

Pleural Effusion in Pulmonary Less Common Association but Serious Implication

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Abstract

Pleural effusion is a common phenomenon occurring due to various causes. Pulmonary embolism is a less common cause of pleural effusion. In our case patient presented with minimal pleural effusion but thorough investigation revealed the underlying homocystenaemia. Thus, we concluded that pleural effusion represents the tip of iceberg of more serious underlying disease.

Keywords: Pulmonary embolism; Pleural effusion; Homocystenemia.

Introduction

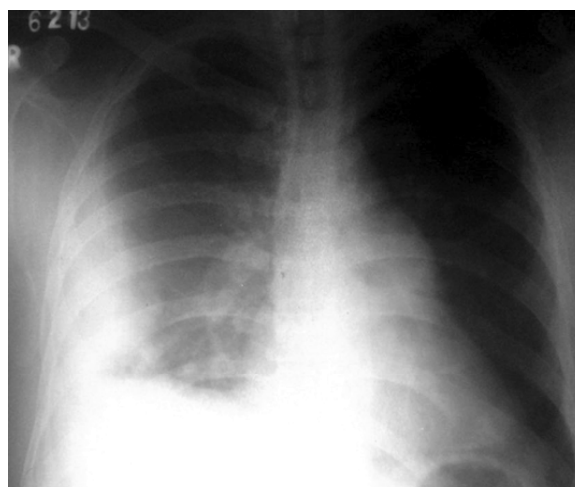
Pulmonary embolism (PE) is a commonly occurring phenomenon often unrecognised and varied manifestation. An estimated 10% of symptomatic PE causes death within one hour of onset.[1] The PE is also a disorder commonly overlooked in the work-up of a patient with pleural effusion and it is probable that PE may be responsible for a substantial fraction of undiagnosed pleural effusion.[2] Here we discuss about the case which came with symptoms of pleural effusion but diagnosed as homocystenemia after thorough investigation.

Case

A 35 year old male patient came to our out patient department with history of cough with blood tinged sputum, right sided chest pain and breathlessness since 15 days. It was

constantly present, through out the day and was no aggravating or relieving factors. Patient had similar episode of breathlessness about a year back. Chest X-ray (Fig 1) showed blunted cardio-pulmonary angle. Pleural fluid diagnostic tap showed transudate, and was negative for malignant cells. Sputum AFB was also negative. An attempt to drain pleural fluid failed and hence suspecting loculated effusion CECT (Fig 2) scan was done. It showed possible infarction in right lower lobe. As patient had similar complaints before we made a diagnosis of recurrent pulmonary embolism. As the source of embolus has to be found we subjected him to battery of investigations. ECHO cardiography and lower limb venous Doppler studies were normal.

Fig 1: Chest X-ray showing minimal pleural effusion



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(Received on 23.02.2013, accepted on 18.03.2013)

Table 1: Causes of pleural effusion[3]

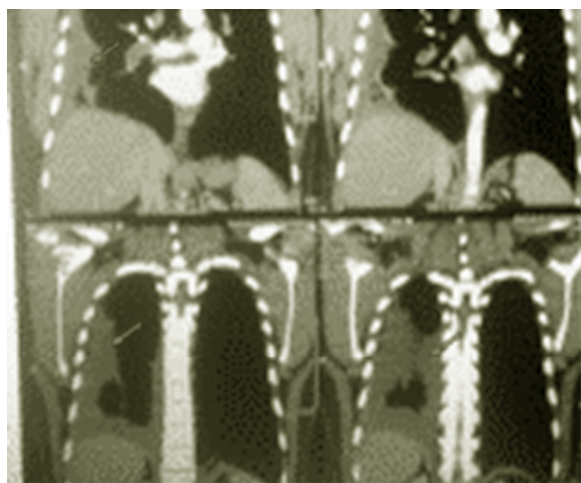
Transudate	Exudate
<p>Common causes</p> <ul style="list-style-type: none"> • Left ventricular failure • Cirrhotic liver disease • Hypoalbuminaemia • Atelectasis • Peritoneal dialysis <p>Less common causes</p> <ul style="list-style-type: none"> • Pulmonary embolus (10–20% is transudates) • Malignancy (5% are transudates) • Hypothyroidism • Mitral stenosis • Constrictive pericarditis • Urinothorax • Ovarian hyperstimulation • Meig's syndrome 	<ul style="list-style-type: none"> • Malignancy – primary / secondary / mesothelioma • Parapneumonic effusion and empyema • Pulmonary embolus (with infarction) • Tuberculosis (TB) <ul style="list-style-type: none"> • Rheumatoid arthritis • SLE(systemic lupus erythematosus) • other connective tissue disease • Benign Asbestos Pleural Effusion (BAPE) • Pancreatitis • Oesophageal rupture • after coronary artery bypass surgery • Yellow nail syndrome • Drugs • Fungal infections • Chylothorax/pseudochylothorax • Hydatid disease (ruptured cyst)

Bronchoscopy was normal. Coagulation study revealed increased level of homocysteine and rest all were normal. Lupus anticoagulant was negative. Hence a common presentation of pleural effusion led us to a rarer homocystenaemia. Patient was discharged with advice of long term anticoagulation and oral vitamin B12, folic acid therapy.

