

Can Vascular Access During Hemodialysis Cause Extremity Loss?

Hemodiyaliz Sırasında Damar Girişimi Ekstremitte Kaybına Neden Olabilir mi?

ABSTRACT

There is always the possibility of complications of vascular access in patients with hemodialysis. The pseudoaneurysm related with accidental arterial puncture is one of the most important complications in patients with hemodialysis and it can cause severe clinic manifestations that may go all the way to limb loss. We describe a 78-year-old woman undergoing regular dialysis treatment with renal failure. The patient had severe left arm pain starting suddenly after hemodialysis, with rapidly progressing cyanosis, and compartment syndrome caused by brachial artery pseudoaneurysm. Urgent surgical procedure was performed. The pseudoaneurysm was successfully repaired, left arm arterial circulation reestablished, and fasciotomy performed on the left arm for compartment syndrome. In the second session, debridement was performed and dermal graft applied to the necrotic lesions. The patient was discharged with full recovery within 2 months following the treatment. In this case, we emphasize that vascular access during hemodialysis has some complications that can even cause extremity loss..

KEY WORDS: Renal dialysis, Aneurysm, False, Complications, Blood circulation

ÖZ

Hemodiyaliz hastalarında vasküler girişim sırasında her zaman komplikasyon gelişme olasılığı mevcuttur. Hatalı arteriyel enjeksiyona bağlı psödoanevrizma gelişimi, ekstremitte kaybına kadar ulaşan ciddi klinik sonuçlara yol açabilen, çok önemli komplikasyonlardan biridir. Biz 78 yaşında renal yetmezlik sebebiyle düzenli diyalize giren bir hastayı tanımladık. Hastada brakial arter anevrizmasının neden olduğu diyaliz sonrası ani başlayan ciddi sol kol ağrısı, hızlı ilerleyen, siyanoz ve kompartman sendromu mevcuttu. Acil cerrahi prosedür uygulandı. Psödoanevrizma başarı ile onarılarak, kolun dolaşımı tekrar sağlandı ve kompartman sendromu nedeniyle sol kola fasyotomi uygulandı. İkinci seansta nekrotik lezyonlara debritleme ve dermal greft uygulandı. Tedaviyi takip eden 2 ay içerisinde hasta tam iyileşme ile taburcu edildi. Bu vakada hemodiyaliz sırasındaki vasküler girişimlerin ekstremitte kaybına varabilen bazı komplikasyonları olduğunu vurgulamak istedik. .

ANAHTAR SÖZCÜKLER: Böbrek diyalizi, Anevrizma, Yalancı, Komplikasyonlar, Kan dolaşımı

INTRODUCTION

Hemodialysis is the most common method used in patients with chronic renal failure. Application of hemodialysis seems to be a simple intervention. Long-term vascular access, which can cause various complications in the vascular bed, is mandatory in patient with hemodialysis (1). However, the vascular access complications are a frequent cause of hospitalization in chronic hemodialysis patients (2). Repetitive

vascular access during hemodialysis stresses vascular structures and can lead to pseudoaneurysm formations and circulation disorders in tissues (1,2). Native vascular grafts are more resistant than synthetic grafts for interventions such as recurrent cannulations. However, permanent applications can cause deterioration even in the endothelial integrity of a native vascular graft (1-3). Pseudoaneurysm is one of the most important complication that can cause

Nurkay KATRANCIOĞLU
Oğuz KARAHAN
Umur Serhat SANRI

Cumhuriyet University School of Medicine,
Department of Cardiovascular Surgery,
Sivas, Turkey



Received : 01.10.2011

Accepted : 10.11.2011

Correspondence Address:
Nurkay KATRANCIOĞLU
Cumhuriyet Üniversitesi Tıp Fakültesi,
Kalp Damar Cerrahisi AD, Sivas, Turkey
Phone : +90 505 242 42 05
E-mail : nurkay@gmail.com

