CASE REPORT

Head injury patient with bilateral vocal cord paralysis: a mistake and a lesson learnt

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SUMMARY

Bilateral recurrent nerve palsy along with head injury is a rare clinical possibility and can be potentially fatal if not properly diagnosed. We report a case of a head injury patient with intact Glasgow Coma Scale requiring immediate re-intubation and tracheostomy after extubation failure as a result of stridor and severe dyspnoea with paradoxical respiratory pattern, possibly because of undiagnosed significant surgical history.

BACKGROUND

Airway compromise following head injury is often seen in clinical scenarios because of deterioration of Glasgow Coma Scale (GCS) score leading to life-threatening complications if not secured in time. Airway compromise with intact GCS score in a patient with head injury does not warrant intubation unless it is associated with cervical spine injury. We report a case of a patient with head injury with intact GCS requiring immediate re-intubation after extubation failure as a result of stridor and severe dyspnoea with paradoxical respiratory pattern because of an undiagnosed significant surgical history.

CASE PRESENTATION

A 25-year-old woman, following head injury after a road traffic accident, presented with a GCS of E₃ V₂ M₆; she was in a drowsy state with severe respiratory distress and laboured breathing. She was immediately intubated in the emergency ward, under intravenous sedation and muscle relaxation, with a 7 mm diameter endotracheal tube (ETT), by a neuro-anaesthesia resident. On direct laryngoscopy, her vocal cords were in paramedian position and negotiable with ETT under muscle relaxant. Her physical examination was insignificant except for an inconspicuous horizontal scar mark on the cervical neck. On non-contrast CT (NCCT) of the head ([figure 1](#)), a right temporal, left frontal contusion along with cerebral oedema and a right frontotemporal parietal left parietal subdural haematoma (SDH) causing a midline shift of 9 mm was evident.

The patient was operated on the same day for haematoma evacuation. Her GCS improved the next day and she was planned for weaning followed by extubation. After extubation, we noticed that she started to develop respiratory distress with chest in-drawing, use of accessory chest muscles and presence of tracheal tug and silent chest. We assumed it to be a case of laryngospasm or laryngeal oedema following extubation.

The patient was managed therapeutically with oxygen support, intravenous corticosteroid, inhaled β_2 agonists/epinephrine, theophylline and non-invasive mechanical ventilation. Even after all possible efforts to ameliorate the laryngospasm, it could not be managed except by maintaining oxygen saturation above 94%. Before re-intubation, the patient's vocal cords were examined with video laryngoscopy, suspecting her condition to be of a vocal cord-related pathology. On examination, the cords were found to be adducted closely towards midline in a paramedian position ([figure 2A, B](#)). There was no movement of the vocal cords with spontaneous respiration. The patient's history revealed that she had been operated (total thyroidectomy) 1 year earlier for toxic multinodular goitre. The histopathological examination of the resected thyroid gland was suggestive of colloid nodular goitre. Postoperatively, she developed residual tiring and hoarseness of voice that slowly recovered to some extent.

INVESTIGATIONS

Preoperatively, cervical spine X-ray imaging in anteroposterior (AP) and lateral view, to preclude any bony fracture, and NCCT of the head to confirm any intraparenchymal or extradural haematoma, or bony fracture, were carried out, along with routine blood investigation: complete blood

Figure 1 Non-contrast CT of the head showing right temporal and left frontal contusions with cerebral oedema with right frontotemporal parietal and left parietal subdural haematoma with midline shift.

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Figure 2 (A) Laryngeal ultrasound image and (B) bronchoscopic close view of laryngeal inlet: right and left arrow showing bilateral adducted vocal cords (paramedian position) in spontaneously breathing patient.

counts, kidney function test, liver function test, prothrombin time with international normalised ratio, chest X-ray, ECG and urine routine microscopy as a part of hospital pre-anaesthesia check-up protocol, were found to be within normal limits. Postoperatively, all routine investigations along with arterial blood gas analysis were performed on a daily basis until the patient was haemodynamically stable. Confirmation of bilateral recurrent laryngeal nerve (RLN) palsy in this case was made with the help of flexible videostroboscopy and laryngeal electromyography (EMG).

DIFFERENTIAL DIAGNOSIS

Laryngospasm could have been resolved with inhaled levosalbutamol, ipratropium bromide and hydrocortisone, if it had existed.

Laryngeal and/or cord oedema is by far the most common cause of stridor after extubation, and, if present, may respond to racemic epinephrine administration.

Tracheomalacia can be precluded on the basis of leak presence after performing a cough leak test before extubation.

In a case of unilateral or partial vocal cord palsy, the clinical presentation of the patient would not be so dire after extubation.

