IN-HOSPITAL OUTCOME OF PATIENTS WITH INFECTIVE ENDOCARDITIS: A RETROSPECTIVE ANALYSIS

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ABSTRACT

OBJECTIVE: To determine the in-hospital outcome of infective endocarditis (IE) in terms of morbidity, mortality and success of treatment in our set up.

METHODS: This descriptive retrospective study was conducted at Cardiology Unit, Lady Reading Hospital, Peshawar. Records of patients with definite diagnosis of IE from September 2009 to August 2012 were reviewed for complications and treatment outcome during hospital stay. Data was analyzed statistically by using SPSS version 16.

RESULTS: Out of 34 admitted patients, 24 (70.59%) were males and 10 (29.41%) were females with male to female ratio of 2.4:1. Age ranged from 5-38 years with mean age of 26±11 years. Out of 17 complications developed in 14 (41.2%) patients, congestive heart failure (n=7 20.59%), transient ischemic attack (n=3; 8.8%), stroke (n=2 5.88%) and renal failure (n=2 5.88%) were the most frequent complications. Medical treatment failed in 9(26.4%) patients. Mortality rate was 23.5% (n=8/34). Six patients died during medical management and 2 during surgery for IE. Two out of three patients with prosthetic valve died during course of therapy.

CONCLUSION: Morbidity, mortality and failure of medical treatment in admitted cases of infective endocarditis is still high in our set up. Failure of medical treatment is still present in a sizeable proportion. Outcome was found excellent in native valve but poor in prosthetic valve. Surgery though less frequently performed; carries more than 50% mortality.

KEY WORDS: Infective Endocarditis (MeSH), Patient Outcome Assessment (MeSH), Mortality (MeSH), Complications (MeSH).

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INTRODUCTION

Infective endocarditis (IE) is infection of the Inner layer of the heart called endocardium or the cardiac valves. It is mainly caused by bacteria however, other organisms like fungi, chlamydia and mycoplasma may also be involved, though, less commonly. Culture-negative endocarditis, a separate entity, does not reveal any organism in blood culture. The main causative microorganism involved in IE is streptococcus but some other pathogens have gained importance recently.[1]

IE is difficult to diagnose and a high index of suspicion is required, especially in patients having underlying rheumatic or congenital heart disease. Diagnosing IE becomes more difficult in developing countries, because, population access to tertiary care center is limited and negative blood culture is common as many patients have already started antibiotics before arrival to hospital.[2] Any patient with fever and murmur should be investigated properly.[3] According to the modified Duke's criteria, appearance of vegetation on echocardiography and/ or at least two positive blood cultures of the same organism are required for the diagnosis of IE.[4]

The incidence of IE has been estimated to be 1.7 to 6.2 per 10,000 cases per year and is on increase despite recent advances in diagnosis, medical, and surgical management.[5] IE remains a serious and life threatening condition and leads to many different complications and involvement of various organ systems of the body. Cardiac, renal and neurological involvement are the most commonly reported in the literature.[2,6] IE has A very poor prognosis and high mortality, ranging from 12.5% to 31% according to different studies.[7-9] Possible contributory factors of this high mortality are changing microbiologic virulence of different organisms, increased use of prosthesis and invasive procedures.[10]

Management of IE is mainly based on recommendations and guidelines derived from western data. Continuous change in the clinical profile of the disease mandates regular appraisal of the management strategies. Thus, despite several guidelines available to treat the disease, IE has always been a challenge for the medical profession.[4] Very little work has been done on the mortality and frequency of complications due to

this fatal disease in our local setup.[2,6,11] This study was therefore, conducted to derive local data about the treatment outcome, complications and mortality associated with IE. This study will help us in understanding the course of disease in available resources in our institutions. Based on these findings, strategies can be adopted to avoid preventable complications and thus, reducing mortality due to IE locally.

METHODS

This descriptive retrospective study was conducted at Cardiology Department, Lady Reading Hospital, Peshawar. Written informed permission in order to have access to patient's data was taken from the ward administration. Medical records of all the patients admitted in the cardiology department between September 2009 and August 2012 were reviewed from the hospital computer database. The study was duly approved by the institutional review board of hospital. Only the patients diagnosed as IE were enrolled. Diagnostic criteria included patients of either gender having age of five years or more, with confirmed diagnosis of infective endocarditis. Infective endocarditis was defined as patients who had vegetation's on echocardiography and/or had positive blood cultures for the microorganisms, with history of fever and underlying abnormality of the heart. Successful treatment means resolution of symptoms and disappearance of vegetation on echocardiography after 2-4 weeks treatment as evident from the clinical record. Patient's records not having clear outcome data were also excluded. Data was collected from enrolled patients record including demographics, underlying diagnosis, echocardiographic findings, type of treatment received with outcome and complications.

