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Case Report

Development of spontaneous subcutaneous emphysema in a case of squamous cell carcinoma of right lung during radiotherapy treatment a rare instance

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Abstract:

Development of spontaneous subcutaneous emphysema is a rare and benign entity and in some cases it could be symptomatic. Subcutaneous emphysema is commonly seen in neck and chest wall which gradually extend to other body organs. It is characterised by development of neck swelling and chest pain with the involvement of deeper tissues of thoracic outlet chest and abdominal wall may predispose in life–threatening conditions. We Report a rare case report of a patient with advanced cancer of right lung who developed extensive subcutaneous emphysema during the course of treatment. This case report highlights the possible etiology, treatment and outcomes of the same.

Keywords: Subcutaneous emphysema (SE), Lung Cancer, Advanced stage

Introduction

Subcutaneous emphysema is characterised by infiltration of air inside skin and subcutaneous tissue; it commonly involves neck and chest wall which may extend floridly in other body organs. It is usually benign and responds well to conservative management. Subcutaneous emphysema is usually caused due to blunt and penetrating trauma including surgical, spontaneous and infectious causes or any settings which alters gradient between intralveolar and perivascular interstitial pressure. Common signs include development of neck swelling and chest pain and often diagnosed with the presence of edema and crepitus of scalp, neck, thorax abdomen and other areas. In cases of Extensive SE patient might develop pneumothorax, pneumomediastinum and pneumoperitoneum.

Case Presentation:

The patient was 76 year old male who presented initially in our OPD with complaints of persistent shortness of breath with haemoptysis .As per the patient that the frequency and episode of blood in cough had increased in past 4 weeks .There was history of oxygen dependent chronic obstructive pulmonary disease (COPD) and patient was on medications for the same since past 10 years .He was a chronic smoker with total 50–pack years of smoking but had quitted smoking 4 years back.

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Upon evaluation he had raised leukocyte count (13.05 K/mm3), Haemoglobin of (10.8 gm/dl). He had biopsy report suggestive of Squamous cell carcinoma in right lung done outside with no cross–sectional imaging done. Patient underwent PET–CECT as part of metastatic and staging workup which revealed metastatic enhancing ill–defined soft tissue density cavitary mass involving anterior segment of right lung upper lobe measuring 4.0X9.3X11.3cm (SUV max 26.1).Lesion was infiltrating costal pleura and chest wall with evidence of adjacent bony infiltration of first to 4th rib with evidence of extra thoracic extension .There were active nodular deposits in superior segment of right lung lower lobe measuring around 0.9X1.1 cm (SUV max :2.2cm)Mild metabolically active mediastinal lymph node were seen in A–P window and subcarinal region largest measuring 1.3X2.1 cm (SUV max :5.1)Interestingly patient had active enlarged right axillary node measuring 2.0x2.7cm (SUV max :13.9 cm). Axillary nodal involvement are usually not seen in lung cancer and is rare occurrence which was seen here .After complete evaluation he was staged as cT4cN2M1b and patient was planned with hypo fractionated radiotherapy to a dose of 55Gy/20# along with concurrent Paclitaxel and Carboplatin @75mg/m2 with AUC of 2. During 15 fraction of radiotherapy patient developed spontaneously neck swelling associated with rapidly developing chest pain associated with shortness of breath with dropping SPO2 .On reviewing CBCT images there was gross opening of cavitation by virtue of tumor response during course of treatment .Patient was referred for Oncosurgery team for evaluation and treatment for the same .X ray Chest revealed "Gingko–Leaf Sign" with extensive right sided subcutaneous emphysema .After evaluation patient underwent emergency infraclavicular "blow–hole "incisions and subcutaneous drain placement along with low negative pressure and required decompression was achieved .Subcutaneous drain remained in situ for 24 hours and patient improved symptomatically. The drains were removed after 5 days after amelioration of patient condition with stable vitals. Patient was discharged from ward and he denied to take any further oncologic directed treatment and wishes to be on short term follow–up for symptomatic management. Currently he is on active follow–up and undergoing symptomatic medical treatment.

