Complications of Wrist and Hand Arthroscopy

Zahab S. Ahsan, MD[a], Jeffrey Yao, MD[b,*]

KEYWORDS

• Wrist arthroscopy • Complications • Neurovascular structures • Tendon injury
• Surgeon experience

KEY POINTS

- A detailed review of the wrist arthroscopy literature yields a complication rate of 4.8%.
- A number of safety precautions have been identified to mitigate the incidence of iatrogenic injury with wrist arthroscopy.
- The rate of complications decreases when a surgeon performs more than 25 cases/year and also decreases significantly after more than 5 years of operative experience.

INTRODUCTION

Arthroscopy of the wrist continues to evolve and advance as a valuable clinical technique in hand surgery that facilitates effective diagnosis and therapy. First introduced in 1979[1] and further detailed in the literature in 1988,[2,3] wrist arthroscopy provides a wide range of current indications and continues to adapt and yield minimally invasive alternatives to open surgical procedures. With increasing adaptation of wrist arthroscopy and an escalating volume of cases performed worldwide, further insights have been gained regarding the complications of wrist arthroscopy over the past 5 years. Specifically, a systematic review of the incidence of complications,[4] systematic review of cadaveric studies reporting structures at risk,[5] and a large multicenter trial[6] have been introduced into the literature for wrist arthroscopy.

Largely regarded as a safe procedure, incidence of complications in the literature ranges from 1.2% to 7.9%.[4,7–14] The most recent study is a multicenter retrospective review of 10,107 cases by Leclercq and colleagues[6] with a finding of 5.98% complications, with 5.07% listed as serious and 0.91% as minor. Serious complications were defined as laceration of tendon, nerve, artery, large cartilage lesion, loose body requiring arthrotomy, hematoma formation, compartment syndrome, pyogenic arthritis, wrist stiffness, chronic regional pain syndrome, and newly defined "failure to achieve the procedure."[6] Minor complications include transient neuropraxia, small cartilage lesion, loose body not requiring arthrotomy, synovial fistula, local swelling, superficial sepsis, portal site pathology (ganglia, adhesion, pain), and miscellaneous self-limiting problems.

Possible complications may be related to traction and positioning of the arm, portal placement, procedure-specific injuries, and general complications involved in wrist arthroscopy.[8,15] Complications that are universal to wrist arthroscopy include infection, articular surface damage, and equipment failure.[15] The establishment of portals and introduction of instruments requires a thorough knowledge of the regional anatomy and appropriate tactile sensitivity of the surgeon. Poor positioning of portals and forceful insertion of instruments may damage articular cartilage,

Disclosure Statement: The authors have no disclosures to report.
[a] Department of Orthopaedics and Sports Medicine, University of Washington, 325 9th Avenue, Box 359798, Seattle, WA 98104, USA; [b] Department of Orthopaedic Surgery, Robert A. Chase Hand and Upper Limb Center, Stanford University Medical Center, 770 Welch Road, Suite 400, Palo Alto, CA 94304, USA
* Corresponding author. 450 Broadway Street, Suite C-442, Redwood City, CA 94063.
E-mail address: jyao@stanford.edu

Hand Clin 33 (2017) 831–838
http://dx.doi.org/10.1016/j.hcl.2017.07.008

ligaments, tendons, cutaneous nerves, and vascular structures.[16]

An evolving figure, the true incidence of complications is likely dependent on the definition of complications as well as the willingness of surgeons to report their complications. Regardless, a thorough knowledge and understanding of the possible consequences of our interventions as surgeons can help to mitigate complications and optimize patient outcomes. The objective of this article is to summarize the current literature to guide clinicians implementing wrist arthroscopy into their respective practices.

A comprehensive review of the literature was performed, identifying 12 multiple patient trials that address complications of wrist arthroscopy (**Table 1**). There were 4 case reports that described unique incidence of wrist arthroscopy complications (**Table 2**).

Cadaveric Studies

Prior to overviewing the clinically reported wrist arthroscopy complications in the literature, a review of the relevant anatomy is warranted. This primarily pertains to the dorsal structures, as most arthroscopic procedures are performed via a dorsal approach (**Fig. 1**). The 6 extensor compartments delineate the margins for instrumentation into the wrist joint. The spaces intervening the compartments (1–2, 3–4, 4–5), as well as the ulnar and radial aspects of the sixth compartment comprise the primary portals. Structures of importance include the deep branch of the radial artery (RA), superficial branch of the radial nerve (SBRN), dorsal sensory branch of the ulnar nerve (DSBUN), and the distal posterior interosseous nerve (PIN).[11,15,17] The deep branch of the RA enters the anatomic snuffbox under the tendons of the first dorsal compartment and crosses the base of the thumb metacarpal to enter the palm.[8,18] The SBRN travels deep to the brachioradialis and changes course at the intersection of the first and second extensor compartments with arborization to supply sensation to the thumb, index, and long fingers.[8,15] The DSBUN arises from the ulnar nerve deep to the flexor carpi ulnaris tendon, runs subcutaneously and wraps around the distal ulna within 1 cm of the ulnar head. Near the level of the ulnar styloid, 5 variable branches of the DSBUN are typically noted, giving rise to higher risk of injury, particularly when using the 6U portal.[18–20] The DSBUN consistently travels intimately around the extensor carpi ulnaris (ECU) and can be found on either side of the tendon, in close proximity to the 6 radial (6R) and 6 ulnar

Table 1
Multiple patient studies presenting wrist arthroscopy complications

Author, Year	Study Design	Level of Evidence	Number of Complications	Number of Patients in Study	Percentage
Lourie et al,[20] 1994	Prospective cohort	II	3	15	20.0
Warhold and Ruth,[15] 1995	Case series	IV	4	205	2.0
de Smet,[16] 1996	Case series	IV	2	129	1.6
Doi et al,[42] 1999	Randomized controlled study	I	7	34	20.5
Hofmeister et al,[10] 2001	Prospective cohort	II	1	89	1.1
Beredjiklian et al,[7] 2004	Case series	IV	11	211	5.2
Pell and Uhl,[27] 2004	Case series	IV	4	47	8.5
Darlis et al,[30] 2005	Case series	IV	2	16	12.5
Rocchi et al,[31] 2008	Prospective randomized study	I	2	20	10.0
Gallego and Mathoulin,[32] 2010	Case series	IV	6	114	5.3
Chen et al,[33] 2010	Case series	IV	1	15	6.6
Leclercq et al,[6] 2016	Multicenter case series	IV	605	10,107	6.0
Total			648	11,002	5.9