PROVOX VOICE PROSTHESIS – THE INDIAN EXPERIENCE

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ABSTRACT : *Following Total Laryngectomy, Tracheo-oesophageal speech prosthesis offers the most reliable form of voice rehabilitation. Of the various prostheses currently available, the Provox voice prosthesis developed by the Netherlands Cancer Institute has been the most popular due to its superior design and in-dwelling nature.*

At the Apollo Cancer Hospital, Hyderabad, 17 patients underwent speech rehabilitation with the Provox voice prosthesis between February 1999 and July 2000. Speech rehabilitation was successful in all patients with the majority (82%) developing Good – Excellent speech. Two patients required replacement and one patient discontinued use of the prosthesis. There were no complications in any of the other patients.

Key words : Provox voice prosthesis, speech rehabilitation, tracheo-oesophageal prosthesis.

INTRODUCTION

The Provox voice prosthesis developed at the Netherlands Cancer Institute has currently replaced most other tracheo-oesophageal voice prosthesis in speech rehabilitation after Total Laryngectomy. The in-dwelling nature of the prosthesis, which avoids the need for periodic removal of the prosthesis for cleaning, and the wider diameter of the lumen resulting in lowered resistance to speech, has

resulted in a greater acceptability by the patients. In the last 1½ years, we have been using the Provox prosthesis for most of our post laryngectomy cases with excellent results.

MATERIALS & METHODS

Seventeen patients underwent insertion of the Provox voice prosthesis (Provox ^{TM}, Provox 2) after Total laryngectomy

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Table - I
Quality of speech of patients with the Provox voice prosthesis

Surgical Procedure undergone	No. of patients (N = 17)	Quality of speech
Laryngectomy	11	Good-Excellent
Laryngectomy + partial Pharyngectomy	3	Good
Laryngopharyngectomy + Jejunal free flap	3	Poor-Moderate

between February 1999 and July 2000 at the Apollo Cancer Hospital, Hyderabad. Eleven patients had primary insertion at the time of laryngectomy and the remaining 6 patients had secondary insertion at varying intervals of time after their laryngectomy. A cricopharyngeal myotomy was standardly performed in all patients undergoing laryngectomy. The technique of both primary and secondary insertion of the prosthesis is well described by the original authors (Hilgers 1995). The various types of surgical resection performed in these patients is shown in Table I. Speech practice was started following removal of the Ryle's tube and commencement of oral diet in the primary cases and the very next day after insertion in the secondary cases. Most patients were able to develop satisfactory speech within 2-3 days of speech practice. Both Provox™ and Provox 2 prosthesis were used depending on availability. A 6 mm prosthesis was used in a majority of patients.

RESULTS

Table-I shows the quality of speech in different categories of patients. All patients who had laryngectomy only or laryngectomy with partial pharyngectomy had uniformly good quality of speech. The quality of speech was superior in patients who had primary insertion, probably due to the performance of a cricopharyngeal myotomy at the time of the laryngectomy (Singer & Blom 1981). Even in secondary insertion, it was found that patients who had a myotomy at the time of the laryngectomy (i.e., our own patients) had a better quality of speech compared with the patients who did not have a myotomy (i.e., patients referred to us for speech prosthesis after laryngectomy elsewhere).

The quality of speech in patients who had free

(microvascular) Jejunal transposition was in general, poor. This is due to the absence of a vibrating TE segment in the Jejunum. In addition, presence of peristaltic movements and excessive mucus production makes the speech unsteady and 'wet', an experience described by the original authors as well (Algaba 1996). Two patients required replacement of the prosthesis at intervals of 6 and 8 months after insertion. One of these patients had leakage through the prosthesis indicating incompetence of the valve and the other patient had formation of excessive granulations around the fistula causing blockage of the prosthesis. The prosthesis was removed in this patient, the fistula allowed to close and a fresh puncture made at a different site and a new prosthesis introduced. One patient who did not come for follow-up for a long time had his prosthesis removed as it was found partly extruded from the fistula. This patient did not want re-insertion of the prosthesis. No problems or complaints were seen in the remaining of the 14 patients. None of the 17 patients have developed disease recurrence at the time of writing this article at follow up periods ranging from 2 months to 18 months.

