



Atypical Cavitary Lung Lesions: A Case Report and Review of Radiologic Manifestations

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Case Report

A 68-year-old woman presented to our emergency department with a 15 day history of epigastric discomfort radiating to the back. She had undergone a hysterectomy with bilateral salpingo-oophorectomy ten years before, for a FIGO stage 1 endometrioid adenocarcinoma. While abdominal examination was unremarkable, her liver function tests showed a cholestatic picture. An ultrasound scan of the abdomen revealed several gallstones as to the cause of this pain. Incidentally on chest radiograph, several lung lesions were noted bilaterally (Figure 1). On further questioning, the lady admitted to a one-year history of asthma with cough during the day and exertional dyspnoea. Inhaled corticosteroids prescribed for her 'asthma' proved to be ineffective. She was a non-smoker. She denied other respiratory symptoms, night sweats, chills, rigors or weight loss. She managed a good appetite and a good exercise tolerance for her age. There was no history of old TB, recurrent chest infections, recent travel or the presence of any mould at home.

The findings in her chest were completely normal as was the rest of her examination. She had a total white cell count of $8.7 \times 10^9/L$ and an eosinophil count of $0.07 \times 10^9/L$. ESR was 42 and CRP was 23. A contrast-enhanced CT scan revealed multiple thin-walled cavities, most containing a soft tissue attenuation mass, in some cases with an air crescent sign. No halos of ground glass opacification surrounded these lesions (Figure 2). A radiological diagnosis of invasive aspergillosis was thus made. Serum galactomannan antigen test however resulted negative.

During bronchoscopy the posterior segment of the right upper lobe appeared to be infiltrated by tissue bearing prominent vascular markings (Figure 3a); the lumen of the right middle lobe was partially occluded by an intraluminal mass (Figure 3b). This intraluminal lesion bled easily on minimal contact. Cytology from lavage and brushings was negative. Culture was negative, and no fungal elements were seen. A repeat bronchoscopy unfortunately yielded no new information.

A CT-guided lung biopsy of a cavitating lesion was thus performed. The lesion in the middle lobe of the right lung was chosen for sampling. The biopsy samples almost completely consisted of complex epithelial glandular proliferation. There was very mild nuclear atypia, almost no mitotic activity and complex architectural features such as rigid cribriform spaces and nuclear stratification (Figure 4a). The tumour cells stained for CK7 and ER (Figure 4b) and were negative for CK20, TTF-1, p63 and CDX-2. These suggested a metastatic endometrial adenocarcinoma.

Hormonal therapy was the modality opted for, and 3 months after starting medroxyprogesterone acetate, the lesions had completely disappeared on chest radiograph. Fourteen months have passed since, and there has been no recurrence of either the cough or of the radiological findings (Figure 5).

Discussion

A cavity is a lucency within a zone of pulmonary consolidation, a mass, or a nodule; that is surrounded by a wall, usually of varied thickness [1]. Non-infectious causes of cavitation include malignancy, inflammatory conditions (e.g. rheumatoid, sarcoidosis and Wegener's granulomatosis), pulmonary infarcts, and other miscellaneous causes such as cryptogenic organising pneumonia and Langerhans' cell histiocytosis [2]. Primary lung cancers tend to form cavities more often than pulmonary metastases do. 22% of primary lung cancers [3] and 4% of pulmonary secondary cavitate, 69% of these are squamous cell carcinomas [4,5]. Pulmonary metastases commonly result from the breast, colon, skeletal or urogenital systems. They usually only cause symptoms if metastatic tumour growth occurs endobronchially [6], as is the case with our patient. Endobronchial metastases were causing a cough which was misdiagnosed as asthma.

Cavitation can be either spontaneous or therapy-induced; of which both chemo- and radio-therapy are known culprits. Spontaneous cavitation occurs by one of two mechanisms: i) either the tumour outgrows its blood supply with resultant central necrosis, or ii) a check valve mechanism [3]. Cavitation of pulmonary metastases occurs more



Figure 1: Postero-anterior CXR view showing multiple round lesions bilaterally.

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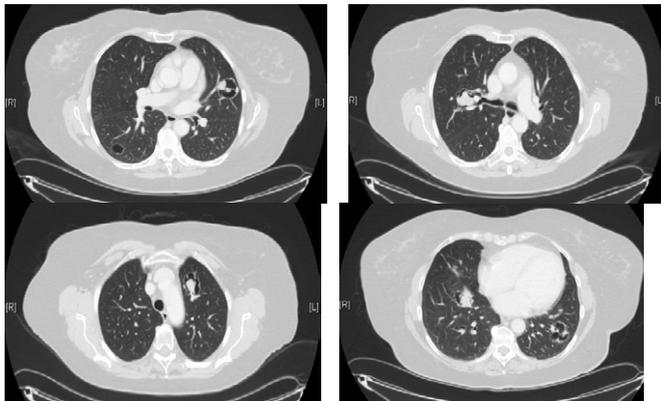


Figure 2: CT scan images showing multiple thin-walled cavities, most containing a soft tissue attenuation mass, in some cases with an air crescent sign. No halos of ground glass opacification are seen around these lesions.

