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Hypertrophic Cardiomyopathy in an Infant of a Diabetic Mother: A Case Report and Neonatal Surgical Perspective

Dr. G.D. Sushintha Josh[1], Dr. G.D. Annora Josh[2], Dr. Shanthi Ramesh[3]

[1]Final year Postgraduate, Department of Paediatrics, Sree Balaji, Medical College and hospital, Chennai, Tamil Nadu 600044, India

[2]ACS Medical College and Hospital Poonamallee High Rd, Velappanchavadi, Chennai, Tamil Nadu 600077

[*]**Corresponding author:**
Dr. Shanthi Ramesh

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ABSTRACT

Background: Hypertrophic cardiomyopathy (HCM) in neonates is a rare and clinically heterogeneous disorder. A recognized cause in the neonatal period is maternal diabetes, particularly pre-gestational diabetes. Infants of Diabetic Mothers (IDMs) are at increased risk of transient myocardial hypertrophy, especially of the interventricular septum.

Case Presentation: We present a neonate born to a mother with poorly controlled pre-gestational diabetes, who was diagnosed postnatally with HCM based on echocardiography showing significant septal hypertrophy and left ventricular outflow tract (LVOT) narrowing. The infant was managed conservatively with beta-blockers, with clinical and echocardiographic improvement over follow-up.

Conclusion: HCM in IDMs is typically transient and responsive to medical therapy. However, distinguishing this from genetic or obstructive HCM is crucial, especially in the neonatal period where surgical intervention may be warranted. Awareness of such presentations is vital for neonatal teams, including pediatric surgeons, cardiologists, and intensivists.

Keywords: *Hypertrophic cardiomyopathy, infant of diabetic mother, neonatal cardiology, septal hypertrophy, left ventricular outflow obstruction*

1. INTRODUCTION

Hypertrophic cardiomyopathy (HCM) is defined by inappropriate myocardial thickening in the absence of an underlying pressure or volume overload. In neonates, HCM is rare but constitutes a significant proportion (25–40%) of pediatric cardiomyopathies, with the highest incidence occurring within the first year of life. Among the identifiable causes, infants born to diabetic mothers (IDMs) are a well-recognized group at risk of developing transient septal hypertrophy, especially in cases of poorly controlled pre-gestational diabetes.

The pathophysiology is thought to involve fetal hyperinsulinemia leading to myocardial overgrowth, particularly affecting the interventricular septum. Although typically benign and reversible, HCM in neonates can cause significant morbidity due to dynamic LVOT obstruction, arrhythmia, or diastolic dysfunction. In rare cases, severe obstruction may prompt surgical consideration.

We report a case of neonatal HCM in an IDM with a focus on clinical features, diagnostic workup, and implications for neonatal surgical teams.

2. CASE REPORT

A full-term male neonate was born via elective cesarean section to a 29-year-old gravida 2 mother with poorly controlled pre-gestational type 2 diabetes. The antenatal period was unremarkable apart from maternal hyperglycemia and a large-for-gestational-age fetus on ultrasonography.

At birth, the baby weighed 4.1 kg and required transient oxygen support for tachypnea. On day 2, a systolic murmur was noted, and echocardiography revealed marked asymmetric septal hypertrophy (IVS thickness 9 mm), with mild dynamic

LVOT obstruction (gradient 30 mmHg). No mitral regurgitation or outflow tract obstruction was noted. ECG showed sinus rhythm with no ischemic changes.

Management included oral propranolol and fluid restriction. The baby remained hemodynamically stable, and serial echocardiograms showed gradual regression of septal thickness. The infant was discharged on day 10 with continued beta-blocker therapy. At 6-week follow-up, septal hypertrophy had reduced significantly, and medication was tapered.

3. DISCUSSION

HCM in neonates is uncommon and can arise from genetic, metabolic, or syndromic causes, including Pompe disease, Noonan syndrome, or inborn errors of metabolism. In contrast, HCM associated with maternal diabetes is typically transient and due to insulin-induced cardiomyocyte hyperplasia.

The hallmark is asymmetric septal hypertrophy, and while most infants are asymptomatic, those with LVOT obstruction may develop symptoms of heart failure. Importantly, distinguishing this transient form from genetic HCM or obstructive variants is essential, as the management and prognosis differ significantly.

4. NEONATAL SURGICAL IMPLICATIONS

In rare cases, severe LVOT obstruction may necessitate early surgical consultation. Pediatric surgeons and anesthesiologists should be aware of the hemodynamic instability risks during anesthesia. Although septal myectomy is rarely performed in neonates, timely identification of those who may progress is critical.

In our case, early diagnosis, medical stabilization, and close monitoring allowed for spontaneous regression without surgical intervention.

5. CONCLUSION

Neonatal HCM in infants of diabetic mothers is an important and often reversible condition. Early echocardiographic screening in symptomatic IDMs allows for prompt management. Neonatal teams, including surgeons, must remain vigilant for cases that may mimic or progress to severe obstructive forms requiring surgical input.

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