The Last Exit Before the Bridge: Atrial Permanent Catheter Placement for Hemodialysis Access

Köprüden Önceki Son Çıkış: Hemodiyaliz Erişimi İçin Atriyal Kalıcı Kateter Yerleştirilmesi

Mehmet Erdem MEMETOĞLU, Bülend KETENCİ, Tamer KEHLİBAR, Mehmet YILMAZ, Rafet GÜNAY, Canan KARAKAYA, Erkan ALBAY, Mahmut Murat DEMİRTAŞ

Dr. Siyami Ersek Thoracic, Cardiovascular Surgery Training and Research Hospital, Department of Cardiovascular Surgery, Istanbul, Turkey

Correspondence Address
Yazışma Adresi

Mehmet Erdem MEMETOĞLU
Dr. Siyami Ersek Göğüs Kalp ve Damar Cerrahisi Eğitim ve Araştırma Hastanesi, Kalp ve Damar Cerrahisi Bölümü, İstanbul, Türkiye

E-mail: dr.m.erdem07@hotmail.com

ABSTRACT

We report the placement of a permanent hemodialysis catheter directly into the right atrium through a right anterior thoracotomy for vascular access with central vein occlusion.

Key Words: Central venous catheters, Hemodialysis, Thoracotomy, Surgery

ÖZ

Santral ven oklüzyonu olan hastada vasküler erişim için, sağ atriyuma, sağ anterior torakotomiyle, direkt olarak kalıcı hemodiyaliz kateteri yerleştirilmesini sunduk.

Anahtar Sözcükler: Santral venöz kateterler, Hemodiyaliz, Torakotomi, Cerrahi

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Mehmet Erdem MEMETOĞLU
ORCID ID: 0000-0003-2669-3223
Bülend KETENCİ
ORCID ID: 0000-0002-8493-0154
Tamer KEHLİBAR
ORCID ID: 0000-0002-5274-7654
Mehmet YILMAZ
ORCID ID: 0000-0002-6243-6876
Rafet GÜNAY
ORCID ID: 0000-0001-7498-2025
Canan KARAKAYA
ORCID ID: 0000-0001-7776-279X
Erkan ALBAY
ORCID ID: 0000-0002-9409-7661
Mahmut Murat DEMİRTAŞ
ORCID ID: 0000-0001-5096-9125

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INTRODUCTION

The prevalence of chronic renal insufficiency is increasing dramatically and a well-functioning vascular access is critical for patients for hemodialysis (HD). Central vein stenosis (CVS) is a common problem in patients on dialysis, and placement of a dialysis catheter is problematic in this situation. Alternative surgical techniques have been described for providing venous access via thoracotomy, sternotomy or videothoracoscopy for patients on whom traditional methods cannot be used. These techniques are direct catheter placement into the right atrium, azygos vein, internal mammary vein, hemiazygos vein, and the inferior and superior vena cava (1).

CASE

A 48-year old woman, with a past medical history of Type 2 diabetes mellitus for 10 years, was admitted to our department for hemodialysis access. She had stage five chronic kidney disease primarily due to diabetic nephropathy, and had a history of major abdominal surgery. She had multiple failed dialysis accesses in both arms. She had undergone an operation for closure of radiocephalic arterio venous fistula for right hand ischemia one year ago. She was undergoing hemodialysis 3 times weekly via a permanent hemodialysis catheter placed in her left subclavian vein for the past 12 months. An upper extremity venography revealed CVS (Figure 1), and a computed tomography (CT) (Figure 2) revealed thrombosis of the vena cava inferior. On investigation for possible thrombophilia, we found that the patient had normal levels of protein C, protein S, antithrombin III, and Factor V Leiden. The patient was taken to the operating room and given general anesthesia. A right anterior thoracotomy was performed through the third intercostal space. After the right lung was retracted, the

pericardium was opened to expose the lateral wall of the right atrium where retraction sutures were placed. A purse string suture with 5/0 polypropylene suture was placed on the right atrial auriculum. A 12f (28 cm) intra-atrial silicone double lumen permanent hemodialysis catheter was inserted through a small atriotomy. After closing the right atriotomy, the catheter was subsequently placed out of the thorax through the third intercostal space and then tunneled subcutaneously to the anterior axillary line. The patient made an uneventful postoperative recovery, underwent hemodialysis from her new catheter, and was discharged from the hospital four days after surgery.

