

ORIGINAL ARTICLE

Clinical Profile and Etiological Agents Involved in Pediatric Infective Endocarditis

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ABSTRACT

Objective: To find out clinical profile and etiological agents involved in Pediatric infective endocarditis.

Study Design: A descriptive observational study.

Place and Duration of the Study: The Department of Pediatrics, Sughra Shafi Medical Complex, Sahara Medical College, Narowal, Pakistan from April 2017 to March 2021.

Material and Methods: A total of 195 children of both genders aged below 14 years and having endocarditis were enrolled. Endocarditis was labeled as per modified Duke's criteria. Data was entered and analyzed using SPSS version 26.0. Quantitative data like age was represented as mean and standard deviation. Qualitative data like gender, area of residence, clinical presentation, types of isolated microorganisms and underlying disease were shown as frequencies and percentages.

Results: Out of a total of 195 children, 124 (63.6%) were male. Overall, mean age was noted to be 5.48±2.1 years. Fever was the commonest type of clinical presentation noted among 148 (75.9%) children followed by shortness of breath 101 (51.8%) and chest pain/discomfort 48 (24.6%). Congenital heart defects were the commonest form of underlying disease observed in 95 (48.7%) children. Blood culture findings revealed 112 (57.4%) samples to produce no growth while coagulase negative staphylococcus was the commonest etiological agent noted in 37 (19.0%) children.

Conclusion: Majority of the children with infective endocarditis were male. Most common types of clinical presentation were fever and shortness of breath. Congenital heart defects formed major chunk of underlying disease. Coagulase negative staphylococcus was found to be the most common etiological agent.

Keywords: Infective endocarditis, fever, shortness of breath, congenital heart defects.

INTRODUCTION

Endocarditis is described as disease affecting endocardium.¹ Endocarditis can be due to bacteria or other micro-organisms getting entry in to blood-stream and damaging heart tissues. Patients who have some kinds of already existing cardiac diseases are at increased risk of developing infective endocarditis.² Incidence of infective endocarditis is estimated to be between 3-9 per 100000 persons while last 50 years have seen a slight rise in number of infective endocarditis cases.^{3,4} Recent decades have not only seen lots of improvement in medical and interventional care but imaging technologies have also seen a major uplift yet mortality among patients of infective endocarditis varies between 15 to 30%.⁵ Infective endocarditis is considered to an important cause of morbidity and mortality throughout the world.⁶

Traditionally, rheumatic heart disease was considered to be the major risk factor predisposing infective endocarditis but recent data from developed countries have described more than 30% of the cases to be due to invasive vascular interventions, prosthetic cardiac devices / implants and corrective surgeries for congenital heart diseases.^{7,8}

Fever with chills and body aches and pains are known to be the most commonly associated symptoms with infective endocarditis. Final diagnosis is usually based upon blood culture and echocardiography.⁹⁻¹¹ Selection of

antibiotic is vital among cases of infective endocarditis while affected heart valves or existence of abscess might need surgery along with antibiotics. Local data lacks about most commonly found etiological agents among cases of infective endocarditis while variation in methods of blood culture have indicated that around 50% of infective endocarditis cases are documented as negative.^{12,13} Most studies from Pakistan involving infective endocarditis patients have been retrospective analysis which has its own limitations. The current study was planned to find out clinical profile and etiological agents involved in Pediatric infective endocarditis.

MATERIAL AND METHODS

This descriptive observational study was conducted at The Department of Pediatrics, Sughra Shafi Medical Complex, Sahara Medical College, Narowal, Pakistan from April 2017 to March 2021. Approval from institutional ethical committee was taken. Written consent was sought from parents/guardians of all study participants.

A total of 195 children of both genders aged below 14 years and having endocarditis were enrolled. Endocarditis was labeled as per modified Duke's criteria. Demographic data like gender, age, underlying heart disease, previous medical history of cardiac surgery or congenital heart diseases were noted. Laboratory data like blood culture, complete blood count, C-reactive protein, erythrocyte

sedimentation rate and microscopic hematuria were asked in all cases. Transthoracic echocardiography was done to find out location of vegetation, type of valve infected and existence of cardiac complications.

Data was entered and analyzed using SPSS version 26.0. Quantitative data like age was represented as mean and standard deviation. Qualitative data like gender, area of residence, clinical presentation, types of isolated microorganisms and underlying disease were shown as frequencies and percentages.

RESULTS

Out of a total of 195 children, 124 (63.6%) were male. Overall, mean age was noted to be 5.48±2.1 years. Majority of the children, 121 (62.1%) belonged to rural areas of residence. Table 1 is showing characteristics of all children studied.

Table 1: Characteristics of Study Cases (n=195)

Characteristics	Number (%)	
Gender	Male	124 (63.6%)
	Female	71 (36.4%)
Age (years)	<6	142 (72.8%)
	>6	53 (27.2%)
Area of Residence	Urban	121 (62.1%)
	Rural	74 (37.9%)

Fever was the commonest type of clinical presentation noted among 148 (75.9%) children followed by shortness of breath 101 (51.8%) and chest pain/discomfort 48 (24.6%). Table 2 is showing frequency of most common clinical presentation.

