Original Article

INFECTIVE ENDOCARDITIS AMONG HOSPITALIZED INTRAVENOUS DRUG USER PATIENTS IN THE SOUTH WEST OF IRAN

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ABSTRACT

***Objectives**:* To determine the frequency of Infective Endocarditis (IE), clinical, echocardiographic and microbiological status at a teaching hospital in Ahvaz, South West Iran.

***Methodology**:* Medical records of 323 Intravenous Drug User (IDU) inpatients from 2001 to 2006 were reviewed, out of which 33 cases that fulfilled the Duke criteria for diagnosis were included in the present study. The patients' characteristics, clinical findings, microbiological findings, echocardigraphic and comorbidities data were extracted. Data of patients with IE and without IE were compared in SPSS using t-test and chi square test.

***Results**:* Patients with IE were 32 male and one female cases with a mean age of 26.2 years. Non IE patients were 288 male and two female cases with mean age of 37.8 years. Nineteen of our patients were HIV positive. There was statistically significant difference between HIV-positive and HIV-negative patients. Weight loss and fever were the commonest clinical findings. *Staphylococcus aureus* was the most common organism (24.2%) followed by coagolase negative staphylococcus (15.1%), most of them were methiciline resistant. Tricuspid valve was involved in 33.3% of cases.

Conclusion: Frequency of Infective Endocarditis (IE) among Intravenous Drug User (IDU) is higher than reported in earlier studies. HIV infection increases the risk of IE. Methicilin resistant *Staphylococcus aureus* is the commonest organism. Tricuspid is the commonest involved cardiac valve.

KEY WORDS: Injection drug users, Infective endocarditis, Ahvaz.

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INTRODUCTION

The proximity of Iran to Afghanistan the main producer country of illicit drugs has greatly contributed to an increased availability of illicit drugs in Iran. According to Iranian welfare organization report, 16.2% of addicted individuals in Iran are Intravenous drug users (IDU) while half of them shared needles.[1] In the increasing number of IDU population in Iran, communicable diseases are an important health problem.[1] These individuals act as sources of many dangerous infectious pathogens in the community.[2]

IDU are at increased risk of infective endocarditis (IE).[3] IE is an infection of the endocardial surface of the heart and it implies presence of micro-organisms in the lesion.[1] Formerly rheumatic heart disease was the commonest predisposing cause, but mitral valve prolapse, aortic sclerosis, bicuspid aortic valvular heart disease, prosthetic valvular heart disease and IDU are now more frequently encountered.[4] IDU can increase IE risk through a variety of mechanisms. Drug solutions may contain particulate matter (e.g., talc) that damage cardiac valves if injected intravenously. In addition, poor injection hygiene (e.g., lack of skin cleaning before injecting), injecting with unsterile equipment, and injecting contaminated drug solutions can introduce high circulating bacterial loads.[5]

In the industrial countries, the incidence of community acquired native-valve endocarditis in most recent studies is 1.7 to 6.2 cases per 100,000 person-years.[6] The incidence among IDU is estimated at 150 to 2000 per 100,000 person-years and can be higher among patients with known valvular heart disease. IE in IDU has special etiological, epidemiological and clinical characteristics compared to IE in non–IDU in most studies.[7] Despite the increasing number of IDU patients in Ahvaz as well as the country there is little data on the effect of illicit drug on IE aspects.

The aim of this study was to determine the incidence of IE, its predisposing factors, echocardiographic and microbiological status among IDU population admitted in a training hospital at Ahvaz a city in the south west of Iran.

METHODOLOGY

In this retrospective study medical records of IDU patients between 2001 and 2006 at Razi Hospital a training hospital affiliated to medical college of Ahvaz Jundishapur University of Medical Sciences(AJUMS) were reviewed.

Three hundred twenty three IDU patients between 2001 and 2006 were identified from hospital records, 33 of whom fulfilled the clinical, microbiological, and echocardiographic criteria (Duke Criteria) described by Durack et al[8] and were included in the present study. Data on the patients' demographic characteristics, predisposing factors, clinical findings, complications, result of investigations and duration of hospital stay were extracted from their hospital's files. Patients were placed in two groups, 33 cases with endocarditis in one group and 290 cases without endocarditis in another group. Statistical analysis was done using SPSS version 16. Students t test was used to compare mean age and chi square test was used to compare proportion among two different groups and a p value of <0.05 was taken as statistically significant.

RESULTS

A total of 33 cases of IE were included in the study. The overall relative frequency was calculated to be approximately 9.9%. Majority of the patients (n= 30, 91.9%) were from urban areas and the rest were referred from rural areas (n=3). As shown in Table-1 a great majority were male (n=32). IE patients had a mean age of 26.3 ±5.4 years and were significantly younger ($p< 0.05$) than non–IE patients (mean age 35.5±8.7 years).Duration of IDU was 6.7 ± 4.4 years in IE patients, while in non IE was 4.1±3.5 ($p<0.05$). At the time of admission, fever was the commonest presenting complaint in IE cases with frequency of 89.7%, sweating with 83.3%, fatigability 86%, shortness of breath 66.7% and cough 57.8% (Table-II).

