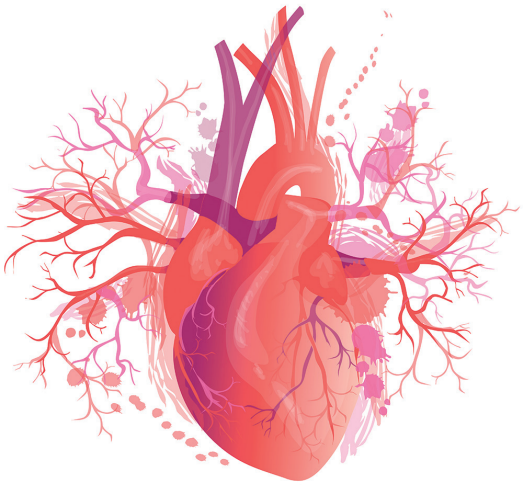

BÖLÜM 41

KALP YARALANMALARI

Orhan KARAYİĞİT[1]

GİRİŞ

Travmatik kardiyak yaralanmalar, yaralanma mekanizmasına göre künt veya penetran olarak sınıflandırılır. Ölümcül yaralanmaları olan hastaların %90'ı bir hastaneye gelmeden önce hayatını kaybetmektedir. Hastaneye ulaşanların hayatta kalma oranının %20-%75 arasında olduğu tahmin edilmektedir (1).

KÜNT KARDİYAK YARALANMALAR

Künt kalp hasarı (KKH), klinik olarak sessiz aritmilerden ölümcül kalp duvarı rüptürüne kadar geniş bir klinik yelpazesi olan bir hastalıktır. Sıklıkla torasik travma ile ilişkili olsa da, multisistem travması olan herhangi bir hastada ortaya çıkabilir. Kabul edilen bir altın standart tanı testi olmaması sebebiyle, künt göğüs travmasını takiben bildirilen KKH insidansı %8 ile %76 oranında değişmektedir (2).

Epidemiyoloji ve Etiyoloji

Künt göğüs travması çok çeşitli kalp yaralanmalarına neden olabileceğinden, klinik olarak KKH tercih edilen tanı terimidir (2). Tanı konan KKH'lar arasında "kardiyak kontüzyon" en yaygın olanıdır. KKH'lar, spesifik yaralanmalar (örneğin; septal rüptür, miyokard infarktüsü) ve kardiyak işlev bozukluğu (örneğin; aritmi) olarak daha ayrıntılı tanımlanabilir (3).

Acil tıpta yaygın olarak kullanılmamasına rağmen, Amerikan Travma Cerrahisi Derneği tarafından geliştirilen kardiyak yaralanma ölçeğinin kullanımı kolaydır, hem künt hem de penetran kalp yaralanmaları için geçerlidir ve standart bir şema sağlar (4).

Künt kalp yaralanması en sık motorlu araç çarpışmalarından (%50) sonra meydana gelir ve tüm motorlu araç çarpışma ölümlerinin %20'si künt göğüs travmasını içerir (2). Düşme ve ezilme yaralanmaları daha az görülür.

Yaralanma Anatomisi ve Mekanizması

KKH'a yol açan travma mekanizmaları aşağıdaki gibidir (5,6):

a. Direksiyon darbesi gibi göğüse doğrudan travma. Ventriküllerin maksimum distansiyonda olduğu diyastol sonunda yaralanma olasılığı yüksektir.

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herhangi bir lezyonu veya yaşamı tehdit eden durumu hızlı bir şekilde belirlemek ve tedaviyi başlatmak, KKH riski taşıyan hastaları belirlemek ve uygun konsültasyon ve testleri başlatmaktır. Hızlı nakil ve değerlendirme, hızlı operatif müdahale ile birleştiğinde en uygun sonuçları verir.

