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SHORT COMMUNICATION

Medialisation thyroplasty with tensor fascia lata: a novel approach for reducing post-thyroplasty complications

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Abstract

Background: Medialisation thyroplasty is considered the 'gold standard' treatment for unilateral vocal fold paralysis, enabling improvement of voice and swallowing function, and preventing life-threatening aspiration events. The most commonly used laryngeal implants induce some degree of local tissue inflammatory response, and carry the risk of immediate or delayed implant extrusion.

Methods: This paper describes a novel approach for medialisation thyroplasty. Specifically, it utilises a ribbon of autologous tensor fascia lata harvested at the time of surgery. This is layered within the paraglottic space in a manner similar to Gore-Tex thyroplasty.

Results: Thus far, this method has been accomplished in two patients with unilateral vocal fold paralysis, who also received prior radiotherapy to the head and neck.

Conclusion: Given the increased risk of post-operative wound breakdown and infection in irradiated patients, it is suggested that this new approach will lead to improved outcomes, and a decrease in complications such as extrusion or wound infection, particularly in this patient population.

Key words: Laryngoplasty; Medialization Thyroplasty; Unilateral Vocal Cord Paralysis; Autologous Transplantation; Fascia Lata; Radiation Injuries; Surgery

Introduction

Medialisation thyroplasty is considered the 'gold standard' treatment for unilateral vocal fold paralysis, enabling improvement of voice and swallowing function, and preventing life-threatening aspiration events.[1] Though other procedures, such as injection laryngoplasty, arytenoid adduction and laryngeal reinnervation, can be used to treat this condition, medialisation thyroplasty has the advantage of allowing intra-operative manipulation of the implant to achieve the desired vocal quality.[2,3]

Some of the most commonly used laryngeal implant materials include Gore-Tex®, Silastic® and hydroxyapatite,[4] but all induce some degree of local tissue inflammatory response, and carry the risk of immediate or delayed implant extrusion.[5,6] This risk is greater in patients who have received chemoradiation to the neck.[7] Laryngeal framework surgery is generally considered to be safe in irradiated patients, but some studies have suggested a higher post-operative minor complication rate.[8]

Here, we describe a novel approach for medialisation thyroplasty, utilising a ribbon of autologous tensor fascia lata harvested at the time of surgery. This is layered within the paraglottic space in a manner similar to Gore-Tex thyroplasty. Tensor fascia lata is widely used for many applications

FIG. 1

Pre-operative examination showing: full abduction with inspiration (a), and full adduction with phonation (b). There is a large glottic gap with phonation due to right vocal fold paralysis despite contralateral hyperfunction.

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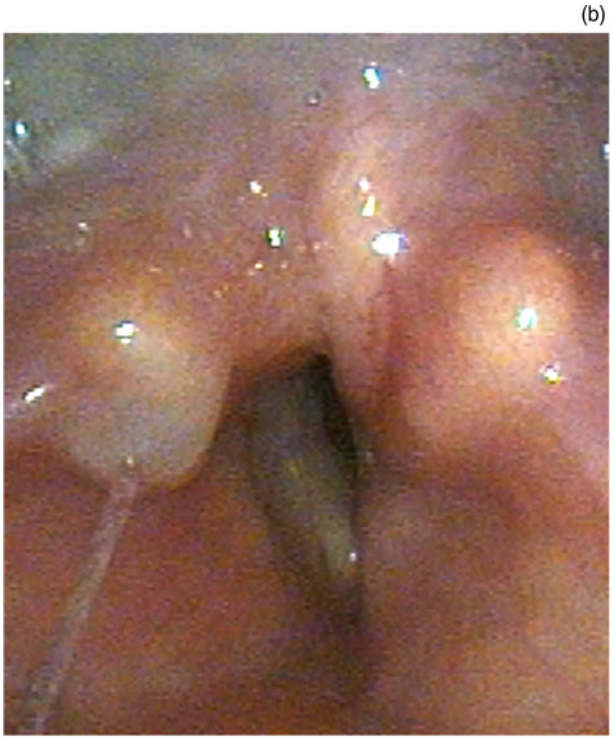

FIG. 1
Continued.

including implanted slings for facial paralysis, with proven safety and durability.[9] By auto-transplanting the patient's native tissue, we hypothesise that the risks of implant extrusion, and other minor complications such as local infection or transient oedema, will be significantly reduced. Fascia lata has been employed in a similar manner in the larynx in animal models, demonstrating minimal inflammatory response on histological sections.[10,11]

Given the increased risk of post-operative wound breakdown and infection in irradiated patients, we believe that this new approach will lead to improved outcomes and decreased complication rates, particularly in this patient population.

