Osteochondritis Dissecans of the Glenoid in Adolescent Baseball Players: Computed Tomography Quantitative Analysis and Recovery after Nonsurgical Treatment

Hong Ki Jin[1], Hyung-Lae Cho[1], Jeong Hoi Koo, Jihoon Kim[2], Won Kyu Jang[2]
[1]Orthopaedic surgery, Good Samsun Hospital, [2]Orthopaedic surgery

INTRODUCTION:

Osteochondritis dissecans of the glenoid (G-OCD) is an idiopathic focal osseous-chondral disruption in concave articular cartilage with the potential long-term consequence of premature osteoarthritis in shoulder. It is exceedingly rare condition in adolescent throwers and there is little literature concerning its special radiological or clinical features. The purpose of this study is to evaluate the characteristics of the G-OCD on computed tomography (CT) scan and the recovery of the lesion after nonsurgical rehabilitation.

METHODS:

We retrospectively analyzed 16 adolescent baseball players (Mean age; 15.2 years, mean Body Mass Index, BMI; 23.8 kg/m^2, mean playing career 4.6 years, pitcher: fielder=10:6, right: left=14:2) diagnosed with symptomatic G-OCD between 2010 and 2021. Osteochondral defects secondary to acute trauma, instability, and primary osteoarthritis were excluded. All patients exhibited posterior shoulder tightness on physical examinations, and demographic characteristics were compared with 60 players without G-OCD as control. The size (anterior-posterior; AP width and superior-inferior; SI length) and depth of the lesion were measured from axial and coronal CT images. In the 3-dimensional reconstruction glenoid en face image, the relative proportion of OCD lesions to the total glenoid articular surface and locational differences among the patients were investigated. Nonsurgical treatment included refraining from throwing and kinetic chain rehabilitation for a duration lasting 3 to 6 months according to the size of the lesions. Fourteen patients were followed for mean 16 months after initial diagnosis (range: 3-36 months), and the recovery of the lesions were evaluated on CT in 8 patients.

RESULTS: The average size of the G-OCD lesions was 12.2 mm (8.5-18.7 mm) in width, and 14.9 mm (9.5-25 mm) in length, and 3.4 mm (2.2-5.9 mm) in depth, respectively. The mean area of the lesion on the en face view was 176.4 mm^2 (58- 250 mm^2) and the proportion was 18.6% (7-36.6%) of total glenoid area. The location of the lesion was at the same level of the most posteriorly convex portion of the mid-posterior glenoid and the slopping of posterior glenoid rim, known as characteristic adaptation of adolescent thrower, was minimal in all G-OCD patients. Of the 16 patients, only one showed fragmentation of the lesion. There were no significant demographic differences except for BMI (p=0.034), compared to the players with physiologic posterior glenoid change without G-OCD. Two out of 14 patients gave up baseball playing and 12 patients (85%) returned to throwing at an average of 6 months (3-8 months) after rehabilitation and mean recovery rate of the lesion area on CT en face view was 52.5% in 6 months after initial diagnosis.

DISCUSSION AND CONCLUSION:

G-OCD is a different type of internal impingement-induced posterior glenoid lesion in adolescent baseball players. Notwithstanding the limited number of cases, it occurs mainly at the mid-posterior glenoid in overweight players with posterior shoulder tightness and fragmentation of the lesion is rare unlike OCD in other joints. Adaptational change of the posterior glenoid rim is minimal and G-OCD can be successfully treated with nonsurgical rehabilitation.

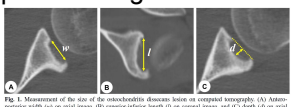

Fig. 1. Measurement of the size of the osteochondritis dissecans lesion on computed tomography. (A) Antero-posterior width (w) on axial image, (B) superior-inferior length (l) on coronal image, and (C) depth (d) on axial image. Each measurement represents the maximal size of the lesion in corresponding image.

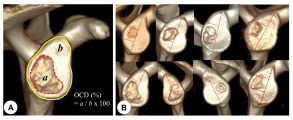

Fig. 2. (A) 3 dimensional computed tomographic en face glenoid view demonstrates how to measure the proportion of osteochondritis dissecans lesions (a, red dotted circle) in total glenoid area (b, yellow circle). (B) The location of osteochondritis dissecans lesion in 8 cases on 3-dimensional en face view. The posterior half of the glenoid articular surface is divided into thirds (red dotted line) and the lesion mainly occurred in the most convex part of the mid-posterior glenoid.

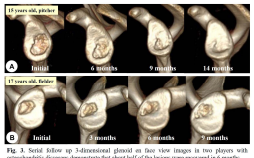

Fig. 3. Serial follow up 3-dimensional glenoid en face view images in two players with osteochondritis dissecans demonstrate that about half of the lesions were recovered in 6 months.

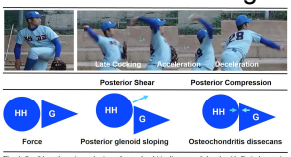

Fig. 4. Possible pathogenic mechanism of osteochondritis dissecans of the glenoid. Typical posterior glenoid sloping is mainly caused by shear force loaded to the posterior glenoid during the late cocking phase, and osteochondritis dissecans is thought to be mainly caused by compressive force applied to the posterior glenoid during the deceleration phase.(HH: humeral head, G: glenoid)