Data analysis: data was analyzed using statistical package for social sciences (SPSS) version 16. Mean ± standard deviation were used for analyzing quantitative variables like age. Categorical variables such as complications, treatment outcome and mortality were described in the form of frequency and percentages.

RESULTS

A total of 37 patients had I.E during study period. Three patients were having incomplete data and were excluded from the study. Out of 34 admitted patients, 24 (70.59%) were males and 10 (29.41%) were females with male to female ratio of 2.4:1. Age ranged from 5-38 years with mean of 26 ± 11 years.

Rheumatic heart disease (RHD) was the commonest underlying lesion, present in 24 (70.59%) patients. Among these, mitral regurgitation was the dominant valvular lesion present in 12 (35%) patients, aortic regurgitation in 6 (17.65%), mitral stenosis in 2(5.88%) and mixed valvular lesions were present in 4 (11.76%) patients. Congenital heart disease was present in 5 (14.7%) patients in which ventricular septal defect (VSD) was present in 2 (5.88%), patent ductus arteriosus (PDA) in 1 (2.94%), pulmonary stenosis in 1 (2.94) and bicuspid aortic valve in 1 (2.94%) patient. Prosthetic valve was present in 3 (8.82%), mitral valve replacement (MVR) in 2 (5.88%), and double valve replacement (DVR) in 1 (2.94%) patient. Mitral valve prolapsed (MVP) with mitral regurgitation (MR) was present in 2 (5.88%) patients. A total of 17 complications developed in 14 (41.2%) patients. Congestive heart failure (CHF) was the commonest complications observed in 7 patients. Two patients having CHF were suffering from renal failure too. Cerebrovascular accident (CVA) and TIA developed in 2 and 3 patients, respectively. One patient with TIA later on developed stroke. Details of various complications is given in Table I.

Combination of injection Benzyl Penicillin and Gentamicin were used as first line treatment. Second line drugs were used when first line therapy was found unsuccessful or blood cultures showed atypical microorganisms. Second line drugs included either injection ceftriaxone or Vancomycin. First line Medical treatment was found successful in 58.8% (20) patients. Two patients died during first line therapy. Ceftriaxone or Vancomycin was used in 12 patients and success was achieved in only 5 (41.6%) patients. Four patients died during course of disease, because of complications. Medical treatment failed in 9(26.4%) patients. Surgery was required when medical management failed or complications developed that could not be addressed medically.

Mortality rate of 23.5% (n=8/34) was observed in the series. Mortality was 19.3% and 66.6% in native valve endocarditis and prosthetic valve endocarditis respectively. Two patients died during surgery for IE. Surgical mortality was 50%. Two out of three patients with prosthetic valve died during the course of treatment.

TABLE I: MORBIDITY AND MORTALITY IN PATIENTS WITH INFECTIVE ENDOCARDITIS

Complications	Frequency (n=34)	%age
Congestive Heart Failure	7	20.5
Transient ischemic attacks	3	8.8
Renal Failure	2	5.88
Stroke	2	5.88
Atrioventricular Block	1	2.94
Cardiac Tamponade	1	2.94
Peripheral Embolism	1	2.94
Mortality	8	23.5

DISCUSSION

This study revealed that we have I.E at lower age as compared to western countries where, IE usually develop at older age.[12-17] However, it is according to other studies from this part of the world.[1,2,6,18,19] We have high frequency of RHD and unrepaired CHD. These predisposing factors lead to I.E at an early age.[2,6,8,18,19] Prevalence of RHD has declined in the West, and average age of general population has increased. But recent reports indicate even lower age group is affected in western society.[20]

Previous studies have observed that IE occur more frequently in men than women.[7,10,16-18] This study revealed the same finding. Men usually have more access to medical care and thus exposed to nosocomial infections. We had probably the same reason for higher prevalence in men. Intravenous drug usage is also more common in men, though not in our society. This difference in men and women is more obvious at younger age. Durante et al[21] observed in their study that male predominance of IE decreases with age. Female hormones may play some protective role against IE.

