Pre and Post Operative Laryngoscopy in Thyroid and Parathyroid Surgery

British Association of Endocrine and Thyroid Surgeons Consensus 2010

Introduction

Vocal cord palsy is a key complications associated with thyroid and parathyroid surgery and with hypoparathyroidism is one of the main causes of endocrine surgical litigation (1). A unilateral vocal cord paralysis may lead to hoarseness, loss of volume and a breathy voice. The severity of these symptoms ranges from mild to socially and professionally debilitating. Dysphagia, especially to liquids, is a common associated symptom that may lead to aspiration of saliva and chest infections. Bilateral vocal cord paralysis is associated with airway restriction that may necessitate a tracheostomy or procedures to widen the glottis (2).

Need for a consensus

Historically, the incidence of vocal cord paralysis was as high as 20% (3) but has been radically reduced since routine identification of the recurrent laryngeal nerve has become a standard part of thyroid surgical technique (4). The modern day true incidence of temporary and permanent vocal cord paralysis following thyroid and parathyroid surgery is unknown and almost certainly under-reported. Permanent vocal cord palsy is often said to have an incidence of 1% but has been reported in up to 11% of nerves at risk in some series (5). The reasons for the lack of definitive vocal cord palsy data includes that vocal cord paralysis may occur without the surgeon being aware of this intraoperatively (6), that there may be no obvious change in the voice (4) and that results that may place clinicians in an unfavourable light are infrequently published. However the biggest single factor in not establishing the true incidence of post operative vocal cord palsy is that the larynx is not routinely assessed following surgery by all surgeons undertaking thyroid and parathyroid surgery.

The drivers for the need for a UK consensus are:

- Vocal cord palsy is a key performance indicator in thyroid and parathyroid surgery;
- Surgeons currently undertaking thyroid and parathyroid surgery in the UK come from diverse professional backgrounds with variable practices;
- Informed consent requires surgeons to provide with their own figures rather than those retrieved from publications;
- Post operative cord assessment is now included in the BAETS audit registry;
- Only a standardized practice allows reliable data collection;

There are some questions that require attention. What follows are answers to the key questionsformulated with some of the more reliable published data:

1. **Is it necessary to perform a pre-operative laryngoscopy on patients with a normal voice prior to thyroid and parathyroid surgery?**

Current BAETS guidelines state that laryngoscopy is required in re-operative neck surgery, those with voice change, and where malignancy is suspected. The abnormal yield appears to be low however some degree of alteration in vocal cord movement may be present in up to 2.4% of patients before thyroid surgery (7). The incidence is even higher - 6.1% - if one considers patients with thyroid cancer in isolation (8). Pre-operative laryngoscopy provides valuable data in non malignancy/ re-operative surgery patients especially if post-operative laryngoscopy is performed since it allows a comparison of pre and post operative findings.
Whilst mandatory routine pre-operative laryngoscopy in all patients has not previously been recommended (on the existing evidence) it would seem coherent to do this if the post operative check is also considered mandatory.

2. **Is post operative laryngoscopy required in all patients?**

It is possible to have a vocal cord palsy despite visualizing an apparently intact recurrent laryngeal nerve during surgery (6). Indeed the commonest scenario when a post operative vocal cord paralysis occurs is that the nerve is documented as intact at the end of surgery (9). It is also possible to have an entirely normal voice in the presence of a unilateral vocal cord palsy (4). The use of routine post operative laryngoscopy offers the only reliable assessment of vocal cord function following surgery. Indeed published vocal cord palsy rates range between 0.3% (10) where no routine postoperative laryngoscopy was performed and 7% where it is (6). Post operative laryngoscopy therefore offers the only way of reliably estimating the incidence of reduced or absent vocal fold movement following thyroid and parathyroid surgery.

Since surgical injury to the recurrent laryngeal nerve is not the only cause of post surgical voice change (endotracheal tube, strap muscle injury or denervation, superior laryngeal nerve injury, global perilaryngeal inflammation, scar fixation, inflamatory change cricothyroid etc.) laryngoscopy may also offer aetiological information where a change of voice has occurred. Post operative laryngoscopy informs the surgeon whether his/her technique is effective, allows risk/benefit analysis in future cervical surgery and informs the patient regarding the prognosis of any voice change as well as the risk of possible aspiration. Ultimately it remains a key objective outcome measure so should be recommended in all patients.

3. If the nerve monitor is used during surgery is post operative laryngoscopy still mandatory?

Despite no conclusive evidence that intraoperative nerve monitoring reduces the risk of permanent laryngeal nerve palsy it is used by an increasing number of thyroid surgeons. Whilst the positive predictive value of the nerve monitor is low it has a very high negative predictive value in most users' hands. In other words if the nerve monitor indicates a functionally intact nerve at the end of surgery the risk of a post operative vocal cord palsy may approach 0% although the literature suggests that it may be as high as 8% (5). However the nerve monitor has not replaced laryngoscopy as the gold standard assessment of vocal cord function. Even with a normally conducting nerve at the end of surgery subsequent RLN oedema or thyroid

bed haematoma can develop and compromise nerve function. This would only be detected on postoperative laryngoscopy.

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4. **If post operative laryngoscopy is to be performed when should this occur?**

Most cases of reduced vocal cord movement following surgery are neuropraxias where the nerve is anatomically intact rather than axonotmesis where there is axonal disruption (followed by degeneration without loss of the myelin sheath) or neurotmesis where the nerve is definitively severed (11). Recurrent laryngeal nerve neuropraxias lead to a transient impairment of conduction that usually, but not always, recovers in days, weeks or months. This may occur in at least 7.1% of thyroidectomy patients (5). The earlier the post operative laryngoscopy the higher the incidence of reduced vocal fold movement since the recovery is time-related (7). Nerve palsies may even occur in a delayed fashion with a higher incidence of palsies detected on day 2 than day 1 on the same cohort. Early laryngoscopy will detect more neuropraxia, a later laryngoscopy will detect more cases where a permanent injury may have occurred. In the only large study of its kind the cord palsy rate in 825 nerves at risk was 6.4% on the day of surgery, 6.7% on day 1, 4.8% on day 2 and 2.5% on day 14 and 0.8% at 6 weeks (7). Since the objective is principally to identify patients at risk of permanent vocal cord paralysis the laryngoscopy can be performed at any time following surgery, with those with a palsy followed up with repeated laryngoscopy to detect permanent injury.

5. **Who should perform the laryngoscopy?**

An independent laryngoscopy may be desirable but organizing this in all patients in all environments may represent an obstacle. Logistically it may be necessary that it be performed by a member of the same surgical team or the operating surgeon if there is no easily viable alternative.

6. Additional issues

What if the patient refuses the post operative laryngoscopy? These should be documented as such.

Summary

- Pre operative laryngoscopy in non cancer patients with no history of voice change has a low rate of abnormal findings. However it is recommended since it may change the management of patients, it allows an objective comparison with a post operative check and excludes the possibility that the palsy pre-dated surgery.
- Post operative laryngoscopy is required as a key quality control measure and should become mandatory.
- The optimal timing of laryngoscopy is unclear and will be governed by local factors. It should ideally be performed at or before the first out patient follow up visit by an independent practitioner although this is not essential.

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