The Journal of Laryngology & Otology
August 2005, Vol. **119,** pp. 629–630

Groningen valve change in difficult cases

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Abstract
A difficult Groningen valve change is one of the problems frequently encountered in the post-laryngectomy patient. A safe and simple technique for this procedure is described.

Key words: Laryngectomy; Surgical Valves; Speech Rehabilitation

Introduction

The use of various voice prostheses for speech rehabilitation is well established in post-laryngectomy patients. They have the advantage of producing good voice in most cases. Various voice prostheses are in use, namely, the Blom–Singer, Provox and Groningen valves. These are indwelling speaking valves which prevent aspiration of food and at the same time allow free passage of air from the trachea to the upper oesophagus, thereby causing the pharyngo-oesophageal segment to vibrate and allowing the production of voice (analogous to the vocal folds). In most cases, with training and therapy, most patients produce good voice and require minimum maintenance.

However, the potential complications of these valves include leakage either through or around the valve, blockage of the valve and infestation by fungus.[1] 'Front-loading' valves such as the Provox or Blom–Singer can be difficult to insert in some patients as front-loading is not always possible due to anatomical factors. Difficult and potentially uncomfortable insertion also means that general anaesthesia may be required in such cases, as opposed to the local anaesthesia required in most other cases.

In our experience, the Groningen device is used as an initial valve in most of our post-laryngectomized patients for speech rehabilitation, with good result.[2] Here, we describe a novel and simple method of Groningen valve insertion.

Literature review

The history of post-laryngectomy speech rehabilitation dates back to 1980, when Singer and Blom[3] described an endoscopic technique for restoration of voice after laryngectomy under general anaesthesia. Over a period of years, new speaking valves developed and the techniques to insert them evolved. Three voice prostheses were developed in Netherlands, namely, the Groningen (1981), Nijdam (1990) and Provox (1990) voice prostheses. In a massive series of 845 patients done at the University of Nijmegen, Netherlands, it was concluded that all these speaking valves were fairly similar and could be easily inserted under local anaesthesia as an out-patient procedure. General anaesthesia was required only in 3 per cent of the 845 patients studied.[1] In 1993, Parker and Clegg devised a slight modification of the original Groningen valve insertion technique, which made it easier and less uncomfortable for the patient.[2] In 1997, Hilgers *et al.*,[4] at the Antony Van Leeuwenhoek Hospital in Amsterdam, described a technique of anterograde insertion of speaking valves, in addition to the retrograde technique already in use. For this, they developed an adapted, second-generation Provox voice prosthesis and new replacement equipment.[4] Anterograde insertion of the prosthesis was safer, simpler, less uncomfortable for the patient and no longer hampered by stenosis of the pharyngo-oesophageal segment.

Much has been published about voice prostheses and their introduction techniques. In our head and neck centre at Sheffield, where the Groningen valve primary insertion technique is used in the vast majority of our patients, we use a novel, simple and safe method of changing Groningen valves in difficult cases, described below.

Method

In our centre, the insertion of a Groningen valve for speech rehabilitation in post-laryngectomy cases is standard practice, being done as a primary procedure at the time of operation. Most Groningen valves are changed as an out-patient procedure by a retrograde insertion technique.[5]

In difficult cases, however, the retrograde insertion of the valve is usually problematic as the introducer and the guide wire encounter resistance to insertion. As a result, the procedure becomes too uncomfortable for the patient and must be performed under general anaesthesia.

However, in such cases, the following simple steps can facilitate insertion of the Groningen valve.

(1) The anaesthetized patient is put in the proper position for upper oesophagoscopy (i.e. neck flexed with extension of the atlanto-occipital joint).
(2) The Groningen valve is removed by holding it with two artery forceps (Figure 1).

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Accepted for publication: 15 February 2005.

https://doi.org/10.1258/0022215054516151 Published online by Cambridge University Press

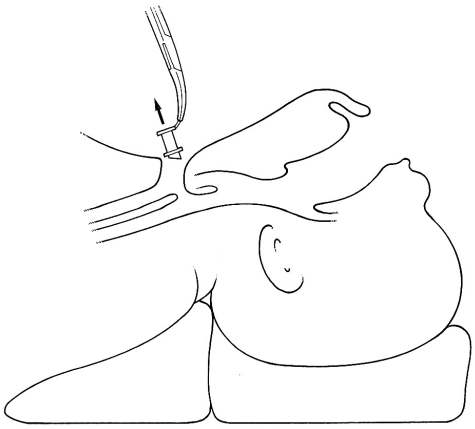


FIG. 1

The Groningen valve is removed by holding it with two artery forceps.

