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Idiopathic Dilated Cardiomyopathy in a 14-Year-Old Girl Presenting with Acute Biventricular Heart Failure at Sunyani Teaching Hospital in Ghana: A Case Report

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ABSTRACT

Dilated cardiomyopathy (DCM) is a rare but life-threatening condition in adolescents, often presenting with vague respiratory symptoms that delay diagnosis, especially in low-resource settings. We report the case of a 14-year-old girl who presented with acute biventricular heart failure after a three-year history of intermittent dyspnea, orthopnea, and lower limb swelling. Initial clinical suspicion at peripheral facilities was low due to nonspecific symptoms and the absence of comorbidities. Echocardiography revealed severe biventricular dysfunction, an ejection fraction of 18%, significant chamber enlargement, severe functional mitral regurgitation and no congenital heart defect was detected. Electrocardiography showed sinus tachycardia with left atrial enlargement. The patient responded well to guideline-directed medical therapy including diuretics, ACE inhibitors, beta-blockers, and aldosterone antagonists. This case illustrates the diagnostic challenge of recognizing idiopathic DCM in adolescents, particularly in sub-Saharan Africa where cardiac imaging may be limited. It also reinforces the importance of early echocardiographic evaluation in patients with unexplained

respiratory symptoms. Early recognition and standard heart failure therapy can significantly improve outcomes in paediatric DCM, even in cases presenting late with advanced dysfunction.

Keywords: Dilated cardiomyopathy, adolescent heart failure, echocardiography, idiopathic DCM, paediatric cardiology.

INTRODUCTION AND SIGNIFICANCE

Dilated cardiomyopathy (DCM) is rare in adolescents, with an estimated annual incidence of approximately 0.34 per 100,000 in children aged 1 to 17 years. [1]. It presents with ventricular dilatation and systolic dysfunction. Paediatric DCM is not only rare but also life-threatening, with significant morbidity and mortality [2]. Most paediatric DCM cases are idiopathic, though genetic, nutritional, or autoimmune aetiologies exist. [3,4]. This case illustrates the challenge of recognizing cardiac causes in a teenager with long-standing symptoms, emphasizing early echocardiography in unexplained dyspnea, particularly in sub-Saharan Africa where access to cardiac diagnostics is often limited.

CASE PRESENTATION

History
Presenting Complaint
Difficulty in breathing of 3 days duration

History of Presenting Complaint

Client is a 14-year-old student with no known chronic illness. She was in her usual state of health until 3 days before presentation, when she started having difficulty breathing. It started as difficulty in breathing on moderate exertion, mild exertion, and finally at rest. It was associated with orthopnea, paroxysmal nocturnal dyspnoea, and bipedal oedema. She has had recurrent episodes of breathlessness for the past 3 years (from 11 years) and usually goes to a peripheral facility for management of chest pain. She was therefore brought to our facility for further management.

On-direct Questioning

Patient admitted to palpitation, easy fatiguability, weight loss, fever, productive cough of yellowish sputum, and a flu before presentation.

Systemic Enquiry

The patient reported early morning facial puffiness and headache; however, there was no frothy urine, haematuria, dysuria, or dizziness.

Additionally, there was epigastric and right upper quadrant abdominal pain, but there was no nausea, vomiting or bowel changes.

Past Medical and Surgical History

Recurrent admission to the peripheral facility because of similar presentations. No transfusions. No history of diabetes, hypertension, or known retroviral infection.

- No past surgeries
- Birth, immunisation, nutrition and developmental history.

- Post-term birth
- Has received full immunisation.
- Been eating a good, balanced diet meal
- Developmental milestones were satisfactory

Drug History
Patient has been on cough syrup prescribed at a peripheral facility

Family History
No family history of dilated cardiomyopathy, diabetes, hypertension, asthma, myocardial infarction, stroke

Social History
Student, lives with parents, does not drink or smoke

Vitals on Presentation
- Bp: 102/66 mmHg
- SpO2: 98 % on nasal prongs
- Pulse: 127 bpm
- Resp: 28 cpm

On Physical Examination
A young girl lying in the supine position is in obvious respiratory distress and pain. She was warm, cyanosed, anicteric, with no lymphadenopathy, no pedal oedema, hydration status was satisfactory.

