

Bölüm

31

AKUT İSKEMİK İNMEYE YAKLAŞIM

İsa KILIÇ¹

GİRİŞ

Son yıllarda mortalite ve *yeti yitimine ayarlanmış yaşam yılı*'ndaki azalmaya rağmen akut iskemik inme, dünya çapında sosyal ve ekonomik sonuçları ile üçüncü onde gelen ölüm nedenidir. Akut iskemik inme aynı zamanda kalıcı engelliliğin de önemli bir nedeni olmaya devam etmektedir (1).

İskemik inme aşağıdaki koşullara dayanarak beyin, omurilik veya retina hücrelerinin iskemiye bağlı ölümü olarak tanımlanabilir:

1. Tanımlanmış bir vasküler sulama alanı içerisinde serebral, spinal kord veya retinadaki fokal iskemik hasarı, patolojik bulguları, görüntüleme yöntemleri ve diğer objektif kanıtlar ile ortaya koymak.
2. Semptomların en az 24 saat devam ettiği (bazen oturmuş iskemi olsa bile yakınmalar klinik olarak 24 saatten önce de düzenebilir), serebral, spinal kord veya retinadaki fokal iskemik hasara ait klinik bulgulara ek olarak diğer etiyolojilerin dışlanması.

İnme genel olarak üç kategoriye ayrılır: iskemik inme, hemorajik inme ve subaraknoid kanama. İskemik inme, beyne kan akışını sağlayan damarların tikanması nedeniyle ortaya çıkar. Kan damarlarının rüptüre olması neticesinde intrakranial alana kanama, hemorajik inme olarak adlandırılır (2).

İskemik inme tüm serobrovasküler hastaların yaklaşık % 85'inden sorumludur (3).

Reperfüzyon tedavisindeki her bir dakika geçmede tahmini iki milyon nöron kaybı olduğu

varsayılmaktadır (4). Zamana bağlı tedaviler akut iskemik inmenin nörolojik sekellerini dramatik olarak değiştirebileceği için inmenin hızlı tanınması önemlidir. "Zaman beyindir" ifadesi, olası akut iskemik inmeli bir hastayı değerlendirirken ve tedavi ederken akılda tutulmalıdır.

İSKEMİK İNME SINIFLANDIRMASI

"Trial of Org. in Acute Stroke Treatment (TOAST)"'a göre üç çeşit iskemik inme vardır (5).

1. Büyük damar inmesi
2. Küçük damar inmesi veya lakinler inme
3. Kardiyoembolik İnme

Büyük damar inmesi internal karotid arter, orta serbral arter, anterior serbral arter gibi beyinin ana arterlerinin trombus ve embolik tikanmasından kaynaklanır. Lakinler inme ise beyin derin yapılarını besleyen perforan kan damarlarının tutulumundan kaynaklanır. Kardiyak kökenli embolizm, tüm iskemik inmelerin yaklaşık % 15 ila % 20'sini oluşturur. Kardiyak emboli trombosit, fibrin, kalsiyum, mikroorganizmalar veya neoplastik fragmanlarından oluşabilir.

RİSK FAKTORLERİ:

Modifiye Edilemeyecekler

- Yaş
- Irk
- Cinsiyet
- Etnik
- Migren öyküsü
- Fibromusküler displazi

¹ Yoğun Bakım Uzmanı, Bursa Şehir Hastanesi, kilicisaicu@gmail.com ORCID iD: 0000-0002-0764-5982

bilitasyon programlarının inme hastalarını topluma yeniden kazandırmada önemli olduğu konusunda genel bir fikir birliği vardır.

KAYNAKLAR:

1. Gorelick PB. The global burden of stroke: persistent and disabling. *Lancet Neurol*.2009; 18: 417–418.
2. Caplan LR. (2009). Basic pathology, anatomy, and pathophysiology of stroke. In: Caplan's Stroke: A Clinical Approach, (4th ed, p 22). Philadelphia: Saunders Elsevier.
3. Hankey GJ. Stroke. *Lancet*.2017;10069(389):641–654.
4. Saver JL. Time is brain—quantified. *Stroke*. 2006;37(01):263–266
5. Adams HP Jr, Davis PH, Leira EC, et al. Baseline NIH Stroke Scale score strongly predicts outcome after stroke: A report of the Trial of Org 10172 in Acute Stroke Treatment (TOAST). *Neurology*. 1999;53(1):126–131.
6. Kasner SE. Clinical interpretation and use of stroke scales. *Lancet Neurol*.2006; 5:603–612
7. Albers G.W, Marks M.P, Kemp S, et al. Thrombectomy for stroke at 6 to 16 hours with selection by perfusion imaging. *N. Engl. J. Med.* 2018;378:708–718
8. Bal R, Bhatia R, Menon BK et al. Time dependence of reliability of noncontrast computed tomography in comparison to computed tomography angiography source image in acute ischemic stroke. *Int. J. Stroke*.2015;10: 55–60
9. Román LS, Menon BK, Blasco J, et al. Imaging features and safety and efficacy of endovascular stroke treatment: a meta-analysis of individual patient-level data. *Lancet Neurol*.2018;17: 895–904
10. Kamalian S, Lev MH. The adult patient with acute neurologic deficit: an update on imaging trends. *Neuroimaging Clin N Am*. 2018;28(03):319–334
11. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N. Engl. J. Med.*1995; 333: 1581–1587
12. Emberson J, Lees KR, Lyden P, et al. Efect of treatment delay, age, and stroke severity on the efects of intravenous thrombolysis with alteplase for acute ischaemic stroke: a meta-analysis of individual patient data from randomised trials. *Lancet*. 2014 ;384:1929–1935
13. Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*.2018; 49:e46.
14. Lees KR, Bluhmki E, von Kummer R, et al. Time to treatment with intravenous alteplase and outcome in stroke: an updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials. *Lancet*.2010; 375: 1695–1703
15. Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke. 2019; e344:e418
16. Thomalla, G. Simonsen CZ, Boutitie F, et al. MRI-guided thrombolysis for stroke with unknown time of onset. *N. Engl. J. Med.* 2018;379:611–622
17. Ma H, Campbell BCV, Parsons MW, et al. Thrombolysis guided by perfusion imaging up to 9 hours after onset of stroke. *N Engl J Med*.2019;380:1795–1803
18. Berkhemer OA, Fransen PSS, Beumer D, et al. MR CLEAN Investigators. A randomized trial of intraarterial treatment for acute ischemic stroke. *N Engl J Med* 2015;372(01):11–20
19. Goyal M, Demchuk AM, Menon BK, et al. ESCAPE Trial Investigators. Randomized assessment of rapid endovascular treatment of ischemic stroke. *N Engl J Med* 2015;372(11):1019–1030
20. Saver JL, Goyal M, Bonafe A, et al. SWIFT PRIME Investigators. Stent-retriever thrombectomy after intravenous t-PA vs. t-PA alone in stroke. *N Engl J Med* 2015;372(24):2285–2295
21. Jovin TG, Chamorro A, Cobo E, et al. REVASCAT Trial Investigators. Thrombectomy within 8 hours after symptom onset in ischemic stroke. *N Engl J Med* 2015;372(24):2296–2306
22. Campbell BCV, Mitchell PJ, Kleinig TJ, et al. EXTEND-IA Investigators. Endovascular therapy for ischemic stroke with perfusionimaging selection. *N Engl J Med* 2015;372(11):1009–1018
23. Campbell BCV, Mitchell PJ, Kleinig TJ, et al; EXTEND-IA Investigators. Endovascular therapy for ischemic stroke with perfusionimaging selection. *N Engl J Med*. 2015;372(11):1009–1018
24. Nogueira RG, Jadhav AP, Haussen DC, et al; DAWN Trial Investigators. Thrombectomy 6 to 24 hours after stroke with a mismatch between deficit and infarct. *N Engl J Med*. 2018;378(01):11–21
25. Hindman BJ, Dexter F. Anesthetic management of emergency endovascular thrombectomy for acute ischemic stroke, part 2: integrating and applying observational reports and randomized clinical trials. *Anesth Analg*.2019;128:706–717.
26. Talke PO, Sharma D, Heyer EJ, et al. Society for neuroscience in anesthesiology and critical care expert consensus statement: anesthetic management of endovascular treatment for acute ischemic stroke*: endorsed by the Society of NeuroInterventional Surgery and the Neurocritical Care Society. *J Neurosurg Anesthesiol*.2014;26:95–108
27. Hindman BJ. Anesthetic management of emergency endovascular thrombectomy for acute ischemic stroke, part 1: patient characteristics, determinants of efectiveness, and efect of blood pressure on outcome. *Anesth Analg*.2019;128:695–705
28. Treurniet KM, Berkhemer OA, Immink RV,et al. A decrease in blood pressure is associated with unfavorable outcome in patients undergoing thrombectomy under general anesthesia. *J Neurointerv Surg*.2018;10:107–111
29. Athiraman U, Sultan-Qurraie A, Nair B,et al. Endovascular treatment of acute ischemic stroke under general anesthesia: predictors of good outcome. *J Neurosurg Anesthesiol*.2018;30:223–230
30. Jadhav AP, Molyneaux BJ, Hill MD, et al. Care of the postthrombectomy patient. *Stroke*. 2018;49:2801–2807
31. Knopf L, Staf I, Gomes J, et al. Impact of a neurointensivist on outcomes in critically ill stroke patients. *Neurocrit Care*. 2012;16:63–71

