

The role of arthroscopy in the treatment of common wrist disorders: A retrospective clinical study

© Muhammed Koroglu¹, © Kadir Ertem², © Okan Aslanturk²

¹Department of Orthopaedics and Traumatology, Kilis State Hospital, Kilis, Turkey

²Department of Orthopaedics and Traumatology, Faculty of Medicine, Inonu University, Malatya, Turkey

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Abstract

Aim: The purpose of this research was to evaluate clinical and functional results of patients that we treated them with wrist arthroscopy.

Material and Methods: Patients treated with wrist arthroscopy between February 2012 and June 2017 were retrospectively evaluated. Patients' disease, treatment, effected side, preoperative and postoperative Quick Disabilities of the Arm, Shoulder and Hand (Q-DASH) score and postoperative Mayo score were recorded.

Results: There were 78 (49 female and 29 male) patients. Mean age was 38±14.91 (16-81 years) years. Mean follow-up time was 45,4±17.93 (range, 6-72 months) months. There were 22 (28.2%) ganglion cyst, 15 (19.2%) triangular fibrocartilage complex tears, 11 (14.1%) Kienböck's disease and 8 (10.3%) intraarticular distal radius fracture. All patients Quick-DASH scores statistically significantly improved at final follow-up compared to preoperative status (p<0.001). There was no major complication in any of the patients.

Conclusion: The wrist arthroscopy is efficient and minimal invasive technique with low complication rates and good clinical results for common wrist pathologies.

Keywords: Ganglion cyst; Kienböck's disease; TFCC tear; Wrist arthroscopy

INTRODUCTION

Wrist arthroscopy is an effective and minimal invasive method which is used for diagnosis and treatment of wrist pathologies (1). When the wrist arthroscopy was introduced to the literature it was mainly used for diagnostic purposes. In time, the wrist arthroscopy evolved to a treatment technique for many wrist pathologies (1). It ensures many benefits by examining the details very closely and increases the evaluation ability of shade differences between normal and pathological anatomy (2).

The advantages of wrist arthroscopy have been reported as shorter hospital stay, less soft tissue trauma, shorter rehabilitation period, shortened time to patient's back to work (3). Another advantage of the wrist arthroscopy is very low complication rate compared to open techniques (1,5,6). Complication commonly related with entry portal sites. Extensor tendon, ulnar nerve, radial artery and nerve injuries have been reported previously (1). Skin problems related to finger traps have also been reported (1)

Wrist arthroscopy has been used for treatment of common wrist pathologies such as Kienböck's disease, arthritis, ganglion cysts, triangular fibrocartilage complex (TFCC) pathologies, carpal fractures, intra articular distal radius fractures (to reduce and control reduction of joint surface) (5-9). Previous studies reported well outcomes with low complication rates performing wrist arthroscopy (5-9). We also believe the arthroscopy could be used in different wrist pathologies with good clinical and functional results. In current study, we presented clinical results of common wrist pathologies treated arthroscopically.

MATERIALS and METHODS

Ninety-nine patients treated with wrist arthroscopy for wrist pathologies between February 2012 and June 2017 at our clinic. Patients' data were retrospectively evaluated. The inclusion criteria were patients with at least 6 months postoperative follow-up, full medical reports, preoperative and postoperative Quick DASH (Q-DASH) score. Exclusion criteria were patients with missing data, follow-up period shorter than 6 months, patients who did not want to participate the study. Ethical committee approval was

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Corresponding Author: Okan Aslanturk, Department of Orthopaedics and Traumatology, Faculty of Medicine, Inonu University, Malatya, Turkey E-mail: okaslanturk@hotmail.com

obtained from Inonu University Ethical Committee (No: 2020/1297). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Kienböck patients and TFCC tears were classified according to Bain-Begg and Palmer classification, respectively (10-11). The patients were evaluated preoperatively and postoperatively (at 3rd, 6th, 12 month and latest follow-up visits) with Quick Disability of arm, shoulder and hand (Q-DASH) and postoperative Mayo score.

All patients were operated by same experienced hand surgeon. All surgeries were performed under axillary block anesthesia. A pneumatic tourniquet was placed to proximal arm. Vertical wrist traction was applied by setting up finger traps on the fingers with the wrist traction tower (Acumed, Hillsboro, Oregon, USA). Standard 3-4 and 4-5 portals, 6 radial (6R), 6 ulnar (6U), midcarpal ulnar (MCU) and midcarpal radial (MCR) (Figure 1) portals were used depending on the identification and treatment. Saline solution with infusion pump was used to separate and wash the joint. 2.4 mm diameter and 30-degree angle arthroscope were used routinely.



