PULMONARY ALVEOLAR PROTEINOSIS - A case report
JEBIN ROGER SASIKUMAR
Department of Tuberculosis Respiratory Disease, CHRISTIAN MEDICAL COLLEGE

Abstract: Pulmonary alveolar proteinosis is a very rare disorder. We report a case who presented with complaints of progressively worsening dyspnea. Her chest x-ray showed bilateral diffuse alveolar opacities. CT scan of the thorax showed a typical crazy paving appearance. Bronchoalveolar lavage showed PAS positive material confirming the diagnosis of pulmonary alveolar proteinosis. She underwent 3 sittings of whole lung lavage under general anesthesia following which she recovered completely and has been recurrence free.

Keyword: Pulmonary alveolar proteinosis, crazy paving pattern, PAS positive material in BAL, whole lung lavage.

Introduction: Pulmonary alveolar proteinosis is a very rare diffuse lung disease characterised by the accumulation of amorphous, periodic acid-Schiff (PAS)-positive liporoteinaceous material (Surfactant phospholipids and proteins) in the distal air spaces with little or no lung inflammation and underlying lung architecture is preserved. Prevalence in US – 1 case per 1,00,000 population. The typical radiological features and BAL appearance of fluid with cytology showing PAS positive material can help us clinch the diagnosis. We are reporting a case who presented to us with dyspnea with diffuse alveolar opacities on chest x-ray, was later diagnosed to have pulmonary alveolar proteinosis and improved with whole lung lavage.

History and examination:
A 52 year old lady, housewife from Kerala, a known hypertensive presented with complaints of breathing difficulty on exertion, which was progressively worsening for the past 2 years. Her effort tolerance was less than 10 meters for about 1 month prior to presentation. There was no history of fever, night sweats, cough, chest pain, orthopnea paroxysmal nocturnal dyspnea, seasonal or diurnal variation of dyspnea, joint pain, loss of weight or appetite. She had no past history of diabetes, ischemic heart disease, bronchial asthma or Tuberculosis. She was evaluated elsewhere before presentation to our hospital, where she was treated as bilateral pneumonia with antibiotics initially and later started on steroids and home oxygen with a diagnosis of probable interstitial lung disease, about 2 months prior to presentation to our hospital. On clinical examination she was found to be tachycardic with a heart rate of 110/min, blood pressure in the right upper limb was 110/70mmHg, tachypneic with a respiratory rate of 30/min and hypoxemic with a oxygen saturation of 86% with 60% venturi. Her jugular venous pressure was not elevated and there was no pallor, icterus, clubbing, lymphadenopathy or pedal edema. Respiratory system examination revealed normal vesicular breath sounds bilaterally with bilateral fine inspiratory crepitations over both lung fields. There were no other added sounds. Examination of the cardiovascular system, abdomen and neurologic examination were normal. The differentials considered at this stage were a diffuse parenchymal lung disease – probable idiopathic interstitial pneumonia and pulmonary edema.

Investigations:
Her blood investigations showed polycythemia with hemoglobin of 19g/DL, PCV of 58%, leukocytosis with a total count of 15,100 and differential count showed 79% neutrophils, 6% monocytes, 1% basophils and 14% lymphocytes with a normal serum procalcitonin of 0.093. Serum creatinine was 0.86 mg%, D-dimer was 1213 and arterial blood gas done on 60% venturi showed hypoxemia with pH - 7.43, pCO2-47.3, pO2-60.2, HCO3-29.8 and Lactate -1.9. Serial chest x-rays done outside showed progressively worsening alveolar opacities.

Chest x-ray done 18 months before presentation (Fig.1): before presentation (Fig.2):

Figure 1. Figure 2. Chest x-ray done 2 weeks before presentation (Fig.4): before presentation (Fig. 3):
A diagnosis of pulmonary alveolar proteinosis was made based on the above radiological findings, typical BAL fluid appearance and BAL cytology showing PAS positive material. The patient underwent whole lung lavage under general anesthesia. A double-lumen ET tube is inserted. One lung was lavaged with warmed (37°C) saline while the other lung is ventilated. Aliquots of 1-1.5 liters of warm saline are required for each lavage and a total of approximately 10-15 lavages are used for clearing of the lavage from each lung. She underwent the procedure in both lungs 3 times over a period of 7 months. Each time, she underwent whole lung lavage of one lung followed by the next lung with an average break between the procedures of about 1 week. She tolerated the procedures well. She had good symptomatic improvement after the procedures but she was still requiring minimal oxygen at the last discharge from the hospital.

Chest x-ray done after whole lung lavage of both lungs with a break of about 1 week between the procedures (Fig. 7):

Figure 6. BAL showing milky appearance.

Treatment given:
A diagnosis of pulmonary alveolar proteinosis was made based on the above radiological findings, typical BAL fluid appearance and BAL cytology showing PAS positive material. The patient underwent whole lung lavage under general anesthesia. A double-lumen ET tube is inserted. One lung was lavaged with warmed (37°C) saline while the other lung is ventilated. Aliquots of 1-1.5 liters of warm saline are required for each lavage and a total of approximately 10-15 lavages are used for clearing of the lavage from each lung. She underwent the procedure in both lungs 3 times over a period of 7 months. Each time, she underwent whole lung lavage of one lung followed by the next lung with an average break between the procedures of about 1 week. She tolerated the procedures well. She had good symptomatic improvement after the procedures but she was still requiring minimal oxygen at the last discharge from the hospital.

Chest x-ray done after whole lung lavage of both lungs with a break of about 1 week between the procedures (Fig. 7):

Figure 7. BAL appearance at the beginning and at the end of whole lung lavage (Fig. 8 and 9):

Figure 8. Figure 9.
Other treatment options like GMCSF therapy and Rituximab were considered but patient was not willing for the same due to financial constraints. The patient has been on follow up and has been asymptomatic for two years after the last whole lung lavage and is off oxygen. Chest x-ray done after about 7 months of the last whole lung lavage (Fig.10):

Figure 10.
Whole lung lavage (WLL) is considered as the Gold standard in the treatment of pulmonary alveolar proteinosis. A study published in the European respiratory journal in the year 2004 showed that out of 21 patients who underwent WLL, 70% were recurrence free at the end of 7 years. Another study published recently from a cohort of patients from 2003-2011 showed that whole lung lavage was efficacious and had long term benefits in the treatment of pulmonary alveolar proteinosis. Studies have also been done to look at the efficacy of GMCSF as subcutaneous injections or in inhaled form and they all show good efficacy in patients who did not improve after whole lung lavage. Rituximab has been tried as a treatment option for patients with pulmonary alveolar proteinosis who had a recurrence after whole lung lavage and have shown some satisfactory results. Studies have also been done in patients with pulmonary alveolar proteinosis by using whole lung lavage and GMCSF simultaneously and have also shown some good results. The problem with all these studies is that none of them are randomized controlled trials and doing such trials might not be feasible due the rare nature of the disease. In conclusion, whole lung lavage is still the Gold standard in treatment of pulmonary alveolar proteinosis.

As we can see from above, our patient met the criteria for undergoing a whole lung lavage. The other treatment options were discussed with the patient as she required a total of 3 sittings of whole lung lavages quit frequently. The other options were not explored as the patient was not willing for the same. The patient did improve and has been recurrence free now for more than a year.

References: