

## Bölüm 48

# DİZ PROTEZİNDE TURNİKE KULLANIMI VE KANAMA KONTROLÜ

Serkan AKPANCAR<sup>1</sup>

### TANIM

Turnike, diğer büyük ekstremite cerrahileri gibi diz protezinde de uzun süredir kullanılmaktadır. Cerrahi alandaki anatomik yapıların daha iyi görülmesi, çimentolama ve diğer cerrahi işlemleri kolaylaştırılması, kan kaybının azaltılması turnikenin en önemli avantajlarıdır (2,3). Turnike ilk olarak Jean Lous Petit tarafından 1718 yılında kullanılmaya başlandı (1). Bu yıllarda ekstremite cerrahilerinde kanama sonrası kan transfüzyonu gereksiniminin artması, ABO uyumsuzluğu ve bağışıklık sisteminin baskılanmasına bağlı enfeksiyon sıklığında artış, turnikeyi ekstremite ameliyatlarının olmazsa olmazı haline gelmiştir.

Turnike kullanımının avantajları olmasına rağmen, aynı zamanda komplikasyon potansiyeli de vardır, bu nedenle yeterli bilgi ve dikkatle kullanılmaları gerekir. Doğru turnike basıncı seçimi, uygun kolluk seçimi, turnike zamanlaması, turnike kullanımının temel noktalarıdır. Son yıllarda artan komplikasyon oranları, cerrahi ve anestezi yöntemlerindeki gelişmeler nedeniyle eski inançların aksine; kardiyovasküler problemi ve morbiditesi olmayan hastalarda turnikesiz ameliyatlar tercih edilmektedir. Literatürde turnikesiz yapılan ameliyatlarda dokuların daha hızlı iyileştiği, kas aktivitesinin daha iyi olduğu, ameliyat sonrası rehabilitasyon süresinin kısaldığı ve daha az analjezik kullanıldığı bildirilmektedir (4).

Total diz protezi, ortopedi ve travmatolojide sıklıkla uygulanan majör ameliyatlardan biridir. Ortalama yaşam süresinin uzaması sonrası osteoartrit görülme sıklığının artması, diz protezi yapılma sıklığının artmasına neden olmuştur (5). Bu artış ülke ekonomileri için ciddi yük getirmektedir. Çok fazla sayıda uygulanan bu ameliyatın başarısının çok yüksek olduğuna dair bilimsel çalışmalarda ortak görüş bulunmakla beraber, turnike kullanımı ile ilgili tartışma mevcuttur.

<sup>1</sup> Uzman Dr, Malatya Eğitim ve Araştırma Hastanesi Ortopedi Kliniği, drserkanakpancar@gmail.com

kullanılmalıdır. Önemli derecede kardiyovasküler problemleri olan, morbiditesi yüksek veya kontrendike durumları olan hastalarda diz protezi turnikeli yapılabilir. Basınç miktarının ve uygulama süresinin uygun şekilde kontrol edilmesiyle komplikasyon riski azaltılabilir. Yukarıda belirttiği gibi herhangi bir problemi bulunmayan hastalarda, hızlı iyileşme, ameliyat sonrası ağrı kesici tüketiminin azaltılması ve operasyon sonrası daha iyi kas aktivitesi amaçlarıyla diz protezi turnike olmadan yapılabilir. Son zamanlarda yapılan çalışmalarda turnike kullanılmayan hastalarda kanama kontrolü için kullanılan bazı ajanlar ile ilgili olumlu sonuçlar bildirilmektedir.

