

## Intra Operative Difficulty in Ventilation: A Case Report.

Narashima Reddy B\*, Prasad Kulkarni, Nirmala BC, and Ravi Shivaraman.

Department of Anaesthesiology, MVJ Medical College & research hospital, Hoskote, Bangalore, Karnataka, India.

### Case Report

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#### \*For Correspondence

Department of Anaesthesiology,  
MVJ Medical College & research  
hospital, Hoskote, Bangalore,  
Karnataka, India.

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#### ABSTRACT

We present a case of a 50 yr old female ASA I, who presented with hemangioma on the right side of the neck was posted for excision. Patient was shifted to operation theatre, intravenous (iv) line secured with 18gauge iv canula. Monitors connected. Induced and intubated. After 30 minutes of induction, we noticed difficulty in ventilation and tight bag since the patient was manually ventilated. There was fall in EtCO<sub>2</sub> levels and later saturation. Auscultation revealed silent chest. Since the surgery involved dissection around the dome of right lung, pneumothorax was the first presumptive diagnosis. Patient was immediately ventilated with 100% O<sub>2</sub>. And a wide bore needle was inserted in right 2<sup>nd</sup> intercostal space which failed to relieve the resistance to ventilation. Endotracheal tube suctioning was done and the tube cuff was deflated but in vain. Patient was extubated and re-intubated with a fresh tube and the rest of the course of anaesthesia was uneventful. On inspection the extubated tube was found to be full of thick mucous secretions occluding the entire lumen of the tube. We present this case in view of the unusual cause for difficulty in ventilation in an ASA I patient with no history of previous lung infection. In this era of ventilation, incidental use of manual ventilation helped us diagnose the obstruction early. Mechanical obstruction is a rare & unanticipated cause of 'tight bag', unless intervened early could be fatal. The surprise is this is a rare cause of blocked ETT, reason of the mucous plug and from where did it come remains enigma.

#### INTRODUCTION

Endotracheal tube (ETT) is used to secure airway. When that itself becomes the cause for airway obstruction it becomes difficult to diagnose and act immediately. Intra operative difficulty in ventilation is a critical incident involving multiple causes leading to confusion and panic when all the causes are ruled out leading to difficulty in treatment. This requires immediate intervention as the situation is fatal.

#### Case Report

Here we present a case of a 50 yr old female of 45kg, without any co-morbidity and insignificant past history, presented with hemangioma on the right side of the neck posted for excision. She was accepted under ASA1. Tab alprazolam 0.5mg and tab ranitidine 150mg was given at night before the surgery. Written informed consent was taken for general anaesthesia after explaining the pros and cons.

Patient was shifted to operation theatre, intravenous (iv) line secured with 18gauge canula and started on ringer lactate. Patient was given injection (inj) glycopyrrolate 0.2mg as anticholinergic and Inj morphine 4mg as analgesic 10 minutes before induction. All the monitors were connected – Non Invasive Blood Pressure, pulse oximeter, Electrocardiography, End tidal Carbon dioxide (EtCO<sub>2</sub>) and the basal readings were recorded. Emergency drugs and difficult intubation cart were kept ready. Patient was preoxygenated with 100% O<sub>2</sub>. Patient was induced with inj. Thiopentone sodium 5mg/kg. Muscle relaxation achieved with inj. Succinyl choline 75mg. She was intubated with endotracheal (ET) tube of 7.5 and secured after confirming bilateral air entry. Anaesthesia was maintained with Oxygen (O<sub>2</sub>), Nitrous oxide, Halothane and vecuronium. We were manually ventilating the patient with bain's circuit.

In the middle of the surgery around 30 minutes after induction, we noticed difficulty in ventilation and tight bag. There was fall in EtCO<sub>2</sub> levels followed by desaturation. Auscultation revealed silent chest bilaterally. Since the surgery involved dissection around the dome of right lung we suspected accidental injury of the pleura leading to pneumothorax. Immediately surgery was stopped and the area of dissection was covered with normal saline, patient was ventilated with 100% O<sub>2</sub> & expiratory valve was kept completely open. A wide bore needle attached to a syringe was inserted in right 2<sup>nd</sup> intercostal space. But this action failed to relieve the resistance for ventilation. Then endotracheal tube suctioning was done and the tube cuff was deflated but in vain. We decided to extubate and mask ventilate as the last resort. We were able to mask ventilate saturation picked up. Patient was re-intubated with a fresh tube and the rest of the course of anaesthesia and surgery was uneventful.

On inspection the extubated tube was found to be full of very thick mucous secretions occluding the entire lumen of the tube at the cuffed area.

