Chapter 6

INFECTIVE ENDOCARDITIS

Cemal KOCAASLAN¹

Introduction

Infective endocarditis(IE) is the infection of the endocardial surface of the heart; it usually introduces with infection of one or more heart valves or infection of an intracardiac device. The real incidence of IE is difficult to ascertain because disease definitions have varied over time between clinical centers (1). In addition, the incidence of predisposing conditions such as rheumatic heart disease or injection drug use is variable over time and lastly there is highly variation between regions and in low- and high-income countries (2).

Risk Factors

There is a number of factors predispose to the development of IE and can be group as patient factors and comorbid conditions.

Patient factors

Age >60 years

More than half of all IE cases occur in patients over the age of 60 and the median age has increased regularly during the past 40 years (3,4-6). This increasing is probably depending on decline in the incidence of rheumatic heart disease and the increasing proportion of older adult individuals in the whole population. Older adults are more likely to have degenerative valve disease and so, more likely need for valve replacement.

Poor Dentition Or Dental Infection

Poor dentition and/or dental infection are supposed to be risk factors for IE due to oral flora (7,8). Dental procedures involving the manipulation of gingival tissue or the periapical region of the teeth or perforation of the oral mucosa can increase risk for IE, otherwise only routine dental cleaning is not a risk. Antimicrobial prophylaxis of IE is recommended for patients undergoing invasive dental procedures with having underlying structural heart disease or prosthetic heart valve.

¹Istanbul Medeniyet University, Göztepe Training and Research Hospital, Istanbul, Turkey

