Arthroscopic Management of the Hamate Proximal Pole Arthrosis

Barkat Ali, MD, DABS
Tuna Ozyurekoglu, MD

Background: Arthrosis of the proximal pole of the hamate is a peculiar cause of ulnar-sided wrist pain. We present clinical, functional, and patient-reported outcomes of arthroscopic management.

Methods: In this retrospective study, all patients with arthrosis of the proximal pole of the hamate encountered in a 10-year period treated with arthroscopy were reviewed. Patient demographics, arthroscopic details, associated injuries, and procedures were reviewed. Functional and patient-reported clinical outcomes after arthroscopic osteochondroplasty were analyzed.

Results: An analysis of 39 patients who underwent arthroscopic osteochondroplasty showed a type II lunate prevalence of 87.2%. On wrist arthroscopy, a triangular fibrocartilaginous complex tear was the most common diagnosis (64.1%), followed by scapholunate ligament tear (61.5%) and lunotriquetral ligament tear (35.9%). All patients were managed arthroscopically with 100% procedural success. Average follow-up of 42.8 ± 37.7 months showed statistically significant improvements in the visual analog score and Mayo wrist score postoperatively (P < 0.01). Three patients (7.7%) failed the procedure at a mean of 23 ± 31.4 months. Risk factors for salvage operations were nondominant wrist involvement 100% (P = 0.04), lunotriquetral ligament injury 100% (P = 0.04), the absence of triangular fibrocartilaginous complex injury 100% (P = 0.04), and the presence of scapholunate advanced collapse 100% (P < 0.01).

Conclusions: Wrist arthroscopy is valuable for accurately diagnosing and treating hamate arthrosis and identifying a wide variety of pathologies associated. This study showed arthroscopic osteochondroplasty produced satisfactory clinical results. Furthermore, the presence of scapholunate advanced collapse wrist offers its prognostic value in determining treatment failure. (Plast Reconstr Surg Glob Open 2022;10:e4672; doi: 10.1097/GOX.0000000000004672; Published online 21 November 2022.)

INTRODUCTION

Ulnar-sided wrist pain is a complex problem. Evaluating patients with ulnar-sided wrist pain requires a broad set of differential diagnoses such as triangular fibrocartilage complex pathologies, lunotriquetral ligament injuries, ulnocarpal impaction syndrome, extensor carpi ulnaris tendinopathies, pisotriquetral arthritis, and carpal and cubital tunnel syndromes. The proximal pole of hamate arthrosis is a rare but peculiar cause of ulnar-sided wrist pain.1-3

A spectrum of pathologies from full-thickness cartilage damage to destruction of subchondral bone is observed at the proximal pole of the hamate. Although initially described as “Hamato-Lunate impingement” because of a lunate facet providing articulation with the proximal pole of the hamate,2 later, it was noted to be associated with lunotriquetral ligament injuries, and hence, was referred to as “Hamate arthrosis lunotriquetral ligament tear” or HALT lesion.3 The clinical studies reporting on the management of this condition and their outcomes are limited to short case series.1-3

We describe our clinical experience with arthroscopic osteochondroplasty for the proximal pole arthrosis of

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the hamate. This study aimed to evaluate the clinical and patient-reported outcomes associated with arthroscopic treatment. We further analyzed the associated pathologies, and the risk factors associated with failure needing salvage procedures.

**METHODOLOGY**

This is a retrospective review of 39 consecutive patients with proximal pole of hamate arthrosis, managed arthroscopically by a single surgeon at a tertiary referral center for hand and upper extremity over a 10-year period (2011–2021). Patients who had proximal pole of hamate arthrosis but managed with salvage procedures at the time of index procedure were excluded. An institutional review board approval was obtained before starting the chart review.

Data were collected on patient demographics, occupation, work-related injuries, and hand dominance. Subjective and objective parameters were used both preoperatively and postoperatively, including visual analog pain score, wrist range of motion (percent of the contralateral normal side), grip strength (kilograms), and functional status (return to full work). We calculated modified Mayo wrist scores for each patient based on these parameters both preoperatively and postoperatively.1

All patients in the cohort were evaluated with plain radiography and most with magnetic resonance imaging (MRI) for their ulnar-sided wrist pain. The patients underwent an arthroscopic evaluation commonly after a failed trial of conservative treatment. We reviewed the available images, all arthroscopic videos, and pictures for the purpose of this study.

