

BÖLÜM 15

PERİFERİK ARTER HASTALIKLARININ GİRİŞİMSEL TEDAVİSİNDE MEDİKAL TEDAVİ

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GİRİŞ

Periferik arter hastalıkları (PAH) günümüzde önemi giderek artan, klinik pratikte de oldukça sık karşıılan önemli bir morbidite ve mortalite nedenidir. Bu hastalık grubunda semptomlar, asemptomatikten egzersiz kapasitesini azaltan aralıklı kladikasyona ve hatta iskemi, gangren ile ekstremité amputasyonuna neden olabilen geniş bir spektrumda izlenebilmektedir. Semptomların şiddeti darlığın derecesi, lokalizasyonu, süresi, kollateral dolaşımın varlığı ve etkilenen dokulara göre değişmektedir.

İskemiye en duyarlı dokular sırasıyla; periferal sinirler (6. Saatten sonra geri dönüşümsüz hasar meydana gelir), cilt, cilt altı dokular ve çizgili kaslar (10 saat üzerinde iskemiye toleransı mevcuttur) sayılabilir.

Akut arteriyel ekstremité iskemisi, arteriyel perfüzyonda ani bir azalma sonucu ekstremité canlılığını tehdit eden ve bu nedenle acil tanı ve tedavi gerektiren durum olarak tanımlanır. (1) Semptom süresi akut iskemilerde iki haftanın altındadır. (2) Bu hastalarda semptomlar genellikle yeni ortaya çıkan veya kötüleşen kladikas-

yon, dinlenme ağrısı, ekstremitede uyuşma ve güçsüzlük, ekstremité sıcaklığında azalma ve cilt renginde soluklaşma olarak ortaya çıkar. (3)

Bulgular ortaya çıktıktan sonraki ilk 24 saat hiperakut dönem, 1-14. günler arası ise akut dönem olarak tanımlanır. (4) Bu dönem kollateral kan akışının sıklıkla mevcut olduğu kronik ekstremité tehdit edici iskeminin aksine, ekstremité canlılığını çok kısa bir zaman aralığında tehdit eder, çünkü ekstremité perfüzyonunun devamlılığını sağlayacak kollateral dolaşım için yeterli zaman yoktur. (5) Ani iskemi deri, kaslar ve sinirler gibi ekstremité dokularının tümünü tehdit eder. Ekstremité canlılığını korumak için bu durumu hızlıca tanımak ve acil revaskülarizasyon gereklidir. (6,7)

Akut arteriyel ekstremité iskemisi daha çok alt ekstremitelerde görülmektedir. ABD'de yapılan çalışmalarla akut ekstremité iskemisi insidansı 100.000 hastada 14-26 aralığında bulunmuştur. (6,8,9,10)

Semptomların iki haftanın üzerinde olduğu durumlarda tanım olarak kronik ekstremité iskemisini kullanmak gerekmektedir.

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tromboembolik nedene göre warfarin gibi oral antikoagulan tedavi protokolüne eklenmelidir.

SONUÇ

Akut arteriyel ekstremité iskemisi amputasyon ve mortaliteye neden olabilen acil bir klinik durumdur. Klinik bulgular yerleşim yeri ve zamanına göre asemptomatikten ciddi iskemi bulgularına kadar değişebilmektedir. Bu tanıdan şüphelenilen hastalarda çok hızlı değerlendirme yapılarak tanı konulmalı ve erken tedavi sağlanmalıdır. Kateter aracılı trombolitik tedaviler seçilmiş hastalarda cerrahiye eş değer sağkalım oranlarına sahip olup perkütan trombektomi yöntemleri ile birlikte önemi giderek artmaktadır.

