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The use of the KTP laser in the management of hypertrophic tracheal mucosa and granulation tissue around Provox® valve protheses

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Abstract

The development of hypertrophic mucosa and granulation tissue around a tracheo-oesophageal fistula voice prosthesis is a commonly encountered problem occurring in 15–20 per cent of patients. Upsizing of the voice prosthesis as well as cautery (silver nitrate and electocautery) are used to counteract this problem to a varying degree of success. The use of the CO_2 laser has been mentioned by some authors but details of the method and results have not been published. We report the successful use of the KTP laser for removing such granulations whilst retaining the valve and discuss the reasons why this method should be considered.

Key words: Laser Surgery; Granulation Tissue; Larynx, Artificial

Introduction

Since its introduction by Singer and Blom in 1980,[1] the speaking valve has become established as the most successful mode of restoring communication after total laryngectomy. A review of the literature shows that 57–93 per cent of patients who have been fitted with a low-resistance voice prosthesis have been successfully rehabilitated.[2–6]

A number of complications have been associated with the use of these voice prostheses including granulation tissue formation and mucosal hypertrophy around the tracheo-oesophageal fistula (TEF) that has been reported to occur in five to 20 per cent of patients.[4,7,8] This may result in troublesome bleeding or lead to the valve sitting proud or being enveloped in granulation tissue with a consequent deterioration in its performance. In some instances this problem cannot be treated sufficiently in the outpatient department by upsizing the valve and/or the use of cautery. Valve removal has then been necessary and a period without a prosthesis required until healing has occurred before a further TEF is constructed.[8] In a few patients alternative methods such as oesophageal or electrolaryngeal voice is required.

The use of the KTP laser to remove hypertrophic mucosa and granulation tissue around TEFs has not been described in the literature. We report the anaesthetic method and KTP laser settings used in four of our patients, all of whom were successfully treated by this technique.

Method

Four of our patients developed troublesome hypertrophic mucosa around their TEF that failed to resolve with silver nitrate cautery and upsizing of their valve. All patients had had a valve inserted primarily at the time of their total laryngectomy for advanced disease and half had received post-operative radiotherapy.

One hour pre-operatively our patients received temazepam 10–20 mg for sedation. Lignocaine four per cent spray or gel was used in all patients to suppress tracheal irritation. The KTP laser was set at 5–7 watts continuous mode using a 0.6 mm disposable endostat and employing a near-touch technique to vaporize the hypertrophic mucosa and granulation tissue. It was not always necessary to remove the valve whilst lasering but it was changed for a new one after the treatment when required. The size of the TEF was assessed and an appropriately sized Provox® valve re-inserted. Patients were discharged either the same or next day.

All patients have been followed up for a minimum of 12 months.

Results

The time interval from surgery to the development of mucosal hypertrophy and granulation tissue around the Provox® valve prosthesis was 11–34 months.

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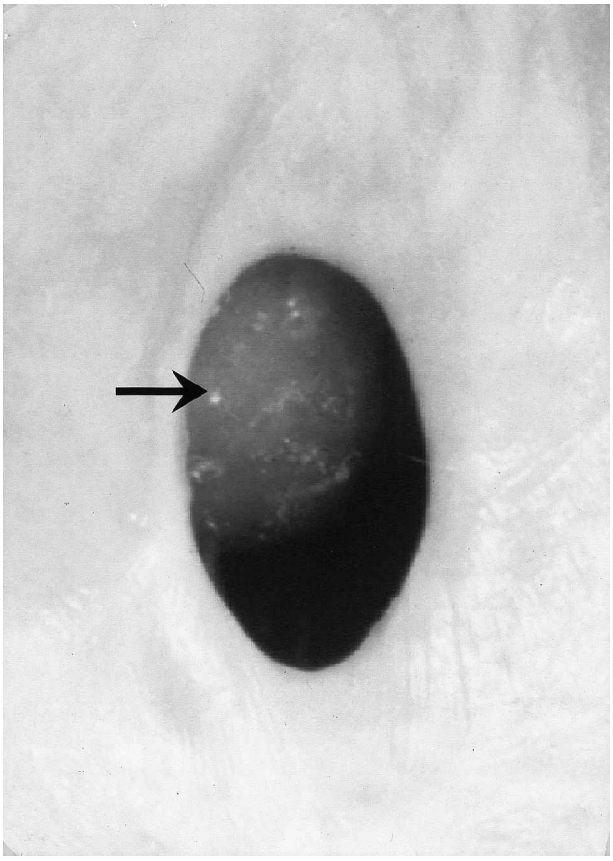

FIG. 1
Provox® valve buried in granulation tissue.

