



# Drop sign of the elbow joint after surgical stabilization of an unstable simple posterolateral dislocation: natural course and contributing factors

In Hyeok Rhyou, MD\*, Kyung Sup Lim, MD, Kyung Chul Kim, MD, Ji-Ho Lee, MD, Ki-Baek Ahn, MD, Seong Cheol Moon, MD

*Upper Extremity and Microsurgery Center, Semyeong Christianity Hospital, Pohang, South Korea*

**Background:** We performed this study to investigate the natural course and factors affecting the incidence of drop sign immediately after stabilization of an unstable posterolateral (PL) dislocation of the elbow.

**Methods:** Twenty-three patients who underwent a stabilization procedure for persistent instability after closed reduction of PL dislocation of the elbow were enrolled. The natural course was evaluated with simple radiographs taken at regular intervals after the operation. Primary repair of medial or lateral ligaments and overlying muscles, degree of adjacent muscle injury, and type of anesthesia were analyzed to determine their relationship to postoperative drop sign. Functional outcomes were evaluated by the Disabilities of the Arm, Shoulder, and Hand score and Mayo Elbow Performance Score.

**Results:** A postoperative drop sign was observed in 4 cases (17%) and resolved within 1 week after the operation. There was no significant relationship between preoperative factors and drop sign except method of anesthesia. All drop signs were found in patients who had received a regional block ( $P = .006$ ). There were no statistically significant differences in functional outcome between the drop sign group and the non-drop sign group.

**Conclusions:** A postoperative drop sign was observed in 17% of patients who underwent a surgical stabilization procedure for an unstable PL elbow dislocation; this sign spontaneously disappeared in all 4 patients within 1 week of the operation. The drop sign was possibly caused by delayed return of muscle tone. A postoperative drop sign did not indicate the need to perform an additional stabilization procedure, nor did it affect postoperative functional outcome.

**Level of evidence:** Level IV, Case-Control Design, Diagnostic Study.

© 2015 Journal of Shoulder and Elbow Surgery Board of Trustees.

**Keywords:** Elbow dislocation; posterolateral elbow dislocation; ulnar collateral ligament; lateral ulnar collateral ligament; primary repair; drop sign

This study was approved by the Pohang SM Christianity Hospital Institutional Review Board: No. SCHIRB-14-008.

\*Reprint requests: In Hyeok Rhyou, MD, Department of Orthopedic Surgery, Upper Extremity and Microsurgery Center, Semyeong Christianity Hospital, POSCO Great Road 351, Nam Gu, Pohang, Kyeongbuk, South Korea.

E-mail address: [osdrrih@gmail.com](mailto:osdrrih@gmail.com) (I.H. Rhyou).

Most cases of posterolateral (PL) elbow dislocation can be managed without surgical treatment because they are usually stable after closed reduction.<sup>6,12,16</sup> Surgical treatment is indicated in cases that have persistent instability of the elbow joint.<sup>6,16</sup> Bone structures such as the distal humerus, proximal ulna, and radius are known to play major

**Table I** Patient data

| Cases | Sex/age | MRI findings |        |      |          |            | Anesthesia | Treatment |      | U-H distance (mm) |               | Functional outcomes |      |
|-------|---------|--------------|--------|------|----------|------------|------------|-----------|------|-------------------|---------------|---------------------|------|
|       |         | UCL          | Flexor | LUCL | Extensor | Brachialis |            | UCL       | LUCL | Affected          | Contralateral | DASH                | MEPS |
| 1     | F/38    | CR           | CR     | CR   | CR       | >75%       | BPB        | No        | Yes  | 8.9               | 2.5           | 15                  | 80   |
| 2     | F/47    | CR           | CR     | CR   | CR       | 50%-75%    | BPB        | Yes       | Yes  | 6.0               | 2.2           | 6.6                 | 85   |
| 3     | M/26    | CR           | PR     | CR   | CR       | 50%-75%    | BPB        | No        | Yes  | 7.1               | 2.4           | 1.6                 | 85   |
| 4     | F/45    | CR           | CR     | CR   | CR       | >75%       | BPB        | No        | Yes  | 6.7               | 1.9           | 0.8                 | 100  |
| 5     | M/46    | CR           | CR     | CR   | CR       | <50%       | G/A        | Yes       | No   | 3.0               | 2.1           | 4.1                 | 85   |
| 6     | M/45    | CR           | PR     | CR   | CR       | 50%-75%    | G/A        | No        | Yes  | 3.9               | 2.7           | 0                   | 100  |
| 7     | F/70    | CR           | CR     | CR   | CR       | <50%       | G/A        | Yes       | Yes  | 3.7               | 2.5           | 0                   | 100  |
| 8     | F/47    | CR           | CR     | CR   | CR       | <50%       | BPB        | Yes       | Yes  | 2.2               | 2.1           | 6.6                 | 85   |
| 9     | M/18    | CR           | PR     | CR   | CR       | Normal     | BPB        | Yes       | No   | 3.9               | 2.3           | NA                  | NA   |
| 10    | M/30    | CR           | CR     | CR   | CR       | <50%       | G/A        | Yes       | Yes  | 3.8               | 2.9           | 0                   | 100  |
| 11    | F/60    | CR           | CR     | CR   | CR       | 50%-75%    | G/A        | Yes       | Yes  | 2.2               | 3.1           | 5.8                 | 85   |
| 12    | M/30    | CR           | PR     | CR   | CR       | >75%       | G/A        | No        | Yes  | 3.6               | 2.6           | NA                  | 100  |
| 13    | M/61    | CR           | PR     | CR   | CR       | Normal     | G/A        | Yes       | Yes  | 3.7               | 2.5           | 7.5                 | 85   |
| 14    | M/40    | CR           | CR     | CR   | CR       | >75%       | G/A        | Yes       | Yes  | 2.9               | 2.0           | NA                  | NA   |
| 15    | F/18    | CR           | PR     | CR   | CR       | <50%       | BPB        | Yes       | Yes  | 3.6               | 2.6           | NA                  | 100  |
| 16    | M/35    | CR           | PR     | CR   | CR       | Normal     | G/A        | No        | Yes  | 2.6               | 1.7           | NA                  | 95   |
| 17    | M/42    | CR           | PR     | CR   | CR       | Normal     | BPB        | Yes       | Yes  | 3.4               | 2.7           | 8.3                 | 85   |
| 18    | M/42    | CR           | CR     | CR   | CR       | 50%-75%    | G/A        | Yes       | Yes  | 3.1               | 2.3           | NA                  | NA   |
| 19    | M/48    | CR           | CR     | CR   | CR       | 50%-75%    | G/A        | Yes       | Yes  | 2.0               | 1.8           | NA                  | NA   |
| 20    | F/50    | CR           | PR     | CR   | CR       | >75%       | G/A        | Yes       | No   | 2.2               | 1.6           | 0                   | 100  |
| 21    | F/51    | CR           | CR     | CR   | CR       | <50%       | G/A        | No        | Yes  | 3.8               | 2.1           | 0                   | 100  |
| 22    | M/25    | CR           | CR     | CR   | CR       | >75%       | BPB        | Yes       | Yes  | 2.8               | 2.1           | 0.8                 | 100  |
| 23    | M/29    | CR           | PR     | CR   | CR       | <50%       | G/A        | No        | Yes  | 1.9               | 1.7           | 0                   | 100  |

