Clinical Diagnosis of Coincident Carpal and Cubital Tunnel Syndromes

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INTRODUCTION: Coincident ulnar compression at the cubital tunnel can affect patients with carpal tunnel syndrome, but poses a diagnostic challenge - sensitivity of "gold standard" nerve conduction study results is limited to 60-70%. To date, this coincidence has not been reported, and a quantitative characterization of diagnostic methods may improve detection of coincident compression neuropathy.[1-3]

METHODS: A retrospective chart review of 515 patients was performed from patients treated for carpal tunnel and/or cubital tunnel release by two university-based hand surgeons. Cohorts included patients with isolated carpal tunnel syndrome (n=337) and patients with coincident carpal and cubital tunnel syndromes (n=178). Patients were characterized by demographics, medical history, physical exam, and nerve conduction studies. Univariate and multivariate logistic regression identified predictors of coincident nerve compression. The Koh-Benhaim score was constructed by integerizing regression coefficients of predictive factors in the multiple regression model (Table 1). Receiver operating characteristic curves were generated, after which sensitivities, specificities, positive, and negative predictive values were calculated to identify a cutoff value.

RESULTS: Loss of intrinsic hand strength, ulnar sensation loss, positive elbow flexion test, positive cubital tunnel Tinel's sign, and abnormal ulnar nerve NCS result were selected. The cutoff value for high risk of coincident compression neuropathy based on the Koh-Benhaim score was 3 points, with a positive predictive value of 82.9% and specificity of 93.4%. Model performance was very good, with a receiver operator characteristics area under the curve of 0.917 (Figure 1).

CONCLUSION: Rather than being utilized as a gold standard diagnostic, give its low sensitivity at the cubital tunnel, the NCS should be considered a supplementary factor for diagnosing coincident cubital tunnel syndrome in carpal tunnel syndrome patients. Patients with a score ≥3 should be carefully evaluated for coincident compression neuropathy. In this developmental cohort, the Koh-Benhaim score was a robust method for detecting coincident cubital tunnel syndrome in carpal tunnel syndrome patients. The component factors of the score (i.e. loss of intrinsic hand strength, ulnar sensory loss, positive elbow flexion test, positive cubital tunnel Tinel's sign, and abnormal ulnar nerve NCS result) are routinely used to assess compression neuropathy at the cubital tunnel, and were of equivalent diagnostic weight in assessing patients with potential coincident compression neuropathy.

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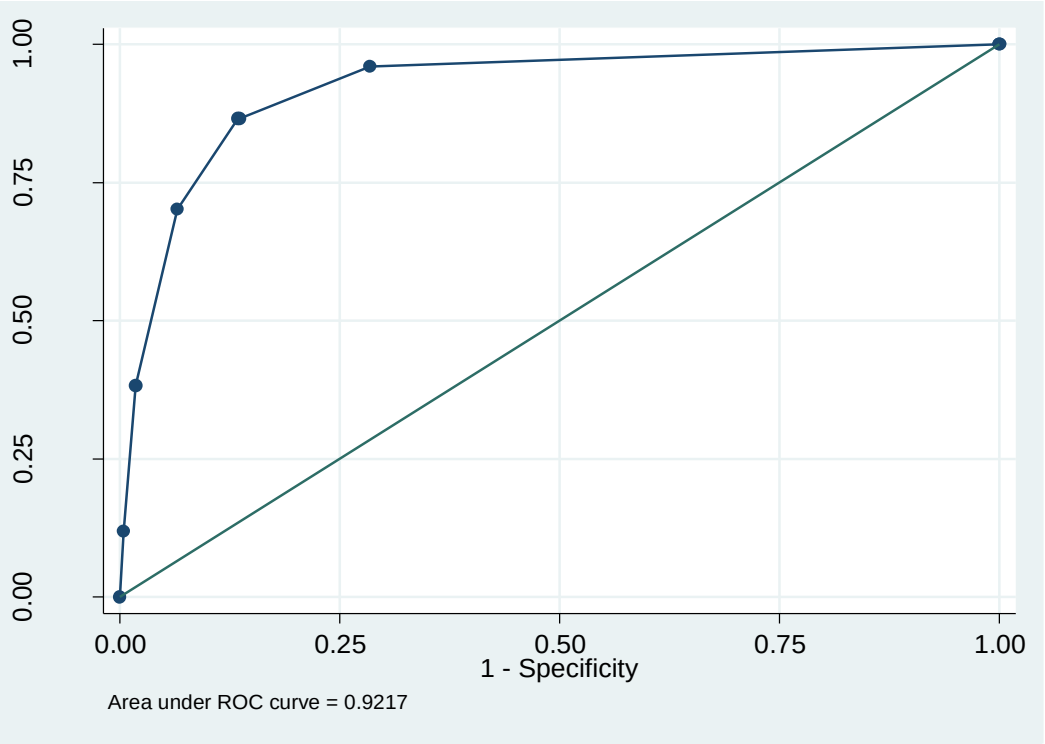
FIGURE LEGEND:

Figure 1. Receiver operating characteristic curve for the Koh-Benhaim Score. Area under curve of 0.5 indicates no predictive value; Area under curve of 1.0 indicates perfect predictive value

Table 1. Components of the Koh-Benhaim Score. Cutoff score of 2 indicates likely coincident compression neuropathy



Koh-Benhaim Score	
Parameter	Points
Intrinsic Strength Loss	1
Ulnar Sensation Loss	1
Elbow Flexion Test	1
Cubital Tunnel Tinel's	1
Ulnar NCS	1
Total Possible	0-5