## DISCUSSION

Differential diagnosis considered in this case were, pneumothorax, bronchospasm, ET tube kinking, bevel touching carina, herniation of endotracheal tube cuff, and foreign body obstruction of the tube.

A complete obstruction of the airway in an intubated patient is quite rare. Usually we see partial and gradual obstruction, with high inspiratory pressure during controlled ventilation. In these cases there will be gradual fall in EtCO<sub>2</sub>, but saturation will be maintained. Possible causes for this will be poor lung compliance, acute bronchospasm, obstruction or kinking<sup>[1]</sup> of the tube and circuit, external compression, tension pneumothorax, endobronchial mass, foreign body or thick secretions in the ET tube, biting, bevel abetting the tracheal wall, obstruction by cuff system malfunction.

Several cases have been reported with cuff<sup>[2]</sup> defects leading to herniation and intraluminal obstruction. It is possible for an ET tube cuff, if overinflated or defective, to herniate over the end of the tube resulting in partial or total airway obstruction. If this happens the airway should be replaced as a cuff deformed in this way may herniate again.



**Figure 1: Blocked Endotracheal Tube**

There are several reported cases on airway obstruction due to blood clots by Arney et al<sup>[3]</sup>. Hyun Kyoung Lim et al<sup>[4]</sup> experienced a case of complete obstruction of the endotracheal tube due to a blood clot during surgery with a patient in the prone position who had a hemo-pneumothorax. But there are few reported cases with mucus plug obstruction.

Endotracheal tubes can become obstructed with mucus, particularly in cases where the mucus contains blood, secretions are thick and when there is inadequate humidification<sup>[5]</sup>. It is possible to have an endotracheal tube totally obstructed by mucus and the patient cannot breathe yet it will be able to pass a suction catheter through the viscid obstruction. This had occurred in over case. If there is any doubt of airway patency then the airway should be replaced immediately. But patients should never be extubated unless some help is present who can assist in immediate reinsertion of an endotracheal tube, perhaps of a smaller diameter than the one removed.

Whenever an endotracheal tube obstruction is considered as the possibility, we have to evaluate the tracheobronchial tree with a flexible bronchoscope for direct detection of bleeding sites and for the removal of any visible blood clots or mucus, even in cases where there is no evidence of preoperative hemoptysis or infection [6]. Additionally, it should be kept in mind that a blood clot or mucus plug can migrate into the endotracheal tube due to intermittent positive pressure ventilation. We also should keep in mind that even though endotracheal suction applied may not be able to eliminate secretions [7,8,9,10].

### CONCLUSION

We present this case in view of the unusual cause for difficulty in ventilation in an ASA I patient with no history of previous lung infection. In this era of ventilation with ventilators, use of manual ventilation helped us to diagnose the obstruction early. Mechanical obstruction is a rare & unanticipated cause of 'tight bag', which unless intervened early could be fatal. Failure to detect any cause compelled us to change the tube and after which the course of anaesthesia was uneventful.

### REFERENCES

1. Chau WL, Ng AS A defective endotracheal tube. Singapore Med J. 2002; 43: 476-8.
2. Munson ES, Stevens DS, Redfern RE Endotracheal tube obstruction by nitrous oxide. Anaesthesiol. 1980; 52: 275-6.
3. Arney KL, Judson MA, Sahn SA. Airway obstruction arising from blood clot: three reports and a review of the literature. Chest. 1999; 115:293-300.
4. Hyun Kyoung Lim, Mi Hyeon Lee, Hee Yong Shim, Hyo Jin Byon, and Hyun Soo Ahn. Korean J Anesthesiol. 2013; 64(4):382-383..
5. Donald R. Elton, Airway Emergencies: Lexington Pulmonary and Critical Care.
6. Shapiro BA, Harrison RA, Trout CA: Airway care in Clinical Application of Respiratory Care, 2nd ed., Year Book Medical Publishers, 1979.
7. Elton DR, Berkowitz GP. Endotracheal tube obstruction in neonates, Perinatology-Neonatology. 1981;5(5):75-80.
8. S Parthasarathy and M Ravishankar. Tight bag. Indian J Anaesth. 2010;54(3).
9. Changjoo Park, Hyunjeong Kim, and Kwangwon Yum. Acute obstruction of an endotracheal tube: a case report. Anesth Prog. 2004;51(2):62-4.
10. Harvey A Zar, Welby W Wu. The Inability to Detect Expired Carbon Dioxide after Endotracheal Intubation as a Result of One-Way Valve Obstruction of the Endotracheal Tube. Anesthesia Analgesia. 2001;93(4):971-2