KAYNAKÇA

1. Acar RD, Sahin M, Kirma C. One of the most urgent vascular circumstances: acute limb ischemia. SAGE Open Med 2013;1. 2050312113516110.
- 2 Rutherford RB, Baker JD, Ernst C, Johnston KW, Porter JM, Ahn S, et al. Recommended standards for reports dealing with lower extremity ischemia: revised version. J Vasc Surg 1997;26: 517-38.
- 3 Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FG, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). Eur J Vasc Endovasc Surg 2007;33(Suppl. 1): S1- S75.
- 4 Patel N, Sacks D, Patelet RI, Moresco KP, Ouriel K, Gray R, et al. SIR reporting standards for the treatment of acute limb ischemia with use of trans_luminal removal of arterial thrombus. J Vasc Interv Radiol 2003; 14: S453-65. [CrossRef]
- 5 Conte, M.S.; Bradbury, A.W.; Kolh, P.; White, J.V.; Dick, F.; Fitridge, R.; Mills, J.L.; Ricco, J.B.; Suresh, K.R.; Murad, M.H.; et al. Global vascular guidelines on the management of chronic limb-threatening ischemia. J. Vasc. Surg. 2019, 69, 3S–125S. [CrossRef] [PubMed]
- 6 Creager, M.A.; Kaufman, J.A.; Conte, M.S. Clinical practice. Acute Limb Ischemia. N. Engl. J. Med. 2012, 366, 2198–2206. [CrossRef] [PubMed]
- 7 Eliason, J.L.; Wainess, R.M.; Proctor, M.C.; Dimick, J.B.; Cowan, J.A., Jr.; Upchurch, G.R., Jr.; Stanley, J.C.; Henke, P.K. A national and single institutional experience in the contemporary treatment of acute lower extremity ischemia. Ann. Surg. 2003, 238, 382–389. [CrossRef] [PubMed]
- 8 Gilliland C, Shah J, Martin JG, Miller MJ Jr. Acute limb ischemia. Tech Vasc Interv Radiol 2017;20(04):274–280
- 9 Lukasiewicz A, Lichota W, Thews M. Outcomes of accelerated catheter-directed thrombolysis in patients with acute arterial thrombosis. Vasc Med 2016;21(05):453–458
- 10 Baril DT, Ghosh K, Rosen AB. Trends in the incidence, treatment, and outcomes of acute lower extremity ischemia in the United States Medicare population. J Vasc Surg 2014;60(03):669–77.e2
- 11 Lawall, H.; Huppert, P.; Rümenapf, G. S3-Leitlinien zur Diagnostik, Therapie und Nachsorge der peripheren arteriellen Verschlusskrankheit. Vasa 2016, 45, 11–82.
- 12 Callum, K.; Bradbury, A. ABC of arterial and venous disease: Acute limb ischaemia. BMJ 2000, 320, 764–767. [CrossRef]
- 13 Fukuda, I.; Chiyoza, M.; Taniuchi, S.; Fukuda, W. Acute limb ischemia: Contemporary approach. Gen. Thorac. Cardiovasc. Surg. 2015, 63, 540–548. [CrossRef]
- 14 Zubair A, Lotfollahzadeh S. Peripheral Arterial Duplex Assessment, Protocols, and Interpretation. 2023 Jan 20. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. PMID: 35015455.
- 15 Case courtesy of Ahmed Abdrabou, Radiopaedia.org, rID: 31978
- 16 Case courtesy of Sajoscha A. Sorrentino, Radiopaedia.org, rID: 15767
- 17 Ruehm SG, Goyen M, Barkhausen J, Kroger K, Bosk S, Ladd ME, Debatin JF. Rapid magnetic resonance angiography for detection of atherosclerosis. Lancet 2001; 357:1086–1091.
- 18 Goyen M, Quick HH, Debatin JF, Ladd ME, Barkhausen J, Herborn CU, Bosk S, Kuehl H, Schleipitz M, Ruehm SG. Whole-body three-dimensional MR angiography with a rolling table platform: initial clinical experience. Radiology 2002;224: 270–277.
- 19 Gohde SC, Goyen M, Forsting M, Debatin JF. [Prevention without radiation—a strategy for comprehensive early detection using magnetic resonance tomography]. Radiologe 2002; 42:622–629.
- 20 Fenchel M, Scheule AM, Stauder NI, Kramer U, Tomaschko K, Nagele T, Bretschneider C, Schlemmer HP, Claussen CD, Miller S. Atherosclerotic disease: whole-body cardiovascular imaging with MR system with 32 receiver channels and total-body surface coil technology—initial clinical results. Radiology 2006; 238:280–291.
- 21 Altaha, M. A., Jaskolka, J. D., Tan, K., Rick, M., Schmitt, P., Menezes, R. J., & Wintersperger, B. J.

