Case Report

Successful treatment of Bronchiolitis obliterans with organizing pneumonia in dialysis patient

Vivek B. Kute, Pankaj R. Shah, Aruna V. Vanikar[1], Manoj R. Gumber, Himanshu V. Patel, Sachin B. Patil, Hargovind L. Trivedi

Abstract

A 42-year-old end stage renal disease (ESRD) patient was admitted with fever, anorexia, malaise, non-productive cough, and dyspnea, of one-week duration. Multiple cultures of the blood, sputum, and urine were negative for microorganisms. The possibility of bronchiolitis obliterans with organizing pneumonia (BOOP) was considered when patient with pulmonary infiltrate did not respond to conventional antibiotic therapy and frequent hemodyalisis. High-resolution computed tomography of the chest revealed patchy air-space consolidation, ground-glass opacities, and small nodular opacities, predominantly located at the peripheral part of the lungs. Cultures and stains of bronchoalveolar lavage (BAL) specimen and bronchoscopic biopsy of lung tissue were negative for organisms [bacteria, mycobacterium tuberculosis, PCP, fungus, and atypical organism] and showed evidence of BOOP. Patient recovered completely with early diagnosis and treatment with steroids and underwent successful renal transplantation with wife as donor without postoperative complication and relapse.

Keywords: Bronchiolitis obliterans with organizing pneumonia, old end stage renal disease, steroid

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Introduction

Access-related infections are the most common and non-access related infections like respiratory tract infections are the second most common causes of infection-related deaths among patients with end stage renal disease (ESRD).[1] Compared with population with normal kidney function, patients with ESRD are at higher risk of contracting bacterial infections, particularly urinary tract infections, pneumonia, and tuberculosis.[2,3] Diagnostic strategies for these infections are similar to those used for patients without renal failure. However, a higher index of suspicion and a lower threshold for the initiation of a search is appropriate, since patients with ESRD are frequently diabetic and/or immunosuppressed because of retention of uremic toxins.[2-4] Slow or incomplete resolution of pneumonia despite treatment is a common clinical problem. Bronchiolitis obliterans organizing pneumonia (BOOP) is a noninfectious etiology of pulmonary infiltrates can mimic pneumonia and therefore represent causes of presumed nonresolving pneumonia.

Case Report

A 42-year-old man was admitted with fever, anorexia, malaise, non-productive cough and dyspnea, and sore throat of 1-week duration. He denied chills, night sweat, weight loss, wheezing, hemoptysis, chest pain, parasysmal nocturnal dyspnea, orthopnea, pedal edema, abdominal pain and urinary symptoms. He denied history of smoking. He was a case of ESRD stage five due to chronic glomerulonephritis and hypertension (treated with nifedipine 20mg twice a day). He was on maintenance hemodyalisis through radiocephalic arteriovenous fistula (AVF) at left wrist. Physical assessment reveals tachypnea, hypoxia, and

From:
Department of Nephrology and Clinical Transplantation, Institute of Kidney Diseases and Research Center, Dr. HL Trivedi Institute of Transplantation Sciences (IKDRC-ITS). [1]Department of Pathology, Laboratory Medicine, Transfusion Services and Immunohematology, IKDRC-ITS, Ahmedabad, India.

Correspondence:
Dr. Vivek Kute, Department of Nephrology and Clinical Transplantation, G.R. Doshi and K.M. Mehta Institute of Kidney Diseases & Research Centre (IKDRC)- Dr. H L Trivedi Institute of Transplantation Sciences (ITS), Civil Hospital Campus, Asarwa, Ahmedabad-380 016, Gujarat, India.
E-mail: drvivekkute@rediffmail.com

respiratory crackles over the involved lung fields. He had blood pressure of 130/80mmHg, temperature 38.3°C, respiratory rate of 30 breaths per minute, heart rate of 100 beats per minute. The chest radiograph (posthemodialysis) revealed bilateral pulmonary infiltrate [Figure 1]. Laboratory investigations revealed hemoglobin, 9gm/L; total white cell count, 10.4 x 10^3 /µl (differential count: 80% neutrophils, 18% lymphocytes, 1% monocytes, and 1% eosinophils); platelet count, 247 x 10^5 /µl; erythrocyte sedimentation rate (ESR),112; serum creatinine (SCr), 8 mg/dl; liver function tests and autoantibodies were negative. Multiple cultures of the blood, sputum, and urine were negative for microorganisms. Enzyme-linked immunosorbent assays test for HIV, HBV, HCV were negative. An electrocardiogram, echocardiogram and stress test were normal.

