Case Report

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Transhepatic Hemodialysis Catheter. Alternative in Patients with Angioaccess Exhaustion: Case Report

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ABSTRACT

The treatment of chronic kidney disease (CKD) is based on a variety of strategies aimed at delaying its progression and managing complications. In advanced cases, hemodialysis or kidney transplantation may be necessary. Vascular access (VA) constitutes the fundamental cornerstone of any extracorporeal hemodialysis treatment. In patients with exhaustion from conventional angioaccess, less common routes have been chosen, such as transhepatic angiographic access. We present the case of a 52-year-old patient with a history of CKD and multiple angioaccesses for hemodialysis, all of which experienced dysfunction. In this patient, we placed a transhepatic vascular access. Currently, the patient continues with hemodialysis sessions, and the catheter functions properly.

Keywords: Chronic Kidney Disease; Transhepatic Vascular Access; Hemodialysis; Vascular Access

Abbreviations: CKD - Chronic Kidney Disease; NKF - National Kidney Foundation; VA - Vascular Access; SEN - Spanish Society of Nephrology; AVF: Arteriovenous Fistula

Introduction

CKD is a pervasive medical condition characterized by the gradual decline in renal function over time, affecting millions of individuals globally. According to the National Kidney Foundation (NKF). The treatment of CKD is based on a variety of strategies aimed at delaying its progression and managing complications. In advanced cases, hemodialysis or kidney transplantation may be necessary. Treatment is individually tailored to each patient and focuses on improving quality of life and preventing severe complications, VA constitutes the fundamental cornerstone of any extracorporeal hemodialysis treatment, and its proper functioning directly influences the patient's quality of life and morbidity and mortality [1]. The ideal VA should allow for a secure and sustainable approach to the vascular system, provide sufficient flows to achieve an adequate hemodialysis dose, and be free from complications. According to the guidelines of the Spanish Society of Nephrology (SEN), the first choice for vascular access is the arteriovenous fistula (AVF), preferably of natural origin, or if not, prosthetic, among other options. However, when these alternatives are exhausted, recourse is made to tunneled permanent catheters [2-4].

Clinical Case

A 59-year-old male patient with a history of hypertension and a diagnosis of CKD at the age of 32, underwent hemodialysis treatment. He had previously experienced three angioaccesses in each extremity, all of which were replaced due to dysfunction. Additionally, he had two intra-auricular angioaccess placements that were removed due to functional issues. His condition began in November 2023 due to

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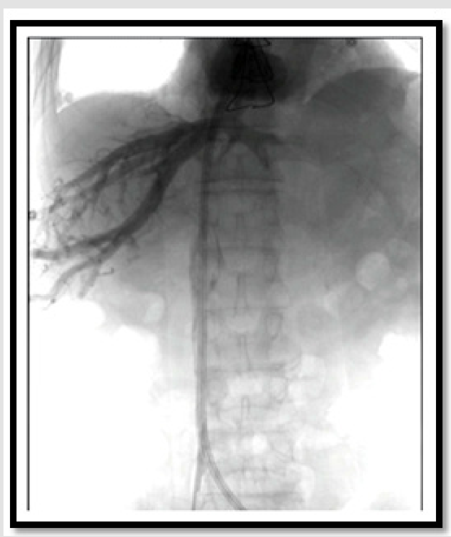
a malfunction of the vascular access in the left groin, resulting in an increase in azotemia levels. The blood workup on peripheral blood showed glucose 189 mg/dl, creatinine 6.8 mg/dl, urea nitrogen 93 mg/dl and serum electrolytes such as Na 142, K 5.28, and CL 109. Hemoglobin 10.1 gr/dL that caused the patient to attend to the hemodynamics service of our hospital unit for consultation for the placement of a hemodialysis angioaccess. Due to the clinical history and the number of previous angioaccesses, the patient was subjected to the realization venous angiography of three extremities (Figure 1) and catheterography (Figure 2) were performed, revealing the following findings: the presence of post-thrombotic sequelae in the cephalic, basilic, axillary, and subclavian veins bilaterally, as well as a defect at the tip of the catheter that caused turbulent and retrograde flow towards the epigastric and diaphragmatic veins, with subsequent passage to the suprahepatic veins and the inferior vena cava. Due to these complications, it was decided to place a transhepatic hemodialysis catheter.