Table 2: Frequency of Most Common Clinical Presentation among Children with Infective Endocarditis (n=195)

Clinical Presentation	Number (%)
Fever	148 (75.9%)
Shortness of Breath	101 (51.8%)
Chest Pain or Discomfort	48 (24.6%)
Cyanotic Spells	26 (13.3%)
Anorexia	14 (7.2%)
Cough	11 (5.6%)

Congenital heart defects were the commonest form of underlying disease observed in 95 (48.7%) children while ventricular septal defect (VSD) were the commonest type of congenital heart defect diagnosed in 29 (14.9%) children whereas patent ductus arteriosus was found in 22 (11.3%) children. Rheumatic heart disease was the 2nd commonest disease group found among 75 (41.5%) children. Table 3 is showing underlying disease group among children studied with infective endocarditis.

Table 3: Underlying Disease Group among Children with Infective Endocarditis

Underlying Disease	Number (%)	
Congenital Heart Defects	Ventricular Septal Defect	29 (14.9%)
	Patent Ductus Arteriosus	22 (11.3%)
	Tetralogy of Fallot	21 (10.8%)
	Atrial Septal Defect	9 (4.6%)
	Coarctation of Aorta	6 (3.1%)
	Others	8 (4.1%)
Rheumatic Heart Disease	75 (41.5%)	
Prosthetic Heart Valve	14 (7.2%)	
Pacemaker	7 (3.6%)	
Others	4 (2.1%)	

Blood culture findings revealed 112 (57.4%) samples to produce no growth while coagulase negative staphylococcus was the commonest etiological agent noted in 37 (19.0%) children. Table 4 is showing details of blood culture findings among children with infective endocarditis in the present study.

Table 4: Blood Culture Findings among Studied Children (n=195)

Blood Culture Findings	Number (%)
Coagulase Negative Staphylococcus	37 (19.0%)
Staphylococcus Aureus	13 (6.7%)
Streptococcus Viridans	12 (6.2%)
Enterococcus Faecalis	9 (4.6%)
Haemophilus Influenzae	5 (2.6%)
Candida Albicans	4 (2.1%)
Escherichia coli	3 (1.5%)
No Growth	112 (57.4%)

DISCUSSION

The present study describes our 4 year experience regarding children with infective endocarditis. In the present study, majority of the children with infective endocarditis were male (63.6%). Researchers report that female prevalence in infective endocarditis cases have increased between 1970 to 2006 but still infective endocarditis children are observed to have male predominance.¹⁴ Ali AM et al from Rawalpindi reported 70% of the children with infective endocarditis to be male.¹⁵ Similarly, Pratap G and Polasa R in their 3 year experience highlighted 74% of the children with infective endocarditis to be male.¹⁶ The reason for this male predominance could be that female hormones might have some protective role against infective endocarditis but the exact reasons are still unknown. In this study, mean age of the children was calculated to be 5.48±2.1 years. A study published in 2000 describing 19 year experience of infective endocarditis among children from Lebanon found mean age to be 11.3±2.8 years but the recent studies have found much younger mean age among children presenting with infective endocarditis which shows that diagnostic modalities and better clinical awareness have resulted in improvement in the diagnosis of infective endocarditis among children.¹⁷

In the present study, fever (75.9%) and shortness of breath (51.8%) were found to be the most frequent clinical presentation. Regional data from India reported fever to be present in 98% of the children with infective endocarditis.¹⁶ Fever and shortness of breath are considered to be the most frequent forms of clinical presentation of infective endocarditis traditionally and this was quite consistent in the present findings. Local data in adult cases of infective endocarditis have stated 73.5% of the cases to present with fever.¹⁵

Congenital heart defects formed the vast majority of underlying diseases in the present set of patients. In the past decades, rheumatic heart disease has been labeled as the most common underlying disease among patients of infective endocarditis but recent studies support the existence of congenital heart defects to be the most frequent form of underlying disease group.¹⁸ Local data from Rawalpindi has reported 52.0% of the children with infective endocarditis to have congenital heart defects while rheumatic heart disease was noted among 32% children.¹⁵ We noted ventricular septal defect to be the most frequent

type of congenital heart defect followed by patent ductus arteriosus. Ventricular septal defect, patent ductus arteriosus and tetralogy of fallot have been presented as most common types of congenital heart defects in the previously published local data as well.¹⁵ Ahmedi and Daryishi et al from Iran have also presented similar findings in their research.¹⁹

In this study, 57.4% of the children were noted to have negative culture infective endocarditis. Our findings present a much higher percentage of cases with negative culture reports as contemporary data shows negative infective endocarditis culture to form between 14 to 19% of cases.^{8,20} High proportion of negative culture reports could be because of antibiotics utilization before hospitalization in the present study. We found that Coagulase negative staphylococcus, staphylococcus aureus and streptococcus viridans were the most frequent types of bacterial isolates noted in 19.0%, 6.7% and 6.2% children respectively. In the recent years, local data has pointed out towards decreasing trends in streptococcus viridians while presence of staphylococcal infections has risen.²¹ A recent study from Rawalpindi found coagulase negative staphylococcus to be present in 31.2% of children with infective endocarditis.¹⁵

Present study had some limitations as well. We were unable to report antimicrobial sensitivities and resistant patterns regarding various microorganisms noted in the present study. We also could not report outcomes among children in the present study. Prevalence of different types of complications and its management was also missing.

CONCLUSION

Majority of the children with infective endocarditis were male. Most common types of clinical presentation were fever and shortness of breath. Congenital heart defects formed major chunk of underlying disease. Coagulase negative staphylococcus was found to be the most common etiological agent.

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