We have the same complications of I.E as occurring in other parts of the world, though its frequency varies. Congestive cardiac failure was present in 20.5% of our patients and 15% patients had stroke or TIA. Almost similar findings were observed by Murdoch DR et al[17] who reported that 16.9% had stroke, 22.6% embolization other than stroke and 32.3% heart failure. Most common complication in our study was heart failure. Tariq M et al[6] observed that most common cardiac complication was CHF, which was present in 24 patients (36%), other extra cardiac complications were not different as reported by other studies from this region. In study from Tariq M et al[6], frequency of extra-cardiac complications in study population were neurologic 32%, renal complications (17%), hemolytic anemia 7%, non-CNS embolic phenomena 6%, and cardiac valve abscess in 3% patients.

In this study, 73.6% patients were treated medically and only 9(26.4%) patients underwent surgery. Surgical was performed only in those cases when a complication developed or medical treatment failed. This finding is in accordance with the practice being done in the region. First line treatment i.e benzyl penicillin and Gentmycin was used in 58.8% of the cases. Second line drug was found successful in 41.6% those patients in whom first line did not work and surgery was used in 12% cases. Study from Karachi[6] reported that Benzyl penicillin and Gentamicin were used in 67%, ceftriaxone in 27% and Vancomycin in 5% of patients.[9] Cardiac surgical intervention was required for 12% of patients. Surgical treatment in I.E is mainly done for complications that cannot be addressed medically.[6,18] However, in the developed part of the world, they have facilities and resources for surgery, therefore lower threshold is kept for surgery and intervention is done early. Surgical therapy was performed in 48.2% of patients in study conducted by Murdoch DR.[17]

In-hospital mortality, in our patients was found higher as compared to developed countries However; it was according to the studies conducted in the developing countries. Murdoch DR et al[17] reported 17.7% mortality in his study which was lower as compared to our finding of 23%.[15] Tariq M et al in a survey conducted in , Karachi, reported In-hospital mortality of 27% (18/66 patients).[6] Heart failure, neurologic complications, systemic emboli and renal failure were significantly associated with mortality. We observed a higher mortality due to prosthetic valve endocarditis which is in concordance with other studies.[22-26] Prosthetic valve had poor outcome as compared to native valve. Similarly, surgery had higher mortality as compared to medical treatment.[2,6] However, surgical treatment was mainly used as rescue therapy, when medical treatment failed or patient developed serious complications.

Our study has few imitations. It was a retrospective study with small sample size. Only complications developed during hospital stay were assessed and patients were not followed up after hospital discharge. Further research having prospective approach with larger sample size is recommended to analyze the existing treatment modalities and its outcome in a better way.

CONCLUSION

Morbidity, mortality and failure of medical treatment in admitted cases of infective endocarditis is still high in our set up. Failure of medical treatment is still present in a sizeable proportion. Outcome was found excellent in native valve but poor in prosthetic valve. Surgery though less frequently performed; carries more than 50% mortality.

REFERENCES

1. Ako J, Ikari Y, Hatori M, Hara K, Ouchi Y. Changing spectrum of infective endocarditis: Review of 194 episodes over 20 years. Circ J 2003; 67: 3-7.
2. Tariq M, Siddiqui BK, Jadoon A, Alam M, Khan SA, Atiq M, et al. Clinical profile and outcome of infective endocarditis at the Aga Khan University Hospital. Int J Collab Res Internal Med Public Health 2009; 1: 84-99.
3. Bayer AS, Bolger AF, Taubert KA,Wilson W, Steckelberg J, Karchmer AW, et al. Diagnosis and management of infective endocarditis and its complications. Circulation 1998; 98(25): 2936-43.
4. Bonow RO, Carabello B, Chatterjee K, de Leon AC Jr, Faxon DP, Freed MD et al: 2008 focused update incorporated into the ACC/AHA 2006 Practice guidelines for the management of patients with valvular heart disease. Circulation 2008; 118: 523-29.
5. Miller B, Moor JE. Antibiotic prophylaxis, body piercing and infective endocarditis. J Antimicrob Chemother 2004; 53: 123-26.
6. Tariq M, Alam M, Munir G, Khan MA, Smeqo RA. Infective endocarditis: a five-year experience at a tertiary care hospital in Pakistan. Int J Infect Dis 2004; 3(8): 163-70.