He did not respond to empirical broad spectrum antibiotic treatment for one week and frequent hemodialysis (HD) for one week. Repeat XRC [Figure 2] revealed persistent bilateral reticulo-nodular opacity and pulmonary infiltrates. High-resolution computed tomography (HRCT) of the chest revealed patchy air-space consolidation, ground-glass opacities, small nodular opacities, and bronchial wall thickening with dilation [Figure 3]. Patchy opacities occur more frequently in the periphery of the lung and are often in the lower lung zone. Results of pulmonary function tests revealed restrictive pattern. Cultures and stains of bronchoalveolar lavage (BAL) specimen and bronchoscopic biopsy of lung tissue were negative for organisms [bacteria, mycobacterium tuberculosis, PCP, fungus, and atypical organism] and showed evidence of BOOP.BAL indicated that large percentages of lymphocytes, of the white blood cells in the lavage fluid, characteristic of BOOP. Bronchoscopic biopsy of lung tissue showed evidence of BOOP. It revealed alvelolar parenchyma with thickened alveolar septae. Air spaces are filled with fibroblastic plugs. Cultures and stains of

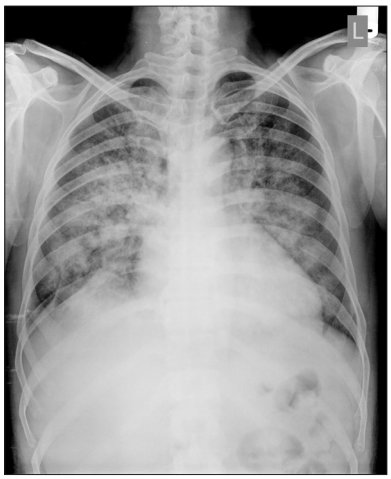

Figure 1: X ray Chest on admission with bilateral pulmonary infiltrate

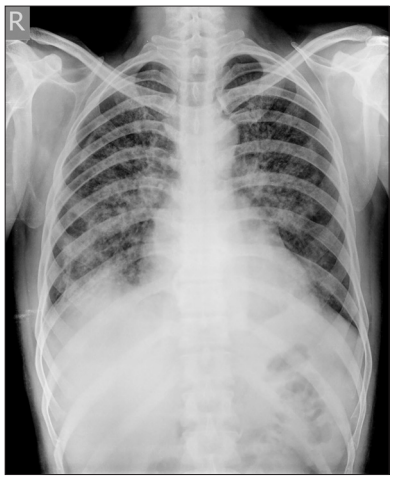

Figure 2: X ray Chest after antibiotic and frequent Hemodyalisis

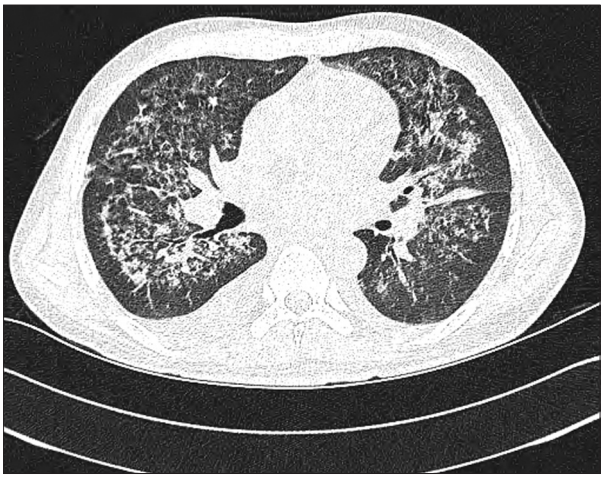

Figure 3: HRCT after antibiotic therapy and frequent Hemodyalisis

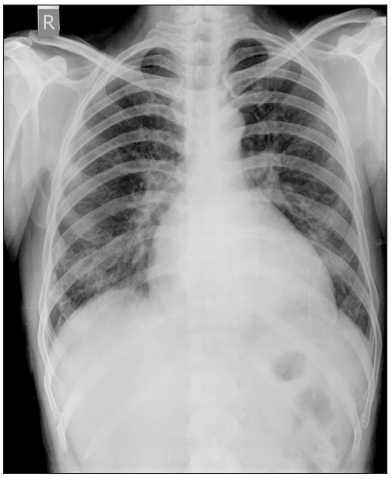

Figure 4: X ray Chest after steroid therapy

the biopsy specimens were negative for organisms. Other etiologies like drugs, malignancy, connective tissue diseases and immunologic disorders were ruled out by the patient's history and laboratory data.

After steroid therapy [IV methylprednisolone, 250 mg /day× 3 days; prednisone 40 mg/day×4 weeks], and clarithromycin 250mg twice a day, the patient's pulmonary symptoms and radiographic findings rapidly recovered [Figure 4]. The prednisone dosage was gradually decreased (20 mg/day×4 weeks). Later he underwent successful renal transplantation (RTx) with wife as donor with good immediate graft function and without any complication in post-transplantation period. Intra-operative he received induction with methylprednisolone. Maintenance immunosuppression consisted of prednisolone 20mg/day and tacrolimus 0.08mg/kg/day and mycophenolate mofety l500 mg TID. He had normal XRC/ graft function and no pulmonary symptoms/relapse.

Discussion

