

KARDİYOVASKÜLER CERRAHİ VE ANESTEZİ

21. BÖLÜM

Ümran KARACA¹

1.Giriş

Her yıl Avrupa'da yaklaşık 3,8 milyon, Avrupa Birliği'nde ise 1,8 milyon kişi kardiyovasküler hastalıklar nedeniyle ölmektedir(1). Ülkemizde ise Türkiye İstatistik Kurumu (TÜİK) 2018 yılının verilerine göre ölüm nedenleri içerisinde dolaşım sistemi hastalıkları nedeniyle gerçekleşen ölüm vakaları tüm ölümlerin %38,45'ini oluşturarak ilk sırada yer almıştır (2). Bu nedenle koroner arter bypass greftleme (KABG) cerrahisi erişkinlerde en sık yapılan kardiyak ameliyatı oluşturmaktadır (3). Kardiyovasküler cerrahi; KABG, kalp kapak tamiri ve replasmanı, aort cerrahisi, kalp nakli ve konjenital kalp defektlerinin cerrahi onarımı gibi cerrahileride kapsamaktadır. Tüm bu cerrahilerde, ölüm veya majör komplikasyon oranını anestezi uygulayan uzmanların tecrübesine göre belirgin şekilde değiştiği gözlemlenmiştir (4). Bu nedenle anestezik yaklaşımlar önem kazanmaktadır.

2.Preanestezik Değerlendirme

Kalp cerrahisi geçirecek hastaların preoperatif değerlendirilmesinin hedefi, cerrahi sırasında ve sonrasında mortalite ve morbitideyi etkileyen risk faktörleri saptayıp bu riskleri en aza indirmek için kişiye özel bakım planlarının geliştirilmesini sağlamaktır. Hastaların anestezi öncesinde ayrıntılı bir öykü alınması ve fizik muayene yapılması önemlidir. Periferik ve santral venöz kateterler için venöz erişim kolaylığı, invaziv arteriyel basınç izleme için periferik arter atımları, son dönem böbrek yetmezliği olan hastalarda fonksiyonel arteriyovenöz fistül varlığı, endotrakeal entübasyonu gerçekleştirmek için uygun ekipman ve

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10.Sonuç

Kardiyovasküler cerrahisi, mobidite ve mortalitesi yüksek olan pek çok parametrenin birlikte değerlendirilmesini gerektiren majör bir cerrahidir. Cerrahi sırasında manüplasyonlar sıklıkla sirkülatuar fonksiyonları bozduğundan; anestezi işlem sırasındaki tüm basamaklarını yakından takip etmek, her adımda bir sorun oluşabileceğini bilmek ve gerekli önlemleri almak durumundadır.

KAYNAKÇA

1. Wilkins E, L Wilson, Wickramasinghe K. European cardiovascular disease statistics 2017. researchportal.bath.ac.uk.
2. Türkiye sağlık bakanlığı sağlık istatistikleri yılı 2018.
3. Glance LG, Kellermann AL, Hannan EL, Fleisher LA, Eaton MP, Dutton RP, Lustik SJ, Li Y, Dick AW. The impact of anesthesiologists on coronary artery bypass graft surgery outcomes. *Anesth Analg.* 2015; 120: 526-33.
4. Barry AE, Chaney MA, London MJ. Anesthetic management during cardiopulmonary bypass: a systematic review. *Anesth Analg.* 2015; 120: 749- 69.
5. Nashef SA, Roques F, Sharples LD, et al. EuroSCORE II. *Eur J Cardiothorac Surg.* 2012; 41: 734- 44.
6. Ting PC, Wu VC, Liao CC, et al. Preoperative Right Ventricular Dysfunction Indicates High Vasoactive Support Needed After Cardiac Surgery. *J Cardiothorac Vasc Anesth.* 2019; 33: 686-93
7. Kennedy JL, LaPar DJ, Kern JA, et al. Does the Society of Thoracic Surgeons risk score accurately predict operative mortality for patients with pulmonary hypertension? *J Thorac Cardiovasc Surg.* 2013; 146: 631-7.
8. Aboyans V, Lacroix P. Indications for carotid screening in patients with coronary artery disease. *Presse Med.* 2009; 38: 977-86.
9. Dai L, Mick SL, McCrae KR, et al. Preoperative anemia in cardiac operation: does hemoglobin tell the whole story? *AnnThorac Surg.* 2018; 105: 100-7.
10. WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. 2011. Geneva (Switzerland): World Health Organization; 2014.
11. Rössler J, Schoenrath F, Seifert B, et al. Iron deficiency is associated with higher mortality in patients undergoing cardiac surgery: a prospective study. *Br J Anaesth* 2020; 124: 25.
12. Fowler AJ, Ahmad T, Phull MK, et al. Meta-analysis of the association between preoperative anaemia and mortality after surgery. *Br J Surg.* 2015;102:1314-24.
13. Hubert M, Gaudriot B, Biedermann S, et al. Impact of Preoperative Iron Deficiency on Blood Transfusion in Elective Cardiac Surgery. *J Cardiothorac Vasc Anesth.* 2019; 33: 2141- 50.
14. Cooper WA, O'Brien SM, Thourani VH, et al. Impact of renal dysfunction on outcomes of coronary artery bypass surgery: results from the Society of Thoracic Surgeons National Adult Cardiac Database. *Circulation* 2006; 113:1063- 73
15. Haga KK, McClymont KL, Clarke S, et al. The effect of tight glycaemic control, during and after cardiac surgery, on patient mortality and morbidity: a systematic review and meta-analysis. *J Cardiothorac Surg.* 2011;6:3.

