

## KORONER ANJİYOGRAFİ GİRİŞİM YERLERİİNDE KOMPLİKASYON AZALTMAK İÇİN VAKALAR EŞLİĞİNDE YAKLAŞIM

Özkan KAYHAN<sup>1</sup>

### GİRİŞ

Girişimsel kardiyoloji giderek yaygınlaşan ve sayısı artan diyagnostik ve invaziv anjiyografi ile bir çok hastanın mortalite ve morbitesi azaltmaktadır. Arteriyel erişim bölgeleri arasında yaygın femoral arter, radyal, ulnar, brakiyal ve aksiller arterler bulunur. Ek olarak, çıkan aorta doğrudan erişim için karotid arter, iliyak ve subklavyen arter kullanılmıştır. Tüm bu prosedürlerde, arteryel veya venöz dolaşma vasküler erişim gerektirir (1). Erişim bir amaç için bir araç olsa da, hayatı tehdit eden adımlardan biri olmaya devam ediyor. Vasküler erişim bölgesi komplikasyonları perkütan koroner girişim (PKG) en sık görülen komplikasyonudur. PKG işlemlerindeki vasküler komplikasyonlar minör ve majör komplikasyonlar olarak sınıflandırılabilir. Minör komplikasyonlar; hafif kanama, ekimoz ve stabil hemotomdur. Majör komplikasyonlar; psödoanevrizma, arteriyovenöz fistül, transfüzyon gerektiren hematoma, arteriyel diseksiyon, emboli, tromboz, infeksiyon, arteriyel perforasyon, ekstremite iskemisi ve retroperitoneal kanamadır (2).

Girişim yerlerinde anatomiyi ve teknigi bilme komplikasyonları azaltır. Femoral girişimde ideal olan femoral bifurkasyon üzerinde, inferior epigastirik arter (IEA) seyrinin 1-2 cm altında, ana femoral artere (AFA) erişimdir. IEA inguinal

ligamente paralel seyredip distaline kadar ilerleyip sonra kranial döner. İnguinal ligament spina iliaka anterior superior ile tuberositas pubika arasında uzanır. Bu iki çıkıştı görüp inguinal ligamentin ikisi arasında seyrettiğini düşünüp 1-2 cm aşağıdan yapılan ponksiyon, özellikle yaşlı, obez hastalarda, doğru teknik olmayabilir (3). Femoral ponksiyonu flokoskopı eşliğinde mikroponksiyon ile yapma komplikasyonu oranını azaltır. Bu teknikte anterior posterior projeksiyonda femur başı referans ile orta üste birlik kesmine kanülasyon amaçlanarak, femur başı alt sınırından cilt ponksiyonu yapılır. Femoral bifurkasyon çoğunlukla (yaklaşık %77) femur başı altındadır. Femoral arter %97 femur başı medial üste birlik kesminden seyreder (4). Bu teknikle bile femoral bifurkasyon altında ponksiyondan kaçınılmaz.

Kardiyak kateterizasyon, anjiyografi ve müda-hale için transradial erişimin (TRA) transfemoral yaklaşma göre çeşitli çalışmalarla gösterilmiş avantajları vardır (5). TRA'ya hakim olmak için, doğru radyal arter ponksiyonu, radyal arter spazminin önlenmesi ve yönetimi, kolun vasküler anatomisinin ve ilgili varyantların kapsamlı bir şekilde anlaşıılması, selektif koroner kanülasyon için kateter manipülasyonu ve perkütan koroner girişimlerde kateter desteğinin maksimize edilmesi gibi tamamlayıcı becerilerin geliştirilmesini gerektirir (6). Radyal kateterizasyon için özel la-

<sup>1</sup> Uzman Doktor, Ağrı Devlet Hastanesi Kardiyoloji Bölümü, ozkan\_kayhan@outlook.com ORCID iD: 0000-0003-0379-7812

ve yapısal müdahaleler için önemli bir erişim alanını olmaya devam etmektedir. Anatomi ve AFA'nın seyri hakkında bilgi ve ultrason rehberliğinin kullanımı, daha iyi ve daha güvenli femoral erişimi sağlayabilir ve komplikasyon oranlarını azaltabilir. Radyal arterin kullanımı Dünya da önemli ölçüde artmaktadır ve tanışal ve girişimsel prosedürler için daha güvenli bir yol sağladığı görülmektedir.

