

Clinical Record

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Successful emergency Lichtenberger lateralisation for immediate bilateral laryngeal immobility after total thyroidectomy: a CARE case report

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Abstract

Objective. This case report discusses a successful emergency Lichtenberger lateralisation procedure after immediate bilateral laryngeal immobility, occurring after total thyroidectomy.

Methods. A 63-year-old female with right-sided vocal fold paralysis due to compression by a multinodular thyroid goitre underwent total thyroidectomy, which resulted in immediate post-operative bilateral vocal fold immobility. The patient had acute-onset post-operative dyspnoea, was promptly re-intubated, and an emergency lateralisation Lichtenberger suture was placed over the right vocal fold and fixated on the outer surface of the neck.

Results. After two weeks, her right vocal fold recovered first, with the suture still in place. At four weeks, both vocal folds regained function and the suture was extracted.

Conclusion. The take-away message is that an emergency lateralisation suture may be a viable option in maintaining airway patency, while allowing for normal deglutition, in patients who would otherwise be candidates for prolonged intubation, posterior cordotomy, medial arytenoidectomy or tracheostomy.

Introduction

This case report discusses a successful emergency Lichtenberger lateralisation procedure after immediate bilateral laryngeal immobility, occurring after total thyroidectomy.

This surgical technique may be used in patients with bilateral vocal fold immobility or paralysis who are expected to regain function of one or both vocal folds, especially in cases when the alternative is a procedure with considerable implications on co-morbidity and quality of life, such as tracheostomy.^{1–3} The most common setting for an emergency lateralisation suture is the immediate post-operative period after total thyroidectomy, as was the case in our report.

Literature suggests that the incidence of transient vocal fold palsy after thyroidectomy for benign lesions varies from 1 to 5 per cent and from 0.3 to 0.8 per cent for permanent damage.⁴ However, the decision-making process when faced with acute airway insufficiency due to immediate post-operative bilateral vocal fold immobility remains highly controversial.

This report aimed to present an emergency lateralisation suture as an acute airway intervention that may be a superior solution in patients who would otherwise be candidates for prolonged intubation, transverse posterior cordotomy, medial arytenoidectomy or tracheostomy. This case report has been assembled according to the EQUATOR (Enhancing the Quality and Transparency of Health Research) / CARE (Case Report) guidelines.

Case report

We present the case of a 63-year-old female patient with a 5-month history of dysphonia, who had a right-sided vocal fold paralysis visible on fibre-laryngoscopy during in-office examination.

A magnetic resonance imaging scan of the neck was performed, which showed an enlarged right lobe of the thyroid. Ultrasonography revealed the thyroid gland dimensions as 63 × 35 × 27 mm for the right lobe and 57 × 25 × 16 mm for the left lobe, with both lobes showing multiple hypoechoic nodules. Fine needle aspiration cytology suggested findings consistent with a nodular thyroid goitre, most likely causing right-sided vocal fold paralysis due to compression.

A total thyroidectomy was performed, with intra-operative laryngeal nerve monitoring used in light of the pre-operative unilateral laryngeal nerve paralysis. Both recurrent nerves were identified and preserved. Immediately after the procedure and extubation, the patient developed severe dyspnoea. Fibre-endoscopy confirmed that both vocal folds were immobile and fixed in the paramedial position, and the patient was promptly

reintubated. A tracheostomy was considered, but instead we opted to place an urgent lateralisation suture over the right vocal fold.

The procedure was carried out via direct laryngomicroscopy, with an endolaryngeal thread guide instrument introduced through the rigid laryngoscope up to the level of the glottis. The right vocal fold was lateralised with a suction tube, to allow for the passage of the instrument. The curved needle of the instrument was then introduced inferior to the vocal process of the arytenoid cartilage, and through the lamina of the thyroid cartilage, until it was seen piercing the skin of the neck (Fig. 1). The needle was then retracted with a non-absorbable nylon suture attached, and another puncture was made in the same manner, superior to the arytenoid process, above the glottis, creating a suture loop around the right vocal fold. The nylon suture was removed from the needle and subsequently tightened on the side of the neck, using a button as a stabiliser, until adequate lateralisation of the vocal fold was seen (Fig. 1). The instrument was then removed from the larynx.

The patient was extubated, with no dyspnoea observed, and the patient was followed up regularly. Fibre-laryngoscopy showed movement of the right vocal fold on the 6th post-operative day, despite the suture still being in place, with no movement of the left vocal fold.

