Serial transcutaneous laryngeal ultrasonography in intensive care unit for assessment of vocal cord palsy: a case report

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Abstract: A direct laryngoscopy is currently the standard method for diagnosing RLN (Recurrent Laryngeal Nerve) paralysis after thyroid or parathyroid surgery but this procedure can be uncomfortable for patients and may cause undesirable changes in vital signs. A 40 years old female after a total thyroidectomy was assumed to have a bilateral vocal cord palsy on direct laryngoscopy after surgery. Patient was shifted to intensive care unit (ICU) on ventilatory support. We used serial transcutaneous laryngeal ultrasonography in the ICU for assessing the vocal cord functions along with conservative management. After 3 days, we were able to safely extubate the trachea and tracheostomy was avoided.

Key words: Serial; ultrasound; thyroidectomy; ICU; vocal cord palsy.

Introduction

Thyroid and parathyroid surgical procedures are common operations and due to a close anatomic relationship between the thyroid, parathyroid glands and the laryngeal nerves iatrogenic injury to the recurrent laryngeal nerve (RLN) with subsequent vocal fold paralysis/palsy (VFP) is one of the most commonly encountered complications. As bilateral RLN paralysis can cause upper airway obstruction, early recognition of this complication before tracheal extubation is important. A direct or indirect laryngoscopy is currently the standard method for diagnosing RLN paralysis, but this procedure can be uncomfortable for patients and may cause undesirable changes in vital signs. The ultrasonography (US) of the vocal cords is a non-invasive technique that is well tolerated. We report the successful use of laryngeal US to evaluate vocal cord function in an endotracheally intubated patient which helped us in avoiding tracheostomy. The patient provided written permission for publication of this report.

Case Description

A 40-year-old female, weighing 60 kg of ASA Physical Status II was planned for total thyroidectomy and central lymph node dissection for papillary carcinoma of thyroid under general anesthesia. ASA standard monitoring was applied along with neuromuscular monitoring. Patient was induced with intravenous injection of fentanyl, propofol and atracurium followed by tracheal intubation with 7.5 mm (ID) endotracheal tube. Anesthesia was maintained with oxygen, air and sevoflurane. After the completion of surgery and reversal of neuromuscular blockage with a TOF (Train of four) ratios of 0.9, deep extubation was done at a MAC (Minimum alveolar concentration) of 0.4. Deep extubation was followed by direct laryngoscopy which showed edematous vocal cords in paramedian position with weak movement even on deep inspiration. A bilateral RLN palsy was assumed and patient was reintubated and transferred to intensive care unit (ICU) for further management.

In the ICU, patient was put on pressure support ventilation and inj. dexamethasone 8mg was given 8 hourly. Serial transcutaneous ultrasonography of the neck region was done daily in awake state to assess vocal cord function and vocal cord velocity. The linear transducer (6-13 MHz, Edge II Ultrasound, FujiFilm SonoSiteTM, Bedford, United Kingdom) was placed transversely on the thyroid cartilage with the neck slightly extended to visualize vocal cord mobility using 2D mode (Fig. 1). Although patient was generating adequate tidal vome on...
limitations imposed by a sensitive gag reflex or neck and jaw rigidity. Direct observation of vocal cord movement by laryngoscopy or observation by fiberoptic laryngoscopy is a standard method to diagnose RLN paralysis in those patients with a native airway. However, the utility of these methods in intubated patients is unclear because the endotracheal tube interferes with the evaluation of laryngeal function. Oral and pharyngeal secretions also interfere with direct laryngoscopy. In addition, introduction of the scope can be uncomfortable in awake or only lightly sedated patients.

US is an evolving method for assessing the vocal cords and successful detection of RLN palsy after thyroid surgery has been reported (3). US has also been used perioperatively to assess vocal cord palsy with endotracheal tube in situ (4). On USG examination in transverse view, uncalcified thyroid cartilage is seen as an inverted V shape within which the true and false vocal cords are visible. The false vocal cords appear as hyperechoic structures whereas true cords are hypoechoic. Visibility of cords is found to be easier in females and young males (5). With increase in age, there is calcification of thyroid cartilage, which is seen as a strong echo with posterior acoustic shadowing. However, the anatomical structures can be visualized despite the calcifications by angling the transducer. In a male patient greater than 40 years, it is better to place the probe superior to the thyroid cartilage and scan through the hyoid-thyroid membrane or below the thyroid cartilage and scan cranially through the crico thyroid membrane (5).

In our case, laryngeal US allowed satisfactory serial evaluation of vocal cord function in the tracheally intubated patient in the intensive care unit. The absence of vocal cord abduction during deep breathing strongly suggested bilateral vocal cord paralysis. Laryngeal ultrasonography or “Echolaryngography” seems to be a simple, easy, cheap, non-invasive, easily available tool with no radiation exposure concerns.

REFERENCES
