Research Article

Demographic Characteristics, Clinical Presentation, Underlying Conditions, and Outcome of Infective Endocarditis

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Abstract

Background: The understanding of the epidemiology and demographic patterns of diseases can accelerate diagnosis and treatment, as well as decrease morbidity and mortality.

Objectives: This study was performed to determine the epidemiological pattern of infective endocarditis in the city of Ahvaz, Iran.

Methods: In this cross-sectional study, 79 patients with infective endocarditis were studied between 2004 and 2013 in Razi Teaching Hospital affiliated to the Ahvaz Jundishapur University of Medical Sciences. The diagnosis was made based on the Duke criteria. The data were recorded in a checklist for epidemiologic data including age, gender, time to defervescence, etc. Data analysis was performed using SPSS version 18 software.

Results: Among the sample of 79 patients, the frequency was highest in men (n = 65, 82.3%) and in the age group of 26 - 35 years (38%). The fever was resolved in 49 (49.4%) patients after four days whereas 19 (24.1%) patients had no fever. The most common predisposing factor was being an intravenous drug user, which was true for 44 (55.7%) patients. The most common affected valve was the tricuspid valve, as seen in 43 (54.4%) patients. The most common peripheral manifestation was musculoskeletal manifestations seen in 13 (16.5%) patients. Blood cultures were positive in 12 (15.2%) patients. Fifteen (19%) patients expired during the study period and 64 patients were improved, of whom 23.4% required surgical intervention.

Conclusions: Appropriate diagnosis is necessary for decreasing mortality.

Keywords: Endocarditis, Demography, Treatment, Outcome, Iran

1. Background

Infective endocarditis (IE) is an infection in the endocardial layer of the heart. IE commonly causes vegetation, which includes platelets, fibrins, microorganisms, and scattered inflammatory cells. The Duke criteria are used for the diagnosis of IE that is sensitive and specific based on laboratory data, clinical presentations, and echocardiographic findings. The incidence and mortality of IE have increased in the last decade (1, 2). In developing countries, although the incidence of congenital heart diseases remains constant, other predisposing factors are shifting from chronic rheumatic heart diseases to intravenous drug use, degenerative valvular heart diseases, intracardiac manipulations, and healthcare-associated infections (3). IE can be fatal if not treated (4). Thus, an early diagnosis, followed by appropriate treatment, is essential (5).

2. Objectives

In this study, we reviewed the clinical signs and outcomes of admitted patients with IE because the recognition of at-risk groups may decrease the disease mortality.

3. Methods

In this descriptive cross-sectional study based on hospital information, all patients with signs and symptoms compatible with IE during 2004 - 2013 were examined. Patients were admitted to Razi Hospital, which is affiliated to the Ahvaz Jundishapur University of Medical Sciences. Informed consent was obtained from each patient. The diagnosis was made by infectious disease specialists based on the Duke criteria. Epidemiological survey forms were completed. The details noted in checklists included the patient's age, gender, time to defervescence, predisposing

factors, type of cardiac valve involvement, peripheral manifestations, blood culture results, antibiotic regimen, need for surgery, and outcome. The data were analyzed by SPSS version 18 software using the chi-square test. P values of less than 0.05 were considered significant.

4. Results

Of the 79 patients studied, 65 (82.3%) were male and 14 (17.7%) were female. The male-to-female ratio was 4.64. The age of patients ranged from 17 years to 83 years with a mean of 35.66 ± 15.61 years. The most prevalent age group was 26 - 35 years (38%), with a mean of 30. Nineteen (24.1%) patients had no fever and 39 (49.4%) had defervescence for more than four days. The predisposing factors were intravenous drug use in 44 patients (55.7%), rheumatic heart diseases in nine patients (11.4%), advanced age (more than 65 years) in eight patients (10.1%), and dialysis in seven patients (8.9%). Eleven patients (13.9%) had no predisposing factor. The most affected valve was the tricuspid valve, as seen in 43 (54.4%) patients, followed by the mitral valve in 20 (25.3%) patients, the aorta in 11 (13.9%) patients, the aorta and the mitral valve in two (2.5%) patients, the tricuspid and mitral valves in two (2.5%) patients, and the pulmonary and mitral valves in one (1.3%) patient. Peripheral manifestations are listed in Table 1. Blood cultures were positive in 12 (15.2%) patients. The most frequently administered antibiotic regimen was ceftriaxone-vancomycin (49.37%). Other regimens were ceftazidime-vancomycin (27.85%), ampicillin - gentamicin - cloxacillin (15.19%), ceftriaxone - vancomycin - gentamicin (3.79%), imipenem - vancomycin (2.5%), and amphotericin B (1.26%). Fifteen (19%) patients expired and 64 (81%) patients were improved, of which 23.4% needed surgical intervention.