KAYNAKLAR

1. Warrington SJ, Mahajan K. Cardiac Trauma. 2021 Jul 19. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan–.
2. Singh S, Heard M, Pester JM, et al. Blunt Cardiac Injury. 2021 Sep 20. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan–.
3. Skinner DL, Laing GL, Rodseth RN, et al. Blunt cardiac injury in critically ill trauma patients: a single centre experience. Injury. 2015 Jan;46(1):66-70.
4. Moore EE, Malangoni MA, Cogbill TH, et al. Organ injury scaling. IV: Thoracic vascular, lung, cardiac, and diaphragm. J Trauma 1994; 36:299.
5. Shoar S, Hosseini FS, Naderan M, et al. Cardiac injury following blunt chest trauma: diagnosis, management, and uncertainty. Int J Burns Trauma. 2021 Apr 15;11(2):80-89.
6. Parmley LF, Manion WC, Mattingly TW. Nonpenetrating traumatic injury of the heart. Circulation 1958; 18: 371-396.
7. Mandavia DP, Hoffner RJ, Mahaney K, et al. Bedside echocardiography by emergency physicians. Ann Emerg Med 2001; 38:377.
8. Leavitt BJ, Meyer JA, Morton JR, et al. Survival following nonpenetrating traumatic rupture of cardiac chambers. Ann Thorac Surg 1987; 44:532.
9. El-Chami MF, Nicholson W, Helmy T. Blunt cardiac trauma. J Emerg Med 2008; 35(2):127–33.
10. Namai A, Sakurai M, Fujiwara H. Five cases of blunt traumatic cardiac rupture: success and failure in surgical management. Gen Thorac Cardiovasc Surg 2007; 55:200.
11. De Maria E, Gaddi O, Navazio A, et al. Right atrial free wall rupture after blunt chest trauma. J Cardiovasc Med (Hagerstown) 2007; 8:946.
12. Molardi A, Nicolini F, Spaggiari I, et al. Late interventricular septal defect after blunt chest trauma: a case report and a review of the literature. Acta Biomed 2013;84(1):69–71.
13. Getz BS, Davies E, Steinberg SM, et al. Blunt cardiac trauma resulting in right atrial rupture. JAMA 1986;255:761–3.
14. Evora P, Ribeiro P, Brasil J, et al. Late surgical repair of ventricular septal defect due to nonpenetrating chest trauma: review and report of two contrasting cases. J Trauma 1985;25:1007–9.
15. Varahan SL, Farah GM, Caldeira CC, et al. The double jeopardy of blunt chest trauma: a case report and review. Echocardiography 2006;23(3):235–9.
16. Marcolini EG, Keegan J. Blunt Cardiac Injury. Emerg Med Clin North Am. 2015 Aug;33(3):519-27.
17. Patel R, Samaha FF. Right coronary artery occlusion caused by blunt trauma. J Invasive Cardiol 2000; 12:376.
18. Tenzer ML. The spectrum of myocardial contusion: a review. J Trauma 1985;25:620–7.
19. Bansal M, Maraj S, Chewaproug D, et al. Myocardial contusion injury: redefining the diagnostic algorithm. Emerg Med J 2005;22(7):465–9.
20. Lindstaedt M, Germing A, Lawo T, et al. Acute and long-term clinical significance of myocardial contusion following blunt thoracic trauma: results of a prospective study. J Trauma 2002;52:479–85.
21. Fulda G, Brathwaite CE, Rodriguez A, et al. Blunt traumatic rupture of the heart and pericardium: a ten-year experience (1979-1989). J Trauma 1991; 31:167.
22. Schultz JM, Trunkey DD. Blunt cardiac injury. Crit Care Clin 2004;20(1):57–70.
23. Rashid MA, Ortenwall P, Wikström T. Cardiovascular injuries associated with sternal fractures. Eur J Surg 2001; 167:243.
24. Dua A, McMaster J, Desai PJ, et al. The Association between Blunt Cardiac Injury and Isolated Sternal Fracture. Cardiol Res Pract 2014; 2014:629687.
25. Perez MR, Rodriguez RM, Baumann BM, et al. Sternal fracture in the age of pan-scan. Injury 2015; 46:1324.
26. Wall MJ Jr, Mattox KL, Wolf DA. The cardiac pendulum: blunt rupture of the pericardium with strangulation of the heart. J Trauma. 2005 Jul;59(1):136-41; discussion 141-2.
27. Maron BJ, Doerer JJ, Haas TS, et al. Sudden deaths in young competitive athletes: analysis of 1866 deaths in the United States, 1980-2006. Circulation 2009;119:1085–92.
28. 28. Maron BJ, Gohman BA, Kyle SB, et al. Clinical profile and spectrum of commotio cordis. JAMA 2002; 287:1142–6.

