

# Anaesthetic management of left main bronchial glomus tumour

## Address for correspondence:

Dr. Mathangi Krishnakumar,  
Department of Anaesthesiology  
and Critical Care, Armed  
Forces Medical College,  
Wanowrie, Pune - 411 040,  
Maharashtra, India.  
E-mail: mathz89@gmail.com

**Mathangi Krishnakumar, Rammurti Sharma, Harshwardhan Singh Pawar,  
Shahbaz Hasnain**

Department of Anaesthesiology and Critical Care, Armed Forces Medical College, Pune, Maharashtra, India

## ABSTRACT

Glomus tumours involving bronchus are rare. Surgical resection is the treatment of choice for this tumour, with excellent prognosis. The nature and location of tumour pose a significant challenge for perioperative anaesthetic management. However, there is a paucity of case reports on anaesthetic risks involved in case of a bronchial glomus tumour. We present a case of glomus tumour involving left main stem bronchus, subjected to bronchial sleeve resection. The various anaesthetic implications of this tumour type and airway management with right double lumen tube are discussed.

**Key words:** Bronchial glomus tumour, glomus tumour, right double lumen tube

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## INTRODUCTION

Anaesthetic management of surgery for tumours involving the respiratory tract poses a significant challenge due to need for control of ventilation, oxygenation and providing a good operative field. This necessitates advance planning and good teamwork between the anaesthesiologist, surgeon and theatre nurses. The main anaesthetic considerations are one lung ventilation, maintenance of airway and ventilation with an open airway. The various techniques which can be used depend on the location, pathology and type of tumour.

Glomus tumours arise from glomus bodies present usually in dermis and subcutaneous tissue. The incidence is as low as 1.6% of all soft tissue tumours. Very rarely, they can also be found in other locations such as bone, heart, stomach, eyelid, nasal cavity, mediastinum, lung, rectum, uterus, vagina and labia.<sup>[1]</sup> Till date, about 29 cases of tracheal and two cases of bronchial glomus tumour have been reported.<sup>[2-4]</sup>

The resection of glomus tumour in other regions, especially of the head and neck presents a formidable challenge and is associated with life-threatening anaesthetic risks.<sup>[5]</sup> However, with increasing

understanding of behaviour of the tumour, there is a significant reduction in complications. Perioperative management aims to prevent adverse events, mandating familiarity with presentation and related anaesthetic challenges.

## CASE REPORT

A 34-year-old male presented to the oncology department with diagnosis of malignant glomus tumour of left main stem bronchus. He had a past history of repeated hospital admissions with complaints of acute episodes of breathlessness, fever and cough with haemoptysis over the past 1 year. He was found to have a bronchial tumour on computed tomography (CT). A diagnostic and therapeutic rigid bronchoscopy was performed 2 months back. The patient had episodes of bronchospasm and desaturations during the procedure which was

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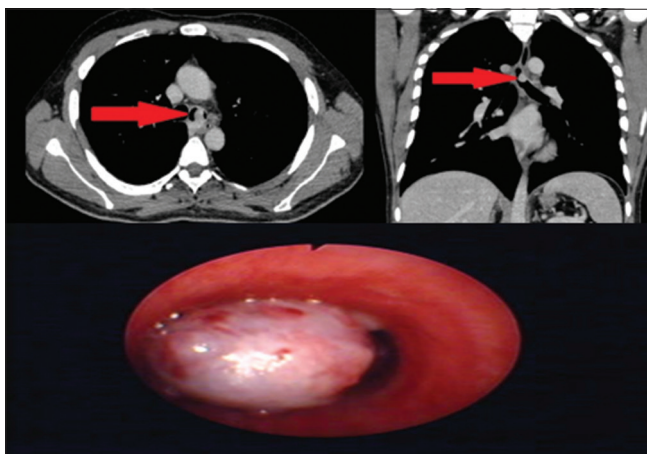
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managed with oxygenation, bronchodilators and steroids. The histopathology supported a diagnosis of malignant glomus tumour positive for muscle-specific actin, desmin and vimentin.