**Anahtar kelimeler:** Diz Protezi; Turnike; Kanama Kontrolü

## **KAYNAKLAR**

1. Ortega-Andreu M, Pérez-Chrzanowska H, Figueredo R, et al. Blood Loss Control with Two Doses of Tranexamic Acid in a Multimodal Protocol for Total Knee Arthroplasty. *The Open Orthopaedics Journal*, 2011;5:44-48.
2. Tai TW, Chang CW, Lai KA, et al. Effects of Tourniquet Use on Blood Loss and Soft-Tissue Damage in Total Knee Arthroplasty: A Randomized Controlled Trial. *The Journal of Bone and Joint Surgery (American Volume)*, 2012;94:2209-2215.
3. Wakankar HM, Nicholl JE, Koka R, et al. The Tourniquet in Total Knee Arthroplasty. *Journal of Bone and Joint Surgery (British Volume)*, 1999;81-B:30-33.
4. Arthur JR, Spangehl MJ. Tourniquet Use in Total Knee Arthroplasty. *J Knee Surg*, 2019;32(8):719-729.
5. Liu Y, Si H, Zeng Y, et al. More pain and slower functional recovery when a tourniquet is used during total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc*, 2019. doi: 10.1007/s00167-019-05617-w. [Epub ahead of print]
6. Aglietti P, Baldini A, Vena LM, et al. Effect of Tourniquet Use on Activation of Coagulation in Total Knee Replacement. *Clinical Orthopaedics and Related Research*, 2000;371:169-177.
7. HCPUnet, Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality. <http://hcupnet.ahrq.gov> (Accessed on December 20, 2012).
8. Cram P, Lu X, Kates SL, et al. Total knee arthroplasty volume, utilization, and outcomes among Medicare beneficiaries, 1991-2010. *JAMA*, 2012; 308:1227
9. Mahomed NN, Barrett J, Katz JN, et al. Epidemiology of total knee replacement in the United States Medicare population. *J Bone Joint Surg Am*, 2005; 87:1222.
10. Noordin S, McEwen JA, Kragh Jr, et al. Surgical Tourniquets in Orthopaedics. *The Journal of Bone and Joint Surgery (American Volume)*, 2010;91:2958-2967.
11. Olivecrona C, Blomfeldt R, Ponzer S, et al. Tourniquet Cuff Pressure and Nerve Injury in Knee Arthroplasty in a Bloodless Field: A Neurophysiological Study. *Acta Orthopaedica*, 2013;84: 159-164.
12. Horlocker TT, Hebl JR, Gali B, et al. Anesthetic, Patient, and Surgical Risk Factors for Neurologic Complications after Prolonged Total Tourniquet Time during Total Knee Arthroplasty. *Anesthesia & Analgesia*, 2006;102, 950-955.
13. Olivecrona C, Ponzer S, Hamberg P, et al. Lower Tourniquet Cuff Pressure Reduces Postoperative Wound Complications after Total Knee Arthroplasty: A Randomized Controlled Study of 164 Patients. *The Journal of Bone and Joint Surgery (American Volume)*, 2012;94:2216-2221.
14. Murphy CG, Winter DC, Bouchier-Hayes DJ. Tourniquet Injuries: Pathogenesis and Modalities for Attenuation. *Acta Orthopaedica Belgica*, 2005;71:635-645.
15. Harvey EJ, Leclerc J, Brooks CE. et al. Effect of Tourniquet Use on Blood Loss and Incidence of

