Myocardial Infarction Due to Coronary Compression by a Rhabdomyoma

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Congenital cardiac tumors are rare in neonates. A rhabdomyoma, the most common neonatal cardiac tumor, tends to regress in the first year of life. Indications for intervention include hemodynamic compromise and intractable arrhythmias. To the best of our knowledge, rhabdomyoma-induced ischemia has not yet been reported. We report a case of a neonate with multiple rhabdomyomas with myocardial infarction related to compression of a coronary artery.

PATIENT DESCRIPTION

A 20-day-old baby with unremarkable prenatal and perinatal history was admitted to our hospital with acute respiratory syncytial virus (RSV) bronchiolitis. Shortly after admission, he had an episode of apnea and profound cyanosis, which necessitated short bag ventilation. On admission, the baby's temperature was 36.5°C, his heart rate 169 bpm, and blood pressure 109/63 mmHg. His O_2 saturation was 90% on room air. Other than moderate dyspnea and bilateral crepitations on lung auscultation, his physical examination was unremarkable. His white blood count was 14.7000/ml with 45% lymphocytes. Unexpectedly, the creatine phosphokinase and lactate dehydrogenase levels were elevated (420 U/L, normal range 39–308; and 1531 U/L, normal range 240–480, respectively). High sensitivity troponin was increased: 0.042 ng/ml (normal < 0.03). B-type natriuretic peptide was also elevated: 2220 pg/ml (normal range 0–125). Electrocardiogram showed ST segment depression of 2 mv on V1, V2, and AVL. Echocardiography revealed multiple hyperechogenic masses in the left and right ventricular myocardium typical for rhabdomyomas. The largest mass (7 × 9 mm) protruded from the interventricular septum into the left ventricular cavity but without obstructing the left ventricular outflow [Figure 1]. Careful examination of the coronary arteries revealed a narrowed right coronary artery surrounded by a large echogenic mass, which started close to the right coronary artery ostium and extended around the right coronary artery for 23 mm into the right atrioventricular groove. The left and right ventricular size and function were normal without regional wall motion abnormality. The electrocardiogram and the biochemical markers returned to normal within 4 days, thus we decided not to intervene. At the one-month follow-up, the electrocardiogram and the cardiac biomarkers were normal. The global and regional myocardial function remained normal. The only abnormal non-cardiac finding that we could relate to tuberous sclerosis were a few hypopigmentation spots on the baby's back.

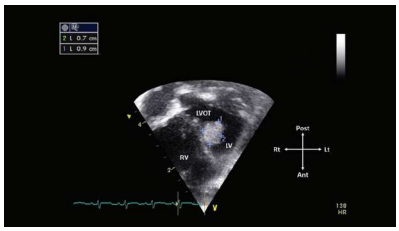
COMMENTS

Rhabdomyomas are rare and have been shown to regress or disappear entirely without intervention. They usually cause no symptom and are incidentally discovered during an echocardiogram or if there is a diagnosis of tuberous sclerosis in a neonate. They rarely cause cardiac dysfunction that necessitate medical and/or surgical intervention [1]. The clinical pre-

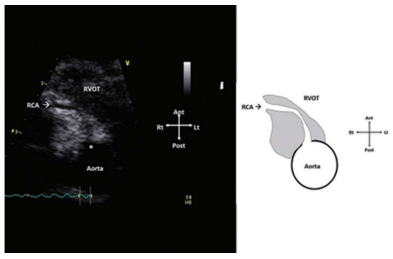
Figure 1. The mass protruding from the interventricular septum into the left ventricular cavity

LV = left ventricle,
LVOT = left ventricular outflow,
RV = right ventricle,
RCA = right coronary artery,
RVOT = right ventricular outflow

[A] Modified apical four-chamber view zoomed over the LVOT. The large rhabdomyoma is attached on the interventricular septum but does not obstruct the LVOT.



[B] The parasternal short axis view zoomed over the aortic root and the RCA. The echogenic rhabdomyoma around the RCA with compression of the coronary artery is shown as it curves toward the upper right atrioventricular groove. The RCA origin *is widely open.



sentation of cardiac rhabdomyomas depends on their number, size, and position [2,3]. The younger the baby at diagnosis, the higher the chance for spontaneous regression, with complete regression being more common in the first 4 years of life [3,4]. Surgical intervention is indicated only in the event of hemodynamic compromise or intractable cardiac arrhythmias [4]. Our patient presented with biochemical and electrocardiographic evidence of acute inferior wall myocardial infarction. The right coronary artery was patent by color flow imaging but did look somewhat compressed. The association of a narrowed coronary artery with impaired flow along with hypoxemia especially during apnea, perhaps RSV induced, could explain the myocardial infarction in an already jeopardized myocardium.

A single case of myocardial infarction caused by a rhabdomyoma compressing a circumflex coronary artery has been reported from a fetopsy [5]. We are not aware of such a case in a newborn or older child.

Considering the favorable natural history of spontaneous regression of a rhabdomyoma versus the risk of any cardiac intervention around a small coronary artery imbedded in a tumor, we decided not to intervene and to monitor the electrocardiogram and cardiac biomarkers. In addition, the contributing factor of hypoxemia to myocardial injury disappeared rapidly as O_2 saturation returned to normal within 2 days.

CONCLUSIONS

Acute myocardial infarction is a rare presentation of neonatal rhabdomyoma. However, we believe that knowledge and consideration of such a clinical emergent condition is an important issue in the neonate with a diagnosis of tuberous sclerosis as well as in any neonate with a rare myocardial infarction.

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Capsule

Symbiont blocks parasite reproduction

Malaria mosquitoes can act as hosts to several microorganisms, including commensal bacterial species. **Huang** et al. noticed that some laboratory colonies of anopheline mosquitoes were incapable of transmitting malaria parasites. These insects also harbored a few cells of a bacterium called *Delftia tsuruhatensis* TC1, which produces a toxic alkaloid called harmane. Bacteria-produced harmane inhibited the development of female *Plasmodium* parasite gametes in the mosquito gut. Harmane was found to be a contact poison that could also cross the mosquito cuticle to kill developing malaria parasites. Contained field trials in Burkina Faso, coupled with modeling studies, showed that the bacterium has the potential to be deployed in mosquito breeding sites as a component of malaria control.

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Capsule

T cells and food allergy

The majority of an individual's immune system is located within the gut. To avoid food allergies, the gastrointestinal system needs to tolerate antigens from foreign substances that could induce an immune response. $CD4^+$ T lymphocytes are immune cells located throughout the intestine that play a key role in tolerance to dietary antigens. **Lockhart** and colleagues designed a model system to better understand how intestinal $CD4^+$ T cells regulate food-derived allergic reactions. In response to dietary protein, antigen-experienced $CD4^+$ T cells accumulated in the intestinal epithelium and modulated the expression of cytotoxic genes on conventional and regulatory $CD4^+$ T cells. Inflammatory signals disrupted the steady-state response, and protection against food allergy required clonal expansion of regulatory T cells and reduced the expression of proinflammatory genes.

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