Case Report

Subcutaneous emphysema in cavitary pulmonary tuberculosis without pneumothorax or pneumomediastinum

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ABSTRACT

Extra-alveolar air in the form of subcutaneous tissue emphysema is observed in a variety of clinical settings. Spontaneous subcutaneous emphysema in the absence of pneumothorax or pneumomediastinum is very rare. We report a case of spontaneous subcutaneous emphysema secondary to cavitary pulmonary tuberculosis in the absence of pneumothorax or pneumomediastinum.

KEY WORDS: Air leak, pulmonary tuberculosis, subcutaneous emphysema

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INTRODUCTION

Subcutaneous emphysema is not an uncommon scenario in clinical practice and usually secondary to trauma to thorax, upper gastrointestinal instrumentation, dental extraction, primary or secondary pneumothorax, pneumomediastinum etc.[1] Subcutaneous emphysema in the absence of the above condition is a rare phenomenon. We report one such case where patient presented with severe shortness of breath and subcutaneous emphysema that was secondary to direct communication of cavitary tuberculosis lesion of right upper lobe into the soft tissue of chest wall.

CASE REPORT

A 42-year-old farmer presented with complaints of breathlessness, with swelling over the right side of the chest for past three days. This was sudden in onset after a bout of coughing leading to an initial swelling at the right side of the chest and then spreading to whole chest, neck, arm and face over the next few hours. History was positive for low-grade fever and mild productive cough for two and a half months. He was on irregular symptomatic treatment and apparently well till the last three days. He denied any history of violent coughing, trauma to chest, any lifting of heavy weight, violent vomiting or retching etc. He had neither associated chest pain nor any history of hospitalization or any medical or surgical procedure in the recent past. No previous history of any breathlessness was noted.

He was a smoker and smoked about 10 bidis/day for the past 22 years. However, he had no addiction to cocaine, cannabis or alcohol. Bowels were not constipated but for the past three days, sleep was decreased.

On examination, there was swelling over neck, chest and right upper limb [Figure 1]. Vital parameters revealed pulse rate 110/min, blood pressure 110/70 mm Hg, respiratory rate 38/min with respiratory distress. The skin over the second intercostal space showed an expansile impulse on coughing. There was no evidence of mediastinal shift or cardiac tamponade clinically, and neck veins were normal. On palpation there was no tenderness. A characteristic rice Kris pies sensations were present over the swelling area. Surgical crepts were heard on auscultation. There was no mediastinal crunch. Classical cavernous type of breathing was present in right infraclavicular area. As the patient was in respiratory distress, he was immediately put on high flow oxygen and bronchodilators. Manual reduction of emphysema was attempted by multiple subcutaneous incisions at the level of thoracic inlet. Subcutaneous emphysema initially reduced, but only to recur after several bout of coughing. Other body system examinations were unremarkable.

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Investigations revealed hemoglobin 9 gm%; total leukocyte count 13700 cells/mm^3 (polymorphs 72%, lymphocytes 20%, monocytes 5%, eosinophils 3%) and ESR 65 mm in first hour. Sputum smear was 2+ for acid-fast bacilli. Skiagram chest PA view disclosed extensive subcutaneous emphysema, right upper zone cavity, along with emphysematous changes [Figure 2]. There was no evidence of pneumothorax, pneumomediastinum or gas under diaphragm. Ultrasound of abdomen was reported to be normal.

As the patient did not improve even after 24 hours, a CECT scan of the chest was done that showed diffuse subcutaneous emphysema along with a large cavity at right upper lobe of lung communicating to the subcutaneous tissue resulting in a cavernous-pleuro-soft tissue fistula [Figure 3]. The cause was attributed to the high tension inside the cavity. Hence intercostal tube drainage was introduced into the cavity. Free air leak was observed during spontaneous breathing but the subcutaneous emphysema reduced rapidly. The patient was put on anti-tuberculosis drugs in combination along with broad spectrum antibiotics, bronchodilators and oxygen. Chest tube was removed after six days and the patient was discharged on the tenth day on anti-tuberculosis drugs and supportive therapy.

DISCUSSSION

Presence of air in the subcutaneous layer of skin is called subcutaneous emphysema. When it is secondary to any surgical procedure, it is called surgical emphysema and when cause is unclear, it is called spontaneous subcutaneous emphysema.[2] Subcutaneous emphysema develops frequently following blunt or penetrating chest injury involving larynx, trachea or bronchi.[3] It may also occur following chest tube insertion, tracheal intubation and upper gastrointestinal tract instrumentation. Alteration in breathing pattern in a variety of situation that is shouting, singing, straining, violent coughing, spirometry, asthmatic paroxysms, mechanical ventilation etc. may cause alveolar rupture and escape of air into subcutaneous tissue. Subcutaneous emphysema may be noted in association with pneumothorax, or pneumomediastinum, secondary to pathological changes in the respiratory tract.[3] The air so escaped following alveolar rupture, enters the perivascular sheath and courses its way towards the hilum and mediastinum. Subsequently the air spreads into the neck and subcutaneous planes. It tends to accumulate in areas where the subcutaneous tissue is most relaxed.[4]