DISCUSSION

Indications for IAC placement of conventional vascular accesses are exhausted, and life- saving situations of multiple venous access failure (1,2). Chavanon et al. (3) were the first to report the placement of IAC in 1999. Alternative ways for hemodialysis access such as the transhepatic route (4), percutaneous transrenal catheter placement (5), placing the catheter in the superior vena cava, the parasternal approach (6), or placing the catheter in the superior vena cava by a direct percutaneous puncture (7) have been described. Two novel hybrid surgical options have been described in the literature, but are rarely used in the local setting. The Haemodialysis Reliable Outflow (HeRO) graft circumvents the site of central obstruction, while the GORE® hybrid vascular graft allows deployment of an integrated stent to treat the stenotic central vein (8). Comparing alternative techniques with classical techniques, the patency rates of the catheters used for HD are said to be low because of the complications such as breakage of the access device, infection, thrombotic catheter occlusion, and surgical site complications. This is probably due to the general worsening conditions in patients who have undergone alternative techniques for HD. There are very few reports in literature for using IAC for HD access. The experience with these catheters in HD is limited and their long term durability is unknown. For reducing operative trauma, minimally invasive surgical techniques like mini-sternotomy, or mini-thoracotomy may be performed. In this case, IAC placement has emerged as a last option for hemodialysis. This patient has had multiple vascular access failure and bilateral central venous occlusion. Although endovascular intervention with angioplasty and/or stent placement becomes an option for treatment of central vein stenosis, it was not preferred in this case because of unsuitable vascular anatomy. The patient was also excluded from consideration for peritoneal dialysis because of previous abdominal operations. The patient's lower extremity veins were not suitable for ensuring vascular access due to thrombosis of the vena cava inferior. The urgent cadaveric renal transplantation was introduced in order to offer patients with an imminent lack of access for either hemodialysis or peritoneal dialysis and the inability of the patient to cope with dialysis with a high risk for suicide (9). This option was not considered for this patient according to consultation of the transplant surgeon. Placing an IAC via sternotomy or thoracotomy carries a high risk of morbidity and mortality. Whenever classical vascular access options are exhausted, placing an IAC may be an option for HD access.