16. Narayan P, Kshirsagar SN, Mandal CK, et al. Preoperative glycosylated hemoglobin: a risk factor for patients undergoing coronary artery bypass. *Ann Thorac Surg.* 2017;104: 606-12.
17. Carson JL, Scholz PM, Chen AY, et al. Diabetes mellitus increases shortterm mortality and morbidity in patients undergoing coronary artery bypass graft surgery. *J Am Coll Cardiol.* 2002; 40: 418-23.
18. Lomivorotov VV, Efremov SM, Abubakirov MN, et al. Perioperative Management of Cardiovascular Medications. *J Cardiothorac Vasc Anesth* 2018; 32:2289.
19. Sousa-Uva M, Head SJ, Milojevic M, et al. 2017 EACTS Guidelines on perioperative medication in adult cardiac surgery. *Eur J Cardiothorac Surg.* 2018; 53: 5-33.
20. Serkan Ertugay, Türkan Kudsioglu, Taner Şen. Consensus Report on Patient Blood Management in Cardiac Surgery by Turkish Society of Cardiovascular Surgery (TS-CVS), Turkish Society of Cardiology (TSC), and Society of Cardio-Vascular-Thoracic Anaesthesia and Intensive Care (SCTAIC) *Turkish Journal of Thoracic and Cardiovascular Surgery.* 2019; 27: 429-50.
21. Mittnacht A, London M, Kaplan JA. Anesthesia for myocardial revascularization. In: Kaplan JA, Reich DL, Savino JS, eds. *Kaplan's Cardiac Anesthesia. The Echo Era.* 6th ed, St. Louis, Missouri: Elsevier Saunders. 2011: 522-70.
22. Engelman R, Baker RA, Likosky DS, et al. The Society of Thoracic Surgeons, The Society of Cardiovascular Anesthesiologists, and The American Society of ExtraCorporeal Technology: Clinical Practice Guidelines for Cardiopulmonary Bypass--Temperature Management During Cardiopulmonary Bypass. *Ann Thorac Surg.* 2015; 100: 748-57.
23. American Society of Anesthesiologists and Society of Cardiovascular Anesthesiologists Task Force on Transesophageal Echocardiography. Practice guidelines for perioperative transesophageal echocardiography. An updated report by the American Society of Anesthesiologists and the Society of Cardiovascular Anesthesiologists Task Force on Transesophageal Echocardiography. *Anesthesiology* 2010; 112:1084 - 96.
24. Coisne A, Dreyfus J, Bohbot Y, et al. Transoesophageal echocardiography current practice in France: A multicentre study. *Arch Cardiovasc Dis.* 2018; 111: 730-38.
25. Kertai MD, Whitlock EL, Avidan MS. Brain monitoring with electroencephalography and the electroencephalogram-derived bispectral index during cardiac surgery. *Anesth Analg.* 2012; 114:533 -46.
26. Douds MT, Straub EJ, Kent AC, et al. A systematic review of cerebral oxygenation monitoring devices in cardiac surgery. *Perfusion* 2014;29:545-52.
27. Alexander D. Principles of cardiac anaesthesia. *Anaesthesia and Intensive Care Medicine* 2015; 16: 479-483.
28. Das S, Forrest K, Howell S. General anaesthesia in elderly patients with cardiovascular disorders: choice of anaesthetic agent. *Drugs Aging.* 2010; 27:265- 82.
29. Hemmerling TM, Russo G, Bracco D. Neuromuscular blockade in cardiac surgery: An update for clinicians. *Ann Card Anaesth* 2008; 11: 80-90.
30. Bonanni A, Signori A, Alicino C, et al. Volatile Anesthetics versus Propofol for Cardiac Surgery with Cardiopulmonary Bypass: Meta-analysis of Randomized Trials. *Anesthesiology* 2020; 132:1429-46.