Discussion

Pleural effusion is a common manifestation

Fig 2: CECT thorax showing (arrows) possible infarction following pulmonary thrombo-embolism



of a wide range of diseases. The causes are varied. It presents as mild discomfort to dyspnoea at rest. It is classified as transudates or exudates according to biochemical criteria. The causes are many as shown in Table 1.[3]

Pulmonary embolus is considered less common cause of pleural effusion and often it is overlooked. The exact pathogenesis of pleural effusions associated with pulmonary embolism remains unknown. However, two mechanisms that can be hypothesised are increased capillary pressure in the parietal pleura and increased pulmonary vascular permeability. The first mechanism does not seem to be predominating because patients with pulmonary hypertension and right heart failure rarely, if ever, develop pleural effusions.[4,5] The likely mechanism of pleural effusion in pulmonary embolism is increased permeability of pulmonary capillaries with the resultant interstitial fluid traversing the visceral pleura and causing accumulation of pleural fluid.[6] The exact incidence of pleural effusion due to pulmonary embolism remains unknown because the exact occurrence of pulmonary embolism itself is unclear, although in one series, pulmonary embolism was the fourth leading cause of pleural effusion.[7] Studies show Pleural effusions occur in 19% to 61% of patients with pulmonary embolism[8-14]

with approximately 48% in patients with no pre-existing cardiac or pulmonary disease. The detection rate is higher if computed tomography (CT) is used as a modality for the diagnosis of pleural effusion 855/3047 (28.1%) with chest radiograph 142/328 (43.3%) with CT.[6]

Pulmonary embolism is known to have varied symptom complex. They may present as pulmonary infarction (pleuritic chest pain and/or haemoptysis), isolated dyspnoea and circulatory collapse.[14,15] Pleural effusion is a common accompaniment in all symptom complexes but in different proportion. In one study[14], pleural effusions occurred in 422 of 1709 patients (27%) who had pleuritic chest pain haemoptysis complexes, 119 of 1083 patients (12%) who had isolated dyspnoea, and in 87 of the 599 (16%) patients who had circulatory collapse.[6] Chest X-ray is the first line of investigation for pleural effusion. In case of pleural effusions associated with pulmonary embolism, effusion are minimal may manifest as mild blunting of CP angle initially but the fluid level increases after 3rd day. The effusions are usually unilateral. However, the effusions can be bilateral with a frequency of 6.5% to 15%, if chest radiograph is used as a modality for diagnosis and 25% to 43% with CT of the chest.[6] These effusions are usually free flowing but loculation are known to occur and are best diagnosed with CT scan. In our patient, the diagnosis could be confirmed only after CT scan, as at initial presentation he had just isolated dyspnoea and Chest X-ray showed pleural effusion. Diagnostic pleural tap was unsuccessful and hence CT scan was done. CT-scan confirmed pulmonary embolism. Although the pulmonary embolism could be confirmed, identifying the predisposing factor for same was diagnostic challenge. As patient had recurrent episode we subjected patient to investigation to find the cause for embolism. Venous Doppler study was normal. Blood investigation revealed homocystenaemia, which is one of the causes for hyper coagulable state.

Homocysteine is known to enhance up-regulation of IL 8, which leads to enhanced

leukocyte recruitment, inhibits prostacyclin synthesis, down regulates thrombomodulin expression, blocks tissue plasminogen activator (t-PA), inhibits plasminogen activation, increases platelet adhesion, induces tissue factor and factor V activation.[16,17] It also suppresses heparan sulfate expression, reduces protein C levels (in homocystinuria, homozygous CBS deficiency)[17] and rapidly incorporates into factor Va by activated protein C due to homocysteinylation of the cofactor by modification free cysteine.[18] All these induce thrombosis and subsequent embolic phenomenon.[19]

Conclusion

Pleural effusion is a common entity in pulmonary medicine practice. Although treatment is simple some times it points to more serious underlying disease. The use of CT scan is advisable in cases of minimal pleural effusion and yielding dry tap on diagnostic aspiration. Identifying such effusion is important as some times it may lead to much more serious pulmonary embolism. In our case we could identify a rare case of homocystenaemia as the cause for recurrent pulmonary embolism. So a thorough investigation of pleural effusion is a must in all cases as it may be tip of an iceberg of serious underlying disease.

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