Vision-Threatening Arteriovenous Fistula in the Upper Extremity

Görmeyi Tehdit Eden Üst Ekstremite Arteriovenöz Fistülü

ABSTRACT

Arteriovenous fistulas (AVFs), which have low complication rates and can stay open for a long time, are preferentially used for hemodialysis in patients with end-stage renal disease (ESRD). Arteriovenous fistulas for hemodialysis frequently cause complications such as bleeding, thrombosis, ischemia of extremities, infection, edema, venous hypertension and venous aneurysm. These complications have negative effects on the quality of life and survival. In this report, a dialysis patient having severe edema in the left eye and arm for one year due to thrombosis in the AVF and experiencing a fast regression of edema after closure of the AVF will be presented. The present case emphasizes that thrombosis in the fistula, a frequent complication of AVF in patients with ESRD, can present with rare symptoms like periorbital edema which prevents unilateral vision in addition to its well-known symptoms.

KEY WORDS: Arteriovenous fistula, End-stage renal disease, Periorbital edema, Thrombosis

ÖZ

Son dönem böbrek yetmezliği hastalarında hemodiyaliz işlemi için, düşük komplikasyon oranına sahip ve uzun süre açık kalabilen kalıcı arteriyovenöz (AVF) fistüller öncelikli olarak kullanılmaktadır. Arteriyovenöz fistüllerde kanama, tromboz, ekstremite iskemisi, enfeksiyon, ödem, venöz hipertansiyon ve venöz anevrizma gibi komplikasyonlarla sıkça karşılaşılmaktadır. Bu komplikasyonlar hastaların yaşam kalitesi ve süresini olumsuz etkilemektedir. Burada AVF trombozuna bağlı 1 yıldır sol kol ve gözde görmeyi engelleyen ileri derecede ödem olan ve AVF kapatılması sonrası gözdeki ödemi hızla gerileyen bir hemodiyaliz hastası sunulmuştur. Son dönem böbrek yetmezliği hastalarında AVF komplikasyonlarından sık olan tromboze fistülün bilinen bulgularının yanı sıra olgumuzdaki gibi tek taraflı görmeyi engelleyen periorbital ödem gibi az rastlanılan bulgularla prezente olabileceğini olgumuzla vurguladık.

ANAHTAR SÖZCÜKLER: Arteriovenöz fistül, Periorbital ödem, Son dönem böbrek yetmezliği, Tromboz

Güner KARAVELİ GÜRSOY[1]
Ebru GÖK OĞUZ[1]
Gülay ULUSAL OKYAY[1]
Cengiz BULUT[1]
Tuğba KİP TEYMUR[1]
Mutlu ACAR[2]
Sinan ÇALIŞKAN[2]
Mustafa KÖŞKER[2]
Başol CANBAKAN[1]
Mehmet Deniz AYLI[1]

1 Dışkapı Yıldırım Beyazıt Education and Research Hospital, Department of Nephrology, Ankara, Turkey
2 Dışkapı Yıldırım Beyazıt Education and Research Hospital, Department of Ophthalmology, Ankara, Turkey

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Correspondence Address:
Güner KARAVELİ GÜRSOY
Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma Hastanesi, Nefroloji Bölümü, Ankara, Turkey
Phone : +90 312 341 03 00
E-mail : gunerkaraveli@gmail.com

INTRODUCTION

Arteriovenous fistulas (AVFs), which have low complication rates and can stay open for a long time, are preferentially used for hemodialysis in patients with end-stage renal disease (ESRD) (1). Problems with permanent intravenous routes are still an important cause of morbidity leading to hospitalization of patients on dialysis (2). Thrombosis in AVF, which is common in these patients, can occur in the short-term or the long-term with hemodialysis. Thrombosis in the short-term mostly results from the surgical technique used while the one in the long-term develops due to insufficient flow in the fistula, hypotensive processes, hypercoagulability and dehydration (3). Thrombosis in AVF usually presents with changes in the quality of murmur at the anastomosis site, an increase in venous pressure, a decrease in arterial pressure, failure to keep bleeding under control after removal of the needle, difficulty in preservation of intradialytic blood flow, difficulty in cannulation, an unexplained

increase in urea and creatinine levels and disappearance of thrill and murmur (4). In this report, a dialysis patient having severe edema in the left eye and arm for one year due to thrombosis in the AVF and experiencing a fast regression of edema after closure of the AVF will be presented.

