Vascular Closure Device Related Complication; A Case Report of Femoral Artery Total Occlusion treated with Femoral to Femoral Bypass Surgery

Ki-Hun Kim, Gi-Yong Yun, Jong-Hyun Park, Seok-Mann Yoon
Department of Neurosurgery, Soonchunhyang University College of Medicine, Cheonan, Korea

Objective

In the current endovascular era, there is possibility of various complications associated with the interventions. Generally, therapeutic interventions have a higher rate of femoral artery access site complications compared to diagnostic interventions. However, the overall incidence of these complications is around 0.52 to 3%.

Despite the development and increased use of suture-mediated vascular closure devices for femoral artery closure, the incidence of access site complications is relatively high, around 5 to 10% (with device failure accounting for 50% and vascular complications accounting for the other 50%). This is higher than the occurrence rate of access site complications with manual compression alone. We want to share our major vascular complication case.

Case Report

	Overall No.	Complication in Perclose™ No.(%)	Complication in control No.(%)	ACD vs Control ratio
Assali et al.	246	3 (2.4)	3 (2.4)	1 : 1
Nasu et al.	176	1 (1.0%)	1 (1.2%)	0.83 : 1
Kahn et al.	8,906	28 (2.4%)	34 (0.4%)	6 :1
Cura et al.	2,507	20 (4.9%)	67 (3.1%)	1.58 : 1
Applegate et al.	4,001	64 (2.9%)	51 (2.7%)	1.07 : 1
Duiffin et al.	477	11 (3.9%)	5 (2.5%)	1.56 : 1
Gerckens et al.	401	6 (2.0%)	12 (4.0%)	0.5 : 1
Carey et al.	2,020	8 (0.7%)	5 (0.4%)	1.75 : 1

Figure 1. Vascular access - related complication rate in patients with Perclose™ and mechanical compression (control) in intervention procedure through arterial puncture.

A 43-years-old woman was admitted for scheduled coil embolization operation. She had unruptured cerebral aneurysm on left superior hypophyseal artery. After coil embolization, we used the ProGlide™ (suture-mediated vascular closure device) for hemostasis on puncture site. The patient was discharged without any specific discomfort.

On the 10th day after discharge, the patient complained of numbness and claudication at outpatient visit. Compared to the left normal side, the pulsation of right dorsalis pedis artery was very weak and temperature was lower. We promptly examined lower extremity computed-tomography(CT) angiography, and we found the femoral artery total occlusion nearby puncture site.

We thought that the recanalization through intervention would be impossible due to long term of occlusion. So, we transferred to the CardioVascular and Thoracic Surgery(CVTS) department for femoral-to-femoral bypass graft. After the bypass surgery, the patient's symptoms have improved generally.

The main reason for the femoral artery occlusion is suppsed to be caused by vascular dissection or overlapping during the installation of the ProGlide™.

