

## OUR EXPERIENCE RELATED TO BLOM-SINGER VOICE PROSTHESIS\*

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### ABSTRACT

**Objective:** To investigate the results of primary and secondary voice restoration in patients who have undergone total laryngectomy (TL).

**Methods:** Seventy patients who had undergone total laryngectomy in our department between December 1992 and April 1997 were reviewed for the results of voice restoration. Results were assessed in 54 patients according to patients' satisfaction and compliance, maximum phonatory time, prosthesis life and intelligibility of speech.

**Results:** Primary or secondary voice restoration with Blom-Singer voice prosthesis had an overall success rate of 85%. The most frequently seen problem was prosthesis loss and subsequent shunt closure.

**Conclusion:** Primary voice restoration (PVR) for patients requiring total laryngectomy is a highly recommended procedure. It is a safe technique, has a high rate of success, allows a faster result and reduces the number of hospitalizations and procedures. PVR does not have a high rate of major complications, and the minor complications are often easily resolved. In cases of failure due to prosthesis loss and shunt closure, the procedure can be repeated without a significant morbidity/mortality to the patient.

**Key Words :** Total laryngectomy, voice restoration, complications

### INTRODUCTION

Total laryngectomy (TL) is a major treatment approach for advanced cases of laryngeal cancer, in which partial laryngectomy techniques cannot be applied. Considering larynx cancer, survival is notably long,

and most of the patients who cannot develop esophageal speech are lacking basic human communication. There are many approaches to overcome this problem, and their mutual point is to divert the air from the lung to the esophagus (1-5). Former methods of voice restoration (VR) have some disadvantages like aspiration and shunt closure (1,6,7). In order to prevent these complications, prostheses with check-valves have been developed. The most frequently used types of these prostheses are Blom-Singer, Provox and Groningen (4,6,7). In this study we are evaluating our experience with Blom-Singer voice prosthesis on 70 patients.

### MATERIAL AND METHODS

Fifty eight primary and 21 secondary voice restoration procedures were applied to 70 total laryngectomy patients between December 1992 and April 1997. Their age rate was between 38-80, with an average of 56,8 years. 65 out of these 70 patients (93%) were male, only 7% were female.

Thirteen secondary voice restoration (SVR) operations were performed on 12 patients after TL, and 6 patients needed SVR after unsuccessful PVR, two of them were operated twice (i.e. 8 operations). In 10 out of 18 patients who underwent SVR, cricopharyngeal myotomy (CPM) had to be done because of cricopharyngeal spasm assessed by insufflation test. The remaining 8 patients needed no CPM. Procedures related to voice restoration were 3 bronchoscopies, 4 stomal reconstructions, 3 fistula reconstructions and 1 fistula repair.

The patients were followed-up between 2-50 months (average 30,4 mo). During this follow-up, patients' overall ability to communicate and compliance was evaluated. In 33 patients, maximum phonation time

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and intelligibility were included in the evaluation. Besides, complications and prosthesis longevity were noted. Our results were classified as success and failure.

## RESULTS

Fifty-four out of 70 patients (77%) were followed-up either in the clinic or by telephone calls, 2 of them were followed-up only for a while, for they did not attend their last appointment after lung metastasis was observed in their last control. Sixteen out of 70 patients (23%) did not return for follow-up after their discharge. Among the patients that were followed-up, 9 out of 54 (17%) died. The causes of death in these patients were traffic accident in 1 patient, cardiac arrest in 1 patient, local recurrence in 2 patients and unknown in the remaining 5 patients.

In 33 patients maximum phonation time was measured as 8-40 seconds, with an average of 18,4 seconds, and prosthesis life was between 1-12 months, with an average of 4 months. Thirty out of 41 patients (73%) with successful voice restoration carried out prosthesis maintenance and/or replacement by themselves and/or their family members. The rest came to our clinic or went to the nearest ENT-specialist for this purpose.

In three patients who preferred esophageal speech, although PVR was successful, VR was ended upon their will. In 2 patients the shunts closed itself and in one patient puncture repair was necessary. Out of 62 patients to whom TL was performed in our clinic (58 TL+PVR and 4 TL+SVR), 7 patients (7/62 = 11%) developed esophagocutaneous fistulas, conservative therapy was sufficient in 6 of them, only in 1 patient surgical repair of the fistula was necessary (1/62 = 1,6%).