ESRD burden is increasing worldwide. In developing countries, ESRD patients are at risk for pneumonia in view of their impaired immune status.[2,3] The incidence and prevalence of BOOP are unknown in ESRD. Cigarette smoking is not a precipitating factor. Glucocorticoid therapy induces rapid clinical and radiological improvement.[4] Relapses are common upon stopping or reduction of glucocorticoid.

There are few descriptions of BOOP in RTx patients from developing country as pulmonary infiltrate are commonly attributed to infectious etiology.[5] BOOP in association with RTx was reported first in 1996.[6] In RTx patients, BOOP may be associated with a variety of infectious agents like PCP, cytomegalovirus, herpes simplex virus (HSV), or may be attributable to drugs; including some immunosuppressive agents.[4,6-8] RTx with BOOP attributable to tacrolimus and HSV pneumonia have been reported.[7]

We did not find reports of BOOP in ESRD. In our case, BOOP might be secondary to pneumonia/uremia, as there was partial recovery seen in repeat XRC [Figure 2] with antibiotic and frequent hemodialysis, however cultures and stains of BAL / bronchoscopic lung biopsy were negative for organisms. Clinical and experimental studies have provided evidence for important deleterious kidney-lung interactions/crosstalk, due to the loss of the normal balance of immune, inflammatory and soluble mediator metabolism that attends severe insults which induce organ injury. Cellular (e.g. neutrophils) as well as soluble mediators (cytokines) contribute to the inflammatory dysregulation under these circumstances.[9] Pulmonary dysfunction in uremic patients may be direct consequence of circulating uremic toxins or may result indirectly from volume overload, anemia, immune suppression, extraosseous calcification, malnutrition, electrolyte disorders, and/or acid-base imbalances.[10] Uremia leads to increased lung vascular permeability and both cellular and soluble inflammation in lung, leading to dysfunction.

Further studies are needed to define whether uremia directly, either through direct kidney injury or inability to clear toxic substances, lead to distant organ dysfunction in lung that in turn predisposes to noninfectious complication like BOOP

Conclusion

Physician should consider the possibility of BOOP when caring for ESRD patient with suspected pneumonia who does not respond to conventional antibiotic therapy. Early diagnosis and treatment with steroids is essential in reducing complications and mortality.

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