

# Outcome of Native Valve Endocarditis

Raj Kumar Sachdevani, Nand Lal Rathi, Suresh Kumar Rathi, Darshana Kumari,  
Bhunesh Kumar Maheshwari, Feroz Memon

## ABSTRACT

**OBJECTIVE:** To determine the in-hospital outcome of Native Valve Endocarditis patients and associated complications.

**STUDY DESIGN, PLACE AND DURATION:** Hospital based prospective study, Department of Cardiology, Liaquat University Hospital Hyderabad from July 2005 to December 2007.

**PATIENTS AND METHODS:** 56 consecutive patients, who presented with fever, joint pain, dyspnoea, history of Rheumatic fever, previous history of IE, history of I/V drug abusiveness were studied by history, physical examination, 3 blood samples were taken and sent to the laboratory for culture and sensitivity. All patients were evaluated by Doppler echocardiography on day 1, at 14 day, at one month and on 6<sup>th</sup> week of treatment. Empiric treatment was started on admission and later adjusted according to culture and sensitivity. Descriptive and inferential statistical analysis was performed using SPSS version 16.0.

**RESULTS:** Males outnumbered females with ratio 37(66.1%) / 19(33.9%). Definite vegetation was found in 40/56 (71.4%); but definite culture positive cases were 30/56 (53.6%). Complete improvement was seen in 32(57.1%), 08(14.3%) patients died during the course of treatment in hospital, 10(17.9%) were referred for surgery and 06(10.7%) patients developed recurrent episode of infective endocarditis. 13/56(23.2%) patients developed congestive heart failure, recurrent episodes of fever in 8(14.3%) and valvular regurgitation 6(10.7%) cases.

**CONCLUSION:** Our study showed that native valve infective endocarditis is not un common. Early diagnosis and treatment can help in improving morbidity and mortality, overall outcome and can reduce devastating complications associated with infective endocarditis. Patients who require surgical intervention like large vegetations or abscess should be referred for surgery as early as possible to avoid further complications.

**KEY WORDS:** Infective Endocarditis, Native valve, Vegetation.

## INTRODUCTION

Infective endocarditis (IE) is a microbial infection of the endothelial surface of the heart. The characteristic lesion "vegetation" is a variably sized mass of platelets and fibrin in which abundant micro-organisms and moderate inflammatory cells are enmeshed. Native Valve Endocarditis (NVE) is an infection of native heart valve or other cardiac structure, whether or not it was previously normal or damaged by acquired or congenital disease. The Intracardiac effects of the infection include severe valvular insufficiency, which may lead to intractable congestive heart failure and myocardial abscesses. IE not only affects the heart but also produces a wide variety of systemic signs and symptoms through several mechanisms, including both sterile and infected emboli and various immunological phenomena.

The investigations and management of infective endocarditis in the developed world have changed radically over the past 30 years.<sup>(1)</sup> Non-invasive imaging (Transthoracic Echocardiography [TTE] & Transesophageal Echocardiography [TEE]), molecular science, diagnostic protocols, and curative surgery have

all become common place, yet the incidence remains unchanged and annual mortality approaches up to 40%.<sup>(2, 3)</sup>

The incidence of infective endocarditis is approximately 1.7 - 6.2 cases per 100,000 patient years<sup>(4)</sup>, although rates are higher in at risk cohorts such as intravenous drug users.

Changes in the etiology, epidemiology, and outcome of infective endocarditis (IE) have been observed in recent years. In NVE, the number of cases that are hospital acquired has been increasing during the last 15 years. These cases are frequently associated with invasive intravascular procedures or IV catheter-related infections. Most patients have a previous valvulopathy that predisposes to IE. The spectrum of microorganisms involved is different from the community-acquired cases. Also, the outcome of endocarditis is worse in nosocomial NVE patients. In patients with enterococcal endocarditis, nosocomial acquisition of infection is an important factor determining outcome.

## PATIENTS AND METHODS

In this was hospital based prospective study we examined 56 consecutive patients diagnosed as native

valve endocarditis admitted in the cardiology department of Liaquat University of Medical and Health Sciences during 30 months period (July 2005 to December 2007).

**Inclusion Criteria:**

Patients with Native Heart Valve.