29. Link MS, Wang PJ, VanderBrink BA, et al. Selective activation of the K1 ATP channel is a mechanism by which sudden death is produced by low energy chest wall impact (commotio cordis). Circulation 1999;100:413–8.
30. Garan AR, Maron BJ, Wang PJ, et al. Role of streptomycin-sensitive stretch activated channel in chest wall impact induced sudden death (commotio cordis). J Cardiovasc Electrophysiol 2005;16:433–8.
31. Milligan J, Potts JE, Human DG, et al. The protean manifestations of blunt cardiac trauma in children. Pediatr Emerg Care 2005; 21:312.
32. Sybrandy KC, Cramer MJ, Burgersdijk C. Diagnosing cardiac contusion: old wisdom and new insights. Heart 2003; 89:485.
33. Velmahos GC, Karaiskakis M, Salim A, et al. Normal electrocardiography and serum troponin I levels preclude the presence of clinically significant blunt cardiac injury. J Trauma 2003; 54:45.
34. Nagy KK, Krosner SM, Roberts RR, et al. Determining which patients require evaluation for blunt cardiac injury following blunt chest trauma. World J Surg 2001; 25:108.
35. Karalis DG, Victor MF, Davis GA, et al. The role of echocardiography in blunt chest trauma: a transthoracic and transesophageal echocardiographic study. J Trauma 1994;36(1):53–8.
36. Chirillo F, Totis O, Cavarzerani A, et al. Usefulness of transthoracic and transoesophageal echocardiography in recognition and management of cardiovascular injuries after blunt chest trauma. Heart 1996; 75:301.
37. Collins JN, Cole FJ, Weireter LJ, et al. The usefulness of serum troponin levels in evaluating cardiac injury. Am Surg 2001; 67:821.
38. Jackson L, Stewart A. Best evidence topic report. Use of troponin for the diagnosis of myocardial contusion after blunt chest trauma. Emerg Med J 2005; 22:193.
39. Rajan GP, Zellweger R. Cardiac troponin I as a predictor of arrhythmia and ventricular dysfunction in trauma patients with myocardial contusion. J Trauma 2004; 57:801.
40. Biffl WL, Moore FA, Moore EE, et al. Cardiac enzymes are irrelevant in the patient with suspected myocardial contusion. Am J Surg 1994; 168:523.
41. Martin M, Mullenix P, Rhee P, et al. Troponin increases in the critically injured patient: mechanical trauma or physiologic stress? J Trauma 2005; 59:1086.
42. Sade R, Kantarci M, Ogul H, et al. The Feasibility of Dual-Energy Computed Tomography in Cardiac Contusion Imaging for Mildest Blunt Cardiac Injury. J Comput Assist Tomogr 2017; 41:354.
43. Burrell AJ, Kaye DM, Fitzgerald MC, et al. Cardiac magnetic resonance imaging in suspected blunt cardiac injury: A prospective, pilot, cohort study. Injury 2017; 48:1013.
44. Wilke A, Kruse T, Hesse H, et al. Papillary muscle injury after blunt chest trauma. J Trauma 1997; 43:360.
45. Schwaitzberg SD, Khalil KG. Isolated traumatic aortic valvular insufficiency with rapid pulmonary deterioration. Report of two cases. Arch Surg 1985; 120:971.
46. Genoni M, Jenni R, Turina M. Traumatic ventricular septal defect. Heart 1997;78:316–8.
47. Ishida K, Kinoshita Y, Iwasa N, et al. Emergency room thoracotomy for acute traumatic cardiac tamponade caused by a blunt cardiac injury: A case report. Int J Surg Case Rep 2017; 35:21.
48. Tanizaki S, Nishida S, Maeda S, et al. Non-surgical management in hemodynamically unstable blunt traumatic pericardial effusion: a feasible option for treatment. Am J Emerg Med 2018; 36: 1655-1658.
49. Foussas SG, Athanasopoulos GD, Cokkinos DV. Myocardial infarction caused by blunt chest injury: possible mechanisms involved--case reports. Angiology 1989; 40:313.
50. Dahle TG, Berger A, Tuna N, et al. Coronary artery stenting for acute myocardial infarction secondary to mild, blunt chest trauma in a soccer player. J Invasive Cardiol 2005; 17:163.
51. Thorban S, Ungeheuer A, Blasini R, et al. Emergent interventional transcatheter revascularization in acute right coronary artery dissection after blunt chest trauma. J Trauma 1997; 43:365.
52. Ledley GS, Yazdanfar S, Friedman O, et al. Acute thrombotic coronary occlusion secondary to chest trauma treated with intracoronary thrombolysis. Am Heart J 1992; 123:518.
53. Clancy K, Velopulos C, Bilaniuk JW, et al. Screening for blunt cardiac injury: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg 2012; 73:S301.
54. Lazaros GA, Ralli DG, Moundaki VS, et al. Delayed development of complete heart block after a blunt chest trauma. Injury 2004;35(12):1300–2.

