



# AORT VE PERİFERİK ARTER HASTALIKLARI

Özge TURGAY YILDIRIM<sup>1</sup>

## GİRİŞ

Vücutun en büyük arteri olan aort, aort kapağından başlar ve orta karına kadar uzanarak burada ana iliak arterlere ayrılır. Aort, seyri boyunca anatomik olarak torasik ve abdominal bileşenlere ayrılır. Torasik aort ayrıca çıkan, arkus ve inen segmentlere ve abdominal aort suprarenal ve infrarenal segmentlere ayrılır (1).

Çıkan aort, aort kapağı seviyesinden başlar ve aortik arkusa kadar uzanır. Aortik kök valsava sinüslerini içerir. Sağ ve sol koroner arterler sırasıyla sağ ve sol koroner sinüslerden çıkmaktadır. Aortik arkustan baş ve üst ekstremitelere giden brakiosefalik arter, sol ana karotid ve sol subklavian arterler çıkar. İnen torasik aort, sol subklavyen arterin orijininin hemen sonrasında başlar. İnen aort posterior mediastende ilerlerken omurganın her seviyesinde interkostal arterleri verir. Distalde torasik aort, genellikle 12. torasik vertebra seviyesinde diyaframdan geçer ve abdominal aort olur. Abdominal aort aşağı doğru devam ederken ön duvarından çölyak arter ve superior mezenterik arteri; posterolateralinden sağ ve sol renal arter dallarını verir. Devamında posteriordan lomber arter dallarını verdikten sonra genellikle dördüncü lomber vertebra seviyesinde, ana iliak arterlere çatallanarak sona erer (1–3).

Aort duvarı, tunika intima, tunika media ve tunika adventisya olmak üzere üç tabakadan oluşur. İntima, endotelial hücreler ve subendotelial boşluktan oluşur ve mediadan internal elastik lamina ile ayrılır. Media tabakası, vasküler düz kas hücreleri elastik lif doku içeren laminal tabakalardan oluşur. Tunika

<sup>1</sup> Doç. Dr., Eskişehir Şehir Hastanesi, Kardiyoloji Kliniği, ozgeturgay@gmail.com

tidrofuril, pentoksifilin, buflomedil, karnitin ve propionil-L-karnitindir (63,64).

Intermitan klodikasyon hastalarında egzersiz tedavisine rağmen günlük yaşam aktiviteleri bozulduğunda, istirahat ağrısı varsa, kronik uzuv tehdit eden iskemi mevcutsa, iskemik ülserasyon veya gangren varsa revaskülarizasyon seçeneği gündeme gelmelidir (31,46).

Aortoiliak tıkaçıcı hastalıklarda, kısa yani <5cm lezyonlar için önce endovasküler strateji önerilir. Ameliyata uygun hastalarda aorto-iliak tıkanıklıklarda aorto-(bi)femoral bypass düşünülebilir fakat hastanın komorbiditeleri fazla ise endovasküler girişim bir alternatiftir. Cerrahi ve endovasküler girişim tercihinde ekibin tecrübesi de çok önemlidir. Lezyon renal arterlere kadar uzanıyorsa açık cerrahi öne çıkmaktadır. İlio-femoral tıkaçıcı lezyonlar olması durumunda, iliak stentleme ve femoral endarterektomi veya bypassı birleştiren hibrit bir prosedür düşünülmelidir. Revaskülarizasyon için başka alternatifi olmayan hastalarda ekstra anatomik bypass endike olabilir (31,65).

Femoropopliteal lezyonlarda eğer tıkaçıcı lezyon < 25cm ise endovasküler strateji ön plana çıkmaktadır. Ameliyat için yüksek risk altında olmayan hastalarda uzun ( $\geq 25$  cm) yüzeysel femoral arter lezyonlarında otolog ven mevcutsa ve yaşam beklentisi > 2 yıl ise bypass cerrahisi endikedir. Fakat hasta ameliyat için uygun değilse bu hastalarda da endovasküler müdahale düşünülebilir (31,66).