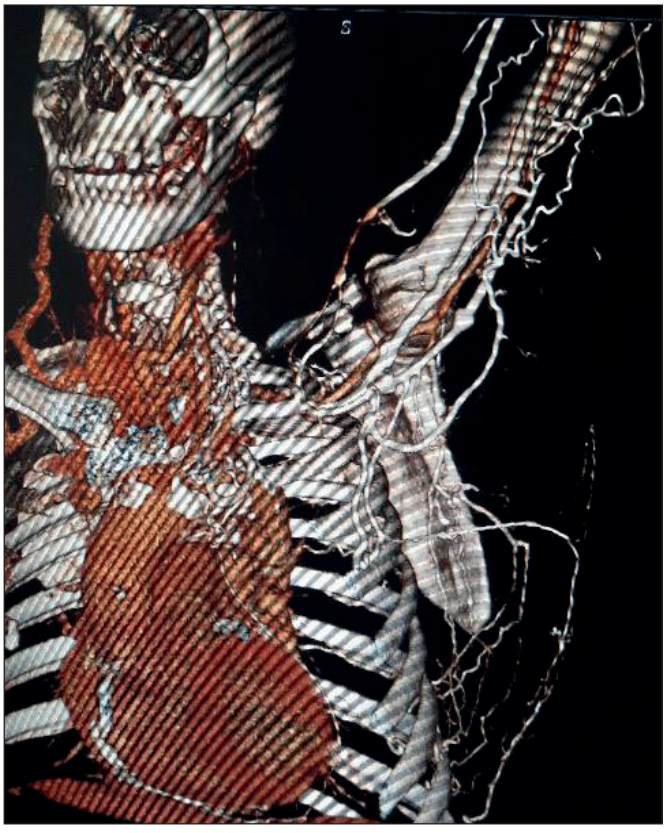

Figure 1: Figure shows central vein stenosis.

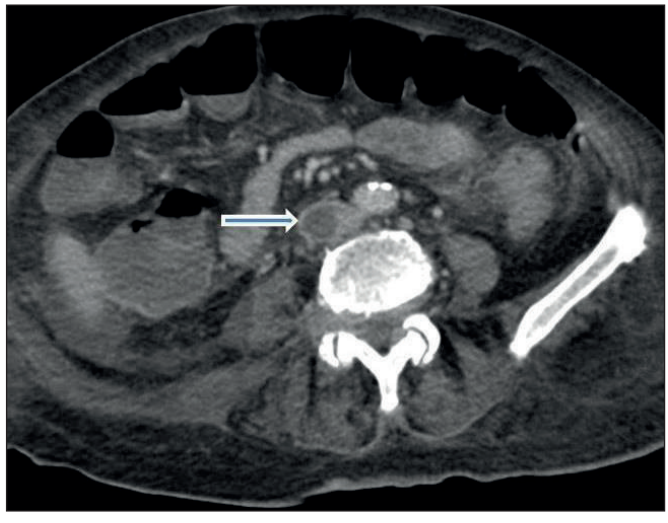

Figure 2: Figure shows thrombosis of vena cava inferior.

REFERENCES

1. Kaufman JA, Kazanjian SA, Rivitz SM, Geller SC, Waltman AC. Long-term central venous catheterization in patients with limited access. AJR Am J Roentgenol 1996; 167:1327-33.
2. Pereira M, Lopez N, Godinho I, Jorge S, Nogueira E, Neves F, Fortes A, Costa AG. Life-saving vascular access in vascular capital exhaustion: Single center experience in intra-atrial catheters for hemodialysis. J Bras Nefrol 2017; 39:36-41.
3. Chavanon O, Maurizi-Balzan J, Chavanis N, Morel B, Blin D. Successful prolonged use of an intracardiac catheter for dialysis. Nephrol Dial Transplant 1999; 14:2015-6.
4. O'shea SI, Lawson JH, Reddan D, Murphy M, Ortel TL. Hypercoagulable states and antitrombotic strategies in recurrent vascular access site thrombosis. J Vasc Surg 2003; 38:541-8.
5. Smith TP, Ryan JM, Reddan DN. Transhepatic catheter access for hemodialysis. Radiology 2004; 232:246-51.
6. Archundia AG, Mendoza AC, Manrique MN, Figueroa SA. A method to insert a haemodialysis catheter by parasternal access. Nephrol Dial Transplant 2002; 17:134-6.
7. Zhai S, Zhao Q, Feng Y, Yu Y, Zhou L, Cui T, Fu P. Placement of tunneled cuffed vascular catheter through superior vena cava puncture. J Vasc Surg Venous Lymphat Disord 2017; 5:547-52.
8. Koh K, Koh YX, Choke ET, Wang JC, Kian CJ. Alternative strategies for central venous stenosis and occlusion in patients requiring haemodialysis access. Ann Acad Med Singapore 2017; 46:39-41.
9. Kousoulas L, Emmanouilidis N, Gwinner W, Klempnauer J, Lehner F. High-urgency renal transplantation: indications and long-term outcomes. J Transplant 2013; 2013:314239.