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PROFILE OF INFECTIVE ENDOCARDITIS IN A TERTIARY CARE HOSPITAL

Muhammad Faheem[1], Muhammad Asif Iqbal[2], Rehman Saeed[3], Muhammad Asghar[4], Mohammad Hafizullah[5]

[1,3] Department of Cardiology, Khyber Teaching Hospital, Peshawar-Pakistan
[2,5] Department of Cardiology, Lady Reading Hospital & Khyber Medical University, Peshawar-Pakistan
[4] Department of Cardiology, Hayatabad Medical Complex, Peshawar-Pakistan

Address for Correspondence:

Dr. Muhammad Faheem,

Assistant Professor,

Department of Cardiology, Khyber Teaching Hospital, Peshawar-Pakistan

Email: drfaheem@live.com

Date Received: June 06,2013
Date Revised: December 14,2013
Date Accepted: January 10,2014

Contribution
All the authors contributed significantly to the research that resulted in the submitted manuscript.

All authors declare no conflict of interest.

ABSTRACT

Objective: The objective was to find the clinical, microbiologic and echocardiographic profile of infective endocarditis (IE) in our local population.

Methodology: It was a retrospective study conducted at department of Cardiology, Lady Reading Hospital, Peshawar. Medical records of all patients admitted between September 2009 and August 2012 were reviewed. Both adults and children, having a diagnosis of "definite IE", based on the modified Duke's criteria, were included. Patients who were labelled possible or rejected IE, were excluded.

Results: A total of 34 patients were studied. Their mean age was 26±11 years. Male were 24(70.59%). Most common presenting complaint was fever, 25(73.53%), followed by dyspnoea 16(47%) and palpitations in 05(14.71%) patients. Echocardiography showed rheumatic heart disease to be the commonest underlying lesion, present in 24(70.59%) patients and among these, the most common valvular lesion was mitral regurgitation 12(35%). Other underlying lesions included CHD in 5(14.71%), prosthetic valve in 3(8.82%)and mitral valve prolapse with mitral regurgitation in 2(5.88%). Native mitral valve was the commonest site for vegetation in 13(38%) patients, followed by native aortic valve in 10(29%), tricuspid valve in 2(5.88%) and prosthetic valve in 2(5.88%) patients. Majority of the patients 17(50%) had negative blood culture results. In 13(38%) of the patients, blood cultures were positive, amongst which the commonest pathogens were streptococcus 6(17.65%) followed by staphylococcus 5(14.71%).

Conclusion: In our local population, infective endocarditis usually occurs in young adults with rheumatic heart disease. Blood culture results are negative in majority of cases.

Key Words: Echocardiography, Infective Endocarditis, Vegetation, Rheumatic Heart Disease

INTRODUCTION

Infection of the endocardium commonly involve heart valves, but may involve other structures like chordae tendinae, septal defects or mural endocardium. Infection of extra cardiac structures like arterio-venous shunts, arterio-arterial shunts and coarctation of aorta can have similar clinical and pathological picture. Different microorganisms, most commonly bacteria can cause infective endocarditis (IE). Streptococci, staphylococci and gram negative coccobacilli cause the majority of cases.[1-4]

Symptoms and signs of IE are often constitutional. As it has a high mortality, a high index of suspicion must be maintained, to avoid over looking the diagnosis. Any patient with fever and a murmur should be investigated properly. The modified duke's criteria facilitates evaluation of patients for IE.

Despite advances in diagnosis, newer antibiotic regimens and invasive surgical techniques, IE is still a major challenge to physicians, due to its high morbidity and mortality. The epidemiology, clinical and micro biologic spectrum of IE is different in different parts of the world. Its profile also depends on the clinical scenario, (i.e young vs. elderly, native valve vs. prosthetic valve). Knowledge of this profile is necessary for early diagnosis and selection of appropriate treatment.

Current guidelines for treating IE are mostly based on Western studies.[5,6] Very little work has been done on finding the characteristics of IE in our local setup.[7,8]

The aim of the present study was to find the clinical, microbiological and echocardiographic profile of IE in local population.

