

Fulminant Myocarditis in a Previously Well Toddler

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Abstract

Presentation

A 16-month-old girl presented with vomiting and increased work of breathing with two days of vomiting and poor oral intake, followed by increased work of breathing. She was pale, dehydrated, tachycardic, tachypneic with delayed capillary refill and mild respiratory distress.

Diagnosis

Investigations revealed metabolic acidosis, cardiomegaly on chest X-ray, and ECG changes. Enterovirus was identified, and echocardiogram confirmed severely impaired left ventricular function (EF 25%).

Treatment

The patient received fluid resuscitation, required mechanical ventilation, inotropic support, antibiotics, anticoagulation and long-term heart failure therapy.

Discussion

Fulminant myocarditis can present with subtle symptoms. In this case, early identification of cardiovascular compromise, abnormal cardiac markers, and rapid referral to intensive care were crucial. The patient recovered fully with normal cardiac function. This case shows the importance of early suspicion and aggressive management in children presenting with non-specific symptoms like vomiting and respiratory distress.

Introduction

Myocarditis is an inflammatory condition of the myocardium, often caused by viral infections. In children, it may present with non-specific symptoms such as vomiting, lethargy, or respiratory distress, making early diagnosis challenging^{1,2}. Early diagnosis and intensive management are crucial for survival. We present a case of a toddler with fulminant viral myocarditis requiring prolonged paediatric intensive care support.

Case Report

A previously healthy 16-month-old girl presented with a two-day history of vomiting and reduced oral intake, followed by increased work of breathing. There was no history of fever, cough or diarrhea. She was born at term via spontaneous vaginal delivery, with normal perinatal and developmental history, vaccinated up to date and had no previous medical or family history of cardiac disease.

On examination, she appeared ill, pale, and mildly dehydrated. She was tachycardic (heart rate 180 bpm) and tachypneic (respiratory rate 65 breaths/min) with capillary refill time of 3 seconds and blood pressure of 95/55 mmHg. Oxygen saturation was maintained at 97% on room air.

Respiratory assessment revealed mild subcostal recession and bilateral crepitations, while cardiac examination showed tachycardia with normal heart sounds and no audible murmurs. The liver edge was 2 cm below the costal margin, and neurological assessment showed that she was alert with no focal deficits. Point of care glucose was 4.0 mmol/l, within the normal range.

Initial laboratory and imaging investigations performed in the emergency department are summarized in Table 1. The results demonstrated metabolic acidosis with elevated lactate, mild leukocytosis with normal inflammatory marker, and evidence of dehydration. Imaging supported a cardiac rather than respiratory cause of the child's presentation.

Table 1. Summary of Initial Investigations

Investigation	Result	Interpretation
Venous blood gas	PH 7.30, HCO ₃ 15mmol/l, Base excess -14, 4.5mmol/l	Metabolic acidosis with elevated lactate (tissue hypoperfusion)
WCC	17×10 ⁹ /l (Neutrophils 8, Lymphocytes 8)	Mild Leukocytosis
CRP	< 5mg/l	Normal-support viral rather than bacterial Causes
Urea/Creatinine	9 mmol/l/33µmol/l	Mild dehydration, normal renal function
Electrolytes/CK	Normal	No electrolyte disturbance, CK not elevated
Respiratory Viral PCR	Positive for Enterovirus	Consistent with viral myocarditis
CXR	Cardiomegaly, no pulmonary infiltrates	Suggest cardiac rather than respiratory causes
ECG	Sinus Tachycardia, low Voltage QRS, T-wave inversion (lateral leads)	Suggest myocardial involvement

These findings, in the context of persistent tachycardia despite fluid resuscitation, raised concern for an underlying cardiac cause. Subsequently patient was urgently transferred to Cardiac intensive care for further management.

Following transfer to the paediatric cardiac intensive care unit, echocardiography revealed severe impairment of left ventricular systolic function with ejection fraction of 25%, confirming the diagnosis of acute viral myocarditis. Cardiac biomarkers also support the diagnosis as it showed very high levels of troponin(340ng/l) and ProBNP (80,000 pg/ml). She required mechanical

ventilation for three weeks and inotropic support with adrenaline, noradrenaline and milrinone. She also needed diuretics, captopril and digoxin as long as broad-spectrum antibiotics (Cefotaxime for five days and Piperacillin -tazobactam for 15 days) were given for suspected secondary bacterial infection, bronchoalveolar lavage was done for persistence respiratory distress confirmed Methicillin-Sensitive *Staphylococcus aureus*. A left atrial thrombus was detected prompting escalation of anticoagulants from prophylactic to therapeutic dosing later. Multiple echocardiograms showed recovery and improvement in the ejection fraction (EF 61%) and stable small thrombus at discharge. The child was slowly weaned of respiratory and circulatory support, tolerated full oral feeds and was discharged home on oral frusemide with outpatient cardiology follow up arranged.

Discussion

The incidence of paediatric myocarditis is low but likely underreported due to its variable presentation³. Gastrointestinal symptoms, especially vomiting, and poor oral intake are common initial features and may be misattributed to benign conditions like viral gastroenteritis⁴. Recent Literature highlighted that non-specific presentations are increasingly recognized in young children. In a 2023 UK multicenter report, Singanayagam et al. described severe neonatal myocarditis cases in which fever and vomiting were the early features necessitating early cardiac evaluation of any child presented with disproportionate tachycardia or poor perfusion despite rehydration⁵. William et al. also mentioned that infants presented with feeding difficulties, vomiting, respiratory distress or hepatomegaly⁶. These findings align closely with our case, in which gastrointestinal symptoms preceded heart failure. In addition, Amoozgar et al. found that hepatomegaly and low ejection fraction at presentation prognostic signs of adverse outcomes in paediatric myocarditis⁷, both were present in our patient.

This case illustrates the rapid progression and potential severity of viral myocarditis in a previously well child. Clinicians should consider myocarditis in children presenting with vomiting and respiratory distress, particularly in the presence of cardiomegaly and abnormal ECG. Early echocardiography and cardiac biomarkers can be life-saving in guiding prompt diagnosis and management.

Declarations of Conflicts of Interest:

None declared.

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