CLINICAL PRESENTATION OF INFECTIVE ENDOCARDITIS

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SUMMARY

In order to determine demographic characteristics, various modes of presentations and distribution of clinical findings, frequencies of different valves involved, special risk factors and complications of infective endocarditis in our population, this study was conducted between September 2000 and July 2001 in the Department of Medicine Khyber Teaching Hospital Peshawar, all patients having clinical suspicion of infective endocarditis were admitted and worked up. Out of seventy patients screened, thirty were selected fulfilling one of Duke criteria for clinical diagnosis of definite infective endocarditis. Thirty admitted patients having definite infective endocarditis as per Duke criteria were included. There were 21(70%) males and 9 (30%) females. Mean age of the patients was 24 years. Ninety percent of the patients were below 40 years of age. The commonest symptoms observed were fever, shortness of breath, arthralgia/myalgia, chills, anorexia, and malaise. The most common signs were fever, cardiac murmur, anemia and splenomegaly. High ESR, anemia and RA factor positivity topped the list of investigations. A definite predisposing factor of bacteremia could be identified in only 6 (20%) patients. Chronic rheumatic heart disease was the most common underlying cardiac predisposing condition 19 (30%), followed by congenital heart disease and mitral valve prolapse. Mitral valve was affected by vegetation in 18 (60%) patients, followed by aortic and tricuspid valves. Twelve patients had complications during the course of their illness. Prior use of antibiotics and lack of positive blood culture prevents most of the physicians making a definitive diagnosis of infective endocarditis. Hundred percent of our patients had underlying cardiac lesion to predispose them to infective endocarditis. Most of the patients belonged to younger age group. Male predominance was confirmed. ASD and MVP may be considered important risk factors in our population. A preceding procedure may not be identified in majority of the patients. Most of the symptoms, signs and laboratory investigations were in conformity to world literature.

INTRODUCTION

Infective endocarditis is a microbial infection of the endocardial surfaces of the heart. Traditionally it has been classified as acute or subacute-chronic on the basis of tempo and severity of the clinical presentation of the untreated disease.[1] However, a newer classification categorizes infective endocarditis into native valve endocarditis, prosthetic valve endocarditis, intravenous drug abuser endocarditis and nosocomial endocarditis.[2,3,4] The characteristic lesion, a vegetation, is composed of a collection of platelets, fibrin, microorganisms and inflammatory cells. It most commonly involves heart valves but may also occur at the site of a septal defect, on the chordae tendinae, or on the mural endocardium.

The reported incidence of infective endocarditis in developed countries is 1.7 to 6.2 cases per 100,000 person years.[5,6] The common predisposing conditions are rheumatic heart disease, congenital heart disease, mitral valve prolapse, degenerative heart disease, asymmetrical septal hypertrophy, intravenous drug abuse and prosthetic valves.[7,8,9,10] The commonest organisms implicated in infective endocarditis are viridans streptococci, staphylococci and enterococci; gram-negative bacilli and fungi are less common causes.[11,12] The clinical presentation of infective endocarditis varies, with common symptoms being fever, chills, sweat, anorexia, weight loss, malaise, headache, nausea/vomiting, cough, dyspnoea and chest pain; less common symptoms are back pain, abdominal pain and confusion. The common examination findings are fever, murmur, splenomegaly, neurological abnormalities, embolic events, clubbing, Osler's nodes, petechiae, Janeway lesions, splinter hemorrhages and Roth's spot.[13,14] Investigations may show high ESR, proteinuria, positive RA factor, positive blood culture and an echocardiographic evidence of infective endocarditis[4]. Clinical diagnosis of infective endocarditis is based on modified Duke major and minor criteria.[15]

While the world literature is abundant in research papers highlighting various aspects of infective endocarditis, only a few studies have been conducted locally.[4,16,17,18,19,20,21,22,23] This small study was conducted focussing on demographic characteristics, various modes of presentations and distribution of clinical findings, frequencies of different valves involved, special risk factors and complications of infective endocarditis in our population.

MATERIAL AND METHODS

All patients admitted for unexplained fever associated with anemia, splenomegaly, hematuria and heart murmur, as well as patients with special risk factors like underlying heart disease, intravenous drug abuse, valve prosthesis, and unexplained stroke with fever were worked up for infective endocarditis. A detailed history was taken and a thorough physical examination was carried out. Two sets of blood culture were taken, at least two hours apart. Transthoracic and transesophageal echocardiography was arranged. Full blood count with ESR, urine examination, ECG, chest x-ray, blood urea, serum creatinine and rheumatoid factors were done in all patients. CT scan brain and abdominal sonography were carried out where necessary. Out of seventy patients screened, thirty were included in the study, fulfilling the following Duke criteria of clinical diagnosis of infective endocarditis.

1. Two major criteria or
2. One major and three minor criteria or
3. Five minor criteria

Major Criteria

1. A positive blood culture for a micro-organism that typically causes infective endocarditis, from two separate blood cultures.
2. Evidence of endocardial involvement documented by echocardiography (definite vegetation, myocardial abscess, new partial dehiscence of valve) or development of new regurgitant murmur.

