



## Case Report

# A curious case of exploding cannonball

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### ABSTRACT

Pulmonary cavitory lesions with pneumothorax are very common in chest imaging and usually pose diagnostic challenge to clinicians. Pneumothorax with a cavitory lesion is a rare occurrence in primary and metastatic lung cancer. A 40-year-old male presented with cough with whitish expectoration, right loin pain, loss of weight and appetite for 3 months and difficulty in breathing for 2 days. Chest x-ray was suggestive of right-side pneumothorax with bilateral nodular opacities in all zones. Contrast-enhanced computed tomography (CECT) thorax and abdomen revealed a non-homogenous large mass in the right kidney with hydronephrotic changes with cavitory lesions in bilateral lungs. Urine cytology was suggestive of urothelial carcinoma. Thus, a diagnosis of urothelial cancer with cavitating metastasis leading to secondary spontaneous pneumothorax was made. Herein, we aim to highlight that cavitating metastasis should be considered in a case of pneumothorax with bilateral lung nodules.

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## 1. Introduction

Secondary Spontaneous Pneumothorax (SSP) can be seen in various lung tumours such as primary tumours, metastasis and Lymphangitis carcinomatosa. However, Urothelial carcinoma with pneumothorax as the initial presentation is rare. Only about 1% of SSP is due to lung metastasis in renal carcinoma.<sup>1</sup> These lesions may present as a solitary mass, interstitial micronodule or multiple nodules. When multiple nodules are present, they are usually round and well-circumscribed, without calcification or cavitation.<sup>2</sup> In this case, an unusual presentation of secondary spontaneous pneumothorax in a case of upper urinary tract urothelial carcinoma is being described with a brief review of the literature.

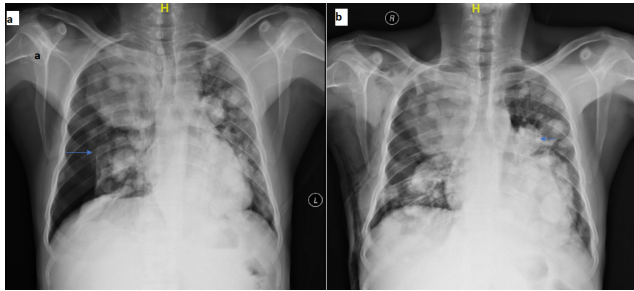
## 2. Case Details

A 40-year-old male smoker (smoking index-140) presented with acute onset breathlessness for 2 days. He had a cough with scanty expectoration, right loin pain, loss of weight and loss of appetite for 3 months. He had no history of fever, chest pain, abdominal distension, burning micturition, hematuria and reduced urine output. Because of acute onset of breathlessness, a chest radiograph was obtained which showed hyperlucency and absent bronchovascular markings in the right lung in all zones with bilateral nodular opacities (cannonball) in all zones. Ultrasound thorax was done which showed the absence of lung sliding on the right side which confirmed the presence of pneumothorax and a right-sided tube thoracostomy was done. He symptomatically improved after tube thoracostomy. Hemogram, renal and liver function test was normal in the range. CECT thorax and abdomen were taken to find out primary carcinoma. It revealed multiple well-circumscribed heterogeneously enhancing nodular lesions

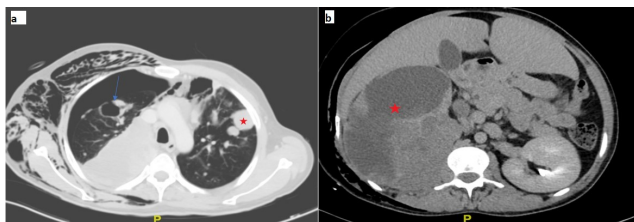
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arising from the wall of dilated calyceal system with Grade 4 right hydronephrosis, suggestive of malignant growth in distal collecting system with pelvi-ureteric junction obstruction. In CT Thorax multiple cavitating nodules were seen bilaterally and surprisingly a cavitory lesion with an eccentric solid component was noted in the anterior segment of the right upper lobe, which showed subtle communication with the pleural cavity and subcutaneous emphysema. Because of growth in the distal collecting system, three samples of urine cytology were sent to find the tumour type which was suggestive of urothelial carcinoma. Doxycycline pleurodesis was done to prevent a recurrence. He is currently in palliative care under medical oncology.