METHODOLOGY

It was a retrospective descriptive study, conducted in the department of Cardiology, Lady Reading Hospital, Peshawar. This is the largest and oldest tertiary care center of the province, having a catchment area of more than 20 million population. Medical records of all patients admitted between September 2009 and August 2012 were reviewed from the computer data base.

Both adults and children, having a diagnosis of "definite" IE, based on Modified Duke's Criteria were included in the study. Patients who were labeled possible or rejected IE were excluded from the study. For each patient, besides demographic data, information on clinical presentation, echocardiographic findings(including underlying lesions and vegetation site), microbiologic results, complications and treatment were collected.

The collected data was stored and analyzed in SPSS version 16. Mean ± SD was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables.

RESULTS

A total of 34 patients were included in the study. Their mean age was 26±11 years. Males were 24(70.59%) and females were 10(29.41%). Most common presenting complaint was fever in 73.53% patients, followed by shortness of breath in 47% patients. Other clinical features are shown in Table 1.

Table 1: Clinical Presentation of Infective Endocarditis

Clinical feature	No of patients (%)
Fever	25(73.53)
Shortness of breath	16(47.06)
Palpitation	5(14.71)
Chest pain	4(11.76)
Confusion / Restless	4(11.76)
Anorexia	2(5.88)
Cough	2(5.88)
Arthralgia	1(2.94)
Hematemesis	1(2.94)

Echocardiography of 34 patients with Infective Endocarditis showed rheumatic heart disease (RHD) to be the commonest underlying lesion, present in 24(70.59%) patients. Among these MR was the dominant valvular lesion present in 12(35%) patients. Table 2 shows other underlying lesions in Infective Endocarditis.

Congenital Heart diseases, comprising of VSD, PDA, PS and bicuspid aortic valve were present in 5(14%) patients. Prosthetic valve and MVP with MR were present in 3(8%) and 2(5%) patients, respectively.

Native mitral valve was the commonest site for vegetation in 13(38%) patients, followed by native aortic valve in 10(29%) patients. Other sites of vegetation are shown in Table 3.

Majority of patients (50%) had negative blood culture results. In 38% patients blood culture were positive, among whom commonest pathogens were streptococcus (17%) and staphylococcus (14%). Table 4 shows details of Blood culture results. Record of 4 patients did not show any Blood culture results.

Majority (76%) of the patients were empirically started on

Table 2: Underlying Lesions in Patients with Infective Endocarditis

Underlying lesions	N(%)
RHD	24(70.59)
MR	12(35.29)
AR	6(17.65)
Mixed Valvular	8(23.53)
MS	2(5.88)
CHD	5(14.71)
VSD	2(5.88)
PDA	1(2.94)
PS	1(2.94)
Bicuspid Aortic Valve	1(2.94)
Prosthetic valve	3(8.82)
MVR	2(5.88)
DVR	1(2.94)
MVP with MR	2(5.88)

RHD = Rheumatic Heart Disease, MR = Mitral Regurgitation, AR = Aortic Regurgitation, MS = Mitral Stenosis, CHD = Congential Heart Disease, PDA = Patent Ductus Arteriosus, PS = Pulmonic Stenosis, VSD = Ventricular Septal Defect, MVR = Mitral Valve Replacement, DVR = Double Valve Replacement, MVP = Mitral Valve Prolapse

combination of Benzyl Penicillin and Gentamycin. After Blood culture results were available, they were changed to ceftriaxone or vancomycin in 26% and 11% of patients respectively. Table 5 shows treatment given to patients with Infective Endocarditis.

