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Short Communication

Front-loading of Groningen voice prosthesis in alaryngeal patients requiring prosthetic replacement

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Abstract

The Groningen voice prosthesis can be successfully replaced using the back-loading system. We have attempted to minimize patient stress by developing a front-loading system that does not require insertion of the introducer via the tracheo-oesophageal shunt to the oral cavity or the mesopharyngeal anaesthetization regularly used with the back-loading system. Using our front-loading system, the existing prosthesis is removed, then the posterior portion of the replacement Groningen prosthesis is grasped by a pair of nasal forceps with a small jaw to make an acute angle and inserted into the oesophageal cavity through the shunt at a stroke. All 20 patients who underwent forward-loading replacement of a Groningen (n = 17) or Blom-Singer (n = 3) valve with a Groningen valve tolerated the procedure well and experienced no complications except, in some cases, for minor bleeding just after insertion of the prosthesis. The procedure was completed within 30 seconds.

Key words: Voice; Prostheses and Implants; Tracheoesophageal Fistula; Surgical Procedures, Operative

Introduction

Prosthetic voice rehabilitation after total laryngectomy is considered the most successful form of voice restoration currently available.[1–6] Daily maintenance of indwelling prostheses such as the Groningen and Provox 2 voice prosthesis requires less manual dexterity and is less time-consuming than non-indwelling prostheses,[1,7–9] but the indwelling prostheses must be routinely replaced. Although the Provox 2 can be easily replaced using the front-loading introduction (anterograde) system,[1] a similar system has not yet been devised for the Groningen prosthesis, which is instead replaced using the back-loading (retrograde) system.[7,10] Our recent research efforts have focused on improving insertion methods of voice prostheses to the tracheo-oesophageal shunt, and we have developed a novel secondary shunt procedure for the Groningen valve that can be performed on an out-patient basis.[11] The standard back-loading technique for replacing the Groningen voice prosthesis involves insertion of the introducer through the old prosthesis fixed at the tracheo-oesophageal shunt after local anaesthetization of the mesopharynx, which reduces the patient's reflexes and discomfort. The active end of the guide wire is passed into the pharynx and pulled out through the mouth. The string of the prosthesis is then fixed to the active end of the guide wire and pulled down through the shunt after the old prosthesis is removed with a pair of forceps. The front portion of the prosthesis is then manipulated out through the shunt using forceps while the posterior portion is retained in the oesophagus. In an attempt to overcome the inconvenience, and reduce patient stress associated with local anaesthetization of the mesopharynx and insertion of the introducer via the shunt, we developed a novel front-loading procedure for the Groningen voice prosthesis.

Patients and methods

Patients

Between January 1998 and January 2002, a total of 20 consecutive patients underwent our novel front-loading replacement procedure using the Groningen voice prosthesis in the out-patient clinic. Of these 20 patients, three had been fitted with a Blom-Singer voice prosthesis, and replacement was required because of leakage, granulation of the tracheo-oesophageal shunts, and/or the emotional difficulties the patients faced in self-management of the Blom-Singer prosthesis. The 20 patients comprised 16 with laryngeal cancer, three with hypopharyngeal cancer, and one with double cancers of the larynx and oesophagus. Of those patients with laryngeal cancer, two had undergone pre-operative radiation therapy and the primary shunt procedure during laryngectomy, but the shunts had widened due to post-operative wound infection around the stoma, necessitating surgical closure with a deltopectoral flap. The remaining patients with hypopharyngeal or double cancers had undergone laryngopharyngectomy or laryngopharyngoesophagectomy and reconstruction with a free jejunal flap.

Front-loading replacement procedure for the Groningen voice prosthesis

Our replacement procedure is a simple out-patient procedure that can be performed without anaesthetization of the mesopharynx. With the patient seated, the existing

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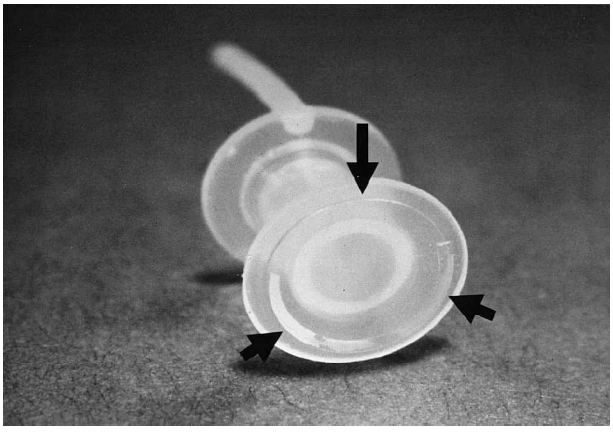


FIG. 1

The Groningen voice prosthesis. The posterior portion includes the valve (short arrows) and its joint (long arrow).