Conclusion

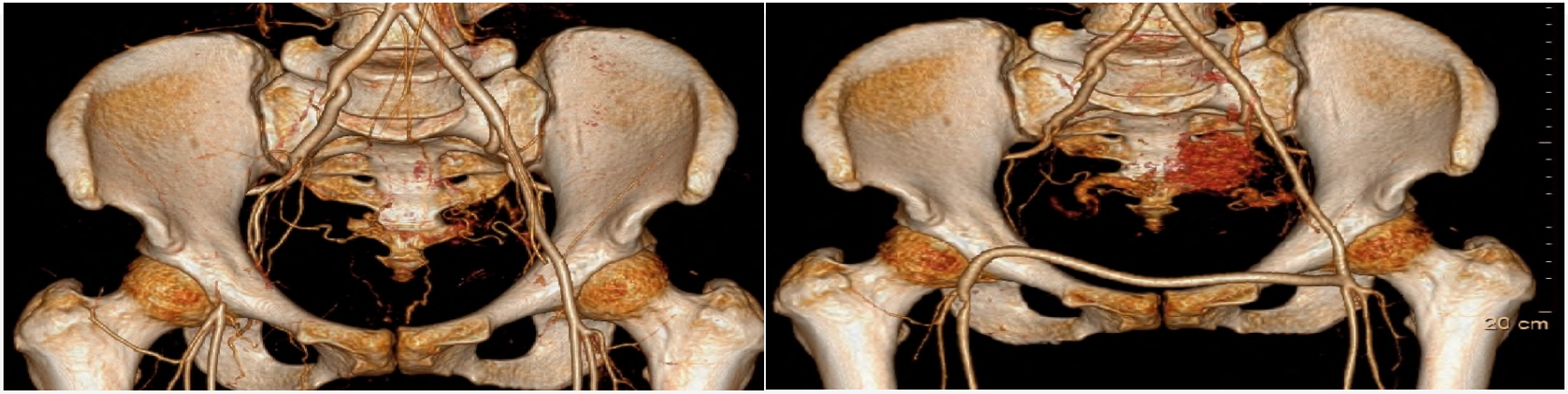

Figure 2.
A image : Lower-extremities Computed-Tomography (CT) angiography image shows the segmental occlusion of right side common iliac artery.
B image : Lower-extremities CT angiography after Femoral to femoral bypass operation in Cardio Vascular and Thoracic surgery (CVTS) department was shown

After that happened, in an attempt to reduce femoral artery access site complications by suture-mediated vascular closure device, we actively employed ultrasound-guided selection protocol.

For femoral artery access, the puncture site was planned around the femoral head, and ultrasound was used to ensure that the access was made vertically in the center of the target vessel.

Conclusion

Prior to using the ProGlide™, iliac artery angiogram was obtained to assess the caliber of vessel, and the ProGlide™ was selectively used based on this assessment. Additionally, patients with obesity (BMI ≥ 30) were excluded from using the ProGlide™, as it had a higher failure rate in this population. The ProGlide™ was also not used in cases where the vessel bifurcated or had accompanying calcification. Finally, after creating a knot using the ProGlide™, ultrasound was used to confirm the absence of complications such as simple vessel dissection, intussusception, or posterior wall dissection.

If any abnormalities were detected, a rescue procedure was performed to remove the knot.

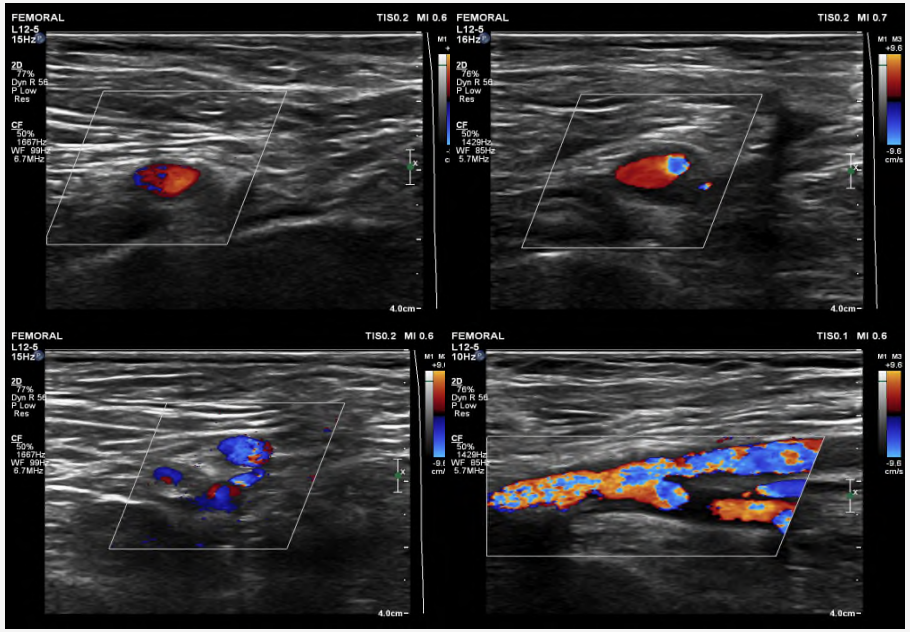

Figure 3. The above ultrasound images were taken to assess the condition of the puncture artery, usually the femoral artery.
(A) image is the proximal part of puncture site
(B) image is the puncture site.
(C) image is the distal part of puncture site.
(D) image is the longitudinal section of the puncture site. These images were captured to evaluate the vascular condition of the puncture site artery.