In 8 out of 54 patients 14% VR has failed because of patient incomppliance or shunt closure after prosthesis loss. One patient had presbycusis, presbyopia and tremor, and two patients had no motivation for VR. In

five patients the shunt was closed after prosthesis loss, three of them did not come back to our clinic for follow-up, one patient is having radiotherapy for the time being and the last one is not willing to undergo a new operation.

In 6 PVR patients and in 3 SVR patients VR had to be repeated because of shunt closure after prosthesis loss, the other PVR patient had undergone repeat VR because his shunt was too high.

Two patients during maintenance and one during a strong cough have aspirated their prosthesis. Bronchoscopy was applied to these three patients (two under general and one under local anesthesia). For one of them SVR was also necessary since the shunt was closed by the time he arrived at our clinic.

Four patients (8%) needed stomal reconstruction, among which three had narrow stomas, and the fourth one had a too large stoma which could not be sealed by his thumb. The reconstruction was carried out during SVR in three patients and after PVR in one patient.

Overall 37 PVR (84%) and 9 SVR (90%) patients have successful voice restoration, whereas in 7 PVR (16%) and 1 SVR patients voice restoration has failed. Table I shows the solutions we suggest for problems and complications.

## DISCUSSION

Verbal communication is an essential characteristic of human being and its loss is often as unimaginable as loss of life itself. Nowhere in the treatment of head and neck cancer is consideration for quality of life more dominant than in the management of laryngeal cancer. It is this critical human need that drives the research and development of treatment methods (8).

In our study we preferred to use Blom-Singer voice prosthesis for voice restoration after TL, because it is relative, easily provided, measured and maintained.

**Table I.** Solutions for problems and complications

Problems and complications	no (%)	Solutions
Prosthesis aspiration	3 (6%)	Bronchoscopy
Aspiration pneumonia	1 (2%)	Medical therapy
Prosthesis loss	10 (18%)	Replacement if arrived early SVR if shunt closed
Narrow stoma	8 (15%)	Silicone tube or reconstruction
Large stoma	2 (4%)	1 got smaller with time Reconstruction in 1 case
Hypotonicity	1 (2%)	External bandage pressure
Malplacement of the shunt	1 (2%)	Left to be closed, later SVR

Blom-Singer prostheses have different sizes and are front-loading and suitable for patients' own use (9).

Great numbers of laryngectomies developed acceptable verbal communication through esophageal speech, which was the dominant rehabilitation in the past years. Success rates between 30-85% have been reported (8,10,11). Many other laryngectomized individuals use mechanical assist devices and are able to communicate in their social life (8). These noninvasive methods are preferred by some patients, but the promise of more natural speech makes the risk of an operative procedure acceptable (8). Since the introduction of tracheo-esophageal puncture (TEP) by Singer and Blom in 1980 (12), postlaryngectomy voice rehabilitation with prostheses has gained increasing popularity over the methods such as esophageal speech and electrolarynx (13). The advantages of TEP over esophageal speech include simple training, longer phonatory time, greater volume and better intelligibility (11,14). TEP also offers greater tonal variation than electrolarynx (13). A great advantage of PVR during TL is that the majority of patients are speaking clearly by the third postoperative week (15). PVR does not prohibit patients from learning esophageal speech (15). Three patients in our study learned esophageal speech spontaneously and their puncture was closed at their request. TEP voice restoration is considered successful if the patient is able to generate, for an adequate duration and has fluent voicing that can produce intelligible and socially acceptable speech (16).

According to this criteria, about 85% of patients who underwent PVR or SVR in our clinic and had Blom-Singer voice prosthesis were considered successfully rehabilitated. Table I summarizes problems and complications encountered in our patient population. Prosthetic extrusion and loss (18%) was one of the most important problems. Extrusion was usually caused by excessive coughing, spontaneous dislodgement or dislodgement during cleaning also occurred. Most of the patients were unable to reinsert the prosthesis, and repuncturing was necessary in 5 patients since they arrived later than 36-48 hours after extrusion. Dislodgement leading to tracheal aspiration occurred in 3% of the patients. This fact may be a reason for choosing indwelling prostheses since the patients do not need to change these prostheses themselves.

Prosthesis longevity was 4 months in average and colonization of the prosthesis by organisms such as *Candida albicans* played the most important role in determining prosthesis lifetime. Prosthesis longevity can be prolonged by giving antifungal therapy and by proper cleaning (16).

In our patient population, no major complications except one aspiration pneumonia, which was

adequately medically treated, have occurred. Our observations confirm the work of others that TEP is an effective and safe technique (5).

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