Femoral Access Choice for Endovascular Procedures: Open Cut-down or Percutaneous Suture-Mediated Closure Devices?: Letter to the Editor

Endovasküler Prosedürlerde Femoral Giriş Şekli: Açık Cerrahi Kesi mi, Perkütan Kapama Cihazları mı?

Aslıhan KÜÇÜKER,[a]
Murat CANYİĞİT,[b]
Şeref Alp KÜÇÜKER,[a]
Mete HIDIROĞLU,[a]
Erol ŞENER[a]

Clinics of
[a]Cardiovascular Surgery,
[b]Radiology,
Ankara Atatürk Training and Research Hospital, Ankara

Geliş Tarihi/*Received:* 10.09.2013
Kabul Tarihi/*Accepted:* 23.10.2013

Yazışma Adresi/*Correspondence:*
Aslıhan KÜÇÜKER
Ankara Atatürk Training and Research Hospital,
Clinic of Cardiovascular Surgery, Ankara, TÜRKİYE/TURKEY
asliastan@yahoo.com

Key Words: *Femoral artery; endovascular procedures*

Anahtar Kelimeler: *Femoral arter; endovasküler prosedürler*

Damar Cer Derg 2014;23(1):64-6

doi: 10.9739/uvcd.2013-37462

Percutaneous procedures are widely used for endovascular treatment of aortic pathologies and for transcatheter valve interventions. Safe and effective vascular access is mandatory for these percutaneous procedures. Femoral arteries are the most preferred route and are traditionally exposed via surgical cut-down. In order to avoid surgery, percutaneous suture-mediated closure devices are also available. These percutaneous access devices have become popular especially among interventional radiology and cardiology colleagues, as well as vascular surgeons. Despite some authors clearly did put into words that 'surgeon input for these interventions are not compulsory anymore',[1] this could be true only if non-surgeon interventionists would repair vascular access complications by themselves or when the complication rates of these percutaneous devices become zero. This statement needs definitely to be challenged as percutaneous closure devices are not totally free of vascular complications. It is recommended that the physicians performing endovascular repair should be experienced in open arterial exposure, should the closure device fail to close the arteriotomy.[2]

Although success rates for percutaneous devices are reported to be high, the obtained data show that complication rates are not zero. The reported technical success rates vary widely from 46.2% to 100% for percutaneous endovascular aneurysm repair.[3] Besides, although everything may seem successful initially, there are some late complications requiring surgery. With the literature data showing that better closure rates with smaller sheaths (<18F) compared to the larger ones, Lee et al. reported the overall success rate as 94.3% with higher successful closure for 12F to 16 F sheaths in their series.[4] Mathisen et al. reported 99.0% technical success rate, and 5 patients required additional surgical interventions for complications including bleeding, occlusion or pseudoaneurysm in the early postoperative period, resulting in 30-day technical success rate of 92.6%.[5] Minion and Davenport compared open cutdown (n=2,802) with

percutaneous femoral access (n=1,781) in elective EVAR cases using the American College of Surgeons National Surgical Quality Improvement Program database, and showed that the main advantage of percutaneous access was a shorter operative time (159±63 min v 150±68 min; p<0.05.). However, they reported that 30-day serious morbidity was more common in percutaneous access, with no significant differences either in the 30-day mortality rate or the mean length of stay between the two groups. The authors concluded that with all access options, safeguards, and procedural protocols, prompt treatment of the complications were essential to maintain good outcomes.[6] Montán et al. reported 91.3% technical success rate in 160 fascia suture technique closures with 8.8% (n=14) technical failures requiring conversion to open cutdown intraoperatively due to bleeding, inadequate limb perfusion and a broken guidewire.[7] A recent study by Bechara et al. reported the overall percutaneous endovascular aneurysm repair technical success rate as 82%.[3]

Nevertheless, the technical success is not 100% and conversion to open incision is not rare. The procedure becomes an emergency surgery necessitating a more complicated femoral artery repair when conversion to open surgery is necessary. The skin incision in such a situation must be much larger in most cases compared to an initial open surgical cut-down procedure, facilitating wound infections. We believe that surgical approach to femoral artery and insertion of the sheets on direct vision is an easy and safe way for endovascular aortic and/or valve procedures. We therefore perform endovascular aortic procedures as a cardiovascular surgeon-interventional radiologist team, and we prefer to use open access approach for femoral artery.

