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Title: Variation in the site of emergence of the median nerve in the forearm and its clinical significance

Abstract

Accurate knowledge of the neurovascular anatomy of the forearm and its relationship to surface anatomy is vital when assessing traumatic injuries and performing surgical procedures safely. In the forearm, the median nerve is typically described as emerging from the radial aspect of the flexor digitorum superficialis (FDS) 5cm proximal to entering the carpal tunnel, at this point becoming more superficial and exposed. However, observations made during dissection have indicated this may not always be the case. In this study, 39 cadaveric forearms (23 male, 16 female) were dissected and the site of emergence of the median nerve was recorded with reference to surface landmarks. Measurements were taken from the medial humeral epicondyle (ME) to the distal wrist crease (DWC) and from the point of emergence of the median nerve beneath the FDS to the DWC. The median nerve ran deep to FDS and emerged from its radial aspect in all specimens. While the mean distance from the point of emergence of the median nerve to the DWC was confirmed to be 5.01cm, the range was 2.01-8.73 cm with an SD of ± 1.67 cm. In 19/39 specimens the median nerve emerged >5 cm from the DWC, and, of these, 2/39 specimens emerged >8 cm. Statistical analysis showed that the relationship between the distance from ME to DWC and ME to the emergence of the median nerve demonstrated a strong positive correlation ($R=0.76$, $P<0.00001$). These findings confirm significant variation in the location at which the median nerve emerges from beneath FDS in the forearm. We hypothesise that cases of proximal emergence leave the median nerve more vulnerable to injury in the distal forearm and that an awareness of the degree of anatomical variation is key to safe clinical practice. Donors provided consent before decease for anatomical research in compliance with HTA 2004.