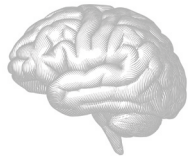
BÖLÜM 21



İNTRAKRANİYAL ACİLLERDE ANESTEZİ YÖNETİMİ

Nevin Esra GÜMÜŞ[1]

GİRİŞ

Anestezi yönetimi gerektiren en sık intrakraniyal acil durum travmatik beyin hasarı (TBH) olup elektif cerrahi sırasında serebral anevrizma rüptürü ve arteriyovenöz malformasyon kanamalarına bağlı serebral hemorajilerde de anestezi yönetimi ihtiyacı olmaktadır (1).

Kafa travması moleküler ve hücresel düzeyde değişikliklerden hemoraji ve kontüzyon gibi geniş doku hasarına kadar çeşitli patolojilerle sonuçlanabilir (2). Primer nörolojik hasar mekanik etkinin kendisinden kaynaklanan hematom, kontüzyon ve diffüz aksonal hasarlanmayı içeren durumdur. Sekonder nörolojik hasar ise doğrudan TBH'nin mekanik travmasından kaynaklanmayan, primer hasardan saatler, günler veya aylar sonra ortaya çıkabilen, daha çok serebral hipoksi ve iskemi ile sonuçlanan nörolojik bozulmadır (2-5). Hipotansiyon ve hipoksemi hasta prognozunu kötüleştirebilecek en önemli iki sekonder hasar nedeni olmakla birlikte hiperkarbi, hipokarbi, hiperglisemi, nöbetler, vazospazm ve intrakraniyal hipertansiyon da diğer sekonder nörolojik hasar nedenleridir (5).

PREOPERATİF DEĞERLENDİRME

Acil serviste multidisipliner bir değerlendirmeye tabi tutulan hastalara cerrahi müdahale gerekli görülürse anestezist tarafından hızlı bir preoperatif değerlendirme yapılmalıdır. Bilinç düzeyi ve pupil yanıtlarını değerlendiren kısa bir nörolojik muayeneye ek olarak havayolu, solunum ve dolaşım sistemi de değerlendirilmeli-

[1] Uzm. Dr., Samsun Gazi Devlet Hastanesi, Anesteziyoloji ve Reanimasyon Bölümü
drnevinesra@hotmail.com

özen gösterilmelidir. Uyanma esnasında bölünmüş dozlarda 3 mg kg^{-1}'a kadar verilen intravenöz lidokain öksürüğü etkili bir şekilde bastırmaktadır. Aşırı sedasyon CO_2'nin tutulmasına ve bunun sonucunda İKB 'de artışa yol açacağından, narkotik ilaçlar uygun dozlarda kullanılmalıdır (1).

