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Diagnostic Imaging

Hypoplastic superficial femoral artery combined with connection of the deep femoral artery to the popliteal artery

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ABSTRACT

The most common anatomical variation of the superficial femoral artery (SFA) is hypoplasia or aplasia associated with a persistent sciatic artery. We report a case exhibiting SFA hypoplasia combined with connection of the deep femoral artery (DFA) to the popliteal artery (in other words, the DFA became the popliteal artery). A 41-year-old man was admitted with a crush injury of the left foot. Computed tomography angiography revealed an SFA branched off the anteromedial side of the common femoral artery and exhibited severe hypoplasia and the DFA branched off the posterolateral side of the CFA and continued to become the popliteal artery.

Introduction

Congenital anomalies of the femoral arteries are rare [1–4]. Here we report a patient with hypoplasia of the superficial femoral artery (SFA) combined with connection of the deep femoral artery (DFA) to the popliteal artery. This anomaly was discovered incidentally during computed tomographic angiography (CTA) of the lower extremities before foot plastic surgery. This anatomical variation has never been previously reported.

Case report

A 41-year-old man without any medical history was admitted with a crush injury of the left foot involving degloving of the foot dorsum and multiple comminuted bone fractures. Simple radiographs and a computed tomographic (CT) scan revealed multiple fractures of the second-to-fourth metatarsal bones, the lateral and intermediate cuneiform bones, and the second-to-fifth toes. The complete blood cell count, levels of blood coagulation factors, and serum biochemistry results

This study is in compliance with ethical standards.

Competing Interests: The authors have no conflict of interest and single case report does not require IRB approval at our institution.

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were all within the normal range. The patient had never undergone surgery. He underwent amputation of the second-to-fifth toes and open reduction and internal fixation of the third and fourth metatarsal bones. He was then transferred to the plastic surgery department for repair of the skin and soft tissue defects, and for treatment of exposed bone on the dorsum and side of the foot. CTA of both lower extremities was performed to evaluate the arterial system before placement of an anterolateral free flap and a skin graft. A free frap (from the left thigh) was subsequently placed, as was a split-thickness skin graft. The postoperative course was uneventful and the patient was discharged with no complications.

CTA revealed hypoplasia of the SFA of the right extremity and a connection between the DFA and the popliteal artery (Figs. 1 and 2). The common femoral artery (CFA), a continuation of the external iliac artery, entered the thigh from behind the inguinal ligament and lay lateral to the femoral vein. The CFA divided into the SFA and DFA at the level of the lower margin of the right femoral head. The SFA branched off the anteromedial side of the CFA and exhibited severe hypoplasia along its entire length. The SFA descended along the anteromedial part of the right thigh, within the femoral triangle, and terminated as a descending genicular artery rather than passing through the adductor canal to become the popliteal artery. The DFA, which branched off the posterolateral side of the CFA, exhibited compensatory hypertrophy along its entire length. The DFA then continued to become the popliteal artery. After branching off from the CFA, the DFA passed over the surfaces of the pectineus and adductor brevis, and then gave rise to the medial and lateral circumflex femoral arteries. The DFA then passed posteriorly between the pectineus and the adductor longus, descended initially between the adductor longus and the adductor brevis, and

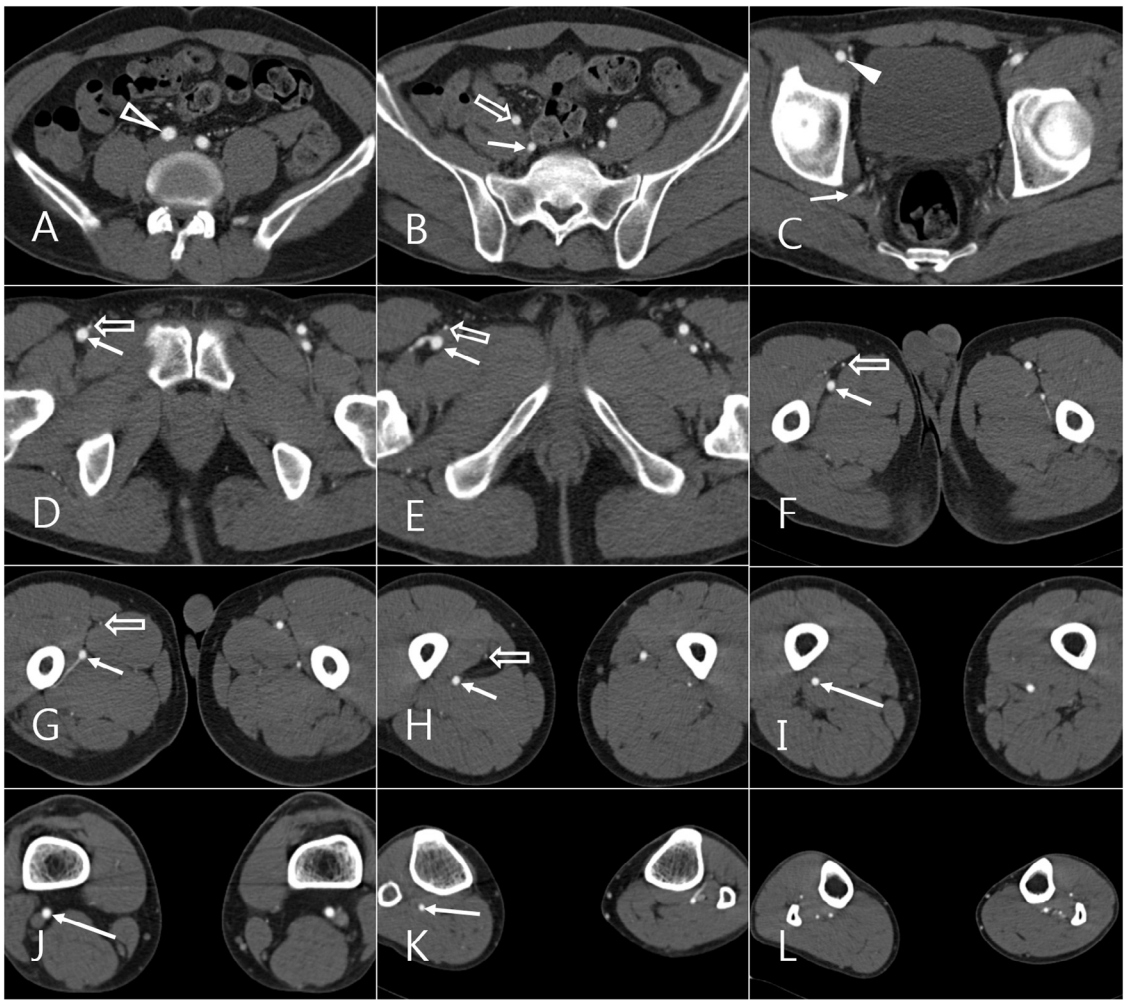

Fig. 1 – Computed tomographic angiography (CTA) of the lower extremities of a 41-year-old man with a crush injury of the left foot. (A, B) The axial CTA images of pelvis show the right common iliac artery (empty arrowhead) bifurcating into the external iliac artery (empty arrow) and the internal iliac artery (short arrow) with normal bifurcation type and pathway of the iliac vessels. (C-L) The axial CTA images of the lower extremities show the right common femoral artery (arrowhead) bifurcating into the hypoplastic superficial femoral artery (empty arrows) and the deep femoral artery (small arrows) connecting to the popliteal artery (long arrows) in the right lower extremity. The arterial system of the left lower extremity is normal.