Case Report

Catheter-associated Central Venous Stenosis Presenting as Persistent Headache in a Dialysis Patient

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Abstract

Background: Central venous stenosis (CVS) is a known complication of central venous access and often presents as superior vena cava (SVC) syndrome. However, non-specific symptoms such as persistent headaches are rarely associated with CVS, leading to delayed diagnosis. **Case Summary**: We report a 68-year-old woman with end-stage kidney disease on regular haemodialysis (HD) who presented with persistent headaches, fever, and cough. Initial treatment for presumed hypertensive urgency provided no symptom relief. Further examination revealed left upper limb swelling, distended veins, and elevated jugular venous pressure (JVP). Notably, these symptoms worsened post-HD. A central venogram confirmed complete stenosis of the left brachiocephalic vein. After switching HD access, the patient's headaches resolved. **Conclusion**: This case highlights the importance of considering catheter-associated CVS in dialysis patients with unexplained headaches, even when typical SVC syndrome features are absent. Early diagnosis and treatment are critical for preventing further complications, including the loss of dialysis access.

Keywords: *persistent headache, superior vena cava syndrome, central venogram, brachiocephalic vein stenosis*

INTRODUCTION

Central venous stenosis (CVS) occurs predominantly as a complication in up to 6.8% of patients with prior central venous procedures, such as catheter insertions, pacemaker placement, or defibrillator wires.[1] Trauma to the endothelium leads to a cascade of thrombosis, intimal hyperplasia, and fibrosis, narrowing the venous lumen. While CVS commonly presents with signs of superior vena cava (SVC) syndrome—such as upper limb oedema, distended neck veins, and dilated chest wall veins—it often remains asymptomatic or goes unrecognised during dialysis access management. However, atypical presenting symptoms such as headaches are uncommon[2], making diagnosis challenging in clinical settings. We present a case where catheter-associated CVS was initially mistaken for hypertensive urgency, leading to a delay in diagnosis. This case highlights the need for heightened awareness of CVS in dialysis patients with unexplained headaches, even in the absence of classic SVC syndrome features.

CASE REPORT

We present a case of a 68-year-old woman with end-stage kidney disease on regular haemodialysis (HD) via left brachiocephalic fistula (BCF) who presented to the emergency department with persistent headaches, fever and a non-productive cough for the past 4 days. Further history revealed that the headache had started 2 months ago and was described as throbbing in nature and generalised. The symptoms initially began intermittently and then increased in frequency for the past 2 months; however, they became persistent for the past 4 days. On arrival, she had elevated blood pressure and a low-grade fever, but her heart rate and oxygen saturation were stable. There were no signs of meningism. She was initially diagnosed and treated for hypertensive urgency possibly triggered by an upper respiratory tract infection. However, despite treatment and a reduction in her blood pressure, the patient's headache persisted and thus prompted further evaluation. A more thorough physical examination revealed significant pitting oedema and hyperaemia in the left upper limb, which was noticeably larger than her right upper limb. There were also distended superficial veins over the left side of her chest and elevated left jugular venous pressure. Otherwise, the patient had a normal neurological examination.

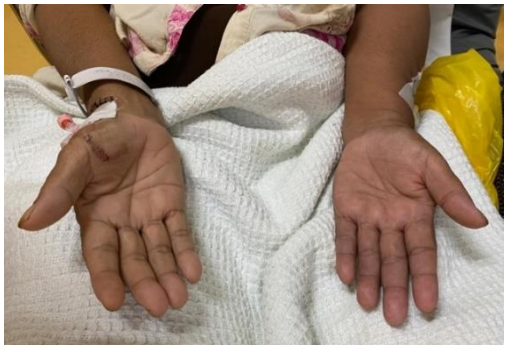

Figure 1: Left upper limb hyperaemia

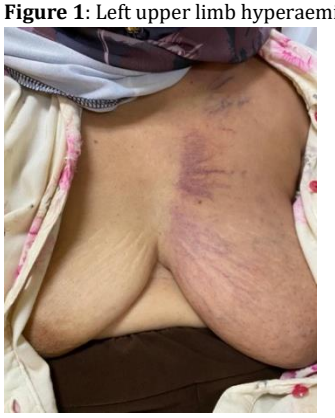

Figure 2: Dilated tortuous veins and hyperaemia of the left chest wall

The patient reported that the swelling and discomfort worsened after HD sessions and were associated with serous discharge from the BCF site post-dialysis. Despite reporting these symptoms to the HD staff, no corrective measures were taken. A non-contrasted CT brain scan ruled out intracranial haemorrhage. Given these findings, a central venogram performed the following day revealed complete stenosis of her left brachiocephalic vein. A right femoral catheter was promptly inserted for temporary HD access, and a central venoplasty was planned. Following the intervention, the patient's headache resolved, and her upper limb swelling gradually improved.

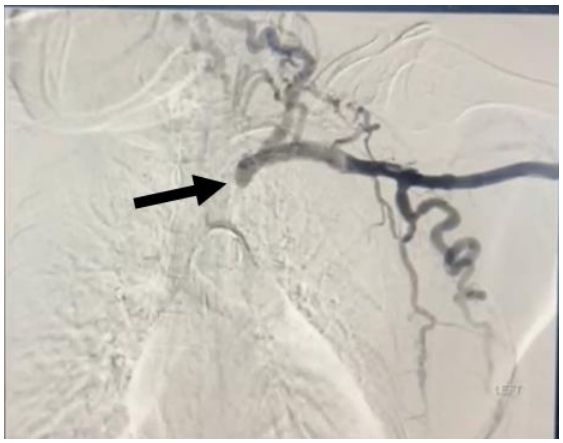

Figure 3: Complete stenosis of the downstream left brachiocephalic vein (arrow)

DISCUSSION

While CVS is an established common complication of central venous access, up to 76% of patients remain asymptomatic.[1] This case underscores the diagnostic challenges when catheter-related CVS presents atypically with non-specific symptoms such as persistent headaches. Headaches in CVS are thought to result from impaired CSF resorption due to venous congestion, which leads to increased intracranial pressure.[3] This feature is rare, as most cases are either asymptomatic or present with classic features of SVC syndrome, such as facial swelling and upper extremity oedema.[4]

The distinction between CVS and SVC syndrome lies in the involvement of the specific venous territory. CVS causes localised stenosis, such as in the brachiocephalic vein, which results in unilateral symptoms, as observed in our patient with isolated left-sided upper limb oedema and left-sided distended chest veins. The diagnosis was particularly challenging, as the patient's primary complaint was headache instead of the typical venous congestion signs.

Recognising CVS is crucial, as it can lead to serious complications, including skin ulcerations, recurrent infections and difficulty cannulating dialysis access due to severe upper limb oedema. Increased venous pressure can cause excessive bleeding from the cannulation site and inadequate HD due to access recirculation. These factors can eventually render access sites inoperable.[4] In extreme cases, untreated CVS may contribute to intracranial hypertension and, in rare instances, intracranial haemorrhage.[5,6] Timely recognition and intervention are crucial to prevent the loss of HD access and improve patient outcomes.

CONCLUSION

Catheter-related CVS is a common yet frequently under-recognised complication in dialysis patients. Persistent headaches, even without classical signs of SVC syndrome and neurological deficits, warrant further examination and investigation. This case highlights the importance of maintaining a high index of suspicion for CVS in dialysis patients with unexplained headaches, particularly those with a history of central venous access. Early recognition and treatment are important to prevent further complications, including loss of dialysis access and potential neurological sequelae.

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