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Variations in the bifurcation of deep femoral artery important for electrophysiologist

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Abstract

Knowing the vascular anatomy of the common femoral artery bifurcation and ultrasound-guided puncture, including doppler, is helpful in recognizing anatomic variations and avoiding complications.

KEYWORDS

anatomic variation, complication, cryoballoon ablation, high bifurcation of deep femoral artery

A 68-year-old woman was admitted for cryoballoon ablation (CBA) for persistent atrial fibrillation. The puncture was performed on the right side under ultrasound guidance. A puncture was performed using the Seldinger technique on a vessel that appeared to be common femoral vein (FV) running on the medial side of common femoral artery (FA). A total of three sheaths were easily inserted and the CBA procedure could be performed without complications. The day after the procedure, a shunt sound was heard, and CT angiography showed pseudoaneurysm arising from ventral surface of right DFA and arteriovenous shunt between right DFA and common FV. DFA was medially bifurcated from common FA just below the inguinal ligament (Figure 1A). It was inferred that all three sheaths had penetrated DFA and had inserted into common FV running directly beneath it. Surgical hemostasis was performed, and surgical repair was completely achieved (Figure 1B). Postoperative vascular ultrasound image and the 3D CT imaging of the right groin revealed

that what we thought was common FA was superficial femoral artery (SFA) and what we thought was common FV was DFA (Figure 2).

High bifurcation of DFA that branch within 10mm of the inguinal ligament is a factor that increases the incidence of vascular injury at the puncture site in catheter intervention, but this is not rare (10%–20%).¹ Six branching variations of DFA have been reported from meta-analysis, and medial branching is rare, occurring in approximately 5% of cases.² The present case had simultaneously two vascular anomaly such as high and medial bifurcation, which is really rare.¹ DFA was laterally bifurcated from common FV in most of the patients. In the present case, however, DFA was medially bifurcated and running in the usual position for venipuncture, resulting in pseudoaneurysm of DFA and an arteriovenous shunt with common FV. Although inguinal puncture is essential for catheter ablation, it is important to be aware of such vascular variations to prevent complications.

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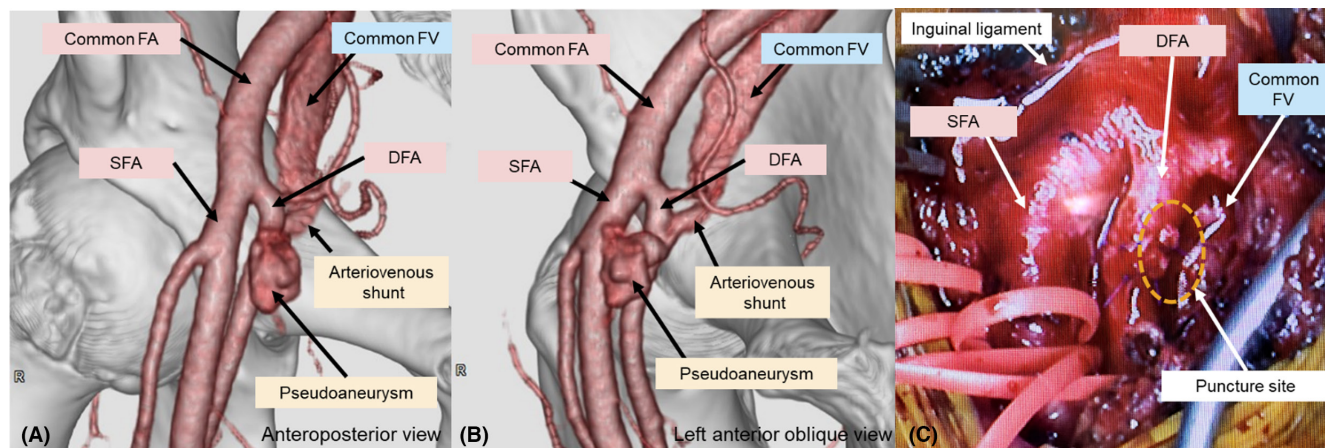


FIGURE 1 (A, B) The 3D CT imaging of the right groin (A: anteroposterior view, B: left anterior oblique view). Pseudoaneurysm arising from ventral surface of right DFA and arteriovenous shunt between right DFA and common FV were shown. (C) This intraoperative image of the right groin reveals that all three sheaths penetrate the DFA and are inserted into the common FV running directly below it. DFA, indicates deep femoral artery; FA, femoral artery; FV, femoral vein; and SFA, superficial femoral artery.

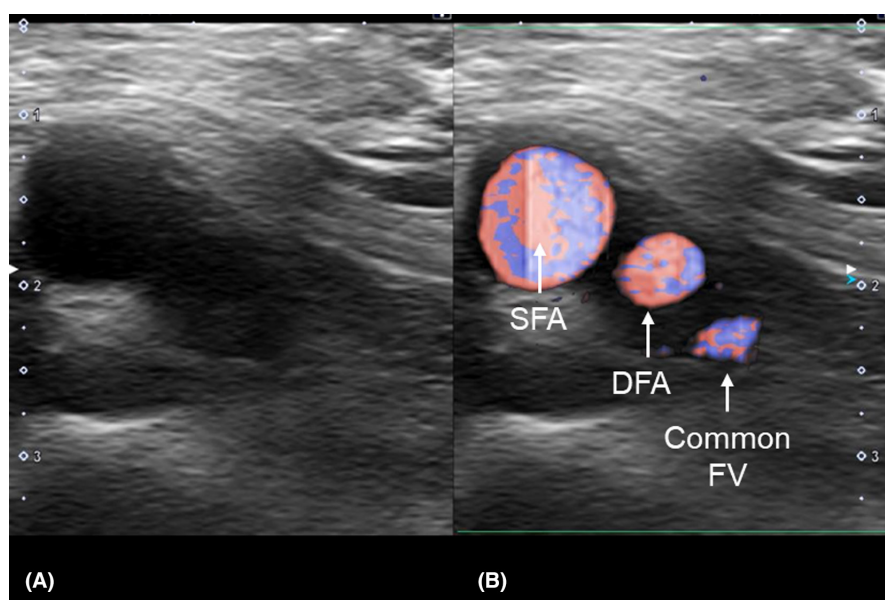


FIGURE 2 (A) Vascular ultrasound image of the right groin. (B) systolic phase with doppler. DFA, indicates deep femoral artery; FV, femoral vein; and SFA, superficial femoral artery.

AUTHOR CONTRIBUTIONS

Kazutaka Nakasone: Conceptualization; writing – original draft. **kunihiko kiuchi:** Project administration; writing – review and editing. **Hiromi Hashimura:** Formal analysis; visualization. **Mitsuru Takami:** Project administration; writing – review and editing. **Koji Fukuzawa:** Project administration; validation. **Ken-ichi Hirata:** Project administration; supervision.

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CONFLICT OF INTEREST STATEMENT

The Section of Arrhythmia is supported by an endowment from Abbott Japan, Boston scientific and Medtronic Japan. KH chairs the Section, and KF and MT belong to the Section. The authors report no relationships relevant to the contents of this study.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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