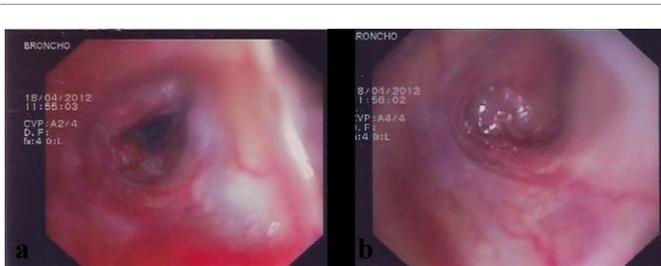


Figure 3: Bronchoscopy images showing: a) Posterior segment of right upper lobe bronchus appears infiltrated b) Mass obstructing sub-totally the right middle lobe bronchus.

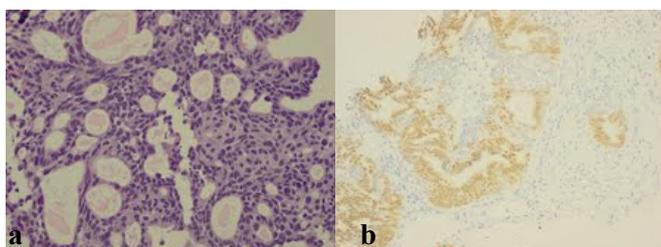


Figure 4: a) Metastatic adenocarcinoma with irregular glandular outlines and rigid cribriform spaces with a hint of squamous metaplasia. b) Diffuse ER staining and strong nuclear positivity.

commonly in the upper lobes, [4] and the location of the cavity is more often central [7].

The case we report clearly shows that metastases can exhibit unusual radiological features that make discrimination from other non-malignant pulmonary diseases difficult. Unusual features can include cavitation, calcification, peri-nodular haemorrhage, air-space pattern, pneumothorax, tumour embolism, solitary mass, endobronchial metastases, and dilated vessels within mass and sterilized metastases. The incidence of visible endobronchial metastases in the major airways is only 2%. The most common radiologic appearance is atelectasis of the corresponding lobe [5].

Features of a cavity suggestive of malignancy comprise of i) cavity wall thickness at its thickest section, and ii) irregular inner and outer margins. A cavity with a wall thickness of ≤ 4 mm is usually benign.

Wall thickness between 5 to 15mm can be either benign or malignant. If the thickness is more than 15mm, the cavity is usually malignant. However, thin walled cavities can still be seen with metastases from adenocarcinomas and sarcomas. Cavities in Wegener's granulomatosis can have irregular thick walls and thus it can be difficult to differentiate these from malignant cavities. The 'air-crescent sign' is generally a sign of an inflammatory process such as aspergillosis. Likewise; lung malignancy, tuberculosis and Wegener's granulomatosis can exhibit this sign too. One must also keep in mind the possibility of mycobacterial or fungal pathogens coexisting in malignant cavities [3]. A distinguishing feature between a malignant cavity and an aspergilloma, is that in malignancy the soft tissue lesion within the cavity, usually enhances with contrast. On the other hand, an aspergilloma exhibits a dependent location and adjacent bronchiectasis [8]. Ground glass opacification surrounding a nodule also known as the 'halo sign' is quite specific for aspergillosis. However, this has been also noted in some patients with pulmonary metastases, where it signifies peri-tumoral haemorrhage [3].

Despite having visualised endobronchial metastases in this patient, cytology was negative. A study on cavitary pulmonary metastases had showed lack of positive bronchial biopsies in all the patients with occluded bronchi secondary to endobronchial metastases [9].

In our case, radical treatment had been performed 10 years prior to the disease metastasising. She had been followed up for 6 years without disease recurrence. In the literature, only 2 cases report a longer interval from radical treatment of endometrial carcinoma to recurrence in the lung, that of 17 years; both of which had *non-cavitating* metastases. Nonetheless the histology of the first case was of the adeno-acanthoma type, with a solitary lung lesion that was amenable to resection [10]. The second case was an endometrial endometrioid adenocarcinoma metastasising to the lung as a large mass with satellite nodules [11].

Patients with low-grade metastatic endometrial carcinoma that are oestrogen-receptor positive, tend to respond as well to hormonal therapy as to cytotoxic chemotherapy, with fewer side-effects and lower morbidity. Trials demonstrate a progression-free interval of 4 to 6 months with medroxyprogesterone acetate [12]. The median interval from detection of lung metastases from endometrial carcinoma to death is only 5 months. 80% of patients usually succumb to the disease



Figure 5: CXR taken 3 months after starting methylprogesterone acetate.

within 12 months of diagnosis [10,12]. In our case, 14 months after detection of lung metastases, the patient is still progression-free with the aid of hormonal therapy. The chest radiograph is free from lesions.

The spectrum of radiological findings in pulmonary metastases is broad. A histo-pathological diagnosis allows an accurate diagnosis of metastases from non-malignant pulmonary diseases to be made. An early diagnosis of lung metastases may be critical in planning effective therapy.

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