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# Invasive Mucinous Adenocarcinoma Carcinoma of Lung Misdiagnosed as Non-Resolving Pneumonia: A Clinical Pitfall

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**Abstract:** ***A female in her late 60s, with no associated co-morbidities, came with complaints of cough with expectoration and exertional dyspnoea for 2 months and fever for 15 days. She was treated at the outside hospital 2months back for similar complaints, diagnosed to have pneumonia and treated with injectable antibiotics and other symptomatic measures and discharged. Following which patient had multiple episodes of recurrence of symptoms and each time was treated with anti-infection measures in view of the persistence of lesions on chest x-ray. Later was referred to our hospital as worsening of symptoms even after 3 days of treatment for further evaluation. After admission patient was empirically started on antibiotics and Computed tomography of thorax was done that revealed bilateral diffuse air space opacities with adjacent ground glassing and air bronchograms within. Bronchoscopy was done and bronchial washing microbiological evaluation was normal, auto immune workup was insignificant and thereby CT guided biopsy of lung was done that revealed Invasive Mucinous Adenocarcinoma Lung. This case report outlines a case of Invasive Mucinous Adenocarcinoma presenting as non resolving pneumonia, and to consider early pathological examination in cases presenting as bilateral lung lesions not responding to antibiotics.***

**Keywords:** Non-resolving pneumonia, Adenocarcinoma lung

## 1. Case Presentation

A female in her late 60's , came with complaints of cough with expectoration and dyspnoea on exertion for 2 months associated with fever for 15 days, patient had similar complaints 2 months back for which patient was treated at the outside hospital, where chest xray suggestive of bilateral non-homogenous opacity, thereby diagnosed as pneumonia and was treated with injectable antibiotics and other symptomatic treatment. And later after discharge as patient had persistence of symptoms, was treated with oral antibiotics and other symptomatic measures for every episode. However, symptoms recurred and became worse even after 3 days of treatment and thereby was referred to our hospital for further evaluation. On examination vitals revealed low saturation in room air thereby oxygen supplementation was started. General physical examination was normal. Respiratory system examination revealed bilateral infrascapular area, ifra-axillary and mammary areas fine crepitations were present.

## 2. Investigations

Blood investigation revealed leucocytosis and elevated CRP. Chest xray suggestive of bilateral non homogenous opacities (figure 1). CT thorax was done that was suggestive of confluent ill- defined air space opacities with adjacent ground glassing and air bronchograms within, involving the bilateral lung segments. Few nodular air space opacifications in the anterior segment of right upper lobe, medial and lateral segments of right middle lobe and basal segments of bilateral lower lobes (figure 2 and 3). Bronchoscopy was done that revealed normal study, no endobronchial growth. Bronchial washing sent for microbiological evaluation for tuberculosis, aerobic and anaerobic culture, culture for nocardia, actinomyces and fungus showed no growth. Auto-immune workup was insignificant. CT-guided lung biopsy was done and sent for microbiological evaluation that was normal. Histopathological evaluation of lung biopsy tissue suggestive of invasive mucinous adenocarcinoma of lung (CK7: POSTIVE, CDX2: FOCAL NUCLEAR POSITIVE, CK20: NEGATIVE). PET CT was done that was suggestive of hypermetabolic consolidatory lesions and diffuse nodular opacities in bilateral lungs – likely primary. Hypermetabolic mediastinal lymph nodes (figure 4).

Later on medical oncologist opinion was sought and was planned to start on palliative chemotherapy with platins and to send tissue for next-generation sequencing (NGS).

**Differential Diagnosis**

We evaluated the case initially with a differential diagnosis of non-resolving pneumonia , the linic radiological findings were suggestive of the same and also blood investigation suggestive of elevated leucocyte count and elevated CRP, bronchial washing done and microbiological evaluation came negative. Other diagnosis of Interstitial lung disease was considered , auto immune work up ( such as ANA profile, ANA global, ANCA , Rheumatoid factor, Anti CCP) was sent and the results were in significant. And as all the above work up was inconclusive, possibility of malignancy was considered and CT guided biopsy of lung was done that came as invasive mucinous adenocarcinoma lung.