Those patients who met the definite modified Dukes criteria of Infective Endocarditis through (a) Clinical parameters, (b) Echocardiographic findings, (c) Blood culture.

**Exclusion Criteria:**

Patients with prosthetic heart valve.

Patients who met the probable and rejected Dukes criteria but did not meet the definite criteria.

Patients who responded within three days of the treatment.

Patients in whom the firm alternate diagnosis of IE was present.

All admitted patients in the department of cardiology LUMHS who presented with fever, joint pain, dyspnoea, history of Rheumatic fever, previous history of IE, history of I/V drug abusiveness were thoroughly studied by detailed history, clinical examination, routine labs, three sets of blood culture were drawn from different sites with at least one hour apart of the suspected patients of IE. The blood samples were incubated for 48 to 72 hours on sticking and swab plat method. The organism and their sensitivity were noted.

Patients were serially evaluated by two dimensional and Doppler echocardiography on day 1, at 14<sup>th</sup> day of treatment, at one month of treatment and on 6<sup>th</sup> week of treatment. The diagnosis of vegetation was made when definite vegetation at the tip of mitral / aortic valve / tricuspid valve / at the site of septal defect was visible throughout the cardiac cycle in at least two different echocardiographic views. After the confirmation of the cases on the basis of Duke's criteria of Infective Endocarditis having native valve were included in the study. In all these cases empiric treatment was started and later adjusted according to blood culture and sensitivity. Patients were very closely observed for the development of complications of infective endocarditis, especially heart failure during hospital course.

**Consent:**

Informed and written consent was taken from all the 60 patients, out of which 4 patients refused to take part in the study.

**Data Analysis Procedure:**

The data were evaluated in statistical program SPSS version 16.0. Simple frequencies and percentages were calculated among categorical parameters on 95% confidence interval. The chi square test of inde-

pendence was applied among the categorical variables to calculate frequencies, percentage and p value. Level of P value  $\leq 0.05$  was considered as significant.

**RESULTS**

In this study 56 cases of Native Valve Endocarditis were studied. Baseline profile including age, gender, site affected, causative agent and predisposing cardiac conditions were noted [Table I]. Males outnumbered females with ratio 37(66.1%) / 19(33.9%). Definite vegetation was present in 40/56 (71.4%) patients; definite culture positive cases were 30/56 (53.6%) [Table II], Streptococcus viridans was most common microorganism.

Complete improvement was seen in 32(57.1%) patients, 08(14.3%) died during hospital course and 10 (17.9%) patients were referred for surgery. [Table III]. Significant improvement was evidenced by the regression of vegetation on echocardiography in 24 (75%) cases with P value of  $< 0.002$ . 06(10.7%) patients developed recurrent episode of infective endocarditis.

Development of complications were observed in 13/56 (23.2%) patients. Congestive heart failure was the most common complication in all 13/56 (23.2%) cases, followed by recurrent episodes of fever 8 (14.3%) and valvular regurgitation 6(10.7%). Valvular abscess developed in 3(5.4%) patients and neurological complications were developed in 2(3.6%) cases. [Table IV].

**TABLE I: BASELINE PROFILE OF THE PATIENTS OF NATIVE VALVE ENDOCARDITIS (n= 56)**

Age (in years), Mean $\pm$ SD	23.13 $\pm$ 11.3(6–60)
<b>Gender:</b>	<b>n (%)</b>
Male	37(66.1%)
Female	19(33.9%)
<b>Site Affected:</b>	
Aortic valve	18(32.1)
Mitral valve	21(37.5)
Tricuspid valve	4(7.1)
Mixed (MR + AR) valves	8(14.3)
Ventricular septum	5(8.9)
<b>Causative agent of IE:</b>	
Streptococcus-viridians	14(25.0)
Staphylococcus aureus\	11(19.6)
Streptococcus Bovis	1(1.8)
Streptococcus Sangius	3(5.4)
Streptococcus epidermidis	3(5.4)
Possible positive	6(10.7)
	18(32.1)

**TABLE II: DISTRIBUTION OF CASES ACCORDING TO NVE DIAGNOSTIC CRITERIA (n=56)**

Major Criteria:	n (%)
<b>Vegetations</b>	
Yes	40(71.4)
No	16(28.6)
<b>Blood Culture:</b>	
Positive	30(53.6)
Negative	26(46.4)
<b>Minor Criteria:</b>	
Fever:	56(100)
Pre-disposing cardiac condition	52(92.9)
IV Drug Abuser	04(7.1)
Janeway's Lesion	3(5.3)
Intracranial Haemorrhage	3(5.3)
Osler Nodes	4(7.1)
RA Factor	8(14.3)
Roth Spot	3(5.3)
Possible vegetation	6(10.7)
Possible positive blood culture	9(16.0)

of the disease is not only attributable to the considerable morbidity and mortality during the active phase of the disease, but also to late complications and sequelae occurring once the infection has been eradicated<sup>(5, 6)</sup>.

