Primary Hypertrophic Cardiomyopathy in Noonan Syndrome

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Abstract

We describe a case of Noonan syndrome referred to the department of pediatric cardiology for routine evaluation of cardiovascular abnormalities. Physical examination, electrocardiogram, chest X-ray and echocardiographic finding confirmed severe hypertrophic cardiomyopathy in the absence of any other cardiac abnormalities or systemic condition ***(Iranian Heart Journal 2007; 8 (1): 52-54)***.

Key words: Noonan syndrome■ hypertrophic cardiomyopathy

Hypertrophic cardiomyopathy includes a thickened but nondilated left ventricle in the absence of other cardiac or systemic disease.[1-3] Mutations of genes for contractile protein on chromosome 14 and other chromosome loci are responsible for this condition.[2,5,6,7]

Histological and morphologic abnormalities produce a disorder of relaxation, and sometimes left outflow tract obstruction; but overt clinical manifestations may not be present for decades.[6,7]

More than 70 terms have been used to decribe hypertrophic cardiomyopathy (HCM); emphasizing different aspects of the disorder; such as the site and asymmetry of left ventricle hypertrophy.[3,8,9]

By the 1980s, the term hypertrophic cardiomyopathy was favored.[3,7] Hypertrophic cardiomyopathy can occur as a congenital heart malformation. In most cases in both children and adults the condition behaves as an a autosomal dominant disorder. HCM was noted in glycogen storage disease, infants of diabetic mother, and in Noonan syndrome.

Case report

A 7 year-old Iranian girl was referred to the department of pediatric cardiology. Physical examination at time of admission disclosed a body weight of 17 kg (Z-score, 1.76); a height of 104cm (Z-score, -3.03) with upper to lower segment ratio of 1.2/1, and blood pressure of 95/77mmHg.

She had a short and webbed neck; low posterior hairline, and shield chest (Fig. 1).

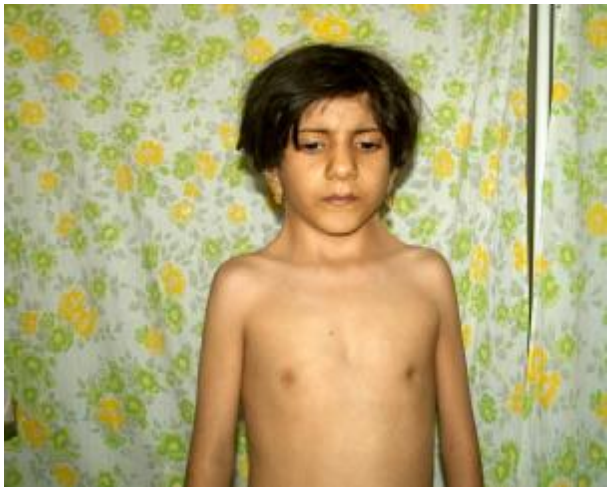

Fig. 1. Webbed neck and shield chest in 7-year old girl with Noonan symdrome

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Cubits valgus, micrognathia, multiple pigmented nervi or edema of the hands was not present. She had a normal pulses and a grade 2/6 systolic murmur was heard in the lower left sternal border.

Childhood history was unremarkable except for a birth weight of 1700gm. Bone age was estimated at 5 years and 8 months, using the Greuliche and Pyle radiographic atlas of skeletal development. Choromosomal study reveald a 45XX karyotype compatable with normal female syndrome.

Hormonal investigation showed total T4 of 95 nmol/L (normal: 58-161 nmol/L); TSH of 2.2 mu/l (normal 0.3-5 mu/l) FSH of 9.4miu/ml; LH of 0.1miu/ml; and estradiol 26 pg/ml (which is in prepubertal range). Hematological and biochemical investigations were normal and unremarkable.

In the chest X-ray, cardiomegaly was noted (Fig. 2) and her electrocardiogram revealed left-sided heart hypertrophy (Fig. 3). The patient's echocardiography (GE Vivid 3, 3.5.5Hz probe) in parasternal long-axis view revealed severe left ventricular hypertrophy (septum thickness equal to 20mm and posterior left ventricle wall equal to 19mm, Fig. 4) and positive systole anterior motion of septum (SAM) sign; without left ventricle outflow tract obstruction.