## KAYNAKÇA

- Applegate RJ, Sacrinity MT, Kutcher MA, Kahl FR, Gandhi SK, Santos RM, et al. Trends in vascular complications after diagnostic cardiac catheterization and percutaneous coronary intervention via the femoral artery, 1998 to 2007. *JACC: Cardiovascular Interventions*. 2008;1(3):317-26.
- Bhatt S, Cooke R, Shetty R, Jovin IS. Femoral vascular access-site complications in the cardiac catheterization laboratory: diagnosis and management. *Interventional Cardiology*. 2011;3(4):503-14.
- Cilingiroglu M, Feldman T, Salinger MH, Levisay J, Turi ZG. Fluoroscopically-guided micropuncture femoral artery access for large-caliber sheath insertion. *J Invasive Cardiol*. 2011;23(4):157-61.
- Bangalore S, Vidi VD, Liu CB, Shah PB, Resnic FS. Efficacy and safety of the nitinol clip-based vascular closure device (Starclose) for closure of common femoral arterial cannulation at or near the bifurcation: a propensity score-adjusted analysis. *The Journal of invasive cardiology*. 2011;23(5):194-9.
- Cohen MG, Alfonso C. Starting a transradial vascular access program in the cardiac catheterization laboratory. *The Journal of invasive cardiology*. 2009;21(8 Suppl A):11A-7A.
- Gilchrist IC, Pancholy S, Patel TB. Patel's Atlas of Transradial Interventions: The Basics and Beyond: HMP Communications; 2012.
- Bertrand OF, Carey PC, Gilchrist IC. Allen or no Allen: that is the question! : *Journal of the American College of Cardiology*; 2014.
- Barbeau GR, Arsenault F, Dugas L, Simard S, Larivière MM. Evaluation of the ulnopalmar arterial arches with pulse oximetry and plethysmography: comparison with the Allen's test in 1010 patients. *American heart journal*. 2004;147(3):489-93.
- Moscucci M. *Atlas of Cardiac Catheterization and Interventional Cardiology*: Lippincott Williams & Wilkins; 2018.
- Spaulding C, Lefèvre T, Funck F, Thebault B, Chauveau M, Hamda KB, et al. Left radial approach for coronary angiography: results of a prospective study. *Catheterization and cardiovascular diagnosis*. 1996;39(4):365-70.
- Hahalis G, Tsikas G, Xanthopoulou I, Deftereos S, Zikas A, Raisakis K, et al. Transulnar Compared With Transradial Artery Approach as a Default Strategy for Coronary Procedures: A Randomized Trial The Transulnar or Transradial Instead of Coronary Transfemoral Angiographies Study (The AURA of ARTEMIS Study). *Circulation: Cardiovascular Interventions*. 2013;6(3):252-61.
- Lotun K, Shetty R, Patel M, Arain SA. Percutaneous Left Axillary Artery Approach for Impella 2.5 Liter Circulatory Support for Patients with Severe Aortoiliac Arterial Disease Undergoing High-Risk Percutaneous Coronary Intervention. *Journal of interventional cardiology*. 2012;25(2):210-3.
- Ari H, Çamci S, Karakuş A, Ari S, Melek M. Axillary artery as alternative access for transcatheter aortic valve implantation in a patient with thoracic and abdominal multilayer flow modulator stents, and in a patient with occluded bilateral carotid and iliac arteries. *Turk Kardiyoloji Derneği arşivi: Turk Kardiyoloji Derneginin yayın organıdır*. 2019;47(5):399-405.
- Bradley SM, Rao SV, Curtis JP, Parzynski CS, Messenger JC, Daugherty SL, et al. Change in hospital-level use of transradial percutaneous coronary intervention and periprocedural outcomes: insights from the national cardiovascular data registry. *Circulation: Cardiovascular Quality and Outcomes*. 2014;7(4):550-9.
- Ivar Seldinger S. Catheter replacement of the needle in percutaneous arteriography: a new technique. *Acta radiologica*. 2008;49(suppl\_434):47-52.
- Sherev DA, Shaw RE, Brent BN. Angiographic predictors of femoral access site complications: implication for planned percutaneous coronary intervention. *Catheterization and cardiovascular interventions*. 2005;65(2):196-202.
- Abu-Fadel MS, Sparling JM, Zacharias SJ, Aston CE, Saucedo JF, Schechter E, et al. Fluoroscopy vs. traditional guided femoral arterial access and the use of closure devices: a randomized controlled trial. *Catheterization and Cardiovascular Interventions*. 2009;74(4):533-9.
- Ben-Dor I, Maluenda G, Mahmoudi M, Torguson R, Xue Z, Bernardo N, et al. A novel, minimally invasive access technique versus standard 18-gauge needle set for femoral access. *Catheterization and Cardiovascular Interventions*. 2012;79(7):1180-5.
- Seto AH, Roberts JS, Abu-Fadel MS, Czak SJ, Latif F, Jain SP, et al. Real-time ultrasound guidance facilitates transradial access: RAUST (Radial Artery access with Ultrasound Trial). *JACC: Cardiovascular Interventions*. 2015;8(2):283-91.
- SETO AH, PATEL A. Ultrasound-Guided Arterial and Venous Access. *Arterial and Venous Access in the Cardiac Catheterization Lab*. 2016:117.
- Dehghani P, Mohammad A, Bajaj R, Hong T, Suen CM, Sharieff W, et al. Mechanism and predictors of failed transradial approach for percutaneous coronary interventions. *JACC: Cardiovascular Interventions*. 2009;2(11):1057-64.
- Rathore S, Stables RH, Pauriah M, Hakeem A, Mills JD, Palmer ND, et al. Impact of length and hydrophilic coating of the introducer sheath on radial artery spasm during transradial coronary intervention: a randomized study. *JACC: Cardiovascular Interventions*. 2010;3(5):475-83.
- Ball WT, Sharieff W, Jolly SS, Hong T, Kutryk MJ, Graham JJ, et al. Characterization of operator learning curve