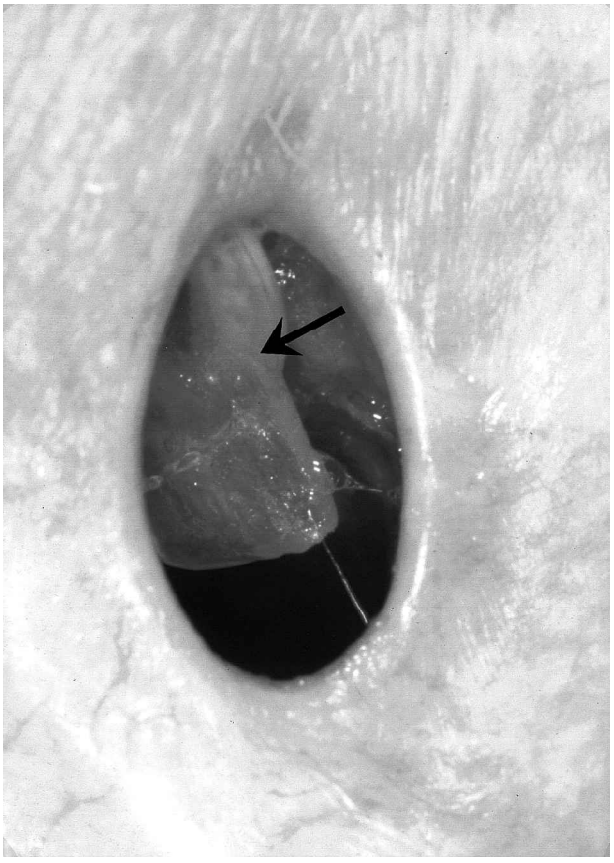

FIG. 2
The appearance of the stoma and Provox® valve following treatment.

The procedure was well tolerated by the patients. The total joules required to treat the granulation tissue in each patient were 305, 1950, 200 and 2019 joules. The variance reflected the severity of the granulations present. An appropriately sized Provox® valve was successfully re-inserted in all patients. To date none of the patients have had a recurrence of the problem following this treatment.

Figure 1 shows the Provox® valve buried in granulation tissue. Figure 2 demonstrates the appearance of the stoma and Provox® valve following treatment.

Discussion

We have found that the KTP laser is a very effective method of removing granulation tissue or hypertrophic mucosa from around the Provox® valve allowing the continued use of the prosthesis. When assessed at follow-up, the treated stomal mucosa had returned to normal. This may be attributed to possible reversion to healthy mucosa as a result of laser treatment, as demonstrated by Polosukhin[9] who studied the structural and metabolic changes in a 188 biopsy specimens from the epithelium of the large bronchi of 76 patients with chronic lung disease. He showed that endobronchial treatment by helium-neon laser irradiation induced proliferative and metabolic changes in the epithelium restoring it to normal structure and differentiation.

A review of the literature outlines the various methods currently used to solve the problem of granulation tissue and hypertrophic mucosa. These include upsizing the prosthesis, treatment with antibiotics and cauterizing the granulation tissue.[8] However, in a quarter of their patients,this problem could not be solved by one of these methods and removal of the prosthesis was necessary to allow spontaneous closure of the fistula with subsequent re-puncture and new valve re-insertion. This may result in a reduction in the patient's quality of life. During this period, patients may have to be hospitalized, fed via a nasogastric tube as well as being unable to vocalize. Modica[10] also reported a treatment failure that involved a patient becoming aphonic following cautery and oral penicillin V treatment. Laccourreye *et al.*[11] used either CO_2 laser vaporization or electrocautery to treat the granulation tissue that developed in six of their 37 patients. No details of the method or outcome are mentioned.

The use of the KTP laser is easy for the surgeon and is well tolerated by the patient with only minimal sedation and lignocaine spray/gel required. This is advantageous as some patients who require this treatment have co-existing medical conditions. In addition, this method can be performed as a day-case procedure.

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Conclusion

The use of the KTP laser in the treatment of mucosal hypertrophy and stomal granulations has been found to be an easy and effective method to enable patients to retain their valve prosthesis and therefore help maintain quality of life with regards to voice preservation and feeding.

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