CASE

A fifty-five year old woman on chronic dialysis for ESRD due to systemic lupus erythematosus (SLE) for 21 years presented to our clinic with her closed left eye due to edema lasting for one month and dysfunction of the AVF in her left arm in the past one week and swelling in the left arm, breast and eye progressing for one year. On history, there was thrombosis in tunnelled catheters inserted in the right and left subclavian veins at short intervals and closure of the arteriovenous fistula opening into the right upper extremity due to swelling and infection after being used for 15 years. The patient also had a history of hypertension in addition to SLE; however, she did not have a history of diabetes. On physical examination, there was edema preventing vision in the left eye, edema in the left breast and arm, a change in skin complexion in the hand and the arm where the AVF was created and collateral formations in the left hemithorax (Figure 1). There was no edema on her right arm where the AVF was closed 15 years ago. In addition, thrombosis was detected in the left external jugular vein on palpation. The patient was on treatment with amlodipine 10 mg/day, doxazosin 8 mg/day, calcitriol 0,5 mcg/day, cinacalcet 90 mg/day, sevelamer 2400 mg/day and lansoprazole 30 mg/day.

Results of the laboratory investigations on admission were as follows: Hb: 12.5 g/ dl, htc: 43.8%, WBC: 5000, PLT: 179.000, blood fasting glucose: 76 mg/ dl, blood urea nitrogen: 124 mg/ dl, creatinine: 8.3 mg/dl, ALT: 7 U/L, Na: 141 mmol/ L, K: 5 mmol/L LDH: 154 U/L, ferritin: 29 ng/ml PTH: 824 pg/ml, PT: 13.4 seconds, aPTT: 36.4 seconds, INR: 1.17

The patient was not found to have trauma in her left arm and was initiated low molecule density heparin for thrombus in the left jugular vein. Consultation was requested from the Ophthalmology department for severe edema in the left eye

Figure 1: *Before closure of the AVF.*

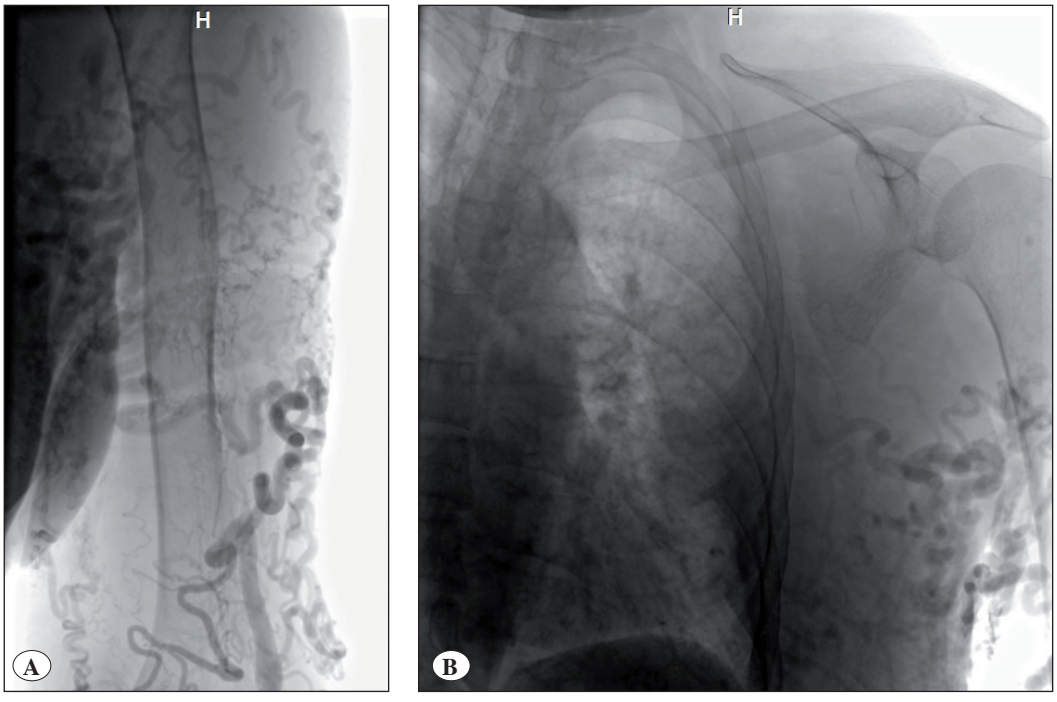

Figure 2: A) *Collateral circulations on the arm*
B) *Collateral circulations on the chest.*

