

Case report



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Oghenekaro Godwin Egbi, Sulaiman Dazumi Ahmed

Corresponding author: Oghenekaro Godwin Egbi, Department of Medicine, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria. drkoge@yahoo.com

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Hemodialysis catheter - related thrombosis of the internal jugular vein in an elderly diabetic woman: a case report and review of literature

Oghenekaro Godwin Egbi^{1,&}, Sulaiman Dazumi Ahmed¹

¹Nephrology Unit, Department of Medicine, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria, ²Department of Internal Medicine, Irrua Specialist Teaching Hospital, Edo State, Nigeria

[&]Corresponding author

Oghenekaro Godwin Egbi, Department of Medicine, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria

Abstract

Internal jugular vein (IJV) catheters are commonly used as vascular access for hemodialysis (HD) patients. They may have certain drawbacks, including infections and thrombotic complications, some of which could be life-threatening. We presented a 75-year old diabetic woman on maintenance dialysis who developed right sided neck and facial swelling. She had been receiving HD via a tunneled jugular venous catheter inserted on the same side 4 months prior. A Doppler ultrasound and CT angiography revealed a thrombus in the right IJV. She was managed conservatively with anticoagulants including heparin, warfarin and apixapan with resolution of symptoms. If diagnosed promptly, catheter related thrombosis can be managed with good outcome. However, to reduce the incidence of thrombotic complications in chronic HD patients, arteriovenous fistulae (AVF) should be preferably used.

Introduction

Patients with end-stage renal disease (ESRD) undergoing hemodialysis (HD) therapy usually require a vascular access (VA) for the procedure to be carried out. Although the arteriovenous fistula (AVF) remains the first choice for chronic HD, central venous catheters (CVCs) are often used where AVF is unavailable or for when HD is only required on the short term. Deep venous thrombosis (DVT), one of the feared complications of CVCs, can lead to significant morbidity and mortality [1]. Although tunneled internal jugular vein (IJV) catheters are often preferred due to perceived lower rates of complications, thrombosis may not be infrequent. We report the case of a 75-year old diabetic woman with ESRD on IJV catheter for maintenance HD who presented with ipsilateral right facial and neck swelling. She was found to have a DVT in the lower two-thirds of the vein. The aim of the report was to highlight some clinical and diagnostic features of IJV thrombosis as well as its predisposing factors. It is important to have a high

index of suspicion to reduce the incidence of missed diagnosis.

Patient and observation

The patient was a 75 year old woman who visited our facility for her routine HD with a 2-day history of swelling on the right side of her neck. There was no history of preceding neck trauma. However, a right permanent tunneled IJ catheter (23cm long, diameter 15F) had been inserted by a vascular surgeon 4 months earlier for maintenance HD following a diagnosis of ESRD from diabetic nephropathy. The procedure was said to have been easy. There was no previous history of catheterization. Heparin anticoagulation was done with 1000IU administered immediately after catheterization with post-dialysis heparin lock. She had no known personal or family history of clotting disorders, DVT or hypercoagulable states. There was also no history of intravenous drug abuse. Examination revealed a low grade fever (37.3° C), pulse rate 92/min, blood pressure 150/90 mmHg, and respiratory rate 28 cycles/min. There were no overt features of sepsis. Head and neck examination showed unilateral swelling of the right half of the face, extending to the right half of the neck along the anterior border of the sternocleidomastoid muscle. Investigations done revealed anemia with a hematocrit of 32% and a normocytic normochromic picture. WBC and platelet counts were essentially normal. Her prothrombin time and activated partial prothrombin time ranged from 15.5 to 20.2 and 36.2 to 62.6 respectively. Her glycemic control was uncontrolled with HbA1c of 8% and a random blood glucose of 12.96 mmol/l. Serum urea and creatinine were 21.1 mmol/l and 519 µmol/l respectively. Arterial blood gases were normal. Doppler USS showed absence of flow in the lower neck and anterior clavicular region of the internal jugular vein with an average-sized thrombus measuring approximately 5cm. Contrast-enhanced computed tomography (CT) of the neck revealed a filling defect in the IJV up to the right subclavian vein region, with the venous lumen filled with dense soft

tissue measuring about 7.5cm (Figure 1). The other veins were essentially normal. The patient was commenced on low molecular weight heparin (enoxaparin) 1mg/kg daily which was later weaned to warfarin 5mg daily with an average INR of 1.7. She was subsequently reviewed by the vascular surgeons who continued the conservative approach but replaced warfarin with apixaban (a factor Xa inhibitor) 2.5mg daily. Other medications administered included antibiotics such as ceftazidime, vancomycin, anti-hypertensives and diuretics. She has continued to improve clinically as the swelling has markedly reduced in size. Meanwhile, she has continued HD using the same catheter.