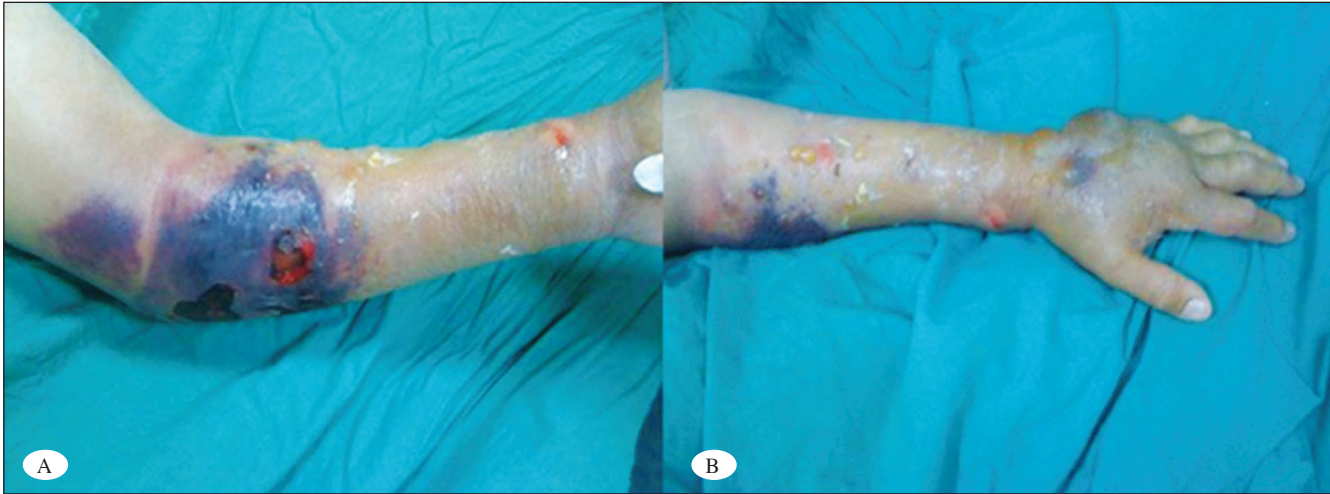


Figure 1 A-B: Severe necrosis and compartment syndrome due to brachial pseudoaneurysm after hemodialysis.



Figure 2 A-B: Full recovery was achieved in the left arm eighth months after the successful repair of brachial pseudoaneurysm and appropriate dermal graft application.

problems ranging from limb loss to life-threatening conditions and should be controlled immediately for these kinds of risks (2,4). In this study, we aimed to present a case with extremity-threatening pseudoaneurysm that causing vascular access during hemodialysis.

CASE REPORT

A 78-year old female patient with a side to-side radiocephalic AVF at the left antecubital region had been under hemodialysis for 2 years due to end stage chronic renal failure. The patient was admitted to another center for a complaint of painful mass in the left antecubital fossa that appeared after hemodialysis and the patient was referred to our clinic for cyanotic ulcer lesion and compartment syndrome in the left arm three days after the hemodialysis. On physical examination, bullous lesions, severe edema and necrotic ulcers were observed in the left upper

limb (Figure 1 A,B). The color doppler ultrasound revealed 50x70x100 mm antecubital hematoma that surrounding the pulsatile pseudoaneurysm 27x41x56 mm in size in the left antecubital area, and an intact arteriovenous (AV) fistula tract in the distal radiocephalic region. Urgent surgery was performed. The left radiocephalic AV fistula tract was ligated and left brachial pseudoaneurysm repair and fasciotomy were performed by the cardiovascular and plastic surgery collaboration. After the surgical approach, the necrotic and bullous ulcers were debrided and peripheral vasodilator treatment was given during the clinical follow up period. The cyanotic appearance of the left upper limb recovered immediately after the surgery. The fasciotomy was repaired primarily and dermal graft implantation was performed on the antecubital necrotic area in the second session. The patient was discharged after the two months follow up period. There was no limb loss and no additional problem was detected eighth months after the operation (Figure 2 A,B).

DISCUSSION

The number of patients with end-stage renal failure has been increasing each year (5). The best treatment for renal failure is kidney transplant but patients are obliged to undergo hemodialysis due to lack of transplant donors; (6). Currently, AV fistulas are the gold standard vascular access for hemodialysis. These patients are dependent on regular and continuous vascular intervention to continue their treatment. The professionalism and experience of dialysis staff are also as important as surgical techniques in this regard (5-7).

