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Case Report

An incidental finding of lung nodule in patient presenting with posterior chest wall trauma: A case report ☆

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ABSTRACT

Lung nodule is considered a common incidental finding in chest CT evaluation. Most cases are benign and derived from a previous infection. However, here we present a case where a patient presenting to the hospital with posterior chest wall trauma had a solitary pulmonary nodule that is consistent with non-small cell lung cancer (NSCLC). We would like to emphasize the importance of evaluation of incidental findings in chest CT evaluation, in this case, trauma cases by presenting this case. An 81-year-old male was referred to the emergency department with altered consciousness and a history of posterior chest trauma. He complained of a productive cough, but no other symptoms were reported. He had a medical history of Alzheimer's dementia, COVID-19, and hypertension. Physical examination revealed a hematoma on the right side of his back and reduced breath sound. Anteroposterior radiograph showed multiple right posterior rib fractures with right pleural effusion. Contrast-enhanced chest CT revealed a low-density solitary pulmonary nodule with multiple lymphadenopathies, with the presumptive diagnosis of incidentaloma. It was confirmed by pleural analysis with the increase of Cyfra 21-1 tumor marker and consistent with non-small cell lung cancer. In CT studies, incidental solitary pulmonary nodules are common, occurring in 8%-51%. Nodules are often discovered incidentally in trauma patients, but they are not always reported or followed up. It is important to note that each may indicate a clinical significance and represents the potential for malignancy which requires additional workup and further evaluation.

List of abbreviations: ACCP, American College of Chest Physician; BTS, British Thoracic Society; CT, Computed tomography; GLOBOCAN, Global burden of cancer; NSCLC, Non-small cell lung cancer.

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Background

Incidental finding of lung nodules in asymptomatic patients is considered a common case. Especially in trauma patients, incidental pulmonary nodule prevalence can be found up to 11% [1]. Some of these nodules (3.7%) are even considered as malignancy. According to Global Burden of Cancer (GLOBOCAN) 2020, lung cancer is the leading cause of cancer death worldwide (18 in 100,000 deaths) [2]. Therefore, incidental pulmonary nodules are important to be looked out for.

There are several published guidelines that have covered recommendation algorithms for the management of incidental lung findings such as; the Fleischner Society, the British Thoracic Society (BTS), the American College of Chest Physician (ACCP), and the National Comprehensive Cancer Network. However, it has always been a dilemma whether these nodules can be left alone or require further evaluation and management [3]. It is important knowing how to decide which best approach to avoid unnecessary invasive diagnostic procedures in the case of benign nodules and the delayed evaluation and management of malignant nodules.

Here, we would like to emphasize the importance of incidental finding evaluation by presenting a case where a patient with posterior chest trauma had a solitary pulmonary nodule as its incidental finding and furthermore, we found that it was a malignancy.

Case presentation

An 81-year-old male was referred to the emergency department with altered consciousness 2 days before admission. It was known that the patient had a history of posterior chest trauma as a result of a fall without a clear time history. The patient also had symptoms of productive cough 1 week prior to admission, nausea, and vomitus, but denied dyspnea, fever, weight loss, or any other urinary and bowel symptoms. He had a medical history of Alzheimer's dementia, COVID-19 infection, and hypertension.

On physical examination, he was somnolent with GCS 11 (E3M5V3), blood pressure was 100/70 mm Hg, pulse 85 bpm, respiratory rate 20 rpm, temperature 36.6°C, and pulse oximeter 96% saturation without supplemental oxygen. Conjunctiva was anemic, a hematoma was seen on the right side of his back, followed by reduced breath sound at the right chest wall. Other examinations revealed no abnormalities.

