





# Massive Subcutaneous Emphysema and Pneumo-Mediastinum after Percutaneous Lung Biopsy

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## Introduction

Transthoracic percutaneous computed tomography (CT)-guided lung biopsy is an established procedure for obtaining tissue diagnosis in lung masses with diagnostic accuracy up to 98%.<sup>1</sup> Post procedure complications such as pneumothorax and pulmonary hemorrhage, leading to hemoptysis are relatively frequent.<sup>2</sup> Pneumothorax incidence varies from 15% to 54% with subsequent chest drain required in 1.4% to 16.7% of patients.<sup>2</sup> Here, we describe a case of a 69-year-old man who developed mild pneumothorax during CT-guided lung biopsy with bilateral extensive subcutaneous emphysema and pneumomediastinum 48 hours later.

## Case Report

A 69-year-old gentleman, a chronic smoker presented with a lung mass for tissue sampling by transthoracic percutaneous CT guided core needle lung biopsy. Routine blood investigations, coagulation profile, and complete blood counts were normal.

After informed consent and procedure counseling about the risks and benefits, the patient was planned for a CT-guided biopsy. During procedure, planning CT, irregular soft tissue density mass lesion was noted in the right lower lobe, limited by an oblique fissure posteriorly. The lesion was approached from the lateral chest wall to avoid the oblique fissure in the prone position. The core needle biopsy was done using an 18G × 10 cm semi-automatic biopsy gun along with its co-axial needle. Mild pneumothorax was noted in the procedural check scan during biopsy without any signs of respiratory distress or dyspnea. Thus, we continued the procedure and successfully performed the CT-guided lung biopsy (→ Fig. 1A). The patient was kept under observation for 4 hours with monitoring of vitals. After 4 hours of observation, a chest radiograph was taken that showed a mild

pneumothorax which was stable and mild subcutaneous emphysema at the local site (→ Fig. 1B). The patient was discharged as he was asymptomatic and advised precautionary measures such as bed rest, avoiding heavy exercise and flying. Two days later, the patient presented with subcutaneous swelling and crepitus over the face, neck, and chest regions. He was further evaluated with a thoracic CT scan that showed extensive subcutaneous emphysema extending from the face, neck, and thoracic regions to the upper abdominal wall bilaterally, pneumomediastinum, and persistent right pneumothorax (→ Fig. 2C, 2D).

In view of no pressure symptoms or respiratory distress/vascular compromise, the patient was managed conservatively with antibiotics and pain medications and requested to follow-up. Further, in due course, the emphysematous changes improved and the patient was started on further treatment as the biopsy revealed non-small cell lung carcinoma (NSCLC) favoring squamous cell carcinoma.

## Discussion

Transthoracic percutaneous CT-guided lung biopsy is an established diagnostic tool for getting tissue diagnosis in lung masses with diagnostic accuracy up to 98%.<sup>1</sup> Post-procedure complications such as pneumothorax and hemoptysis are relatively common. Pneumothorax is the most common complication with an incidence of 25% with subsequent chest drain required in 5.6% of patients in a recent meta-analysis of 12,753 lung biopsies.<sup>2</sup> Patient position, small size of the lesion, multiple pleural punctures, and distance of the lesion from the pleura increases the risk of pneumothorax proportionally.<sup>1,3,4</sup>

Subcutaneous emphysema (SE) is the leakage of air from the respiratory or gastrointestinal system that diffuses under

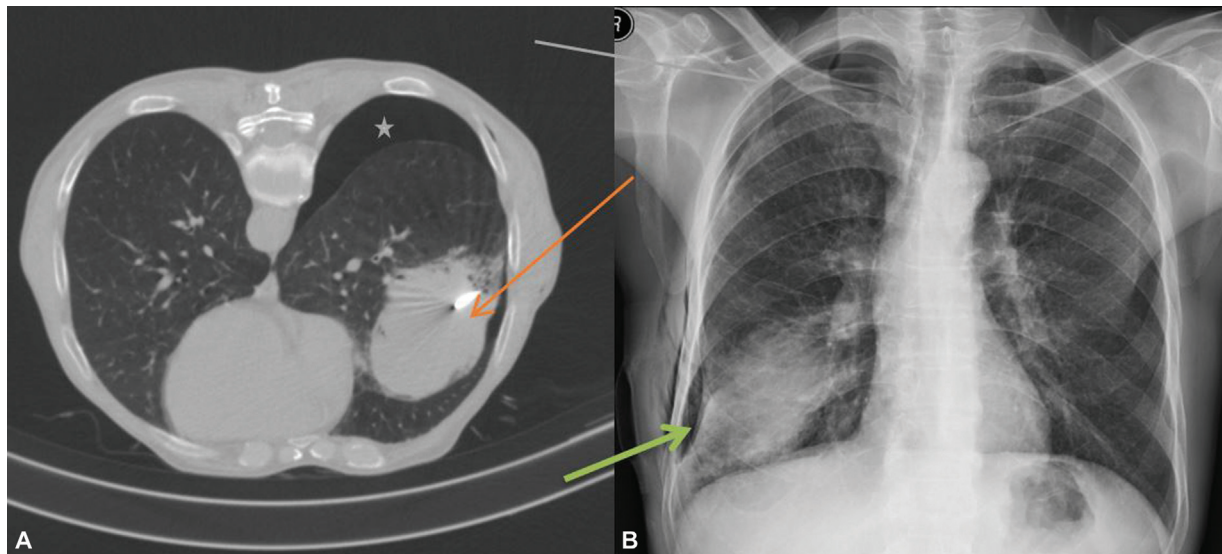
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**Fig. 1** (A) Right lung mass lesion was approached in the prone position with coaxial needle in situ (red arrow), mild pneumothorax (green asterisk) in the CT scan. Note is made of a small focus of air near the chest wall beneath the muscular layer. (B) Mild subcutaneous emphysema at the local site and mild pneumothorax in the apical region in the chest X-ray (green arrow).