- for transradial coronary interventions. *Circulation: Cardiovascular Interventions*. 2011;4(4):336-41.
24. Looi JL, Cave A, El-Jack S. Learning curve in transradial coronary angiography. *The American journal of cardiology*. 2011;108(8):1092-5.
  25. Pancholy SB, Sanghvi KA, Patel TM. Radial artery access technique evaluation trial: randomized comparison of Seldinger versus modified Seldinger technique for arterial access for transradial catheterization. *Catheterization and Cardiovascular Interventions*. 2012;80(2):288-91.
  26. Goldberg SL, Renslo R, Sinow R, French WJ. Learning curve in the use of the radial artery as vascular access in the performance of percutaneous transluminal coronary angioplasty. *Catheterization and cardiovascular diagnosis*. 1998;44(2):147-52.
  27. Kiemeneij F. Prevention and management of radial artery spasm. *J Invasive Cardiol*. 2006;18(4):159-60.
  28. Coppola J, Patel T, Kwan T, Sanghvi K, Srivastava S, Shah S, et al. Nitroglycerin, nitroprusside, or both, in preventing radial artery spasm during transradial artery catheterization. *The Journal of invasive cardiology*. 2006;18(4):155-8.
  29. Dery JP, Simard S, Barbeau GR. Reduction of discomfort at sheath removal during transradial coronary procedures with the use of a hydrophilic-coated sheath. *Catheterization and cardiovascular interventions*. 2001;54(3):289-94.
  30. Pullakhandam NS, Yang Z-j, Thomas S, Wasenko J. Unusual complication of transradial catheterization. *Anesthesia & Analgesia*. 2006;103(3):794-5.
  31. Dieter RS, Akef A, Wolff M. Eversion endarterectomy complicating radial artery access for left heart catheterization. *Catheterization and cardiovascular interventions*. 2003;58(4):478-80.
  32. Slogoff S, Keats AS, Arlund C. On the safety of radial artery cannulation. *Anesthesiology: The Journal of the American Society of Anesthesiologists*. 1983;59(1):42-7.
  33. Rathore S, Stables RH, Pauriah M, Hakeem A, Mills JD, Palmer ND, et al. A randomized comparison of TR band and radistop hemostatic compression devices after transradial coronary intervention. *Catheterization and Cardiovascular Interventions*. 2010;76(5):660-7.
  34. Stella P, Kiemeneij F, Laarman G, Odekerken D, Slagboom T, Van der Wieken R. Incidence and outcome of radial artery occlusion following transradial artery coronary angioplasty. *Catheterization and cardiovascular diagnosis*. 1997;40(2):156-8.
  35. Greenwood MJ, Della-Siega AJ, Fretz EB, Kinloch D, Klinke P, Mildenberger R, et al. Vascular communications of the hand in patients being considered for transradial coronary angiography: is the Allen's test accurate? *Journal of the American College of Cardiology*. 2005;46(11):2013-7.
  36. Valentine RJ, Modrall JG, Clagett GP. Hand ischemia after radial artery cannulation. *Journal of the American College of Surgeons*. 2005;201(1):18-22.