Note: Presence of post-thrombotic sequelae in the cephalic, basilic, axillary, and subclavian veins bilaterally.
Figure 1: Venous Angiography.



Note: A defect at the tip of the catheter that caused turbulent and retrograde flow towards the epigastric and diaphragmatic veins, with subsequent passage to the suprahepatic veins and the inferior vena cava.
Figure 2: Catheterography.

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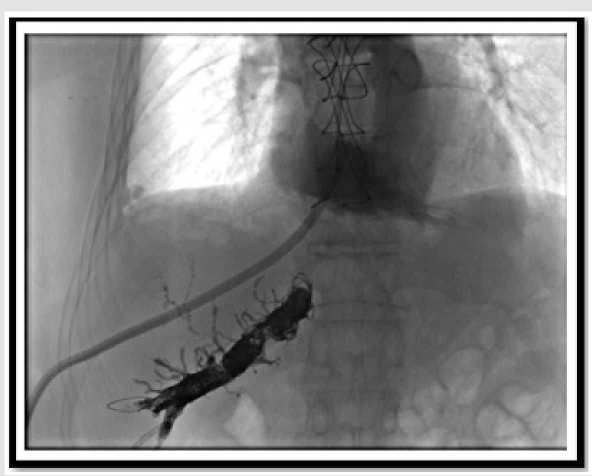
The procedure involved conducting a catheterography through the venous lumen of the previously placed hemodialysis catheter in the left groin for procedure planning. This revealed thrombosis sequelae in the inferior vena cava, as well as the patency and dilation of the suprahepatic veins. Due to these clinical conditions and the urgency of continuing his dialytic treatment, it was decided to place a hepatic angioaccess. Subsequently, an ultrasound examination was performed in the right hypochondrium, showing the suprahepatic veins with a normal course, anechoic content, and increased caliber and no other contraindications. Patient was prepared for percutaneous surgical procedure in hemodialysis room, a puncture was made with an 18 G x 23 cm Chiva-type needle through the tenth ipsilateral intercostal space, obtaining venous return. Through this route, contrast medium was instilled, observing opacification of the middle suprahepatic vein with adequate arrival to the right atrium. Under fluoroscopic guidance, a metallic/teflon-coated guide wire was passed and secured (Figure 3). A hemodyalisis catheter of 11.5 FR x 19.5 cm was placed with the distal end positioned in the right atrium (Figure 4). The catheter was secured to the skin with 2.0 Nylon, and the procedure was concluded. Flow tests were successful in the following days, with adequate flows in the hemodialysis machine. After 14 days, the catheter was replaced with a tunnelled one without major complications. Currently, the patient continues with hemodialysis sessions, and the catheter functions properly.

Note: Under fluoroscopic guidance, a metallic/teflon-coated guide wire was passed and secured.

Figure 3.



Note: Hemodialysis catheter of 11.5 FR x 19.5 cm was placed with the distal end positioned in the right atrium.

Figure 4: Control.

Discussion

The treatment CKD is based on a variety of strategies designed to slow down its progression and manage its complications. In advanced situations, hemodialysis may be necessary. Reliable vascular access, a pre-requisite for haemodialysis, mandates a blood flow of 200–500 ml per minute to enable multiple haemodialysis over a long duration [5]. There are primarily two types of catheters commonly used for hemodialysis: tunneled and non-tunneled catheters. Tunneled catheters are surgically placed beneath the skin, offering more stability and a lower risk of infection. Non-tunneled catheters, on the other hand, are inserted directly into a large vein without tunneling and are generally considered temporary solutions [6]. The choice between these catheter types depends on the patient's individual needs and the expected duration of hemodialysis treatment. Currently, the number of patients with central venous catheters has experienced a significant increase in hemodialysis units, surpassing by far the percentage recommended by the guidelines of the Spanish Society of Nephrology and the National Institute of Diabetes and Digestive and Kidney Diseases (KDOQI), which suggest it should be maintained below 10% [7,8]. This trend may be attributed to the growing population of elderly and diabetic patients, as well as the recurrent failure of vascular accesses due to dysfunction, thrombosis, infection, among other factors, leading to an irreversible depletion of the vascular network [9].

