Case Report

Cocaine-induced pulmonary complications: A diagnosis of waiting and watching

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ABSTRACT

Pulmonary complications of cocaine among users are common. Manifestations include lung congestion, intra-alveolar edema, and diffuse alveolar hemorrhage (DAH). Direct cellular toxicity, eosinophilia, barotrauma, and vasoactive effects of cocaine are believed to induce DAH. We present a rare case of cocaine-associated focal alveolar hemorrhage mimicking malignancy on imaging. Initially contemplated biopsy was avoided based on rapid growth of concerning lung lesion, with subsequent near resolution on follow-up. This case illustrates the importance of epidemiologic and temporal multimodality correlation when evaluating indeterminate lung lesions.

KEY WORDS: Cocaine, fluorodeoxyglucose positron emission tomography/computed tomography, focal alveolar hemorrhage, lung injury, unnecessary biopsy

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INTRODUCTION

Cocaine has vasoactive properties resulting in eosinophilia, cellular toxicity, and barotrauma with alveolar hemorrhage.[1] While cocaine-associated diffuse alveolar hemorrhage is relatively common, focal alveolar hemorrhage (FAH) is only reported in isolated cases without true numbers regarding prevalence.[2-5] Although FAH may mimic malignancy on imaging, this case illustrates the importance of follow-up and re-evaluation before taking biopsy for benign etiologies. Upon re-evaluation, rapid growth and eventual resolution of the lesion is apparent. In contrast, lung neoplasms naturally do not have such rapid size enlargement, with a reported mean tumor volume doubling time of 166 days.[6] Cessation of cocaine, oxygenation, and glucocorticoids remain the mainstay management of cocaine-induced alveolar hemorrhage.[4]

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CASE REPORT

A 73-year-old man with long-standing history of smoking tobacco, cocaine, and cannabis presented with acute chest pain. Initial chest X-ray (CXR) showed two lung nodules up to 2.7 cm [Figure 1A, red arrows – left lower lobe (LLL), black arrows – right upper lobe (RUL)]. Subsequent CXR and chest computed tomography (CT) 4 days later showed the LLL nodule increase to 5 cm [Figure 1B1-3, red arrows]. Fluorodeoxyglucose positron emission tomography/CT (FDG PET/CT) performed showed an intensely avid (maximum standardized uptake value: 7.4) LLL lesion measuring 7 cm, with photopenic areas suggestive of necrosis [Figure 1C1 and 2, red arrows]. The RUL nodule was also intensely avid [Figure 1C1, black arrow].

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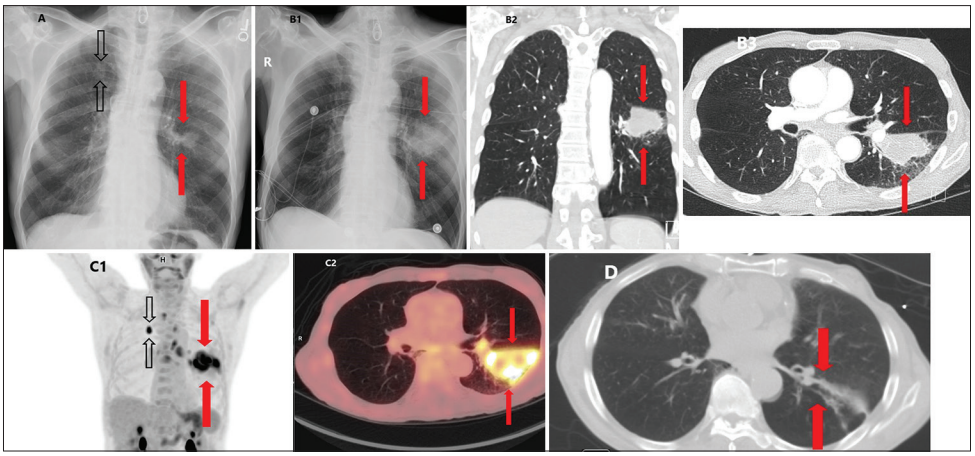

Figure 1: Computed tomography and fluorodeoxyglucose positron emission tomography modality imaging of cocaine-inducible focal alveolar hemorrhage reveals rapid doubling and resolution and exhibits a solid-like, hazy appearance and preserved underlying bronchial structures and vasculature. (A) Initial chest X-ray showing two lung nodules up to 2.7 cm (red arrows – left lower lobe, black arrows – right upper lobe. (B1) Subsequent chest X-ray illustrating left lower lobe nodule increase to 5 cm (red arrows). (B2) Subsequent coronal chest computed tomography illustrating left lower lobe nodule increase to 5 cm (red arrows). (B3) Subsequent axial chest computed tomography illustrating left lower lobe nodule increase to 5 cm (red arrows). (C1) Intensely avid, 7 cm lower lobe nodule lesion on coronal fluorodeoxyglucose positron emission tomography/computed tomography with photopenic areas suggestive of necrosis (red arrows) with additional intensely avid right upper lobe nodule (black arrows). (C2) Intensely avid, 7 cm lobe nodule lesion on axial fluorodeoxyglucose positron emission tomography/computed tomography with photopenic areas suggestive of necrosis (red arrows). (D) Resolved pulmonary lesion with minimal residual fibrosis on axial chest computed tomography 1 month after initial imaging (red arrows)

Although biopsy was initially suggested by the PET reader, the tumor board determined that the lesion's rapid growth was inconsistent with malignancy. Indeed, the lesions nearly resolved with minimal residual fibrosis on chest CT approximately a month later [Figure 1d, red arrows]. Subsequent analysis determined that the presentation was most consistent with a rare cocaine-induced FAH.[7-9]

DISCUSSION

Cocaine-induced FAH may mimic benign and malignant conditions on imaging. In fact, there are several benign neoplasms that mimic lung malignancies on FDG PET-CT.[10-16] Pulmonary hamartoma is the most common benign neoplasm and is composed of mesenchymal tissues such as cartilage, fat, and connective tissues.[11,17] Hamartomas appear as a smooth, round, or lobulated mass on CT. However, in the absence of common features of fat and central calcification, it is difficult to discern pulmonary hamartoma from a round or lobulated primary lung malignancy.[13,18] Hamartomas also usually show low-grade uptake of FDG, appearing analogous to lung cancers with low metabolic rates like bronchoalveolar carcinoma.[12,19] Focal inflammatory and infectious conditions may further complicate a diagnosis of cocaine-induced FAH.[20-26] Diffuse idiopathic pulmonary neuroendocrine cell hyperplasia similarly presents with necrotizing granulomatous inflammation, mimicking aggressive malignancy on FDG PET.[20] Tuberculosis (TB) is a chronic granulomatous infection caused by *Mycobacterium tuberculosis*. Similar to FAH, active TB presents with central necrosis and elevated FDG uptake on PET-CT, attributable to high macrophage count.[21,22] Fast-growing malignancy like small-cell lung cancer may also appear comparable to cocaine-induced FAH due to its highly rapid growth, with a mean doubling time of approximately 86 days.[6,27] By waiting and re-evaluating, unnecessary biopsy can be avoided in patients with cocaine-induced pulmonary injury.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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