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CASE REPORT

A rare case report of complete transposition of the femoral artery and vein

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Abstract

In the inguinal region at normal anatomical situation the artery is positioned lateral to vein and by this figure artery and vein get out under inguinal ligament and entrance to this region. Every surgeon (general surgeon, vascular surgeon or orthopaedic) that works at this region should know anatomical anomaly and variation of these vessels in inguinal region. Dissection at this region without knowing these variations could damage the vessels especially femoral artery. Some times this variations could induce compression on the vein and induce deep vein thrombosis. In this case while exploring femoral artery for transfemoral thrombectomy, femoral vein was found in the arteries anatomical position and complete transposition of artery and vein was founded. In conclusion, knowing normal variations and anomalies while dissecting this area helps us for lowering iatrogenic vascular trauma and complications.

Keywords: Femoral artery, Femoral vein, Anatomical variations, Anatomy transposition

Introduction

The femoral artery, also known as the common femoral artery, is a continuation of the external iliac artery deep to the inguinal ligament. The proximal part of the artery and the femoral vein remain within the femoral sheath, and the vein is placed medial to the artery (1) NAVY rule, is an array of nerve plexus, artery and vein from external to internal, (2) and this rule helps us for finding vessels in ultrasonography and puncturing vein or artery in interventions even in open dissection for finding vessels.

There are multiple anatomical variation and anomalies in inguinal region for artery and vein. Dissection and puncturing without knowing of this variations could injure vessels and some times can be late for diagnosis of complications (3,4,5). Arterial and vein anomalies and transposition can induce sever complications especially by young surgeons and some times this complications are sever limb ischemia and for prevention adequate training in anatomy, anatomical variants, and anatomical dissection is necessary (6). Anatomical variations of the femoral artery and vein within the inguinal region have been widely documented in the literature but few reports have described their synchronous association (7, 8). Although these variants rarely could cause clinical manifestations, technical difficulties and complications can take place during surgical procedures. Incidence of the complete transposition of the femoral vessels associated with an anomalous development of the GSV is rare and is about 0.02% (9). Femoral artery becomes the main vessel of the lower limb during the 14mm embryo stage. Embryologically, while the middle portion disappears the proximal segment of the axial sciatic artery persists to develop the inferior gluteal artery and some authors suggested the possibility that an anterior position of the common femoral artery can compress the femoral vein and contribute to DVT or secondary varices (10) as a complication due to this transposition. For this reasons, knowing of this variations is critical for every surgeons (general surgeon, vascular surgeon, orthopedics) that works at this field and region for lowering complications.

Case

The patient was an 80 years old woman with a past medical history of diabetes mellitus and hypertension on medical treatment came to hospital with a chief complaint of pain and loss of sense in right lower limb in the past 24 hours. During physical exam limb was cold from 1/3 distal thigh and ankle movement decreased but no type plegia was seen. Sense in leg and foot were decreased and had tenderness in calf.

Blood pressure: 150/80, PR: 80 and had irregular irregularity in rhythm. In the right limb has no pulses but pulse in left limb was detected in dorsal pedis and posterior tibial arteries. After primary evaluation she became a candidate for transfemoral thrombectomy under local anesthesia. In operation by inguinal incision we couldn't find femoral artery in anatomical position and the femoral vein was at this location. After meticulous dissection femoral artery was found medial to vein, indeed it was complete transposition of femoral vein and artery (figure 1). Thrombectomy was done and after the operation limbs became warm and had no pain.

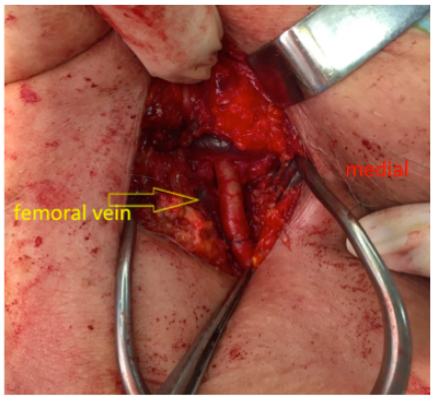

Figure 1: Right femoral vein and artery that explored and controlled. The femoral vein is lateral the to artery

Discussion

The femoral artery (FA) and its branches play significant roles in the suppling of the lower extremity (11). Variations in arteries that vascularize the lower extremity are the result of anomalies during embryological development (12, 13, 14). The development of arterial system of the lower extremity starts when the embryo is 6 mm in length and ends at intrauterine 3 months (11). We had a patient with acute ischemia and during the operation when we dissected the inguinal region to explore and control the vessels contacted by this rare anomaly. NAVY rule, is

an array of nerve plexus, artery and vein from external to internal (2). Moreover, this rule helps us in finding vessels on ultrasonography and puncturing vein or artery in interventions even in open surgery. The femoral pulse is used as an anatomical landmark for traditional catheterization in the femoral triangle but cannot always be relied upon (2). Puncturing ultrasonography guidance help us and as this rule in inguinal dissection help us for less dissection and less complications.

Some anatomical anomalies, like separate femoral entrance of the great saphenous vein below its tributaries, femoral artery and vein transposition or superficial femoral artery running in front of the saphenous junction seem to predispose to arterial injuries especially for young surgeons who start their surgical experience a complete knowledge of the anatomy and anomalies and adequate anatomical surgical technique are mandatory. A high level of suspicion and a careful attitude may further reduce surgical complications (15). Transposition of the artery and vein and its branches anomaly could induce severe complications as miss arterial striping over in open procedures. Leite JO and Bandyopadhyay M reported three cases of an incomplete transposition of the vessels with the femoral vein, the SFJ and the GSV placed behind the artery during varicose vein surgery or in course of cadaveric dissection (10-16). About contralateral femoral vessel orientation in the femoral triangle no additional information were reported by the authors (16) as our case that in operation time we found this anomaly and due to having no symptoms in contralateral limb we did not checked it.

Although US examination in the preoperative planning can play an important role but, the US examination does not lead to easy detection of such anomalies and the US examiner rarely performs a detailed evaluation to achieve a clear identification of vascular orientation (16) and we as vascular surgeons have the same opinion and thinking about this anomaly and attention in open procedures could help more.

In some articles CT angiography is a very helpful method to view vasculature variation, but is not a routine test for patients who are about to undergo cardiac catheterization. In the clinic, ultrasound examinations are useful for identifying any anatomical variations and the relationship among the femoral vessels. It is important when attempting to perform an arterial puncture, having sufficient information regarding the level of the femoral bifurcation and atherosclerotic plaque. Therefore, ultrasound-guided vascular cannulation is recommended to improve the success rate of such procedures and reduce complications, [17]. In conclusion, every surgeon should know anatomical variation and be aware the tissues for lowering complications.

Conflict of interest

The authors have no conflict of interest to declare.

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