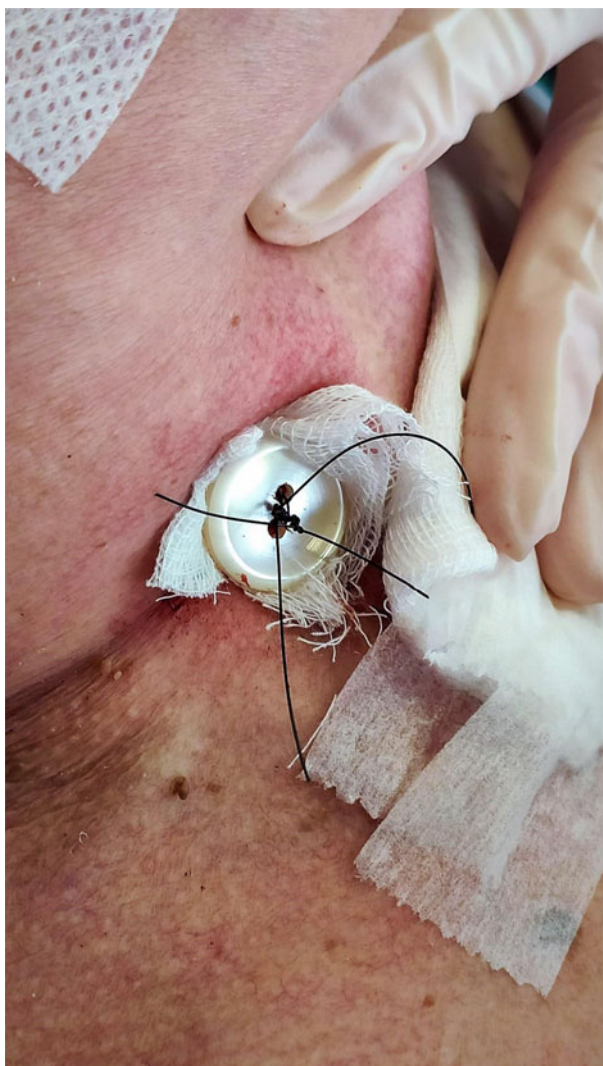


Figure 1. The suture was tightened on the side of the neck, using a button as support.

Parenteral feeding was administered during the first 2 days to avoid fluid aspiration. Anti-oedematous and antibiotic treatments were also introduced. The patient was prescribed 150 µg of daily levothyroxine supplementation after a definitive histopathological examination had been completed, along with 40 mg of esomeprazole (orally) for laryngeal protection.

The patient was closely monitored, and on the 19th post-operative day the suture was removed. The right vocal fold was fully mobile while the left showed occasional slight movement. Breathing and swallowing functions were fully restored, while dysphonia persisted. It is important to note that the pathohistological analysis of the thyroid revealed a pathologically confirmed tumour stage T_{1a} papillary carcinoma in the left thyroid lobe.

The patient was discharged from hospital 20 days after surgery. Her serum calcium level was 2.30 mmol/l and parathyroid hormone level was 4.90 pmol/l. The patient attended regular follow-up appointments, where she continued to show improved left fold mobility. After two months following hospital discharge, both of the vocal folds had a normal movement and mucosal wave, and she had almost fully recovered her voice (Fig. 2). Voice quality was superior to the pre-operative period, and the patient returned to smoking cigarettes, which she had been forced to give up prior to surgery due to right-sided vocal fold paralysis (which was strongly discouraged by our team).

Discussion

When dealing with those at risk of bilateral post-operative vocal fold paralysis, one must inform the patient of their treatment options, and the possible risks and benefits.⁵ The first treatment option is immediate reintubation and observation, as this is the easiest way of securing the airway. The second is tracheostomy, which guarantees a secure airway and is preferred by many otorhinolaryngologists after 48 hours of intubation. Both of those options are associated with serious peri-procedural issues. Intubation can lead to vocal fold granuloma, arytenoid luxation or posterior glottal stenosis. The patient may recover nerve function, but might still be left with debilitating vocal or respiratory complications. Intubation also increases the risk of aspiration and associated

