CHAPTER 6

ABDOMINAL AORTIC PATHOLOGY SURGERY

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INTRODUCTION

Abdominal aortic aneurysm (AAA) is defined as an enlargement of 50% or more of the anteroposterior diameter of the aorta anywhere in the subdiaphragmatic aorta (1). It is usually diagnosed incidentally by radiological imaging methods, and it progresses asymptomatically. It is a life-threatening condition that requires treatment planning depending on the clinical course and size of the aneurysm. Early diagnosis and treatment of abdominal aortic aneurysms are of great importance for patient prognosis. There are significant differences in mortality and morbidity between elective cases and cases with rupture.

AAA causes 1.3% of all deaths in the male sex aged 65-85 years in developed countries (2). Abdominal aortic aneurysms become more common around the age of 60, peaking in the seventh and eighth decades of life. The risk of abdominal aortic aneurysms is higher among white men (3). The incidence of FMF was found to be 4.3% in men and 2.1% in women, and it has been shown that these rates increase with age. The prevalence in 50-year-old men was found to be 2.6%, and it was determined that smoking increased the development of

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collateral circulation between the inferior mesenteric artery (IMA) and Superior mesenteric artery. In ruptured cases, ischemia may develop in the left colon, especially in the occlusion of the inferior mesenteric artery. If possible, the IMA should be revascularized during surgery (30).

Graft Infection: Graft infections are still frequently seen despite precautions such as antibiotic prophylaxis, sterilization measures, and operative approaches. In case of detection of gerft infection, the entire graft should be removed as infected. Extraanatomical bypass may be preferred for revascularization (31).

Aortoenteric Fistula: Fistulas between the gastrointestinal tract and aorta are a fatal complication of aneurysm surgery. Patients usually present with complaints of gastrointestinal bleeding. Fistula occurs due to the contact between the graft and the gastrointestinal tract (32).

RESULTS

Dubost et al. although AAA open surgery, which was first described by AAA in 1952, has left its place to endovascular treatments in appropriate cases, it is still shown as the gold standard approach (33). The early and long-term mortality rates of elective open surgical aneurysm repair range from 1.1% to 7%. Due to the increased experience in endovascular interventions, the 30-day mortality rate has been shown to be 1.6% (34). Due to the increase in the number of centers performing EVAR and its easier applicability, surgeons have preferred endovascular treatment more. In addition, the equivalence of short-term and long-term results of EVAR therapy in patients with AAA has made it the primary choice.

REFERENCES

1. Kent KC. Clinical practice. Abdominal aortic aneurysms. N Engl J Med. 2014 Nov 27;371(22):2101-8.
2. Sakalihasan N, Limet R., Defawe OD. Abdominal aortic aneurysm. Lancet. 2005 Apr 30-May 6;365(9470):1577-89.
3. Zommorodi S, Leander K, Roy J, Steuer J, Hultgren R. Understanding abdominal aortic aneurysm epidemiology: socioeconomic position affects outcome. J Epidemiol Community Health. 2018 Oct;72(10):904-10.
4. Fattahi N, Rosenblad A, Kragsterman B, Hultgren R. Risk factors in 50-year-old men predicting development of abdominal aortic aneurysm. J Vasc Surg. 2020 Oct;72(4):1337-1346.e1. doi: 10.1016/j.jvs.2019.11.062. Epub 2020 Feb 27.

5. Sweeting MJ, Thompson SG, Brown LC, Powell JT.; RESCAN collaborators. Meta-analysis of individual patient data to examine factors affecting growth and rupture of small abdominal aortic aneurysms. Br J Surg. 2012 May;99(5):655-65.
6. Shaw PM, Loree J, Gibbons RC. Abdominal Aortic Aneurysm. 2021 Jan 3. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan–. PMID: 29262134.
7. Powell JT, Sweeting MJ, Brown, LC, Gotensparre SM, Fowkes FG, Thompson SG. Systematic review and meta-analysis of growth rates of small abdominal aortic aneurysms. Br J Surg. 2011 May;98(5):609-18.
8. Eliason JL, Hannawa KK, Ailawadi G, Sinha I, Ford JW, Deogracias MP, et al. Neutrophil depletion inhibits experimental abdominal aortic aneurysm formation. Circulation. 2005 Jul 12;112(2):232-40.
9. Busuttil RW, Rinderbriecht H, Flesher A, Carmack C. Elastase activity: the role of elastase in aortic aneurysm formation. J Surg Res. 1982 Mar;32(3):214-7.
10. Xu C, Zarins CK, Glagov S. Aneurysmal and occlusive atherosclerosis of the human abdominal aorta. J Vasc Surg. 2001 Jan;33(1):91-6.
11. Matsumoto T. Anatomy and Physiology for the Abdominal Aortic Aneurysm Repair. Ann Vasc Dis. 2019 Sep 25;12(3):329-33.
12. AboyansV, Ricco JB, Bartelink MEL, Björck M, Brodmann M, Cohnert T, et al. Editor's Choice - 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). Eur J Vasc Endovasc Surg 2018;55:305-68.
13. Schmitz-Rixen T, Keese M, Hakimi M, Peters A, Böckler D, Nelson K, et al. Ruptured abdominal aortic aneurysm-epidemiology, predisposing factors, and biology. Langenbecks Arch Surg 2016;401:275-88.
14. National Institute for Health and Care Excellence. Abdominal aortic aneurysm: diagnosis and management. NICE guideline NG156. Available at: https://www.nice.org.uk/guidance/NG156. [Accessed: March 20, 2020].
15. RESCAN Collaborators, Bown MJ, Sweeting MJ, Brown LC, Powell JT, Thompson SG. Surveillance intervals for small abdominal aortic aneurysms: a meta-analysis. JAMA 2013;309:806-13.
16. Soden PA, Zettervall SL, Ultee KH, Darling JD, Buck DB, Hile CN, et al. Outcomes for symptomatic abdominal aortic aneurysms in the American College of Surgeons National Surgical Quality Improvement Program. J Vasc Surg 2016;64:297-305.
17. Ten Bosch JA, Koning SW, Willigendael EM, Van Sambeek MR, Stokmans RA, Prins MH, et al. Symptomatic abdominal aortic aneurysm repair: to wait or not to wait. J Cardiovasc Surg (Torino) 2016;57:830-8.
18. Sicard GA, Reilly JM, Rubin BG, Thompson RW, Allen BT, Flye MW, et al. Transabdominal versus retroperitoneal incision for abdominal aortic surgery: report of a prospective randomized trial. J Vasc Surg. 1995 Feb;21(2):174-81; discussion 181-3.
19. Mei F, Hu K, Zhao B, Gao Q, Chen F, Zhao L, et al. Retroperitoneal versus transperitoneal approach for elective open abdominal aortic aneurysm repair. Cochrane Database Syst Rev. 2021 Jun 21;6(6):CD010373.