## KAYNAKLAR

1. Braverman AC, Thompson RW. Diseases of the Aorta. In: Bonow RO, Mann DL, Zipes DP, Libby P, Braunwald E (eds.) Braunwald's heart disease: A textbook of cardiovascular medicine. 9th ed. Philadelphia: Saunders/Elsevier;2012. p. 1309-1337.
2. Fuster V, Walsh RA, Harrington RA. Hurst's the Heart. (Ömer Kozan, Çev. Ed.). Ankara: Güneş Tıp Kitabevleri;2014.
3. Muhammad KI, Thamilarasan M. Aortic Aneurism and Aortic Dissection. In: Griffin BP, Topol EJ (eds.) Manual of Cardiovascular Medicine. 3rd ed. Lippincott Williams & Wilkins; 2008. p. 375-392.
4. Caro CG. The Mechanics of Circulation. New York, NY: Oxford University Press; 1978.
5. Erbel R, Aboyans V, Boileau C, Bossone E, Bartolomeo RD, Eggebrecht H, et al. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult. The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). Eur Heart J. 2014 Nov 1;35(41):2873-926.

6. Golledge J, Norman PE. Pathophysiology of abdominal aortic aneurysm relevant to improvements in patients' management. *Curr Opin Cardiol*. 2009 Nov;24(6):532–8.
7. Baxter BT, Terrin MC, Dalman RL. Medical management of small abdominal aortic aneurysms. *Circulation*. 2008 Apr 8;117(14):1883–9.
8. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. *Eur Heart J*. 2018 Sep 1;39(33):3021–104.
9. Ramanath VS, Oh JK, Sundt TM, Eagle KA. Acute aortic syndromes and thoracic aortic aneurysm. *Mayo Clin Proc*. 2009 May;84(5):465–81.
10. Jondeau G, Detaint D, Tubach F, Arnoult F, Milleron O, Raoux F, et al. Aortic event rate in the Marfan population: a cohort study. *Circulation*. 2012 Jan 17;125(2):226–32.
11. Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC), European Association for Cardio-Thoracic Surgery (EACTS), Vahanian A, Alfieri O, Andreotti F, Antunes MJ, et al. Guidelines on the management of valvular heart disease (version 2012). *Eur Heart J*. 2012 Oct;33(19):2451–96.
12. Hirst AE, Johns VJ, Kime SW. Dissecting aneurysm of the aorta: a review of 505 cases. *Medicine (Baltimore)*. 1958 Sep;37(3):217–79.
13. Rizvi AZ, Murad MH, Fairman RM, Erwin PJ, Montori VM. The effect of left subclavian artery coverage on morbidity and mortality in patients undergoing endovascular thoracic aortic interventions: a systematic review and meta-analysis. *J Vasc Surg*. 2009 Nov;50(5):1159–69.
14. Hagan PG, Nienaber CA, Isselbacher EM, Bruckman D, Karavite DJ, Russman PL, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease. *JAMA*. 2000 Feb 16;283(7):897–903.
15. Reul GJ, Cooley DA, Hallman GL, Reddy SB, Kyger ER, Wukasch DC. Dissecting aneurysm of the descending aorta. Improved surgical results in 91 patients. *Arch Surg Chic Ill 1960*. 1975 May;110(5):632–40.
16. Suzuki T, Distant A, Zizza A, Trimarchi S, Villani M, Salerno Uriarte JA, et al. Diagnosis of acute aortic dissection by D-dimer: the International Registry of Acute Aortic Dissection Substudy on Biomarkers (IRAD-Bio) experience. *Circulation*. 2009 May 26;119(20):2702–7.
17. Am R, Lk H, Am B, Ca N, Dm W, Ea K, et al. Sensitivity of the aortic dissection detection risk score, a novel guideline-based tool for identification of acute aortic dissection at initial presentation: results from the international registry of acute aortic dissection. *Circulation [Internet]*. 2011 May 24 [cited 2022 Jun 12];123(20). Available from: <https://pubmed.ncbi.nlm.nih.gov/21555704/>
18. Chiappini B, Schepens M, Tan E, Dell' Amore A, Morshuis W, Dossche K, et al. Early and late outcomes of acute type A aortic dissection: analysis of risk factors in 487 consecutive patients. *Eur Heart J*. 2005 Jan;26(2):180–6.
19. S T, Ca N, V R, T M, T S, Rh M, et al. Contemporary results of surgery in acute type A aortic dissection: The International Registry of Acute Aortic Dissection ex-

