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Early Identification and Early Intervention for Better Result Transluminal Angioplasty in Hemodialysis Patient

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Abstract

BACKGROUND: Stasis, thrombosis, and impaired arteriovenous (AV) fistula are possible problems to manifest central venous stenosis (CVS). Almost 25% dysfunctional fistulas at patient with dialysis are known to have these problems. Proper and immediate identification of CVS is critical to improve the successful rate of percutaneous transluminal angioplasty (PTA) in hemodialysis patient. We present the immediate decision of CVS in hemodialysis patients.

CASE PRESENTATION: This is case of a 53-year-old woman complaining of left arm swelling for 2 weeks. These complaints are not combined by pain, fever, or accidental injuries to the arm. She routinely undergoes hemodialysis (HD) twice a week with AV fistula access in the left arm for 12 years. HD can still run smoothly even with swelling in her left arm. PTA was performed without waiting HD problem as an immediate management of CVS and resulting without any complications.

CONCLUSION: CVS is generally associated with long-term AV fistula. The endothelial injury from physical stimulation of the vein wall preceded the development of CVS and also developed smooth muscle proliferation and microthrombi. PTA as an immediate procedure for CVS has high rate of success although patentability is low in long-term condition. This patient is still needed to follow-up for determining long-term patency.

Introduction

Patients are undergoing hemodialysis (HD) for longer periods of time due to the aging global population, increased patient survival from renal failure, and the scarcity of organ donors. Patients who need HD frequently arrive with advanced renal disease. Central venous stenosis (CVS) was one of the patient's problems. It is unclear how prevalent and frequent CVS is in the population of people with end-stage renal disease (ESRD) because the majority of CVS research only includes symptomatic participants [1]. HD patients were at risk from CVS. Vascular access thrombosis, aneurysmal dilatation, collateral development, protracted post-dialysis bleeding, increased venous pressure during dialysis, and vein tortuosity are all effects of CVS. Untreated CVS may result in inadequate dialysis and other problems [2]. Various methods of treatment are available for CVS. The most widely utilized method of treatment is endovascular, including percutaneous transluminal angioplasty (PTA) and stents. Understanding the treatment characteristics is necessary to select the CVS treatment that will assist HD patients the most. This report presents a case of CVS recurrence following PTA in a woman with HD.

Case Report

A 53-year-old woman was admitted to the hospital due to worsened painful swollen right arm 2 weeks prior. The patient had an AV shunt for 12 years and had been re-admitted due to a similar complaint. The patient was diagnosed with chronic kidney disease (CKD) in 2011 and had routine HD 2 times per week since then. She had AV shunt access since 12 years ago. 7 months ago, hypertension (HT) was diagnosed therefore given furosemide 3×80 mg.

On physical examination, blood pressure was 156/78 mmHg, heart rate was 84 beats/min (bpm), and visual analog scale was 6/10. The patient's urine output was ±150 cc/24 jam. The patient had anemic conjunctivae, raised jugular venous pressure, and antebrachial AV shunt on the left hand. Other vital signs and general status were normal.

On electrocardiography, the result was sinus rhythm 100 bpm, FA normal, HA CWR, PR interval 120 ms, QRS 85 ms, and ST-T changes (-). Laboratory examination showed abnormal results on hemoglobin (6.8), MCV (91.6), MCH (30), albumin (4.05), ureum (168), creatinine (9.99), and eGFR (3.8).

