Venous dissection due to brachiocephalic arteriovenous fistula puncture

Brakiyosefalik arteriyovenöz fistül girişine bağlı venöz diseksiyon

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Arteriovenous fistula is the most important vascular access for hemodialysis for chronic renal disease. It is quite easy to puncture the fistula when hemodialysis is needed. On the other hand, it is more difficult to cannulate the native fistulas than the grafts; therefore, puncture-related complications occur more in the native fistulas. These complications are hematoma, aneurysm formation, thrombosis, and venous wall dissection during hemodialysis, although this is extremely rare. A 48-year-old male patient with end-stage renal disease had venous wall dissection diagnosed by ultrasonography. This case report presents this rare pathology in a case treated with supportive measures.

Key words: Arteriovenous fistula; axillary vein; complication; hemodialysis.

Kronik böbrek hastalığında arteriyovenöz fistül hemodiyalize yönelik en önemli damar ulaşım yollarından biridir. Hemodiyaliz gerektiğinde fistüle giriş yapmak oldukça kolaydır. Diğer taraftan greftlere göre fistüllerin kanülasyonu daha zor olduğundan girişime bağlı komplikasyonlar native fistüllere göre daha fazla oluşmaktadır. Bu komplikasyonlar hematom, anevrizma oluşumu, tromboz ve hemodiyaliz esnasında oldukça nadir görülen venöz duvar diseksiyondur. Son evre börek hastalığı olan 48 yaşında bir erkek hastada tanısı ultrasonografi ile konulan venöz duvar diseksiyonu vardı. Bu yazıda destekleyici önlemler ile tedavi edilen bir olguda bu nadir patoloji sunuldu.

Anahtar sözcükler: Arteriyovenöz fistül; aksiller ven; komplikasyon; hemodiyaliz.

Vascular access for hemodialysis is essential for patients with end-stage renal disease. Native arteriovenous fistulas (AVFs) have many advantages over grafts, as shown by a lower incidence of thrombotic and infectious complications and longer access survival.[1] The first choice for vascular access is the radiocephalic fistula in the nondominant arm with the alternative being the antecubital brachiocephalic AVF. If the cephalic vein is unsuitable in the upper arm, the choice of conduit is between the prosthetic graft or brachiobasilic vein.[2]

It is more difficult to cannulate native fistulas than the grafts; therefore, puncture-related complications occur more often in native fistulas.[3]

The most common complications due to AVF are edema, thrombosis, hematoma, venous hypertension, and lymph leakage.[2] In addition, venous dissection due to venous puncture has been rarely reported.[3] We present a case of venous dissection due to hemodialysis intervention on the cephalic vein diagnosed by Doppler ultrasound evaluation.

CASE REPORT

A 48-year-old male with end-stage renal disease had a right brachiocephalic AVF operation for chronic hemodialysis eight months previously. The patient had been on chronic hemodialysis for 16 years due to glomerulonephritis. In his last venous puncture for hemodialysis, he suddenly complained of acute severe pain in the upper arm. He had a sudden swelling over the cephalic vein trace, starting from the puncture site and extending to the infraclavicular region, without erythematous changes of the overlying skin (Figure 1). Hemodialysis was not started, and the needles were immediately removed. Clinical examination revealed a palpable thrill over the cephalic vein with an audible continuous murmur. Distal to the insertion site of the venous needle, the cephalic vein had hardened and was tender on palpation.

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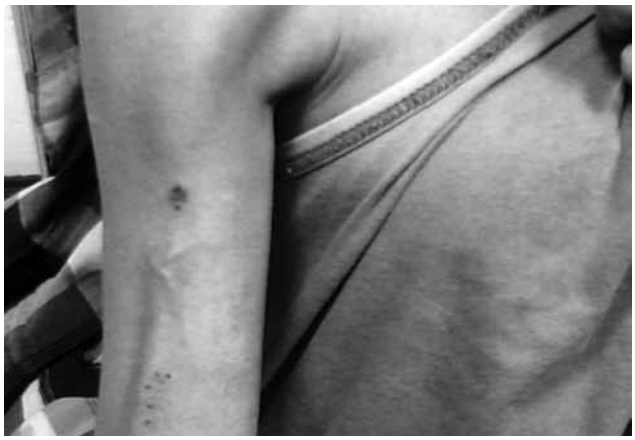

Figure 1. Swelling due to venous wall dissection in the brachio-cephalic arteriovenous fistula.

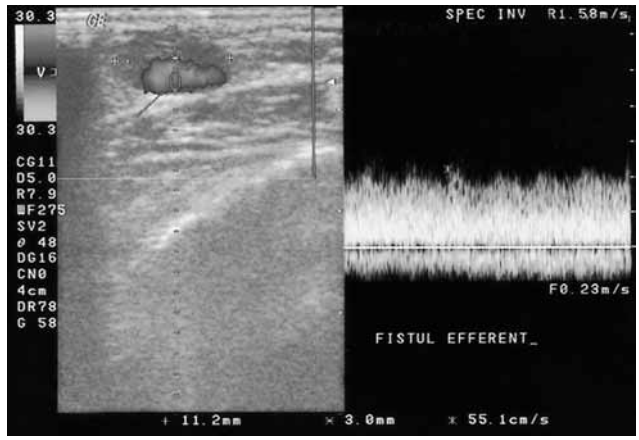

Figure 2. Ultrasound image of the venous wall dissected which demonstrates cephalic vein wall thickening.