- perience. *J Thorac Cardiovasc Surg* [Internet]. 2005 Jan [cited 2022 Jun 12];129(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/15632832/>
20. Perko MJ, Nørgaard M, Herzog TM, Olsen PS, Schroeder TV, Pettersson G. Unoperated aortic aneurysm: a survey of 170 patients. *Ann Thorac Surg*. 1995 May;59(5):1204–9.
  21. Nienaber CA, Rousseau H, Eggebrecht H, Kische S, Fattori R, Rehders TC, et al. Randomized comparison of strategies for type B aortic dissection: the INvestigation of STEnt Grafts in Aortic Dissection (INSTEAD) trial. *Circulation*. 2009 Dec 22;120(25):2519–28.
  22. Nienaber CA, Kische S, Rousseau H, Eggebrecht H, Rehders TC, Kundt G, et al. Endovascular repair of type B aortic dissection: long-term results of the randomized investigation of stent grafts in aortic dissection trial. *Circ Cardiovasc Interv*. 2013 Aug;6(4):407–16.
  23. Grabenwöger M, Alfonso F, Bachet J, Bonser R, Czerny M, Eggebrecht H, et al. Thoracic Endovascular Aortic Repair (TEVAR) for the treatment of aortic diseases: a position statement from the European Association for Cardio-Thoracic Surgery (EACTS) and the European Society of Cardiology (ESC), in collaboration with the European Association of Percutaneous Cardiovascular Interventions (EAPCI). *Eur Heart J*. 2012 Jul;33(13):1558–63.
  24. Sundt TM. Intramural hematoma and penetrating atherosclerotic ulcer of the aorta. *Ann Thorac Surg*. 2007 Feb;83(2):S835–841; discussion S846–850.
  25. Nathan DP, Boonn W, Lai E, Wang GJ, Desai N, Woo EY, et al. Presentation, complications, and natural history of penetrating atherosclerotic ulcer disease. *J Vasc Surg*. 2012 Jan;55(1):10–5.
  26. Ganaha F, Miller DC, Sugimoto K, Do YS, Minamiguchi H, Saito H, et al. Prognosis of aortic intramural hematoma with and without penetrating atherosclerotic ulcer: a clinical and radiological analysis. *Circulation*. 2002 Jul 16;106(3):342–8.
  27. Troxler M, Mavor AI, Homer-Vanniasinkam S. Penetrating atherosclerotic ulcers of the aorta. *Br J Surg*. 2001 Sep;88(9):1169–77.
  28. Eggebrecht H, Herold U, Schmermund A, Lind AY, Kuhnt O, Martini S, et al. Endovascular stent-graft treatment of penetrating aortic ulcer: results over a median follow-up of 27 months. *Am Heart J*. 2006 Feb;151(2):530–6.
  29. Creager MA, Libby P. Peripheral Artery Diseases. In: Bonow RO, Mann DL, Zipes DP, Libby P, Braunwald E (eds.) *Braunwald's heart disease: A textbook of cardiovascular medicine*. 9th ed. Philadelphia: Saunders/Elsevier;2012. p. 1338–1358. In.
  30. Chhatrwalla AK, Bajzer CT. Carotid Artery Disease. In: Griffin BP, Topol EJ (eds.) *Manual of Cardiovascular Medicine*. 3rd ed. Lippincott Williams & Wilkins; 2008. p. 427–442. In.
  31. Aboyans V, Ricco JB, Bartelink MLEL, Björck M, Brodmann M, Cohnert T, et al. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS): Document covering atherosclerotic disease of extracranial carotid and vertebral, mesen-