Initial investigation showed normocytic anemia (hemoglobin 9.4 g/dL, mean corpuscular volume 81.3 fL, mean corpuscular hemoglobin 28.8 pg/dL, mean corpuscular hemoglobin concentration 35.5 g/dL), hematocrit 26.5 %, leukocytosis (white blood cell 13.61 × 103 mm^3), and normal thrombocytes 349.000/uL. Anteroposterior radiograph showed multiple right posterior rib fractures with right pleural effusion (Fig. 1A). Contrast-enhanced chest CT scan was performed and showed a low-density solitary nodule (size ± AP 1.55 x LL 1.97 x CC 2.16 cm) inside passive atelectasis area

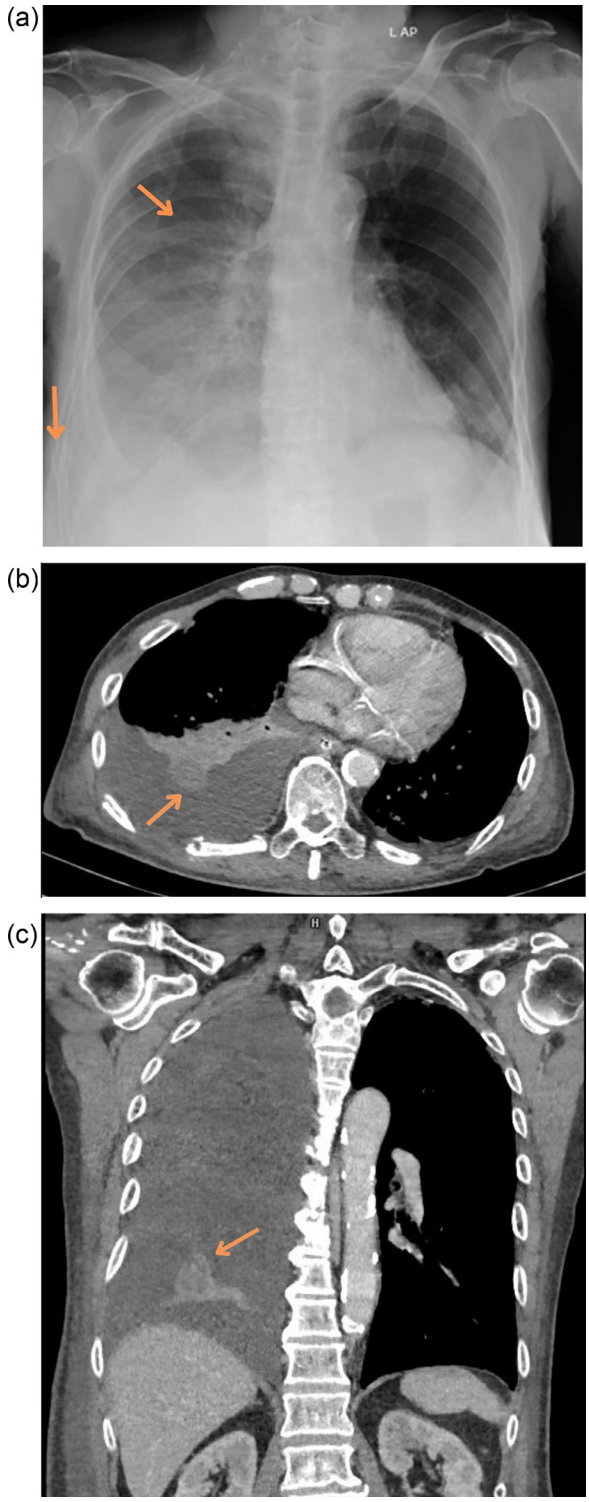

Fig. 1 – (A) Anteroposterior chest radiograph showed right pleural effusion and complete linear fracture (orange arrow) of right posterior 7th and 8th costae. Contrast-enhanced thoracic CT images axial and coronal view (B,C) showed a low density solitary nodule (orange arrow) inside passive atelectasis area in the right pulmonary segment 9-10 with pleural effusion.