Gray-scale and color Doppler ultrasonography (USG) revealed a thickening of the concentric vein wall (11.2 mm) extending along the arterialized cephalic vein up to its junction with the axillary vein (Figure 2). There was good flow in the vein lumen, but it was slightly narrowed. Cannulation of the vein was done from the proximal portion of the cephalic vein for subsequent hemodialysis because the fistula patency had been preserved. The patient received low-dose heparin at dialysis and no heparin during the hemodialysis-free intervals. The patient had an uneventful recovery, and one-month follow-up revealed a regression of the venous dilatation (Figure 3). Control USG revealed normal venous wall thickness (Figure 4).

DISCUSSION

Venous dissection has been seen on rare occasions. On one previous occasion, it was diagnosed by gray-scale and color Doppler USG by Salgado et al.[3] As in our case, their patient had sudden swelling over the cephalic vein trace. Their patient was anticoagulated, probably because of luminal narrowing. We did not anticoagulate our patient because there was good flow in the cephalic vein. Also, we did not stop venous puncture to the cephalic vein for subsequent hemodialysis since the proximal portion of the vein was suitable for vascular access.

Vesely et al.[4] reported venous dissection in three cases, due to a venous percutaneous angioplasty procedure. Venous dissection is defined as a partial thickness tear with disruption of the intimal and medial layers of the vein wall in which the adventitial layer remains intact. Minor venous dissections may be ignored or unrecognized whereas major venous dissections may often be incorrectly categorized as venous ruptures. Venous dissection does not cause perivascular

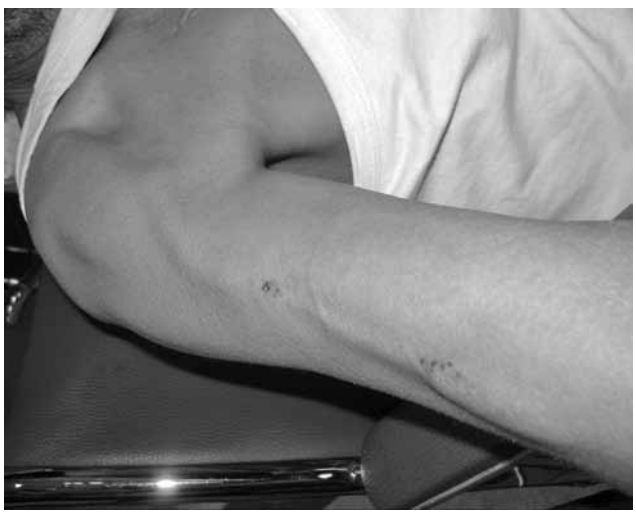

Figure 3. Regression of the swelling after a month.

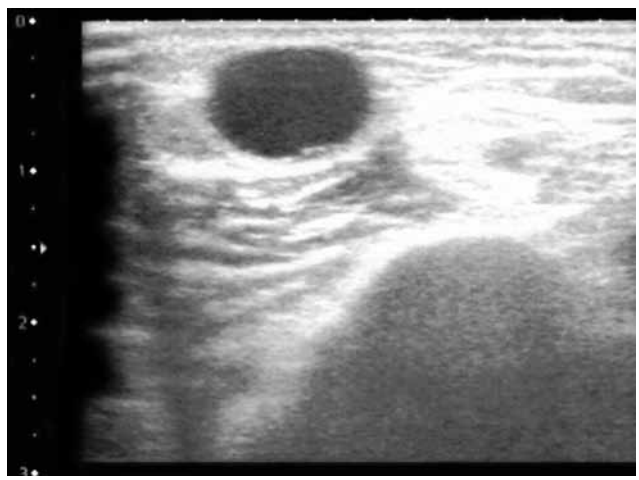

Figure 4. Ultrasound image demonstrating the normal cephalic vein wall after a month.

hemorrhage, but a flow-limiting dissection can decrease the efficiency or cause thrombosis of a vascular access. They can be managed using percutaneous techniques.[5] However, in our case and in one other reported incident, venous dissection regressed without any intervention.

Venous dissection appears to result from vein layer disruption caused by the misplacement of the bevel of the needle which leads to the formation of a layer gap through which an anterograde dissecting column originates. This is driven by the pressure of the dialysis machine's blood pump. Additionally, the vein wall lesion may occur at the time of cannulation when the needle bevel is rotated.[3] Venous dissection, in our case, had occurred just after venous puncture before hemodialysis was started.

It is important to make the differential diagnosis from thrombosis which necessitates surgical revision. On the other hand, medical therapy is mostly sufficient for the patency of the fistula. Furthermore, as in our case, it may not be necessary to suspend hemodialysis if there is a good flow through the vein and if the length of the vein proximal to the dissection is enough for venous puncture.

In conclusion, venous dissection is a complication which is very rarely seen in vascular access for hemodialysis. It can be treated with supportive measures when diagnosed. We suggest routine dialysis from the proximal portion of the fistula if there is a good flow, which may be indicated by a good thrill.

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