Discussion

Catheter-related DVT occur more commonly than is reported. In a prospective study, it was associated with 26% of inserted CVCs [2]. Up to 70% of the DVT- catheter related thrombosis was reported with an IJV cannulation compared with 30% for the subclavian vein (SCV). This is not surprising as IJV access may be constrained with higher likelihood of collapse and mechanical damage from head and neck movements. This is however contrary to an earlier report suggesting a higher rate of thrombosis with tunneled subclavian compared with IJ catheters [3]. IJV thrombosis resulting from catheterization may be largely asymptomatic. However, typical signs may include swelling and pain of the ipsilateral neck, mandible angle or the anterior border of the sternocleidomastoid muscle with erythema, tenderness, and warmth. Other features may include presence of superficial varicose collateral veins and difficulties while trying to aspirate from the access. Pulmonary embolism may also ensue. Our patient presented with increasing facial and neck swelling. The development of thrombosis may also be related to the duration of the in-dwelling catheter. Yardim *et al.* reported IJV thrombosis in a quarter of HD patients within 10 days of catheterization with the rate increasing progressively after the time of catheterization [4]. The index patient had the in-

dwelling catheter up to 120 days before presenting with thrombotic symptoms. A central catheter on the left is more prone to thrombosis than a right sided one [5]. Our patient's catheter was however right sided. Catheter infections are also a risk factor for the development of catheter-related thrombosis. [6] This may be because some of the usual bacteria implicated in catheter infections are highly thrombogenic. Other catheter-related-factors include the size of its lumen, the number of attempts at insertion and the catheter tip location. Increase in catheter lumen size and repetitive catheterization may predispose to thrombosis by causing a disruption of the vascular endothelium. On the other hand, having the catheter tip at the junction of the superior vena cava and right atrium may be protective as there is a lower likelihood of direct contact with the endothelium. There were no features suggestive of catheter infection or malposition in the index patient. The risk of thrombosis is higher in the elderly. There is however some ambiguity of the relationship with gender. There is no clear cut difference in the risk of development of first thrombosis between men and women [7]. The index patient presented with hyperglycemia. Although diabetes and hypertension may appear linked with development of thromboembolism, there are no consistent reports to show an association in patients with CVCs.

Coagulation abnormalities could occur in the setting of thromboembolism and may particularly require monitoring after instituting anticoagulant therapy. Our patient had deranged clotting profile but platelets was normal. There were no suggestive history of thrombophilia in our patient. However, anti-thrombin III, factor V Leiden, protein C or protein S were not assayed. INR monitoring is required for patients who are on warfarin. However, apixapan, which the patient was later converted to, requires less monitoring. Doppler ultrasound is the initial imaging modality of choice for patients with IJV thrombosis. This is because of its reliable and non-invasive nature. It typically shows a hyperechoic mass within the IJV. The use of ultrasound guidance during catheterization has

however not shown any effect on the risk of CRT. Although venography remains the gold standard of diagnosing, there are attendant risks of contrast and radiation exposure. It should therefore only be requested when there is high clinical suspicion in spite of a negative Doppler scan. CT scan may be superior to ultrasound due to a better assessment of veins located under soft tissues. It shows an intraluminal filling defect in the jugular venous wall as was evident in our patient. Where there are facilities, magnetic resonance imaging (MRI), and nuclear medicine scanning could also be done. The consensus opinion for the treatment of CRT is for systemic anticoagulation for a minimum of three months [8]. Treatment should be directed at obtaining early venous recanalization and attempts to fully restore venous patency. Anticoagulation should be continued with either low molecular weight heparin (LMWH), direct oral anticoagulants (DOACs) or vitamin K antagonists. In rare selected cases, treatment may also include initial thrombolysis, venous thrombectomy, or placement of a superior vena cava filter especially when anticoagulation is contraindicated. The index patient did well with only anticoagulation and did not require thrombolytics, surgical intervention or any invasive therapy. The offending catheter was not removed in this case. Guidelines from the American College of Chest Physicians (ACC) recommend that the catheter may only need to be removed if it is no longer needed or working. Anticoagulation would however need to be continued for as long as the catheter is in place and for another 3 months when it is eventually removed [9]. Minimizing the use of CVCs for HD remains the best approach in preventing adverse complications such as thrombosis. According to the National Kidney Foundation - Kidney Disease Quality Initiative (NKF-KDQI), AVF remains preferred among ESRD patients receiving HD. It is advised that use of vascular catheters be limited to less than 10% of patients [10].

Conclusion

We have reported a case of catheter-related IJV thrombosis in an elderly diabetic woman on maintenance HD who was managed with good outcome. Adequate surveillance is required when using CVCs to identify complications early in order to avoid associated morbidity. Patients with IJV thrombosis can be conservatively managed with anticoagulants with good outcome. However, where possible, patients on chronic HD should opt for AVF rather than CVCs for vascular access.

Competing interests

The authors declare no competing interests.

Authors' contributions

All the authors have read and agreed to the final manuscript.

Figures

Figure 1: contrast-enhanced computed tomography scan showing a right IJV thrombus in the patient

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Figure 1: contrast-enhanced computed tomography scan showing a right IJV thrombus in the patient