7. Nunes MC, Gelape CL, Ferrari TC. Profile of infective endocarditis at a tertiary care center in Brazil during a seven-year period: prognostic factors and in-hospital outcome. Int J Infect Dis 2010; 14(5): 394-98.
8. Garg N, Kandpal B, Garg N, Tewari S, Kapoor A, Goel P, et al. Characteristics of infective endocarditis in a developing country: Clinical profile and outcome in 192 Indian patients,1992-2001. Int J Cardiol 2005; 98: 253-60.
9. Khaled AA, Al-Noami AY, Al-Ansi M, Faiza AA. Clinical Features and Outcome of infective endocarditis in Yemeni patients treated with empirical antibiotic therapy. Heart Views 2010; 11: 2-9.
10. Hoen B, Alla F, Selton-Suty C, Béguinot I, Bouvet A, Briançon S, et al. Changing profile of infective endocarditis: Results of a 1-year survey in France. JAMA 2002; 288: 75-81.
11. Khan NU, Farman MT, Sial JA, Achakzai AS, Saghir T, Ishaq M. Changing trends of infective endocarditis. J Pak Med Assoc 2010; 60: 24-27.
12. Netzer RO, Zollinger E, Seiler C, Cerny A. Infective endocarditis: clinical spectrum, presentation and outcome. An analysis of 212 cases 1980-1995. Heart 2000; 84: 25-30.
13. Moreillon P, Que YA. Infective endocarditis. Lancet 2004; 363: 139-49.
14. Castillo JC, Anguita MP, Ramírez A, Siles JR, Torres F, Mesa D, et al. Long term outcome of infective endocarditis in patients who were not drug addicts: A 10 year study. Heart 2000; 83: 525-30.
15. Tornos P, Iung B, Permanyer-Miralda G, Baron G, Delahaye F, Gohlke-BärwolfCh, et al. Infective endocarditis in Europe: Lessons from the Euro heart survey. Heart 2005; 91: 571-75.
16. Ferreiros E, Nacinovich F, Casabé JH, Modenesi JC, Swieszkowski S, Cortes C, et al. EIRA-2 Investigators. Epidemiologic, clinical, and microbiologic profile of infective endocarditis in Argentina: A national survey. The Endocarditis Infecciosa en la República Argentina-2 (EIRA-2) Study. Am Heart J 2006; 151: 545-52.
17. Murdoch DR, Corey GR, Hoen B, Miro JM, Fowler Jr VG, Bayer As 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: 463-73.
18. Math RS, Sharma G, Kothari SS, Kalaivani M, Saxena A, Kumar AS, et al. Prospective study of infective endocarditis from a developing country. Am Heart J 2011 Oct; 162(4): 633-38.
19. Choudhury R, Grover A, Varma J, Khattri HN, Anand IS, Bidwai PS, et al. Active infective endocarditis observed in an Indian hospital 1981-1991. Am J Cardiol 1992; 70: 1453-58.
20. Pazdernik M, Baddour LM, Pelouch R. Infective endocarditis in the Czech Republic: eight years of experience at one of the country's largest medical centers. J Heart Valve Dis 2009; 18(4): 395-400.
21. Durante-Mangoni E, Bradley S, Selton-Suty C, Tripodi MF, Barsic B, Bouza E 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: 2095-103.
22. Yameogo NV, Kologo KJ, Yameogo AA, Yonaba C, Millogo GR, Kissou SA et al. Infective endocarditis in Sub-Saharan African children, cross-sectional study about 19 cases in Ouagadougou at Burkina Faso. Ann Cardiol Angeiol (Paris) 2013; 13. S0003-3928(13)00020-6. doi: 10.1016/j.ancard.2013.02.004.
23. Elbey MA, Akdağ S, Kalkan ME, Kaya MG, Sayın MR, Karapınar H, et al. A multicenter study on experience of 13 tertiary hospitals in Turkey in patients with infective endocarditis. Anadolu Kardiyol Derg 2013; 13(6): 523-27.
24. Stockins B, Neira V, Paredes A, Castillo C, Troncoso A. Profile of patients with infective endocarditis admitted to a Chilean regional hospital. Rev Med Chil 2012; 140(10): 1304-11.
25. Letaief A, Boughzala E, Kaabia N, Ernez S, Abid F, Ben Chaabane T. Epidemiology of infective endocarditis in Tunisia: a 10-year multicenter retrospective study. Int J Infect Dis 2007; 11(5): 430-35.
26. Wilson W, Taubert KA, Gewitz M, Lockhart, PB, Baddour LM, Levison M et al: Prevention of infective endocarditis. Guidelines from the American Heart Association. Circulation 2007; 116: 1736-88.

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

MAI: Concept & study design, acquisition of data, drafting the manuscript, final approval of the version to be published

MF, IK, NK: Acquisition and analysis of data, drafting the manuscript, final approval of the version to be published

MH: Critical revision, drafting the manuscript, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declare no conflict of interest

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