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ORIGINAL ARTICLE

Carpal Tunnel Syndrome's Laboratory Testing: Current Practice in an Academic Center in Western Saudi Arabia

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Abstract. There is no consensus to obtain screening blood tests after carpal tunnel syndrome electro-diagnosis, nor does medical literature provide a clear cut indication. A retrospective review of 140 consecutive adult patients diagnosed with carpal tunnel syndrome between January and December 2010, at King Abdulaziz University Hospital electrophysiology laboratory, looking at screening blood tests ordered by their various practitioners to diagnose commonly associated clinical conditions with carpal tunnel syndrome, namely: *Diabetes mellitus,* hypothyroidism and connective tissue diseases. Around one third of patients had screening for *diabetes mellitus* with one or more of the following: fasting blood glucose, random blood glucose, two hours glucose testing or glycated hemoglobin. All patients who were found to have abnormal glucose values were known diabetics. Thyroid stimulating hormone was obtained in 42 (30%) patients, only 4 patients showed abnormal values, two of them were known to have hypothyroidism on treatment, the other two patients showed a normal free thyroxine values. Erythrocyte sedimentation rate, C-reactive protein, antinuclear antibodies and rheumatoid factor were requested in a negligible number of patients and were within normal limits. Screening for clinical conditions associated with carpal tunnel syndrome in this series yielded no new cases.

Keywords: Carpal tunnel syndrome, Electro diagnosis, *Diabetes mellitus*, Hypothyroidism, Median nerve.

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Introduction

Carpal tunnel syndrome (CTS) is the commonest compressive neuropathy diagnosed at electrophysiological laboratories[1], and it has been traditionally associated with a multitude of medical conditions including *diabetes mellitus* (DM), hypothyroidism and connective tissue diseases (CTDs), among others. This retrospective data collection looked at a local series of consecutive patients diagnosed with CTS over one calendar year at an academic hospital in Western Saudi Arabia, looking at practices of different practitioners ordering screening blood tests for conditions associated with CTS. This review looked at the common clinical conditions classically quoted as having an association with CTS, namely, DM, hypothyroidism and CTDs and whether it has helped to diagnose any new cases. CTDs included rheumatoid arthritis, systemic lupus erythematosus, Sjögren's syndrome, mixed connective tissue disease and scleroderma.

Methods

Adults above 18 years who were referred to the electrophysiology laboratory at King Abdulaziz University Hospital (KAUH) between January and December 2010 with a clinical diagnosis of CTS, confirmed by electrodiagnostic studies, were included.

After identification, electronic records were reviewed looking at blood tests requested by referring practitioners during the visit where electrodiagnostic study was requested and those requested during the next follow-up visit. Tests were considered not done, and therefore missing, if not requested during these two visits. Tests ordered outside these two clinic visits were likely requested for reasons other than CTS screening. Ethical approval for a “retrospective data collection” study was granted by Biomedical Ethics Unit at Faculty of Medicine, King Abdulaziz University.

Results

Total number of patients diagnosed with CTS was 142 patients. Two of them were below 18 years of age and were excluded from the analysis. Patients were 116 (83%) females and 24 (17%) males. CTS severity was mild to moderate in 116 patients (83%), and severe in the rest. 103 (74%) patients were bilateral, 27 (19%) patients were right-sided and 10 (7%) patients were left-sided.

Of the 46 (33%) patients, where a fasting blood glucose was requested, an abnormal value (above 7.0 mmol/L) was found in 25. Random blood glucose was obtained in 11 (8%) patients; only 3 of those were abnormal. Two hours glucose testing was obtained in 22 (16%) patients, 17 of those were abnormal (above 11.1 mmol/L). Glycated hemoglobin (HbA1c) was obtained in 39 (28%) patients, with 33 abnormal (above 6.5% considered abnormal). All patients with abnormal glucose values were known diabetics.

Thyroid stimulating hormone (TSH) was obtained in 42 (30%) patients, only 4 of them showed abnormal values in the hypothyroid range. (Normal TSH range 0.4 – 5.0 μU/mL). Two patients were known to have hypothyroidism on treatment, the other two patients showed normal free thyroxine values.