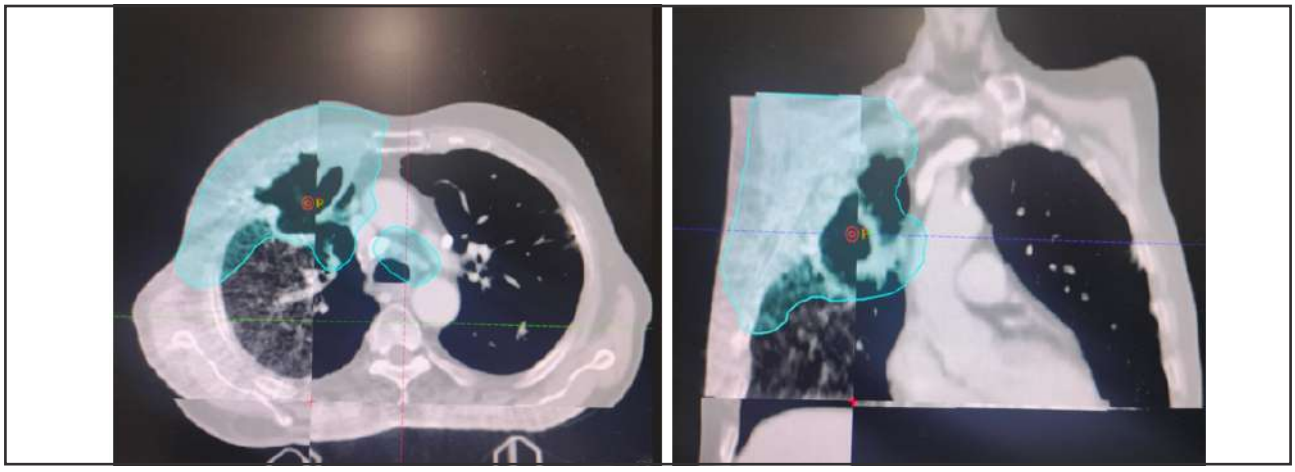


Figure 1 & 2: Depicting axial and frontal images of cone beam computed tomography revealing opening up of cavitary lesion

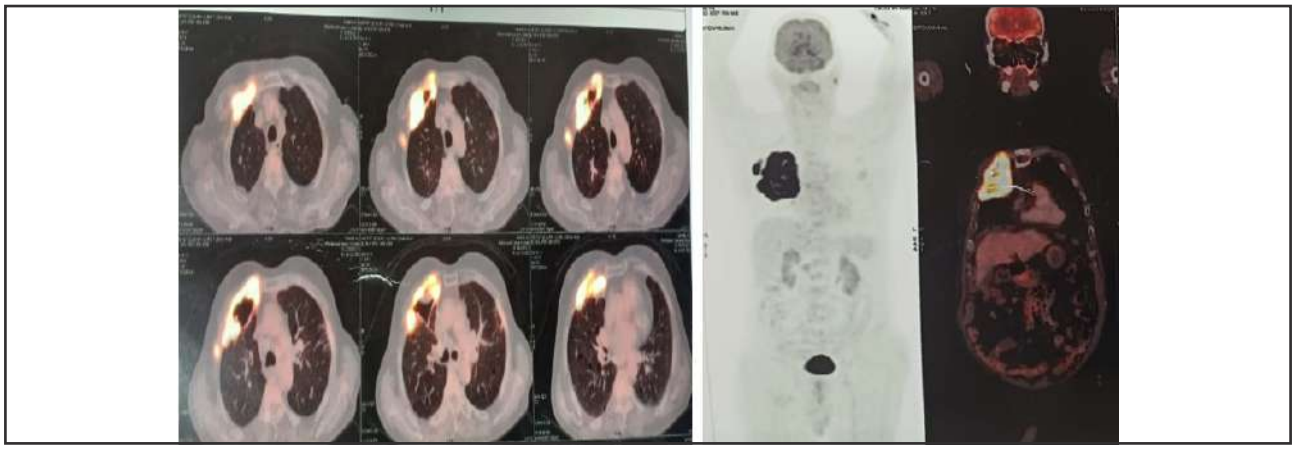


Figure 3 & 4: PET–CECT suggesting of cavitary lesion in Right Upper lobe eroding first to fourth rib and infiltration into costal pleura



Figure 5: Chest X ray depicting "Gingko–Leaf Sign" suggestive of subcutaneous emphysema



Figure 6: Image showing "Blow–Hole incision" for treating subcutaneous emphysema

Discussion:

Subcutaneous emphysema is oftenly benign condition usually caused due to various process such as blunt ,penetrating trauma ,infection and surgical complications[1,2].Occurrence of nontraumatic subcutaneous emphysema is rare in cancer patients[3]. In this patient the etiology of spontaneous subcutaneous emphysema can be attributed to baseline disease involvement of ribs and response to radiotherapy which was visualised during reviewing CBCT (Cone Beam Computed Tomography).The Most common signs and symptoms in subcutaneous emphysema are swelling in neck and chest pain [4].Additionally it can be accompanied with dysphagia ,sore throat, breathlessness ,wheezing and abdominal distension.[5,6] It is clinically diagnosed with the presence of edema and crepitus in neck ,thorax and abdomen and radiologically in cross sectional imaging such as CT with the presence of soft –tissue air entry [4].

Currently there is no consensus guidelines in management of extensive subcutaneous emphysema in low–impact trauma without associated rib fracture, surgical interventions include placing of blow holes [7] and doing circular incisions with partial skin removal to relieve soft–tissue emphysema [8,9]. These treatments are usually symptomatic as communication source between the pleural cavity and surrounding soft tissue is never addressed. Apart from this literature also recommends using bilateral infraclavicular incisions, in which modified blow holes of linear shape aids for better expansion and effective air evacuation [4]. Moreover, this intervention helps to provide immediate and cosmetically improved outcomes compared to traditional mediastinotomy [4]. There is paucity of literature available in occurrence of spontaneous subcutaneous emphysema during course of radiotherapy as its rare occurrence. Patient subcutaneous emphysema had significantly improved post blowhole incision and was discharged in vitally stable state.

Conclusions

Subcutaneous emphysema is a rare complication attributed from severe etiologies. In current case its occurrence was seen due to invasion of malignant cavity invading into chest wall. This case report highlights occurrence of rare occurrence which was effectively treated with blow hole incisions.

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