- teric, renal, upper and lower extremity arteries Endorsed by: the European Stroke Organization (ESO) The Task Force for the Diagnosis and Treatment of Peripheral Arterial Diseases of the European Society of Cardiology (ESC) and of the European Society for Vascular Surgery (ESVS). *Eur Heart J*. 2018 Mar 1;39(9):763–816.
32. Esposito-Bauer L, Saam T, Ghodrati I, Pelisek J, Heider P, Bauer M, et al. MRI plaque imaging detects carotid plaques with a high risk for future cerebrovascular events in asymptomatic patients. *PloS One*. 2013;8(7):e67927.
  33. A G, K K, H B, H K, A P, Ae G, et al. Plaque echolucency and stroke risk in asymptomatic carotid stenosis: a systematic review and meta-analysis. *Stroke* [Internet]. 2015 Jan [cited 2022 Jun 12];46(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/25406150/>
  34. Naylor AR, Schroeder TV, Sillesen H. Clinical and imaging features associated with an increased risk of late stroke in patients with asymptomatic carotid disease. *Eur J Vasc Endovasc Surg Off J Eur Soc Vasc Surg*. 2014 Dec;48(6):633–40.
  35. Wardlaw JM, Chappell FM, Stevenson M, De Nigris E, Thomas S, Gillard J, et al. Accurate, practical and cost-effective assessment of carotid stenosis in the UK. *Health Technol Assess Winch Engl*. 2006 Aug;10(30):iii–iv, ix–x, 1–182.
  36. Bullen C. Impact of tobacco smoking and smoking cessation on cardiovascular risk and disease. *Expert Rev Cardiovasc Ther*. 2008 Jul;6(6):883–95.
  37. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet Lond Engl*. 2012 Dec 15;380(9859):2224–60.
  38. Ga A, Rk F, Gs G, Sa A, F T. Statin therapy in lower limb peripheral arterial disease: Systematic review and meta-analysis. *Vascul Pharmacol* [Internet]. 2014 Nov [cited 2022 Jun 12];63(2). Available from: <https://pubmed.ncbi.nlm.nih.gov/25446168/>
  39. Mancia G, Fagard R, Narkiewicz K, Redón J, Zanchetti A, Böhm M, et al. 2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *J Hypertens*. 2013 Jul;31(7):1281–357.
  40. ONTARGET Investigators, Yusuf S, Teo KK, Pogue J, Dyal L, Copland I, et al. Telmisartan, ramipril, or both in patients at high risk for vascular events. *N Engl J Med*. 2008 Apr 10;358(15):1547–59.
  41. J O, P S, G D, K D, J B, Y Q, et al. Impact of ramipril in patients with evidence of clinical or subclinical peripheral arterial disease. *Eur Heart J* [Internet]. 2004 Jan [cited 2022 Jun 12];25(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/14683738/>
  42. Halliday A, Mansfield A, Marro J, Peto C, Peto R, Potter J, et al. Prevention of disabling and fatal strokes by successful carotid endarterectomy in patients without recent neurological symptoms: randomised controlled trial. *Lancet Lond Engl*. 2004 May 8;363(9420):1491–502.

43. Borhani Haghighi A, Edgell RC, Cruz-Flores S, Zaidat OO. Vertebral artery origin stenosis and its treatment. *J Stroke Cerebrovasc Dis Off J Natl Stroke Assoc.* 2011 Aug;20(4):369–76.
44. Khan S, Cloud GC, Kerry S, Markus HS. Imaging of vertebral artery stenosis: a systematic review. *J Neurol Neurosurg Psychiatry.* 2007 Nov;78(11):1218–25.
45. Kumar Dundamadappa S, Cauley K. Vertebral artery ostial stenosis: prevalence by digital subtraction angiography, MR angiography, and CT angiography. *J Neuroimaging Off J Am Soc Neuroimaging.* 2013 Jul;23(3):360–7.
46. Helton TJ. Peripheral Artery Disease. In: Griffin BP, Topol EJ (eds.) *Manual of Cardiovascular Medicine.* 3rd ed. Lippincott Williams & Wilkins; 2008. p. 415–426. In.
47. Aboyans V, Criqui MH, McDermott MM, Allison MA, Denenberg JO, Shadman R, et al. The vital prognosis of subclavian stenosis. *J Am Coll Cardiol.* 2007 Apr 10;49(14):1540–5.
48. Safian RD, Textor SC. Renal-artery stenosis. *N Engl J Med.* 2001 Feb 8;344(6):431–42.
49. Jennings CG, Houston JG, Severn A, Bell S, Mackenzie IS, Macdonald TM. Renal artery stenosis-when to screen, what to stent? *Curr Atheroscler Rep.* 2014 Jun;16(6):416.
50. Aboyans V, Criqui MH, Abraham P, Allison MA, Creager MA, Diehm C, et al. Measurement and interpretation of the ankle-brachial index: a scientific statement from the American Heart Association. *Circulation.* 2012 Dec 11;126(24):2890–909.
51. Collins R, Cranny G, Burch J, Aguiar-Ibáñez R, Craig D, Wright K, et al. A systematic review of duplex ultrasound, magnetic resonance angiography and computed tomography angiography for the diagnosis and assessment of symptomatic, lower limb peripheral arterial disease. *Health Technol Assess Winch Engl.* 2007 May;11(20):iii–iv, xi–xiii, 1–184.
52. R M, S B, Da L, Ja R, Mj K. Diagnostic performance of computed tomography angiography in peripheral arterial disease: a systematic review and meta-analysis. *JAMA [Internet].* 2009 Jan 28 [cited 2022 Jun 12];301(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/19176443/>
53. Menke J, Larsen J. Meta-analysis: Accuracy of contrast-enhanced magnetic resonance angiography for assessing steno-occlusions in peripheral arterial disease. *Ann Intern Med.* 2010 Sep 7;153(5):325–34.
54. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts) Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). *Eur Heart J.* 2016 Aug 1;37(29):2315–81.
55. Aung PP, Maxwell HG, Jepson RG, Price JF, Leng GC. Lipid-lowering for peripheral arterial disease of the lower limb. *Cochrane Database Syst Rev.* 2007 Oct 17;(4):CD000123.