On the other hand, some authors report that more wound complications including hematomas or wound breakdowns are seen with an open surgical cut-down.[8] In order to reduce wound complications and infection, we reduced the size of the skin incision. Our technique consists of a very limited skin incision to avoid infection. Common femoral artery (CFA) is exposed for a short segment and suspended with vascular tapes distally and proximally. Then, a circular purse string suture is placed using a 5-0 polyprolen suture, large enough for the size of the delivery system. At the end of the procedure, the purse string suture is tied down without a need for additional sutures to repair the vessel in most cases, and a small vacuum or penrose drain is placed to avoid even minimal collection that can lead to local infection. These precautions result in rapid and clean healing of the incision. The length of surgical incision is not much longer than the one that is done for a percutaneous closure device insertion (Figure 1). Exposure for the common femoral artery adds about 10 minutes to overall procedure in most instances. We allow some back bleeding during catheter withdrawal to avoid distal embolization, which we have never experienced. Especially in thin patients with no subcutaneous fat, femoral incision is minimized to about 2 cm at a very short time indeed, without a need for expensive percutaneous devices.

Small incisions may make the delivery system insertion to CFA more difficult in obese patients since CFA is located deeper anatomically and this causes the insertion of the delivery system in a perpendicular fashion. This way of insertion may complicate the insertion process and may lead to arterial wall dissection or injury of the posterior vessel wall. To avoid this and deliver the catheters in an oblique way, we prefer to make a small puncture on the skin distal to the incision and insert the catheter from there under direct vision while entering to CFA (Figure 2). This approach prevents enlarging the skin incision and perpendicular insertion.

FIGURE 1: Incision for open femoral access.

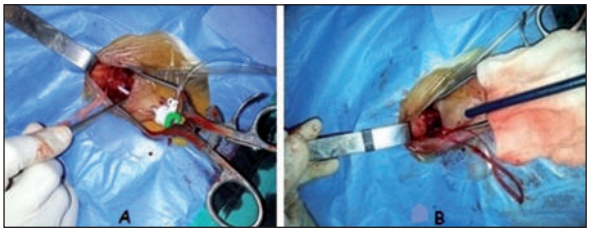

FIGURE 2: Incision for an obese patient. **A.** Access of the needle is from distal intact skin to avoid perpendicular entry of the delivery system. **B.** Insertion of the delivery system.

The cost-effective use of public resources is another aspect that worths considering since these percutaneous devices are much more costly compared to open surgical cut-down.[4] For an average size patient, surgical cut-down is very small in size, adds not much time to overall procedure and heals fast with almost no complications. We believe that femoral access with percutaneous devices should not be performed in all the patients undergoing endovascular procedures, but they should be reserved for difficult cases like very obese patients. Protocols for patient selection for open access and percutaneous devices need to be constituted. The rational for using percutaneous devices or open cut-down for endovascular therapies should not relay on the idea of avoiding surgeons' interface, but on patients' benefit and good use of scarce public resources.

Conflict of Interest

Authors declared no conflict of interest or financial support.

REFERENCES

1. Zhong-han Ni, Jian-fang L, Wen-hui H, Yuan L, Ling X, Ji-yan C. Totally percutaneous thoracic endovascular aortic repair preclosing technique: a case-control study. Chin Med J 2011;124(6):851-5.
2. Shafique S, Murphy MP, Sawchuk AP, Cikrit D, Dalsing MC. Femoral arterial access management for endovascular aortic aneurysm repair: evolution and outcome. Perspect Vasc Surg Endovasc Ther 2009;21(1):29-33.
3. Bechara CF, Barshes NR, Pisimisis G, Chen H, Pak T, Lin PH, et al. Predicting the learning curve and failures of total percutaneous endovascular aortic aneurysm repair. J Vasc Surg 2013;57(1):72-6.
4. Lee WA, Brown MP, Nelson PR, Huber TS. Total percutaneous access for endovascular aortic aneursym repair ('Preclose' technique). J Vasc Surg 2007;45(6):1095-101.
5. Mathisen SR, Zimmermann E, Markström U, Mattsson K, Larzon TJ. Complication rate of the fascia closure technique in endovascular aneurysm repair. Endovasc Ther 2012;19(3): 392-6.
6. Minion DJ, Davenport DL. Access techniques for EVAR: percutaneous techniques and working with small arteries. Semin Vasc Surg 2012;25(4):208-16.
7. Montán C, Lehti L, Holst J, Björses K, Resch TA. Short- and midterm results of the fascia suture technique for closure of femoral artery access sites after endovascular aneurysm repair.J Endovasc Ther 2011;18(6):789-96.
8. Al-Khatib WK, Zayed MA, Harris EJ, Dalman RL, Lee JT. Selective use of percutaneous endovascular aneurysm repair in women leads to fewer groin complications. Ann Vasc Surg 2012;26(4):476-82.