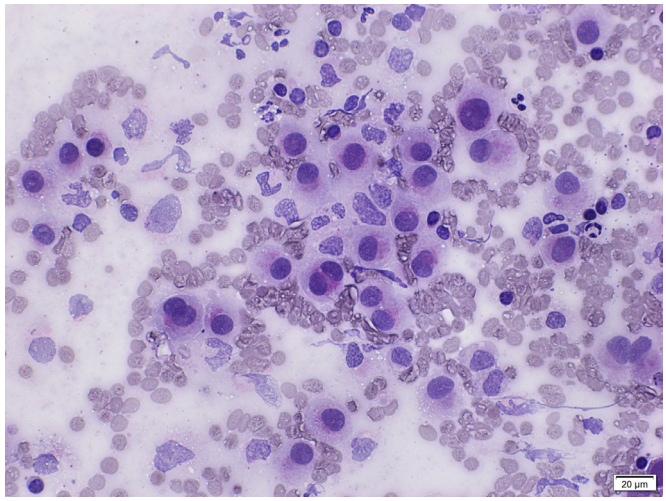

Fig. 2 – Large and dense group of epithelial tumor cells with pleomorphic nuclei and pale eosinophilic cytoplasm indicating a non-small cell lung cancer suggesting adenocarcinoma.

in right pulmonary segment 9-10, duplex pleural effusion, multiple lymphadenopathies in lower paratracheal, subcarinal, and perihilar, complete fracture with mild displacement on posterior costae 7,10,11 dextra, both anterior and posterior costae 8,9 dextra (Figs. 1B and C). This solitary nodule was incidentally found (incidentaloma) and further examination was carried out to confirm the diagnosis by pleural analysis. The result showed an increase in Cyfra 21-1 tumor marker up to 4.8 ng/mL (normal $\leq$ 3.30 ng/mL), indicating pulmonary cancer NSCLC type.

A cytopathology examination of pleural fluid was also done and showed a dense group of large epithelial tumor cells, pleomorphic nuclei, binucleated to multinucleated, coarse chromatin, irregular nuclear membrane, with pale eosinophilic cytoplasm (Fig. 2). This result indicated an epithelial tumor that leads to non-small cell lung cancer.

After receiving intensive care, our patient was discharged with a stable condition and was recommended to do several additional workups, including a biopsy related to his lung nodules alongside routine control for post-trauma condition in the outpatient clinic. During the outpatient visit, a follow-up chest radiograph eventually showed lobulated opacity with a spiculated margin in the right lower lobe and increasing right pleural effusion, indicating a worsening condition related to lung malignancy (Fig. 3). However, after considering benefits, risks, and the patient's age, his family decided to take palliative care. Our last follow-up on the patient revealed that the patient had passed away about 6 months after the diagnosis.

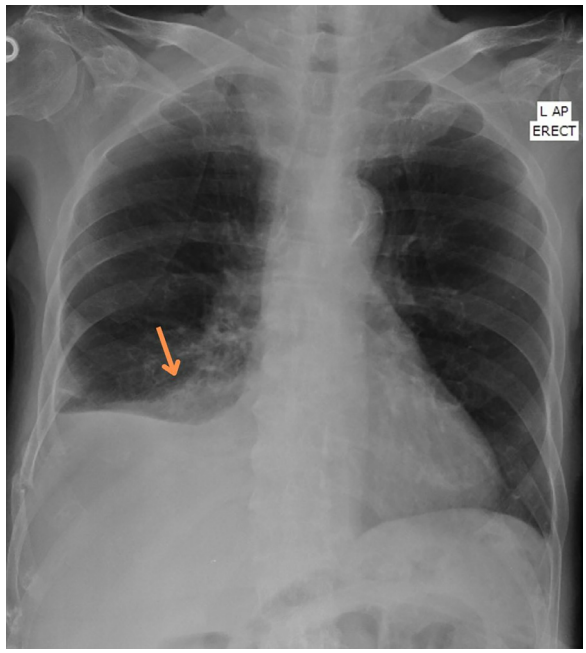

Fig. 3 – Anteroposterior chest radiograph during outpatient visit showing lobulated opacity with spiculated margin in the right lower lobe (orange arrow) and increasing right pleural effusion.

Discussion

Incidental finding or incidentaloma is defined as incidentally discovered abnormalities that are detected by various imaging modalities that were initially requested for unrelated clinical reasons. Specifically in trauma patients, incidental findings are abnormal imaging findings that are not the result of a traumatic event [4]. Here, we covered a case where a patient presenting with posterior chest trauma had a solitary pulmonary nodule as its incidental finding which is considered to have a clinical significance and consistent with NSCLC.