The Mann-Whitney test showed no significant relationship between mortality and gender (P = 0.623). The Kruskal-Wallis test disclosed no correlation of mortality with age and affected valve (P = 0.781, P = 0.318, respectively).

5. Discussion

The present study showed that IE was more common in men with a mean age of 35.66 years. The intravenous drug use was the most prevalent predisposing factor and the tricuspid valve was the most affected valve.

Our study found that IE was more common in men. This finding is in agreement with the studies by Singer et al. (70%), Luk et al. (77%), Reyahin et al. (66%), and Alavi et al. (86.7%); however, the prevalence in our study was higher than the rates of the disease noted in the studies by Parvisi et al. (35%) and Francischetto et al. (49%) (6-11). The high prevalence rate might be attributed to intravenous drug users who were more common in men.

In this study, the most prevalent age group comprised of 25 - 36-years-old, with a mean age of 35 years, which is similar to the findings obtained by Reyahin et al. (age 20 - 33 with a mean of 28 ± 15 years), Singer et al. (mean age 29.3 ± 10.6), Besharat et al. (20 - 40 years), Behzadnia et al. (mean age 34.8 ± 11.6), Parvizi et al. (mean age 34 years), and Alavi et al. (mean age 29.53 ± 10.28); however, the mean age was higher in the studies by Luk et al. (50 years), Francischetto et al. (47 ± 18.7), and Fedeli et al. (68 years) (5-13). This difference might be due to the lower age onset of addiction.

In this study, 76% of the patients had fever, which is similar to the findings obtained by Reyahin et al. (79.7%), but lower than those reported by Besharat et al. (91%), Behzadnia et al. (95%), and Francischetto et al. (92%). It is possible that the patients had undergone antibiotic treatment before admission to our center (7, 9, 12).

The most prevalent predisposing factor was intravenous drug use, a finding that is similar to that of Singer et al. (50%) and Behzadnia et al. (60%) and inconsistent with that of Reyahin et al. (44.5%), possibly due to a high prevalence of addiction (5, 9, 11).

In this study, the most affected valve was the tricuspid valve. This finding is similar to that of Reyahin et al., Behzadnia et al., and Besharat et al. and inconsistent with Parvizi et al. (the aorta) and Francischetto et al. (the mitral valve) (5-7, 9, 12).

Blood cultures were positive in 15% of the patients, similar to the results by Behzadnia et al. (27%) and Reyahin et al. (21%), but inconsistent with the findings of Parvizi et al. (80%) and Francischetto et al. (89%). This may be because our patients possibly had received antibiotics prior to admission (5-7, 9).

In our study, 35 (44.3%) patients had no peripheral manifestations; in the rest, the most common manifestations were musculoskeletal manifestations (n = 13, 16.5%) and neurologic manifestations (12.7%), similar to Parvizi et al. study that found neurologic manifestations in 15% of patients (6).

The need for surgical intervention in our study was 23.4%, which is consistent with the reports of Singer et al. (25%) and Asgerisson et al. (15% - 45%) (11, 14).

In our study, the mortality rate was 19%, which is similar to Parvizi et al. (20%) and Asgerisson et al. (20% - 30%), but disagreed with other studies by Behzadnia et al. (5%), Reyahin et al. (7.5%), Francischetto et al. (32%), and Besharat et al. (52%) (5-7, 9, 12, 14).

Table 1. Peripheral Manifestation

Peripheral Manifestations	Frequency	Frequency Percent	Cumulative Percent
No sign	35	44.3	44.3
Neurologic signs	7	8.9	53.2
Janeway lesions	4	5.1	58.2
Splenomegaly	3	3.8	62
Subconjunctival hemorrhage	2	2.5	64.6
Musculoskeletal manifestations	13	16.5	81
Glomerulonephritis	4	5.1	86.1
Osler nodes, splinter hemorrhage, and subconjunctival hemorrhage	1	3.1	87.3
Neurologic signs, musculoskeletal manifestations	3	3.8	91.1
Musculoskeletal manifestations and splinter hemorrhage	2	2.5	93.7
Splenomegaly and septic emboli	1	1.3	94.9
Septic emboli and musculoskeletal manifestations	1	1.3	96.2
Neurologic signs, Janeway lesions, splinter hemorrhage, and Osler nodes	1	1.3	97.5
Neurologic signs and splenomegaly	2	2.5	100
Total	79	100	-

Some limitations should be considered in our study. The study population was restricted to admitted patients to a referral center. Hence, this may have been a source of bias and resulted in the overestimation of intravenous drug use. Other limitations were the use of disk diffusion to report blood cultures while it was ideal to test susceptibility and resistance by MIC. Incomplete information in the hospital files and the small sample size were the other limitations.

5.1. Conclusions

In people with drug injection, IE is a differential diagnosis in febrile patients. Appropriate diagnosis and treatment are essential for decreasing the IE mortality.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

Footnotes

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