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Abnormal vein patterns on the feet: two case reports

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Abstract

There are many variable variants of the posterior tibial veins and these are extremely important fot the venous circulation of the feet. Due to the complex and variable nature of the lower extremity veins, their drainage is particularly important in some surgical operations including flap operations and the treatment of important pathological conditions such as deep vein thrombosis (DVT). The plantar surface of the foot and the tarsal tunnel have significant neurovascular structures. Therefore it is extremely difficult to determine a safe zone when working in this region, especially for surgeons.

In these two cases, abnormal vein patterns with rare anastomoses with their different drainage patterns and the fenestration were observed in the right and left feet and medial region of the ankle of male cadavers during the routine dissection. The clinical importance of this condition was particularly discussed.

There are very limited cadaver studies to find out the relationship between the PTV and great saphenous vein (GSV) due to the difficulty of working on surgically deep vein thrombosis and some flap techniques. Therefore the region should be well known anatomically. Thanks to the variations and the anastomoses in our study, we aim to contribute to the studies to understand the complex structure of the region.

Key words: posterior tibial veins, great saphenous vein, deep vein thrombosis, anastomoses

INTRODUCTİON

Considering the venous drainage of the foot, after the dorsal digital veins of the foot drains into dorsal venous arch on the dorsal surface. It continues as lateral marginal vein and drains into small saphenous vein (SSV). In the medial side, medial marginal vein drains into great saphenous vein (GSV). When the plantar region is examined, it continues with plantar digital veins, medial plantar vein and lateral plantar vein and drains into posterior tibial veins. Then the GSV drains into the femoral vein and posterior tibial veins drain into popliteal vein [1]. At the same time, important perforating veins such as Cockett's perforators drain into the GSV and posterior tibial veins. Although it varies in the foot and ankle region, it is known that there may be about 3-4 medial perforator veins [5]. This area has so many complex structures but there are not enough cadaver studies on this region. We hope that our study will guide clinicians in terms of surgical approaches to this area, especially the veins that we showed in Figures 1 and 2.

CASE REPORT

During the educational dissection for medical students in two male cadavers, we observed unusual vein patterns when lifting the skin and the superficial fascia of the plantar region of the feet and the medial ankle regions.

In the case 1, although it is known that there are many perforating veins in this region that first drain the superficial fascia, then pierce the deep fascia, and then drain into SSV and GSV on the dorsal surface. The PTV in the plantar surface and posterior compartment, it has not been reported before that a vein from the posterior compartment and a large vein from the dorsal surface of the foot anastomoses and drains into PTV (Figure 1).

On the other hand, it was observed that a cutaneus branch given to the posterior compartment by the posterior tibial artery passed through a fenestration thought to occur congenitally in PTV.

In the case 2, we observed a very large anastomosis between the GSV and PTV in which one of each branches drains from the medial plantar region of the foot and from the skin of the medial surface of the ankle (Figure 2). Other than those conditions, no variations were observed for the other structures.

DISCUSSION AND CONCLUSIONS

These two conditions contain rare abnormal drainage patterns. Although there are many articles in the literature on supplying and drainage of the foot and ankle, the rate of cadaver dissection studies especially on venous drainage are very few. Beyond all veins of the leg and foot, the most important disorder for the veins is DVT which can cause motor functions deficiency in the lower limb, especially in the elderly patients [4].

DVT seen in patients with acute strokes is usually peripheral type. 12.7% of acute stroke seen in PTV occur with hemorrhagic stroke and 7.6% with ischemic stroke [7]. In addition, according to Bergan J. et al., the incidence of DVT after cardiovascular surgery for venous disorders as a complication is average 1.8% [3].

According to the studies performed, the catheter-directed thrombolysis (CDT) method has an important place in the treatment of DVT. For this method, some studies indicate that PTV is an ideal entry point [10]. Although it is known that the prognosis of the catheter-directed thrombolysis (CDT) method performed over PTV is better than the popliteal vein according to long-term studies, it is recommended to be careful because of the high variation and small diameter rate of VTP [2].

Due to the fact that it receives more pressure, the vascular structure on the palmar surface of the hand, as well as the plantar surface of the foot, is very thin and the connections between them are very weak. This condition may cause difficulties in some flap operations in terms of reconstructive surgery. On the other hand, the structural architecture of perforating and superficial veins can be seen as an alternative and facilitating factor in flap operations allowing drainage to be performed directly to the deep veins or with anastomoses between deep veins and superficial veins [11].

The perforating veins of the feet act as a connection between the deep veins and the superficial veins as they follow a path from the deep to the surface. This is very

important in ascending venous pump activation [9]. When the pathology is examined, it is obvious how important it is in vein structures as well as the organization of arterial and nerve structures for surgical operations to be performed on the dorsal surface and plantar surface of the foot and for the ankle region. In addition, the thrombosis in PVT can be seen some different conditions such as the antiphospholipid syndrome, some metabolic syndromes, or in some developmental venous malformations [6, 8].