A standard wrist arthroscopy setup was used with a 3-4 portal placed 1 cm distal to the Lister tubercle, and a midcarpal-radial portal 1 cm distal to the 3-4 portal followed by a 4-5 portal ulnar to the fourth extensor compartment tendons and a midcarpal-ulnar portal distal to the latter. A diagnostic arthroscopy inspecting radiocarpal and midcarpal joints confirmed pathologies of the wrist. The scapholunate ligament (SL) and lunotriquetral ligament (LT) intervals were inspected following Geissler staging for each patient. The lunate type was determined by the shape of the lunate and the corresponding articular facet on the surface of the hamate, triangular fibrocartilage was tested with trampoline and hook tests, and articular surfaces were examined for arthritic changes (Fig. 1). We spotted arthrosis of the hamate proximal pole in all patients using the midcarpal-radial portal (Figs. 2 and 3). We recorded a spectrum of pathologies using an arthroscopic probe in the midcarpal-ulnar portal ranging from full-thickness fibrillation and loose cartilage to osteochondral lesions with defect in the subchondral bone after outerbridge classification.5

The arthrosis of the proximal pole of hamate was addressed with an arthroscopic osteochondroplasty using a gator shaver and an arthroscopic burr. (See Video [online], which displays an intraoperative video showing loose cartilage at the proximal pole of the hamate and the osteochondroplasty.) The resection depth during osteochondroplasty was always kept less than 2.2 mm and was confirmed with the width of the arthroscopic tools and with intraoperative fluoroscopy. After managing all associated injuries such as scapholunate, lunotriquetral ligaments, triangular fibrocartilaginous complex, hemostasis was ensured, and skin was closed. The patients were placed in a short arm splint for two weeks, followed by a wrist brace for 4 weeks and range of motion exercises if other treatments did not require further immobilization. Weightlifting and gripping were begun gradually at 6 weeks. They were released to work at 6–10 weeks depending on their progress and job demands. Treatment failure was defined as continued pain after the procedure, for which patients were offered wrist salvage procedures.

Descriptive and inferential statistics were performed using STATA 16. Variables with normal distribution were documented using means and standard deviation, whereas the non-normal distribution variables were documented as mode and interquartile range. For group comparisons,
Fischer exact and chi-squared tests were used for categorical variables, whereas Student t test and nonparametric tests were used for continuous data. The level of significance was set at a P value less than 0.05.

**RESULTS**

Thirty-nine patients who underwent an arthroscopic proximal pole osteochondroplasty of the hamate were identified from electronic medical records. The mean age at surgery was 54.4 ± 9.2 years. Most patients were male (22; 56.4%). The right side was more commonly involved (22; 56.4%). The dominant wrist was involved in 25 patients (64.1%). A third of patients were worker’s compensation cases (11; 28.9%). MRI was available in 27 patients, of whom only 11 were positive for arthrosis of the proximal pole of the hamate (40.7%).

All patients underwent wrist arthroscopy and none were converted into open. Type II lunate was present in the vast majority of patients (34; 87.2%). The most common associated injuries were triangular fibrocartilaginous complex (TFCC) in 25 patients (64.1%) and SL injury in 24 patients (61.5%). LT injury was the third most common injury, prevalent in 14 patients (35.9%). Ulnacarpal impaction syndrome was addressed in seven patients (17.9%). Six patients (15.4%) had scapholunate advanced collapse (SLAC) wrist at presentation. The treatment of these pathologies and other associated procedures are included in Table 1.

There were no perioperative complications. The visual analog scale score improved from a mean of 5.7 ± 1.9, preoperatively to 2.4 ± 1.7, postoperatively (P < 0.01). Grip strength reduced from a standard of 46.1 ± 31.9 kg, preoperatively to 45.7 ± 21.6 kg, postoperatively; however, this was not statistically significant (P = 0.92). Wrist range of motion increased from a median of 77.5% and IQR of 50%–100% of contralateral side preoperatively to 100% and IQR of 80%–100% of contralateral side postoperatively.

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**Fig. 2.** Arthroscopic view of the hamate from the radial midcarpal portal. A, Osteochondral lesion on dorsal aspect of the proximal pole of hamate. Full depth fissure and loose cartilage seen. B, After osteochondroplasty.