the skin and myofascial planes.<sup>5</sup> It is found more commonly in association with pneumothorax<sup>6</sup> and is often accompanied by pneumomediastinum.<sup>5</sup> Causes of subcutaneous emphysema in the thoracic region are post-surgery, trauma, infectious, iatrogenic, etc. Post-transthoracic lung biopsy, the incidence of subcutaneous emphysema (SE) is very rare. Very few number of case reports of severe SE have been reported in the literature.<sup>4,5</sup>

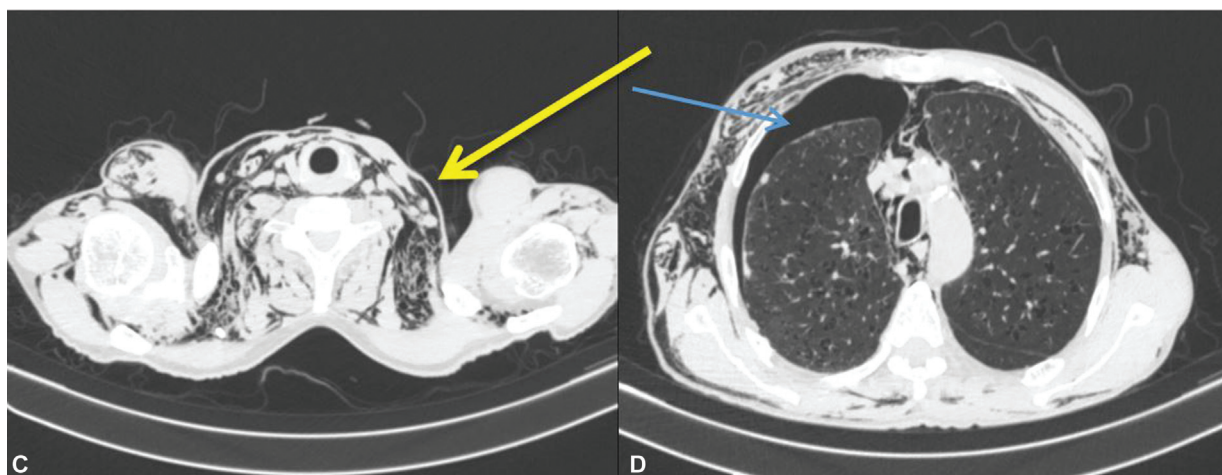
Free air in the subcutaneous thoracic region can be caused due to parietal pleural injury that further diffuses in myofascial planes dissecting them to cause severe subcutaneous emphysema, as discussed in our case. There is a significant correlation between the underlying lung parenchymal condition, which in our case study showed emphysematous changes and the increase in the risk of pneumothorax, and further in subcutaneous emphysema.

Conservative management is the mainstay of treatment of SE; however, it can be individualized depending on the clinical context and severity of symptoms. The increased pressures can cause serious complications, such as upper airway compression and vascular compromise, requiring emergent intervention as necessary. Hence, the patients should be kept under close follow-up.

## Conclusion

This case highlights the importance of knowing about this rare but manageable complication and the interventional radiologist should be aware of this.

The appearance can be alarming; however, it typically follows a benign course and patients should be kept under close follow-up.



**Fig. 2** (C and D) Severe bilateral subcutaneous emphysema in the neck and thorax region with mild pneumothorax, pneumomediastinum in the CT scan (arrows) after 2 days.

**Conflict of Interest**

None declared.

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