

Colon carcinoma with endobronchial metastasis masquerading as bronchial asthma causing ball valve effect

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SUMMARY

Malignant central airway obstruction (CAO) with ball valve effect (BVE) in the lung is rare. We discuss a case of metastatic colon cancer who presented with asthma like symptoms which thoracic computed tomography and bronchoscopy revealed an intraluminal tumour obstructing the left main bronchus in a ball valve manner. Airway patency was restored urgently with immediate alleviation of symptoms. This illustrates the importance of recognizing subtle features of central airway obstruction to allow expedition of appropriate investigations and therapy.

INTRODUCTION

Central airway obstruction (CAO) is a known complication from primary or metastatic tumour in the lung. Obstruction that behaves in ball valve manner can lead to pneumothorax and subsequent cardiorespiratory compromise. Thus, timely management of this local crisis is essential, in concurrence with adequate systemic control of the underlying malignancy. Symptoms of CAO are variable and case reports on central airway obstruction masquerading as bronchial asthma are not uncommon.^{1,2} Hence, high clinical suspicion is pertinent to ensure prompt recognition of this potential lethal condition to allow expedition of appropriate investigations and therapy. We report a case of progressive colon cancer with endobronchial metastasis causing ball valve effect in the lung, who presented with new onset asthma like symptoms.

CASE REPORT

A 56-year-old lady with progressive metastatic colon cancer presented with two weeks history of exertional dyspnea and wheezing. Her modified medical research council (mMRC) dyspnea scale was 3. She had no history of bronchial asthma and had good functional status prior to these new symptoms. Physical examination revealed monophasic wheeze over the left parasternal edge and saturation under room air is 100%. Chest radiograph on examination noted a lingular mass with hyperinflated left lung. Flow volume loop was normal on spirometry as well as arterial blood gas. Thoracic computed tomography (CT) showed an enlarging lingular mass with endobronchial extension into the left main bronchus (LMB) causing obliteration of the airway with hyperinflation of

left lung (Figure 1). Flexible bronchoscopy confirmed that the LMB was partially occluded by the intraluminal tumor in a ball valve manner, with only a slit like opening between the tumour and the posterior wall of LMB. Copious viscous secretion was noted from distal airway. Patency of LMB was urgently restored via rigid bronchoscopy with mechanical debulking and argon plasma coagulation. The tumour was shaved off to the lumen of lingular bronchus, allowing aeration of the left upper divisional and lower lobe bronchi. Post procedure, patient reported immediate relief of her symptoms. Surveillance bronchoscopy six months later demonstrated a patent LMB (Figure 2). Her underlying malignancy was meanwhile being controlled with further effective palliative systemic oncological therapy.

DISCUSSION

Central airway obstruction (CAO) occurs in 20-30% of patients with primary lung cancer or secondaries to the lung.¹ CAO with ball valve effect (BVE) can lead to catastrophic complications. BVE occurs when a partially occluded airway only allows inflow of air during inspiration, but prevents outflow during expiration phase of breathing. This leads to lung hyperinflation distal to the obstruction. In untreated cases, pneumothorax and cardiorespiratory compromise would ensue. Malignant central airway obstruction causing BVE in the lung is rare with only few reported cases in literature.³

Presentation of CAO is variable. It depends on the location of obstruction, rate of progression, underlying health status and post-obstructive sequelae.¹ In patients with BVE with partially obstructed airway, a misdiagnosis of exacerbations of asthma or obstructive airway disease may occur.¹ Case reports on central airway obstruction masquerading as bronchial asthma are not uncommon.² Hence, high clinical suspicion is crucial for high risk patients who present with new onset wheezing and hyperinflation symptoms such as reduced effort tolerance. Our patient presented with new onset wheezing and exertional dyspnea symptoms which completely resolved after the patency of central airway was restored.