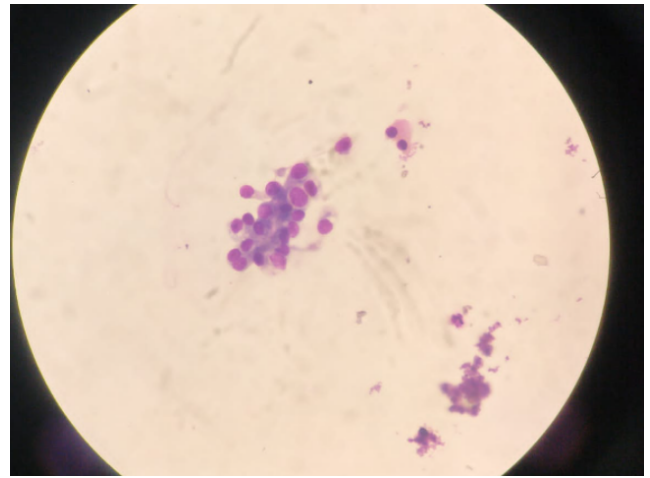
**Fig. 1: a):** Chest x-ray PA View: Bilateral Lung cannon ball metastasis with Right side pneumothorax (arrow indicates visceral pleural line); **b):** Chest Xray PA view Post ICD -Bilateral lung cannon ball metastasis.



**Fig. 2: a):** CECT Thorax-Right lung upper lobe cavity communicating with pleura with pneumothorax and subcutaneous emphysema. (Blue arrow-ruptured cannon ball, asterisk-cannon ball); **b):** CECT Abdomen-Enlarged right kidney with multiple heterogeneously enhancing nodules (asterisk).

### 3. Discussion

Lung metastasis is seen in 20-54% of extrathoracic malignancies. Typically, pulmonary metastasis appears scattered throughout the lungs bilaterally. Malignancies like squamous cell carcinoma primary lung and metastasis from squamous cell carcinoma of the head and neck, a primary tumour from gastrointestinal, transitional carcinoma of the bladder, sarcoma, pancreatic adenocarcinoma can cause metastatic cavitating nodules in the lung.<sup>3</sup> Atypical presentations of pulmonary metastasis include



**Fig. 3:** Urine cytology HPE image showed atypical urothelial cell

cavity, consolidation, calcification, haemorrhage and pneumothorax.<sup>4</sup>

Cannonball metastasis most commonly seen in renal cell carcinoma and choriocarcinoma, it was also noted less commonly in prostate carcinoma, endometrial carcinoma, synovial sarcoma and adrenal carcinoma.<sup>5</sup>

Pulmonary metastasis are usually asymptomatic (90% of the case).<sup>6</sup> Spontaneous pneumothorax can be primary (without any existing lung pathology) or secondary (with underlying lung disease). Cancer-related spontaneous pneumothorax is a rare event that accounts for 0.05-1% of all spontaneous pneumothorax but it can vary in different cancer. Pneumothorax in case of malignancy can occur due to tumour emboli, ball valve mechanism, rupture of cavitating metastasis and direct extension of the primary tumour.<sup>2</sup> Pneumothorax in pulmonary metastasis is most commonly associated with osteogenic sarcoma and germ cell tumours. But renal carcinoma with spontaneous pneumothorax with cannonball metastasis as the initial presentation is very rare. In this case, we identified right-side pneumothorax caused by cavitating pulmonary metastasis from urothelial carcinoma (UC) of the renal pelvis. Usually, only renal carcinomas with Birt-Hogg-Dubé syndrome leads to the development of pneumothorax. Birt-Hogg-Dubé syndrome's clinical manifestations includes lesion (fibrofolliculoma, angiofibroma, acrochordons, oral papules, cutaneous collagenomas, and epidermal cysts), pulmonary lesion (cyst and pneumothorax) and a variety of renal carcinoma. Some patients have spontaneous pneumothorax and renal tumours without cutaneous manifestations. Diagnosis of Birt-Hogg-Dubé syndrome is established by the identification of a mutation in FLCN or cutaneous manifestations like fibrofolliculoma.<sup>7</sup>

UC of the upper urinary tract is uncommon and accounts for only 5 to 10% of UCs, in contrast to bladder tumours. Sporadic cases of lung metastasis associated with UC of the bladder, have occasionally been reported when compared to upper urinary tract urothelial cell carcinoma.<sup>8</sup>

In renal cell carcinoma, the risk of spontaneous pneumothorax is high in patients receiving chemotherapy compared to those who have not been receiving chemotherapy as chemotherapy predisposes the rupture of the necrotic subpleural micrometastasis.<sup>3</sup> However, this patient has not received chemotherapy and was found to have pneumothorax at the time of initial presentation.

#### 4. Conclusion

Pulmonary nodules with pneumothorax are not always due to a primary lung lesion. It can also occur in case of lung metastasis from a distant primary. Hence, clinicians should keep a high index of suspicion in a case of cavitating lung lesion resulting in pneumothorax and look for features of malignancy elsewhere in the body.

#### 5. Acknowledgments

None.

#### 6. Conflict of Interest

None.

#### 7. Source of Funding


None.

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