Subcutaneous emphysema secondary to tuberculosis may develop due to associated pneumothorax, pneumomediastinum, or following the chest tube insertion.[5] Spontaneous pneumomediastinum in tuberculosis has been noted in miliary as well as non-miliary and the cavitary forms of pulmonary lesions.[4,6,7] Adhesions between visceral and parietal pleura are too

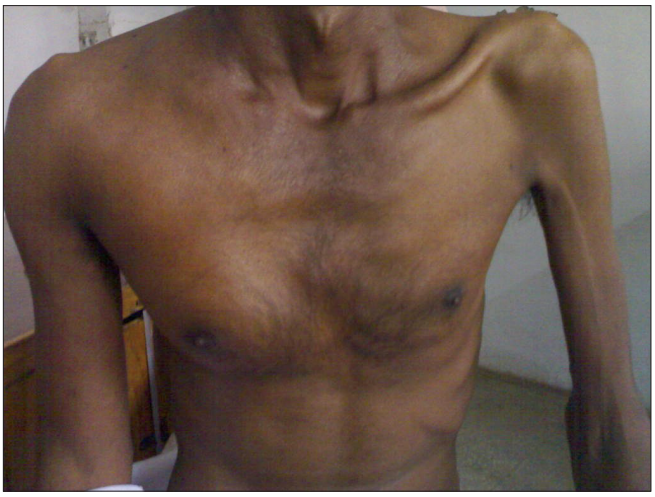

Figure 1: Photograph of the patient showing subcutaneous emphysema over right side chest, neck and arm

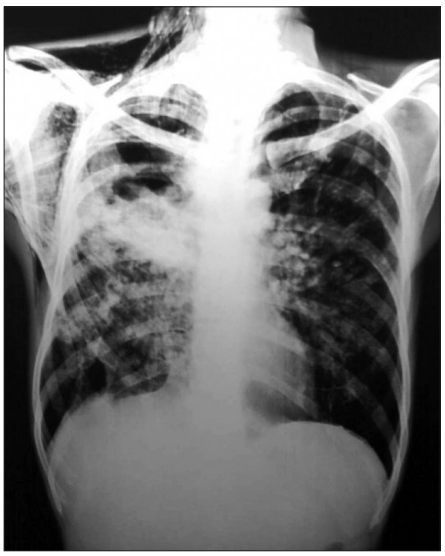

Figure 2: X-ray chest showing extensive subcutaneous emphysema, a cavitary lesion at right upper zone but no pneumothorax or pneumomediastinum

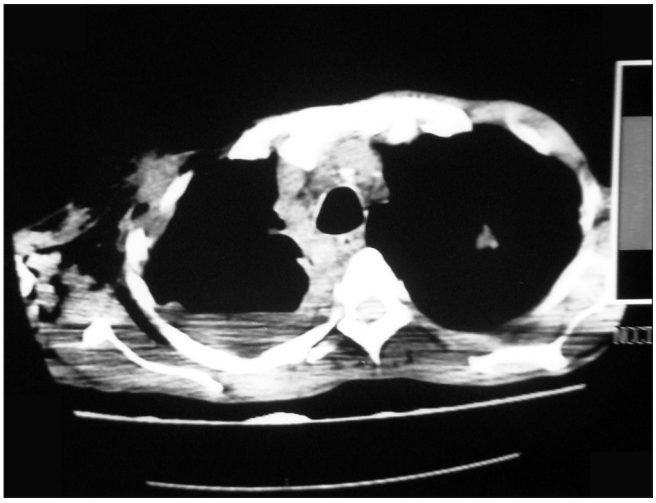

Figure 3: CT scan chest showing subcutaneous emphysema and pulmonary cavitary lesions communicating with the soft tissues of chest wall

common over the areas of tuberculosis lung. A tear of such pleural symphysis into subcutaneous tissue may produce emphysema giving rise to a typical crepitus.[5] Local airway obstruction and distal airway trapping can also cause alveolar rupture and subsequent pneumomediastinum in tuberculosis.[8] Subcutaneous emphysema in cavitary pulmonary tuberculosis without pneumothorax or pneumomediastinum is extremely rare[9] and this makes our case a unique one. The CT scan picture clearly depicted a communication of pulmonary cavity to the subcutaneous tissue (caverno-pleuro-soft tissue fistula) in our case. The cavity was probably under tension and allowed seepage of bronchial air through a tear to create subcutaneous emphysema. With the release of tension and treatment of underlying disease, leakage of air stopped gradually and patient improved subsequently.

Subcutaneous emphysema is usually benign, producing cosmetic symptoms and at times visual problems. Once progressing beyond the stage of tactile fascination, it will require prompt intervention to allay the anxiety of patient and to prevent potential complications such as hypoxia, cardiac tamponade and sudden death. Management lies in managing the primary cause and its treatment. Additional high flow oxygen helps to correct hypoxia and denitrification of the blood which hastens reabsorption of subcutaneous air. Subcutaneous emphysema may be manually reduced by multiple skin incisions at the level of thoracic inlet, placement of subcutaneous drain – HEMOVAC drain and regular 20 F chest tube. Checking the patency of an *in situ* intercostal chest drainage tube and mild suction of the subcutaneous drain are other measures to correct this otherwise self-limiting condition.[10]

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