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## Evaluation of Patients with Infective Endocarditis in a Pulmonary Referral Centre

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### ABSTRACT

**Background:** Despite the decreased incidence of rheumatic fever and use of prophylactic antibiotic the incidence rate of infective endocarditis has not declined. In this research, we have studied the clinical feature and therapeutic response of patients with infective endocarditis presenting with pulmonary manifestations to a pulmonary referral center.

**Materials and Methods:** All patients with diagnosis of endocarditis that had pulmonary manifestations (based on Duke Criteria) as their primary clinical presentation were entered in this study. Data in regard to individual information, clinical features, laboratory finding and therapeutic responses were noted. All data were analysed using SPSS software (version 11.5).

**Results:** A total number of twenty patients here entered the study. Mean age was  $34.8 \pm 11.6$  yr. The commonest clinical features included: fever (95%), cough (65%) and dyspnea (65%). Also the commonest signs were cardiac murmurs (65%), hepatomegaly (35%) and splenomegaly (35%). Clubbing was seen in 10%. Sixty percent of the cases were intravenous drug users and 25% were infected with HIV. Also 50% of the patients did not have any background of valvular diseases. However, there was vegetations on one valve in 75% and multiple valves were involved in 25%. The commonest valves affected were aortic (50%), mitral (30%) and pulmonic valve (10%). *Staphylococcus aureus* (47.3%) and *Streptococcus viridans* (27.3%) were the commonest microorganisms detected. Pericardial effusion was present in 30% which was higher in IV drug users ( $p$  value=0.042). Total mortality rate in hospital was 5%.

**Conclusion:** Infective endocarditis should be considered in the list of differential diagnosis in patients suffering from pulmonary symptoms especially in IV drug users. (*Tanaffos* 2005; 4(16): 41-45)

**Key words:** Endocarditis, Intravenous drug user, Valvular disease

### INTRODUCTION

Despite the decreased incidence of rheumatic fever in the world and use of prophylactic antibiotics in patients with cardiac lesions, there is no evidence

of decline in endocarditis. In fact, based on certain findings, infective endocarditis is on the rise (1). Our information on endocarditis goes back to Fernal's report from early 1500 A.D. This disease is still a diagnostic and therapeutic challenge for physicians and is associated with high mortality and morbidity

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(2). Therefore, for a proper approach rapid diagnosis and treatment are necessary and essential (3). Recently *Staph. aureus* has been considered as the commonest microorganism (4).

On the other hand, infective endocarditis is one of the severest complications of IV addiction (5). The incidence of endocarditis among this group ranges from 150-2000/ 100000 per year (6). Usually the tricuspid valve is affected and *Staph. aureus* is the commonest cause. However, endocarditis in IV drug users is associated with good prognosis (5, 7).

In the USA and Western Europe the incidence of endocarditis in normal valves ranges from 1.7-6.2/100000 per year (7, 8). Endocarditis on the left side of the heart usually presents with extracardiac manifestations and local spread of infection. Meanwhile, involvement of the right side of heart with endocarditis is presented with peripheral emboli and pulmonary complications (9).

We have studied the epidemiological, clinical and therapeutic features of patients with infective endocarditis that had referred with pulmonary symptoms.

## MATERIALS AND METHODS

Masih Daneshvari hospital is a pulmonary referral center. In this research, patients that were admitted with pulmonary symptoms (from 2002-2004) and based on Duke criteria (9), were diagnosed as endocarditis, were enrolled in this study.

Epidemiologic, clinical, diagnostic, and therapeutic data of patients were collected from their files and entered in special forms. Data were entered and analysed using SPSS software (version 11.5). Central indices for quantitative variables were calculated.

In order to evaluate the relation between status and gender and positive blood culture with IV drug use, chi-square and Fisher exact tests were used. Also, for evaluating the relation between IV drug use

and pericardial effusion chi-square test was used. A p-value less than 0.05 was considered statistically significant.

## RESULTS

A total of 20 cases consisting of 17 male (85%) and 3 female (15%) patients entered the study. Mean age of patients was  $34.8 \pm 11.69$  yr. The most frequent symptoms were fever (95%), cough (65%), and dyspnea (65%). Also, the commonest sign was cardiac murmur (60%). Hepatomegaly and splenomegaly were seen in 35% of cases.

Table 1 demonstrates the clinical features. Mean duration from the onset of symptoms to diagnosis was  $13.5 \pm 19.7$  days. Also, 60% of patients were IV drug users while 25% were HIV positive.

**Table 1.** Clinical features of infective endocarditis in under study patients (N=20) admitted in Masih Daneshvari hospital during 2002-2004.

symptoms	Number of patients affected (%)	Signs	% of patients affected
Fever	19 (95)	Murmur	12(60)
Cough	13 (65)	Splenomegaly	7(35)
Weakness	13 (65)	Hepatomegaly	7(35)
Weight loss	13 (65)	Clubbing	2(10)
Dyspnea	13 (65)	petechia	1(5)
Chest pain	13 (65)		
Sputum production	12 (60)		
Anorexia	11(55)		
Hemoptysis	5(25)		
Myalgia	3(15)		
Arthralgia	2 (10)		

Laboratory investigation demonstrated: mean WBC=  $11.9 \pm 0.9$  ( $\times 1000$ ), mean Hb=  $10.6 \pm 0.4$ , mean platelet=  $226.6 \pm 32.97$  ( $\times 1000$ ), and mean ESR=  $71 \pm 7.4$ .

Meanwhile, WBC<4000 was observed in 5%, WBC=4000-10000 in 25%, and WBC> 10000 in 70% of patients. In 100%, PMN were the predominant cells. Thrombocytopenia was observed in 15% and rheumatoid factor was positive in 40% of the patients.

