Mid-radial Portal for Operative Arthroscopy of the Elbow: Cadaveric and Clinical Description of a New Portal

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We report a previously undescribed portal on the lateral aspect of the elbow—the mid-radial portal—and discuss the safety and use of this portal in a clinical practice via cadaveric dissection and retrospective review of 61 patients. It is located midway between the proximal anterolateral and the direct lateral portals at the level of the radiocapitellar joint and serves as a second portal on the lateral side of the elbow for use anteriorly or posteriorly. The portal penetrates the common extensor origin and courses between the radial and ulnar bands of the lateral collateral ligament complex prior to penetrating the joint capsule.

In the clinical series, the mid-radial portal was used in 40 (66%) of 61 cases. The most common procedures involved removal of loose bodies and debridement in the radiocapitellar joint or posterolateral gutter. Follow-up in the clinical series averaged 6 months. No major and 2 minor complications, neither of which could be directly attributed to the use of the mid-radial portal, were found. Specifically, no cases of postoperative lateral instability existed. The previously undescribed mid-radial portal is a safe, effective option for arthroscopy on the lateral aspect of the elbow.

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The techniques of diagnostic and surgical arthroscopy of the elbow have been well described since the earliest reports in the 1980s. In one of the earliest reviews in the English literature, Andrews1 noted that, compared with the knee, arthroscopic examination of the elbow requires a greater attention to detail due to the deep muscle layers surrounding the elbow and the close proximity to important neurovascular structures. A variety of portals on the medial and lateral aspects of the elbow have been described.2 We report a previously undescribed portal on the lateral aspect of the elbow and discuss the safety and use of this portal in a clinical practice.

**TECHNIQUE**

The patient is positioned on the operating table in the supine position, with the operative extremity held in overhead traction. The joint capsule is distended by injecting 20 cc of sterile saline through the lateral soft spot. Diagnostic arthroscopy is performed using proximal anteromedial, proximal anterolateral, and direct lateral portals.

We start with the proximal anteromedial portal by creating a 5-mm incision through the skin located approximately anterior and proximal to the medial epicondyle. Blunt dissection down to the anterior capsule is performed using a hemostat to penetrate the deeper layers, paying careful attention to stay anterior to the intermuscular septum. The capsule is penetrated with the hemostat, and a metal cannula is inserted using a blunt trochar.

The arthroscope is inserted to create the remaining portals under direct vision while low-pressure pump infl ow is used to maintain joint distention. The proximal anterolateral portal is created using an inside-out technique anterior and proximal to the lateral epicondyle. The direct lateral portal is made by palpating the lateral soft spot in the center of the triangle formed by the olecranon, the lateral epicondyle, and the radial head.

When indicated, the mid-radial portal is created using an outside-in technique while viewing from the direct lateral portal. The location of the portal is midway between the proximal anterolateral and direct lateral portals (Figure 1). A spinal needle is inserted into the proposed location to identify the level of the radiocapitellar joint, and proper positioning is confirmed by direct visualization with the arthroscope (Figure 2). A 5-mm incision is made through the skin, and a hemostat is used to penetrate and dilate the deeper layers, including the lateral joint capsule.

**RESULTS**

To evaluate the safety of the mid-radial portal, a cadaveric elbow was dissected, and the relative position of the mid-radial portal from other portals and neurovascular structures on the lateral aspect of the elbow was determined. The structures penetrated in creating the mid-radial portal were also identified. This dissection identified the location of the mid-radial portal as 2 cm distal to the lateral epicondyle, adjacent to the radial head, 3.3 cm from the posterior interosseous nerve, and 8.5 cm from the lateral antebrachial cutaneous nerve. The mid-radial portal was farther from each of these structures than the proximal anterolateral portal. The portal was observed to penetrate the common extensor origin and course between the radial and ulnar bands of the lateral collateral ligament complex prior to penetrating the joint capsule (Figure 3).

The senior author’s (D.M.A.) clinical experience with the mid-radial portal over a 5-year period was reviewed. The mid-radial portal was used in 40 (66%) of 61 elbow arthroscopies. The most common diagnoses were loose bodies, osteochondral lesions of the radial head or capitellum, osteoarthritis, posterolateral synovitis, and plica. The most common procedures involved removal of loose bodies, debridement in the radiocapitellar joint or posterolateral gutter, and chondroplasty and drilling of osteochondritis dissecans lesions. Follow-up averaged 6 months.

No major and 2 minor complications during this time period were observed. One patient had a superficial infection around the proximal anteromedial portal incision that was treated successfully with oral antibiotics. The second patient had a postoperative anterior interosseous nerve palsy that recovered by his 3-month follow-up appointment. Neither of these complications could be directly attributed to the use of the mid-radial portal. No cas-
es of postoperative posterolateral instability were observed.

**DISCUSSION AND CONCLUSION**

Surgeons performing operative arthroscopy of the elbow must have a precise knowledge of the surface and arthroscopic anatomy to safely establish effective arthroscopic portals. This point is emphasized by a review article by Kelly et al\(^3\) that examined complications associated with elbow arthroscopies performed at the Mayo Clinic. The authors noted a higher prevalence of neurological complications after elbow arthroscopy than arthroscopy of other joints and attributed this to the proximity of the neurovascular structures to the portal sites, particularly the anterolateral portal. Over the past 2 decades, several authors have evaluated the safety of a variety of portals on both the medial and lateral sides of the joint.\(^4\)\(^8\)

The previously undescribed mid-radial portal is a safe, effective option for arthroscopy on the lateral aspect of the elbow. Whether for visualization or instrumentation, it provides valuable access to pathology at the radiocapitellar joint, anteriorly or posteriorly. Its use should be considered by all surgeons performing arthroscopy of the elbow.

**REFERENCES**