Cardiovascular System
Capillary refill time <3sec, pulse was irregular, not of good volume, radial pulse: 127 bpm, apical pulse: 56 bpm, pulse deficit: 71 bpm. There was radio-radial synchrony and no radio-femoral delay; the jugular venous pressure was raised. There were visible pulsations in the cardiac region, apex beat was diffused, no palpable thrills or heave, S1 and S2 heart sounds present, pansystolic murmur heard at the mitral area. There were bibasal crepitations and tender hepatomegaly

Respiratory System
Respiratory rate = 16cpm, trachea was central, cricosternal distance admits three finger breadths, no chest wall deformity, no area of tenderness, symmetric chest movement.
Chest expansion was adequate and symmetric bilaterally, tactile fremitus was normal, percussion notes were resonant, and air intensity was good bilaterally. Breath sounds were normal. No adventitial sounds heard.

Gastrointestinal
Abdomen full, no distended veins or angiomata, moves with respiration, no visible peristalsis on the abdomen, normal female pattern hair distribution, There was epigastric and right hypochondriac tenderness, no guarding or rebound tenderness, and the liver and spleen were not palpable.

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The kidneys were not bimanually palpable, no shifting dullness, bowel sounds present and normal, and no aortic or renal bruit.

Central Nervous System
Alert and conscious, oriented to person, time and place, GCS-15/15, pupils were equal and reactive to light directly and consensually.

On inspection, there were no scars, no evidence of muscle wasting, involuntary movement, fasciculations and tremors. Tone was normal in all limbs.

Key Investigations
A Chest X-ray was done, which revealed marked cardiomegaly as shown in Figure 1. Also, an electrocardiogramme was done, which revealed sinus tachycardia with left ventricular enlargement as shown in Figure 2. Prompt echocardiography was also done, which revealed severe biventricular dysfunction with an ejection fraction of 18%, markedly dilated left ventricle (LVID d 7.13 cm), severely enlarged left atrium (26.94 cm^2), global hypokinesia, and severe functional mitral regurgitation. Additionally, there was grade III diastolic dysfunction evidenced by an elevated E/e' ratio of 10.8 and reduced septal e' velocity (0.06 m/s). However, no congenital heart defect was detected.

Serological investigations are as follows: HIV 1 and 2 non-reactive; FBC: Unremarkable; Urine R/E Unremarkable; Other serological markers unremarkable.