Cardiovascular Surgery

References

- Tleyjeh IM, Abdel-Latif A, Rahbi H, et al. A systematic review of population-based studies of infective endocarditis. Chest 2007; 132:1025.
- 2. Ambrosioni J, Hernandez-Meneses M, Téllez A, et al. The Changing Epidemiology of Infective Endocarditis in the Twenty-First Century. Curr Infect Dis Rep 2017; 19:21.
- 3. Hill EE, Herijgers P, Claus P, et al. Infective endocarditis: changing epidemiology and predictors of 6-month mortality: a prospective cohort study. Eur Heart J 2007; 28:196.
- 4. Cantrell M, Yoshikawa TT. Infective endocarditis in the aging patient. Gerontology 1984; 30:316.
- Durante-Mangoni E, Bradley S, Selton-Suty C, et al. Current features of infective endocarditis in elderly patients: results of the International Collaboration on Endocarditis Prospective Cohort Study. Arch Intern Med 2008; 168:2095.
- Castillo FJ, Anguita M, Castillo JC, et al. Changes in Clinical Profile, Epidemiology and Prognosis of Left-sided Native-valve Infective Endocarditis Without Predisposing Heart Conditions. Rev Esp Cardiol (Engl Ed) 2015; 68:445.
- 7. Lockhart PB, Brennan MT, Thornhill M, et al. Poor oral hygiene as a risk factor for infective endocarditis-related bacteremia. J Am Dent Assoc 2009; 140:1238.
- 8. Chen SJ, Liu CJ, Chao TF, et al. Dental scaling and risk reduction in infective endocarditis: a nationwide population-based case-control study. Can J Cardiol 2013; 29:429.
- 9. Griffin MR, Wilson WR, Edwards WD, et al. Infective endocarditis. Olmsted County, Minnesota, 1950 through 1981. JAMA 1985; 254:1199.
- 10. McKinsey DS, Ratts TE, Bisno AL. Underlying cardiac lesions in adults with infective endocarditis. The changing spectrum. Am J Med 1987; 82:681.
- 11. Gersony WM, Hayes CJ, Driscoll DJ, et al. Bacterial endocarditis in patients with aortic stenosis, pulmonary stenosis, or ventricular septal defect. Circulation 1993; 87:I121.
- 12. Carrel T, Schaffner A, Vogt P, et al. Endocarditis in intravenous drug addicts and HIV infected patients: possibilities and limitations of surgical treatment. J Heart Valve Dis 1993; 2:140.
- 13. Berlin JA, Abrutyn E, Strom BL, et al. Incidence of infective endocarditis in the Delaware Valley, 1988-1990. Am J Cardiol 1995; 76:933.
- 14. Martín-Dávila P, Fortún J, Navas E, et al. Nosocomial endocarditis in a tertiary hospital: an increasing trend in native valve cases. Chest 2005; 128:772.
- 15. Finkelstein R, Sobel JD, Nagler A, Merzbach D. Staphylococcus aureus bacteremia and endocarditis: comparison of nosocomial and community-acquired infection. J Med 1984; 15:193.
- 16. Martino P, Micozzi A, Venditti M, et al. Catheter-related right-sided endocarditis in bone marrow transplant recipients. Rev Infect Dis 1990; 12:250.
- 17. Morpeth S, Murdoch D, Cabell CH, et al. Non-HACEK gram-negative bacillus endocarditis. Ann Intern Med 2007; 147:829.
- 18. Fernández-Hidalgo N, Almirante B, Tornos P, et al. Contemporary epidemiology and prognosis of health care-associated infective endocarditis. Clin Infect Dis 2008; 47:1287.
- 19. Nucifora G, Badano LP, Viale P, et al. Infective endocarditis in chronic haemodialysis patients: an increasing clinical challenge. Eur Heart J 2007; 28:2307.
- 20. Robinson DL, Fowler VG, Sexton DJ, et al. Bacterial endocarditis in hemodialysis patients. Am J Kidney Dis 1997; 30:521.
- 21. Abbott KC, Agodoa LY. Hospitalizations for bacterial endocarditis after initiation of chronic dialysis in the United States. Nephron 2002; 91:203.
- Nahass RG, Weinstein MP, Bartels J, Gocke DJ. Infective endocarditis in intravenous drug users: a comparison of human immunodeficiency virus type 1-negative and -positive patients. J Infect Dis 1990; 162:967.
- 23. Bestetti RB, Figueiredo JF, Da Costa JC. Salmonella tricuspid endocarditis in an intravenous drug abuser with human immunodeficiency virus infection. Int J Cardiol 1991; 30:361.
- 24. Riancho JA, Echevarría S, Napal J, et al. Endocarditis due to Listeria monocytogenes and human immunodeficiency virus infection. Am J Med 1988; 85:737.
- 25. Selton-Suty C, Célard M, Le Moing V, et al. Preeminence of Staphylococcus aureus in infective endocarditis: a 1-year population-based survey. Clin Infect Dis 2012; 54:1230.