DISCUSSION

Our study has revealed the characteristics of infective endocarditis (IE) in our local setup. The mean age of the patients was 26±11 years. Previous studies on IE in local population as well as from neighboring countries also showed lower age of presentation of IE.[7-12]

Table 3: Site of Vegetation in Infective Endocarditis

Site of Vegetation		N(%)
Native Valve		
	Mitral Valve	13(38.24)
	Aortic Valve	10(29.41)
	MV+AV	2(5.88)
Interventricular Septum		1(2.94)
Tricuspid Valve		2(5.88)
Prosthetic valve	Mitral Prosthesis	1(2.94)
	Aortic Prosthesis	1(2.94)
No Vegetation		4(11.76)

Table 4: Blood Culture Results of Patients with Infective Endocarditis

Site of Vegetation		N(%)
Positive Blood Culture		13(38.24)
	Streptococcus	6(17.65)
	Staphylococcus	5(14.71)
	E-Coli	1(2.94)
	Candida Species	1(2.94)
Negative Culture		17(50)
Culture Result unavailable		4(11.76)

Reason for this lower age may be higher incidence of RHD and unrepaired CHD in developing countries like ours. On the other hand Gupta A et al, showed higher age (50yrs) of patients with IE, although it was a study from a developing country.[3] One reason for this may be that they included only adult patients (>18yrs) in their study, while in our study there was no age limit for inclusion and we included children as well as adults.

Western studies usually show higher age of patients with IE.[13-20] This is due to the fact that incidence of RHD has gone down over there and average age of general population has increased. But lower age is not an exemption in west and IE is still reported there to occur at lower age.[21]

Historically men are more prone to IE than women. Our study also revealed that men were affected almost twice than women. Previous local and western studies also showed that IE occur more frequently in men than women.[7,8,10-18]

Men usually have more access to medical care and thus exposure to health care related and nosocomial infections.

Table 5: Treatment Given to Patients with Infective Endocarditis

Treatment Started; N (%)	Treatment Changed after Culture ; N (%)
Benzyl Penicillin + Gentamycin 26(76.46)	Ceftriaxone 9(26.47)
	Vancomycin 4(11.76)
	Chloromphenical+Fusidic Acid 1(2.9%)
Ceftriaxone + Gentamycin 5(14.71)	Continued
Vancomycin 3(8.82)	Continued

Another reason is more use of IV drugs by men, but in our society this cause is uncommon.

The difference in incidence of IE in men and women is more obvious at younger age. Durante et al, showed that male predominance of IE decrease with age.[22] This gives a clue that female hormones may have some protective role against IE. On the other hand few studies showed that women were more affected than men.[23] Correa et al, showed that incidence of IE among women has increased from 1970 to 2006.[24]

RHD in now rare in western countries but still common in developing countries.[25] In our study RHD was the commonest underlying cause for IE, which is concordant with previous studies from developing countries. [2,3,4,7,10,11,12,19,26,27] Western studies show RHD as an uncommon cause of IE, but Pazdarnik et al, showed that 19% of IE cases were still caused by RHD in that part of the developed world.[1,13,18,21]

Second commonest cause of IE, in our study was congenital heart disease. All these cases were unrepaired, pointing to the fact that many of our young patients with CHD are still away from surgical facilities. Prosthetic valve endocarditis accounted for 3 cases. This is in agreement with other local studies.[8,11]

MVP associated with MR accounted for 2 cases of IE. Although revised AHA guidelines no longer recommends MVP for IE prophylaxis, but in our part of the world MVP with MR may be considered for antibiotics prophylaxis, when undergoing dental or surgical procedures.[28] The commonest valvular lesion, in our study, was mitral regurgitation and the commonest site for vegetation was mitral valve. Previous study also reported similar findings. [3,8,11]

Right heart vegetations were found in two of our cases. One of these was on tricuspid valve associated with VSD. The other case was vegetation on tricuspid valve with structurally normal heart, and without any history of IV drug use. Tariq et al, showed 9% of patients had right sided IE and only one subject had history of IV drug use.[7]

Blood culture is the corner stone in diagnosis and management of patients with IE. Our study showed only (38%) patients to be culture positive. Other local studies also showed low rate of culture positivity.[7,9,10,12,29] Western studies usually showed higher percentage (80-90%) of positive culture. [1,13-18] Main reason for negative culture result are prior antibiotic use. IE is a chronic disease and the incubation period may be prolonged, thus patients usually start antibiotics before reaching physician. Like other drugs antibiotics are easily available over the counter, in our setup. Poor culture techniques and rare microorganism are other reasons for culture negative results.