Minor Criteria

1. The presence of a predisposing condition.
2. Fever > 38C°
3. Vascular phenomenon: major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial haemorrhage, conjunctival haemorrhage and Janeway lesions.
4. Immunologic phenomenon: glomerulonephritis, Osler's nodes, Roth's spot and rheumatoid factor.
5. Positive blood culture but not meeting the major criteria or serologic evidence of active infection with organisms consistent with infective endocarditis.
6. Echocardiogram consistent with infective endocarditis but not meeting major criterion.

All patients with specific febrile diseases like enteric fever, malaria, pneumonia or having evidence of other common infection were excluded by clinical examination and appropriate laboratory investigations. All patients with clinical suspicion of infective endocarditis who could not be categorized as definite infective endocarditis were also not included in the study.

All included patients were examined by two independent physicians to confirm the validity of clinical findings. The details of the selected patients were entered into a standard proforma. All selected patients were followed for a minimum of four weeks to document any complication.

RESULTS

A total of thirty patients fulfilled the criteria (Table–1). Twenty one (70%) were males and nine (30%) were females. The mean age of the patients in the study was 24 yrs. Overall age distribution for either sex is shown in Table–1. Fifty percent patients were below age 20. All female patients were below age 40.

AGE AND SEX DISTRIBUTION

Age group	Male	%	Female	%	Total No. of patients (%age)
10–20	8	26.66%	7	23.33%	15(50%)
21–30	4	13.33%	1	3.33%	5(16.66%)
31–40	6	20%	1	3.33%	7(23.33%)
41–50	2	6.66%	–	–	2(6.66%)
51–60	–	–	–	–	–
61–70	1	3.33%	–	–	1(3.33%)
	21		9		30

TABLE – 1

COMMON CLINICAL FEATURES

Symptoms	No. of patients (%age)	Signs	No. of patients (%age)
Fever	30(100%)	Fever	30(100%)
Shortness of breath	19(63.33%)	Murmur	29(96.66%)
Myalgia/arthralgia	18(60%)	Pallor	26(86.66%)
Chills	14(46.66%)	Splenomegaly	12(40.66%)
Anorexia	14(46.66%)	Clubbing	8(26.66%)
Malaise	12(40%)	Embolic phenomenon	7(23.33%)
Sweating	11(36.66%)	Neurologic complications	5(16.66%)
Backache	11(36.66%)	Petechiae	2(6.66%)
Weight loss	9(30%)	Roth's spot	1(3.33%)
Cough	9(30%)	Any other	
Chest pain	9(30%0	Hepatomegaly	6(20%)
Nausea/vomiting	7(23.33%)	Cyanosis	1(3.33%)
Headache	6(20%)		
Confusion	4(13.33%)		
Abdominal pain	3(10%)		
Visual loss	1(3.33%)		
Seizure/loss of consciousness	1(3.33%)		

TABLE – 2

The commonest symptoms were fever, shortness of breath, arthralgia/ myalgia, chills, anorexia and malaise. Less common symptoms included backache, sweating, weight loss, cough and chest pain (Table–2).

The most common signs observed were fever, cardiac murmurs, anemia and splenomegaly. Other signs included hepatomegaly and peripheral embolic complications due to embolic phenomenon (Table–2)

LABORATORY MANIFESTATIONS

Manifestations	No. of patients
High ESR	30(100%)
Anemia	26(86.66%)
RA factor	16(53.33%)
Leucocytosis	9(30%)
Hematuria	8(26.66%)
Raised urea	7(23.33%)
Raised serum creatinine	6(20%)
Proteinuria	6(20%)
Positive blood culture	5(16.66%)

TABLE – 3

High ESR, anemia and RA factor positivity topped the list of abnormal laboratory investigations. (Table–3) However, other like leukocytosis, hematuria, proteinuria and high BUN were also not uncommon. Blood culture was positive only in 5 out of 30 patients.

The most common underlying predisposing conditions were chronic rheumatic heart disease, congenital heart disease and mitral valve prolapse (Table–4). One patient had a prosthetic valve.

Six patients had a possible preceding surgical procedure done to account for the development of infective endocarditis (Table–5). Four of these were females and all of them had a gynecological procedure.

Mitral valve topped the list of predominant valves involved in the process of colonization by the bacteria, followed by

PREDISPOSING CARDIAC CONDITIONS

Lesion	No. of patients
RHD	**19(63.33%)**
MR & AR	8(26.66%)
MR	5(16.66%)
MS & MR	4(13.33%)
AR	1(3.33%)
MS/MR & AS/AR	1(3.33%)
CHD	**7(23.33%)**
ASD secundum	2(6.66%)
VSD	2(6.66%)
PDA	1(3.33%)
PS	1(3.33%)
TR	1(3.33%)
MVP	**3(10%)**
Prosthetic valve	**1(3.33%)**

TABLE – 4

aortic and tricuspid valves (Table–6). One patient has two valve involvement while the pulmonary valve was involved in one patient. Pulmonary vegetations were diagnosed in a single patient as well.