In regard to radiological manifestation, abnormal features were detected in 70%; cardiomegaly in 25%, pleural effusion in 50% and pneumothorax in 20% of the patients.

Echocardiography proved vegetations on a single valve in 75% of the cases while multiple valves were involved in 25%:

Urine analysis showed hematuria in 40% pyuria in 25%, and proteinuria in 20% of the patients.

In 50% of the patients, there was no underlying valvular disease; meanwhile, congenital heart disease and valvular heart disease were detected in 25% and 25% of the cases respectively. The commonest valvular complications were MVP (mitral valve prolapse) and mitral valve regurgitation (20%).

Electrocardiogram (EKG) showed non-specific changes such as ST-T changes and sinus tachycardia in 50% of the cases. In 50% of the patients there was tricuspid vegetation. This was followed by mitral (30%) and pulmonic valve (10%) involvement. Also in 10% vegetation was observed on VSD. In 65% of the patients the size of the vegetation was greater than 1 cm. Pericardial effusion was detected in 30%.

In nine cases, in which the micro organism was detected, *Staph. aureus* (27.3%) and *Strep. viridans* (27.3%) were the commonest microorganisms. *Enterococcus*, *E.Coli*, and *Stap. epidermidis* each were detected in one case. The commonest sites in which the microorganisms were detected were blood culture (33.3%) and pleural fluid (33.3%).

After therapy, echocardiographic results were available in all cases except one.

In one case the vegetation disappeared (5%) while in 10(55%) its size reduced. The size of vegetation

increased in 1 (5%) case while there was no change in the dimensions of the vegetation in the remaining cases (30%).

Fifty percent of the patients showed improvement with medical therapy while 45% were referred to surgical ward for further treatment. The mortality rate was 1 (5%) which was due to endocarditis.

There was a significant statistical relation between improvement with medical therapy and IV drug use ( $p=0.014$ ). However, this was not the case with gender ( $p=0.625$ ) and positive blood culture ( $p=0.721$ ). Also, the incidence of pericardial effusion in IV drug users was significantly higher than normal individuals ( $p=0.042$ ).

## DISCUSSION

Although endocarditis is not considered as an important element in the list of differential diagnosis of patients with pulmonary manifestation, rapid diagnosis is essential and significant. It is noteworthy that clinical and epidemiological characteristic of infective endocarditis is continuously changing (10). In developing countries, there is little information on pattern and response of treatment in patients with infective endocarditis (11). Many countries have reported the changes observed in the pattern of endocarditis in the past three decades (12).

In this research, about 60% of the patients were IV drug users; which is a higher rate as compared to other studies (8, 10, 13). Since patients with respiratory symptoms were studied in this study, this point is justifiable. In regard to mean age (32.8yr.), it was compatible with reports from developing countries (11, 12, 14, 15) while when compared with statistics from developed countries it was low (10, 11). It seems that when patients refer with pulmonary manifestations and have certain diagnostic criteria such as being an IV drug user, the disease is diagnosed more rapidly. 55% of the patients did not have any underlying heart disease; a rate which is

higher when compared with other researches (10, 13, 16). Therefore, when a patient refers with pulmonary features, presence of underlying disease is not essential to confirm the diagnosis of endocarditis.

In regard to clinical features, cough and fever were the commonest symptoms. Hepatosplenomegaly was observed in 35% which is a lower rate when compared to other studies (17).

It is notable that peripheral lesions were observed in only one case. Clubbing is one of the findings reported in endocarditis cases; which was detected in 10% of our cases. Therefore, in patients with pulmonary symptoms and clubbing, endocarditis must be considered in differential diagnosis. Most of vegetations occurred on tricuspid valve. In the absence of IV drug use, vegetation on pulmonic valve is a rare incidence (18). In our study, vegetation on pulmonic valve was observed in 10% of the patients; both of them being IV drug users. It is noteworthy that 30% of our patients had vegetation on mitral valve. Thus, presence of pulmonary manifestation as a presentation of endocarditis does not rule out left sided endocarditis.

Blood culture is the key in diagnosis of endocarditis (19). New reports from different parts of the world have considered *Staph. aureus* as the commonest microorganism (8, 17, 18, 20) followed by *Strep. viridans* (17, 20). Similarly in our research *Staph. aureus* and *Strep. viridans* were the commonest microorganisms.

The rate of culture negative endocarditis ranges from 20-49% as reported in different studies (19, 21). Methodologic problems of blood culture and the absence of a uniform system for studying the rare infectious causes are the other notable issues (19). In our research we did not detect any microorganism in 55% of the cases; a rate which is higher than other studies (19, 21). It seems the most important reason being the unnecessary use of antibiotics in these

patients. Although other reasons such as laboratory problems should not be forgotten.

Only one patient (5%) died as a result of endocarditis which was a lower rate when compared with other in-hospital records (13, 17, 20, 22, 23). The reason seems to be the higher rate of IV drug users that had right sided endocarditis in our under study population.

Another important point in this study was the presence of pericardial effusion in IV drug users, which was significantly higher ( $P= 0.042$ ) as compared to normal individuals. This fact i.e. pericardial effusion in IV drug users with endocarditis, has been mentioned in other studies as well (17).

## CONCLUSION

Infective endocarditis must be considered in patients with pulmonary manifestations especially those that are IV drug users. In majority of patients, tricuspid valve was involved, which had a better prognosis as compared to left sided endocarditis. Also pericardial effusion in IV drug users with endocarditis is a common finding.

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