In our study blood cultures which were positive showed streptococcus to be the commonest culprit, followed by staphylococcus. This coincides with the results of previous studies.[1-4] Elbey et al, showed staphylococcus and enterococcus to be the commonest pathogens detected.[26]

CONCLUSION

In our local population, Infective endocarditis usually occurs in young adults with rheumatic heart disease. Blood culture results are negative in majority of cases.

REFERENCES

1. 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;140:1304-11.
2. Yameogo NV, Kologo KJ, Yameogo AA, Yonaba C, Millogo GR, Kissou SA, et al . Infective endocarditis in subSaharan African children, crosssectional study about 19 cases in Ouagadougou at Burkina Faso. Ann Cardiol Angeiol (Paris) 2014;63:7-10.
3. Ashish Gupta, Anu Gupta, Upendra Kaul, Amit Varma. Infective endocarditis in an Indian setup: are we entering the 'modern' era? Indian J Crit Care Med 2013;17:140-7.
4. Senthilkumar S, Menon T, Subramanian G. Epidemiology of infective endocarditis in Chennai, South India. Indian J Med Sci 2010;64:187-91.
5. 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;98:2936-48.
6. 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 guidelines for the management of patients with valvular heart disease. Circulation 2008;118:e523-661.
7. 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.
8. Khan NU, Farman MT, Sial JA, Achakzai AS, Saghir T, Ishaq M. Changing trends of infective endocarditis. J Pak Med Assoc 2010;60:24-7.
9. 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;162:6338.
10. 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;70:1453-8.

11. 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.

12. Abdullah S. Assiri Clinical and microbiological profiles of infective endocarditis in a tertiary hospital in Aseer region, Saudi Arabia. J Saudi Heart Assoc 2011;23:207-11.

13. 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.

14. Moreillon P, Que YA. Infective endocarditis. Lancet 2004;363:139-49.

15. 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.

16. Hoen B, Alla F, Selton-Suty C, Béguinot I, Bouvet A, Briançon S, et al. Changing profile of infective endocarditis: results of a 1year survey in France. JAMA 2002;288:75-81.

17. Tornos P, Iung B, Permanyer-Miralda G, Baron G, Delahaye F, Gohlke-Bärwolf Ch, et al. Infective endocarditis in Europe: lessons from the Euro heart survey. Heart 2005;91:571-5.

18. Ferreiros E, Nacinovich F, Casabé JH, Modenesi JC, Swieszkowski S, Cortes C, et al. 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.

19. Nunes MC, Gelape CL, Ferrari TC. Profile of infective endocarditis at a tertiary care center in Brazil during a sevenyear period: prognostic factors and in hospital outcome. Int J Infect Dis 2010;14:e394-8.

20. Murdoch DR, Corey GR, Hoen B, Miró JM, Fowler VG, Bayer AS, et al. Clinical presentation, etiology, and outcome of infective endocarditis in the 21st century. Arch Intern Med 2009;169:463.

21. 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;18:395-400.

22. 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.

23. Ikama MS, Nkalla-Lambi M, Kimbally-Kaky G, Loumouamou ML, Nkoua JL. Profile of infective endocarditis at Brazzaville University Hospital. Med Sante Trop 2013;23:89-92.

24. Correa de Sa DD1, Tleyjeh IM, Anavekar NS, Schultz JC, Thomas JM, Lahr BD, et al. Epidemiological trends of infective endocarditis: a populationbased study in Olmsted County, Minnesota. Mayo Clin Proc 2010;85:422-6.

25. Rheumatic fever and rheumatic heart disease. World Health Organ Tech Rep Ser 2004;923:1-122.

26. 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;13:523-7.

27. 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.

28. 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;116:1736-54.

29. 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;11:430-3.