Routine laboratory tests were within normal limits except for anaemia (10 g%). Electrocardiogram (ECG) and pulmonary function tests (forced vital capacity - 4.43 L [98%], forced expiratory volume in first 1 s - 3.16 L [82%]) were within normal limits. Computerized tomogram (CT) chest revealed a recurrence of growth in left main bronchus (15 mm × 19 mm × 20 mm) projecting into the carina and trachea [Figure 1]. Flexible bronchoscopy showed a polypoid, vascularised tumour occluding the left main bronchus arising from the posterior wall [Figure 1]. The surgical plan was a left sided thoracoscopic mobilisation of left main bronchus followed by a right thoracotomy for sleeve resection and anastomosis of left main bronchus.

Salmeterol and ipratropium nebulisation and injection. hydrocortisone 100 mg were administered a day before surgery.

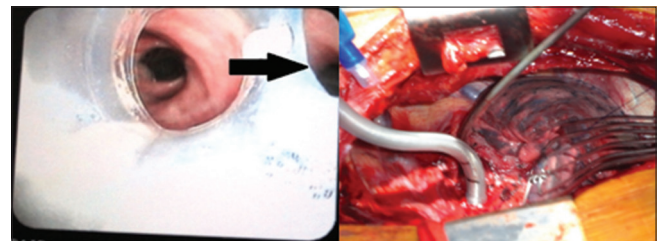
In the operating room, monitors (pulse-oximeter (SpO<sub>2</sub>), ECG, non-invasive blood pressure (BP) and temperature) were applied, and the baseline values were recorded. A large-bore intravenous (IV) cannula was secured. Thoracic epidural catheter was placed at T7-8 under local anaesthesia. Patient was pre-oxygenated with 100% oxygen for 5 min. Anaesthesia was induced with IV fentanyl 2 µg/kg and thiopentone 4 mg/kg and inhalation via mask with oxygen, nitrous oxide and sevoflurane. Initially, trachea was intubated using vecuronium 0.1 mg/kg and single



**Figure 1:** Computed tomography scan showing tumour in bronchus along with bronchoscopy showing polypoid tumour arising from wall of bronchus

lumen endotracheal tube size with internal diameter of 8.0 mm. Right subclavian vein was cannulated for central venous pressure (CVP) monitoring, and an invasive arterial line was established for continuous BP monitoring and periodic arterial blood gas analysis. A flexible bronchoscopy was done to assess the airway and extent of bronchial obstruction. Subsequently, a 37 Fr right-sided double lumen tube (DLT) was carefully placed replacing the single lumen tube under bronchoscopic visualisation. DLT placement was confirmed and adequate ventilation of the right upper lobe was ensured [Figure 2]. Anaesthesia was maintained with 50% N<sub>2</sub>O in oxygen and sevoflurane 2%. An epidural infusion of 0.125% bupivacaine with 2 µg/ml fentanyl was started at 5 ml/h. At the time of starting of the procedure, the monitored values were heart rate - 84/min, BP - 122/84 mmHg, CVP - 11 mmHg, SpO<sub>2</sub> -100% and CO<sub>2</sub>, EtCO<sub>2</sub> -37mmHg.

For the left thoracoscopy and mobilisation, the patient was positioned in the right lateral position and the left lung was collapsed. Ventilator settings were adjusted so as to avoid any barotrauma or unacceptably high airway pressure (peak inspiratory pressure >30 cm H<sub>2</sub>O). FiO<sub>2</sub> was kept at 100%; respiratory rate (RR) was adjusted to maintain minute ventilation and tidal volume 350–400 ml. Following this, the right femoral artery and vein were prepared for possible urgent cardiopulmonary bypass, which was kept on standby. For a right postero lateral thoracotomy, patient was repositioned to a left lateral position. The position of DLT was confirmed by fibreoptic bronchoscopy and the right lung was collapsed for surgery. Ventilation was maintained with FiO<sub>2</sub> 100%; tidal volume 350 ml; RR 16/min; peak airway pressure 25 cm H<sub>2</sub>O and EtCO<sub>2</sub> between 35 and 40 mmHg. During the procedure, there were 5 episodes of desaturation with SpO<sub>2</sub> 70–80% which was managed initially with oxygen insufflations of non-ventilated lung and application of positive end-expiratory pressure 3–5 cm H<sub>2</sub>O to the ventilated lung. During events of persistent low saturation, surgery



**Figure 2:** Bronchoscopy confirming correct placement of double lumen tube (left) and flexometallic tube inserted to distal bronchus after tumour resection (right)

was interrupted, and both the lungs were ventilated till SpO<sub>2</sub> 100% was achieved.