KAYNAKLAR

1. Lam AM. Anesthesia for Neurosurgical Emergencies. Anesthesiology Clinics of North America. 1996;14(3):543-60.
2. Pearn ML, Niesman IR, Egawa J, Sawada A, Almenar-Queralt A, Shah SB, et al. Pathophysiology Associated with Traumatic Brain Injury: Current Treatments and Potential Novel Therapeutics. Cell Mol Neurobiol. 2017;37(4):571-85.
3. Kutteruf R, Rozet I, Domino K. Care of the acutely unstable patient. Cottrell and Patel's Neuroanesthesia E-Book. 2016.
4. Phan R, Bendo A. Perioperative management of adult patients with severe head injury. Cottrell and Patel's Neuroanesthesia 6th Edition Elsevier. 2017:326-36.
5. Sharma D, Vavilala MS. Perioperative management of adult traumatic brain injury. Anesthesiol Clin. 2012;30(2):333-46.
6. Örken D. Scales Used In Neurointensive Care Unit. Turkiye Klinikleri J Int Med Sci. 2006;2(22):1-3.
7. Balestreri M, Czosnyka M, Chatfield D, Steiner L, Schmidt E, Smielewski P, et al. Predictive value of Glasgow Coma Scale after brain trauma: change in trend over the past ten years. Journal of Neurology, Neurosurgery & Psychiatry. 2004;75(1):161-2.
8. Brennan PM, Murray GD, Teasdale GM. Simplifying the use of prognostic information in traumatic brain injury. Part 1: The GCS-Pupils score: an extended index of clinical severity. Journal of neurosurgery. 2018;128(6):1612-20.
9. Carney N, Totten AM, O'Reilly C, Ullman JS, Hawryluk GW, Bell MJ, et al. Guidelines for the Management of Severe Traumatic Brain Injury, Fourth Edition. Neurosurgery. 2017;80(1):6-15.
10. Wendling AL, Tighe PJ, Conrad BP, Baslanti TO, Horodyski M, Rechtine GR. A comparison of 4 airway devices on cervical spine alignment in cadaver models of global ligamentous instability at c1-2. Anesth Analg. 2013;117(1):126-32.
11. Upchurch CP, Grijalva CG, Russ S, Collins SP, Semler MW, Rice TW, et al. Comparison of Etomidate and Ketamine for Induction During Rapid Sequence Intubation of Adult Trauma Patients. Ann Emerg Med. 2017;69(1):24-33.e2.
12. Banh KV, James S, Hendey GW, Snowden B, Kaups K. Single-dose etomidate for intubation in the trauma patient. The Journal of emergency medicine. 2012;43(5):e277-e82.
13. Bruder EA, Ball IM, Ridi S, Pickett W, Hohl C. Single induction dose of etomidate versus other induction agents for endotracheal intubation in critically ill patients. Cochrane Database Syst Rev. 2015;1(1):Cd010225.
14. Cohan P, Wang C, McArthur DL, Cook SW, Dusick JR, Armin B, et al. Acute secondary adrenal insufficiency after traumatic brain injury: a prospective study. Crit Care Med. 2005;33(10):2358-66.
15. Filanovsky Y, Miller P, Kao J. Myth: Ketamine should not be used as an induction agent for intubation in patients with head injury. Cjem. 2010;12(2):154-7.
16. Cohen L, Athaide V, Wickham ME, Doyle-Waters MM, Rose NG, Hohl CM. The effect of ketamine on intracranial and cerebral perfusion pressure and health outcomes: a systematic review. Ann Emerg Med. 2015;65(1):43-51.e2.
17. Sanfilippo F, Santonocito C, Veenith T, Astuto M, Maybauer MO. The role of neuromus-