Figure 1. Arthroscopic entry portals

Postoperatively, sutures were removed at 2 weeks. The physiotherapy program was initiated in different time zones depending on treated disease and treatment type. In patients treated with scaphocapitate fusion for Kienböck disease, K wires for distal radius intraarticular fractures and arthroscopic fixation for TFCC tears were kept in a short arm splint for 6 weeks and then the physiotherapy started. In patients treated with plate-screw fixation for distal radius fracture, cyst excision for ganglion cyst and arthroscopic debridement for irreparable TFCC tears, the physiotherapy was initiated 7-10 days after surgery.

Statistical Analysis

The archived data was uploaded to IBM SPSS Statistics for Windows version 22.0 (New York, USA) version package program. Categorical measurements were summarized as numbers and percentages, while numerical measurements were summarized as mean and standard deviation, minimum-maximum. Shapiro-Wilk test was used for confirmation of normal distribution of data. Wilcoxon

test and paired samples t test in dependent groups were used in the study. Due to preoperative and postoperative Q-Dash scores, posttest power analysis showed 100% power.

RESULTS

This retrospective study included 78 patients that come to their routine controls. Mean age was 38±14.91 (range, 16-78 years) years. Mean follow-up time was 45,43±17.93 (range, 6-72 months) months. There were 22 (%28.2) ganglion cyst, 15 (%19.2) TFCC rupture, 11 (%14.1) Kienböck disease, 8 (%10.3) distal radius intraarticular fracture (Table 1). Trauma history is positive in 37 (47.4%) patients. The right side was affected in 46 (59%) patients, left side in 32 (41%).

Table 1. Demographic of patients

| | |
|--------------------------------|--------------------|
| Age (Mean±SD)(min-max) | 38±14.91 (16-78) |
| Follow-up time (months) | 45,43±17.93 (6-72) |
| Gender (n(%)) | |
| Male | 29 (37.1%) |
| Female | 49 (62.8%) |
| Operated Side (n(%)) | |
| Right | 46 (58.9%) |
| Left | 32 (41%) |
| Pathologies (n(%)) | |
| Ganglion cyst | 22 (28.2%) |
| TFCC injuries | 15 (19.2%) |
| Kienböck | 11 (14.1%) |
| Distal radius fracture | 8 (10.2%) |
| Ulnar impingement syndrome | 6 (7.6%) |
| Scapholunate instability | 5 (6.4%) |
| Scaphoid nonunion | 4 (5.1%) |
| Radiocarpal arthrosis | 4 (5.1%) |
| Radial impingement | 2 (2.5%) |
| Lunotriquetral instability | 1 (1.2%) |

All ganglion cysts were removed arthroscopically after detection of the cyst stalk. There was only one recurrence at final follow-up. The mean follow-up time was 46.4 (6-72) months. In patients with ganglion cyst, mean Q-DASH scores statistically significantly improved from preoperative 74.8 to postoperative 32.47 (p<0.001). There were two complications. One patient had recurrence of the cyst that treated with open excision and one patient had complex regional pain syndrome (CRPS) healed completely with physiotherapy. Post-operative Mayo scores were statistically significantly increased from early period to final follow-up (p<0.001).

Seven of 15 patients with TFCC tear had Palmer type-1a, 5 Palmer type-1b, 1 Palmer type-1d, 1 to Palmer type-2a and 1 to Palmer type-2c. Four of the patients were suitable for fixation so TFCC arthroscopically fixed and remaining 11 were arthroscopically debrided. The mean follow-up time was 37.2 (range, 9-72 months) months. The Q-DASH score statically significantly improved from preoperative

74.94 to postoperative 23.32 ($p < 0.001$). Post-operative Mayo scores were statistically significantly increased from early period to final follow-up ($p < 0.001$).

In Kienböck patients, 7 patients were grade 3 and 4 were grade 4. All-patients treated with arthroscopic lunatum excision and scaphocapitate fusion (SCF). The mean follow-up time was 56.5 (range, 51-65 months) months. The Q-DASH score statically significantly improved from preoperative 73.27 to postoperative 47.95 ($p < 0.001$). Post-operative Mayo scores were statistically significantly increased from early period to final follow-up ($p < 0.001$).

The patients with intraarticular radius fracture, osteosynthesis was done with K-wires in 7 patients, and with plate and screws in 1 patient after arthroscopy assisted reduction. The mean follow-up time was 53.2 (range, 48-61 months) months. The Q-DASH score statically significantly improved from preoperative 100 to postoperative 19.6 ($p < 0.001$). Post-operative Mayo scores were statistically significantly increased from early period to final follow-up ($p < 0.001$). (Table 2).

There were no surgical side infection, hematoma or nerve injury in any of the patients. All patients were satisfied with the results at final follow-up.