Materials and methods

Patients with a history of radiotherapy to the neck, with unilateral vocal fold paralysis and a large glottic gap, were selected to undergo the procedure (Figure 1). The procedure is performed under local anaesthesia with intravenous sedation, to allow for patient vocalisation intra-operatively. In order to accomplish this technique, a strip of tensor fascia lata is harvested from the lateral thigh. This is left to desiccate during the approach in the neck (Figure 2).

The thyroid cartilage is exposed from an anterior neck incision in the typical fashion. A window is drilled into the lower aspect of the thyroid lamina using cutting and diamond burrs, and subsequently the inner perichondrium of the thyroid lamina is entered using a Penfield elevator to create a tight pocket in which the graft will be placed.

The fascia lata is then cut into a 3 mm wide ribbon with a length of approximately 15–20 cm, as demonstrated in Figure 2c. The ribbon is layered into the paraglottic space. Flexible fibre-optic laryngoscopy is performed while the patient is asked to phonate. The graft amount and position is adjusted to obtain optimal vocal quality and glottic gap closure. The ribbon is trimmed at the appropriate length and the window sealed with bone wax to prevent migration. Additional means of implant fixation are avoided to minimise foreign body reaction. The neck and thigh are then closed in the usual fashion.

Results

Thus far, this method has been accomplished in two patients with unilateral vocal fold paralysis, who had previously received intensity-modulated radiotherapy to the primary site and ipsilateral neck for stage III oropharyngeal squamous cell carcinoma. Both patients had symptoms of aspiration and breathiness, which were significantly impacting quality of life prior to laryngoplasty.

Post-operatively, both patients demonstrated complete closure of the glottic gap during phonation and excellent wound healing (Figure 3). Neither patient has shown signs of infection, inflammation, airway compromise or extrusion. Voice quality improved, as demonstrated by a significant improvement in grade, roughness, breathiness, asthenia and strain ('GRBAS') scores. Pre-operatively to six weeks post-operatively, the scores improved from 8 to 0 in patient one,

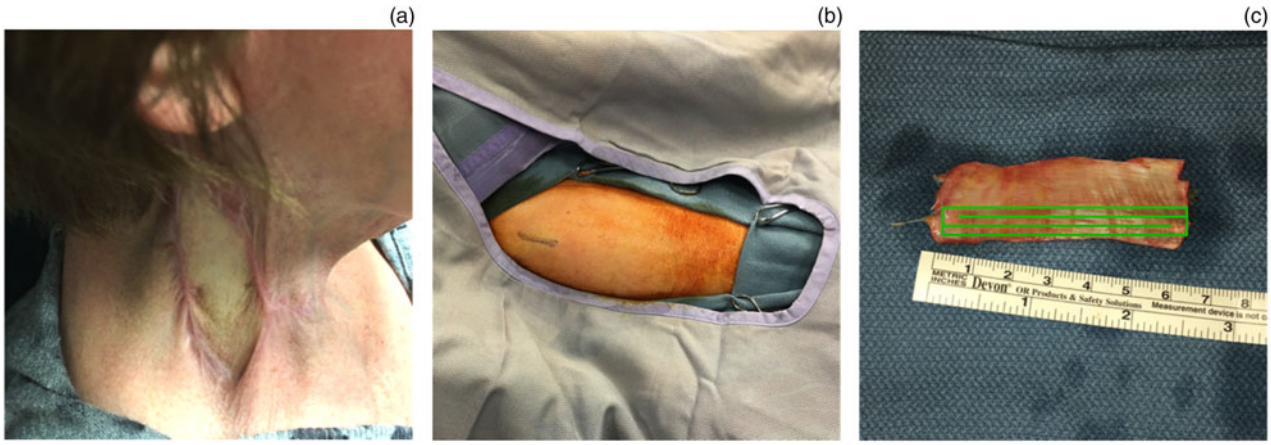

FIG. 2
The patient had significant scarring and fibrosis of the neck because of a prior pectoralis flap and radiation exposure (a). The lateral thigh is prepped to allow for fascia lata harvest (b). The fascia lata is allowed to desiccate before being trimmed to an appropriate size, with the approximate cuts made to achieve the full length of fascia lata, outlined in green (c).