31. Güldner A, Kiss T, Serpa Neto A, et al. Intraoperative protective mechanical ventilation for prevention of postoperative pulmonary complications: a comprehensive review of the role of tidal volume, positive end-expiratory pressure, and lung recruitment maneuvers. *Anesthesiology* 2015; 123: 692 - 713.
32. Wang YC, Huang CH, Tu YK. Effects of Positive Airway Pressure and Mechanical Ventilation of the Lungs During Cardiopulmonary Bypass on Pulmonary Adverse Events After Cardiac Surgery: A Systematic Review and Meta-Analysis. *J Cardiothorac Vasc Anesth* 2018; 32:748- 59
33. Jameel S, Colah S, Klein AA. Recent advances in cardiopulmonary bypass techniques. *Continuing Education in Anaesthesia, Critical Care & Pain* 2010; 10 (1): 20-23
34. Wahba A, Milojevic M, Boer C, et al. 2019 EACTS/EACTA/EBCP guidelines on cardiopulmonary bypass in adult cardiac surgery. *Eur J Cardiothorac Surg.* 2020; 57: 210.
35. Flobato RL, Despotis GJ, Levy JH, et al. Anticoagulation management during cardiopulmonary bypass: a survey of 54 North American institutions. *J Thorac Cardiovasc Surg* 2010; 139:1665 -66.
36. Finley A, Greenberg C. Review article: heparin sensitivity and resistance: management during cardiopulmonary bypass. *Anesth Analg* 2013; 116:1210 -22.
37. Leontyev S, Borger MA, Legare JF, et al. Iatrogenic type A aortic dissection during cardiac procedures: early and late outcome in 48 patients. *Eur J Cardiothorac Surg.* 2012; 41: 641-6.
38. Williams ML, Sheng S, Gammie JS. Aortic dissection as a complication of cardiac surgery: report from the Society of Thoracic Surgeons database. *Ann Thorac Surg .* 2010; 90: 1812-6.
39. Buckberg GD, Athanasuleas CL. Cardioplegia: solution or strategies? *Eur J Cardiothorac Surg* 2016; 50:787-91.
40. Plegisol US approved prescribing information available at US National Library of Medicine DailyMed website. <https://dailymed.nlm.nih.gov/dailymed/getFile.cfm?setid=35a174f0-f0d7-4ec7-3f81-d3d572c059cf&type=pdf&name>(Accessed on October 19, 2017)
41. Ad N, Holmes SD, Massimiano PS, et al. The use of del Nido cardioplegia in adult cardiac surgery: A prospective randomized trial. *J Thorac Cardiovasc Surg.* 2018; 155:1011- 18.
42. Li Y, Lin H, Zhao Y, et al. Del Nido cardioplegia for myocardial protection in adult cardiac surgery: a systematic review and meta-analysis. *Asaio J* 2018; 64: 360-7.
43. Thomassen SA, Leonaviciute D, Haahr PE, et al. Keep Ventilating the Lungs While the Heart is Still Ejecting on Femoro-femoral Cardiopulmonary Bypass. *J Cardiothorac Vasc Anesth.* 2018; 32:1848- 50.
44. Barry AE, Chaney MA, London MJ. Anesthetic management during cardiopulmonary bypass: a systematic review. *Anesth Analg.* 2015; 120:749 -69.
45. Hemmerling TM, Russo G, Bracco D. Neuromuscular blockade in cardiac surgery: An update for clinicians. *Ann Card Anaesth.* 2008; 11: 80-90.
46. Murphy GS, Hessel EA 2nd, Groom RC. Optimal perfusion during cardiopulmonary bypass: an evidence-based approach. *Anesth Analg.* 2009; 108:1394- 1417.
47. Heinrichs J, Lodewyckx C, Neilson C, et al. The impact of hyperoxia on outcomes after cardiac surgery: a systematic review and narrative synthesis. *Can J Anaesth.* 2018; 65: 923- 35.