DISCUSSION

In advanced laryngeal and hypopharyngeal cancer, total laryngectomy often offers the best chance of a cure. However, the resultant loss of speech deters many patients from accepting this option and trying other treatment modalities (Radiation with/without chemotherapy) with a compromise in their cure rates. Hence, it has been the endeavour of many laryngologists to develop a reliable and consistent method of assuring the post laryngectomy patient of speech development. Of these methods, the tracheo-oesophageal prosthesis speech has been shown to offer the best results in terms of quality of speech and reliability (Singer and Blom 1980). However, the various prosthesis available earlier (Blom-Singer, 1980, Panje 1981) left a lot to be desired in terms of patient acceptability (Andrews et al 1987). These prostheses were non indwelling (Singer & Blom 1980) (i.e., they had to be regularly removed for cleaning and maintenance purposes) and patients had to be themselves trained for this and for its re-insertion. Many patients found this cumbersome and discontinued the use of the prosthesis (Hilgers et al 1993). In addition, there was a risk of aspiration of the prosthesis during re-insertion by untrained persons and during violent coughing, which did happen in 2 of our patients, requiring emergency bronchoscopy for its retrieval.

The development of the Provox voice prosthesis in 1990 at the Netherlands Cancer Institute and its further modifications in design, Provox 2 (Hilgers et al 1997), has solved many of the drawbacks of the earlier prostheses. The prosthesis is in-dwelling (i.e., once inserted stays inside and need not be removed for any maintenance purposes). It also has a much wider lumen, thus requiring less effort by the patient for speech production.

Of the 17 patients in the series, only 1 patient discontinued the use of the prosthesis and returned for its removal. There was no case of accidental dislodgement and in general patients were quite satisfied with the quality of speech and the prosthesis was not a hindrance to their activities.

The quality of speech (Table-I) was uniformly good in all patients who underwent laryngectomy alone or with partial pharyngectomy. In patients with Jejunal transposition after Total laryngopharyngectomy (3 patients), the quality of speech was not fully satisfactory, due to the inherent properties of the Jejunal flap (as discussed earlier). The prosthesis can also be safely inserted in patients who have more extensive resection of the pharynx with flap reconstruction and after pharyngolaryngoesophagectomy with Gastric pull up, although, so far, we have not had an opportunity to do so. In case of Gastric pull up, obviously the prosthesis can only be inserted as a secondary procedure to allow the trachea and stomach to adhere to each other (Medina et al 1987; Maniglia et al 1989).

The quality of speech was found to be somewhat better in patients with primary insertions than in secondary insertion for reasons already discussed. In general, patients are encouraged to have primary insertions at the time of laryngectomy itself. Only in cases where patients have received radical dose of radiation in the recent past (within 6 months) is secondary insertion advised, due to the risk of post operative fistula and tracheostomal problems. The average life span of the prosthesis as per the original authors is 235 days (Hilgers et al 1993). In the West, **where the** prosthesis is much cheaper and most of the patients are covered by insurance, replacement of the prosthesis is done at the slightest indication.

The same is not possible here in view of the high cost (Rs. 12,000/- per prosthesis). Most of our patients have managed to retain their prosthesis longer than 8-10 months and only 2 have so far undergone replacement of the

prosthesis. With the development of the Provox 2 prosthesis, the replacement procedure also has been much simplified and can now be done in the clinic itself by the antegrade method (Hilgers et al 1997). Hopefully, we may soon have a further modification, which may allow us to keep the same prosthesis for a much longer period if not permanently. This would go a long way in our efforts to further improve the quality of life of the Laryngectomee.

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