- Deep Vein Thrombosis in Total Knee Arthroplasty. *The Journal of Arthroplasty*, 1997;12:291-296.
16. Sherman OH, Fox JM, Snyder SJ, et al. Arthroscopy—“No-Problem Surgery”: An Analysis of Complications in Two Thousand Six Hundred and Forty Cases. *The Journal of Bone and Joint Surgery (American Volume)*, 1986;68:256-265.
  17. Jorgensen HR. Myoglobin Release after Tourniquet Ischemia. *Acta Orthopaedica Scandinavica*, 1987;58:554-556.
  18. Butt U, Ahmad R, Aspros D, et al. Factors Affecting Wound Ooze in Total Knee Replacement. *Annals of The Royal College of Surgeons of England*, 2011;93:54-56.
  19. Jacob AK, Mantilla CB, Sviggum HP, et al. Perioperative Nerve Injury after Total Knee Arthroplasty: Regional Anesthesia Risk during a 20-Year Cohort Study. *Anesthesiology*, 2011;114:311-317.
  20. Tai TW, Lin CJ, Jou IM, et al. Tourniquet Use in Total Knee Arthroplasty: A Meta-Analysis. *Knee Surgery, Sports Traumatology, Arthroscopy*, 2011;19:1121-1130.
  21. Huang ZY, Pei FX, Ma J, et al. Comparison of Three Different Tourniquet Application Strategies for Minimally Invasive Total Knee Arthroplasty: A Prospective Non-Randomized Clinical Trial. *Archives of Orthopaedic and Trauma Surgery*, 2014;134:561-570.
  22. Barwell J, Anderson G, Hassan A, et al. The Effects of Early Tourniquet Release during Total Knee Arthro-Plasty: A Prospective Randomized Double-Blind Study. *The Journal of Bone and Joint Surgery (British Volume)*, 1997;79:265-268.
  23. Chang CW, Lan SM, Tai TW, et al. An Effective Method to Reduce Ischemia Time during Total Knee Arthroplasty. *Journal of the Formosan Medical Association*, 2012;111:19-23.
  24. Olivecrona C, Lapidus LJ, Benson L, et al. Tourniquet Time Affects Postoperative Complications after Knee Arthroplasty. *International Orthopaedics*, 2013;37:827-832.
  25. Kvederas G, Porvaneckas N, Andrijauskas A, et al. A Randomized Double-Blind Clinical Trial of Tourniquet Application Strategies for Total Knee Arthroplasty. *Knee Surgery, Sports Traumatology, Arthroscopy*, 2013;21:2790-2799.
  26. Newman JH, Jackson JP, Waugh W. Timing of Tourniquet Removal after Knee Replacement. *Journal of the Royal Society of Medicine*, 1979;72:492-494.
  27. Lotke PA, Faralli VJ, Orenstein EM, et al. Blood Loss after Total Knee Replacement: Effects of Tourniquet Release and Continuous Passive Motion. *The Journal of Bone and Joint Surgery (American Volume)*, 1991;73:1037-1040.
  28. Huang Z, Ma J, Zhu Y, et al. Timing of Tourniquet Release in Total Knee Arthroplasty. *Orthopedics*, 2015;38, 445-451.
  29. Zhang W, Liu A, Hu D, et al. Effects of the Timing of Tourniquet Release in Cemented Total Knee Arthroplasty: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Journal of Orthopaedic Surgery and Research*, 2014; 9:125.
  30. Widman J, Isacson J. Surgical Hemostasis after Tourniquet Release Does Not Reduce Blood Loss in Knee Replacement. A Prospective Randomized Study of 81 Patients. *Acta Orthopaedica Scandinavica*, 1999;70:268-270.
  31. Abdel-Salam A, Eyres KS. Effects of tourniquet during total knee arthroplasty: A prospective randomised study. *Journal of Bone and Joint Surgery (British volume)*, 1995;77(2):250-253.
  32. Tai TW, Lin CJ, Jou IM, et al. Tourniquet use in total knee arthroplasty: a meta-analysis. *Knee Surgery, Sports Traumatology, Arthroscopy*, 2011;19(7): 1121-1130.
  33. Zhang W, Li N, Chen S, et al. The effects of a tourniquet used in total knee arthroplasty: a meta-analysis. *Journal of Orthopaedic Surgery and Research*, 2014;9(1):13.
  34. Berman AT, Parmet JL, Harding SP, et al. Emboli observed with use of transesophageal echocardiography immediately after tourniquet release during total knee arthroplasty with cement. *Journal of Bone and Joint Surgery (American volume)*, 1998;80(3):389-396
  35. Sulek CA, Davies LK, Enneking FK, et al. Cerebral microembolism diagnosed by transcranial Doppler during total knee arthroplasty: correlation with transesophageal echocardiography. *Anesthesiology*, 1999;91(3):672-676.

36. Huh IY, Kim DY, Lee JH, et al. Relation between preoperative autonomic function and blood pressure change after tourniquet deflation during total knee replacement arthroplasty. *Korean Journal of Anesthesiology*, 2012;62(2):154–160.
37. Parmet JL, Horrow JC, Berman AT, et al. The incidence of large venous emboli during total knee arthroplasty without pneumatic tourniquet use. *Anesthesia and Analgesia*, 1998;87(2):439–444.
38. Deo H, West G, Butcher C, et al. The prevalence of cognitive dysfunction after conventional and computerassisted total knee replacement. *Knee*, 2011;18(2):117–120.
39. Kumar N, Yadav C, Singh S, et al. Evaluation of Pain in Bilateral Total Knee Replacement with and without Tourniquet; a Prospective Randomized Control Trial. *Journal of Clinical Orthopaedics and Trauma*, 2015;6:85-88.
40. Dennis DA, Kittelson AJ, Yang Vandebussche E, et al. The Effect of Tourniquet Use in Total Knee Arthroplasty. *International Orthopaedics*, 2002;26:306-309.
41. CC, et al. Does Tourniquet Use in TKA Affect Recovery of Lower Extremity Strength and Function? A Randomized Trial. *Clinical Orthopaedics and Related Research*, 2016;474:69-77.
42. Liu D, Graham D, Gillies K, et al. Effects of Tourniquet Use on Quadriceps Function and Pain in Total Knee Arthroplasty. *Knee Surgery & Related Research*, 2014;26:207-213.
43. Shen PF, Hou WL, Chen JB, et al. Effectiveness and Safety of Tranexamic Acid for Total Knee Arthroplasty: A Prospective Randomized Controlled Trial. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, 2015;21:576-581.