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A patient diagnosed with pauciarticular juvenile rheumatoid arthritis after a mechanical prosthetic valve replacement due to aortic regurgitation

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Valvular heart disease is a rare complication of juvenile rheumatoid arthritis (JRA), with most cases associated with polyarticular JRA. The aortic valve is most commonly affected, and valvular involvement occurs months or years after the onset of JRA. Reported cases of valvular heart disease in patients with JRA in a pauciarticular pattern are rare. We report a case of severe aortic insufficiency in a 12-year-old boy who underwent aortic valve replacement before diagnosis of JRA with a pauciarticular pattern.

Key words: Aortic valve insufficiency, aortic valve replacement, heart valve disease, heart valve prosthesis translantation, juvenile rheumatoid arthritis

Cardiac involvement in the form of pericarditis, myocarditis, and valvular disease is well documented in juvenile rheumatoid arthritis (JRA) [1-6]. Pericarditis is the most common type of cardiac involvement, occurring predominantly in children with the systemic form of JRA. The much rarer form of valvular heart disease results in aortic insufficiency in most cases. It is usually observed in patients with a polyarticular pattern and has been reported to occur months or years after the onset of JRA [7-11]. We report a case of severe aortic insufficiency and mild mitral insufficiency in a 12-year-old boy who underwent aortic valve replacement with a mechanical prosthetic valve before diagnosis of pauciarticular JRA.

Case Report

A 12-year-old boy was admitted for evaluation due to reported left thigh pain for 2 weeks in May 2002. He had been well until the age of 11, when he developed coughing and exercise intolerance in June 2001. A grade 4/6 to and fro heart murmur at the right upper sternal border and left sternal border was heard, and an echocardiogram revealed mild mitral regurgitation and moderate aortic regurgitation. Chest radiograph showed cardiomegaly with a bulging left atrium. Blood culture, antistreptolysin O titers and serum rheumatic factors were negative. Heart failure was impressed. His symptoms deteriorated, and lip cyanosis with breathlessness developed 3 months later. Electrocardiogram showed severe left ventricular hypertrophy. Echocardiogram showed severe left ventricular dilatation, severe aortic regurgitation and mild mitral regurgitation. Operation for aortic valve replacement with a mechanical prosthetic valve and mitral valvuloplasty was performed in September 2001. After the operation, the patient's clinical status was stable. At follow-up he had improved generally.

The patient recalled intermittent bilateral knee discomfort since January 2001 and had noted occasional bilateral hip pain for more than 1 year. He had suffered from left thigh pain for 2 weeks, and could barely move his left leg when waking up in the morning. The pain was located at the upper part of his left thigh during active movements, and he could not walk without assistance. He had no history of morning stiffness, fever, skin rash, trauma, or recent upper airway infection.

Upon admission, no fever was noted. Blood pressure was 101/58 mm Hg and pulse 80 beats/min. His height and weight were within the 50th percentile for his age. He had moderate left thigh pain and refused to walk. The left thigh showed muscle wasting. Left hip pain was noted during hip flexion. The hips and knees were not swollen or erythematous. Ophthalmic examination showed no abnormalities. No skin rash, lymphadenopathy, or hepatomegaly was detected. Upon examination of the

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cardiovascular system, a grade 3/6 diastolic murmur over the left upper sternal border, and a grade 2/6 systolic murmur over the left sternal border and apex were heard. Cardiac echo revealed residual mild mitral and aortic regurgitation and no vegetation.

Laboratory examination showed C-reactive protein 8.22 mg/dL and lactate dehydrogenase 826 U/L. Hemoglobin was 10.6 g/dL with a hematocrit of 32.5%. White blood cell count was 7630/mm^3, platelets 246000/mm^3, and erythrocyte sedimentation rate 112 mm/hour. Serum total protein and albumin were 7.6 and 3.3 g/dL, respectively. Other liver and renal function tests were normal.

Tests for serum rheumatoid factors and antinuclear antibodies were negative, but human leucocyte antigen (HLA)-B27 was positive. Blood cultures, synovial fluid culture and bone marrow culture yielded negative results. Tuberculin skin test was negative. Antistreptolysin titers were within the normal range. Other values measured were C3 166 mg/dL, C4 32 mg/dL, immunoglobulin A (IgA) 444 mg/dL, IgG 2280 mg/dL, and IgM 150 mg/dL. Carotid duplex scanning of vessels of the bilateral lower limbs were also within normal limits. Radiograph of the hip (Fig. 1) showed bone erosion of the right femur with bilateral widening of the hip joint space and sclerotic change over the iliosacral joint. Radiography of the knee was within normal limits. Magnetic resonance imaging of the hip revealed markedly increased effusion around both hip joints which was more severe on the right side. Bone marrow aspiration was performed and revealed only reactive bone marrow.

