ELSEVIER

Case Report

Recurrent Brachiocephalic Vein Stenosis as a Cause for Persistent Left-sided Transudative Pleural Effusion in a Hemodialysis Patient

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Background: Effusion is common in dialysis patients. The most common causes include fluid overload due to renal failure and nonrenal causes like congestive heart failure and infection. We here report a case of left side transudative effusion due to brachiocephalic venous stenosis.
Methods: A 34-year-old female who had chronic kidney disease V during transplant work-up was found to be having left arm swelling and left transudative effusion. Work-up for transudative effusion did not show any cardiac cause or liver problem. Her dialysis duration was optimized from 2 times a week to 3 times a week for 4 hr and her dry weight was adjusted. Despite adequate dialysis for 1 month, effusion on the left side persisted. She had a previous venoplasty for a stenosis in brachiocephalic vein but restenosis occurred again.
Results: Brachiocephalic vein stenting was performed which successfully lead to resolution of left arm swelling and left effusion. She was later on successfully transplanted.
Conclusions: Brachiocephalic stenosis can cause ipsilateral transudative effusion. Venoplasty and stenting of the brachiocephalic vein lead to complete resolution of effusion.

CASE REPORT

A 34-year-old female with chronic kidney disease V (CKD-V) due to chronic interstitial nephritis was evaluated as a potential kidney transplant recipient. She was known to be hypertensive since 2008. She also suffered from kidney dysfunction since 2005 and underwent a kidney biopsy which showed idiopathic interstitial nephritis. She commenced on dialysis in October 2013 through an AVF (arteriovenous fistula). Unfortunately, she developed left arm swelling upon commencement of dialysis and a venogram revealed 40−50% venous stenosis of the left brachiocephalic vein. Venoplasty of the brachiocephalic vein was performed and 80% of stenotic lesion was successfully dilated. Interestingly, there was no history of subclavian or internal jugular catheterization. After 2 months she again developed left arm swelling for which she was readmitted and underwent investigations. Her general observations including blood pressure, oxygen saturation, and pulse were unremarkable. Physical examination revealed unilateral left arm swelling and signs of left effusion. There were no other relevant physical signs.

A chest X-ray was performed which confirmed a left-sided effusion with lower lobe atelectasis (Fig. 1A). There was no history to suggest an infective or malignant cause of effusion. Ultrasound-guided aspiration drained 900 mL of the fluid, which showed the presence of red blood cells, a total leukocyte count of 40 cu/mm (5%

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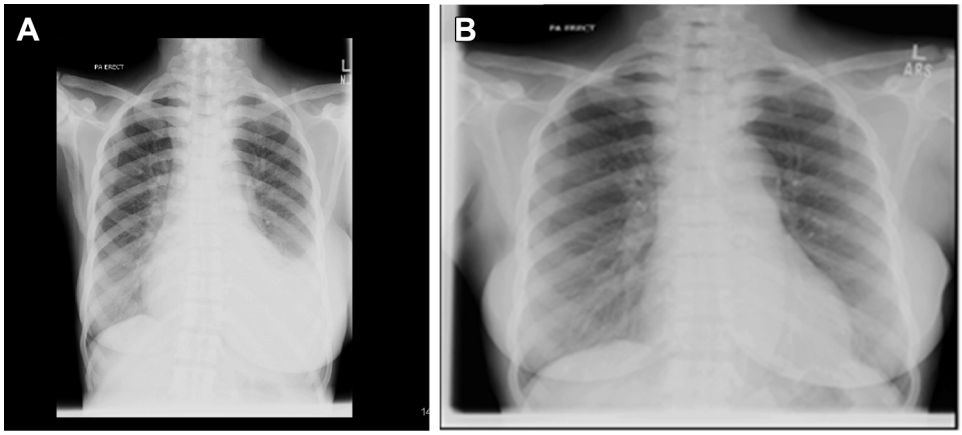

Fig. 1. (A) X-ray supine: obliteration of the left costophrenic angle suggestive of pleural effusion. **(B)** X-ray supine: left costophrenic angle can be seen showing improvement in pleural effusion in the same patient.

polymorphonuclear cells, 95% lymphocytes), glucose of 127 mg/dL, and protein of 1.6 g/dL. Body fluid lactate dehydrogenase was 108 IU/L and albumin 1.1 g/dL. As the diagnosis was suggestive of transudative effusion, corrective measures were implemented to improve dialysis adequacy and fluid overload. Her dialysis was stepped up to thrice per week from twice in a week. Despite significant improvement in dialysis adequacy and fluid status, her effusion persisted even after 1 month. Meanwhile, further investigations were also performed to rule out cardiac dysfunction. Transthoracic echocardiogram showed normal ejection fraction, grade II left ventricular diastolic dysfunction, mild–moderate mitral regurgitation, mild tricuspid regurgitation, and mild pulmonary artery hypertension. Other investigations including interferon gamma assay, computed tomography scan of her thorax, liver function tests, and hepatitis screen were negative. Persistence of stenosis (80%) at the junction of left brachiocephalic vein and superior vena cava was noted. Lumen of stenotic segment was successfully dilated with only 20% residual stenosis. A single stitch placed at the sheath insertion point was removed after 24 hr. Her left-sided effusion resolved gradually in the ensuing weeks (Fig. 1B).

The patient had a successful kidney transplant on the June 7, 2014. To date, her fistula remains patent with no further arm edema or sign of effusion.

DISCUSSION

Effusion is a common complication seen in patients undergoing renal dialysis.[1] In patients receiving long-term hemodialysis, the incidence is reported to be between 16% and 20.2%.[2,3] Nonrenal diseases such as congestive heart failure, infections, and neoplasms can also cause effusion in CKD patients.[3,4] Transudative effusion can be caused by heart failure, fluid overload, and nephrotic syndrome in chronic hemodialysis patients. Cardiogenic and hepatitic causes were excluded through our exhaustive investigations detailed previously. Tuberculosis, one of the most frequent causes of effusion in our region,[5] was excluded based on a negative interferon gamma release assay test and a typical transudative clinical presentation. A diagnosis of uremic pleurisy,[6] which is usually made by exclusion criteria, was also rejected because of the presence of transudative effusion, absence of any uremic pericarditis, and failure of the effusion to resolve after extensive dialysis. Venous stenosis is one of the rare causes of transudative effusion. AVF is widely used as a vascular access in long-term hemodialysis patients. Venoplasty with stenting lead to successful resolution of effusion. Among vascular stenotic causes,[7] a prior history of subclavian or internal jugular venous catheterization is more commonly seen than left brachiocephalic venous stenosis.[8–11] Its benefits over other vascular accesses are widely recognized and validated.[12] Vascular stenosis is a complication of AVF that can lead to serious consequences.[13] This is especially common with the frequent use of subclavian vein catheters for vascular access.[9] Central venous stenosis associated with upper limb swelling in the absence of subclavian catheterization has been reported in patients undergoing hemodialysis.[14,15] Ipsilateral arm edema may develop within 2 weeks to 25 months after the formation of an AVF.[16] Usually, such edema is caused by stenosis and/or thrombosis of the brachiocephalic and/or subclavian veins leading to increased venous pressure.[17,18]

The unusual presentation of left effusion can be explained by the unique anatomic peculiarities of the left thoracic venous drainage. The left-sided