RBS 8.9mmol/l

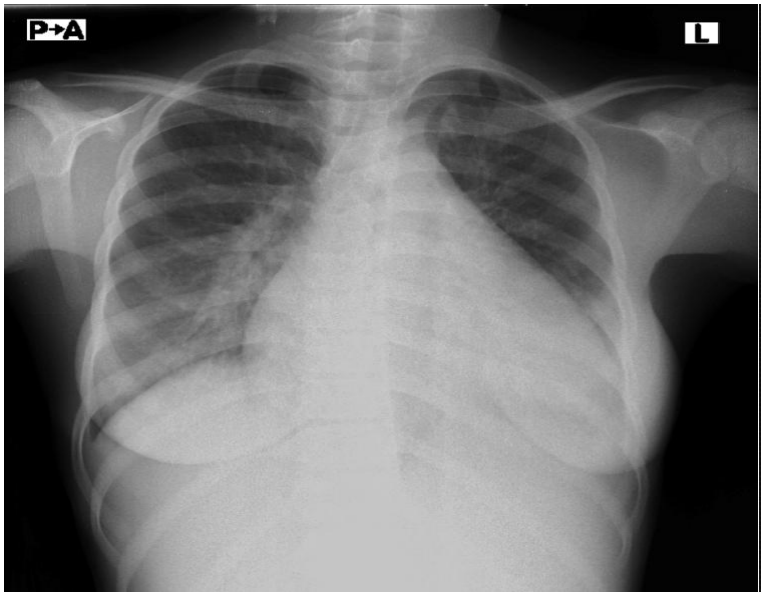


Figure 1: Show marked cardiomegaly

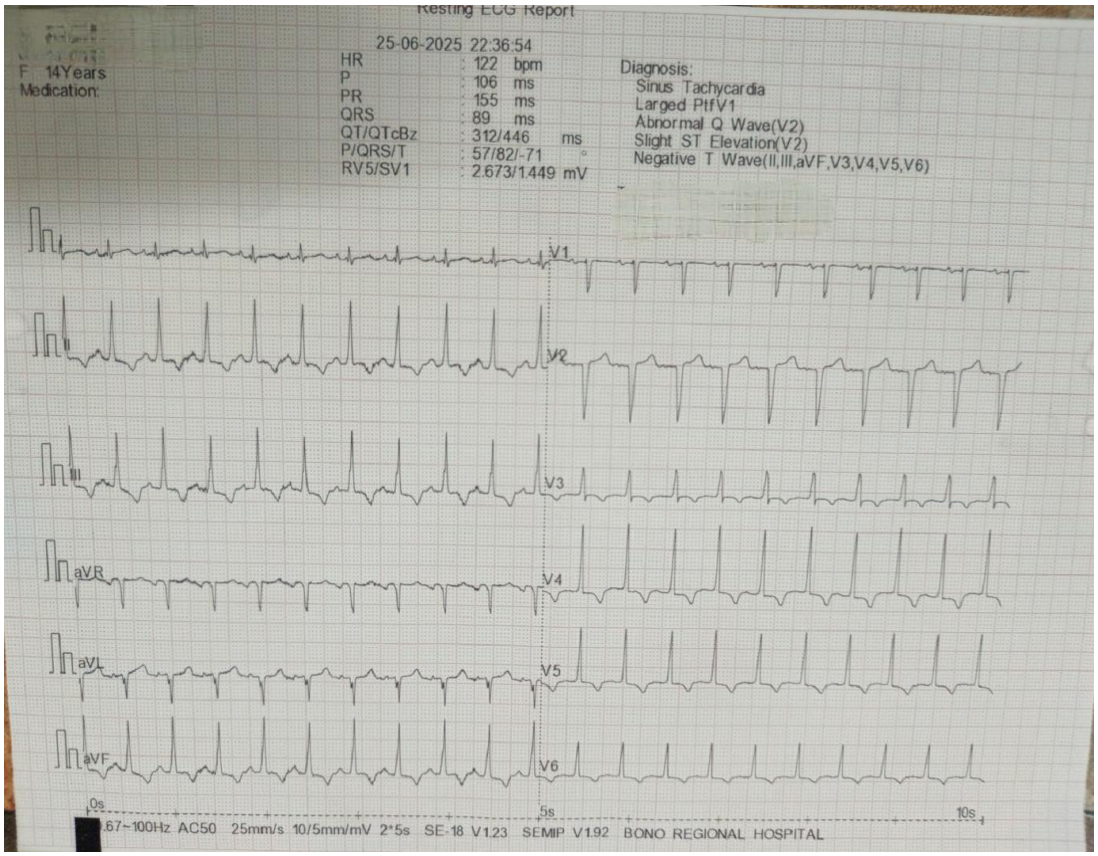
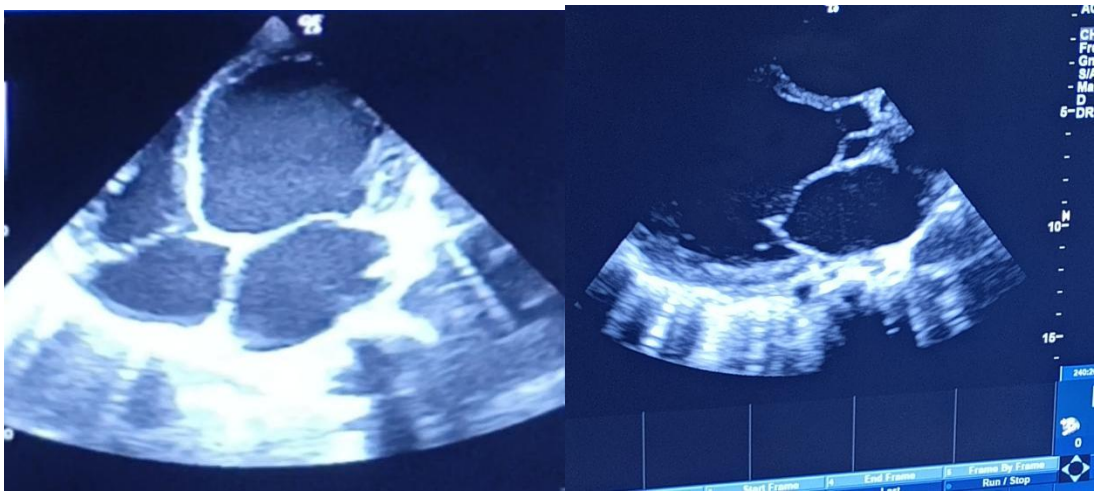


Figure 2: Shows sinus tachycardia with left atrial enlargement.