20. Borkon MJ, Zaydfudim V, Carey CD, Brophy CM, Guzman RJ, Dattilo JB. Retroperitoneal repair of abdominal aortic aneurysms offers postoperative benefits to male patients in the Veterans Affairs Health System. Ann Vasc Surg. 2010 Aug;24(6):728-32.
21. Ma B, Wang YN, Chen KY, Zhang Y, Pan H, Yang K. Transperitoneal versus retroperitoneal approach for elective open abdominal aortic aneurysm repair. Cochrane Database System Rev. 2016 Feb 5;2:CD010373.
22. Mehta T, Wade RG, Clarke JM. Is it safe to ligate the left renal vein during open abdominal aortic aneurysm repair? Ann Vasc Surg. 2010 Aug;24(6):758-61
23. Edward YW, Scott MD. (2014). Abdominal Aortic Aneurysms: Open Surgical Treatment, Cronenwett, J.L., Johnston, K.W, Rutherford's Vascular Surgery, (Section 21,8nd ed. ,pp.2024-2045). Philadelphia: Elsevier Saunders.
24. Ourel K, Rutherford RB. Atlas Of Vascular Surgery. Operative Procedures. Philadelphia. 1998.p.111-119
25. Gelman S. The pathophysiology of aortic cross-clamping and unclamping. Anesthesiology. 1995 Apr;82(4):1026-60.
26. Hans SS, Vang S, Sachwani-Daswani G. Iatrogenic Major Venous Injury Is Associated with Increased Morbidity of Aortic Reconstruction. Ann Vasc Surg. 2018 Feb;47:200-4.
27. Wolpert LM, Dittrich KP, Hallisey MJ, Allmendinger PP, Gallagher JJ, Heydt K, et al. Hypogastric artery embolization in endovascular abdominal aortic aneurysm repair. J Vasc Surg. 2001 Jun;33(6):1193-8.
28. Drazic OD, Zárate CF, Valdés JF, Krämer AH, Bergoeing MP, Mariné LA, et al. Juxtarenal Abdominal Aortic Aneurysm: Results of Open Surgery in an Academic Center. Ann Vasc Surg. 2020 Jul;66:28-34.
29. Awad H, Tili E, Nuovo G, Kelani H, Ramadan ME, Williams J, et al. Endovascular repair and open repair surgery of thoraco-abdominal aortic aneurysms cause drastically different types of spinal cord injury. Sci Rep. 2021 Apr 9;11(1):7834.
30. Cheng W, Chen Z, Tang XB, Wu ZM, Liu H, Kou L, et al. Clinical analysis of perioperative gastrointestinal complications after endovascular and open repair of abdominal aortic aneurysm. Zhonghua Wai Ke Za Zhi. 2019 Aug 1;57(8):591-95.
31. Schaefers JF, Donas KP, Panuccio G, Kasprzak B, Heine B, Torsello GB, et al. Outcomes of Surgical Explantation of Infected Aortic Grafts After Endovascular and Open Abdominal Aneurysm Repair. Eur J Vasc Endovasc Surg. 2019 Jan;57(1):130-36.
32. Shitara K, Wada R. Gastrointestinal bleeding after aortic surgery: a case report. Cases J. 2009 Nov 23;2:9074.
33. Fortner G, Johansen K. Abdominal aortic aneurysms. WestJ Med. 1984 Jan;140 (1):50-9.
34. Schermerhorn ML, Giles KA, Sachs T, Bensley RP, O'Malley AJ, Cotterill P, et al. Defining perioperative mortality after open and endovascular aortic aneurysm repair in the US Medicare population. J Am Coll Surg. 2011 Mar;212(3):349-55.