Twelve patients (40%) have some complications of infective endocarditis during course of their illness. Eight had single event while other four had more than one complication (Table–7). Glomerulonephritis was the frequently occurring complication, followed by neurologic and septic pulmonary emboli. Three patients had peripheral embolic episodes while one patient developed acute left ventricular failure. Five patients died during the course of their illness giving a mortality of 16.66%.

DISCUSSION

Interesting trends emerge from this study. The male predominance is one aspect and has been reported elsewhere by researchers.[8,24,25] Most of the patients belonged to a younger age group, with almost 90% of them falling below 40. Majority of the researchers from developing countries report a similar age group affected,[16,26,27,27,28,29] in comparison to developed countries where a relatively older population is affected. The reason to support this finding is based on the fact that chronic rheumatic heart disease is not only the most common underlying predisposing condition in developing countries but is also prevalent in a younger age group predisposing them to infective endocarditis. On the other hand increased longivity in developed countries due to better health care system has not only given rise to predisposing factors like degenerative valvular disease, placement of prosthetic valves, and increased exposure to nosocomial bacteremia, but also the median age of the patients has increased from 30-40 years during pre-antibiotic era to 47-69 years more recently.[1,6,8,30,31]

There were no surprises in the pattern of symptoms, signs and laboratory features compared to other reported studies.[2,16,32,33,34] However, worth mentioning are the low positivity of blood culture and the presence of positive rheumatoid factor. Low culture positivity is understandable because of the previous intake of antibiotics by almost all the patients but in its absence rheumatoid factor gained an immense importance. It was present in majority of our patients and helped in classifying the patients as definite

COMMON RISK FACTORS IN INFECTIVE ENDOCARDITIS

Risk factor	No. of patients
Forceps delivery	2(6.66%)
Evacuation & curettage	1(3.33%)
Abortion	1(3.33%)
I/V drug abuse	1(3.33%)
Cardiac surgery	1(3.33%)

TABLE – 5

VALVES AFFECTED IN INFECTIVE ENDOCARDITIS

Valves	No. of patients
Mitral	18(60%)
Aortic	4(13.33%)
Tricuspid	4(13.33%)
Pulmonary	1(3.33%)
Aortic & Pulmonary	1(3.33%)
Pulmonary artery	1(3.33%)
Prosthetic valve	1(3.33%)

TABLE – 6

infective endocarditis. This is a simple and easily available test and must be included in the work up of all patients suspected of infective endocarditis.

Chronic rheumatic heart disease was the most common underlying lesion and is a similar finding in Pakistan and other countries.[16,26,27,29,35,36,37] The pattern of valve involvement showed interesting findings. Mitral valve was affected in majority of patients as reported elsewhere.[38,39] However two patients had ASD secundum type on transesophageal echocardiography, and both of them showed vegetation on the tricuspid valve. Normally the ASD lesion is considered carrying a low risk for infective endocarditis[40], but whether this finding suggests a predisposition for tricuspid valve vegetation is difficult to substantiate. Similarly, three out of thirty patients had MVP with MR and vegetation. Although American Heart Association categorizes this cardiac lesion as intermediate risk for infective endocarditis[40]; we feel these are significant findings and both underlying lesions may be considered in priority for prophylactic antibiotic therapy in our population.

Only in 6 out of 30 patients a possible preceding procedure could be identified to account for the colonization of the predisposed underlying heart valves. This included four females while only two males gave a history of such an event. This is supported by other studies.[26,41,42] What initiated the process in the others remained inconclusive and needs further studies. This is important as if identified, it may lead to some local prophylactic guidelines for the prevention of infective endocarditis in our male predisposed population, especially majority of the patients showing an underlying cardiac lesion.

Mortality and complications were similar to studies reported elsewhere.[25,43,44,45,46,47,48]

CONCLUSION

Infective endocarditis is a common problem but prior use of antibiotics and lack of positive blood culture prevents most of the physicians making a definite diagnosis. Hundred percent of our patients had underlying cardiac lesion to predispose them to infective endocarditis. Most of the patients belonged to younger age group. Male predominance was confirmed. ASD

COMPLICATIONS OF INFECTIVE ENDOCARDITIS

Complications	No. of patients (%age)
Single complications	**8(26.66%)**
Glomerulonephritis	2(6.66%)
Septic pulmonary emboli	2(6.66%)
Right hemiplegia	1(3.33%)
Left hemiplegia	1(3.33%)
Seizure/loss of consciousness	1(3.33%)
Acute left ventricular failure	1(3.33%)
Multiple complications	**4(13.33%)**
GN/Septic pulmonary emboli	1(3.33%)
GN/Septic pulmonary emboli/ small gut gangrene	1(3.33%)
GN/ischemic foot/monocular blindness/right hemiplegia/ gangrene finger	1(3.33%)

TABLE – 7

and MVP may be considered important risk factors in our population. A preceding surgical procedure may not be identified in majority of the patients. Most of the symptoms, signs and laboratory investigations were in conformity to the world literature.

It is emphasized that this is a small study and can not be considered for drawing guidelines and firm conclusions. However this is an important study and highlights many interesting and practical aspects of this important clinical entity and can be taken as a baseline for formulating larger studies.

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