Groningen or Blom-Singer prosthesis is removed by forceps. The posterior portion of the suitably-sized replacement Groningen valve is grasped by a pair of nasal forceps with a small jaw to make an acute angle (Figure 1, 2), where the joint of the valve is set at the head of the Groningen prosthesis. Lidocaine gel is applied to the posterior portion before the Groningen prosthesis is pushed into the tracheo-oesophageal shunt, and immediately inserted into the oesophageal space in a posterior upward direction at a stroke (Figure 3(a),(b),(c)). Either the front portion or the string of the Groningen prosthesis is held by another pair of nasal forceps to prevent the Groningen prosthesis from falling into the trachea. When all but the front portion of the prosthesis has been inserted, the first pair of forceps is pulled out while the second pair grasps and keeps the Groningen prosthesis in place at the shunt (Figure 3(d)). The string is cut (Figure 3(e)) and the procedure is completed once phonation and no leakage of water during swallowing are confirmed.

This procedure was performed more than three months after primary or secondary tracheo-oesophageal shunt (including tracheo-neoesophageal shunt reconstructed with flap) surgery when the shunt tract was established and mature.

Results

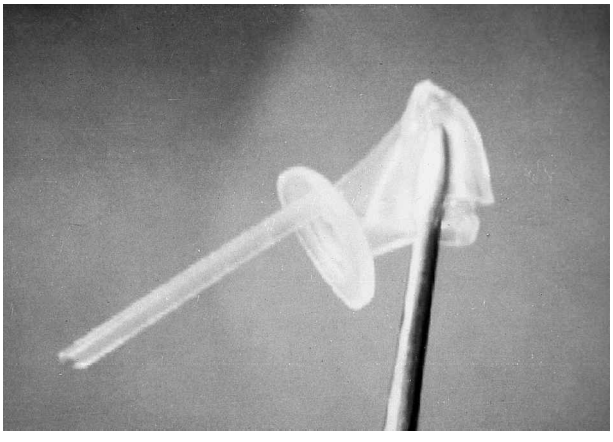
All 20 patients who underwent prosthesis replacement by front-loading of the Groningen prosthesis tolerated it well and experienced no complications, such as damage to the Groningen prosthesis, shunt leakage, inflammation around the stoma, oesophageal stenosis or phonation disturbance. Only slight bleeding was evident immediately after insertion of the prosthesis in some cases. The procedure was completed within 30 seconds. Neither the technique nor time taken to complete the procedure differed between a tracheo-oesophageal shunt and a tracheo-neoesophageal (reconstructed with deltopectoral or jejunal flap) shunt. There were no cases of the posterior portion of the Groningen prosthesis becoming stuck in the tracheo-oesophageal shunt or of the entire device entering the oesophageal cavity in this procedure.

Discussion

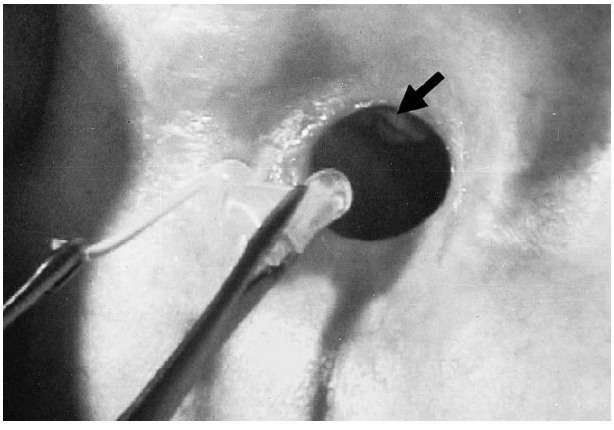
To the best of our knowledge, this is the first report to describe front-loading replacement of a voice prosthesis with a Groningen in an out-patient clinic. The procedure minimized patient stress, did not require local anaesthesia to the mesopharynx or insertion of the introducer through the shunt and up into the oral cavity, and was not associated with complications such as damage to the prosthesis, shunt, trachea, or oesophagus. Although slight bleeding was sometimes observed just after insertion of the Groningen valve, such bleeding also occurs when the Groningen valve is replaced using the back-loading procedure and when the Provox 2 is replaced using the front-loading procedure.[12]

Our novel technique has advantages in that it minimizes patient stress and results in fewer complications. It should also prove suitable for patients who do not wish to have repeated local anaesthesia. Furthermore, unlike replacement with a Groningen using the back-loading system, our procedure allows repeated insertion and extraction of the Groningen prosthesis after the string has been severed.

Devices for use in a Groningen front-loading system, similar to those used in the Provox 2 system,[1] may be designed in the near future. However, our quick and safe procedure benefits both patients and surgeons by reducing



(a)



(b)

FIG. 2

Preparing to insert the Groningen voice prosthesis. (a) The posterior portion of the suitably sized Groningen is grasped by a pair of nasal forceps with a small jaw to make an acute angle. The joint of the valve of the posterior portion is set at the head of the Groningen. (b) With the patient seated, the posterior portion of the Groningen, which is coated with lidocaine gel, is held toward the shunt (arrow). During insertion, either the front portion or the string of the Groningen is held by another pair of nasal forceps to prevent the prosthesis from falling into the trachea.

