

Anaesthetic Management in a Case of Bronchial Obstruction Causing Lung Collapse

¹Dr Ashish Yadav, Senior Resident, Department of Anaesthesia, PGIMS, ROHTAK

²Dr Kirti Kamal, Professor, Department of Anaesthesia, PGIMS, ROHTAK

³Dr Vineet Kumar, Assistant professor, Department of Anaesthesia, PGIMS, ROHTAK

⁴Dr Parul Gupta, Junior Resident⁴, Department of Anaesthesia, PGIMS, ROHTAK

⁴Dr Renu Lamba, Junior Resident, Department of Anaesthesia, PGIMS, ROHTAK

⁴Dr Kiran Mittal, Junior Resident, Department of Anaesthesia, PGIMS, ROHTAK

Corresponding Author: Dr Vineet Kumar, Assistant professor, Department of Anaesthesia, PGIMS, ROHTAK

Citation this Article: Dr Ashish Yadav, Dr Kirti kamal, Dr Vineet Kumar, Dr Parul Gupta, Dr Renu lamba, Dr Kiran Mittal,“ Anaesthetic Management in a Case of Bronchial Obstruction Causing Lung Collapse”, IJMSIR- April - 2020, Vol – 5, Issue -2, P. No. 57 – 60.

Type of Publication: Case Report

Conflicts of Interest: Nil

Introduction

Lung collapse secondary to blocked airway is caused due to continuous absorption of alveolar gases by pulmonary capillaries, which is not replenished because of the blockade in the lumen. In chronic cases, reabsorption of intra-alveolar secretions and exudates may result in complete collapse.¹ Obstruction in the bronchial lumen can be caused by foreign body, tumor/growth, granulation tissue etc. Granulation tissue can be seen in post-operative patients or in cases of foreign material such as retained suture material or foreign body causing repetitive trauma.²

Patients with tracheobronchial obstructions present with persistent cough, asthma, like wheezing, dyspnea and ventilatory failure which affects the quality of life. The mainstay of treatment for symptomatic lesions is surgery, which can be risky to the patient. Interventional bronchoscopy is considered as the first-line treatment in patients with tracheobronchial obstruction. Interventional bronchology techniques,

including argon plasma coagulation, cryotherapy, tracheal dilation and stenting are quite effective treatments for patients with central airway obstruction or less.³

Granulation tissue is pink, soft, granular in gross appearance. Histological appearance shows proliferation of fibroblasts, new capillaries (which are thin-walled and delicate), in a loose extracellular matrix, often with admixed inflammatory cells, mainly macrophages.⁴ Presence of these fragile capillaries in initial phase makes granulation tissue prone to bleed.

Airway management is crucial in such cases as the airway is shared by the anaesthesiologist and the surgeon. Also the granulation tissue is prone to bleed which can lead to further complications during bronchoscopy and dilatation.

Here we present anaesthetic management of a case of left lung collapse secondary to granulation tissue formation, the cause of which could not be ascertained.

Case Report

A 50 yrs old female presented with a history of cough for past 3-4 months which was insidious in onset. To start with it was dry in nature, became productive in past 3 days. It was not associated with postural or diurnal variation. It was also associated with shortness of breath, exertional in nature, without postural or diurnal variation. Patient was a known case of left renal stone (measuring 16 mm in) for past 6 months for which she was taking herbal medications. She had history of hypertension for past 6 months for which she was on tab amlodipine 5 mg OD. On examination patient had pulse rate of 80 bpm, regularly regular, blood pressure of 140/90mm Hg. On auscultation patient had grossly decreased air entry on left side. S1, S2 were normal. Airway examination revealed an MPG grade 2 with bucked teeth and short neck with thyromental distance of <6.5 cm. Her bga showed pO₂ value of 84.5, pH 7.43. HCO₃⁻ 23.2 and O₂ saturation of 96.7%. Her chest x-ray showed collapse of left hemithorax. She was treated for the same in a private hospital where she was evaluated for cardiac causes and 2 D Echo was done which was normal with ejection fraction of 67%. Video bronchoscopy (figure 1) showed completely obstructed left main bronchus which bled on touch. Bronchial washings and brushing samples were analysed and were found negative for malignant cells as well as acid fast bacilli. Microscopy of bronchial brushing revealed benign bronchial epithelial cells, along with macrophages, neutrophils and lymphocytes against a haemorrhagic background. CECT Chest showed collapse of left hemithorax with left sided pleural effusion with abrupt cut off of left main bronchus just distal to its origin with tracheomediastinal shift towards left side, FOB showed

stenosis of left main bronchus, virtual bronchoscopy showed circumferential mural thickening (approx 1 cm after carina) in left main bronchus with near complete luminal obliteration (for a length of approximately 2.5 cm). Near complete collapse of left lung parenchyma with loss of left lung volume and shift of heart and mediastinum towards left, mild left pleural effusion. Pulmonary function tests revealed pre bronchodilator FVC 59%, FEV₁ 64.4%, FEV₁/FVC % 96.4% showing moderate restriction.