The flow-volume loop can be useful in evaluation of patient with CAO. In general, flow-volume loop with bicompartamental

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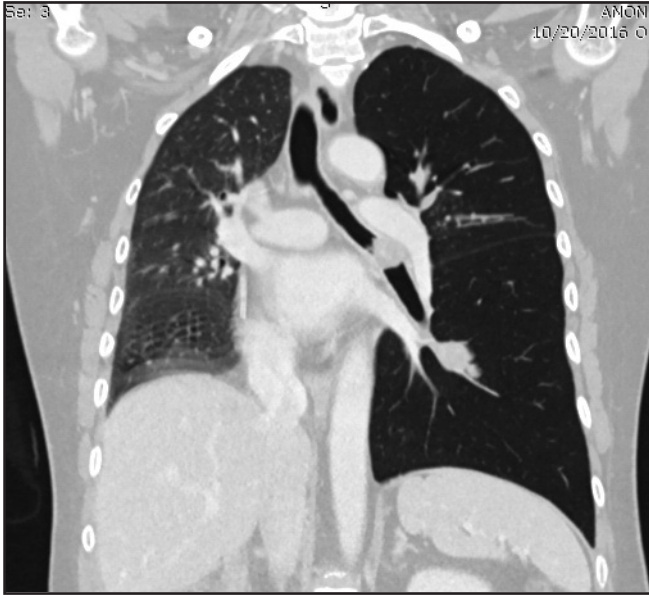


Fig. 1: Contrast enhanced computed tomography of thorax showed a lingular mass with endobronchial extension into the left main bronchus (LMB) causing obliteration of the airway with hyperinflation of left lung.

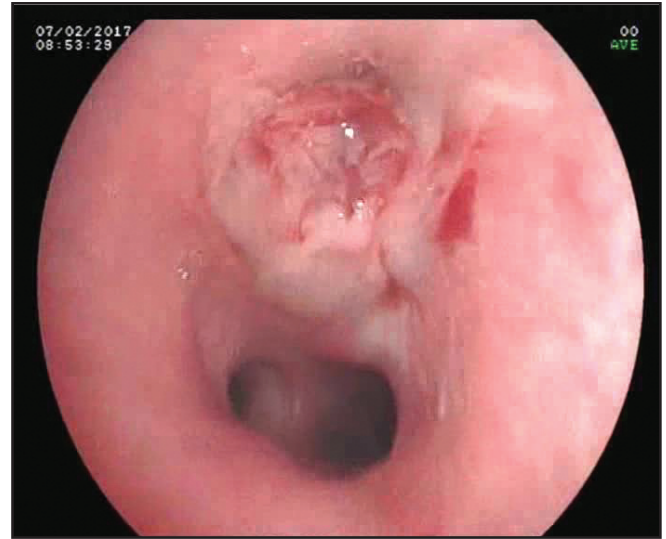


Fig. 2: Surveillance bronchoscopy six months post debulking demonstrated a patent LMB with occluded left upper lobe bronchus.

configuration of the inspiratory arm suggests unilateral obstruction of the main bronchi.^{1,4} However, classical spirometric patterns for CAO are uncommon in daily practice as the pattern will depend on the site, extent and the type of obstructive lesion towards the maximum inspiratory and expiratory flow. Hence, the absence of classic spirometric patterns for CAO does not accurately predict the absence of pathology. Thus, endoscopic and radiological techniques are the next step to confirm CAO.⁵ Although the flow volume loop in our patient was normal, contrasted CT thorax demonstrated classical main bronchi obstruction with associated distal lung hyperinflation, which was confirmed endoscopically. This demonstrates the pertinent role of CT thorax and bronchoscopy in diagnosing central airway obstruction and the limitation of diagnosing central airway obstruction using flow volume loop clinically.

Timely management of central airway obstruction with BVE is crucial. Rigid bronchoscope is recommended over flexible bronchoscopy as it provides better control of airways and concurrently allows passage of multiple instruments for therapeutic intervention.¹ Our patient was managed successfully via rigid bronchoscopy with immediate relieve of

her symptoms to baseline post procedure. She remained asymptomatic with continuation of effective palliative systemic oncological therapy. In conclusion, central airway obstruction causing ball valve effect is uncommon. It can masquerade as bronchial asthma and any delayed intervention could potentially lead to catastrophic complications. Hence, high clinical suspicion allows prompt appropriate intervention to prevent morbidity and mortality.

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