- (2016). *Non-contrast-enhanced MR angiography in critical limb ischemia: performance of quiescent-interval single-shot (QISS) and TSE-based subtraction techniques.* European Radiology, 27(3), 1218–1226.
22. Case courtesy of Sajoscha A. Sorrentino, Radio-paedia.org, rID: 14975
23. Kumar, Ajay & Valakkada, Jineesh & Ayyappan, Anoop & Kannath, Santhosh. (2022). Management of Acute Complications during Endovascular Procedures in Peripheral Arterial Disease: A Review. Journal of Clinical Interventional Radiology ISVIR. 07. 10.1055/s-0042-1760246.
24. Linkins LA, Dans AL, Moores LK, Bona R, Davidson BL, Schulman S, et al. Treatment and prevention of heparin-induced thrombocytopenia: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141: e495Se530S.
25. Gunawansa N. Atraumatic Acute Limb Ischemia: Clinical Presentation, Classification, Assessment and Management- A Review. J Vasc Surg Med 2017; 1: 10–15
26. Valle JA, Waldo SW. Current Endovascular Management of Acute Limb Ischemia. Interventional Cardiology Clinics 2017; 6: 189–196
27. Karnabatidis D, Spiliopoulos S, Tsetis D et al. Quality Improvement Guidelines for Percutaneous Catheter-Directed Intra-Arterial Thrombolysis and Mechanical Thrombectomy for Acute Lower-Limb Ischemia. Cardiovasc Intervent Radiol 2011; 34: 1123–1136
28. Kessel DO, Berridge DC, Robertson I. Infusion techniques for peripheral arterial thrombolysis. Cochrane Database of Systematic Reviews 2004; 78: 988–1020.
29. Hage A, McDevitt J, Chick J et al. Acute Limb Ischemia Therapies: When and How to Treat Endovascularly. Semin intervent Radiol 2019; 35: 453–460
30. Lichtenberg M. Percutaneous mechanical thrombectomy by means of rotational thrombectomy. Current study situation. Med Klin (Munich) 2010; 105: 705–710
31. Thrombolysis in the management of lower limb peripheral arterial occlusion—a consensus document. J Vasc Interv Radiol 2003;14: S37-49.
32. Chandrasekar B, Doucet S, Bilodeau L, et al. Complications of cardiac catheterization in the current era: a single-center experience. Catheter Cardiovasc Interv 2001;52(03):289–295
33. Brenna CTA, Ku JC, Pasarikovski CR, et al. Access-site complications in ultrasound-guided endovascular thrombectomy: a single- institution retrospective cohort study. Neurosurg Focus 2021; 51(01): E3
34. Ouriel K, Veith FJ, Sasahara AA. A comparison of recombinant urokinase with vascular surgery as initial treatment for acute arterial occlusion of the legs. Thrombolysis or Peripheral Arterial Surgery (TOPAS) Investigators. N Engl J Med 1998; 338: 1105–11. [CrossRef]
35. McNamara TO, Fischer JR. Thrombolysis of peripheral arterial and graft occlusions: improved results using high-dose urokinase. AJR Am J Roentgenol 1985;144(04):769–77
36. Lukasiewicz A. Treatment of acute lower limb ischaemia. Vasa 2016;45(03):213–221
37. Bozkaya, Halil & Kocyigit, Ali. (2015). Periferik Arteriyel ve Venöz Trombozların Tedavisinde Girişimsel Radyoloji. Türk Radyoloji Seminerleri. 3. 277-286. 10.5152/trs.2015.276.
38. Shaw, G.J.; Dhamija, A.; Bavani, N. Arrhenius temperature dependence of in vitro tissue plasminogen activator thrombolysis. Phys. Med. Biol 2007, 52, 2953–2967. [CrossRef]
39. Patel NH, Krishnamurthy VN, Kim S, Saad WE, Ganguli S, Walker TG, et al. Quality improvement guidelines for percutaneous management of acute lower-extremity ischemia. J Vasc Interv Radiol 2013;24: 3–15.
40. Ebben HP, Jongkind V, Wisselink W, Hoksbergen AWJ, Yeung KK. Catheter directed thrombolysis protocols for peripheral arterial occlusions: a systematic review. Eur J Vasc Endovasc Surg 2019; 57:667e75.
41. Darwood R, Berridge DC, Kessel DO, Robertson I, Forster R. Surgery versus thrombolysis for initial management of acute limb ischaemia. Cochrane Database Syst Rev 2018;8:CD002784.
42. Wang JC, Kim AH, Kashyap VS. Open surgical or endovascular revascularization for acute limb ischemia. J Vasc Surg 2016;63: 270e8.
43. Kuoppala M, Akeson J, Svensson P, Lindblad B, Franzen S, Acosta S. Risk factors for haemorrhage during local intra-arterial thrombolysis for lower limb ischaemia. J Thromb Thrombolysis 2011; 31:226e32.
44. Galland RB, Earnshaw JJ, Baird RN, Lonsdale RJ, Hopkinson BR, Giddings AE, et al. Acute limb deterioration during intra-arterial thrombolysis. Br J Surg 1993; 80:1118e20.
45. Sullivan KL, Gardiner GA Jr, Kandarpa K, Bonn J, Shapiro MJ, Carabasi RA, et al. Efficacy of thrombolysis in infrainguinal by-pass grafts. Circulation 1991; 83(Suppl 2): 99-105.
46. Berridge D, Kesel D, Robertson I. Surgery versus thrombolysis for initial management of acute

