tissue formation, obstruction, and dislodgment of the cannula. On three occasions he was rushed to the emergency room to relieve an airway obstruction that was causing severe respiratory distress. Eventually, he was referred to our hospital for further evaluation and treatment.

After endoscopy confirmed that the rest of the airway was normal, a permanent tube-free tracheostomy was performed by means of a surgical technique described extensively by Eliachar [1]. Briefly, this

procedure is performed under general anesthesia. The patient is placed in a supine position, the shoulders are elevated, and the neck is moderately extended. A horizontal, omega-shaped skin incision is made at approximately 1 cm above the clavicles. Flaps are created in the sub-platysmal plane, the isthmus of the thyroid gland is divided or excised, and the strap muscles along with the thyroid lobes are laterally mobilized and sutured to the ipsilateral sternocleidomastoid muscle tendons. Adipose tissue in the suprasternal space is removed. A superiorly based flap is then created at the anterior tracheal wall, elevating the medial third of rings number 2 and 3. The skin flaps are trimmed of excess adipose tissue, advanced, and using vertical mattress sutures are meticulously adapted to the margins of the tracheal fenestration and the flap. A continuous, circumferential mucocutaneous junction is thus created. A cuffed tracheotomy tube is placed through the stoma for 12 hours until the patient is fully awake and stable. From then on the stoma remains tube-free.



The permanent, tube-free, self-sustaining tracheostomy 18 months after surgery. Note the mucocutaneous junction (arrow) that prevents infection and formation of granulation tissue.

Indeed, immediately after the operation, the patient stopped using a cannula altogether. Today, 18 months after the surgery, he maintains a skin-lined, non-collapsing, non-stenosing and self-sustaining stoma [Figure]. In the absence of an irritating foreign body (i.e., a cannula), the stoma remains comfortable and easy to handle. The patients' quality of life has improved considerably, and he is able to maintain an almost normal way of living. He uses his finger or a special stomal stent to occlude the stoma when speaking and is able to appear in front of an audience and even give a lecture when required.

### Comment

A temporary tracheotomy is recommended whenever short-term support of the airway is needed, such as in the management of patients on prolonged ventilatory support or in patients undergoing major head and neck surgeries. When maintained for prolonged periods (beyond a few days or weeks), TT can sometimes cause serious complications such as recurrent infections,

granulation tissue formation, obstruction, and tracheal stenosis [1,2]. Jackson [3] was the first to draw a distinction between "tracheotomy" (referred to here as TT), which is intended to provide temporary access to the trachea, and "tracheostomy" (referred to here as PTFT), which is designed to constitute a permanent opening into the airway. Today, it is well established in the otolaryngologic literature that PTFT is recommended whenever pro-

PTFT = permanent tube-free tracheostomy

TT = temporary tracheotomy

longed needs for a stoma are anticipated, such as in the management of chronic or progressive diseases [1]. The stoma in PTFT is skin-lined, non-collapsing, non-stenosing and self-sustaining. It does not require a cannula to maintain the tract open. In the absence of a foreign body to irritate it, the stoma promptly heals and is well tolerated by the patient. Stomal care and management are effortless. Thus, it may be said that PTFT resembles a "third nostril" [4]. Surgical closure of the stoma may be considered once the underlying disease is resolved.

PTFT provides physicians with a new

treatment option for patients who require a long-term bypass of the larynx. The significant improvement in the quality of life for these patients, which is achieved by PTFT, justifies consideration of this possibility.

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*Travel is the most private of pleasures. There is no greater bore than the travel bore. We do not in the least want to hear what he has seen in Hong Kong*

*Vita Sackville-West, 20th century British writer*

## Capsule

### Neural expression

For normal organ and tissue development and function, certain genes must be expressed at the appropriate place and time. For example, neural genes must be expressed in neural tissue but shut down in non-neural tissues. Lunyak et al. examined mechanisms by which neuron-specific gene expression can be restricted from non-neural tissues. The zinc-finger transcription factor REST/NRSF can mediate extraneural restriction through two different mechanisms. One uses active repression via a

histone deacetylation complex, and the other involves gene silencing via DNA methylation and the recruitment of the co-repressor CoREST and silencing machinery. The latter mechanism can mediate gene silencing of specific chromosomal regions, including gene clusters encompassing neuron-specific genes, some of which do not themselves contain REST/NRSF response elements.

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## Capsule

### Dengue vaccines

Every year, several hundred thousand cases of dengue hemorrhagic fever/dengue shock syndrome (OH F/DSS) result in thousands of deaths. The only method currently available to prevent dengue infections is the control of *Aedes aegypti*, the mosquito vector. Monath and colleagues (*Lancet* 2002;360:1243) developed a live attenuated chimeric vaccine against Japanese encephalitis virus by replacing the premembrane (prM) and envelope (E) genes of the yellow fever 170 vaccine with the corresponding genes from SA 14-14-2, an attenuated Japanese encephalitis virus strain, to produce a YFJE chimera. (*Vaccine* 2002;20:100). No unusual side effects were seen in the phase I

study, and high titers of neutralizing antibodies to Japanese encephalitis virus were found 3-4 weeks after inoculation of doses of 10,000 and 100,000 plaque-forming units. A similar methodology has been used to make chimera vaccines with yellow fever virus for all four dengue viruses. To ensure the introduction of safe and effective dengue vaccines for the world's children, ways must be found to accelerate phase 3 trials of tetravalent dengue vaccines in suitable individuals. Only testing in humans can answer questions of safety and efficacy. A parallel effort is needed to understand protective mechanisms in dengue infections, especially those mediated by antibodies.