cular blockade in patients with traumatic brain injury: a systematic review. Neurocrit Care. 2015;22(2):325-34.
18. Stirt JA, Grosslight KR, Bedford RF, Vollmer D. "Defasciculation" with metocurine prevents succinylcholine-induced increases in intracranial pressure. Anesthesiology. 1987;67(1):50-3.
19. Minton MD, Grosslight K, Stirt JA, Bedford RF. Increases in intracranial pressure from succinylcholine: prevention by prior nondepolarizing blockade. Anesthesiology. 1986;65(2):165-9.
20. Clancy M, Halford S, Walls R, Murphy M. In patients with head injuries who undergo rapid sequence intubation using succinylcholine, does pretreatment with a competitive neuromuscular blocking agent improve outcome? A literature review. Emerg Med J. 2001;18(5):373-5.
21. Kovarik WD, Mayberg TS, Lam AM, Mathisen TL, Winn HR. Succinylcholine does not change intracranial pressure, cerebral blood flow velocity, or the electroencephalogram in patients with neurologic injury. Anesthesia and analgesia. 1994;78(3):469-73.
22. White PF, Schlobohm RM, Pitts LH, Lindauer JM. A randomized study of drugs for preventing increases in intracranial pressure during endotracheal suctioning. Anesthesiology. 1982;57(3):242-4.
23. Chui J, Mariappan R, Mehta J, Manninen P, Venkatraghavan L. Comparison of propofol and volatile agents for maintenance of anesthesia during elective craniotomy procedures: systematic review and meta-analysis. Can J Anaesth. 2014;61(4):347-56.
24. Matsumoto M ST. Effects of anesthetic agents and other drugs on cerebral blood flow, metabolism and intracranial pressure In: James Cottrell PP, editor. Cottrell and Patel's Neuroanesthesia. 6 ed. New York: Elsevier; 2016.
25. Prabhakar H, Singh GP, Mahajan C, Kapoor I, Kalaivani M, Anand V. Intravenous versus inhalational techniques for rapid emergence from anaesthesia in patients undergoing brain tumour surgery. Cochrane Database Syst Rev. 2016;9(9):Cd010467.
26. Winkler SR, Munoz-Ruiz L. Mechanism of action of mannitol. Surg Neurol. 1995;43(1):59.
27. Komotar RJ, Mocco J, Ransom ER, Mack WJ, Zacharia BE, Wilson DA, et al. Herniation secondary to critical postcraniotomy cerebrospinal fluid hypovolemia. Neurosurgery. 2005;57(2):286-92.
28. Sharma D, Brown MJ, Curry P, Noda S, Chesnut RM, Vavilala MS. Prevalence and risk factors for intraoperative hypotension during craniotomy for traumatic brain injury. Journal of neurosurgical anesthesiology. 2012;24(3):178.
29. Kawaguchi M, Sakamoto T, Ohnishi H, Karasawa J, Furuya H. Preoperative predictors of reduction in arterial blood pressure following dural opening during surgical evacuation of acute subdural hematoma. J Neurosurg Anesthesiol. 1996;8(2):117-22.
30. Ract C, Vigué B. Comparison of the cerebral effects of dopamine and norepinephrine in severely head-injured patients. Intensive Care Med. 2001;27(1):101-6.
31. Steiner LA, Johnston AJ, Czosnyka M, Chatfield DA, Salvador R, Coles JP, et al. Direct comparison of cerebrovascular effects of norepinephrine and dopamine in head-injured patients. Crit Care Med. 2004;32(4):1049-54.
32. Johnston AJ, Steiner LA, Chatfield DA, Coles JP, Hutchinson PJ, Al-Rawi PG, et al. Effect of cerebral perfusion pressure augmentation with dopamine and norepinephrine on global and focal brain oxygenation after traumatic brain injury. Intensive care medicine. 2004;30(5):791-7.
33. Sookplung P, Siriussawakul A, Malakouti A, Sharma D, Wang J, Souter MJ, et al. Vasopressor use and effect on blood pressure after severe adult traumatic brain injury. Neurocrit Care. 2011;15(1):46-54.
34. Myburgh J, Cooper D, Finfer S. Saline or albumin for fluid resuscitation in traumatic brain injury (author reply). The New England Journal of Medicine. 2007;357(25):2635-6.
35. Cooper DJ, Myburgh J, Heritier S, Finfer S, Bellomo R, Billot L, et al. Albumin resuscitation for traumatic brain injury: is intracranial hypertension the cause of increased mortality? J Neurotrauma. 2013;30(7):512-8.
36. Bulger EM, May S, Kerby JD, Emerson S, Stiell IG, Schreiber MA, et al. Out-of-hospital hyper-

