Outcomes of the Mini-Open Outerbridge-Kashiwagi Procedure According to Preoperative Radiocapitellar Joint Status

Soo-Min Cha, MD, Hyun-Dae Shin, MD, PhD, Kyung-Cheon Kim, MD, PhD, Il-Young Park, MD

Purpose To compare the clinical and radiological outcomes in patients treated with the mini-open Outerbridge-Kashiwagi procedure according to radiological grading of the radiocapitellar joint.

Methods Sixty-three patients with primary elbow arthritis diagnosed between March 2004 and February 2010 were enrolled. Patients without and with radiocapitellar arthrosis were assigned to groups 1 (n = 34) and 2 (n = 29), respectively. The mean follow-up period was 51 months. Clinical outcomes were compared between groups using the presence of resting elbow pain; Morrey pain score; the Mayo Elbow Performance Score; the Disabilities of the Arm, Shoulder and Hand score; and active range of motion. Radiological outcomes, including the presence of loose bodies and re-ossification of fenestration, were evaluated.

Results No patient in group 1 and 4 patients in group 2 reported resting elbow pain at the final follow-up examination. All pain was on the radial side, and it was aggravated in 2 patients. The Mayo Elbow Performance Score and Disabilities of the Arm, Shoulder and Hand score and active motion improved in both groups. No significant difference in the Morrey pain score, Mayo Elbow Performance Score, Disabilities of the Arm, Shoulder and Hand score, or active range of motion was observed between groups. Postoperative deterioration of radiological joint status was similar in the ulnohumeral and radiocapitellar joints of both groups. Re-ossification of the fossa fenestration did not differ significantly between groups.

Conclusions We compared the outcomes of the mini-open Outerbridge-Kashiwagi procedure according to radiocapitellar joint status. Short-term results were satisfactory in both groups, but resting pain associated with newly developed anterior loose bodies led to a poor outcome in group 2. *(J Hand Surg Am. 2014;39(2):209–218. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic III.

Key words Radiocapitellar, ulnohumeral, mini-open, Outerbridge-Kashiwagi procedure.

From the Department of Orthopaedic Surgery, Regional Rheumatoid and Degenerative Arthritis Center, Chungnam National University Hospital, Chungnam National University School of Medicine, Daejeon, Korea.

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Corresponding author: Hyun-Dae Shin, MD, Department of Orthopedic Surgery, Chungnam National University School of Medicine, 640, Daesa-Dong, Jung-Gu, Daejeon, Korea; e-mail: hyunsd@cnu.ac.kr.

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OUTERBRIDGE AND KASHIWAGI introduced a transhumeral approach to treat mild-to-moderate osteoarthritis of the elbow.[1] Osteophytes from the olecranon, coronoid, and their concomitant fossae impinge on each other, which then limits the hinging elbow motion and produces end-arc pain. Minami et al reviewed the long-term results for the Outerbridge-Kashiwagi (O-K) procedure and found that 55% of patients had no or little pain; these results represented a 10% deterioration since their original report of the short-term results.[1,2]

The mini-open O-K procedure was recently introduced.[1–3] Morrey[4] modified the original technique with a triceps-sparing approach in 1992. The long-term results of this ulnohumeral arthroplasty were satisfactory for pain relief and improved range of motion.[5] An alternative to the mini-open O-K procedure is elbow arthroscopy, which effectively relieves the mechanical symptoms of locking or catching caused by intra-articular loose bodies.[6,7] Good results have also been reported after more extensive arthroscopic debridement involving removal of osteophytes and fenestration of the distal part of the humerus.[8]

However, the importance of radiocapitellar joint status for the treatment of elbow arthritis has been emphasized by few studies. Forster et al[9] assumed that the preoperative radiological degenerative findings of radiocapitellar joint were associated with clinical outcomes, particularly resting pain. Rettig et al[10] developed a radiographic classification system in 2008, with 3 classes to predict outcomes after debridement of elbow osteoarthritis, particularly based on the presence of arthritic changes in the radiocapitellar joint.

The original O-K procedure and the modified method by Morrey do not allow access to this radiocapitellar area. Although an arthroscopic approach provides access to the entire elbow joint, adequate debridement may be difficult. We compared the clinical and radiological outcomes of patients treated with the mini-open O-K procedure according to the radiological radiocapitellar grade in a retrospective comparative study.

MATERIALS AND METHODS

Patient selection

Our institutional review board approved the registry, and all patients provided informed consent before participation. Sixty-three patients were enrolled from a cohort of 75 patients who had undergone operative treatment for primary elbow arthritis between March 2004 and February 2010.

The inclusion criteria were (1) radiological findings of elbow osteoarthritis, (2) the presence of definitive end-arc pain at flexion or extension, (3) availability of a complete medical record and radiological data, (4) postoperative follow-up period of at least 3 years, (5) mild-to-moderate ulnohumeral degenerative arthritis,[1,4] and (6) management by conservative means for at least 6 months (nonsteroidal anti-inflammatory medications, physiotherapy, immobilization, and activity modification) with a poor response.

Patients without radiological arthritic findings in the radiocapitellar joint, based on preoperative simple radiographs and computed tomography (CT) scans, were designated as group 1 (class I by Rettig et al[10]; Fig. 1). Patients with findings of radiological arthrosis were classified as group 2 (class II by Rettig et al[10]; Fig. 2). All patients in both groups were evaluated by CT scans before surgery and were followed for at least 3 years after the operation. The clinical outcomes and radiological results of 34 (group 1) and 29 (group 2) patients were compared retrospectively.

We excluded patients with the following characteristics: (1) history of elbow trauma or traumatic elbow arthritis, (2) clinical findings with suspicion of ulnar nerve compression, (3) electrophysiological findings of ulnar nerve compression around the wrist and elbow, (4) a preoperative limitation of elbow extension greater than 60° and flexion less than 100°, (5) revision surgery for the same lesion, (5) definitive painful crepitus during pronation and supination, (7) worker's compensation coverage, (8) deformed elbow joint.

Preoperative evaluation

The characteristics of the pain at the limits of flexion or extension were checked before surgery. Lateral elbow pain localized to the radiocapitellar joint irrespective to forearm motion was designated "resting elbow pain." It was distinctly different from the tenderness at the lateral epicondyle or radial tunnel. The preoperative pain score was assigned based on a system devised by Morrey.[4] In addition, the presence or absence of resting elbow pain was noted.

Preoperative functional status was investigated using the Mayo Elbow Performance Score[11] (MEPS) and Disabilities of the Arm, Shoulder and Hand (DASH) score. The MEPS system was used to assess pain, arc of flexion-extension, stability, and daily functional activities. An excellent or good rating was considered a satisfactory result.

The preoperative radiographs were graded with a points system ranging from 0 (normal) to 9 (extremely severe). Points were allocated as follows: olecranon osteophyte, coronoid osteophyte, or loose body present (1 point for each) and the width of ulnohumeral or radiohumeral joint space (> 2 mm $=$ 1; 1–2 mm $= 2$; and < 1 mm $= 3$ points). Forster et al[9] used this preoperative scoring system. Preoperative CT scans were obtained for all elbows in the 2 groups for a definitive investigation of a spur or loose body.