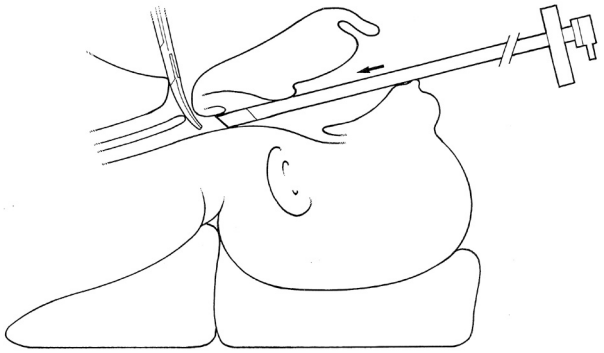


FIG. 2

An oesophagoscope is introduced into the upper oesophagus until the open jaws of the artery forceps are visualized.

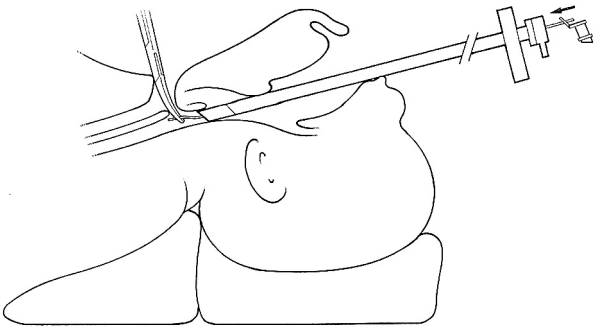


FIG. 3

The guide wire is removed from its outer introducer and its end is introduced through the oesophagoscope and between the jaws of the forceps.

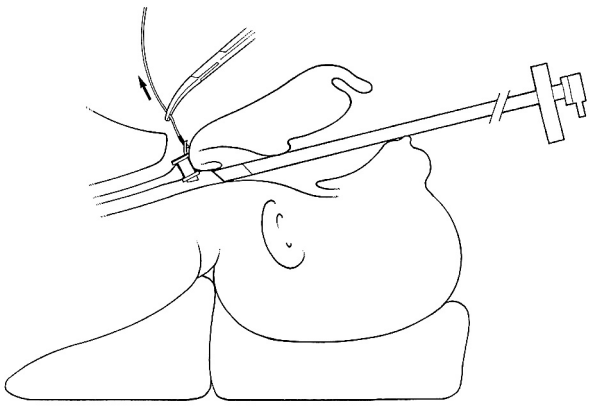


FIG. 4

The guide wire is pulled until the string comes out of the fistula, the valve is pulled into place and the string is cut.

(3) The assistant introduces an artery forceps with its jaws opened into the tracheoesophageal fistula.
(4) An oesophagoscope is introduced into the upper oesophagus until the open jaws of the artery forceps are visualized (Figure 2).
(5) The guide wire is removed from its outer introducer and its end (other than the bulbous tip for holding the string of the Groningen valve) is introduced through the oesophagoscope and between the jaws of the forceps (Figure 3).
(6) The end of the guide wire is held by the forceps and is pulled through the tracheoesophageal fistula, after making sure that the string of the Groningen valve is securely held by the bulbous tip of the guide wire coming out of the mouth of the patient.
(7) The guide wire is then pulled until the string comes out of the fistula, the valve is pulled into place (until both the flanges 'click in') and the string is cut (Figure 4).

This technique is simple, safe and quick. The use of the oesophagoscope ensures that the stenosed pharyngo-oesophageal segment is negotiated safely. However, in cases of severe stenosis, dilatation of the stenosis may be required prior to valve insertion. This procedure necessitates general anaesthesia. It is immensely important to document the operation notes very clearly, as the same procedure will be required for future valve change.

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Mr A J Parker takes responsibility for the integrity of the content of the paper.
Competing interests: None declared

https://doi.org/10.1258/0022215054516151 Published online by Cambridge University Press