ULNAR VARIANCE AND ITS RELATIONSHIP TO LIGAMENT INJURIES OF THE WRIST

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An anatomic study on cadavers and a clinico-radiological study on patients were undertaken to verify if ligament injuries of the wrist could be associated with ulnar variance. Neither scapholunate nor triquetrolunate ligament injuries could be related to shorter or longer ulnae. Longer ulnae were associated with significantly more perforations of the triangular fibrocartilage complex (TFCC).

Keywords : ulnar variance ; wrist ; ligament lesion ; scapholunate ligament, TFCC.
Mots-clés : variance cubitale ; poignet ; lésions ligamentaires ; ligament scapho-lunaire ; ligament triangulaire.

INTRODUCTION

Since Hulten in 1928 related shorter ulnar length to Kienböck's disease (3) various other disorders of the wrist have been examined and related to ulnar variance. The wear caused by the longer ulna on the triangular fibrocartilage complex (TFCC) and the ulnar facet of the lunate have been described as the ulnar impaction syndrome. Scapholunate ligament injuries have been related to ulna minus by Czintrom *et al.* (1) whereas lesions of the lunotriquetral ligament were more frequently seen in the ulnar impaction syndrome (5). The purpose of this survey was to verify these statements.

MATERIAL AND METHODS

In a cadaver study, 88 wrists were dissected, and the ulnar length was determined by radiography and direct measurement. The status of the TFCC, the scapholunate (SL) ligament and the triquetrolunate (TL) ligament were verified. The cadavers were embalmed ; the mean age was 76.8 years, ranging from 55 to 94 years (2).

In a second study the mean ulnar variance of 42 patients with proven SL ruptures was compared to the ulnar variance of 125 controls. The radiographs were taken in the zero-position, and the ulnar variance was determined with Palmer's method (4). All controls were patients consulting for reasons other than hand or wrist pathology. Their mean age was 36 years (range 17 to 69 years) ; there were 67 males and 58 females. The SL rupture was diagnosed by radiography (34 cases), arthrography (14 cases), arthroscopy (21 cases) and direct exploration (6 cases).

RESULTS

Cadaver study

The results are summarized in table I ; 32 wrists had an ulna minus and 28 had a neutral or positive ulnar variance. An SL lesion was seen in 9 (10%), a TL lesion in 22 (25%) and both ligaments were ruptured in 5 wrists. The ligament ruptures were

Table I

	Total	SL lesion	TL lesion	TFCC lesion
ulna minus	32	5	6	5
ulna neutral	28	3	7	15
ulna plus	28	1	9	18
^{2}		NS	NS	$p < 0,05$

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not significantly related to the distribution of the ulnar length, but perforation of the TFCC was more frequent in ulna plus or ulna neutral ($p < 0.05$) (Chi-square test).

Radiographic study

The mean ulnar variance was 0.4 mm (SD = 1.5 mm) in the controls and 0.6 mm (SD = 1.5 mm) in the SL ruptures. These differences were not significant (t-test). The distribution ratio was not significantly related to the presence of SL lesions (Chisquare test) (table II).

Table II

	Controls	SL lesion
ulna minus	54	19
ulnar neutral	23	15
ulna plus	48	9
		NS

DISCUSSION

The pattern of lesions does not depend only on the external trauma but is also influenced by the anatomical structures, making some patients more vulnerable to specific lesions.

In 1987 Czintron *et al.* correlated ulna minus with SL dissociations (1). In these studies however we could not confirm their findings, neither in the clinico-radiological study, nor with an anatomical study.

The pattern of the ulna plus with the ulnar impaction syndrome has been described by Palmer *et al.* (5). Not only was the TFCC involved but also the ulnar facet of the lunate and the TL ligament. The attrition of the TFCC was confirmed, but the TL ligament rupture was not significantly correlated with the ulnar length (2). Since the present study was done on a limited number of cadavers, it is possible that the power of the study is not strong enough to eliminate a type 2 statistical error.

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SAMENVATTING

L. DE SMET. Ulnaire variantie en de relatie met intra-articulaire ligament letsels van de pols.

Een anatomisch en radiologisch onderzoek werd verricht met als doel de incidentie van ligamentaire letsels van de pols te relateren aan de ulnaire variantie. Ulna minus kon niet worden geassocieerd met scapholunaire noch triquetrolunaire ligamentletsels. Ulna plus daarentegen was gerelateerd aan frequenter voorkomen van TFCC perforaties.

RÉSUMÉ

L. DE SMET. La variance cubitale et sa relation avec les lésions ligamentaires du poignet.

Une étude sur cadavres et une autre sur radiographies ont été réalisées pour établir l'incidence des lésions ligamentaires du carpe en relation avec la variance cubitale. Le cubitus court n'était pas associé avec des lésions du ligament scapho-lunaire ni du ligament semi-lunaire-pyramidal. Le cubitus long était associé avec des perforations plus fréquentes du ligament triangulaire du carpe.