Evaluation of chronic wrist pain

Arthroscopy superior to arthrography: comparison in 39 patients

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39 patients with chronic wrist pain underwent arthrography and arthroscopy to reveal disruptions of the triangular fibrocartilage complex (TFCC) and/or interosseous ligaments. TFCC disruption was diagnosed arthroscopically in 15 cases of which arthrography revealed the disruption in only 7. In 3 other patients, arthrography showed rupture of the TFCC: however, arthroscopy showed no defects. Rupture of an interosseous ligament was diagnosed arthroscopically in 6 patients in all of whom it was also revealed by arthrography. In 6 other patients, arthrography showed disruption of an interosseous ligament not verified by arthroscopy.

We conclude that arthroscopy is superior to arthrography for diagnosing chronic wrist pain.

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In spite of the rapid development of imaging techniques such as bone scintigraphy, CT and MRI, arthrography is still used to diagnose lesions in the wrist joint causing chronic wrist pain (Ranawat et al. 1972, Levinsohn and Palmer 1983, Palmer et al. 1983, Resnick et al. 1984, Blair et al. 1985, Tirman et al. 1985, Manaster 1986, Levinsohn et al. 1987, Pittman et al. 1988, Zinberg et al. 1988, Belsole et al. 1990). This technique has been further developed in the form of triple-injection arthrography and digital subtraction arthrography. Arthrotomy is accepted as the most accurate method for revealing ligament tears, but it appears from previous reports (Roth and Haddad 1986, Cooney 1993) that arthroscopy may be as good.

We compared the findings from arthrography and arthroscopy in 39 patients with chronic wrist pain.

Patients and methods

Between 1990 and 1993, 39 patients who visited our clinic with chronic wrist pain, in whom case history, physical examination and plain radiography in two planes were not diagnostic, underwent wrist arthrography and arthroscopy. None of these 39 patients (18 women and 21 men) suffered from a generalized disease, such as rheumatoid arthritis or gout. The median age was 27 (12–68) years. The median duration of wrist pain was 18 (3–132) months. In 20 of 39 patients, the right side was affected, in 19 of the 39 patients the left side. The dominant hand was affected in 24 of the 39 cases. 19 of the patients had had a trauma.

The first 20 arthrograms were performed and reviewed by the Department of Radiology, University Hospital, Leiden, the last 19 by the Department of Radiology, Saint Anna Hospital, Oss. Standard techniques were used. The arthroscopies were all performed by the same surgeon.

Arthrography

The patients were placed in a prone position on the X-ray table with the arm along the head and towards the end of the table. The hand was placed in the lateral position with some volar flexion. Subsequently, under fluoroscopic control, a 23 G 2.5 cm long needle connected with a preloaded venotube and syringe with hexabrix 320 was directed proximovolarly from the point of puncture toward the radiolunate joint space. Thereafter, the hand was carefully extended to neutral flexion and turned so that the palm was flat on the table-top and the joint spaces between scaphoid and lunate and lunate and triquetrum were profiled as much as possible. Thereafter, some contrast was injected to determine whether the needle was intraarticular. 1–2 mL of the contrast medium was injected under fluoroscopic control with videotape recording, whereby possible leakage to the midcarpal and/or distal radioulnar compartment was observed in detail. After filling of the radiocarpal joint, the needle was withdrawn and the hand was first gently moved and

Table 1. Findings at arthrography versus arthroscopy with regard to TFCC disruption (n 39)

	Arthroscopy	
Arthrography	Positive	Negative
Positive	7	3
Negative	6	21
Dubious, failure or other diagnosis	2	–

(p 0.01)

Table 2. Findings at arthrography versus arthroscopy with regard to interosseous ligamentous disruption (n 39)

	Arthroscopy	
Arthrography	Positive	Negative
Positive	6	6
Negative	–	25
Dubious or failure	–	2

(p 0.001)

thereafter more vigorously in the radial and ulnar deviation direction to open perforations which were sealed off in the neutral position. Distraction maneuvers were also made and all of these were fluoroscopically monitored to observe leakage to other compartments. Radiographs were taken at the moment of leakage to such compartments. After contrast injection and manipulation, a series of radiographs was taken under fluoroscopic control. This series consisted of a neutral PA and lateral view, a 70-degree oblique and reversed oblique view, a distraction PA view and a radial and ulnar deviation stress view. In case of leakage to the distal compartment, profiled views were also made of the interosseous ligaments between scaphoid and lunate and triquetrum in such a manner as to ensure that no contrast pooling was disturbing this site. In cases of discus perforation, a profiled view was made by elevating the hand from the table-top.