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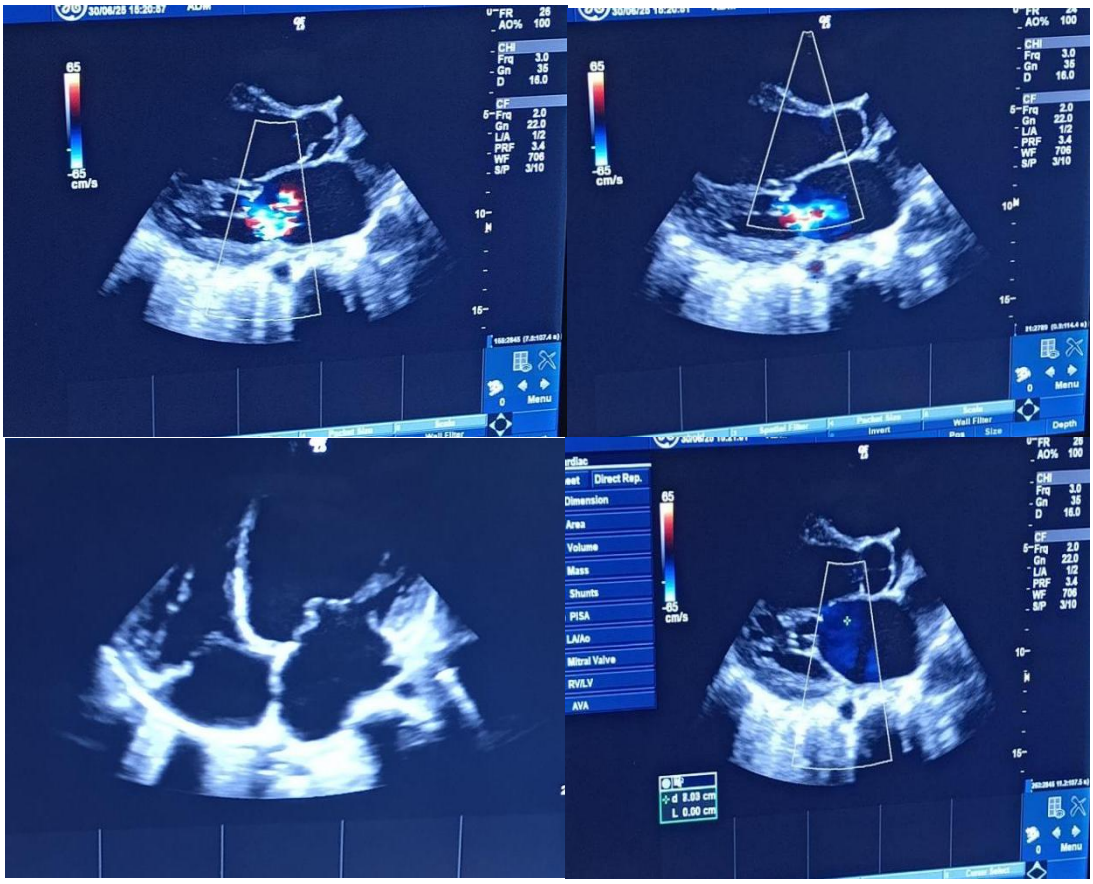

Figure 3: Clinical image of her Echocardiography showing severe biventricular dysfunction with an ejection fraction of 18%, markedly dilated left ventricle (LVID d 7.13 cm), severely enlarged left atrium (26.94 cm^2), global hypokinesia, and severe functional mitral regurgitation. Additionally, there was grade III diastolic dysfunction evidenced by an elevated E/e' ratio of 10.8 and reduced septal e' velocity (0.06 m/s). No congenital heart defect detected.

Additionally, the Framingham's Criteria for Heart Failure were met and represented in Table 1 below

Table 1: Shows the Framingham's major and minor criteria that were satisfied

Major criteria Present	Minor criteria Present
Paroxysmal nocturnal dyspnoea and orthopnea	Ankle edema
Acute pulmonary edema	Pleural effusion
Distended neck veins	Dyspnea on exertion
Cardiomegaly	

Plan

Patient was propped up in bed at the head end of the bed at 30 degree.
Supplemental oxygen via nasal prongs at 3 litres per minute was given.