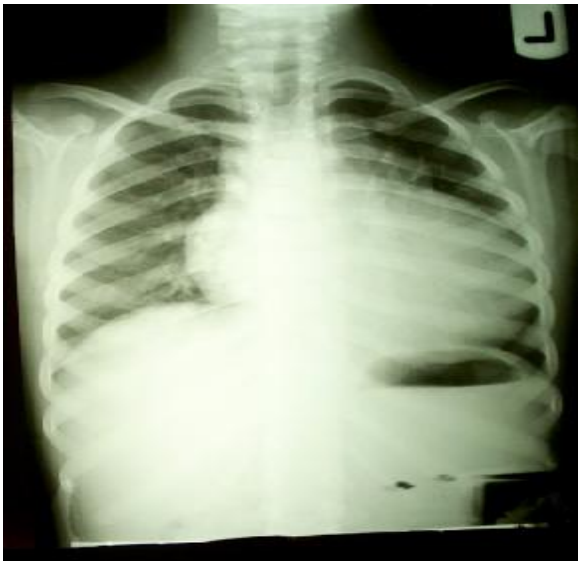
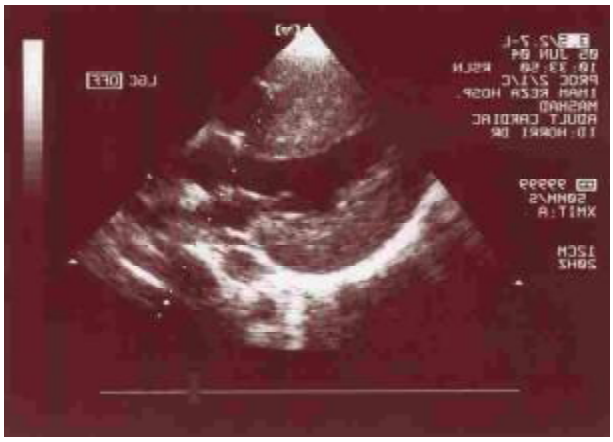
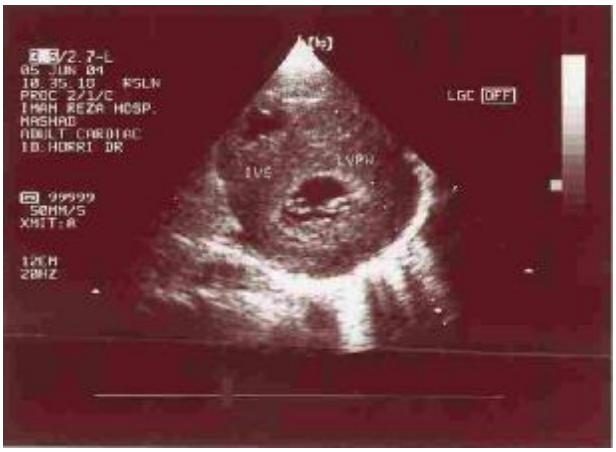


Fig. 2. Posteroanterior chest radiograph of patient demonstrating cardiomegaly.



A



B

Fig. 3. Two dimensiomal echocardiogram: A, Pararasternal long- axis image with the free wall of the left ventricle. B; Parasternal short- axis image demonstrating typical septal hypertrophy.

Discussion

Patients with Noonan syndrome are known to have a higher incidence of congenital heart disease. Pulmonary valve stenosis and peripheral pulomonary artery stenosis as well as HCM were seen in this syndrome (our case was HCM).[4-7]

Hypertrophic cardiomyopathy (HCM) is a primary and usually familial cardiac disorder with heterogeneous expression, unique pathophysiology, and adiverse clinical course for which several disease-causing mutations in genes encoding proteins of the sarcomere have been reported.[5,8,9]

HCM may be identified or cause disability and death at any age, including early chilhood. During the past 40 years, our understanding of the complexity of HCM has increased dramatically. On the other hand, perhaps no other cardiovascular disease has presented the challenges and controversies with respect to diagnosis, clinical course, and management as has HCM. Development and progression of left ventricular hypertrophy can lead to ventricular outflow obstruction in 25% of patients.[8,9]

Prognosis is significantly affected by age and mode of presentation. Mortality for HCM is twice as high in children as in adults. Presentation is by heart murmur, and congestive heart failure and arrhythmia more likely portend a poor prognosis.

Both medical and surgical treatment may improve quality of life.

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