Arthroscopy

The patient was positioned supine on the operating table. Plexus anesthesia or general anesthesia was used. A pneumatic tourniquet was applied and a sling was placed over the arm. The long, ring and little fingers were placed in sterile finger traps attached to the ceiling. With the elbow in 90 degrees flexion, a 5 kg weight was applied to a hook attached to a sling over the arm to provide countertraction.

The 3–4 portal between the third and fourth dorsal compartments was used to inject 7 mL of sterile saline. By means of an introductor, a 15 degree-angled 1.9 mm arthroscope was introduced through portal 3–4 or 6R. Return of saline was ensured through portal 6U. The midcarpal joint was visualized through the midcarpal radial portal 1 cm distal from portal 3–4. In that case, return of saline was obtained through portal MCU. Hand instruments were introduced through portal 6R. Since the articular surface and ligamentous structures of the radiocarpal joint, triangular fibrocartilage and midcarpal joint were systematically examined through these portals, all visualized articular surfaces and ligaments were palpated with a hook probe. Joint debris was removed with hand instruments (mostly the shaver with the 3.5 mm full radius blade).

The findings at arthrography were compared with the arthroscopic findings with regard to (a) contrast leakage into the distal radioulnar joint, (b) contrast leakage into the midcarpal joint, and (c) whether any abnormality was detected. The findings at arthroscopy were compared with the arthrographic findings with regard to (a) TFCC disruption, (b) ligamentous disruption, (c) chondromalacia and (d) whether any abnormality was detected.

Data were analyzed using the chi-square test and Fischer's exact test. All reported p-values are two-sided. P-values ≤ 0.05 were considered significant.

Results

Arthroscopy showed that an incomplete or faulty diagnosis was made at arthrography in 31 of the 39 patients. No significant difference concerning false negative or positive results at arthrography were found between the first group (n 20) from Leiden and the other group (n 19) from Oss.

A correlation was present between arthrography and arthroscopy concerning TFCC disruption and ligamentous disruption findings (Tables 1 and 2). Arthroscopy showed disruption of the scapholunar ligament in 2 patients and disruption of the lunotriquetral ligament in 7 patients.

Arthrography showed chondromalacia grade 2 in 1 patient and arthrosis in 1 patient. Arthroscopy showed grade 1 in 11 patients, chondromalacia grade 2 in 14 patients and grade 3 in 5 patients. Synovitis was arthroscopically found in 10 of the 39 patients; of these 10 patients, 8 also had other abnormalities, 2 had synovitis as a solitary abnormality. In almost all cases of synovitis or chondromalacia, shaving of debris was necessary in order to get a good view. Arthroscopy showed a corpus liberum in 1 patient

and chondromalacia grade 4 in 1 patient. Arthrography did not reveal these abnormalities. Arthrographic complications occurred in 4 cases: the lunate was damaged by the needle. Arthroscopic complications occurred in 1 case, in which a ganglion developed at the 6R portal after arthroscopy.

Discussion

We used the single-injection technique for arthrography. Although the triple injection technique is regarded as the "gold standard", several reports on the single technique show almost the same results as with the triple one (Manaster 1991, Wilson et al. 1991). To offset valve-like effects with ligament injury, we moved the wrist in all directions under fluoroscopic control.

Concerning TFCC disruption, arthrography produced many false negative results and concerning ligamentous disruption, arthrography had many false positive results. Our results correspond to the results of Cooney (1993) and Roth and Haddad (1986).

Concerning ligamentous disruption, Belsole et al. (1990) and Cooney (1993) showed that arthrography also produced false negative results. We have no clear explanation of this; perhaps differences of experience and skill in performing arthrography played a role. Herbert et al. (1990) and Cantor et al. (1994) suggested that the existence of anatomic variations might explain arthrographic false positive results in the diagnosis of ligamentous disruption.

There was a clear difference between arthrography and arthroscopy in the diagnosis of chondromalacia: arthrography showed chondromalacia in 1 patient, arthroscopy in 30 patients. The finding of chondromalacia at arthroscopy was very common. We think these findings were primary lesions, because in the cases of ligament disruption we found no clinical or radiographic signs of carpal instability. Several authors (Roth and Haddad 1986, Belsole et al. 1990, Koman et al. 1990, Cooney 1993) state that chondromalacia can hardly be diagnosed with arthrography.

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