

Introduction

- In our previous study, we first proposed that the cross-sectional area (CSA) of the ulnar artery as a new ultrasonographic parameter and proved that median nerve to ulnar artery cross-sectional area ratio (MUAR) correlates with other CTS parameters. In addition, we found that the MUAR at forearm level is useful parameter in our pilot study.
- The aim of this study is to identify the value of the parameters including ulnar artery related aspects in CTS patients.

Material and methods

- In this study, fifty newly diagnosed CTS wrists were recruited. They have no surgical or treatment history and the diagnosis was fully based on electromyography. Also, fifty healthy wrists included.
- We measured the median nerve and ulnar nerve in three level, including carpal tunnel inlet, carpal tunnel outlet, and 12cm proximal from wrist crease. We also evaluated the CSA of ulnar artery at the moment of fully dilated state in same three levels.
- Using these parameters, at all three levels, we obtain the several diagnostic parameters which are well-defined as CTS ultrasonographic findings. Furthermore, MUAR of each level was collected for analyzing the difference between CTS patients and healthy persons.

Result

- Table 1 proposes baseline characteristics of each group.
- In Table 2, the CSAs of median nerve at carpal tunnel inlet and outlet level were significantly larger in the CTS group than control group. Also, median nerve to ulnar nerve CSA ratio at carpal tunnel inlet was significantly larger in the CTS group than control group. In addition, the MUAR at 12cm proximal from wrist crease was significantly smaller in the CTS group than control group.

Table 1. Baseline characteristics

Characteristics	Control group N=50	CTS group N=50
Gender (M/F)	5/45	16/34
Age (years)	35.5 (22.75 - 54)	56 (51.25 - 62)
BMI (kg/m ²)	23.34 (21.49 - 24.77)	23.42 (21.15 - 25.97)
Lesion side (Rt./Lt.)	-	27/23
Duration (months)	-	6 (3 - 12)

BMI = body mass index; CTS = carpal tunnel syndrome

Values are presented as median (interquartile range)

Table 2. Comparison of ultrasonographic values among two groups

	Control group	CTS group	p-value	
Median nerve CSA (mm ²)	at inlet	9 (8 - 10.25)	14 (10 - 16)	<0.001**
	at outlet	9 (8 - 10)	10 (8.93 - 13)	0.002**
	12cm proximal from wrist crease	7 (6 - 8)	7 (6 - 9)	0.746
Median nerve CSA / Ulnar nerve CSA	at inlet	2.0 (1.75 - 2.75)	3.2 (2.94 - 4.5)	<0.001**
	at outlet	*	*	*
	12cm proximal from wrist crease	1.2 (1.14 - 1.53)	1.34 (1 - 1.64)	0.623
Median nerve CSA / Ulnar artery CSA	at inlet	3 (2.33 - 3.67)	3.43 (2.26 - 5.2)	0.178
	at outlet	2.67 (2.0 - 3.0)	2.71 (2 - 4.01)	0.227
	12cm proximal from wrist crease	1.75 (1.4 - 2.33)	1.47 (1.19 - 2)	0.009**
Wrist to forearm ratio of Median nerve CSA	1.67 (1.14 - 2.34)	1.8 (1.49 - 2.6)	0.156	

CSA = cross sectional area; CTS: carpal tunnel syndrome

Values are presented as median (interquartile range)

*Ulnar nerve was not evaluated because it branches at this level

** Significant at p<0.05, by using Mann-Whitney U test

Conclusion

- In this study, we found that MUAR at forearm level can be considered as meaningful diagnostic parameter in ultrasonographic evaluation of CTS.
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