**Fig. 3.** Intraoperative view of the midcarpal joint. A, Osteochondral lesion on most proximal part of the hamate. B, Post osteochondroplasty resecting 2.4 mm of the proximal pole.
Our study describes total arthroscopic management of proximal pole of hamate arthrosis and all associated injuries with 100% procedural success. In our experience, hamate proximal pole arthrosis is a heterogenous clinical condition associated with a wide variety of associated injuries. Three clinical studies were identified in the literature in English reporting the outcomes of arthrosis of the proximal pole of hamate, all with small sample sizes.1-3 Our study describes total arthroscopic management of proximal pole of hamate arthrosis and all associated injuries with 100% procedural success. In our experience, hamate proximal pole arthrosis is a heterogenous clinical condition associated with a wide variety of associated injuries.

DISCUSSION

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They reported an average bone resection on postoperative imaging, which was 2.2 mm. We used this number as a guide in managing our patients and restricted the resection to less than 2.2 mm using arthroscopic tools, and hence, did not measure the resected amount on postoperative imaging. All the patients in our study were treated arthroscopically for proximal hamate osteochondroplasty and associated pathologies. We report favorable functional and patient-reported outcomes.

Meaike et al., most recently described their series of 21 wrists in 19 patients and described outcomes of surgical management of HALT. They reported arthroscopic management in 15, open in five, and a combined approach in one patient. They reported improvement in Mayo wrist scores from 54 to 71. They also reported three patients who underwent additional procedures for persistent pain. Our study is similar in terms of an overall improvement in Mayo wrist score. They also noted LT involvement only in 12 patients, that is, 63% as opposed to 91% by Harley et al. We report TFCC injury as the most common associated finding in arthrosis of the proximal pole of hamate (64.1%), followed by SL tear (61.5%), followed by LT tear (35.9%). Hence, we believe the LT involvement may not be as characteristic as initially thought. There is a need for more studies to better understand the true significance of LT injuries in hamate proximal pole arthrosis.

Despite these differences in LT, TFCC, and SL tears, the most common persistent finding across all clinical studies is the association between type II lunate and hamate arthrosis. Initially reported by Viegas et al., type II lunate appears to have a clear association with the proximal pole of the hamate arthrosis. The presence of the articular facet for type II lunate on the surface of the proximal hamate causes a restriction of midcarpal motion and the presence of a triquetrocapitate ligament. This finding has been noted in all three case series reported so far. We report strong association of 86.1% of cases of arthrosis of the proximal pole of hamate with type II lunate.

We found SL injury in 61.5% of the cases, more common than the LT ligament injuries in 35.9% of the cases. SL rupture and the consequent carpal instability may cause a shift in the distal row in a proximal direction, increasing the forces between the hamate and the lunate, especially in type II lunate. These increased forces likely initiated the arthritic changes. Furthermore, in SLAC wrist, the contact forces may increase further between the hamate proximal pole and the type II lunate, as the lunate and triquetrum shift to a dorsal intercalated segment instability position.

We report SLAC wrist as a risk factor associated with treatment failure and the need for subsequent salvage procedures. We report a statistically significant association between SLAC wrist and risk for failure, needing a salvage procedure down the road. All six SLAC wrists were early stage; hence, salvage procedures were not considered at the outset. One type III SLAC wrist was diagnosed during arthroscopy and needed a four-corner arthrodesis. The other five were treated with abrasion arthroplasty. The risk of failure and subsequent salvage procedures was only 7.7% at about 2 years.

Although the carpal kinematics of the arthrosis of the proximal pole of the hamate have been studied, consequences of the excision of the proximal pole of the hamate on the midcarpal joint dynamics, especially the triquetrolunate joint to date, remains unknown. Although radiographic follow-up suggests midcarpal instability in one of our patients, they did not report symptoms related to this; hence, the patient has not undergone a salvage procedure yet.

Despite its strengths, our study has several limitations. All operations were done by a single surgeon at a single center; hence, findings may be subject to confounding by experience. We described hamate proximal pole lesions as a heterogeneous clinical entity. The results of the treatment are probably affected by the outcome of associated clinical conditions. Our study cannot elucidate a clear association between the proximal pole of hamate arthrosis and LT, TFCC, or SL injuries. This may, in part, be because of our small sample size. However, there is a need for further studies to delineate this.

**CONCLUSIONS**

Evaluation of patients with ulnar-sided wrist pain requires a wide range of differentials. Wrist arthroscopy is not only diagnostic but also therapeutic where all concurrent findings can be managed appropriately. We recommend evaluation of the proximal pole of hamate for arthrosis as part of routine wrist arthroscopy. Our extensive experience suggests that the proximal pole of hamate arthrosis can be managed with an arthroscopic osteochondroplasty with favorable functional and patient-reported outcomes. Further, the findings of SLAC wrist are prognostic in determining treatment failure.

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