**Treatment**

At the time of admission as patient was maintaining low saturation in room air and also ABG suggestive of type 1 respiratory failure, oxygen supplementation was started. And blood parameters showed leucocytosis with elevated CRP and also history of fever and cough with expectoration, started on empirical antibiotics with piperacillin and tazobactam plus azithromycin, along with other symptomatic treatment. During the course of hospital stay patient had sudden desaturation, thereby was shifted to high dependency unit (HDU) for further management and was started on non-invasive ventilation (NIV) in view of worsening tachypnoea, however patient improved symptomatically there by weaned of NIV and was shifted out of HDU to ward on oxygen supplementation via nasal prongs.

**Outcome and Follow-Up**

Patient did not have any further fever spikes, she required minimal oxygen supplementation via nasal prongs. Later on patient blood parameters showed improvement. Patient was shifted TO Medical oncology for starting on chemotherapy and NGS analysis.

**Discussion**

Mucinous Adenocarcinoma, formarly known as bronchioloalveolar carcinoma, is an infrequent micic of Non-resolving pneumonia, it accounts for 5% of lung carcinomas (5). This type of tumours do not have a specific clinical manifestion(6). The etiology and mechanism remain unclear, but the occurrence of IMA may be related to a variety of risk factors such as EGFR, KRAS and/or HER2 genes mutation (7-9). Its pathophysiology is associated with genetic factors, environmental factor and chronic inflammation. The pathological basis may be the invasive growth of cancer tissue derived from bronchioles or alveoli get disseminated in the airway, the cancer cells cover the surface of the alveolar wall and grow along the alveolar wall (7). Some patients with IMA can be asymptomatic, others present with non- specific respiratory sympyoms like cough, dysponoea, respiratory distress, chest pain, haemoptysis and other systemic symptoms like fever, weight loss.

Mucinous adenocarcinoma most commonly found to involve lower lobe of the lungs (10). Diagnosis of IMA is usually delayed because of its radiological appearance may mimic as infective pneumonia (11). It is easily misdiagnosed as pneumonia tuberculosis or pulmonary actinomycosis (19). And also may present in several other forms. And this rare neoplasm has also showen to have cavitation formation in the consolidations in 40% of cases (9). The variant with cavitation tends to have worse prognosis than the non cavitatory tye (12). IMA is difficult to diagnose not only because of its nonspecific clinical manifestations but also because of inflammation signs in imaging studies. The affected alveoli and normal alveoli are arranged in a mixed manner, which in this case manifested in the imaging study as diffuse and vague patchy shadows throughout both lungs.

According to the literature, IMA presenting as diffuse and patchy shadows are unusual. Most IMA cases manifest as patch consolidation in the lungs rather than diffuse and patchy shadows in the bilateral lungs. Thereby from this case we can learn that diffuse patchy shadows may be sign of IMA.

Overall Mucinous adenocarcinomas are considered to have same prognosis and survival as that of non-mucinous adenocarcinomas. However, stage at diagnosis and molecular markers are important in the evaluation and management of patients with adenocarcinoma lung (13,14).

IMA is divided into two types, pneumonic and solid types. These types have difference in clinical outcome. Compared with pneumonia IMA, the isolated type usually has more satisfying outcome. Reports have been found that patients with pneumonic type have significantly worse disease free survival and high recurrence and /or metastasis after resection (15,16).

According to previous reports it is found that IMA is associated with gene mutations and also immune check point inhibitors are widely used to treat patients with NSCLC (17). Nakagomi et al (18) reported that expression of PD-L1 in ≥1% of cells is observed in only 6.1% of IMAs.

Compared with untreated IMA patients, the overall survival rate of IMA patients receiving conventional chemotherapy does not improve (19). Early IMA patients can benefit from surgery and postoperative chemotherapy. At present, there are no effective drugs for the treatment of advanced pulmonary IMA (19).

The clinical manifestations of IMA are atypical, and the imaging findings vary. The diagnosis is often missed, and misdiagnosis is common. These issues delay treatment. Therefore, in clinical practice, when patients with bilateral diffuse consolidatory patches, do not respond to regular anti-infection treatment and the lesion persisting, IMA should be considered and early pathological examination should be performed to rule out IMA

**Learning Points/Take Home Messages**

- IMA to be considered in patients presenting with non-resolving pneumonia after adequate antibiotic therapy.
- IMA can present as bilateral diffuse ill defined air space opacities with air bronchograms**.**
- Early pathological evaluation will prevent delay in IMA diagnosis, and help in early initiation of treatment.