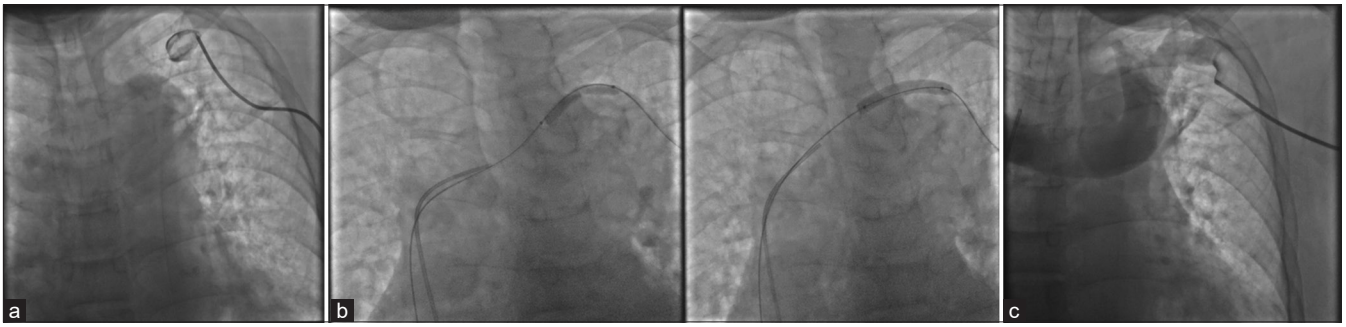


Figure 1: (a) Pre-balloon inflation on the left subclavian vein showed significant stenosis, (b) Durante-balloon inflation on the left subclavian vein, (c) Post-balloon inflation on the left subclavian vein

The patient was assessed with unilateral arm swelling sinistra due to AV shunt stenosis, CKD stage 5 on AV shunt fistula, heart failure stage C FC II, HT on treatment, and anemia related to renal disease. The patient was given oxygen through nasal cannula 2–4 L/min (lpm), IV plug, equal fluid balance, renal diet of 1700 kkal/day with low sodium <2 g/day, protein 1.2–1.5 g/BW/day, oral PCT 3×500 mg, oral lansoprazole 2×30 mg, oral furosemide 3×80 mg, and oral amlodipine 1×10 mg. She was planned for balloon angioplasty (Figures 1 and 2).

Discussion

HD patients were at a high risk of developing CVS, which can affect the subclavian, brachiocephalic, superior, and inferior vena cava, as well as the iliac veins. The most frequent risk factors for CVS in patients with ESRD are previous cephalic vein cutdown (CVC) or cardiac implanted electronic devices. The location of the stenosis affects how the condition manifests clinically [1]. For instance, stenosis on the right subclavian vein resulted in progressive ipsilateral edema in this patient. The mechanism by which CVS manifests in HD patients is not entirely known. The etiology of CVS in HD is thought to be heavily influenced by the progression of inflammation, oxidative stress, leukocyte activation, myeloperoxidase release, and activation of the coagulation cascade. Cannulation CVC damage, foreign body chronic indwelling with varying degrees of biocompatibility, catheter movement during respiration, head movement, posture changes, and increased flow and turbulence due to AV access are a few reasons relating to these patients. These elements trigger the production of thrombin, platelet activation and deposition, and thickening of the venous wall.

Not all CVS cases need to be treated. Based on clinical symptoms and venographic findings, the intervention is decided [4]. One instance of CVS that does not require angiography intervention is asymptomatic CVS with no decreased blood flow or with few symptoms (such as isolated increased venous pressure or modest arm edema). An alternative is to take a conservative approach, such as elevating the extremities and using anticoagulant medication. Symptomatic cerebral venous HT, moderate-severe arm or face edema, poor access flows, extended bleeding times, and developing substantial fistula dilatation access thrombosis are all indications for intervention [3]. Surgery and endovascular intervention are examples of intervention. Stents and PTA are examples of endovascular interventions. When alternative treatments for treating CVS fail, surgery is regarded as the final resort [5], [6], [7], [8], [9].

The patient in this case had central vein stenosis. The patient had AV shunt for 12 years ago, and the patient never had a problem with AV shunt along 12 years. The patient had left arm swelling for 2 weeks before admission, we measured volume flow, we found volume flow vein 4214 mL/m, and volume flow inflow 897 mL/m, and finally, we decided to conduct angiography and we found stenosis 95% at proximal subclavia, the stenosis was soft because we conduct PTA as soon as we suggested that patient had stenosis at central vein. After PTA, there is no dissection or thrombus, and we found TIMI flow III [6].



Figure 2: Patient clinical condition pre- (a) and post-procedure (b) showed clinically improvement in arm edema

Conclusion

This report presents a case of a woman with CVS who was indicated for PTA. In most cases, PTA is chosen as the primary treatment of CVS. PTA was successful with magnificent result, because the patient was early to identification and intervention. The patient until 6 months still has no recurrent arm swelling. The guideline 20 NKF-K/DOQI suggests that the percutaneous intervention with transluminal angioplasty is the preferred treatment for CVS, and PTA has very high initial technical success rates, ranging from 70% to 90%.

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