Prognosis in patients surviving the initial stages of infective endocarditis is dependent on three main factors: substantial risk of recurrence (recently estimated at 0.3 – 2.5 /100 patient years); the need for valve replacement during follow up as a result of valve lesions caused or exacerbated by endocarditis; and lastly death particularly from heart failure<sup>(7, 8)</sup>.

Improvements in microbiology techniques, together with the recent introduction and development of Echocardiographic techniques (TTE & TEE) and expertise, have made a substantial contribution to ensuring early diagnosis, providing accurate information on possible complications and their monitoring<sup>(9, 10, 11)</sup>.

**TABLE III: OUTCOME OF STUDIED CASES OF NVE (n=56)**

	Improved (n = 32)	P value	Developed complications (n = 13)	P value	Referred for surgery (n = 10)	P value	Death (n = 8)	P value	Recurrent Episode (n = 6)	P value
<b>Aureus:</b>										
Yes	7(21.9%)	NS	5(38.5%)	0.05	4(44.4%)	0.04	4(50.0%)	0.04	-	
No	25(78.1%)		8(61.5%)		5(55.6%)		4(50.0%)			
<b>Culture Negative:</b>										
Yes	13(40.6%)	0.05	4(30.8%)	NS	-		2(25.0%)	NS	-	
No	19(59.4%)		9(69.2%)		6(75.0%)					
<b>Viridian:</b>										
Yes	12(37.5%)	0.01	2(15.4%)	NS	3(33.3%)	NS	2(25.0%)	NS	2(33.3%)	NS
No	20(62.5%)		11(84.6%)		6(66.7%)		6(75.0%)		4(66.7%)	

**TABLE IV: COMPLICATIONS OBSERVED IN THE STUDIED POPULATION (n = 56)**

	n (%)
Congestive Heart Failure	13(23.2)
Neurological	2(3.6)
New valvular regurgitation	6(10.7)
Recurrent Episode of Fever	8(14.3)
Valvular Abscess	3(5.4)

## DISCUSSION

Untreated infective endocarditis is one of the few universally fatal infectious diseases. The poor prognosis

It is also reported that the microbiological profile causing IE has changed in western countries, where staphylococcus is now the most common pathogen<sup>(12,13,14)</sup>. Western studies noted that this change may have resulted from dental problems being less important as a focus for infective endocarditis. Consequently several studies have reported that dental procedures are not a risk factor for infective endocarditis in various heart diseases<sup>(15,16,17)</sup>.

Masood Sadiq et al observed that infective endocarditis is difficult to diagnose in a surprisingly high propor-

tion of cases. This is particularly so in a developing country like Pakistan, where patients are referred late, or treated with antibiotics before referral, there is low yield of blood cultures, and incidence of rheumatic heart disease is high. Patients in our setup usually receive antibiotic treatment before reaching hospital which is usually late<sup>(18)</sup>.

The improvement during the course of treatment in the admitted cases of Native Valve Endocarditis was significant in the patients having vegetation as observed by repeated Echocardiography along with the clinical assessment and also the improvement seemed to be significant in the culture positive cases of streptococcus viridians. While the complication rate seemed higher in patients having staphylococcus aureus positive culture.

### **CONCLUSION**

Early diagnosis and treatment can help in improving morbidity and mortality, overall outcome and can reduce devastating complications associated with infective endocarditis. Those patients who require surgical intervention like large vegetations or abscess should be referred for surgery as early as possible to avoid further complications.

