Clinical and Radiological findings of Posterior Labral Tears without Glenohumeral Instability are Underestimated Compared with Tears with Instability

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INTRODUCTION: Posterior labral tears can occur due to various causes, including repetitive microtrauma, acute traumatic episodes, and even atraumatic causes. Recent studies have reported differences in the clinical and radiological characteristics of patients with posterior labral tear without instability, introducing the need to diagnose posterior labral tear differently based on the presence of instability. Patients with posterior labral tear without instability more frequently complained of nonspecific pain only in certain activities or sports such as push-ups or bench press, with a complaint of decreased weight or repetitions. In some patients, no significant abnormalities were found on radiological images, making diagnosis more challenging. As most studies have focused on posterior labral tear with glenohumeral joint instability, posterior labral tears have not yet been classified according to the presence of instability. Furthermore, few studies have compared the clinical and radiological characteristics of posterior labral tear with and without instability. This study aimed to compare the clinical characteristics, radiological and arthroscopic findings, and functional improvements after labral repair between patients who had posterior labral tear with and without instability.

METHODS: Patients who were unresponsive to conservative treatment and underwent arthroscopic posterior labral repair were retrospectively enrolled. Patients were divided into two groups: posterior labral tear with glenohumeral instability (group I) and posterior labral tear without glenohumeral instability (group II). Patients in group II were defined as those who did not have a history of frank posterior dislocation or subluxation, or any signs of glenohumeral instability on physical examination. Patients in group I were defined as patients with a history of frank posterior dislocation, or subluxation, and who showed positive physical examination on posterior instability. Demographic, radiological, physical examination data, intraoperative findings were collected. Clinical outcomes were assessed at a minimum two-year follow-up using the VAS for pain, ASES, and Rowe scores. Labral healing was evaluated using CT arthrography at one year postoperatively.

RESULTS: A total of 85 patients were included (40 in group I and 45 in group II) with mean follow-up duration of 31.8 ± 12.2. Patients in group II were older (31.4 ± 1.0 years old, $p<0.001$), had longer symptom durations (30.1 ± 5.6 months, $p=0.002$), and reported fewer trauma history (16 patients, $p=0.009$). Competitive sports were more common in group I (nine patients, $p=0.047$), whereas weight lifting exercises were more common in group II (24 patients, $p=0.047$). MRI underestimated incomplete posterior labral tear more frequently in group II than in group I ($p=0.033$). Incidence of occult posterior labral tear detected during arthroscopy was higher in group II (10 patients) than in group I (2 patients; $p=0.029$). In group I, the VAS score improved from 2.7 ± 0.4 preoperatively to 0.1 ± 0.1 at the last follow-up ($p < 0.001$), and in group II, from 1.9 ± 0.2 to 0.4 ± 0.1 ($p < 0.001$). The ASES score in group I improved from 76.7 ± 2.0 preoperatively to 96.1 ± 5.9 at the last follow-up ($p < 0.001$), and in group II, from 77.2 ± 1.9 to 94.1 ± 1.4 ($p < 0.001$). Rowe score in group I improved from 78.2 ± 2.2 preoperatively to 98.2 ± 1.0 postoperatively ($p < 0.001$), and in group II, from 81.9 ± 3.5 to 97.6 ± 1.0 ($p < 0.001$). No statistically significant differences were found in shoulder function improvement between the two groups. Incomplete labral healing was suspected in group I (7 patients) and group II (5 patients), with no statistically significant difference ($p=0.409$).

DISCUSSION AND CONCLUSION: Posterior labral tears with instability were more common in competitive sports participants with a history of trauma, whereas posterior labral tears without instability were more common during weight lifting exercises. Posterior labral tears with instability are associated with redundant capsule and the posterior inferior glenohumeral ligament (PIGHL), either due to natural variation or as a result of various injuries. Redundancy in the capsule and PIGHL leads to a decreased compressive force applied to the glenohumeral joint, causing only a shear force primarily to act between the glenoid bone and labrum. This causes a posterior labral tear with capsular injury, resulting in caspulolabral complex detachment from the glenoid. However, patients who had posterior labral tear without instability had no redundancy in the capsule and PIGHL. When a posteriorly directed repetitive shear force is applied along with compressive forces in the glenohumeral joint, such as weight lifting exercises, the labrum can be damaged without injury to the capsule. This repetitive weight lifting motion for a long time might result in microtrauma to body of the posterior labrum, which leads to degeneration of the labrum, especially when the weight is overloaded to the patient's capability. At this stage, the posterior labrum is degenerated and injured, especially the body portion remaining in the superficial labrum attached loosely to the glenoid, presenting as an occult tear on MRI. Clinical and radiological findings of posterior labral tears without glenohumeral instability are underestimated compared with those with instability. Surgical treatment showed good clinical outcomes in both groups for patients who failed conservative management.