55. Rosenfeld EH, Lau P, Shah SR, et al. Sternal fractures in children: An analysis of the National Trauma Data Bank. J Pediatr Surg 2019; 54:980.
56. Campbell NC, Thomson SR, Muckart DJ, et al. Review of 1198 cases of penetrating cardiac trauma. Br J Surg. 1997 Dec;84(12):1737-40.
57. Thourani VH, Feliciano DV, Cooper WA, et al. Penetrating cardiac trauma at an urban trauma center: a 22-year perspective. Am Surg. 1999 Sep;65(9):811-6; discussion 817-8.
58. Goldstein AL, Soffer D. Trauma to the heart: A review of presentation, diagnosis, and treatment. J Trauma Acute Care Surg 2017; 83:911.
59. Mandal AK, Sanusi M. Penetrating chest wounds: 24 years experience. World J Surg 2001; 25:1145.
60. Tyburski JG, Astra L, Wilson RF, et al. [2000] Factors affecting prognosis with penetrating wounds of the heart. J Trauma 48[4]: 587-90; discussion 590-1
61. Rodrigues AJ, Furlanetti LL, Faidiga GB, et al. [2005] Penetrating cardiac injuries: a 13 year retrospective evaluation from a Brazilian trauma center. European Assoc of Cardio-Thoracic Surgery
62. Šimek M, Konečný J, Hájek R, et al. Penetrating Injuries of the Heart and Great Vessels - Fifteen Years of Experience of the Cardiac Surgery Service as a Part of the Major Trauma Centre. Acta Chir Orthop Traumatol Cech. 2018;85(2):144-148.
63. Gunay C, Cingoz F, Kuralay E, et al. Surgical challenges for urgent approach in penetrating heart injuries. Heart Surg Forum 2007; 10:E473.
64. Asensio JA, Berne JD, Demetriades D, et al. One hundred five penetrating cardiac injuries: a 2-year prospective evaluation. J Trauma 1998; 44:1073.
65. Wall MJ Jr, Mattox KL, Chen CD, et al. Acute management of complex cardiac injuries. J Trauma. 1997 May;42(5):905-12.
66. Eckstein, M, Henderson, SO. Thoracic Trauma. In: Rosen's Emergency Medicine, 7th ed, Marx, JA, Hockberger, RS, Walls, RM (Eds), Mosby Elsevier, Philadelphia 2010. Vol I, p.387.
67. Brown J, Grover FL. Trauma to the heart. Chest Surg Clin N Am. 1997 May;7(2):325-41.
68. Nicol AJ, Navsaria PH, Hommes M, et al. Sternotomy or drainage for a hemopericardium after penetrating trauma: a randomized controlled trial. Ann Surg 2014; 259:438.
69. Degiannis E, Bowley DM, Westaby S. Penetrating cardiac injury. Ann R Coll Surg 87, 2005.
70. Macho JR, Markison RE, Schecter WP. Cardiac stapling in the management of penetrating injuries of the heart: rapid control of haemorrhage and decreased risk of personal contamination. J Trauma 1993; 34: 711-5.
71. Mayrose J, Jehle DV, Moscati R, et al. Comparison of Staples versus Sutures in the Repair of Penetrating Cardiac Wounds. J Trauma 46[3]; 441-443, 1999.
72. Asensio, Juan A. Penetrating Cardiac Injuries: A Complex challenge. Surg Today 31:1041-1053, 2001.
73. Bowley DM, Saeed M, Somwe D, et al. Off-pump cardiac revascularization after a complex stab wound. Ann Thorac Surg 74[6]: 2192-3, 2002.