We know that the dissection of the areas that we mentioned is hard, that is why almost all studies are done with radiological images of the areas. It is foreseen that our study will provide a new perspective on the initiatives to be made in this region.

Conflict of interest: None declared

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Figure 1. 1 - the vein which arises from the posterior compartment, 2 - the large vein 3 - an anastomosis between them, 4- the drainage junction, arrows: cutaneous branches.

Figure 2. black asterisk: GSV, white asterisk: PTV, 1 - the anastomosis between GSV and PTV, 2 - the vein that arises from the skin of the medial surface of the ankle, 3 - the vein that arises from the medial plantar region of the foot


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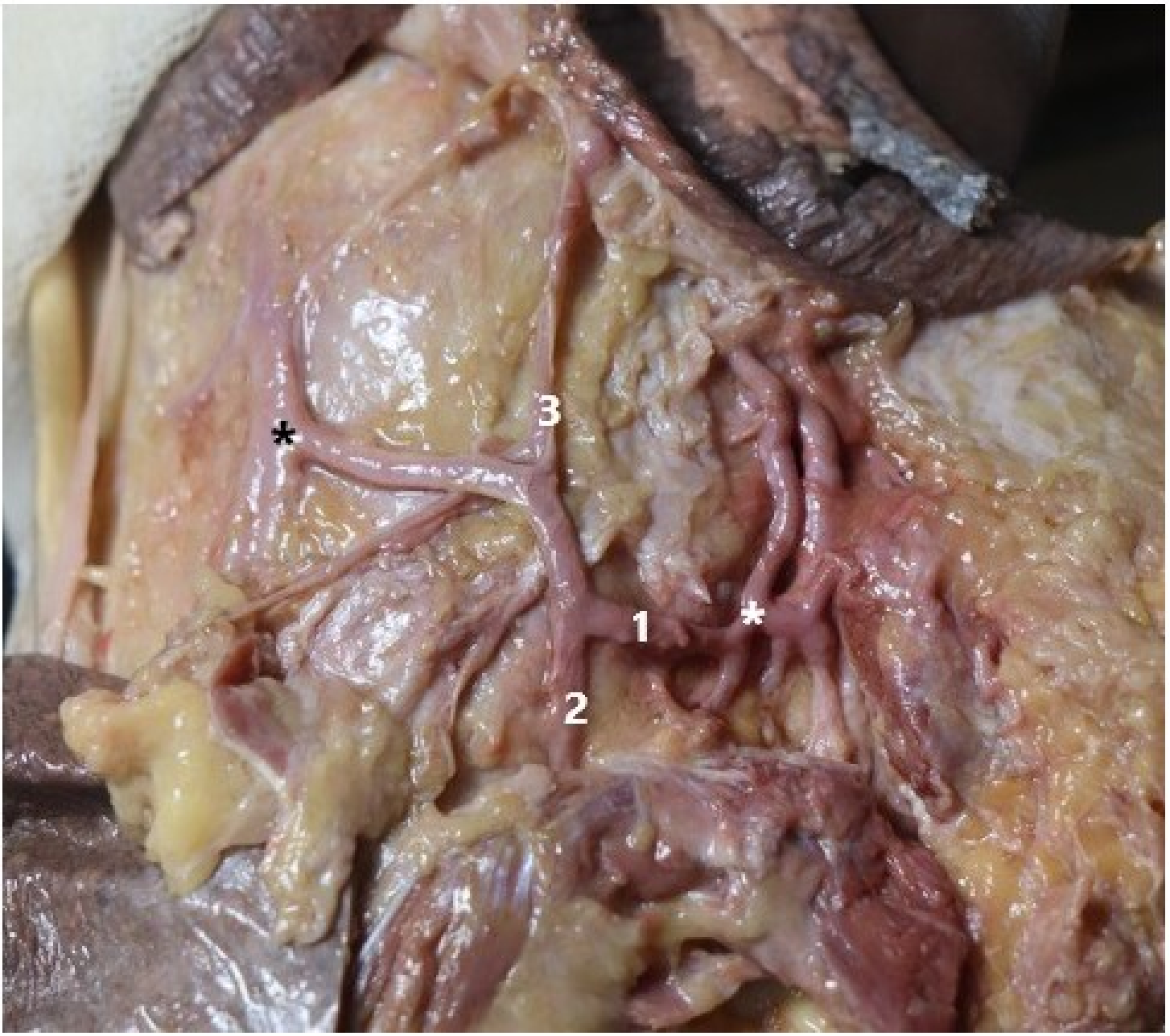
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