There are other centers where they reported the used of translumbar, gonadal, and internal mammary veins to get access to the inferior vena cava, mostly for total parenteral nutrition and infusion of chemotherapeutic agents. However, Christopher L. et al reported a the use of transhepatic access for hemodialysis [10]. And Ebeid reported in 2007 the indications, technical details and potential complicactions of the use of transhepatic vascular access [11]. The effectiveness and durability of vascular access depend on multiple factors. In patients with exhaustion of conventional angioaccess, less common routes have been chosen, such as transhepatic angiographic access. At our hospital, we do not have extensive experience with this type of angioaccess. Therefore, the information obtained in the following clinical case will help enrich the knowledge base for the multidisciplinary team that deals with renal pathologies.

Conclusion

VA represents the fundamental cornerstone in any extracorporeal hemodialysis treatment. The effectiveness and longevity of vascular access depend on multiple factors. In patients with exhaustion of conventional angioaccess, less common routes have been chosen, such as transhepatic access. In our case, the choice of transhepatic VA proved to be a valuable alternative and yielded satisfactory results in the patient's clinical evolution. Therefore, we conclude that the ongoing development of new VA options aimed at treating patients with chronic kidney disease, along with continuous improvement in the analysis of presented clinical cases, will enrich the knowledge base for the multidisciplinary team dedicated to renal pathologies.

Disclosure

The authors of this manuscript have no conflicts of interest to disclose.

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Informed Consent Statement

Informed consent was obtained from the subject involved in the study.

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References

1. J R Polo, J M López (2008) Accesos vasculares para hemodiálisis. En: L. Hernando Avendaño (Edt.).,. Nefrología Clínica Panamericana 19: 889-904.
2. Jimeno Martín I, José Ignacio Minguelaa, Julen Ocharan Corcueraa, Alejandro Chenaa, Ramón Ruiz de Gaunaa, et al. (2008) Indicaciones y tipos de accesos para Hemodiálisis. Dial Traspl 29(4): 173-176.
3. John T Daurgidas, Catéter venoso central para hemodiálisis. En: Manual de diálisis cap, p. 86-103.
4. J A Rodríguez Hernández, E González Parra, JM Gutiérrez Julián, Alfons Segarra, B Almirante Gragera, et al. (2005) Guías SEN. Guías de acceso vascular en hemodiálisis. Nefrología 25(1): 1-174.
5. Batura D, Saxena VK Vsm, Alva S, Rajvanshi A, Murthy M (1999) ANGIO-ACCESS FOR HAEMODIALYSIS IN RENAL FAILURE-AN ANALYSIS OF THE ROLE OF THE BRESCIA-CIMINO FISTULA. Med J Armed Forces India 55(4): 310-312.
6. Butt KM, Friedman EA, Kountz SL (1976) Angioaccess. Curr Probl Surg 13(9): 1-67.
7. (2001) National Kidney Foundation. KDOQI Clinical Practice Guidelines for Hemodialysis Adequacy, 2000. Am J Kidney Dis 37(1): S7-S64.
8. J M da Motta Leal Filho, F C Carnevale, F Nasser, W de Oliveira Sousa Junior, C E Zurstrassen, et al. (2010) Percutaneous transhepatic venous access for hemodialysis: an alternative route for patients with end-stage renal failure. J Vasc Bras 9(3): 131-136.
9. Fan PY (1994) Acute vascular access: new advances. Adv Ren Replace Ther 1(2): 90-98.
10. Po CL, Koolpe HA, Allen S, Alvez LD, Raja RM (1994) Transhepatic PermCath for hemodialysis. Am J Kidney Dis 24(4): 590-591.
11. Ebeid MR (2007) Transhepatic vascular access for diagnostic and interventional procedures: techniques, outcome, and complications. Catheter Cardiovasc Interv 69(4): 594-606.

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