48. Lonjaret L, Lairez O, Minville V, Geeraerts T. Optimal perioperative management of arterial blood pressure. *Integr Blood Press Control*. 2014; 12: 49-59.
49. Mailhot T, Cossette S, Lambert J, et al. Delirium After Cardiac Surgery and Cumulative Fluid Balance: A Case-Control Cohort Study. *J Cardiothorac Vasc Anesth*. 2019; 33:93 - 101.
50. Pagano D, Milojevic M, Meesters MI, et al. 2017 EACTS/EACTA Guidelines on patient blood management for adult cardiac surgery. *Eur J Cardiothorac Surg*. 2018; 53:79 -111.
51. Futier E, Garot M, Godet T, et al. Effect of Hydroxyethyl Starch vs Saline for Volume Replacement Therapy on Death or Postoperative Complications Among High-Risk Patients Undergoing Major Abdominal Surgery: The FLASH Randomized Clinical Trial. *JAMA*. 2020; 323: 225- 36.
52. Ng RR, Chew ST, Liu W, et al. Identification of modifiable risk factors for acute kidney injury after coronary artery bypass graft surgery in an Asian population. *J Thorac Cardiovasc Surg*. 2014; 147:1356 - 61.
53. Engelman R, Baker RA, Likosky DS, et al. The Society of Thoracic Surgeons, The Society of Cardiovascular Anesthesiologists, and The American Society of ExtraCorporeal Technology: Clinical Practice Guidelines for Cardiopulmonary Bypass--Temperature Management during Cardiopulmonary Bypass. *J Extra Corpor Technol*. 2015; 47:145- 57.
54. Mehta A, Choxi R, Gleason T, et al. Carotid Artery Disease as a Predictor of In-Hospital Postoperative Stroke After Coronary Artery Bypass Grafting From 1999 to 2011. *J Cardiothorac Vasc Anesth* 2018; 32:1587- 96.
55. Praeger PI, Kay RH, Moggio R, et al. Prevention of ventricular fibrillation after aortic declamping during cardiac surgery. *Tex Heart Inst J*. 1988; 15:98- 101.
56. Welsby IJ, Newman MF, Phillips-Bute B, et al. Hemodynamic changes after protamine administration: association with mortality after coronary artery bypass surgery. *Anesthesiology*. 2005; 102: 308- 14.
57. Koster A, Faraoni D, Levy JH. Argatroban and bivalirudin for perioperative anticoagulation in cardiac surgery. *Anesthesiology*. 2018; 128: 390-400.
58. Fierro MA, Daneshmand MA, Bartz RR. Perioperative Management of the Adult Patient on Venovenous Extracorporeal Membrane Oxygenation Requiring Noncardiac Surgery. *Anesthesiology*. 2018; 128: 181 - 201.
59. Aldea GS, Bakaeen FG, Pal J, et al. The Society of Thoracic Surgeons Clinical Practice Guidelines on Arterial Conduits for Coronary Artery Bypass Grafting. *Ann Thorac Surg*. 2016; 101:801-9.
60. Kirmani BH, Holmes MV, Muir AD. Long-Term Survival and Freedom From Reintervention After Off-Pump Coronary Artery Bypass Grafting: A Propensity-Matched Study. *Circulation*. 2016; 134:1209-20.
61. Bianco V, Kilic A, Gelzinis T, et al. Off-Pump Coronary Artery Bypass Grafting: Closing the Communication Gap Across the Ether Screen. *J Cardiothorac Vasc Anesth* 2020; 34:258.
62. Guarracino F, Baldassari R (2012). *Anesthesia in minimally invasive cardiac surgery*. Inderbitzi RGC, Schmid RA, Melfi FMA, Casula, RP(ed). *Minimally Invasive Cardiac and Thoracic Surgery* (s.384-98). Berlin Heidelberg.Springer Verlag.

63. Caputo M, Alwair H, Rogers CA, et al. Thoracic epidural anesthesia improves early outcomes in patients undergoing off-pump coronary artery bypass surgery: A prospective, randomized, controlled trial. *Anesthesiology*. 2011; 114: 380-90.
64. Watanabe G, Tomita S, Yamaguchi S, et al. Awake coronary artery bypass grafting under thoracic epidural anesthesia: Great impact on off-pump coronary revascularization and fast-track recovery. *Eur J Cardiothorac Surg*. 2011; 40: 788-93.
65. Lung B, Baron G, Butchart EG, et al. A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. *Eur Heart J* 2003; 24:1231 -43.
66. Nishimura RA, Otto CM, Bonow RO, et al. 2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2017; 70: 1159- 95.
67. Nkomo VT, Gardin JM, Skelton TN, et al. Burden of valvular heart diseases: a population-based study. *Lancet*. 2006; 368: 1005 -11.
68. Nath J, Foster E, Heidenreich PA. Impact of tricuspid regurgitation on long-term survival. *J Am Coll Cardiol*. 2004; 43: 405- 9.