Case Report

Dilated Cardiomyopathy due To Coxsackie-B Virus Myocarditis: A Case Report

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Abstract

Dilated cardiomyopathy (DCM) is a rare disorder which may be caused by diverse reasons. Many of them are idiopathic also. The article reports a case of DCM resulting from acute Coxsackie virus myocarditis. Antibody to Coxsackie-B virus was positive from a lab of United States of America. This is first case report of Coxsackie-B virus myocarditis (proven) led to cardiomyopathy in Bangladesh.

Key-words: Dilated cardiomyopathy, Coxsackie-B virus, Myocarditis.

Introduction

Dilated cardiomyopathy (DCM) is a heterogeneous group of myocardial disease characterized by cardiac dilatation and impaired myocardial contractility[1]. Infection, Metabolic, ischemic, toxic and hereditary factors have been implicated in the disease pathogenesis. Despite intensive research to find out the cause, most of the cases are still labeled as idiopathic. Myocarditis is an inflammatory disease of the myocardium with necrosis and/or degeneration of adjacent myocytes is the most frequent cause of DCM in children as a result of a viral infection.

The natural history of disease and possible outcome of cardiomyopathy in children is difficult to predict due to heterogeneous causes and characters. A patient of DCM may be cured completely or die[2]. It is difficult to find out the real incidence of dilated cardiomyopathy as diagnostic criteria varies in different countries. It varies from 34/100000 to 1.24/100000 in Finland and Australia[3-5].

In most of the children DCM is a sporadic condition of unknown cause. However, familial cases have been reported with autosomal dominant, recessive or x-linked inheritance pattern. DCM is rarely due to some systemic disease. Metabolic, endocrine, storage, mitochondrial and connective tissue disorder may involve myocardium. Myocarditis is difficult to diagnose but spontaneous resolution is likely, though short time mechanical support may be required before transplantation in nonresponders[6,7]. Positive viral culture or increased antibody titre may help in diagnosis. The Presented case of DCM was due to viral myocarditis and Coxsackie-B virus antibody was positive. This is the first ever proven case of Coxsackie-B virus related cardiomyopathy which led to writing this report.

Case Report

A six months old baby girl A, got admitted to paediatric cardiology unit of Combined Military Hospital (CMH) Dhaka with the complaints of cough and respiratory distress for five days with profuse sweating of forehead during feeding associated with suck-rest-suck cycle. She had history of fever with running nose fifteen days back. There was no history of cyanosis, convulsion or unconsciousness. She was exclusively breast fed and was immunized as per expanded program on immunization (EPI) schedule. On examination pulses were feeble, rate was 136/min and baby was hypotensive, BP was 67/30 mm of Hg, respiratory rate was 66/min with chest in drawing. Apical impulse was lateral to mid clavicular line in 6th intercostal space. Heart sound was muffled, precordium was hyper dynamic and there was hepatosplenomegaly. On auscultation of chest, crepitation and rhonchi were present all over the chest. Initially, patient was diagnosed as bronchiolitis with heart failure. Blood complete picture showed microcytic hypochromic anaemia with leukocytosis, Chest X-ray showed cardiomegaly and ECG showed left ventricular dominance. Echocardiography showed global hypokinesia of left ventricle (LV) with poor LV function. LV was hugely dilated with Left ventricular ejection fraction (LVEF) 30% and Left Ventricular Fractional Shortening (LVFS) 14%. Antibody for Coxsackie-B virus was positive. So finally diagnosis was dilated cardiomyopathy secondary to Coxsackie-B virus infection. The Patient was treated with, head up position, O_2 inhalation, nebulization with salbutamol in paediatric intensive care unit (ICU). Later patient was shifted to paediatric cardiac ICU and treated with Injection Frusemide, Injection Digoxin, Tablet Enalapril, Tab Carvedilol, Tab Thiamine and Syrup Carnitine. Intravenous gamma globulin

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therapy was also given for first two days. Blood transfusion was given to raise the Hb% level to 12 gm/dl. The patient responded dramatically to above management and discharged after two weeks with LVEF 46% and LVFS 23% on follow up all parameters were excellent. On 3 months follow up in January 2016 her LVEF raised up to 60%.

