

Case Report**Bilateral Vocal Cord Paralysis After Extubation**

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**ABSTRACT**

Vocal cord paralysis is an uncommon complication of endotracheal intubation after induction of general anesthesia. It may be due to the endotracheal tube cuff pressure on the recurrent nerves. Vocal cord edema occurring in the presence of a paralyzed cord may precipitate complete airway obstruction and can cause bilateral cord paralysis. Here, we describe post anesthetic bilateral vocal cord paralysis in an elderly female patient which diagnosed by direct laryngoscopy and successfully treated by tracheostomy in respiratory intensive care unit. The patient discharged after two weeks and achieved complete recovery one month later.

**Key words:** Vocal cord paralysis, Endotracheal intubation

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Endotracheal intubation which is passing the endotracheal tube into the trachea and between the vocal cords has been an established technique for more than 50 years. It was first performed by MacEwan in Glasgow, who blindly introduced a metal tube into the trachea using the oral route. Over the years as the techniques and equipments became more advanced, endotracheal intubation evolved into a routine procedure for adults and children undergoing general anesthesia<sup>1</sup>. Although vocal cord paresis rarely may be caused by a central lesion, it is most frequently due to endotracheal tube cuff on the vulnerable portion of the anterior branch of the recurrent nerve, 6 to 10 mm below the cords between the cuff and overlying thyroid cartilage. Its possibility was first presented in the anesthesiology literature in 1975<sup>2</sup> Despite many advantages from endotracheal intubation as an essential tool for saving lives, and many simple and complicated operations, it will be complicated mild to severe if essential points have not considered<sup>3</sup>.

**Case report**

One 71 year old female with ASA physical status II (a general classification arranged by American

Society of Anesthesiologists) scheduled for cataract surgery with general anesthesia in Nikokari hospital, Tabriz Iran. The patient did not have any coexisting disease such as diabetes mellitus, rheumatoid arthritis, neuropathy, or history of difficult intubation. The reason for general anesthesia was establishing adequate depth of anesthesia to prevent patients movement and possible coughing, which preferred by surgeons. After preoxygenation, she anesthetized routinely using fentanyl (1µg/kg) and lidocaine (1mg/kg). Then sodium thiopental (4 mg/kg) followed by succinylcholine (1.5 mg/kg) were injected. Anesthesia maintained by O<sub>2</sub> (50%) and N<sub>2</sub>O (50%) with halotane (1-2 Volume %).

There was not any problem during laryngoscopy and vocal cords were in normal position. Pavulon (2mg) administered since controlled mode ventilation with adequate depth of anesthesia was needed. There was not any considerable side effect in induction and maintenance plans of anesthesia. After complete recovery, the patient seemed a little bit agitated and experienced difficult respiration. Her vital signs were stable. She had not hemoptysis or wheezing.

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Oxygen saturation pressure was abnormal. Other abnormal findings included productive cough with inspiratory stridor. Both chest x-ray and electrocardiography were normal. Suspected differential diagnosis were laryngospasm, laryngotracheitis and arytenoid cartilage dislocation. She transferred to respiratory care unit then to ENT department. Finally, direct laryngoscopy diagnosed bilateral vocal cord paralysis.

## Discussion

Bilateral vocal cord paralysis is an uncommon clinical entity with many causes. There are numerous etiologies which can be divided into neurologic or mechanical causes. One of the mechanical causes is acute complication of intubation as a result of injury to recurrent laryngeal nerve, hyperextension of the neck that stretches the vagus nerve or excessive cuff pressure<sup>4</sup>. Several authors have also reported this complication after endotracheal intubation. Vocal cord paralysis (inability to move the vocal cords), is a rare complication of endotracheal intubation. It can be seen in the elderly patients more than younger ones. Although there are many precipitating factors, in anesthesia practice it may be due to body built, size of endotracheal tube, sex, duration of laryngoscopy, too much hyperextension of neck or glottic movement related to inadequate depth of anesthesia. Nitrous oxide, an anesthetic gas which increases endotracheal cuff volume in a concentration and time related fashion and causes insertion of nasogastric tube with difficulty- should not be overlooked<sup>2,5,6</sup>. High cuff pressure in this patient is also accused. Inflation of a cuff should be sufficient to provide an air tight system but not to exceed mucosal circulation and not to be fixed on the vulnerable zone<sup>3</sup>. Cavo suggested this re-

gion is 6 to 10 mm below the posterior end of the free edge of the vocal cords. He recommended that the cuff should be placed at least 15mm below the vocal cords<sup>2,7</sup>. Another cause is endotracheal tube movement against the vocal cord mucosa, resulted from positioning of patient's head or ventilator cycling<sup>2,6</sup>. For diagnosing vocal cord paralysis, chest x-ray may be an important tool which also performed in this patient<sup>8</sup>. Laryngoscopic investigation is recommended before intubation. Direct laryngoscopy either flexible or rigid, could be useful to diagnose bilateral vocal cord paralysis in patient who experiences stridor, cyanosis, apnea and agitation. In this patient it also confirmed the diagnosis. Performing emergency tracheostomy in operating room is another alternative decision when cure cannot be achieved, which has down for this patient and resulted in successful outcome<sup>9</sup>. Medialization procedures i.e injection of an inert teflon into the paralyzed vocal cords may be done. It is important to remember this attempt helps with voice quality and swallowing liquids only and it is generally not improved<sup>10</sup>. Today, the resection of posterior vocal cord with or without arytenoid cartilage has been possible through laser microsurgery which has had many success<sup>11</sup>. As mentioned earlier, tracheostomy is the last effort which done for this patient in this study in operating room after definitive diagnosis. The patient discharged after two weeks admission to ENT department and achieved complete recovery one month later.

In conclusion, authors of this case recommend on being meticulous from the air amount and cuff pressure when performing endotracheal intubation, especially when they inflate the cuff of the tube.

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