The differential diagnosis of postoperative hoarseness requires the use of specific tools that go beyond simple laryngoscopy; these include videostroboscopy as well as intralaryngeal and extralaryngeal EMG.¹

TREATMENT

Transient paralysis can often be seen to recover after 6–8 months. Hence, a follow-up with direct or indirect laryngoscopy for at least 6 months might improve the outcome of these cases. In case of permanent paralysis, surgical intervention remains the only option for treatment. Endoscopic ventriculocordectomy or arytenoidectomy are the surgical procedures of choice for such patients. The use of electrophysiological monitoring of RLN during thyroid surgery has been mentioned in the literature in high-risk cases, to avoid injuring the nerve.^{2,3}

OUTCOME AND FOLLOW-UP

Because vocal cord paralysis is temporary in most cases, emergency tracheostomy is seldom indicated. In our patient, this was possibly because of bilateral RLN injury/paralysis occurred as a complication of thyroidectomy. Following surgery, the patient

was percutaneously tracheostomised and referred to a speech-language pathologist for voice therapy, which may involve exercises to strengthen the vocal folds or improve breath control while speaking. Indirect laryngoscopy or fiberoptic bronchoscopy (FOB) was advised to the patient on her follow-up visit to hospital.

DISCUSSION

Thyroid surgery in recent years has been generally considered as quite safe. Better preoperative preparation and proper surgical techniques of thyroidectomy have minimised complications to <2–3%. Iatrogenic injury to the RLN remains one of the most concerning complications of thyroid surgery.^{4,5} Bilateral RLN palsy is the rarest among all complications post-thyroidectomy, with a reported incidence varying between 0.4% and 14%.^{2,6} The overall transient bilateral palsy rate is 0.7%, the permanent palsy is reported in only 0.3%.⁷ Incidence is currently reported to be reduced effectively with the use of laryngeal nerve monitoring intraoperatively. The benefits of intraoperative nerve monitoring (IONM) are primarily for high-risk cases such as malignancy, reoperation, retrosternal or toxic goitre and for low-volume surgeons.^{8–11} Moreover, available studies regarding the use of IONM do not show a significant decrease in the incidence of either transient or permanent RLN injury in low-risk surgical procedures for high-volume surgeons.⁸ Routine visual identification of the RLN decreases the incidence of iatrogenic injury and is regarded as the standard of care in thyroid surgery. Recently, in patients with residual permanent bilateral vocal cord paralysis, to avoid long-term tracheostomy, partial posterior cordectomy using laser surgery can restore sufficient laryngeal airflow with minimal vocal sequelae. Early management of this complication by teams of specialists may allow appropriate and less invasive surgery.¹ However, feasibility of this modality could be another limiting factor in developing countries where it is available only at apex medical centres. Patients with vocal cord palsy after thyroidectomy experience significantly more morbidity and incur significantly more healthcare charges after surgery than similar patients without vocal cord-related pathology after thyroidectomy.¹²

No patient should be discharged from hospital without proper examination of the vocal cords by an otolaryngologist post-thyroidectomy, with proper written notes and advice given to the patient. We should consider thyroidectomy a possible cause of extubation failure and manage it accordingly. Authors

recommend following Bailey's manoeuvre^{13 14} by adding intubating laryngeal mask airway (LMA) or air-Q simultaneously with ETT followed by an extubation trial, or by keeping the tube exchanger inside the trachea after extubation for the meantime in these post-thyroidectomy patients, to look for bilateral vocal cord movement by flexible FOB under sedation, and then taking a decision accordingly.¹⁵ Among non-invasive methods, laryngeal ultrasound is an emerging modality that can also be utilised to assess the vocal cords.¹⁶

Learning points

- ▶ Bilateral recurrent nerve palsy along with head injury is a rare clinical possibility, but can be potentially fatal if not properly diagnosed.
- ▶ Before any intervention, proper significant medical and surgical history of the patient should be sought from his or her close relatives.
- ▶ Follow Bailey's manoeuvre^{6 7} by adding intubating laryngeal mask airway (LMA) or air-Q simultaneously with endotracheal tube followed by an extubation trial, or by keeping the tube exchanger inside the trachea after extubation for the meantime in these post-thyroidectomy patients, to look for bilateral vocal cord movement by fiberoptic bronchoscopy under sedation, and then taking a decision accordingly.
- ▶ Laryngeal ultrasound should be performed in patients with pre-existing hoarseness or history of voice changes before intubation or extubation.
- ▶ Complete discharge notes (instructions) should be documented in black and white along with significant postoperative findings or complications, if any.

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