32. Kiphuth IC, Schellinger PD, Kohrmann M, et al. Predictors for good functional outcome after neurocritical care. *Crit Care*.2010; 14:R136
33. Berrouschot J, Rossler A, Koster J, et al. Mechanical ventilation in patients with hemispheric ischemic stroke. *Crit Care Med*. 2000;28:2956–2961
34. Rowat AM, Dennis MS, Wardlaw JM. Hypoxaemia in acute stroke is frequent and worsens outcome. *Cerebrovasc Dis*. 2006;21:166–172
35. Schonberger S, Niesen WD, Fuhrer H, et al. Early tracheostomy in ventilated stroke patients: study protocol of the international multicentre randomized trial SET-POINT2 (Stroke-related Early Tracheostomy vs. Prolonged Orotracheal Intubation in Neurocritical care Trial 2). *Int J Stroke*.2016;11:368–379
36. Carney N, Totten AM, O'reilly C, et al. Brain Trauma Foundation TBI guidelines for the management of severe traumatic brain injury, fourth edition. *Neurosurgery*. 2017;80:6–15.
37. Duan J, Bai L, Zhou L, et al. Decreasing re-intubation using prophylactic noninvasive ventilation in elderly patients: a propensitymatched study. *J Crit Care*. 2019;50:77–81
38. Tejerina E, Pelosi P, Muriel A, et al. Association between ventilatory settings and development of acute respiratory distress syndrome in mechanically ventilated patients due to brain injury. *J Crit Care*. 2017;38:341–5.
39. Brower RG, Matthay MA, Morris A, et al. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. *N Engl J Med*. 2000;342:1301–8.
40. Mazzeo AT, Fanelli V, Mascia L. Brain-lung crosstalk in critical care: how protective mechanical ventilation can affect the brain homeostasis. *Minerva Anestesiol*. 2013;79:299–309.
41. Dziewas R, Stellato R, van DTI, et al. Pharyngeal electrical stimulation for early decannulation in tracheotomised patients with neurogenic dysphagia after stroke (PHAST-TRAC): a prospective, single-blinded, randomised trial. *Lancet Neurol*. 2018;17:849–859
42. Ko SB, Yoon BW. Blood pressure management for acute ischemic and hemorrhagic stroke: the evidence. *Semin Respir Crit Care Med*.2017;38:718–725
43. Mistry EA, Mistry AM, Nakawah MO, et al. Systolic blood pressure within 24 hours after thrombectomy for acute ischemic stroke correlates with outcome. *J Am Heart Assoc*.2017;18;6(5):e006167
44. Goyal N, Tsivgoulis G, Pandhi A, et al. Blood pressure levels post mechanical thrombectomy and outcomes in large vessel occlusion strokes. *Neurology*.2017; 89:540–547
45. Goyal N, Tsivgoulis G, Pandhi A, et al. Blood pressure levels post mechanical thrombectomy and outcomes in non-recanalized large vessel occlusion patients. *J Neurointerv Surg*.2018;10:925–931
46. Manning LS, Mistry AK, Potter J, et al. Shortterm blood pressure variability in acute stroke: post hoc analysis of the controlling hypertension and hypotension immediately post stroke and continue or stop post-stroke antihypertensives collaborative study trials. *Stroke*.2015;46:1518–1524
47. Greer DM, Funk SE, Reaven NL, et al. Impact of fever on outcome in patients with stroke and neurologic injury: a comprehensive meta-analysis. *Stroke*.2008;39:3029–3035
48. Andrews PJD, Verma V, Healy M, et al. Targeted temperature management in patients with intracerebral haemorrhage, subarachnoid haemorrhage, or acute ischaemic stroke: consensus recommendations. *Br J Anaesth*.2018;121:768–775
49. den Hertog HM, van der Worp HB, van Gemert HM, et al. The paracetamol (acetaminophen) in stroke (PAIS) trial: a multicentre, randomised, placebo-controlled, phase III trial. *Lancet Neurol*.2009;8:434–440
50. Horn CM, Sun CH, Nogueira RG, et al. Endovascular reperfusion and cooling in cerebral acute ischemia (ReCC-LAIM I). *J Neurointerv Surg*.2014;6:91–95
51. Wang Y, Pan Y, Zhao X, et al. Clopidogrel with aspirin in acute minor stroke or transient ischemic attack (CHANCE) trial: one-year outcomes. *Circulation*.2015; 132:40–46
52. Johnston SC, Easton JD, Farrant M, et al. Clopidogrel and aspirin in acute ischemic stroke and high-risk TIA. *N Engl J Med*.2018;379:215–225
53. Kirkman MA, Citerio G, Smith M. The intensive care management of acute ischemic stroke: an overview. *Intensive Care Med*.2014;40:640–653
54. Sandercock PA, Counsell C, Kane EJ. Anticoagulants for acute ischaemic stroke. *Cochrane Database Syst Rev*.2015;3:1–71.doi:10.1002/14651858.CD000024.pub4
55. Bembenek J, Karlinski M, Kobayashi A, et al. Early stroke-related deep venous thrombosis: risk factors and influence on outcome. *J Thromb Thrombolysis*.2011; 32:96–102
56. Dennis M, Sandercock P, Reid J, et al. Effectiveness of intermittent pneumatic compression in reduction of risk of deep vein thrombosis in patients who have had a stroke (CLOTS 3): a multicentre randomised controlled trial. *Lancet*.2013;382:516–524
57. Sandercock PA, Counsell C, Tseng MC. Low-molecular-weight heparins or heparinoids versus standard unfractionated heparin for acute ischaemic stroke. *Cochrane Database Syst Rev*. 2008;4:1–37. doi:10.1002/14651858.CD000119.pub3
58. Arabi YM, Al-Hameed F, Burns KEA, et al. Adjunctive intermittent pneumatic compression for venous thromboembolism prophylaxis. *N Engl J Med*.2019;380:1305–1315
59. Alvarez-Sabin J, Molina CA, Montaner J, et al. Effects of admission hyperglycemia on stroke outcome in reperfused tissue plasminogen activator-treated patients. *Stroke*.2003;34:1235–1241
60. Johnston KC, Bruno A, Barrett K, et al. Stroke hyperglycemia insulin network effort (SHINE) trial primary results. International Stroke Conference 1189 2019. Available at: https://nett.umich.edu/sites/default/files/docs/shine_isc_2019.pdf.
61. Kim JT, Liebeskind DS, Jahan R, et al. Impact of hyperglycemia according to the collateral status on outcomes in mechanical thrombectomy. *Stroke*.2018;49:2706–2714
62. Singh S, Hamdy S. Dysphagia in stroke patients. *Postgrad Med J*.2006;82:383–391