- limb ischemia. Cochrane Database Syst Rev 2002; CD002784
47. Walker TG. Acute limb ischemia. Tech Vasc Interv Radiol 2009; 12: 117-29. [CrossRef]
48. Schrijver, A.M.; van Leersum, M.; Fioole, B.; Reijnen, M.M.; Hoksbergen, A.W.; Vahl, A.C.; de Vries, J.P.P. Dutch randomized trial comparing standard catheter-directed thrombolysis and ultrasound-accelerated thrombolysis for arterial thromboembolic infrainguinal disease (DUET). *J Endovasc Ther.* 2015, 22, 87-95. [CrossRef]
49. Funke C, Pfiffner R, Husmann M, Pfammatter T. The use of the “preclosure” technique for antegrade aspiration thrombectomy with large catheters in acute limb ischemia. *Cardiovasc Interv Radiol* 2013; 36:377e84.
50. Henry, M.; Amor, M.; Henry, I.; Tricoche, O.; Aliaoui, M. The Hydrolyser thrombectomy catheter: A single-center experience. *J. Endovasc. Surg.* 1998, 5, 24–31. [CrossRef]
51. Kasirajan K, Gray B, Beavers FP, Clair DG, Greenberg R, Mascha E, et al. Rheolytic thrombectomy in the management of acute and subacute limb-threatening ischemia. *J Vasc Interv Radiol* 2001; 12:413e21.
52. Blaisdell FW. The Pathophysiology of Skeletal Muscle Ischemia and the Reperfusion Syndrome: A Review. 2016. Available at: <http://dx.doi.org/101177/096721090201000620>. Accessed November 15, 2018
53. Gillani S, Cao J, Suzuki T, Hak DJ. The effect of ischemia reperfusion injury on skeletal muscle. *Injury* 2012;43(06):670–675.
54. Watson JD, Gifford SM, Clouse WD. Biochemical markers of acute limb ischemia, rhabdomyolysis, and impact on limb salvage. *Semin Vasc Surg* 2014;27(3-4):176–181
55. Petejova N, Martinek A. Acute kidney injury due to rhabdomyolysis and renal replacement therapy: a critical review. *Crit Care* 2014;18(03):224
56. Clagett GP, Valentine RJ, Hagino RT. Autogenous aortoiliac/ femoral reconstruction from superficial femoral-popliteal veins: feasibility and durability. *J Vasc Surg* 1997; 25:255e66.
57. Orrapin S, Orrapin S, Arwon S, Rerkasem K. Predictive factors for post-ischemic compartment syndrome in non-traumatic acute limb ischemia in a lower extremity. *Ann Vasc Dis* 2017; 10:378e85.
58. SchmidtCA, Rancic Z, LachatML, MayerDO, Veith FJ, WilhelmMJ. Hypothermic, initially oxygen-free, controlled limb reperfusion for acute limb ischemia. *Ann Vasc Surg* 2015; 29:560e72.
59. Tiwari, A.; Haq, A.I.; Myint, F.; Hamilton, G. Acute compartment syndromes. *Br. J. Surg.* 2002, 89, 397–412. [CrossRef]
60. Ricco JB, Schneider F, Phong Le T. Traumatismes vasculaires des membres: formes topographiques et particulières. *EMC – Techniques chirurgicales-Chirurgie vasculaire* 2014; 9:1e23.
61. Lambert MA, Belch JJF. Medical management of critical limb ischaemia: where do we stand today? *J Intern Med* 2013;274 (04):295–307