As shown in Table-II, microbiological findings of our cases were as follow: *Staphylococcus aureus* was the commonest organism (24.2%) followed by *Staphylococcus coagulase negative* (15.1%) and *pseudomonas* (3.1%). Most of staphylococci isolated were methicillin-resistant.

Echocardiography results were available in 24 cases. The tricuspid valve alone was involved in 33.3% of cases followed by mitral valve (24.2%) and aorta (15.1%). Involvement of more than one valve was found in two cases (6.6%). (Table-II). Vegetation and mass on the valve leaflet was the most reported lesions (57.5%) in the patients in whom echocardiography was performed.

Table-I: Demographic Characteristics, Habits and Comorbidity in IE and non IE patients.

Variables		*IE N(%)*	*Non IEN(%)*	*P-value*
Sex	Male	32(96.9)	288(99.3)	0.27
	Female	1(3.1)	2(0.7)	
Age	>35 years	13(39.4)	165(60)	
	<35 years	20(60.6)	125(40)	0.04
Habits	Smoking	32(96.9)	288(99.3)	0.27
	Alcohol	18(54.5)	140(48.3)	
Duration of IDU	Sharing in needles	21(63.6)	145(50)	
	>5 years	21(63.6)	90(31.1)	0.09
	<5 years	12(36.4)	200(68.9)	0.0002
Imprisonment		21(63.6)	145(50)	0.09
Co morbidity	HIV	19(57.5)	41(14.1)	<0.0001
	HCV	13(39.3)	90(31.1)	0.21
	HBV	4(12.1)	8(2.8)	0.02
	TB	15(45.5)	44(15.2)	0.0001

Co-morbidity such as infection with hepatic B virus, hepatitis C virus and Human Immunodeficiency Virus, and tuberculosis among IE and non IE cases are shown in Table-I. Smoking, alcohol consumption, sharing in needle /syringe and imprisonment in both groups are also shown in Table-I.

DISCUSSION

The estimated incidence of IE in our study was 10 percent. The incidence of IE in general population is four per 100,000 in average[4] Although our patient are not real representative of total IDU in the region, but virtually we can say that the incidence of IE among IDU are very higher than in the general population. This finding is in consistent with previous studies.[9] Frontra believed that the incidence of IE in IDU is 100-1000 times higher than in the general population[9] The high incidence may be related to IDU and sharing in needles and repeated injections.[5] Our study showed that long duration of ID usage increases the risk of IE among IDU individuals (6.7years vs.4.1years, $p<0.05$). Our results are in agreement with earlier studies.[10] Repeated illicit drug injecting through years of drug abuse puts the IVDU patients at increased risk of endothelial damage and consequently valvular involvement.

The present study showed that the commonest clinical finding was weight loss followed by fever, cough and fatigue. This finding is in agreement with previous studies and literature.[10-13]

These confounding variables are not independently related to IE. Indeed chronocity of addiction, long term opportunist infections, inappropriate nutrition and poverty may influence on these findings.

Table-II: Clinical, Echocardiogrphic and Microbiological findings of IE patients.

Variables		*Number*	*Percent*
Clinical	Fever	29	87.9
	Fatigue	21	63.6
	Weight loss	33	100
	Cough	26	78.8
Echocardiography:	Tricuspid valve	11	33.3
	Mitral valve	8	24.2
	Other valves	5	15.1
Microbiology:	Staphylococcus areus	8	24.2
	Coagulase negative staphylococcus	5	15.1
	Others	1	3.1

The association between HIV infection and IE in this study was statistically significant ($p<0.05$). Yousef et al[6] explained in their work that there is no significant difference between HIV positive and HIV negative in the incidence of IE. Yu et al have explained that drug illicit AIDS patients are at high risk of IE.[13,14] we believe that HIV infection increases the risk of IE among IDU patients. Indeed repeated bacterial infection put the IDU patients at the higher risk of valve involvement. In the other hand, HIV-related cardiopathy may be responsible for valvular damage resulted in IE.

In this study, in less than 50% of IE patients, tricuspid valve was involved. Frontera et al and earlier investigators[9] reported that tricuspid valve was involved in more than 75% of IDU patients with IE. Tricuspid valve is expected to be involved in 86% IDU patients with IE.[15] This difference in our results may be due to this fact that our sample size was small, restricted to a teaching hospital and probably because of misdiagnosed pre-existing valvular diseases.

In the present study although only 42% patients had positive blood cultures, Staphylococcus areus was the commonest isolated organisms mostly methicillin resistant. Review of earlier studies on this issue demonstrate controversial findings.[5,6,11,12,16,17] Yousef et al explained that most of isolated S. aureus in the IE patients were methicilline sensitive.[6] Cooper et al showed that methicillin resistant S. areus were dominant isolated pathogen from their patients.[5] We believe that the reason of drug resistant in our study may be due to unnecessary use or and self administration of antibiotic in our patients. Antibacterial abuse in the region of study is a chronic and a known major public challenge for the local health policy makers.

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