On the basis of these clinical features and laboratory data, pauciarticular JRA with positive HLA-B27 was diagnosed. The pain persisted during hospitalization. Therefore, meloxicam (7.5 mg/day) was started, partially relieving his left thigh pain. Sulphasalazine (40 mg/kg/day) was administered later, and prednisolone (2 mg/kg/day) was given for 1 week. The arthralgia improved and prednisolone was tapered. Overall, cardiac involvement was stable during this period.

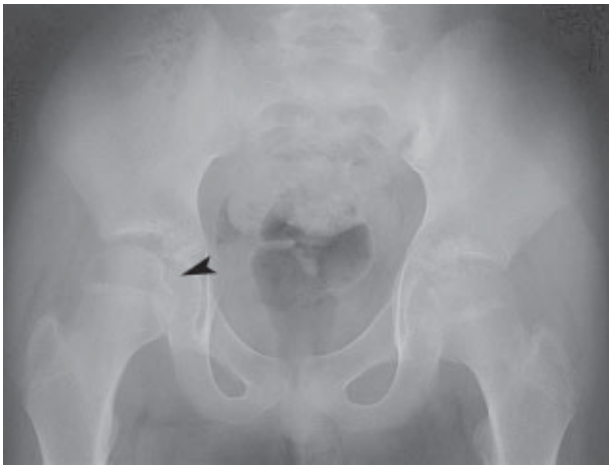

Fig. 1. Radiograph of the hip showing bone erosion of the right femur (arrowhead) with bilateral widening of the hip joint space and sclerotic change over the iliosacral joint.

Discussion

Valvular heart disease is a rare but serious complication of JRA. The aortic valve is most often affected. Although valvular involvement has been described in patients with all 3 types of JRA, there have been only a few reports associated with pauciarticular JRA [7,12]. The reported duration from diagnosis of JRA to onset of valvular disease varied from 4 months to 30 years, and predominantly occurred in patients with polyarticular type, severe destructive arthritis presenting with subcutaneous nodules, vasculitis, and with high titers of rheumatoid factors [2,8,9,12]. None of these risk factors was present in our patient. However, our patient's cardiac lesion was found before JRA was diagnosed, which is rare. Clinicians were unaware of JRA when severe aortic insufficiency was diagnosed.

Our patient had pauciarticular JRA, and was seronegative for antinuclear antibody but seropositive for HLA-B27. Huppertz et al described 4 patients with HLA-B27-associated juvenile arthritis with inflammatory aortic regurgitation [13]. Our patient also showed the possibility of aortic regurgitation in HLA-positive-associated JRA.

Unfortunately, there were no data available on the pathology of valvular disease in our patient. Rheumatic fever was included in the differential diagnosis. Some indicators suggested that rheumatic fever was not likely, including absence of fever, absence of streptococcal infection, low titers of antistreptolysin, and absence of migratory polyarthritis. However, our patient's aortic regurgitation could have occurred independently of JRA. Tracing his history, bilateral intermittent knee pain was reported during the period of valvular involvement. The absence of risk factors for endocarditis, the lack of clinical findings or symptoms suggestive of prior structural aortic valve disease, and the rapid progression of left ventricular volume overload suggested that the symptoms of arthritis and aortic valve disease might be related.

The rapid onset and progression of aortic valve insufficiency has been reported in JRA [7-11]. Many

patients with aortic insufficiency eventually require valve replacement. Our patient's aortic valve insufficiency progressed in severity from the time of discovery until surgery 3 months later. Replacement of the aortic valve in JRA-associated valvulitis has been described, but there have been only 2 reports of successful aortic valve replacement with a mechanical prosthesis in the pediatric JRA population [2,4,8,10,12,14]. A previous case of pulmonary autograft failure after aortic root replacement in a patient with JRA was reported [10]. This case confirms the possibility of performing a successful mechanical aortic valve replacement and resolving cardiac abnormalities in JRA patients with severe progressive aortic insufficiency.

This case suggests the need to perform regular radiographs of the joints and evaluation for arthritis as part of the routine assessment when patients with aortic insufficiency complain of joint discomfort. Whenever arthritis is detected in these patients, JRA should be considered. Treatment should be started as soon as possible, since valve insufficiency may lead to deterioration of cardiac function and cardiac surgery may be needed.

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