International Journal of Cardiology 221 (2016) 42–45

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Clinicodemographic features and outcome of acute myocarditis in children admitted at tertiary care hospital

Nighat Haider [a,*,1], Abdul Sattar Shaikh [b], Rehana Wazir [c], Mehnaz Atiq [d]

[a] Shifa International Hospital, Islamabad, Pakistan
[b] National Institute of Cardiovascular Diseases, Karachi, Pakistan
[c] Dow University of Health Sciences, Karachi, Pakistan
[d] Agha Khan University Hospital, Karachi, Pakistan

ARTICLE INFO

Article history:
Received 22 April 2016
Accepted 24 June 2016
Available online 27 June 2016

Keywords:
Acute myocarditis
Clinical features
Demographic features

ABSTRACT

Background: Myocarditis is an inflammatory disorder of myocardium associated with high mortality and morbidity. It is often difficult to diagnose because it can either be asymptomatic or mimic other illnesses. This study is conducted to evaluate clinicodemographic features and outcome of acute myocarditis in children admitted at a tertiary care hospital.

Methods: Medical records of all children aged 1 month to 16 years who were admitted between 2005 and 2013 at Aga Khan University Hospital, Karachi and discharged with a diagnosis of myocarditis were reviewed retrospectively. Clinical and demographic features, management and outcome were recorded.

Results: Records of a total of 62 patients with the diagnosis of myocarditis were reviewed retrospectively between 2005 and 2013. Median age of patients was 12.5 months with 28 (45%) females and 34 (55%) males. The main presenting complaint observed was irritability (73%) and least common symptom was abdominal pain (23%) while the most frequently occurring examination finding was tachycardia (90%). Length of the hospital stay was 8 ± 4.7 days with 21 (34%) admissions in the ward and 41 (66%) in intensive care unit.

Conclusion: The most frequent presentation in our study was irritability, followed by difficulty in breathing while the least common symptom was abdominal pain. Tachycardia was the commonest clinical sign observed so it is important to look for heart rate and rhythm in a sick child with irritability.

1. Introduction

Myocarditis is an inflammatory disease of myocardium with both infectious (viruses, bacteria, parasites) and noninfectious (drugs) etiologies. The incidence of myocarditis is difficult to calculate because of its nonspecific presentation and definitive diagnostic test not routinely done being invasive but estimated incidence from different reports is 1 per 100,000 children [1]. Viruses are the most common cause with most cardiotoxic being coxsackie B virus [2]. In the past coxsackie B virus was considered the commonest etiological factor as well but with time there is epidemiological change and now parvo virus B19 is considered to be the commonest viral agent causing myocarditis. Although prevalence of bacterial myocarditis is only 0.2% to 1.5%, it should be considered in patients with ventricular failure and sepsis [3].

In humans the pathophysiology of myocarditis is poorly understood. Though three phases are suggested. In the first phase virus enters the myocardial cell through specific receptor, replicating inside myocyte causing its necrosis leading to invasion by host defense cells. This is the acute phase which lasts for a few days. The second phase is characterized by autoimmune response. This subacute phase lasts a few days to months. Most patients overcome this autoimmune response with the elimination of virus without any sequelae. In some patients however the immune response persists leading to remodeling of myocardial muscle and dilated cardiomyopathy. This is the third and chronic phase of myocarditis [4].

The clinical presentation may vary from a mild subclinical course to acute cardiac failure as it is the most common cause of cardiac failure in children without any previous heart disease. General presenting complaints are tachypnea, tachycardia, subcostal recessions and grunting, misleading to diagnosis of pneumonia and some children may present with nausea and vomiting so they can be misdiagnosed as having acute gastritis for which intravenous fluids can be started aggravating the condition and leading to congestive cardiac failure [5].

For the diagnosis of condition there are certain nonspecific investigations including chest radiograph, electrocardiogram, cardiac

* Corresponding author.
E-mail addresses: nighathaider@hotmail.com (N. Haider), Sattar21@yahoo.com (A.S. Shaikh), rehanawazir@hotmail.com (R. Wazir), mehnaz.atiq@aku.edu.pk (M. Atiq).
[1] Postal address: E3, MI Flats, Javed Sultan Shaheed Colony, Cobbe Lines, Rawalpindi, Pakistan.

http://dx.doi.org/10.1016/j.ijcard.2016.06.187
0167-5273/

enzymes, cardiovascular magnetic resonance (CMR) and viral serology but definitive diagnosis is only made by endomyocardial biopsy which is the gold standard. As the pathological events are occurring at cellular level, biopsy is the only option to establish diagnosis [6].

The standard strategies for treatment are antifailure therapy and complete physical rest. Other options are antiviral and herbal remedies. Though few studies have shown some therapeutic benefits by immunosupressive therapies like IVIG or corticosteroids and immunomodulating therapies like monoclonal antibodies but mostly the outcome is controversial. The better understanding of pathophysiology of viral myocarditis in recent years has opened new doors to therapeutic approaches with promise of better outcome [7]. The important steps of nursing care are airway management with adequate oxygenation and ventilation, detection and management of arrhythmias, ongoing monitoring of hemodynamic parameters, pain management/comfort, prevention of complications, and family support [8]. Despite all the therapeutic measures the mortality is very high, about 75% in infants and 25% in children [9].