### **REFERENCES:**

1. Prendergast BD. The changing face of infective endocarditis. *Heart* 2006; 92:879-85.
2. Cabell CH, Jollis JG, Peterson GE, Corey GR, Anderson DJ, Sexton DJ, et al. Changing patient characteristics and the effect on mortality in endocarditis. *Arch Intern Med* 2002;162:90-4.
3. Mylonakis E, Calderwood SB. Infective endocarditis in adults. *N Engl J Med* 2001; 345:1318-30.
4. Scheld WM, Sande MA. Endocarditis and intravascular infections. In: Mandell GI., Douglas RG, Benett JE, eds. Principles and practice of infectious diseases, 3<sup>rd</sup> ed. New York: Churchill Livingstone; 1990:670-706.
5. Korzeniowski OM, Kaye D. Infective endocarditis. In: Heart disease, a textbook of cardiovascular medicine. Braunwald E, ed. Philadelphia: WB Saunders, 1992: 1078-105.
6. Delahaye F, Ecochard R, De Gevigney G, et al. The long term prognosis of infective endocarditis. *Eur Heart J* 1995; 16(suppl 2):48-53.
7. Tornos MP, Almirante B, Soler J. Natural history and prognosis in infective endocarditis. *Rev Esp Cardiol* 1998; 51(suppl 2):40 – 3.
8. Cormier B, Vahanian A. Echocardiography and indications for surgery. *Eur Heart J* 1995; 16(suppl B):6871.
9. Schulz R, Werner GS, Fuchs JB, et al. Clinical outcome and echocardiographic findings of native and prosthetic valve endocarditis in the 1990s. *Eur Heart J* 1996; 14:281-8.
10. Werner GS, Schulz R, Fuchs JB, et al. Infective endocarditis in the elderly in the era of transoesophageal echocardiography: Clinical features and prognosis compared with younger patients. *Am J Med* 1996; 100:90-7.
11. Awadallah SM, Kavey RE, Byrum CJ, Smith FC, Kveseilis DA, Blachman MS et al. The changing pattern of infective endocarditis in childhood. *Am. J. Cardiol.* 1991; 68: 90– 4.
12. Dudkiewicz B, Mikucki J, Ostrowski S. Infective endocarditis changes in the microbiological profile. *Mater. Med. Pol.* 1996; 28: 49–56.
13. Parras F, Bouza E, Romero J et al. Infective endocarditis in children. *Pediatr. Cardiol.* 1990; 11: 77–81.
14. Guntheroth WG. How important are dental procedure as a cause of infective endocarditis? *Am. J. Cardiol.* 1984; 54: 797–801.
15. Strom BL, Abrutyn E, Berlin JA et al. Dental and cardiac risk factors for infective endocarditis: a population-based, casecontrol study. *Ann. Intern. Med.* 1998; 129: 761–9.
16. Wahl MJ. Myths of dental-induced endocarditis. *Arch. Inter. Med.* 1994; 154: 137–44.
17. Van der Meer JT, Van Wijk W, Thompson J, Vandenbroucke JP, Valkenburg HA, Michel MF et al.

Efficacy of antibiotic prophylaxis for prevention of native-valve endocarditis. Lancet 1992;339:135-9.

18. Masood Sadiq, Ahsan Waheed Rathore, Mohsin

Nazir, Sheryar A Sheikh. Infective Endocarditis in children – diagnosis in a developing country Pak Paed J Jun 2000; 24(2):31-6.



*AUTHOR AFFILIATION:*

**Dr. Raj Kumar Sachdewani**

Registrar, Department of Cardiology  
Liaquat University of Medical & Health Sciences  
(LUMHS), Jamshoro, Sindh, Pakistan.

**Dr. Nand Lal Rathi** (Corresponding Author)

Assistant Professor, Department of Cardiology  
Isra University Hospital Hyderabad, Sindh-Pakistan.  
Email: drnand69@gmail.com

**Dr. Suresh Kumar Rathi**

Associate Professor, Department of Medicine  
Isra University Hospital Hyderabad, Sindh-Pakistan.

**Dr. Darshana Kumari**

LUMHS, Jamshoro, Sindh, Pakistan.

**Dr. Bhunesh Kumar Maheshwari**

Final year M.B.B.S Student  
LUMHS, Jamshoro, Sindh, Pakistan.

**Dr. Feroz Memon**

Professor, Department of Cardiology  
Isra University Hospital Hyderabad, Sindh-Pakistan.