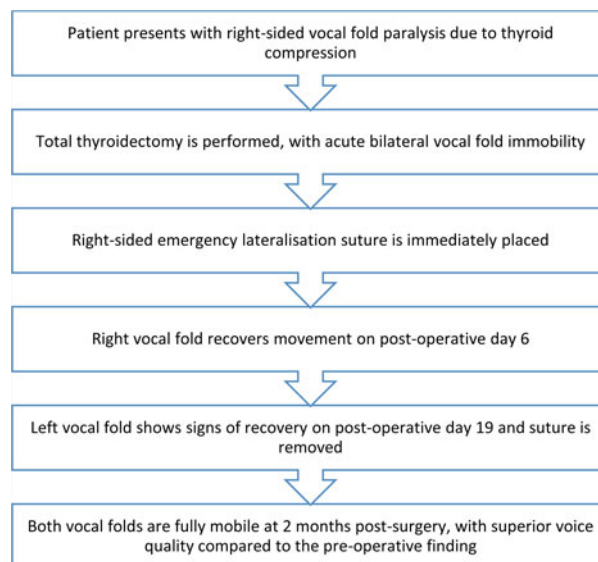


Figure 2. Timeline of the case.

pneumonia, and is detrimental to quality of life. Tracheostomy carries a risk of bleeding, infection and long-term scarring on the neck. Furthermore, it can be emotionally and socially unacceptable for some patients.

After our patient was extubated, immediate fibre-laryngoscopy confirmed bilateral vocal fold paralysis, and she was reintubated after endoscopy, enabling the suturing procedure to be performed under optimal circumstances. A decision was made to perform unilateral, right-sided lateralisation based on the fact that the right vocal fold was immobile prior to thyroidectomy, to minimise the possibility of lateralising a potentially functioning vocal fold.^{3,4}

- An urgent lateralisation suture over one vocal fold may be placed instead of prolonged intubation or tracheostomy in patients with acute bilateral vocal fold paralysis, most commonly after total thyroidectomy
- A decision on performing a unilateral lateralisation suture is based on minimising the possibility of lateralising a potentially functioning vocal fold
- The procedure was carried out via direct laryngomicroscopy, with an endolaryngeal Lichtenberger thread guide instrument
- A lateralisation suture is an alternative to tracheostomy, and achieves the same functional results of maintaining airway patency, preserving deglutition and minimising aspiration risks

When considering placing a lateralisation suture over the vocal fold, it is important to position it around the vocal process of the arytenoid cartilage. In this way, it is possible to ensure that the entire vocal fold will lateralise, so as to achieve the widest opening of the rima glottidis.¹ This also prevents damaging the softer anterior part of the fold, while adequate manoeuvring of the endotracheal tube provides adequate exposure during the procedure.² If recurrent nerve transection or ligation occurred during surgery, with low chances for delayed recovery, the procedure should not be attempted. In addition, structural damage to the vocal folds or the presence of underlying neurological illness affecting the glottis should also preclude this procedure.⁴

In our case, it is unclear why the right vocal fold recovered first, but decompression due to thyroidectomy, possible peri-procedural joint mobilisation and several months of axonal regeneration, may have been influencing factors. The literature reports a peak of recovery rates in the fifth month after paralysis onset, associated with the length of time required to resolve neurapraxia, which corresponds with our findings.⁵

We report a favourable outcome, with bilateral vocal fold mobility restored, an occult papillary thyroid microcarcinoma removed, and improved voice and quality of life, but other outcomes were possible as well. In cases of persistent vocal fold paralysis, the suture could be left in place for up to six weeks, and then removed with simultaneous laser vaporisation of the thyroarytenoid muscle lateral of the vocal process, with repeat placement of the suture and fixation onto the sternohyoid muscle, subcutaneously.

When considering a lateralisation suture as an alternative to tracheostomy, it should be noted that it carries a low risk of

injury to the vocal folds and the surrounding structures. Prolonged intubation carries the risk of infection, extreme discomfort and requires the patient to be placed in an intensive care unit. Transverse posterior cordotomy and medial arytenoidectomy are alternative procedures, but are mainly used in patients with permanent vocal fold paralysis.

A lateralisation suture achieves the same functional results of maintaining airway patency, preserving deglutition and minimising the risk of aspiration as the aforementioned procedures, while at the same time being aesthetically satisfactory and allowing for an adequate quality of life.¹⁻⁴ It requires an experienced laryngologist to be available if the need arises, but may present a viable option in avoiding a tracheostomy.^{6,7}

Conclusion

Bilateral vocal fold paralysis can be a life-threatening condition. It is a rare and one of the most severe complications of total thyroidectomy. The take-away message is that an emergency lateralisation suture may be a viable option in maintaining airway patency, while allowing for normal deglutition, in patients who would otherwise be candidates for prolonged intubation, transverse posterior cordotomy, medial arytenoidectomy or tracheostomy in the immediate post-operative setting.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0022215123000646>

Data availability statement. All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

Competing interests. None declared.

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