

Treatment and Diagnosis of Panner's Disease. A Report of Three Cases.

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Avascular necrosis of the humeral capitellum (Panner's disease), a relatively rare disorder in the juvenile. We diagnosed three patients using radiographs and magnetic resonance imaging, who were previously misdiagnosed with osteochondritis dissecans of the humeral capitellum. All patients were successfully treated by restriction of sports activities using the upper extremities. It is often difficult to distinguish Panner's disease from osteochondritis dissecans of the humeral capitellum. Panner's disease has been reported to occur in boys between 7 and 10 years old, which is younger than susceptible age of osteochondritis dissecans. In MRI, low intensity area in the ossification center of the humeral capitellum in T1-weighted image is useful findings for diagnosis. For the treatment, the conservative treatment has been recommended in the early stage of Panner's disease, while surgical intervention is required in some cases of osteochondritis dissecans.

INTRODUCTION

Avascular necrosis of the humeral capitellum (Panner's disease), a relatively rare disorder in the juvenile, was first described by Panner in 1927 as a condition resembling Calvé-Perthes' disease of the hip joint.^{1, 2} Although the pathogenesis of this disease has not been fully understood, the elbow pain has been reported to occur with valgus stress, when the humeral capitellum may be subjected to compression and shear forces. Therefore, Panner's disease is often misdiagnosed with lateral type of little league elbow. In this series of clinical cases, three patients, diagnosed with little league elbow by a previous doctor, were finally diagnosed with Panner's disease. All patients were successfully treated by restricting sports activities using the upper extremities.

CLINICAL CASES

Report of three cases

From October 2006 to February 2008, three patients diagnosed with little league elbow were referred to our institution for further inspection and treatment including surgical indication (Table). All patients were boys and their mean age was 7.7 years old (range, 6 to 9 years old). All patients felt pain and had limited range of motion at the elbow joint of the dominant arm without having experienced any major trauma or outbreak. The patients were examined by radiographs and magnetic resonance imaging (MRI) at our initial consultation and diagnosed with Panner's disease. The mean duration from onset to diagnosis was 4.3 months (range, 2 to 8 months). All patients were treated conservatively by restricting sports activities using the upper extremities, until the symptoms, including pain and limited range of motion, had disappeared. In this report, all of the patients and

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their families were informed that data from their cases would be submitted for publication and gave their consent.

Table. Summary of reported cases

| Age /Sex | Side | Sports | First diagnosis at previous clinic | Symptoms | Duration from onset to diagnosis | Treatment | Follow-up period | Result at final follow up | |
|----------|------------------|-----------|------------------------------------|--|----------------------------------|-----------|------------------|-----------------------------------|-----------------------|
| | | | | | | | | Clinical findings | Radiographic findings |
| 8/M | right (dominant) | Soccer | Little League Elbow | motion pain of the elbow limitation of range of motion (ext. -20, flex.120) | 8 months | rest | 20 months | pain free full range of motion | remodeled |
| 9/M | right (dominant) | Soccer | Little League Elbow | motion pain of the elbow limitation of range of motion (ext. -5, flex.130) | 3 months | rest | 18 months | pain free full range of motion | remodeled |
| 6/M | right (dominant) | gymnastic | Little League Elbow | motion pain of the elbow limitation of range of motion (ext. -10, flex.110) | 2 months | rest | 12 months | pain free full range of motion | remodeled |

Representative case (First case of the Table)

An 8-year-old boy, who belonged to the soccer team at his elementary school, felt pain in the right elbow joint without any history of major trauma. On clinical examination, tenderness at the lateral aspect of the elbow joint was observed. Range of motion of the elbow was also limited, extension -20 degree and flexion 120 degree. Pronation and supination of the forearm were not limited. There was no muscle weakness, sensory disturbance or joint instability. The radiographs of the elbow demonstrated fragmentation and a radiolucent zone with marginal sclerosis in the humeral capitellum (Figure 1), which indicated avascular osteonecrosis. A smooth articular surface of the humerus was observed in all MRI coronal images; however low-signal-intensity on T1-weighted images (Figure 2A) and linear high-signal-intensity on T2-weighted images (Figure 2B) were observed in the ossification center of the humeral capitellum.

We diagnosed the patient with Panner's disease and instructed him to stop all sports activities using his right upper extremity. The symptoms such as pain and limited range of motion gradually improved, and he was able to return to his original level of sports activities one year and 6 months after initial onset. On the radiographs, the depressed and fragmented humeral capitellum had been completely remodeled and the radiolucent area had disappeared (Figure 3 A, B). The high-signal-intensity originally presented at the ossification center of the humeral capitellum disappeared on the current T2-weighted coronal images (Figure 3 C). These findings suggested that remodeling of the humeral capitellum was complete.