56. Shahin Y, Barnes R, Barakat H, Chetter IC. Meta-analysis of angiotensin converting enzyme inhibitors effect on walking ability and ankle brachial pressure index in patients with intermittent claudication. *Atherosclerosis*. 2013 Dec;231(2):283–90.
57. Bagger JP, Helligsoe P, Randsbaek F, Kimose HH, Jensen BS. Effect of verapamil in intermittent claudication A randomized, double-blind, placebo-controlled, cross-over study after individual dose-response assessment. *Circulation*. 1997 Jan 21;95(2):411–4.
58. Lane R, Ellis B, Watson L, Leng GC. Exercise for intermittent claudication. *Cochrane Database Syst Rev*. 2014 Jul 18;(7):CD000990.
59. Fokkenrood HJP, Bendermacher BLW, Lauret GJ, Willigendael EM, Prins MH, Teijink JAW. Supervised exercise therapy versus non-supervised exercise therapy for intermittent claudication. *Cochrane Database Syst Rev*. 2013 Aug 23;(8):CD005263.
60. G G, G G, L B, A S, Gg S, F S, et al. Use of statins in lower extremity artery disease: a review. *BMC Surg* [Internet]. 2012 [cited 2022 Jun 12];12 Suppl 1(Suppl 1). Available from: <https://pubmed.ncbi.nlm.nih.gov/23173874/>
61. McDermott MM, Guralnik JM, Greenland P, Pearce WH, Criqui MH, Liu K, et al. Statin use and leg functioning in patients with and without lower-extremity peripheral arterial disease. *Circulation*. 2003 Feb 11;107(5):757–61.
62. Robertson L, Andras A. Prostanoids for intermittent claudication. *Cochrane Database Syst Rev*. 2013 Apr 30;(4):CD000986.
63. Ah M, Mb J, Cb N, Mr M, T VA, Js L. Drug therapy for improving walking distance in intermittent claudication: a systematic review and meta-analysis of robust randomised controlled studies. *Eur J Vasc Endovasc Surg Off J Eur Soc Vasc Surg* [Internet]. 2009 Oct [cited 2022 Jun 12];38(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/19586783/>
64. Stevens JW, Simpson E, Harnan S, Squires H, Meng Y, Thomas S, et al. Systematic review of the efficacy of cilostazol, naftidrofuryl oxalate and pentoxifylline for the treatment of intermittent claudication. *Br J Surg*. 2012 Dec;99(12):1630–8.
65. Jongkind V, Akkersdijk GJM, Yeung KK, Wisselink W. A systematic review of endovascular treatment of extensive aortoiliac occlusive disease. *J Vasc Surg*. 2010 Nov;52(5):1376–83.
66. J L, T Z, Ka H, Pj S, M G, S MH, et al. Sustained benefit at 2 years for covered stents versus bare-metal stents in long SFA lesions: the VIASTAR trial. *Cardiovasc Intervent Radiol* [Internet]. 2015 Feb [cited 2022 Jun 12];38(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/25472936/>