tonic resuscitation after traumatic hypovolemic shock: a randomized, placebo controlled trial. Ann Surg. 2011;253(3):431-41.
37. Cooper DJ, Myles PS, McDermott FT, Murray LJ, Laidlaw J, Cooper G, et al. Prehospital hypertonic saline resuscitation of patients with hypotension and severe traumatic brain injury: a randomized controlled trial. Jama. 2004;291(11):1350-7.
38. Sekhon MS, McLean N, Henderson WR, Chittock DR, Griesdale DE. Association of hemoglobin concentration and mortality in critically ill patients with severe traumatic brain injury. Crit Care. 2012;16(4):R128.
39. Pendem S, Rana S, Manno EM, Gajic O. A review of red cell transfusion in the neurological intensive care unit. Neurocritical Care. 2006;4(1):63-7.
40. Robertson CS, Hannay HJ, Yamal JM, Gopinath S, Goodman JC, Tilley BC, et al. Effect of erythropoietin and transfusion threshold on neurological recovery after traumatic brain injury: a randomized clinical trial. Jama. 2014;312(1):36-47.
41. Salim A, Hadjizacharia P, DuBose J, Brown C, Inaba K, Chan L, et al. Role of anemia in traumatic brain injury. J Am Coll Surg. 2008;207(3):398-406.
42. Warner MA, O'Keeffe T, Bhavsar P, Shringer R, Moore C, Harper C, et al. Transfusions and long-term functional outcomes in traumatic brain injury. J Neurosurg. 2010;113(3):539-46.
43. Lelubre C, Bouzat P, Crippa IA, Taccone FS. Anemia management after acute brain injury. Crit Care. 2016;20(1):152.
44. Griesdale DE, Tremblay MH, McEwen J, Chittock DR. Glucose control and mortality in patients with severe traumatic brain injury. Neurocrit Care. 2009;11(3):311-6.
45. Kramer AH, Roberts DJ, Zygun DA. Optimal glycemic control in neurocritical care patients: a systematic review and meta-analysis. Crit Care. 2012;16(5):R203.
46. Liu-DeRyke X, Collingridge DS, Orme J, Roller D, Zurasky J, Rhoney DH. Clinical impact of early hyperglycemia during acute phase of traumatic brain injury. Neurocrit Care. 2009;11(2):151-7.
47. Perman SM, Goyal M, Neumar RW, Topjian AA, Gaieski DF. Clinical applications of targeted temperature management. Chest. 2014;145(2):386-93.
48. Lewis SR, Evans DJ, Butler AR, Schofield-Robinson OJ, Alderson P. Hypothermia for traumatic brain injury. Cochrane Database Syst Rev. 2017;9(9):Cd001048.
49. Ahmed AI, Bullock MR, Dietrich WD. Hypothermia in Traumatic Brain Injury. Neurosurg Clin N Am. 2016;27(4):489-97.
50. Rincon F, Hunter K, Schorr C, Dellinger RP, Zanotti-Cavazzoni S. The epidemiology of spontaneous fever and hypothermia on admission of brain injury patients to intensive care units: a multicenter cohort study. J Neurosurg. 2014;121(4):950-60.
51. Roberts I, Yates D, Sandercock P, Farrell B, Wasserberg J, Lomas G, et al. Effect of intravenous corticosteroids on death within 14 days in 10008 adults with clinically significant head injury (MRC CRASH trial): randomised placebo-controlled trial. Lancet. 2004;364(9442):1321-8.
52. Edwards P, Arango M, Balica L, Cottingham R, El-Sayed H, Farrell B, et al. Final results of MRC CRASH, a randomised placebo-controlled trial of intravenous corticosteroid in adults with head injury-outcomes at 6 months. Lancet. 2005;365(9475):1957-9.
53. Alderson P, Roberts I. Corticosteroids for acute traumatic brain injury. Cochrane Database Syst Rev. 2005;2005(1):Cd000196.
54. Vespa PM, Nuwer MR, Nenov V, Ronne-Engstrom E, Hovda DA, Bergsneider M, et al. Increased incidence and impact of nonconvulsive and convulsive seizures after traumatic brain injury as detected by continuous electroencephalographic monitoring. J Neurosurg. 1999;91(5):750-60.
55. Claassen J, Mayer SA, Kowalski RG, Emerson RG, Hirsch LJ. Detection of electrographic seizures with continuous EEG monitoring in critically ill patients. Neurology. 2004;62(10):1743-8.
56. Temkin NR, Dikmen SS, Wilensky AJ, Keihm J, Chabal S, Winn HR. A randomized, double-blind study of phenytoin for the prevention of post-traumatic seizures. N Engl J Med.

1990;323(8):497-502.
57. Thompson K, Pohlmann-Eden B, Campbell LA, Abel H. Pharmacological treatments for preventing epilepsy following traumatic head injury. Cochrane Database Syst Rev. 2015(8):Cd009900.
58. Inaba K, Menaker J, Branco BC, Gooch J, Okoye OT, Herrold J, et al. A prospective multicenter comparison of levetiracetam versus phenytoin for early posttraumatic seizure prophylaxis. J Trauma Acute Care Surg. 2013;74(3):766-71; discussion 71-3.
59. Jones KE, Puccio AM, Harshman KJ, Falcione B, Benedict N, Jankowitz BT, et al. Levetiracetam versus phenytoin for seizure prophylaxis in severe traumatic brain injury. Neurosurg Focus. 2008;25(4):E3.
60. Hernández-Palazón J, Tortosa JA, Martínez-Lage JF, Pérez-Ayala M. Rocuronium-induced neuromuscular blockade is affected by chronic phenytoin therapy. J Neurosurg Anesthesiol. 2001;13(2):79-82.
61. Heiderich S, Jürgens J, Rudolf D, Dennhardt N, Echtermeyer F, Leffler A, et al. Compatibility of common drugs with acetate-containing balanced electrolyte solutions in pediatric anesthesia. Paediatr Anaesth. 2016;26(6):590-8.
62. Zafar SN, Khan AA, Ghauri AA, Shamim MS. Phenytoin versus Leviteracetam for seizure prophylaxis after brain injury - a meta analysis. BMC Neurol. 2012;12:30.