



Case Report

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# Immediate Post Thyroidectomy Stridor Caused by Paradoxical Vocal Cord Dysfunction: Results from a Single Centre Case Series

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## Abstract

**Background:** Immediate post thyroidectomy stridor is a known phenomenon which is most commonly caused by bleeding and haematoma formation. Recurrent laryngeal nerve dysfunction, laryngeal oedema and tracheomalacia are the other causes. Paradoxical vocal cord dysfunction (PVCD) is an abnormal adduction of the vocal cords during the respiratory cycle (especially during the inspiratory phase) that produces airflow obstruction at the level of the larynx. PVCD is a rare cause for stridor following thyroidectomy. We report 6 patients who developed PVCD leading to stridor following total thyroidectomy for multi nodular goitre.

**Case series:** Six female patients (median age – 50 years; range 27-65) who were clinically and biochemically euthyroid underwent total thyroidectomy for multi nodular goitres (2013 – 2017). All had pre-operative vocal cord assessment which was normal. Intubations were not difficult. They developed stridor immediately after extubation without evidence of haematoma formation. Post-operatively they had paradoxical movement of vocal cords (at laryngoscopy) during tidal breathing. Out of six, three patients were re-intubated and observed in the intensive care unit for 24 hours. Other 3 patients were observed in the ward. Stridor resolved completely in all patients in 24 hours, and they were discharged on 3rd day. Speech therapy was started on 2nd day. Re-evaluation done after 2-weeks, revealed normal vocal cord movement in all.

**Conclusion:** Paradoxical vocal cord movement is a cause of stridor in some patients without evidence of RLN damage, bleeding, or hematoma formation.

**Keywords:** Stridor; Paradoxical vocal cord dysfunction; Endotracheal intubation

**Abbreviations:** RLN: Recurrent Laryngeal Nerve; PVCD: Paradoxical Vocal Cord Dysfunction; ICU: Intensive Care Unit; BMI: Body Mass Index

## Introduction

Stridor is a rare but alarming complication of thyroid surgery. Exact incidence of post thyroidectomy stridor has not been assessed in isolation in the literature. Common causes of stridor are bleeding, haematoma formation, recurrent laryngeal nerve dysfunction and laryngeal oedema. Immediate post thyroidectomy stridor is identified just after extubation. Paradoxical vocal cord dysfunction (PVCD) is a rare cause for immediate post thyroidectomy stridor. Information of PVCD following thyroidectomy is sparse in the literature.

## Case series

Six patients out of 518 patients, who underwent total thyroidectomy for multinodular goitre, were diagnosed PVCD (from 2002 to 2017). They were clinically and biochemically euthyroid at the time of surgery and none of them had bronchial

asthma or other comorbidities. All six subjects were female, age between 27 – 65 years (median – 50). Preoperative direct laryngoscopy demonstrated normal vocal cord anatomy and function. Surgery was performed under general anaesthesia with muscle relaxants and endotracheal intubation. Bilateral RLN, external branch of superior laryngeal nerve and parathyroid glands were identified and preserved. Trachea was normal, there was no tracheomalacia. Average time duration was one hour (45 min – 90 min) with minimal blood loss.

All six patients developed stridor immediately after extubation, three patients were reintubated due to respiratory distress and they were managed at the ICU. After 24 hours, they were extubated successfully. Other three patients were managed in the ward with close observation. Stridor resolved after 24 hours. Fibreoptic laryngoscopy demonstrated paradoxical vocal cord movement in

inspiratory phase of respiration in all six patients. Other causes for stridor were excluded. Speech therapy was arranged. Fiberoptic laryngoscopy demonstrated normal vocal cord functions after two weeks of speech therapy. Four patients had colloid goitre and other two had thyroiditis as histological findings.

## Discussion

Paradoxical vocal cord dysfunction (PVCD) is an abnormal adduction of the vocal cords during the respiratory cycle (especially during the inspiratory phase) that produces airflow obstruction at the level of the larynx [1]. Diagnosis is mainly by exclusion and direct observation of vocal cord function by doing fiberoptic laryngoscopy. Flattening of inspiratory loop is seen in the pulmonary function test, demonstrating upper air way obstruction [2]. Postoperative causes of paradoxical vocal cord motion have rarely been described in the past and have generally been attributed to psychological causes (strong emotion and stress), inhalation of irritants (fume, smoke), prolonged intubation and acid reflux [3].

Common risk factors for PVCD are anxiety disorders, high BMI, female sex, and uncontrolled asthma [4]. Being a middle-aged female is the only risk factor identified in our patients. Laryngeal irritation by endotracheal intubation and manipulation of the larynx during surgery are the suggestive cause for PVCD of our

patients. PVCD is a temporary phenomenon [5]. It may or may not need reintubation as demonstrated in this series. Awareness of PVCD and proper management will help to resolve the stridor successfully.

## Conclusion

Paradoxical vocal cord movement is a rare cause of stridor in some patients without evidence of RLN damage, bleeding, or haematoma formation.

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