Discussion

DCM is the most common form of cardiomyopathy in children. Epidemiology and clinical cause of DCM in children are not yet clear. DCM is a disorder of heart muscle and affects ventricular systolic function, diastolic function or both. This is a myocardial dysfunction and characterized by dilated left ventricle (LV) chamber and systolic dysfunction that commonly results in congestive heart failure[5-7]. This is also the most common cause of cardiac transplantation. In infants and older children there are many causes but myocarditis is the commonest cause which leads to cardiomyopathy and heart failure. Relatively little information has been published on the incidence of DCM.

Fujioka SK et al demonstrated active Coxsackie-B virus RNA replication in the myocardium was present in a significant proportion of virus positive American and Japanese patients 5 of 7 (71.42%) and 9 of 15 (60%) respectively with end stage idiopathic dilated cardiomyopathy[8]. Another study showed incidence of DCM as 0.56 cases per 100,000 per year which is 10 times higher than adults. Boys have a higher incidence than girls and blacks have a higher incidence than whitees[9-11]. DCM is more likely to present in the first year of age than in early or late childhood. Infants are 13 times more affected than older age group. Most common cause of infantile DCM includes idiopathic, secondary to viral myocarditis, inborn error of metabolism and deficiency of thiamine and carnitine. DCM in older age has a worse outcome. Congestive cardiac failure is common in 71% cases of DCM and associated with myocarditis and idiopathic varieties[5]. Mortality for DCM usually occurs in first two years of life. Mortality rate does not match with specific cause of cardiomyopathy. Transplantation is the specific modality of treatment but not yet possible in Bangladesh. One-third of DCM patient die, one-third cure with therapy, rest one third patient survive and require treatment throughout life. Early diagnosis, risk stratification, new therapy need to be developed for infants and children with DCM to avoid the need for transplantation and premature death[12-15]. In present case Coxsackie-B virus was detected as the cause of myocarditis which led to DCM secondary to myocarditis and patient received Intravenous Immune globulin (IVIG) with a good outcome. DCM due to thiamine and carnitine deficiency also has a good outcome after treatment. The patient received two doses of IV Immunoglobulin and her cardiac function improved within 3 months of treatment.

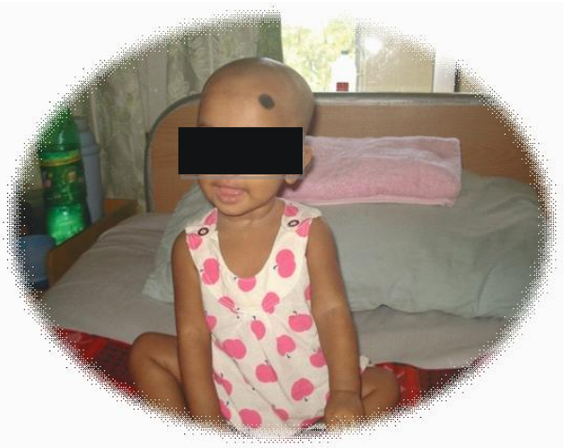


Fig-1: Patient "A" after treatment.