No pre operative medication was given. Patient was explained about the risk involved due to difficult airway and informed written consent was taken for post op mechanical ventilation, tracheostomy. On OT table all routine monitors were attached (Heart rate, SpO₂, blood pressure, ECG). Difficult airway cart with assorted airways, assorted tubes of various sizes, classic P-LMA of size 3 and 4 was kept ready. Equipment for tracheostomy and cardiothoracic surgical team was kept ready as backup in case of loss of airway. Preoxygenation done with 100% O₂ for 3 min. After securing intravenous (iv) line, inj glycopyrrolate 0.2 mg and injection fentanyl 100 microgram, inj propofol 140 mg was given iv. After check ventilation injection succinylcholine 100 mg was given. Rigid bronchoscope inserted and procedure started. Anaesthesia was maintained with injection propofol 30 mg and injection atracurium 5 mg iv SOS, IPPV with 100% O₂ in between the procedure. The granulation tissue was cauterised by passing a flexible cautery through the bronchoscope. A guidewire of size 2.5 mm was passed through the gap created in granulation tissue. Now flexible bronchoscope was used for 3-4 serial dilatations and after the procedure patient was extubated.



Figure 1: video bronchoscopy -completely obstructed left main bronchus, bleeding on touch.

Discussion

We present a case of granulation mass in left main bronchus which was posted for cauterisation and dilatation using a rigid bronchoscope as a conduit for instrumentation. Our patient presented with complaints of cough for past 3-4 months associated with shortness of breath. virtual bronchoscopy showed circumferential mural thickening (approx 1 cm after carina) in left main bronchus with near complete luminal obliteration (for a length of approximately 2.5 cm). microscopic examination of bronchial brushings revealed granulation tissue. Various anaesthetic risks involved in such patients include difficulty in maintaining the airway as there are chances of bleeding from the granulation tissue and sharing the airway with the surgeon makes the communication between surgeon and the anaesthesiologist very important part of management of such patients. To decrease the airway reactivity, patient was nebulised with duolin respules preoperatively. Patient was preoxygenated adequately till her expiratory O₂ became > 90%. Injection propofol was used for smooth induction. Previously anaesthesiologists have used DLT tubes to isolate the

two sides of lungs to prevent spillage of blood and tissue from one side to another.⁵ Other devices that can be used for lung isolation are dependent blockers such as univent tube and independent blockers such as Arndt™, Cohen™, Fuji™ and EZ™-blocker.⁵ But these devices were not used in our case due to non availability.

Some authors have also used rigid bronchoscope to resect intratracheal tumor under general anaesthesia where ventilation was continued via side port by connecting the breathing circuit. Rigid bronchoscope was used as a port for punch biopsy.⁶

In our case we preferred general anaesthesia to insert rigid bronchoscope using short acting muscle relaxant (succinylcholine) as spontaneous ventilation could prove ineffective. Rigid bronchoscope can be inserted under local anaesthesia too but that becomes uncomfortable for the patient, hence not preferred in such cases where we need immobility of the patient and there is risk of losing the airway due to bleeding.

Anaesthesia was maintained with inj propofol and inj atracurium and not with inhalational agents as multiple interruptions during instrumentation through bronchoscope makes it difficult to achieve adequate MAC. We were also ready with CTVS surgeon for cardiopulmonary bypass if the need arises in case of loss of airway anytime during surgery.

It is always advisable to evaluate the patient radiologically in cases of airway obstruction due to any mass to weigh our options as any obstruction in thoracic part of trachea will not be relieved even on tracheostomy.

Conclusion

Even though rigid bronchoscope provides a good conduit for passing cautery and various other instruments while debulking or managing mass in

tracheobronchial tree, its use can be traumatic to the patient. We suggest the use of a supraglottic device instead of rigid bronchoscope as a conduit for ventilation as well as instrumentation. We cannot stress enough on the fact that close communication between surgeon and anaesthesiologist is essential in any tracheobronchial surgery.

References

1. <https://radiopaedia.org/articles/resorptive-obstructive-atelectasis>
2. Georges An Unusual Case of Recurrent Post-Obstructive Pneumonia from Spontaneous Granulation Tissue Formation Georges Al-Helou1*, Sripooja Satya2, Brian Senisi2, Robert Maximos3 and Jalil Ahari1 *Int J Respir Pulm Med* 2016, 3:050 ISSN: 2378-3516 Volume 3 | Issue 3
3. Chen hengai Successful treatment of bronchial obstruction by flexible bronchoscopy and isoniazid: A case report HENGYI CHEN, XIN HONG and YONG HE Department of Respiratory Medicine, Daping Hospital, The Third Military Medical University, Chongqing 400042, P.R. China Received July 19, 2013; Accepted November 11, 201
4. Kumar V, Abbas AK, Aster JC, Perkins JA. Robbins and Cotran pathologic basis of disease.2015:103.
5. Kumar KM, Sharma R, Hasnain S. Anaesthetic management of left main bronchus glomus tumour. *Indian J Anaesth.* 2016. 60(4): 276-79.
6. Uma B, Kochhar A, Verma UC, Rautela RS. Anaesthetic management for bronchoscopy and debulking of obstructing intratracheal tumor. *Saudi J Anaesth.* 2015;9(4):484-8.