

Pulmonary thromboembolism in a patient with active ulcerative colitis and lung abscess secondary to pulmonary infarction

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Abstract

Crohn's disease and ulcerative colitis are inflammatory bowel diseases and they primarily involve intestines. Herein we report the case of a young man who, during a clinical recurrence of ulcerative colitis, presented with symptoms suggestive of a lung abscess. When the patient was re-evaluated because of unexplained shortness of breath, an area of infarction was detected that had led to the development of cavitation secondary to submassive embolism and foci of infection contained within. The patient was managed with subcutaneous heparin and he was asymptomatic during 2 months of follow-up. He completed six months of anti-coagulation therapy and any recurrence was not detected during 3 months of post-treatment follow-up.

Keywords: Venous Thromboembolism, Crohn's disease, Inflammatory bowel diseases.

Introduction

Crohn's disease and ulcerative colitis belong to a group of systemic inflammatory bowel diseases (IBDs) primarily affecting bowels also with their extra-intestinal involvement. Local and systemic inflammation, together with other acquired risk factors such as surgery, prolonged immobilisation, central venous catheters, fluid depletion, steroid therapy, smoking, oral contraceptives, high levels of anti-phospholipid antibodies and hyperhomocysteinaemia because of vitamin deficiencies, may induce a hypercoagulable state and prothrombotic conditions in patients with IBD.¹

Pulmonary thromboembolism is a frequently seen disease worldwide. In the USA, every year an estimated 65,000 people are affected by this disease.² Various factors cause pulmonary cavitation, most frequently infection and malignancies induce pulmonary cavitations. Therefore, pulmonary embolism is not a frequent cause of cavitation. In 4-7% of the cases, cavitation is seen in the area of pulmonary infarction.²

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Case Report

A 38-year-old male patient presented to the outpatient clinic with complaints of fever, coughing, sputum, right flank pain, shortness of breath and haemoptysis persisting for 2 weeks. He had not responded to empirical antibiotic therapy. He was experiencing shortness of breath while performing his daily activities. He had suffered from three episodes of haemoptysis. The ulcerative colitis of the patient was not controlled despite immunosuppressive therapy and initiation of a new drug therapy was planned. His diagnosis of ulcerative colitis had been made 4 years earlier as a result of histopathological examination of the biopsy material and colonoscopic examination. He was a non-smoker without any history of alcohol or substance abuse.

For three months the patient had been under treatment with prednisolone and anti-neoplastik-immunomodulator ajan (imurane) in daily dosages of 150mg, Salofalk,™ and isoniazid prophylaxis. Chest X-ray obtained 15 days earlier were normal (Figure-1a), but the most recent chest radiograms demonstrated left-sided lung abscess (Figure-1b). The clinical examination on admission showed a rhythmic, rapid and narrow arterial pulse and his blood pressure was 90/70mmHg. He received adequate hydration, parenteral antibiotics and N-acetylcysteine during his hospitalisation. Computed tomography (CT) scan of the lung was performed at the 48th hour of his hospitalisation because of symptom persistence. Contrast-enhanced CT showed a large lung

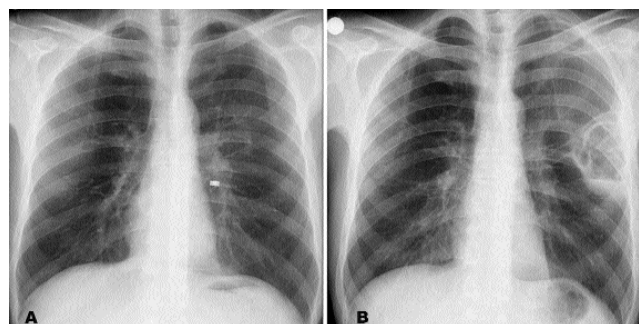


Figure-1: (a) Chest X-ray obtained 2 months previously. (b) Chest X-ray obtained at admission to the outpatient clinic.

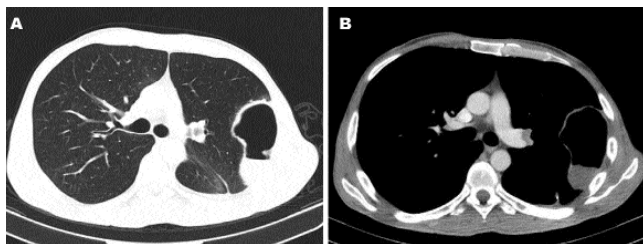


Figure-2: (a) Left lung abscess accompanied by a thrombus in the left main bronchus. (b) A thick-walled cavitation (53x96 mm) which contained linear septations and an air-fluid level is seen in the left upper lobe of the lung. This cavitary formation is localised in the fissure extending anteriorly up to superior lingula.

abscess in the left middle lobe (Figure-2a), with scalloped margins, peripheral consolidation and a large hypoechoic clot in the left main pulmonary artery (Figure-2b). CT pulmonary angiogram showed complete occlusion of the left main pulmonary artery, with no contrast passage in the entire left lung. Diagnosis of infected cavitary pulmonary infarction was made. We managed the patient with subcutaneous heparin. Thrombolysis was not considered because of the long duration of symptoms and the absence of hypotension, hypoxaemia and substantial right ventricular dysfunction. He improved symptomatically without any recurrence of haemoptysis and was asymptomatic during 2 months of follow-up. He completed six months of anti-coagulation therapy and any recurrence was not detected during 3 months of post-treatment follow-up.