Erythrocyte sedimentation rate (ESR) was requested in 3 patients, Rheumatoid Factor (RF) in 2 patients, anti-nuclear antibodies (ANA) was obtained for one patient and none had c-reactive protein (CRP). All tests requested were within normal limits. Results are summarized in Table 1.

Table 1. Screening blood tests obtained for patients included in the study. Missing data are labeled "Not done".

Number	FBG	HbA1c	Rnd Glu	2hrs GT	TSH	ESR	CRP	ANA	RF
Done	46	39	11	22	42	3	0	1	2
Normal	25	6	8	17	38	1	0	1	2
Abnormal	21	33	3	5	4	2	0	0	0
Not done	94	101	129	118	98	137	140	139	138
Total	140	140	140	140	140	140	140	140	140

Legend: FBS: fasting blood glucose, HbA1c: glycated hemoglobin A1c, Rnd Glu: random glucose, 2hrs GT: two hours glucose testing, TSH: thyroid stimulating hormone, ESR: erythrocyte sedimentation rate, CRP: c reactive protein, ANA: anti-nuclear antibodies, RF: rheumatoid factor.

Discussion

Patients with CTS symptoms are seen by multiple specialties and referrals to the electrophysiology laboratory at KAUH come from neurosciences, family medicine, internal medicine, and orthopedics among others.

In this series of 140 patients, screening for associated conditions with CTS was low, but even those who were screened and came back positive were already diagnosed, and new screening after CTS diagnosis yielded no new cases. This finding is in keeping with an older series from the Netherlands by de Rijk *et al*.[2].

One possible explanation for missing data is the lack of a unifying personal health number used to order tests and get medical services, and patient visits and screenings done outside our hospital are not recorded.

A systematic review of CTS published in 2003 found an association between CTS and *diabetes mellitus*, hypothyroidism and rheumatoid arthritis but found not enough evidence to support blood screening tests for them after CTS diagnosis[3]. Various groups have looked at screening for these medical conditions after CTS electrophysiological confirmation and found it to be not very helpful[3,4]. The association between CTS and these clinical conditions might be a reflection of their high incidence in the general population and not a true causal relationship[5-11].

It is reasonable to conclude that screening for medical conditions associated with CTS is warranted if patients have other manifestations like polydipsia and polyuria for DM and cold intolerance for hypothyroidism, and that screening based solely on CTS electro-diagnostic study will likely be of little value.

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متلازمة النفق الرسغي وفحوصات الدم المخبرية: الحالة الراهنة في مركز جامعي غرب السعودية

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المستخلص. لا يعلم على وجه الدقة ما ينبغي فحصه مخبرياً في حال تم اكتشاف الاصابة بمتلازمة النفق الرسغي والأدب الطبي لا يقدم توصيات محددة بهذا الشأن. تم مراجعة سجلات ١٤٠ مريضاً تم تأكيد إصابتهم بمتلازمة النفق الرسغي بمستشفى جامعة الملك عبدالعزيز بجدة خلال عام ٢٠١٠م، والبحث في سجلاتهم الطبية عن فحوص الدم التي أجراها أطبائهم عقب علمهم بتأكيد إصابتهم بالمتلازمة بواسطة الفحص الكهربي التشخيصي. ثلث العينة تم إجراء فحوصات داء البول السكري لهم واتضح أن كل ذوي القيم المرضية هم من مرضى السكري المعروفين من قبل. تم إجراء فحص هرمون الدرق الحاث لأقل من ثلث العينة ووجدت في مستوى عوز الدرق المرضي لأربعة منهم؛ إثنين منهم معروفين بالإصابة بعوز الدرق والآخران أثبتت فحوصات الثيروكسين سلامتهما من المرض. تم إجراء فحوص إعتلالات الأنسجة الضامّة لعدد قليل من المرضى وكانت كُلّها سلبية. وبالمحصلة فان فحص الإعتلالات المصاحبة لمتلازمة النفق الرسغي في هذه العينة لم تسفر عن تشخيص أي حالات مرضية جديدة.