- Vitals signs were monitored four hourly.
- To keep the input and output chart.

Medications

- IV Furosemide 40mg tds (was switched to tabs on admission day 3)

- Tab Spironolactone 12.5mg od
- Tab Lisinopril 2.5mg od
- Tab Carvedilol 3.125 mg bd (was revised to bisoprolol on admission day 4)
- Tab Digoxin 0.125 mg od
- Sub Heparin 2500 IU bd

Updates and Improvements

The patient responded well to the standard heart failure medications. The clinical observations and improvements are displayed in table 2 below.

Table 2: Shows updates and improvements of the patients during the inpatient stay in the hospital.

	Admission Day 1	**Admission Day 2**	**Admission Day 3**	**Admission Day 4**
SPO_2	99% on Nasal Prongs at 3L/min	99% on Nasal Prongs at 2L/min	98% on Room Air	99% on Room Air
Pulse /bpm	127	110	85	61
Blood Pressure /mmHg	102/66	95/57	91/55	93/56
Respiratory Rate /cpm	25	21	18	16
Dyspnea	Present	Resolved mildly	Resolved	Resolved
Orthopnea	Preent	Resolved	Resolved	Resolved
Bipedal Edema	Present	Resolved mildly	Resolved	Resolved

The patient and her parents were educated on the condition, and she was discharged on admission day 4.

Discharge Medications

- Tab Furosemide 40mg bd
- Tab Spironolactone 12.5mg od
- Tab Lisinopril 2.5mg od
- Tab Bisoprolol 2.5mg od
- Tab Digoxin 0.125 mg od
- Tab Dapagliflozin 10mg od

DISCUSSION

This case reinforces existing literature identifying idiopathic dilated cardiomyopathy (DCM) as the most common form of cardiomyopathy in children and adolescents. [1,8]. However, diagnosis in adolescents remains rare and often delayed due to vague symptoms or misdiagnosis, particularly in low-resource settings.

Our patient presented with progressive heart failure symptoms after several years of intermittent respiratory complaints, which were initially not linked to cardiac pathology. Similar diagnostic delays have been documented. For example, [5] described a 14-year-old girl with insulin-dependent diabetes who developed DCM despite the absence of microvascular complications. In another report, [6] discussed a pregnant 14-year-old with familial DCM.

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Unlike those cases, our patient had no underlying systemic disease or family history of cardiomyopathy, supporting a diagnosis of idiopathic DCM.

In sub-Saharan Africa, limited access to echocardiography, cardiology expertise, and public awareness frequently contributes to late presentation of pediatric cardiac disease. This case highlights how chronic respiratory symptoms in adolescents may mask evolving heart failure. As emphasized in reports from the Pediatric Cardiomyopathy Registry, delayed diagnosis often correlates with more severe dysfunction at presentation, but early initiation of standard heart failure therapy can still yield substantial clinical improvement. [7,10].

Despite severe biventricular dysfunction (EF 18%), marked cardiac chamber enlargement, and functional mitral regurgitation, the patient responded well to guideline-directed therapy. This supports current literature showing that optimal medical management, even in advanced pediatric DCM, can improve symptoms and quality of life. [4,9].

This case underscores the importance of high clinical suspicion and early echocardiographic assessment in adolescents with unexplained dyspnea, particularly in under-resourced healthcare settings like Ghana. Increased awareness among general clinicians can improve early diagnosis and outcomes for children with cardiomyopathy.

CONCLUSION

Dilated cardiomyopathy in children may go unrecognised for years. A high index of suspicion, timely echocardiography, and early heart failure therapy can improve outcomes. This case reinforces the importance of evaluating heart failure in adolescents with unexplained or chronic respiratory symptoms.

RECOMMENDATIONS

Early echocardiography is essential in teenagers with recurrent or unexplained respiratory symptoms to avoid delayed diagnosis of cardiac pathology.

Standard heart failure therapy can lead to significant clinical improvements even in severe cases of idiopathic DCM when diagnosed and managed properly.

Ethical clearance sought from the research and development committee of Sunyani Teaching Hospital. Code number STH/RD/25/016.

Patient informed consent granted

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