

The Anatomic Relation Of The Radial Nerve To A 90 Degrees Flexed Elbow And Its Effect On Lateral Pins Placement At The Distal Humerus

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INTRODUCTION:

Radial nerve injury is a known complication of surgical procedures at the distal humerus. We are investigating the safety of using a new anatomical landmark in relation to radial nerve at the distal humerus.

METHODS:

Twenty elbows from 12 cadavers were dissected after 2 pins were placed at the distal humerus lateral aspect. The first pin was placed at the level of the volar surface of a forearm with the elbow flexed to 90 degrees (VolarFP). The second pin is positioned at the level of the lateral epicondyle using clinical judgment. The radial nerve position was determined at the level at which the radial nerve crosses the lateral aspect of the humerus through dissection and the distances from the radial nerve to both pins were measured.

RESULTS:

The results are in the following table, the mean of the distances from the VolarFP to the radial nerve was 6.925 cm while the mean distance from the level of the lateral epicondyle pin to the radial nerve was 9.5 cm. The 95% confidence interval for the distances from the Volar FP to the radial nerve was between 5.97cm-7.965cm. while the 95% confidence interval for the distances between the lateral epicondyle pin to the radial nerve was between 8.59cm-10.425cm. There were no statistically significant differences between the distances measured at the right and left side of the cadavers.

	Cadaver left elbow		right elbow	
	pin	epi	pin	epi
1	5.5	7.5	6	8
2	5	8	5.5	8.5
3	6.5	10	7	9.5
4	6.5	11		
5	6.5	10	6.5	9
6	5.5	8.5	6	9
7	5.5	7.5		
8	6.5	8.7		
9	7	9	6.5	9
10	8.5	10		
11	10	11.5	9	11
12	10.5	12.5	9.3	12

DISCUSSIONS:

Numerous anatomical studies were done to study the radial nerve course along the arm and to try to assign a safe zone for pin placement. Wegman et al [1] measure the distances from the center of rotation of the elbow to three points along the course of the radial nerve, however, he couldn't delineate a safe zone. Kamineni S et al was able to identify a safe zone using bony landmarks in relation to the radial nerve position. Our study was able to identify a safe distance based on simple anatomical landmark.

CONCLUSION:

The level of the volar surface of a 90 degrees flexed elbow is quite safe for pin placement as far as the radial nerve is concerned, further investigation to correlate the circumference of the forearm to the aforementioned distances can be considered to detect any possible association

REFERENCES:

1. Wegman K et al. J Hand Surg Am. 2014 Jun;39(6):1136-40.
2. Kamineni et. al. Clin Anat. 2009 Sep;22(6):684-8