For trauma patients, a CT scan is the modality that is commonly used in this setting. Several studies have also shown that most of the incidental findings that were seen on CT scans originally in trauma patients derived from abdominopelvic followed by thoracic areas [4,5]. Specifically, in-

cidental findings of lung nodules are common findings in daily clinical practice. Hammerschlag et al. also showed incidental nodules can be found in up to 8.5% of trauma patient's CT assessment and 81% met the Fleischner Society Guidelines criteria for follow-up. Eduardo et al. even provides evidence that incidental findings (45.7% lung nodules) are more commonly found than traumatic injuries-related findings on trauma patient chest CT imaging (62.3% vs 31.3%) [1]. Further investigations were carried out and revealed that many of these nodules are poorly followed up either due to patient loss to follow-up or physician deliberately took no action. This ignorance may lead to risks of poor outcomes [4].

Our case is confirmed to be an incidental finding of a malignant solitary lung nodule which manifested as an NSCLC with the increase of Cyfra 21-1 tumor marker. Some patients who have NSCLC are often diagnosed coincidentally without symptoms suggestive of the presence of malignancy. In this case, the patient which was later confirmed by his family, never experienced symptoms related to malignancy. This asymptomatic condition of malignancy may also be related to the patient's medical history of Alzheimer's dementia. Ashley et al. [6] found dementia patients have difficulty noticing new symptoms, especially acknowledging them as potential cancer signs and appreciating cancer's seriousness, and thus may not report symptoms to caregivers or clinicians and may cause diagnostic overshadowing.

When differentiating NSCLC based on their subtypes, squamous cell carcinoma is often centrally located in the lung and may grow larger than 4 cm in diameter, while adenocarcinoma and large cell carcinoma are mostly distributed peripherally in the lung parenchyma. Nodules indicating squamous cell carcinoma are often seen with spiculated shape and cavitations in most cases. On the other hand, most cases of adenocarcinoma appear as a parenchymal nodule with dimensions less than 3 cm. CT image in our patient showed a hypodense, solitary lung nodule with the size of ± AP 1.55 x LL 1.97 x CC 2.16 cm, indicating a high-risk nodule (>8 mm) [7,8]. It was also later confirmed cytopathologically that there were large epithelial tumor cells, with pleomorphic nuclei and pale eosinophilic cytoplasms confirmed to be non-small cell lung cancer suggesting adenocarcinomatous type.

Reports of NSCLC as an incidental finding in trauma patients are scarce. A study of registry-based analysis performed by Kocher et al. [9] stated that most NSCLC detected incidentally through CT scans in trauma patients are classified as stage IV NSCLC. In this case, the lung nodule has its largest diameter of 2.16 cm and multiple lymphadenopathies have already been seen. Evidence of metastases in our case is pleural effusion which turns out to be a malignant process after we confirmed the fluid cytologically using Cyfra 21-1 tumor marker. It may be concluded based on our examination that this patient has met the criteria of a Stage IVA NSCLC. Our last follow-up on the patient revealed that the patient had passed away about 6 months after the diagnosis. This is consistent with the overall 5-year survival rate of stage IV NSCLC of only about 1%, which explains the poor prognosis our patient had [10].

Although there are recommendations with guidelines regarding incidental pulmonary nodules such as Fleischner and BTS, adherence to these guidelines for follow-up is mostly poor. Even after being given specific instructions to follow up nodules in radiology reports, the rate is still low [11]. Lee et al. showed that the gap between the requirement of follow-up and surveillance was not associated with reduced mortality but a note of longer duration follow-up is needed to confirm. Albeit the majority of incidental findings are benign lesions and not associated with reducing mortality, it does not rule out the possibility of finding malignant lesions like in this case [11,12].

Conclusions

Incidental solitary pulmonary nodules are a common finding in CT images, especially in trauma patients. However, mostly not reported or poorly followed up and this can cause missed/late important diagnoses, such as malignancy. Based on the presented case, we would like to emphasize the importance of incidental findings' follow-up because it can cause clinical significance. Particularly in high-risk nodules, additional workup, and further evaluation may be needed.

Patient consent

Written informed consent for the publication of this case report was obtained from the patient.

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