His medications at the time of evaluation included prednisolone, Imurane, Salofalk, metronidazole, piperacilline, tazobactam, ciprofloxacin, diclofenac, pantoprazole and low-molecular-weight heparin. On evaluation, he was afebrile, alert and normotensive, with a respiratory rate of 22 breaths/min and a heart rate of 90 bpm. There was no evidence of pedal oedema or generalised lymphadenopathy. Auscultation revealed coarse crackles with bronchial breathing heard over the left mammary area. Laboratory investigations showed anaemia (10.3 g/dL, mean corpuscular volume 92 fL), leukocytosis and normal platelet count. Renal function tests were remarkable with elevated serum creatinine levels (1.3 mg/dL). Urine microscopy, serum electrolytes and liver function test (LFT) results were within normal limits. Fasting serum glucose was 99 mg/dL and enzyme-linked immunosorbent assay (ELISA) test results for hydatid cyst were unremarkable. Transthoracic echocardiography showed no evidence of infective endocarditis with normal left-ventricular function, mild tricuspid regurgitation and pulmonary artery hypertension (right ventricular systolic pressure,

35mmHg). Human immunodeficiency virus (HIV) ELISA was non-reactive and the Mantoux test was negative (6mm). Colour-Doppler sonograms were obtained from both legs and deep venous thrombi were not detected. Arterial blood analysis revealed partial pressure of oxygen/ Fraction of Inspired Oxygen (PaO₂/FIO₂) 335mmHg, partial pressure of carbon dioxide (PaCO₂) 30mmHg, pH 7.46 and bicarbonate (HCO₃) 24mEq/L. Sputum culture was positive for *Enterobacter* spp. which was susceptible to meropenem, but negative for acid-fast bacilli, while cultures obtained for *Mycobacterium tuberculosis* (via BACTEC, BD, Franklin Lakes, New Jersey, USA) and fungi (via Sabouraud dextrose agar media) yielded negative results. Anti-nuclear antibodies and anti-neutrophil cytoplasmic antibodies were not detected in immunofluorescent tests.

Discussion

The association between IBD and venous thromboemboli was first reported in 1936.³

Though IBDs primarily affect gastrointestinal system, as systemic diseases they can involve extra-gastrointestinal organs. They can especially cause venous thromboemboli. Deep Vein Thrombosis (DVT) and pulmonary thromboembolism are frequently seen.⁴

Especially during active periods of IBDs, the risk of thromboembolism increases in association with hypercoagulability.^{5,6} In our patient, pulmonary embolism developed during the active phase of the disease. During inactive phase of the disease thromboembolic complications have been reported in one-third of the patients.^[5] Use of anti-coagulants as Coumadin protects the patients from the risks of venous thromboembolism, but they can also induce massive bleeding episodes.⁷ However, in some patients, drugs like sulphasalazine or azathioprine can induce resistance to the mechanism of action of anticoagulants.⁸

Some of the drugs used by the patient also predispose to thrombi formation. In patients using glucocorticoids, fibrinolytic activity decreases, predisposing the patient to thrombotic complications. Inflammation and thrombosis in IBDs are related to the severity of the disease. They induce thromboembolic complications with hitherto not fully explained pathophysiological mechanisms.⁹

Among 1000 IBD patients treated in a study, 18 cases were identified with venous thromboembolism.³ Meta-analyses performed since then have demonstrated increase in the risk of venous thromboemboli in patients with IBD.¹⁰

Lung diseases are common in people who are on

immunosuppressive treatment. The aetiological factors for cavitary diseases frequently include fungal and mycobacterial infections. Patients under steroid therapy especially have a higher risk of thrombosis.¹¹⁻¹³ Our case was also under long-term immunosuppressive therapy. Therefore, we first assumed that the aetiological factor of cavitation had caused the infection with resultant air-fluid level. However, IBD also carried a risk of thrombosis. Lack of any acute manifestation in his history led us to think infectious aetiologies. Despite anti-biotic therapy, any improvement in his clinical condition was not observed which emphasised the importance of thoracic CT in this patient population.

Pulmonary embolism is among non-infectious causes which induces formation of cavitation in the lungs. Pulmonary embolism causes infarction in 15% cases and in 5% of these areas of infarction, cavitations develop.² In immunosuppressive patients cavitary infarction is rarely seen (in 1% of the cases with non-tuberculous cavitations).^{14,15}

Cavitations generally occur in areas of infarction larger than 4cm.¹⁶ In our patient, the area of infarction was 6cm in diameter. Milder clinical picture of our patient despite such a large area of infarction, suggested the presence of recurrent embolisms. Fever accompanied with positive sputum culture also suggested the presence of infected cavitation. Infected cavitation is a late complication of pulmonary infarct, which is generally seen in elderly patients with heart failure.¹⁷ Our patient was a youngster without any concomitant disease.

Gram-negative bacteria are the most common organisms causing super-added infections. Earlier series reported high mortality rates for pulmonary embolism (56%). However, mortality rates were even higher in such patients with infected infarctions (73%) relative to those without it (41%).² No recent series has investigated mortality rates in this subset of patients. However, in the past decade, mortality rates were probably much lower, given the improved recognition, earlier diagnosis, improved imaging techniques, therapies and supportive care for massive pulmonary embolism.

Conclusion

Pro-inflammatory and pro-thrombotic conditions often coexist. If immune status is compromised because of the

treatment, involvement of inflammatory processes in the thrombotic infarct area is anticipated which manifest themselves as a pulmonary abscess. These patients should receive treatment for both abscess and thrombus, and diagnostic examinations should be conducted for both entities.

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