U-H, ulnohumeral; MEPS, Mayo Elbow Performance Score; DASH, Disabilities of Arm, Shoulder, and Hand; UCL, ulnar collateral ligament; LUCL, lateral ulnar collateral ligament; PR, partial rupture; CR, complete rupture; NA, not available; BPB, brachial plexus block; G/A, general anesthesia.

roles in the stability of the elbow joint.<sup>1,10,11</sup> In addition, static soft tissue structures of the joint capsule and collateral ligaments contribute to stability, with flexor and extensor muscles acting as dynamic stabilizers.<sup>5,7,10,13</sup>

The “drop sign,” a term coined by Coonrad et al<sup>3</sup> in 2005 in performing conservative treatment of simple elbow dislocation, refers to an ulnohumeral joint space widened >4 mm. The drop sign has been interpreted to indicate an unstable elbow joint that requires stabilization procedures.<sup>3</sup> Surgical management is generally used for unstable simple dislocation of the elbow joint if it is manifested with persistent instability after closed reduction. The elbow joint is considered to be stable when the concentric ulnohumeral joint shows stability over the range of motion of flexion and extension after surgical repair of torn collateral ligaments and overlying muscles.<sup>6,16</sup> However, it is unclear what procedure to follow if there is a widened ulnohumeral joint space on simple radiographs taken immediately after the operation.<sup>4</sup> Therefore, the purpose of this study was to investigate the natural course of and factors affecting postoperative drop sign observed immediately after stabilization of an unstable PL dislocation of the elbow joint. In addition, we evaluated the results of surgical treatment based on our treatment algorithm.

## Materials and methods

Twenty-three patients (14 men and 9 women) between 18 and 70 years of age who underwent primary ligament repair for persistent instability after closed reduction of a simple PL dislocation of the elbow joint from January 2008 to December 2012 were enrolled in this study (Table I). Cases that showed ulnohumeral joint space widening and subluxation after closed reduction were defined as persistent instability cases. Furthermore, if elbow subluxation or dislocation occurred with 30° to 40° of extension on measurement of stable arc range of motion, we considered the elbow joint unstable.<sup>6,12,16</sup> Retrospective review of patient radiographs and medical records was performed. The right elbow was involved in 14 cases, whereas the left elbow was involved in 9 cases. Cause of injury was slip (n = 15), fall from a height (n = 3), traffic accident (n = 2), or sports accident (n = 3). Mean follow-up duration was 40 months (range, 6-92 months). All cases were evaluated preoperatively with plain radiographs of the elbow joint and magnetic resonance imaging (MRI). MRI was performed with a 1.5T scanner (Intera; Philips, Eindhoven, The Netherlands). T1-weighted, T2-weighted, and T2-weighted fat suppression MRI sequences in the axial, sagittal, and coronal planes based on the long axis of the humerus were acquired with the affected elbow in a long arm splint (60°-90° of flexion, depending on the degree of pain and swelling). All patients underwent MRI within 1 week after trauma. A variety of MRI pulse sequences were used. A picture archiving and communication system (Pi view; INFINITT, Seoul, South Korea) was used to

Download English Version:

<https://daneshyari.com/en/article/4073392>

Download Persian Version:

<https://daneshyari.com/article/4073392>

[Daneshyari.com](https://daneshyari.com)