preventing vision. However, an ophthalmological examination could not be performed since the eye was closed due to edema. Therefore, the patient was diagnosed as orbital cellulitis and initiated antibiotics. On left arm Doppler ultrasonography, there was a thrombus 5 mm in length in the AVF. Arteriovenous fistulogram showed that the AVF was totally blocked and that collateral circulations helped to continue sanguination (Figure 2A, B). A tunnelled catheter was inserted to the left jugular vein and hemodialysis was initiated. The patient was examined by a cardiovascular surgeon and the AVF on the left arm was closed. On day 2 after closure of the AVF, edema in the left eye regressed almost completely (Figure 3). Ophthalmological examination by an ophthalmologist revealed slightly dilated episcleral and conjunctival vessels, but did not show corneal edema (Figure 4). On fundoscopy, intraocular pressure was normal. Considering that the ocular edema was due to thrombosis in the AVF, the large spectrum antibiotic, which was initiated for ocular cellulitis, was discontinued. Since the patient had a history of SLE, anticardiolipin antibodies and lupus anticoagulants were investigated but the results were negative. Other hematological tests that detect other possible causes of thrombosis (protein C, protein S, factor 5 leiden mutation) were performed. Since the patient had widespread thrombosis, she was given coumadin and was discharged and invited to the hospital for regular follow-up. The patient had no vision loss three months after her discharge from the hospital. The patient, whose anticoagulant treatment was stopped based on the recommendation from the hematology department, is receiving anticoagulant treatment only during dialysis. Currently the patient is receiving dialysis from a tunnelled catheter and is on the cadaver transplant list.

DISCUSSION

Arteriovenous fistulas for hemodialysis frequently cause complications such as bleeding, thrombosis, ischemia of extremities, infection, edema, venous hypertension and venous aneurysm. These complications have negative effects on the quality of life and survival (5). In this report, a case of unilateral severe orbital edema secondary to venous thrombosis in the AVF is presented.

As far as we are aware, there have been two cases of end-stage renal disease (ESRD) presenting with intermittent loss of eyesight, diplopia and edema, which were attributed to increased intraocular pressure due to carotid cavernous fistula. However, the diagnosis was ruled out on cerebral angiography (6, 7). Subclavian angiography showed that the left brachiocephalic vein was completely occluded. In both cases, ocular symptoms regressed and disappeared when the fistulae were closed. Unlike the two cases reported in the literature, in the case presented here, funduscopic examination could not be performed on admission since the eye was completely closed due to edema. Upon detection of thrombosis on fistulogram the AVF was closed immediately. As in the abovementioned two cases, ocular edema quickly regressed after closure of the fistula.

There was sufficient thrombosis in the AVF to create collaterals and the resultant flow allowed hemodialysis until admission to our clinic.

The present case had a rare complication of an arteriovenous fistula for hemodialysis. We thought that in both the present case and the two cases reported in the literature, high pressure in the left jugular vein due to occlusion of the left brachiocephalic vein increased carotid venous pressure, which resulted in a rise in the superior ophthalmic vein pressure and intraocular pressure. Incompetence of the anti-reflux mechanism associated with

Figure 3: *On day 2 after closure of the AVF.*

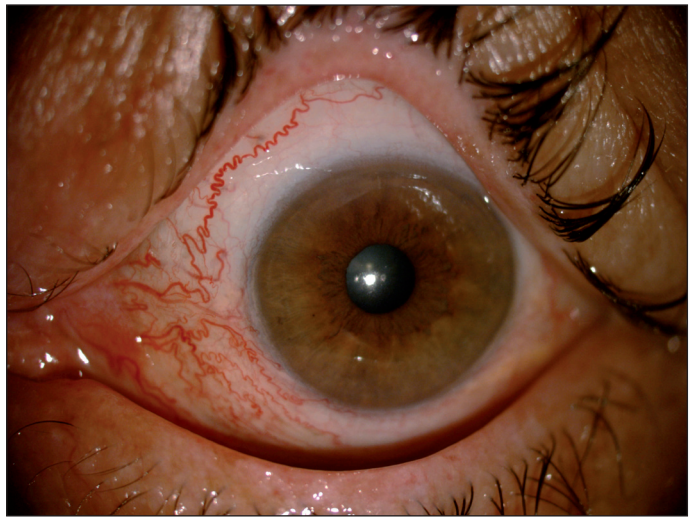

Figure 4: *Left eye; after closure of the AVF.*

elevated venous pressure might have caused unilateral ocular edema sufficient to prevent vision (8).

CONCLUSION

The present case emphasizes that thrombosis in the fistula, a frequent complication of AVF in patients with ESRD, can present with rare symptoms like periorbital edema which prevents unilateral vision in addition to its well-known symptoms. Especially patients with SLE, who tend to develop thrombosis in the AVF, should be closely monitored even if the fistula works well since collaterals that allow it to function may develop.

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