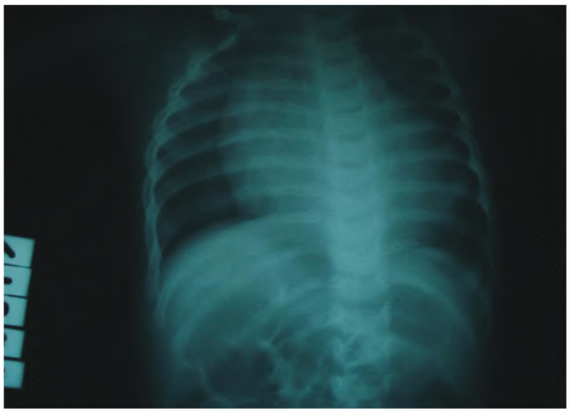


Fig-2: CXR of Patient "A" showing cardiomegaly

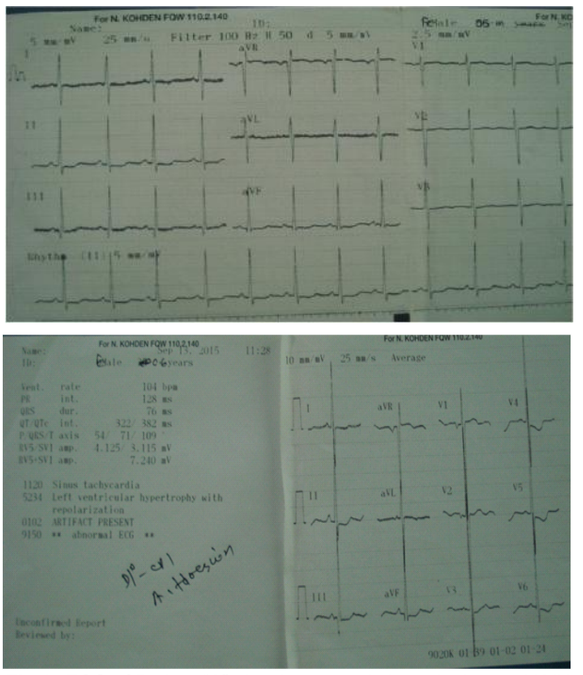
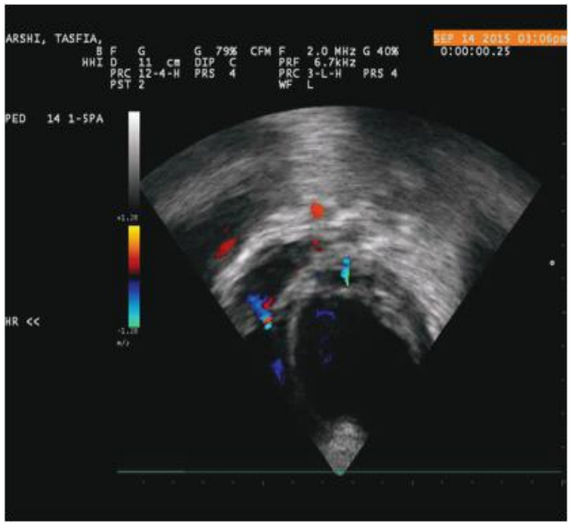
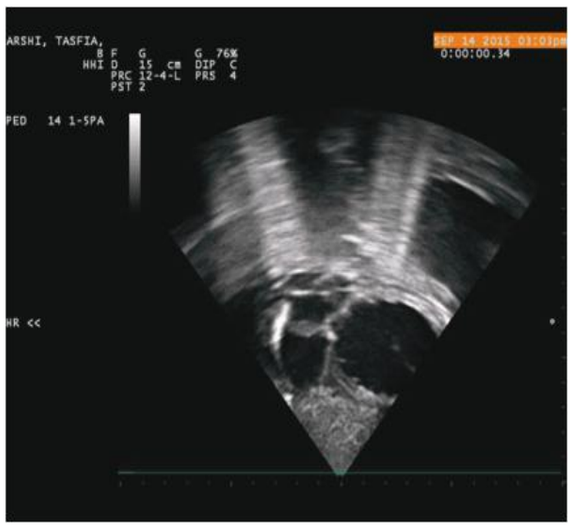


Fig-3: ECG of Patient "A" showing normal sinus rhythm and LVH





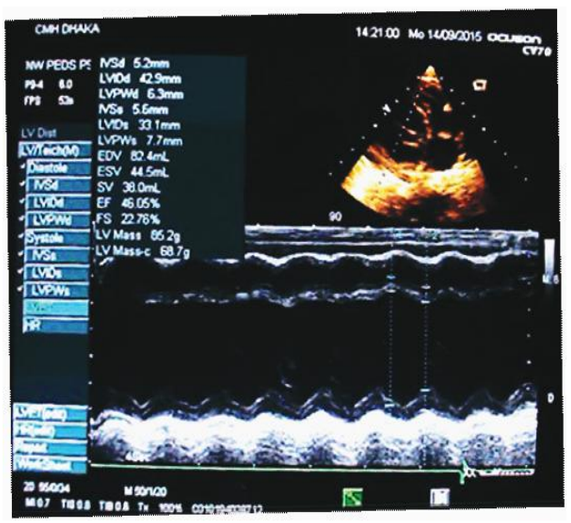


Fig-4: Echocardiography showing dilated LV and poor LV function.