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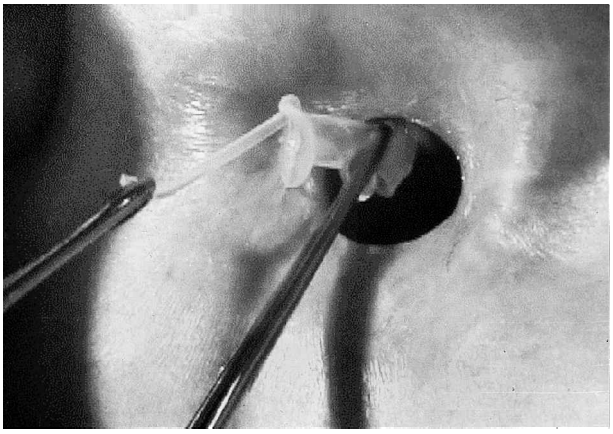

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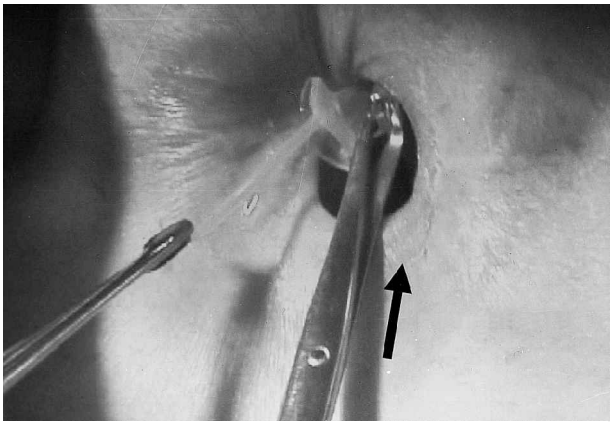
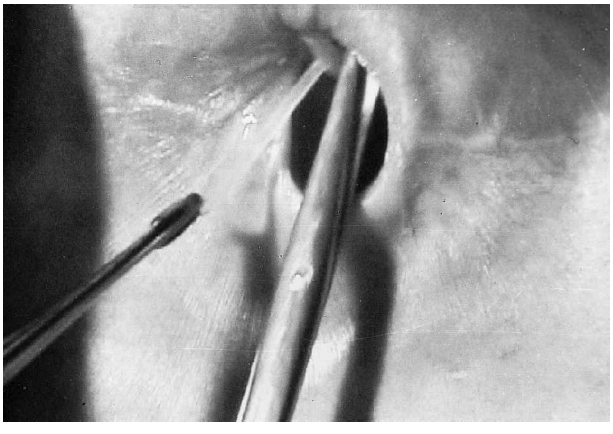
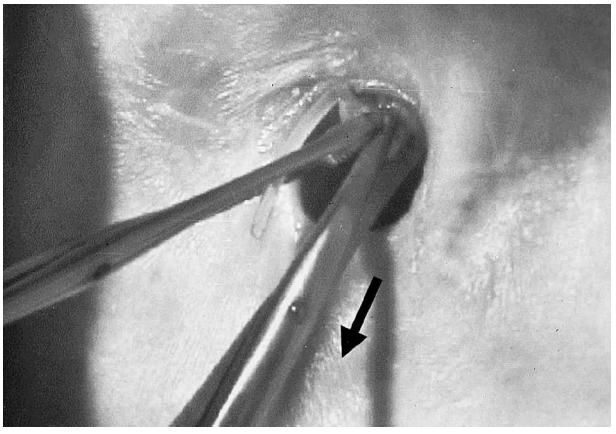


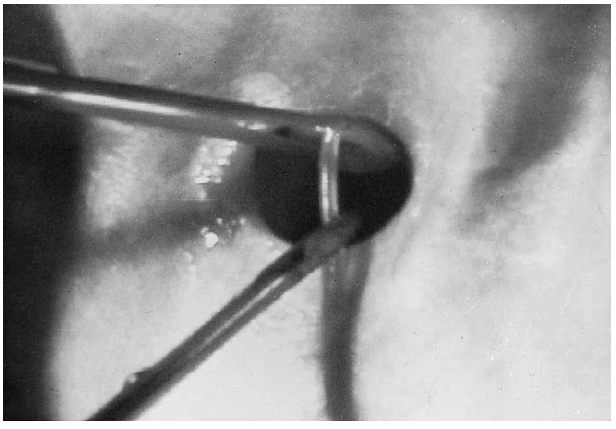
(b)



(c)



(d)



(e)

FIG. 3

Inserting the Groningen. (a) The posterior portion of the Groningen is pushed into the tracheo-esophageal shunt, and (b) is immediately inserted into the oesophageal space in a posterior upward direction (arrowed) at a stroke. (c) When all but the front portion of the Groningen has been inserted, (d) the first pair of forceps (right) is pulled out in the direction of the arrow, while the second pair of forceps (left) grasps and keeps the Groningen in place at the shunt. (e) The string is cut and the procedure is completed once phonation and no leakage of water during swallowing are confirmed.

patient stress and by improving time- and cost-effectiveness of treatment, taking only 30 seconds to complete and just two pairs of nasal forceps.

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