Table 2. Q-DASH and Mayo scores of patients

| | Mean Q-DASH Preoperative (Mean±SD) | Mean Q-DASH Final follow-up (Mean±SD) | p values | Mean Mayo score Postoperative 3 months (Mean±SD) | Mean Mayo score Postoperative Final follow-up (Mean±SD) | p values |
|------------------------|---|--|----------|--|---|----------|
| Ganglion cyst | 74.80±20.33 | 32.47±21.85 | <0.001 | 73.86±8.71 | 95±5.56 | <0.001 |
| TFCC rupture | 74.94±12.11 | 23.32±19.40 | <0.001 | 74±8.49 | 93.3±5.56 | <0.001 |
| Kienböck | 73.27±18.96 | 47.95±26.04 | 0.007 | 61.36±61.36 | 83.18±83.18 | <0.001 |
| Distal radius fracture | 100±0 | 19.66±21.45 | <0.001 | 69.37±4.95 | 95.62 ±4.95 | <0.001 |

Q-DASH: Quick Disabilities of the Arm, Shoulder and Hand

DISCUSSION

The wrist arthroscopy can be used for treatment of many wrist pathologies with low complication rate and good results. We obtained satisfactory outcomes using wrist arthroscopy in different wrist pathologies. At the beginning, wrist arthroscopy was used for diagnostic aims, helped us to better understand wrist pathologies and became an efficient technique for treatment of many wrist pathologies with low complication rate (12). The wrist arthroscopy has multiple advantages over open procedures such as smaller incisions, earlier recovery and decreased postoperative pain (7). In this study, we reported clinical results of the patients treated with wrist arthroscopy for common wrist pathologies.

Ganglion cyst is the most common benign soft tissue tumor of the wrist (13). Treatment of ganglion cyst depends on the patient's symptoms. In absence of any symptom, cyst could be observed. If there is pain even after conservative treatments, treatment options are aspiration of the cyst, open or arthroscopic excision (7,13). Most common complication of ganglion cysts treatment has been reported as recurrence (13). In a systematic review, Head et al. reported recurrence rate of aspiration, open excision, and arthroscopic excision as 59%, 21%, 6%, respectively (13). We had one cyst (4,5%) recurrence treated with open resection. Rizzo et al. reported no complications in their study that included 41 patients and followed at least 2 years (14). In our series, we had 2 complications, one recurrence and one CRPS, both patients had no problem after their final treatment in the last follow-up. In current study, 11 patients

underwent arthroscopic TFCC debridement, 3 of these patients had sensitivity in the grinding test. All patients emphasized that their complaints had subsided, and they were satisfied with the surgical process. Osterman has reported achievement of 88% good and excellent results in arthroscopic TFCC debridement in 52 patients (15). In our study, TFCC were fixed in 4 patients. Distal radio-ulnar joint (DRUJ) of all 4 patients was stable and functional scores improved postoperatively. Iwasaki et al. reported significant improvement in Q-DASH score was achieved in the follow-up results between 2 and 4 years (8). We also achieved statistically significant improvement in all TFCC patients' Q-DASH and Mayo scores during the follow-up period after arthroscopic surgery. In the literature, cases with postoperative DRUJ instability have been reported as complication (14), but in the current study, we did not have any postoperative complications in patients underwent TFCC arthroscopic treatment.

Kienböck's diseases treatment is controversial and there is no consensus about ideal treatment (16). Midcarpal fusion is an option with good long-term results (9). Wrist arthrodesis commonly performed with open surgery, but Ho defined arthroscopic arthrodesis (5). Recently, Ertem et al. reported good functional clinical results with arthroscopic lunatum excision and SCF (9). Advantages of arthroscopic arthrodesis are less soft tissue injury, better visualization of articular surfaces and can be performed without bone grafting (no donor site morbidity) (9). In current study, all patients had complete fusion without any complication. Their functional scores were improved statically significantly in postoperative period.

Knirk and Jupiter have reported that intraarticular distal radius fractures with more than 2 mm displacement in the wrist joint developed arthrosis 90% radiologically (17). The fact that the arthroscopic treatment method guides the diagnosis and treatment of ligamentous injuries accompanying trauma provides an advantage for the surgeon. This situation helps us to found better clinical results by preventing the missed diagnosis in long-term follow-up (6,18). In one of our cases, we detected scapholunate ligament injury accompanying the fracture and treated in same session.

LIMITATIONS

Our study has several limitations. The retrospective design was major limitation. We had heterogenous group of patients with small number of patients. We have relatively short follow-up period.

CONCLUSION

In conclusion, wrist arthroscopy is an effective treatment method for common wrist pathologies. Faster recovery, lesser soft tissue damage and better evaluation of the joint are the major advantage of the wrist pathology. To perform wrist arthroscopy with low complication rates; surgeon should be well-trained and necessary equipment's should be available. We believe that wrist arthroscopy will be increasingly used by surgeons in next years.

Competing Interests: The authors declare that they have no competing interest.

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