

Axillary access for a left ventricular assist device during percutaneous angioplasty

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A 66-year-old woman with left ventricular ejection fraction of 18% and diffuse multivessel coronary disease including the left main artery was qualified for percutaneous coronary intervention (PCI) of the left main and left anterior descending arteries with support of a percutaneous left ventricular assist device (pLVAD). Femoral access for pLVAD was impossible due to calcified uncrossable atherosclerosis in the iliac and femoral arteries; therefore, axillary access was the only feasible percutaneous alternative.

Before the axillary puncture, ipsilateral radial access was acquired. It allows for subclavian and axillary angiography, guidance during the puncture, and balloon inflation in the case of bleeding during the puncture or removal of the axillary sheath. Afterward, bilateral angiography revealed a tight occlusion in the left subclavian artery and a crossable narrowing in the right subclavian artery. To increase the safety of the puncture, a peripheral 6.0 × 40 mm balloon was inflated in the axillary artery. The balloon indicated the proper depth of the needle insertion — upon balloon rupture, the needle was not advanced to avoid puncture through the posterior artery wall, which usually results in major bleeding or a hematoma. The balloon also serves as a fluoroscopic guidance, as well as a stabilization of the artery during the puncture [1]. The right axillary artery was successfully punctured below the clavicle, in the second segment to avoid damage to the branching arteries and nerve plexus (Figure 1). The needle was guided by fluoroscopy and ultrasound. The guidewire was inserted in the punctured balloon and advanced *en bloc* into the descending aorta. Then the balloon was removed, and the puncture was dilated using a 6F sheath. This was

followed by an application of a pre-suture with the Perclose Prostyle system (Terumo Medical Corporation, Somerset, NJ, US) to ensure the safety of the large bore access (LBA) closure. The 14F Impella CP sheath (Abiomed, Danvers, MA, US) was then inserted, and Hi-Torque SupraCore guidewire (Abbott Vascular, CA, USA) was used to reach the left ventricle and deliver Impella CP despite a small kink in the narrowed subclavian artery (Supplementary material, Video S1). The following PCI was performed via contralateral, left radial access under optical coherent tomography imaging. Impella CP was removed straight after PCI, and an 8F AngioSeal system (Abbott Cardiovascular, Plymouth, MN, US) and previously inserted sutures were used to successfully close axillary access. To minimize the risk of bleeding, a peripheral 7.0 × 60 mm balloon was inflated proximally to the puncture using safety radial access. Axillary angiography at the end of the procedure revealed no signs of contrast extravasation. The puncture site healed well, with no bleeding or hematoma, and the patient was discharged 6 days later. Revascularization of total chronic occlusion of the right coronary artery was not planned due to lack of viability on stress echocardiography.

Femoral access constitutes a commonly acknowledged gold standard for the pLVAD access site. However, advanced peripheral artery disease increases the risk of vascular complications and might preclude using the femoral artery for large bore access. As presented, with ultrasound and fluoroscopic guidance, axillary access may pose a safe alternative to femoral access [2, 3]. Nevertheless, it is still underused besides rare clinical reports [1, 3] and small registries [4]. Kinking of the Impella catheter should be avoided, as it poses a risk

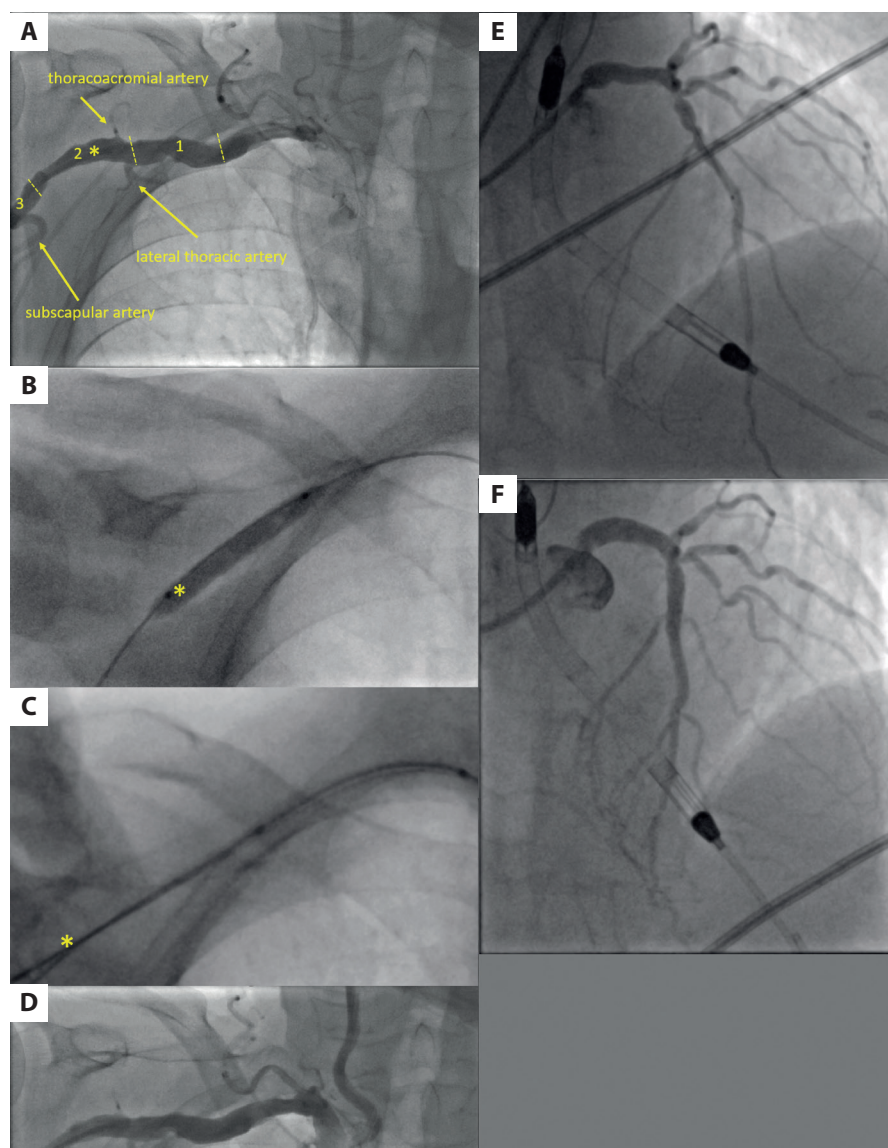


Figure 1. **A.** Angiographic landmarks with the recommended puncture site in the second segment of the axillary artery, indicated by the asterisk. **B.** Inflated balloon in the second segment of the right axillary artery introduced through radial access, with an asterisk indicating the recommended puncture site. **C.** A guidewire introduced into the balloon via the subclavian puncture (asterisk). **D.** Axillary angiography after the procedure (no signs of contrast extravasation). **E.** Initial angiography of the left coronary artery. **F.** Final angiography of the left coronary artery

of guidewire trapping and displacement of the device [5]. The described technique can be applied to minimize the risk of complications and perform an optimal angioplasty in patients with unavailable femoral access.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

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