Diagnostic Wrist Arthroscopy for Nonspecific Wrist Pain

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Abstract

Background: This study addresses the prevalence of discrete pathophysiology accounting for patients' symptoms during diagnostic wrist arthroscopy in individuals with wrist pain without a specific preoperative diagnosis. Secondly, we determined the number and type of surgeries subsequent to diagnostic wrist arthroscopy. **Methods:** Between January 2000 and January 2015, 135 diagnostic wrist arthroscopies were performed by 12 surgeons in 3 urban academic hospitals. We recorded the diagnostic findings of diagnostic wrist arthroscopy and any subsequent surgeries. **Results:** One hundred and five patients had synovitis or a normal wrist (78%), 17 had likely age-appropriate changes (eg, central triangular fibrocartilage complex defects scapholunate changes) (13%), 8 (6%) were given uncommon diagnoses, and 5 (4%) had osteochondral defects. Sixteen patients (12%) had subsequent wrist surgery: 2 were for adverse events, 2 were carpal tunnel releases, and 12 were other surgeries. **Conclusion:** Diagnostic arthroscopy performed in the setting of an unclear preoperative diagnosis yielded limited diagnostic benefit.

Keywords: arthroscopy, arthralgia, diagnosis, diagnostic arthroscopy, pain, wrist

Introduction

Nonspecific wrist pain is a difficult problem to treat. In a study of the practice of 3 hand surgeons, the wrist was the most common site of puzzling pain, with 50% of all patients receiving no specific diagnosis (in peer review). Diagnostic wrist arthroscopy is one of many strategies for patients with wrist pain that does not correspond with discrete pathophysiology on examination or radiological studies. Some patients' desire to establish a specific diagnosis is strong enough that they will consider diagnostic surgery.^{5,7,8,16}

The rationale for diagnostic wrist arthroscopy is that discrete, treatable pathophysiology is not always detectable on examination or radiological studies. In a systematic review, Andersson and colleagues² recommended wrist arthroscopy for evaluation of unexplained wrist pain because they noted that the negative predictive values of magnetic resonance imaging (MRI) and clinical provocative tests in diagnosing lesions of the interosseous ligaments and triangular fibrocartilage complex (TFCC) were less than 95%. However, this presumes that these lesions, which are missed by advanced imaging, are causing pain and would benefit from treatment.^{12,13} Chan and colleagues⁴ noted strong evidence that changes in the TFCC are expected with aging and unlikely to be a good target for

treatment. Surgery can only do harm if there is no pathophysiology that will benefit from treatment. It would be helpful to know how often diagnostic wrist arthroscopy does identify discrete pathology and how often that leads to an opportunity for effective treatment.

This study addresses the prevalence of discrete pathophysiology accounting for patients' symptoms during diagnostic wrist arthroscopy in individuals with wrist pain that is nonspecific on exam and selective radiological studies. Secondly, we determined the number and type of surgeries subsequent to diagnostic wrist arthroscopy.

Methods

The institutional review board approved this retrospective study. We identified 698 adult patients who had wrist arthroscopy by 1 of 12 surgeons between January 2000 and January 2015 at 1 of 3 hospitals (2 level I trauma

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Table 1. Patient Characteristics.

Variable	Characteristics	n	%
Sex	Men	62	46
	Women	73	54
Race	White	119	88
	Hispanic	7	5
	Black	5	4
	Asian	4	3
Marital status	Married	63	47
	Single	60	44
	Divorced or separated	9	7
	Unknown	3	2
Side of arthroscopy	Right	79	59
	Left	56	41
Pain location	Ulnar	79	59
	Nonspecific	49	36
	Radial	7	5
Smoking	Yes	31	23
	No	104	77
Alcohol or drug misuse	Yes	17	13
	No	118	87
Psychiatric comorbidity	Yes	32	24
	No	103	76
Workers' compensation	Yes	16	12
	No	119	88

centers, 1 level II trauma center). Patients were identified using Current Procedural Terminology (CPT) procedure codes for wrist arthroscopy (29844, 29845, 29846), excluding arthroscopy for “infection, lavage and drainage” (29843) and “internal fixation for fracture or instability” (29847) because they involved a discrete preoperative diagnosis. For patients who had more than 1 wrist arthroscopy, we considered the first arthroscopy as the index procedure.

Two independent researchers reviewed operative reports, radiographs, and MRI reports as well as preoperative notes to determine whether or not a discrete pathophysiology accounting for the patient's symptoms was diagnosed prior to the arthroscopy. A third researcher resolved disagreements. We excluded 398 patients who had a discrete diagnosis prior to arthroscopy (the majority TFCC abnormalities), 87 with prior wrist fracture, 61 with prior surgery on the same wrist, and 17 for whom there was no operative report available. The remaining 135 patients who had diagnostic wrist arthroscopy for pain without a specific preoperative diagnosis were the focus of this study.

The mean age was 39 years (SD: 12 years) and 62 (46%) were men (Table 1). Three surgeons performed 119 (88%) of the diagnostic wrist arthroscopies. We recorded the arthroscopic findings of diagnostic wrist arthroscopy and any subsequent surgeries.

Table 2. Findings at Diagnostic Wrist Arthroscopy.

Arthroscopic findings	n	%
Synovitis	99	73
Central triangular fibrocartilage complex defect	14	10
Volar capsular tear	7	5
Normal	6	4
Osteochondral defect ^a	5	4
Scapholunate ligament changes	3	2
Plica	1	1
Total	135	100

^aPossibly iatrogenic.