Conclusion

The primary cause of DCM is unknown in most of the cases of children. The true incidence of viral-induced myocardial inflammation is difficult to predict but data from both paediatric and adult centers suggest that Coxsackie-B virus is the most common viral etiology. Other viruses that can also cause myocarditis like parvo virus B 19, Adenovirus, Cytomegalovirus (CMV) etc. Vaccination has been used successfully to prevent this disease like many viral diseases which suggest that a Coxsackie-B virus specific vaccine could be beneficial for reducing the incidence of myocarditis or DCM. The prognosis in individual patients is unpredictable. It depends on specific etiology, timely diagnosis and optimum management of heart failure and cardiac transplantation in some selected cases.

References

1. Azhar AS. Pediatric Idiopathic Cardiomyopathy: A single center experience. J Nat Sci Biol Med 2013; 4(1):145-8.

2. Saad IA. Idiopathic Cardiomyopathy in children; Natural history of predictors of prognosis. Libyan J Med 2007; 2(3):129-34.

3. OM Franklin, M Burch. Dilated Cardiomyopathy in childhood Images Paediatr Cardiol 2000; 2(1):3-10.

4. Kuhn H, Lawrenz T, Beer G. Indication for myocardial biopsy in myocarditis and dilated cardiomyopathy. Med Klin 2005; 100(9)553-61.

5. Maisch B, Richter A, Sandmöller A et al. Inflammatory dilated cardiomyopathy (DCMI). Herz 2005; 30(6):535-44.

6. Caforio AL, Vinci A, Iliceto S. Anti-heart autoantibodies in familial dilated cardiomyopathy. Autoimmunity 2008; 41(6):462-9.

7. Michels VV, Moll PP, Miller FA. The frequency of dilated cardiomyopathy in a series of patient with idiopathic dilated cardiomyopathy. N Eng J Med 1992; 326:77-82.

8. Fujioka SK, Kitaura Y, Deguchi H et al. Evidence of viral infection in the Myocardium of American and Japanese patients with Idiopathic Dilated Cardiomyopathy. AMJ Cardiol 2014; 94:602-5.

9. Bristow MR, Gillbert EM, Abraham WT. Carvedilol produces dose related improvement in left ventricular function and survival in subjects with chronic heart failure. Circ 1996; 94:2807-16.

10. Connuck DM, Sleeper LA, Colan SD et al. Characteristics and outcomes of cardiomyopathy in children with Duchenne or Becker muscular dystrophy: A comparative study from the Pediatric Cardiomyopathy Registry. Am Heart J 2008; 155(6):998-1005.

11. Dimas VV, Denfield SW, Friedman RA et al. Frequency of cardiac death in children with idiopathic dilated cardiomyopathy. Am J Cardiol 2009; 104(11):1574-7.

12. Friedberg MK, Roche SL, Balasingam M et al. Evaluation of mechanical dyssynchrony in children with idiopathic dilated cardiomyopathy and associated clinical outcomes. Am J Cardiol 2008; 101(8):1191-5.

13. Fujioka S, Kitaura Y, Ukimura A et al. Evaluation of viral infection in the myocardium of patients with idiopathic dilated cardiomyopathy. J Am Coll Cardiol 2000; 36(6):1920-6.

14. Griffin ML, Hernandez A, Martin TC et al. Dilated cardiomyopathy in infants and children. J Am Coll Cardiol 1988; 11(1):139-44.

15. Hershberger RE, Lindenfeld J, Mestroni L et al. Genetic evaluation of cardiomyopathy-A Heart Failure Society of America practice guideline. J Card Fail 2009; 15(2):83-97.