63. Neuberger U, Kickingereder P, Schonenberger S, et al. A Risk factors of intracranial hemorrhage after mechanical thrombectomy of anterior circulation ischemic stroke. *Neuroradiology*.2019;61:461–469
64. McDermott M, Jacobs T, Morgenstern L. Critical care in acute ischemic stroke. *Handb Clin Neurol*.2017;140:153–176
65. Huttner HB, Schwab S. Malignant middle cerebral artery infarction: clinical characteristics, treatment strategies, and future perspectives. *Lancet Neurol*.2009; 8:949–958
66. Smith M. Refractory intracranial hypertension: the role of decompressive craniectomy. *Anesth Analg*.2017;125:1999–2008
67. Vahedi K, Hofmeijer J, Juetter E, et al. Early decompressive surgery in malignant infarction of the middle cerebral artery: a pooled analysis of three randomised controlled trials. *Lancet Neurol*.2007;6:215–222
68. Juttler E, Unterberg A, Woitzik J, et al. Hemicraniectomy in older patients with extensive middle-cerebral-artery stroke. *N Engl J Med*.2014;370:1091–1100
69. AVERT Trial Collaboration Group. Efficacy and safety of very early mobilisation within 24h of stroke onset (AVERT): a randomised controlled trial. *Lancet*.2015; 386, 46–55
70. Stroke Foundation. Clinical guidelines for stroke management 2017. InformMe <https://informme.org.au/> Guidelines .