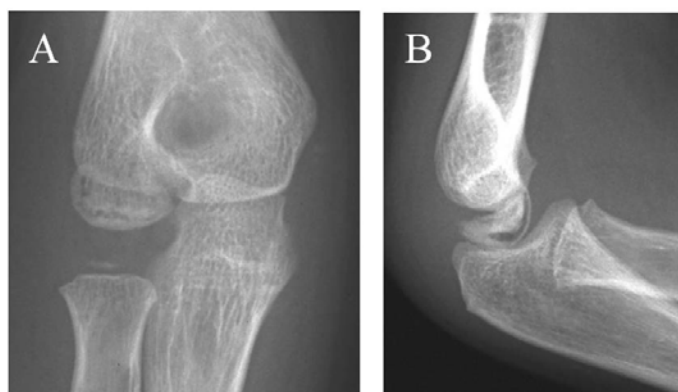


Figure 1. Radiographs of the right elbow at initial visit to our hospital (8 months after onset). Depressed and fragmented humeral capitellum and radiolucent area with marginal sclerosis in the ossification center of the humeral capitellum are observed on antero-posterior (A) and lateral (B) views.



Figure 2. MRI findings of the right elbow. The ossification center of the humeral capitellum presents with high-intensity compared with the humeral condyle and a low signal is seen in the ossification center of the humeral capitellum on the T1-weighted coronal image (A). The ossification center of the humeral capitellum presents with low-intensity compared with the humeral condyle and high signal are seen in the ossification center of the humeral capitellum on T2-weighted coronal image (B).



Figure 3. Radiographs and MRI of the right elbow at final follow-up. Depressed and fragmented capitellum is remodeled completely on the antero-posterior (A) and lateral views (B). The ossification center of the humeral capitellum presents with low-intensity the same as the metaphysis of the humerus (C).

DISCUSSION

Avascular necrosis of the humeral capitellum (Panner's disease) is a rare disorder. Panner first described two boys with pain and restriction of range of motion of the elbow joint related to a trauma and radiographically diagnosed them with avascular osteonecrosis of the humeral capitellum.¹ Two patients completely healed clinically with 4 and 6 months conservative observation. Heller and Wiltse reported Panner's disease in boys occurring after trauma.³ Typical clinical symptoms of Panner's disease are pain and limited range of motion of the elbow joint with localized tenderness over the lateral condyle of the humerus; these symptoms are similar to osteochondritis dissecans of the humeral capitellum. However, it is important that Panner's disease should be distinguished from osteochondritis dissecans of the humeral capitellum, which is a lateral type of little league elbow because both disorders occur in active boys and treatment are different between both conditions.^{2,4} The etiology of Panner's disease is not completely understood, however major trauma, repetitive micro-trauma, and endocrine abnormalities might be the factors suggested which cause local failure of intraosseous circulation resulting in disordered endochondral ossification.^{1,2,4} Osteonecrosis and fragmentation of the humeral capitellum can be detected by both radiograph and MRI.

Osteochondritis dissecans of the humeral capitellum is seen as a lateral type of little league elbow and is caused by overuse of the elbow joint in baseball players. The pathomechanism of little league elbow is considered to be insufficiency of the medial collateral ligament due to valgus extension overload of the elbow which then causes the disorder in the medial side of the elbow, resulting in compressive stress at the

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humero-radial joint on the lateral side and impingement between the olecranon and the olecranon fossa at the posteromedial side.^{2,4,5} Thus in little league elbow, the abnormality at the subchondral zone of the humeral capitellum as well as the medial epicondyle and the olecranon can be observed in the radiographs and MRI.^{2,4,5,6} These findings are helpful in distinguishing osteochondritis dissecans at the humeral capitellum in little league elbow from Panner's disease. Moreover, patients with little league elbow tend to be relatively older than patients with Panner's disease. Panner's disease is often seen in boys between 7 and 10 years and osteochondritis dissecans at the humeral capitellum of little league elbow generally occurs in older adolescent athletes playing overhead throwing sports.² In the present report, all patients with elbow pain and limited range of motion were boys (age from 6 to 9 years old) younger than 10 years old and typical findings of Panner's disease were detected on radiographs and MRI. Therefore we diagnosed these patients with avascular osteonecrosis of the humeral capitellum (Panner's disease).

For the treatment, Panner's disease heals well with restriction of use of the affected upper extremity and the prognosis is relatively good with conservative treatment.¹⁻³ Whereas, osteochondritis dissecans sometimes needs surgical treatment including fixation with autologous bone plug or osteochondral transplantation.²⁻³ In the present cases, all patients were treated by restriction of activities using the affected upper extremities and the disordered humeral capitellum were well remodeled as a result.

In conclusion, Patients with Panner's disease should be diagnosed by a careful look at the clinical history of the onset and typical findings of radiographs and MRI thus distinguishing it from osteochondritis dissecans at the humeral capitellum, which is a lateral type of little league elbow. For patients with Panner's disease, physicians should instruct the patient to restrict activities using the affected upper extremities.

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