After adequate mobilisation and sufficient surgical access, a sterile flexometallic endotracheal tube size 6.5 mm was inserted to left main bronchus (by surgeon) before resection of the proximal end of the left main bronchus along with the tumour [Figure 2]. The ventilation of the left lung was maintained separately with sterile connecting tubing attached to a Bain's circuit. It was ensured that a tidal volume of about 250 ml was delivered while maintaining an EtCO<sub>2</sub> between 35 and 45 mmHg. There were three episodes of sudden tachyarrhythmia while handling the tumour which was managed with beta-blockers. The arrhythmias settled once the tumour was removed. After completion of two-third anastomosis between the cut ends of the left main bronchus, the flexometallic tube was removed and both the lungs were ventilated via the DLT. The surgery lasted 7 h with 1 h of the right lung ventilation and 4.5 h of the left lung ventilation.

On completion of anastomosis and checking for air leaks, the chest was closed after placing chest drains. The DLT was replaced with a single lumen endotracheal tube over a bougie and a check bronchoscopy was done. The trachea was extubated 3 h after surgery. The post-operative pain was managed with epidural morphine 3 mg along with 0.125% bupivacaine in 10 ml normal saline as and when required. The patient was mobilised and transferred to surgical ward on the post-operative day 4.

## DISCUSSION

We present a case of left main bronchus glomus tumour which was managed with resection anastomosis of left main bronchus. Our patient presented with repeated episodes of cough, fever and acute respiratory embarrassment and a mass in bronchus on CT chest. This is similar to presentation in previous reported cases of glomus tumour of airway and lungs.<sup>[1,4]</sup> Glomus tumour should be considered a differential diagnosis in any mass lesion involving the respiratory tract in addition to carcinoid, haemangioma and metastatic tumours due to their similarity in presentation.

Anaesthetic management stems directly from pre-operative concerns. The most important risk involved in resection of glomus tumour is their ability

to secrete catecholamines, serotonin, histamine and bradykinin owing to their relationship to neuroectodermal tissue and chromaffin tissue.<sup>[6]</sup> A detailed history and physical examination for features of pheochromocytoma and carcinoid are important in addressing this issue. There was history of bronchospasm during previous bronchoscopy which could be attributed to either the secretion of histamine by the tumour or use of propofol.<sup>[7]</sup> To avoid any adverse events, thiopentone was used for induction and the patient was given steroids pre-operatively to reduce increased airway reactivity. Intraoperatively, there were episodes of tachycardia and hypertension. About 1–4% glomus tumours reported in literature have been shown to secrete norepinephrine, attributing to these presentations.<sup>[6]</sup> However, pre-operative levels of catecholamine and urinary vanillylmandelic acid were found to be normal. Catecholamine secretion may be subclinical in some patients and the surgical handling of the tumour might have increased secretions.<sup>[6]</sup>

Anaesthetic management of left bronchial glomus tumours is a formidable challenge. This relates to the risks associated with their resection and choice of airway device for lung isolation. Various devices for lung isolation are available which include DLTs, dependent blockers such as univent tube and independent blockers such as Arndt™, Cohen™, Fuji™ and EZ™-blocker. DLT and bronchial blocker should be part of the armamentarium of every anaesthesiologist involved in lung isolation techniques, and every device should be tailored to specific case needs.<sup>[8]</sup> Sleeve resection of left main bronchus and near total obstruction of lumen by the tumour as in the present case are a few indications for the use of a right DLT.<sup>[9]</sup>

The right DLT due to its inherent design is difficult to position, has a smaller margin of safety and increased incidence of intraoperative malposition.<sup>[8,9]</sup> Knowledge of bronchoscopic anatomy (A), use of fiberoptic bronchoscopy (B) for placement and confirmation and assessment of tumour size and location along with the tracheobronchial anatomy from chest CT and X-ray chest (C) will help the anaesthesiologist take an informed decision on tube size, choice and placement.<sup>[9]</sup> Following these simple steps of "ABC" will ensure correct placement, remove apprehension and encourage use of right DLT when the situation arises for the same.

The episodes of desaturation during left lung ventilation with the tracheal lumen of DLT could be

attributed to the occlusion of the left main bronchus by the tumour and by virtue of compression of tracheal lumen of DLT in left lateral position.

## CONCLUSION

Management of bronchial glomus tumour can be successful with thorough preparedness, assessment, choice of lung isolation device and knowledge of tumour behaviour in successful anaesthetic management.

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## Conflicts of interest

There are no conflicts of interest.

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