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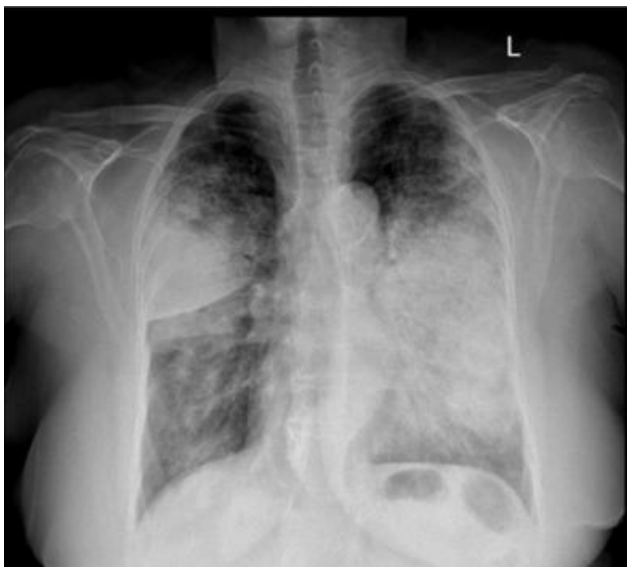


**Figure 1:** Chest X-ray suggestive of bilateral non homogenous opacities

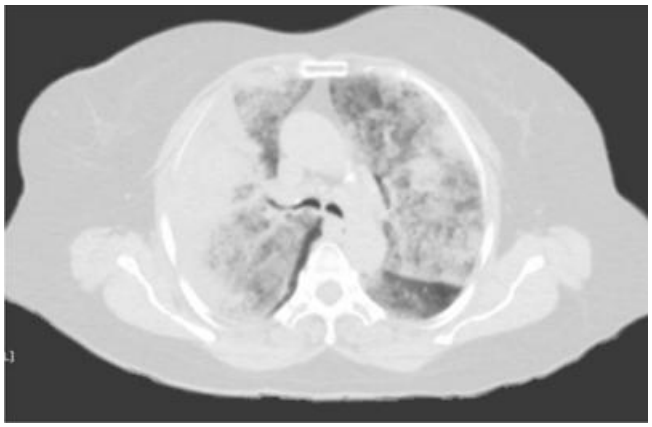

**Figure 2:** CT thorax: Showing bilateral ill defined air space opacities with adjacent ground glass opacities and air bronchograms within.

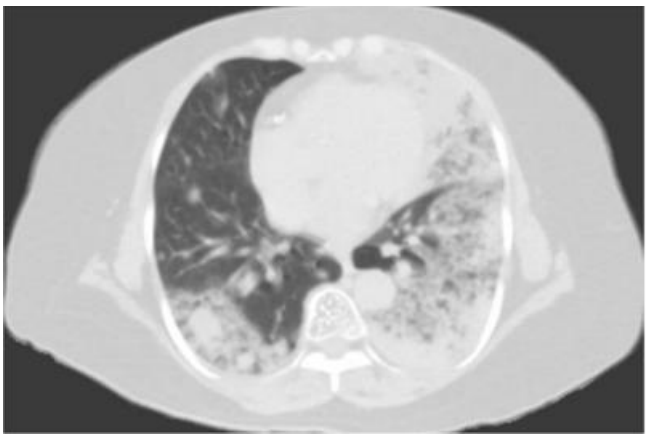

**Figure 3:** CT Thorax: showing bilateral ill defined air space opacities with adjacent ground glass opacities and air bronchograms within

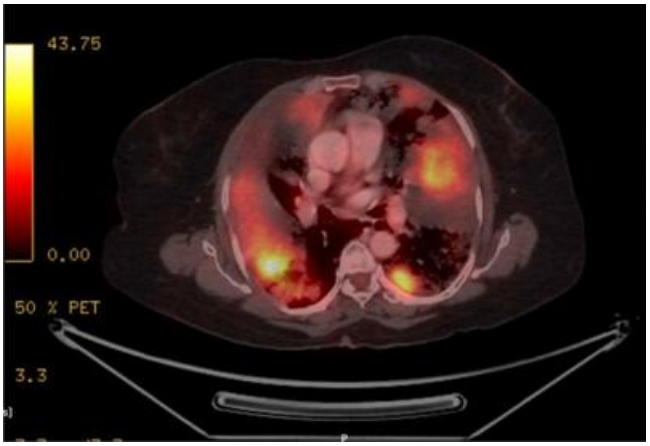


**Figure 4: PET CT** suggestive of hypermetabolic consolidatory lesions and diffuse nodular opacities in bilateral lungs – likely primary