  37. Rao SV, Tremmel JA, Gilchrist IC, Shah PB, Gulati R, Shiroff AR, et al. Best practices for transradial angiography and intervention: a consensus statement from the society for cardiovascular angiography and intervention's transradial working group. *Catheterization and Cardiovascular Interventions*. 2014;83(2):228-36.
  38. Sanmartin M, Gomez M, Rumoroso JR, Sadaba M, Martinez M, Baz JA, et al. Interruption of blood flow during compression and radial artery occlusion after transradial catheterization. *Catheterization and Cardiovascular Interventions*. 2007;70(2):185-9.
  39. Pancholy S, Coppola J, Patel T, Roke-Thomas M. Prevention of radial artery occlusion—patent hemostasis evaluation trial (PROPHET study): a randomized comparison of traditional versus patency documented hemostasis after transradial catheterization. *Catheterization and Cardiovascular Interventions*. 2008;72(3):335-40.
  40. Schulz-Schüpke S, Helle S, Gewalt S, Ibrahim T, Linhardt M, Haas K, et al. Comparison of vascular closure devices vs manual compression after femoral artery puncture: the ISAR-CLOSURE randomized clinical trial. *Jama*. 2014;312(19):1981-7.
  41. Holm NR, Sindberg B, Schou M, Maeng M, Kaltoft A, Böttcher M, et al. Randomised comparison of manual compression and FemoSeal™ vascular closure device for closure after femoral artery access coronary angiography: the CLOSURE dEvices Used in everyday Practice (CLOSE-UP) study. *EuroIntervention: journal of EuroPCR in collaboration with the Working Group on Interventional Cardiology of the European Society of Cardiology*. 2014;10(2):183-90.
  42. Holper EM, Kim RJ, Mack M, Brown D, Brinkman W, Herbert M, et al. Randomized trial of surgical cutdown versus percutaneous access in transfemoral TAVR. *Catheterization and Cardiovascular Interventions*. 2014;83(3):457-64.
  43. Brueck M, Bandorski D, Kramer W, Wieczorek M, Höltgen R, Tillmanns H. A randomized comparison of transradial versus transfemoral approach for coronary angiography and angioplasty. *JACC: Cardiovascular Interventions*. 2009;2(11):1047-54.
  44. Vorobcsuk A, Kónyi A, Aradi D, Horváth IG, Üngi I, Louvard Y, et al. Transradial versus transfemoral percutaneous coronary intervention in acute myocardial infarction: systematic overview and meta-analysis. *American heart journal*. 2009;158(5):814-21.
  45. Joyal D, Bertrand OF, Rinfret S, Shimony A, Eisenberg MJ. Meta-analysis of ten trials on the effectiveness of the radial versus the femoral approach in primary percutaneous coronary intervention. *The American journal of cardiology*. 2012;109(6):813-8.
  46. Jolly SS, Yusuf S, Cairns J, Niemelä K, Xavier D, Widimsky P, et al. Radial versus femoral access for coronary angiography and intervention in patients with acute coronary syndromes (RIVAL): a randomised, parallel group, multicentre trial. *The Lancet*. 2011;377(9775):1409-20.
  47. Gargiulo G, Ariotti S, Vranckx P, Leonardi S, Frigoli E, Ciociano N, et al. Impact of sex on comparative outcomes of radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: data from the randomized MATRIX-Access trial. *JACC: Cardiovascular Interventions*. 2018;11(1):36-50.