Posterolateral rotatory instability of the elbow: a case report and literature review

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【Abstract】Posterolateral rotatory instability of the elbow describes a condition that radial head subluxation or dislocation occurs when forearm rotates externally in relation to humerus. It is difficult to diagnose and treat. We reported a typical case which was confirmed by physical examination and MR images. Ligamentous insufficiency was confirmed under direct vision, and was reconstructed with triceps fascia as described by Gong et al with slight modification. Regain of full function was achieved one year after surgery.

Key words: Forearm; Joint instability; Elbow

Posterolateral rotatory instability of the elbow was termed by O’Driscoll et al in 1991 to describe the condition that the radial head subluxated or dislocated, when the forearm rotates externally in relation to the humerus. The lateral ligament complex, together with radial head and the coronoid process, plays an important role in maintaining the posterolateral rotatory stability. Deficiency of these constraints may lead to instability.

The lateral ligament complex includes three components: annular ligament, radial collateral ligament and lateral ulnar collateral ligament. The function of the complex is to limit extra external rotation of the radius and ulna relative to the humerus. Trauma, cubitus varus and iatrogenic causes may lead to disruption of the lateral ligament complex. Posttraumatic disruption is the most common reason.

Diagnosis is based on patients’ complaint, history and physical examination. MRI is a significant method in determining the posterolateral rotatory instability. For the patients whose instability symptoms persist despite conservative measures, reconstruction of the lateral ligament complex may provide significant relief of pain and functional improvement. Long-term follow-up of posterolateral rotatory instability of the elbow without treatment showed prevalence of osteoarthritis and tardy ulna nerve palsy.

Here we reported a female who had a definite trauma history of dislocation of right elbow. Posterolateral rotatory instability of the elbow was confirmed by physical examination and MRI. After an isolated lateral ligament reconstruction, good pain-free function was regained at the one-year follow-up.

CASE REPORT

A 23-year-old female with sustained pain in the left elbow after traumatic elbow dislocation was presented. The pain persisted for 8 months despite conservative treatments. Besides, she often experienced popping feeling during elbow motion. Physical examinations revealed slight swelling and tenderness in the lateral side of her left elbow. Full extension of the elbow may elicit pain and apprehension. Pivot-shift sign and table-top relocation tests were positive. MR images indicated the tearing of lateral ligament complex while plain radiographs showed integrity of bony structures. (Figures 1-3). Under general anesthesia, pivot-shift sign was positive again. Ligamentous insufficiency was confirmed under direct vision, and was reconstructed with triceps fascia as described by Gong et al with slight modification. Postoperative cast immobilization was applied for 2 weeks, followed by rehabilitation. Normal elbow range of motion (ROM) was obtained and stability was restored at one year follow-up.
DISCUSSION

Posterolateral rotatory instability usually results from trauma. Therefore, any history of subluxation or dislocation should be carefully retrieved. Other causes include congenital anomaly, throwing sports injury, and ambulation with crutches. Pain on the lateral aspect of elbow is the main complain, and occasionally patients may experience popping, giving way, catching or snapping.

Several provocative tests have been described, based on the mechanism that the instability could be elicited when the forearm is positioned in supination and slight flexion. MRI is of great value in establishing the diagnosis.

Several provocative maneuvers for posterolateral rotatory instability have been described, such as lateral pivot-shift test and lateral pivot-shift apprehension test, posterolateral rotatory drawer test, table-top relocation test, active floor push-up sign and chair sign. The consistent mechanism is extraction of instability when the forearm is positioned in supination and slight flexion. Among these tests, the pivot-shift test performed under anesthesia is of specific value. Just like in this case, the pivot-shift became obvious and could be verified under image intensifier after anesthesia.

Charalambous et al recommended the pivot-shift test because the image intensifier can be used in performing the pivot-shift test. But Regan et al suggested that both the chair sign and push-up sign are more effective than the pivot-shift sign in diagnosis of posterolateral rotatory instability because the awake patient has a low positive pivot-shift sign without anesthesia. Potter suggested that abnormal MR finding could be constantly observed in patients with posterolateral rotatory instability. The tearing of lateral lunar collateral ligament and posterior subluxation of the radial head relative to the center of the capitellum were typical MR findings in this patient.

If conservative treatment is ineffective, reconstruction of lateral ligament complex could provide significant relief and functional improvement. Cheng et al described a patient with posterolateral rotatory instability without treatment who sustained osteoarthritis and tardy ulna nerve palsy finally.

Several techniques have been described by DelaMora, Sanchez-Sotelo, Lee, Olsen and Eygendaal, using different tendon grafts including palmaris tendon, gracilis tendon, semitendinosus tendon, plantaris tendon and triceps fascia. We utilized the method using triceps fascia and bone tunnels to reconstruct the complex which was introduced by Gong et al in 2009.
technique has advantages of simplifying the lunar-side fixation, no needs of another incision for tendon harvest and avoiding the risk of fracture of bone bridge between the tunnels. Besides suturing the fascia back to itself on the lateral epicondyle, we slightly modified it by adding an anchor to enhance the fixation.

REFERENCES


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ERRATUM

This is to notify that the Chinese name of the first author in the article “Treatment of osteoporotic compression fracture of thoracic/lumbar vertebrae by kyphoplasty with SKY bone expander system” published in the fifth issue of our journal (Chin J Traumatol 2010; 13(5):270-274) should be “熊建”, rather than “熊健”.

Editorial Office