Title:

Breast is Best? A case of dilated cardiomyopathy and rickets in an almost exclusively breast-fed 18-month-old infant.

Authors:

Jessie Yester, MD, PhD (fellow)\*, Allison K. Black, MD (fellow)\*, Matthew Zinn, DO (attending)

\*Contributed equally to this study

Introduction:

Calcium plays an important role in bone development and the cardiac myocyte contraction/relaxation cycle. Hypocalcemia is a recognized, albeit rare cause of reversible dilated cardiomyopathy in children and surprisingly uncommonly related to the presence of rickets. Reports of young infants with reversible cardiomyopathy have been described in the literature but uncommon in children > 9 months, especially in a developing country.

Case report:

An 18-month-old unvaccinated female with developmental delay, presented to the ED with 7 days of cough and respiratory distress. Her chest radiograph revealed cardiomegaly (Fig. 1). Her labs showed metabolic acidosis with respiratory compensation (7.34/31/48/17/-8), elevated troponin (0.714), BNP (1510), iron deficiency anemia, and severe hypocalcemia. Her EKG had T wave inversions in the V5, V 6, and prolonged QTc. Her initial echo showed severely dilated left ventricle (LV) with depressed function. She was admitted to the CICU for management of suspected myocarditis and CHF. She was intubated for afterload reduction, required a calcium gluconate infusion for severe hypocalcemia, and received inotropic support. Her viral study was positive for Rhinovirus. A skeletal survey was concerning for nonaccidental trauma with rib fractures, a left femur buckle fracture, and questionable non-displaced fractures of each ulna. There was profound rickets with severe osteopenia.   
She was diagnosed with severe hypovitaminosis D leading to dilated cardiomyopathy and rickets, iron deficiency anemia, and malnourishment. Review of her dietary history uncovered a diet with minimal table foods and almost exclusive breast-feeding. Parents were not supplementing with vitamin D. Her mother reported that the child had not seen a pediatrician due to insurance issues. During her stay she underwent calcium replacement, intensive dietary rehabilitation, and was discharged to rehab unit. She was eventually home with her family with strict follow up. Her calcium and vitamin D corrected with daily supplementation. She had rapid improvement of her cardiac function with calcium replacement and her LV function has now normalized. Her EKG no longer shows QTc prolongation. She has progressed developmentally with early intervention services. While parents have had some hesitation about vaccinations, the child is working on a catch-up vaccination schedule.

Implication to clinical practice:

This case describes a unique etiology of dilated cardiomyopathy in an exclusively breastfed older infant in the United States, and serves as a reminder to rule out nutritional causes of cardiomyopathy in pediatric patients and to include nutritional studies during the acute presentation of cardiomyopathy in an infant. It provides insight into familial rehab using a comprehensive multidisciplinary care plan. It highlights importance of access to health for pediatric patients. Her rapid recovery with accurate and fast diagnosis, improvement in development, and vaccination status highlights the importance of both broad differential in the acute setting and importance of long term preventative medicine.