Most of the complications related to vascular access after hemodialysis are related with a failure of hemostasis at the puncture sites in a reasonable. This situation may manifest as external bleeding, hematoma, or pseudoaneurysm (8,9). Pseudoaneurysm is an important complication of AV fistulas that can cause problems ranging from bleeding to life-threatening conditions. The incidence of pseudoaneurysm is estimated at 2% to 10% of venous access grafts (9,10). It is more common in prosthetic grafts than in autogenous access. This complication may also occur in every needle puncture during routine hemodialysis. Since, pseudoaneurysm is located often at the puncture site, determination of the vascular puncture site is crucial to prevent vascular access complications. (9). In our case, there was direct puncture to brachial artery, which rapidly enlarged and lead to the compartment syndrome, instead of an arteriovenous fistula.

There are various treatment strategies in pseudoaneurysm management. A small puncture site pseudoaneurysm may usually resolve conservatively. Surgical intervention may be necessary if it is enlarging or acutely expanding. Anastomotic pseudoaneurysms almost always require intervention (9). Ultrasound-guided compression repair, percutaneous injection of thrombin, endovascular covered stent exclusion, aneurysmectomy and surgical repair are various treatment options (11,12). Moszkowicz and his colleagues (4) reported their brachial artery pseudoaneurysm cases. They used various treatment methods and according to their report only one patient had limb loss (4th & 5th digits). However, surgical interventions are preferable in case of compartment syndrome causing extremity ischemia, as in our case.

To sum up, creating vascular access is a crucial intervention for the hemodialysis patient. Regular and continuous vascular interventions can be safely performed by experienced staff. We think that education of the hemodialysis staff is vital to prevention of vascular access problems. Prevention is more important than treatment.

REFERENCES

1. Zibari GB, Rohr MS, Landreneau MD, Bridges RM, DeVault GA, Petty FH, Costley KJ, Brown ST, McDonald JC: Complications from permanent hemodialysis vascular access. *Surgery* 1988; 104(4): 681-686
2. Lapus TP, Trerotola SO, Savader SJ: Radial artery pseudoaneurysm complicating a Brescia-Cimino dialysis fistula. *Nephron* 1996; 72: 673-675
3. Hein AN, Vesely TM: Use of the percutaneous thrombolytic device for the treatment of thrombosed pseudoaneurysms during mechanical thrombectomy of hemodialysis grafts. *J Vasc Interv Radiol* 2002; 13: 201-204
4. Moszkowicz A, Behrens G, Gueyikian S, Patel NH, Ferral H: Occlusion of a rapidly expanding hemodialysis graft pseudoaneurysm with placement of a stent graft. *Semin Intervent Radiol* 2007; 24(1): 34-37
5. Rooijens PP, Burgmans JP, Yo TI, Hop WC, de Smet AA, van den Dorpel MA, Fritschy WM, de Groot HG, Burger H, Tordoir JH: Autogenous radial-cephalic or prosthetic brachial-antecubital forearm loop AVF in patients with compromised vessels? A randomized, multicenter study of the patency of primary hemodialysis access. *J Vasc Surg* 2005; 42(3): 481-486
6. Kutay V, Ekim H, Karadağ M, Öztürk V, Kırallı K, Yakut C: Kronik Böbrek yetmezlikli hastalarda görülen arteriyovenöz fistül komplikasyonları ve cerrahi tedavisi. *Turkish J Thorac Cardiovasc Surg* 2004; 12: 115-118
7. Schanzer H, Skladany M: Vascular Access For Dialysis. Haimovici H (Ed), Haimovici's Vascular Surgery Principles and Techniques. (4th ed). 1996; 1028-1041
8. Topal M, Özdemir N: Acute complications of hemodialysis. *Turkiye Klinikleri J Int Med Sci* 2006; 2(4): 24-29
9. Padberg FT Jr, Calligaro KD, Sidawy AN: Complications of arteriovenous hemodialysis access: Recognition and management. *J Vasc Surg* 2008; 48(5): 55-80
10. Yasim A, Kabalci M, Eroglu E, Zencirci B: Complication of hemodialysis graft: Anastomotic pseudoaneurysm: A case report. *Transplant Proc* 2006; 38(9): 2816-2818
11. Yildirim S, Nursal TZ, Yildirim T, Tarım A, Caliskan K: Brachial artery pseudoaneurysm: A rare complication after haemodialysis therapy. *Acta Chir Belg* 2005; 105(2): 190-193
12. Paulson EK, Sheafor DH, Kliever MA, Nelson RC, Eisenberg LB, Sebastian MW, Sketch MH Jr: Treatment of iatrogenic femoral arterial pseudoaneurysms: Comparison of US guided thrombin injection with compression repair. *Radiology* 2000; 215: 403-408