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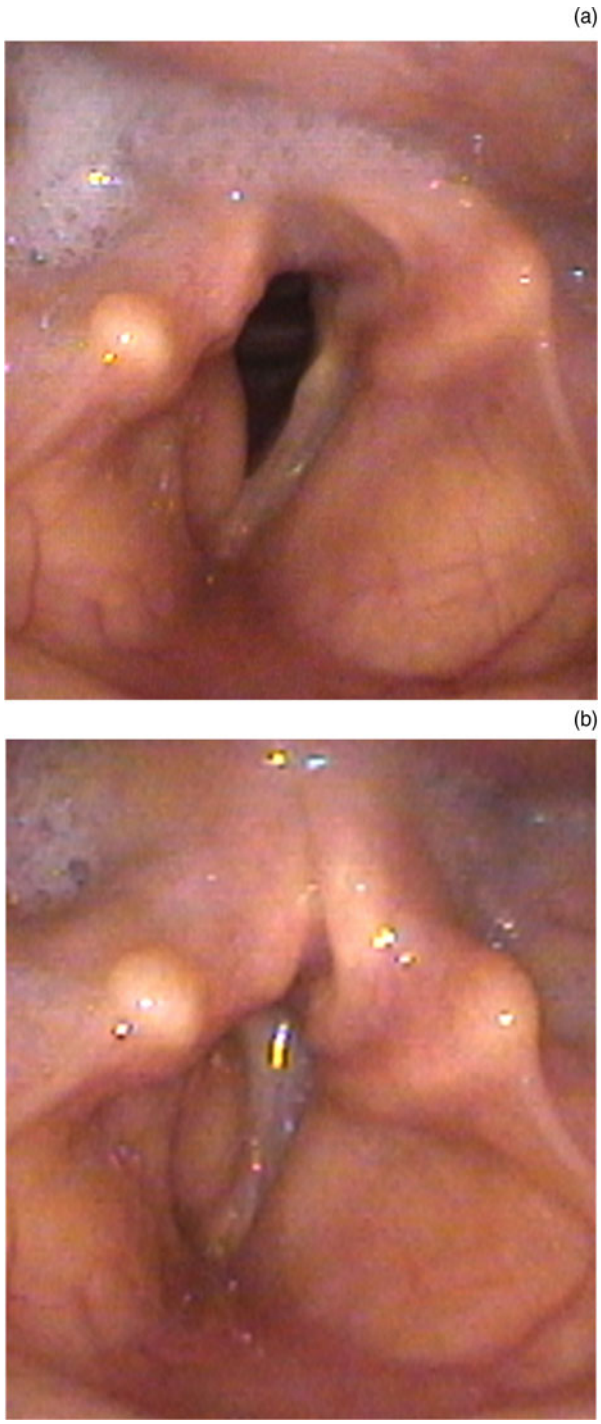

FIG. 3
Post-operative examination showing: full abduction with inspiration (a), and full adduction with phonation (b).

and from 11 to 2 in patient two. No complications were observed in the fascia lata donor site in the leg. Both patients have continued to experience excellent voice outcomes without complications one year after surgery.

Discussion

Patients with a history of radiation to the neck have a significantly increased risk for post-operative complications and wound infections for subsequent surgery in the head and neck.[12] Though generally considered safe for the carefully selected patient,[13] traditional laryngeal framework surgery in this population may be associated with minor post-operative wound complications.[8] Major complications have been reported in some case series as well, including fistula formation and implant extrusion.[14,15]

Therefore, we developed the fascia lata thyroplasty technique so that permanent vocal fold medialisation could be achieved using the patient's native tissue, thus decreasing the likelihood of implant rejection or wound breakdown. This is the first time this technique has been described in the literature. Both patients who have undergone this procedure have had durable improvement in voice quality, without peri-operative or long-term wound complications. For patients with an increased risk of wound healing impairment, we believe that use of tensor fascia lata as the implanted material in type I thyroplasty should be strongly considered.

Conclusion

Patients with unilateral vocal fold paralysis and a history of radiation exposure have an increased risk for complications after conventional thyroplasty techniques, including extrusion or wound infection. Medialisation thyroplasty using a tensor fascia lata graft is a novel technique that produces excellent post-operative voice outcomes and may reduce the risk of developing surgical complications.

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