Cardiovascular Surgery

- Murdoch DR, Corey GR, Hoen B, et al. Clinical presentation, etiology, and outcome of infective endocarditis in the 21st century: the International Collaboration on Endocarditis-Prospective Cohort Study. Arch Intern Med 2009; 169:463.
- 27. Alberti MO, Hindler JA, Humphries RM. Antimicrobial Susceptibilities of Abiotrophia defectiva, Granulicatella adiacens, and Granulicatella elegans. Antimicrob Agents Chemother 2015; 60:1411.
- 28. Téllez A, Ambrosioni J, Llopis J, et al. Epidemiology, Clinical Features, and Outcome of Infective Endocarditis due to Abiotrophia Species and Granulicatella Species: Report of 76 Cases, 2000-2015. Clin Infect Dis 2018: 66:104.
- 29. Baddour LM, Wilson WR, Bayer AS, et al. Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications: A Scientific Statement for Healthcare Professionals From the American Heart Association. Circulation 2015; 132:1435.
- 30. Hoen B, Duval X. Clinical practice. Infective endocarditis. N Engl J Med 2013; 368:1425.
- 31. Habib G, Lancellotti P, Antunes MJ, et al. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). Eur Heart J 2015; 36:3075.
- 32. Chirillo F, Scotton P, Rocco F, et al. Impact of a multidisciplinary management strategy on the outcome of patients with native valve infective endocarditis. Am J Cardiol 2013; 112:1171.
- 33. Yanagawa B, Pettersson GB, Habib G, et al. Surgical Management of Infective Endocarditis Complicated by Embolic Stroke: Practical Recommendations for Clinicians. Circulation 2016; 134:1280.
- 34. Botelho-Nevers E, Thuny F, Casalta JP, et al. Dramatic reduction in infective endocarditis-related mortality with a management-based approach. Arch Intern Med 2009; 169:1290.
- 35. Park LP, Chu VH, Peterson G, et al. Validated Risk Score for Predicting 6-Month Mortality in Infective Endocarditis. J Am Heart Assoc 2016; 5:e003016.
- 36. 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. J Am Coll Cardiol 2017.
- 37. Nishimura RA, Otto CM, Bonow RO, et al. 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 Practice Guidelines. J Am Coll Cardiol 2014; 63:e57.
- 38. Kiefer T, Park L, Tribouilloy C, et al. Association between valvular surgery and mortality among patients with infective endocarditis complicated by heart failure. JAMA 2011; 306:2239.
- 39. Bannay A, Hoen B, Duval X, et al. The impact of valve surgery on short- and long-term mortality in left-sided infective endocarditis: do differences in methodological approaches explain previous conflicting results? Eur Heart J 2011; 32:2003.
- 40. Lalani T, Cabell CH, Benjamin DK, et al. Analysis of the impact of early surgery on in-hospital mortality of native valve endocarditis: use of propensity score and instrumental variable methods to adjust for treatment-selection bias. Circulation 2010; 121:1005.
- 41. Cooper HA, Thompson EC, Laureno R, et al. Subclinical brain embolization in left-sided infective endocarditis: results from the evaluation by MRI of the brains of patients with left-sided intracardiac solid masses (EMBOLISM) pilot study. Circulation 2009; 120:585.
- 42. Gaca JG, Sheng S, Daneshmand MA, et al. Outcomes for endocarditis surgery in North America: a simplified risk scoring system. J Thorac Cardiovasc Surg 2011; 141:98.
- 43. Chu VH, Park LP, Athan E, et al. Association between surgical indications, operative risk, and clinical outcome in infective endocarditis: a prospective study from the International Collaboration on Endocarditis. Circulation 2015; 131:131.
- Anantha Narayanan M, Mahfood Haddad T, Kalil AC, et al. Early versus late surgical intervention or medical management for infective endocarditis: a systematic review and meta-analysis. Heart 2016; 102:950.
- 45. Prendergast BD, Tornos P. Surgery for infective endocarditis: who and when? Circulation 2010; 121:1141.
- 46. Snygg-Martin U, Gustafsson L, Rosengren L, et al. Cerebrovascular complications in patients with left-sided infective endocarditis are common: a prospective study using magnetic resonance imaging and neurochemical brain damage markers. Clin Infect Dis 2008; 47:23.

Cardiovascular Surgery

- 47. Barsic B, Dickerman S, Krajinovic V, et al. Influence of the timing of cardiac surgery on the outcome of patients with infective endocarditis and stroke. Clin Infect Dis 2013; 56:209.
- 48. Maruyama M, Kuriyama Y, Sawada T, et al. Brain damage after open heart surgery in patients with acute cardioembolic stroke. Stroke 1989; 20:1305.
- 49. 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.
- 50. Shih CJ, Chu H, Chao PW, et al. Long-term clinical outcome of major adverse cardiac events in survivors of infective endocarditis: a nationwide population-based study. Circulation 2014; 130:1684.
- 51. Delahaye F, Chu VH, Altclas J, et al. One-year outcome following biological or mechanical valve replacement for infective endocarditis. Int J Cardiol 2015; 178:117.