Results

At diagnostic wrist arthroscopy, 105 patients had normal anatomy (78%); most of them (99 of 105) noted to have mild synovitis. Fifteen had findings consistent with degenerative change (a central TFCC defect in 14 patients and scapholunate fraying without scapholunate diastasis in 3 patients) (13%), 8 (6%) were given uncommon diagnoses (“volar capsular tear” in 7 patients and plica in 1 patient), and 5 (4%) had osteochondral defects (Table 2). One of the patients with an osteochondral defect developed rapid radiolunate arthrosis within 1 year after surgery documented on pre- and postoperative imaging. Sixty-six patients (49%) had a normal preoperative radiograph, 29 (21%) a nonspecific radiograph, and the

Table 3. Surgeries Subsequent to Diagnostic Wrist Arthroscopy.

Surgery	n	%
Ulnar shortening ^a	3	19
Extensor carpi ulnaris tenosynovectomy/tendon stabilization ^b	3	19
Carpal tunnel release ^c	2	13
Anterior and posterior interosseous neurectomy	2	13
Synovectomy	1	6
Complication: Irrigation and debridement of septic arthritis	1	6
Modified Brunelli procedure for "partial scapholunate interosseous ligament deficiency"	1	6
Distal ulna resection combined with extensor carpi ulnaris stabilization ^d	1	6
"Volar capsular repair"	1	6
Radiolunate arthrodesis	1	6
Total	16	100

^aNo evidence of ulnocarpal impaction.

^bNo tendon dislocation.

^cOne with normal and 1 mild electrodiagnostic findings.

^dMinimal to no distal radioulnar joint arthrosis.

remaining 38 patients (30%) did not have a preoperative radiograph. Eighty-three patients (61%) had MRI findings incidental to the symptoms, 12 (9%) a normal MRI, and the remaining 38 patients (30%) did not have a preoperative MRI.

Sixteen patients (12%) had a second surgery after diagnostic wrist arthroscopy (Table 3). Two were for complications (infection, arthrosis). The patient who developed rapid arthrosis was treated with radiolunate arthrodesis and then total wrist arthrodesis. Nine surgeries were performed without a discrete preoperative diagnosis: 8 on the ulnar and 1 on the radial side of the wrist. Three were nonspecific surgeries for pain relief (synovectomy, neurectomy). Two patients had carpal tunnel release.

Discussion

Some surgeons believe that discrete, treatable pathophysiology cannot be excluded without diagnostic wrist arthroscopy.^{2,5,6,10-12} However, it is not known how often a discrete diagnosis is identified in the setting where clinical exam and radiologic findings do not provide a clear diagnosis preoperatively.^{14,15} In this study, we evaluated the intraoperative findings during wrist arthroscopy in patients with nonspecific wrist pain.

This study has several limitations. First, because we used CPT codes, the data are subject to coding errors. Based on extensive use, we know that coding errors are uncommon with this particular database. Second, because of retrospective design, we rely on the medical record, which might be incomplete or inaccurate. For instance, we cannot know when osteochondral lesions are iatrogenic. In addition, surgeons coding a procedure may use a preoperative diagnosis of "wrist pain" because of ease of coding. We tried to minimize bias by having 1 research fellow and 2 experienced surgeons separately review patient data and radiological

studies for uncertain patients. Last, the results of this study may only apply to urban, academic hospitals, although the vast majority of patients come directly from primary care, not intraspecialty referral or second opinions.

Our interpretation of these findings is that wrist arthroscopy did not add further clarity when there was not a discrete preoperative diagnosis. One in 8 patients had age-appropriate changes that were visualized at arthroscopy, but may or may not have been the etiology of the patient's pain. One in 16 patients was given an uncommon diagnosis including volar capsular tear and wrist plica. The values of these diagnoses are debated among surgeons. The complication rate was as high as 5% including possibly iatrogenic osteochondral defects (1 leading to arthrodesis) and septic arthritis in 1 patient. It is possible that other osteochondral defects were created, but not documented. This complication rate is similar to previous studies.^{1,3}

One in 8 patients had 1 or more subsequent wrist surgeries, most of them in the continued setting of an unclear diagnosis. Examples of surgeries that would generate some debate among hand surgeons include ulnar shortening without clear evidence of ulnocarpal impaction, extensor carpi ulnaris (ECU) tendon stabilization in the absence of tendon subluxation or dislocation from the ECU notch on the ulna, and carpal tunnel releases (a surgery that addresses numbness not nonspecific wrist pain) with no or mild median neuropathy on electrodiagnostic testing. These additional surgeries emphasize some areas of opportunity as many of these patients have problems that are confounding even for experienced surgeons.

A review of diagnostic wrist arthroscopy at 3 urban academic hospitals showed few benefits to patients, as many as 1 in 20 adverse events (2 needing additional surgery), and 1 in 8 subsequent surgeries of debatable benefit. Wrist arthroscopy is championed as the "gold standard" for diagnosis, but

this may be a logical fallacy. The “gold standard” for diagnosis is the sum total of the clinical examination, imaging studies, and arthroscopy in their entirety. If 2 of these 3 elements are unremarkable, isolated findings at arthroscopy are unlikely to yield further benefit. This study reinforces the concept that arthroscopy is most useful as a diagnostic modality when there is a high clinical suspicion of a problem. Our study did not address therapeutics.

Ethical Approval

Institutional review board (IRB) of Massachusetts General Hospital has approved the data repository research protocol. The IRB approval number is 2009P001019.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

The authors confirm that informed consent was not necessary to obtain from patients included in the study because it was a retrospective data repository study.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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