The prognosis varies from recovery to progression to chronic disease to death. But improvement in long term and short term prognosis can be achieved by development of new targeted therapeutic approaches and diagnostic technique [10]. In the present study we have analyzed 8 year data to see the demographics, clinical features and outcome of myocarditis in children at a tertiary care hospital. Having the familiarity with presenting signs and symptoms will help make an early diagnosis and timely initiation of prompt treatment leading to decrease morbidity and mortality associated with this fatal disease.

2. Material and methods

A retrospective review of the medical records of all children from 1 month–16 years admitted at Aga Khan University Hospital, Karachi during 2005–2013 with diagnosis of myocarditis was done. Their history, demographic feature, laboratory investigations, echocardiography, clinical examination, management and hospital course were reviewed. Children were selected if their history and clinical examination was suggestive of myocarditis along with supportive evidence like 1) previously healthy children with short history of illness, 2) echocardiography showing left ventricular dysfunction, 3) cardiac biomarkers suggestive of cardiac damage, and 4) electrocardiography suggestive of acute myocarditis. Children were excluded if their echocardiography was indicative of any congenital heart disease, past and or family history suggestive of cardiomyopathy, radiological diagnosis of lung disease, and laboratory investigation suggestive of any other associated disease like malaria, enteric fever, dengue fever, urinary tract infection, meningitis, otitis media and dysentery. A total of 62 patients were selected for final analysis according to inclusion and exclusion criteria.

Statistical analysis was performed by using SPSS software package (version 20.0 SPSS). Results were presented as mean and standard deviation for continuous variables (i.e., age, length of stay) and frequency and percentage for categorical variables (i.e., gender, month of presentation, clinico-demographic features, management and outcome). Data are presented as mean ± SD, frequency and percentages.

3. Results

The total number of patients admitted with diagnosis of myocarditis was 62. Median age of patients was 12.5 months. There was male predominance with 34 (55%) males and 28 (45%) females. Length of the hospital stay was 8 ± 4.7 days. Twenty-one (34%) patients were admitted in the ward while 41 (66%) patients were admitted in intensive care unit. Regarding management 58 (94%) patients were given inotropes, 25 (40%) intravenous immunoglobulin, 17 (27%) steroids and 38 (61%) patients required mechanical ventilation. Analyzing outcome showed that 55 (89%) children were discharged alive while 7 (11%) patients died (Table 1).

Table 1
Demographic profile of study population n = 62.

Demographic feature	N (%)
Age (in months) median	12.5 (21.6 ± 12)
Gender	
Female	28 (45%)
Male	34 (55%)
Length of stay (in days)	8 ± 4.7
Place of admission	
Ward	21 (34%)
Intensive care unit (ICU)	41 (66%)
Management	
Inotropes	58 (94%)
Intravenous immunoglobulin	25 (40%)
Steroids	17 (27%)
Mechanical ventilations	38 (61%)
Outcome	
Discharge alive	55 (89%)
Died	7 (11%)

Regarding clinical features 40 (65%) children presented with history of preceding upper respiratory tract infection, 36 (58%) fever, 45 (73%) irritability, and 40 (65%) lethargy. As far as gastrointestinal symptoms are concerned 37 (60%) presented with anorexia/poor feeding, 26 (42%) vomiting, 18 (29%) diarrhea, and 14 (23%) abdominal pain. Regarding respiratory presentations, 42 (68%) come with history of tachyponea/difficulty in breathing and 37 (60%) cough. Clinical examination findings revealed that 56 (90%) children had tachycardia, 54 (87%) poor capillary refill, 52 (84%) cold peripheries, 36 (58%) hepatomegaly, 31 (50%) hypotension and 35 (57%) basal crepitations at the time of presentation to hospital (Table 2).

We also observe for the seasonal variation of myocarditis and found maximum incidence to be from March to May 28 (45%) with peak during April 12 (19%) (See Graph 1).

4. Discussion

Myocarditis is an uncommon pediatric disease characterized by inflammation involving the myocardium i.e., the muscle of the heart. It is usually diagnosed on high index of suspicion based on symptoms, clinical examination and few supportive investigations. Myocardial biopsy being the definitive test for diagnosis is not usually performed especially in resource poor countries like ours. The horizon of symptoms in myocarditis is very wide ranging from mild viral illness to severe circulatory and cardiac failure. Durani et al. noted that the most frequently reported symptoms of myocarditis were shortness of breath (69%),

Table 2
Clinical profile of study population. N = 62.

Clinical feature	N (%)
History of preceding URTI	40 (65%)
Fever	36 (58%)
Irritability	45 (73%)
Lethargy	40 (65%)
GI presentation	23–60%
Anorexia/poor feeding	37 (60%)
Vomiting	26 (42%)
Diarrhea	18 (29%)
Abdominal pain	14 (23%)
Respiratory presentations	60–68%
Tachyponea/difficulty in breathing	42 (68%)
Cough	37 (60%)
Clinical examination findings	
Tachycardia	56 (90%)
Poor capillary refill	54 (87%)
Cold peripheries	52 (84%)
Hepatomegaly	36 (58%)
Hypotension	31 (50%)
Chest basal creps	35 (57%)