

Electrodiagnosis in the Patient with Metabolic Syndrome: Adding Value to Patient Care

Karen P. Barr, MD

KEYWORDS

- Electrodiagnosis • Nerve conduction studies • Metabolic syndrome • Prediabetes
- Polyneuropathy • Carpal tunnel syndrome • Radiculopathy

KEY POINTS

- Patients with metabolic syndrome are at increased risk for peripheral neuropathy, entrapment neuropathy, and radiculopathy, even if they have normal blood glucose levels.
- Electrodiagnostic studies are often necessary in this population because of the complexity of their symptoms and overlapping conditions.
- Patients with metabolic syndrome are at risk for functional decline if their nerve disease is not addressed.

INTRODUCTION

Metabolic syndrome is a group of related conditions that includes impaired glucose metabolism, central obesity, hypertension, and hyperlipidemia (Table 1 for diagnostic criteria). It is a common condition encountered in the electrodiagnostic laboratory because it has a high prevalence in the population and because patients with metabolic syndrome are prone to multiple peripheral nerve disorders.

The prevalence of metabolic syndrome has been increasing in the United States, and it is currently estimated that more than 35% of the US population has this disorder. It is particularly prevalent among older patients, with those older than age 70 having a five times higher risk than those younger than age 40.¹

There is a well-known link between increased blood sugar and neuropathy.² An increasing body of evidence shows a link between other aspects of the metabolic syndrome and various neuropathies.³ Patients with metabolic syndrome, even those without blood sugar dysfunction, have an increased risk of length-dependent

Disclosure Statement: Nothing to disclose.

PM&R, Department of Orthopaedics, West Virginia University, Box 9100, 1 Medical Center Drive, Morgantown, WV 26506, USA

E-mail address: Karen.barr@hsc.wvu.edu

Phys Med Rehabil Clin N Am ■ (2018) ■-■

<https://doi.org/10.1016/j.pmr.2018.06.008>

1047-9651/18/© 2018 Elsevier Inc. All rights reserved.

pmr.theclinics.com

Criterion	Definition	Men	Women
Abdominal obesity	Waist circumference	≥40 in	≥35 in
Dyslipidemia ^a	Triglyceride level	≥150 mg/dL	Same
	Reduced high-density lipoprotein cholesterol	<40 mg/dL	<50 mg/dL
Hypertension ^a	Systolic or diastolic	≥130/85	Same
Hyperglycemia ^a	Fasting plasma glucose	≥100	Same

^a Or taking medication to treat this condition.

Data from Grundy SM, Cleeman JI, Daniels SR, et al. Diagnosis and management of the metabolic syndrome: an American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement. *Circulation* 2005;112(17):2735–52.

polyneuropathy, entrapment neuropathies, and radiculopathy.^{4–7} A well-designed electrodiagnostic study can give information about these conditions that cannot be obtained any other way.

PATHOPHYSIOLOGY OF NERVE DAMAGE IN METABOLIC SYNDROME

Hyperglycemia

There is a well-established link between hyperglycemia and microvascular damage that causes neuropathy. Types of neuropathies linked to hyperglycemia include distal symmetric sensorimotor polyneuropathy (DPN), autonomic neuropathy, proximal neuropathies, focal neuropathies, and small fiber neuropathies. Neurons are at risk of damage from hyperglycemia from several mechanisms including glucose-mediated endothelial damage, oxidative stress, and advanced glycation end products.⁸ The incidence of DPN in patients with type 1 and type 2 diabetes mellitus (DM) varies by study, partly based on populations and the way that the neuropathy is diagnosed, but likely is 40% or more with a 10-year history of diabetes. Prediabetes also seems to be a risk factor for the development of DPN (**Table 2** for diagnostic criteria). Multiple studies show a higher prevalence of peripheral neuropathy in those with prediabetes.^{9,10}

In some aspects, the amount of nerve injury in those with hyperglycemia seems to be “dose dependent” in that those with longer duration and less well controlled diabetes have a higher incidence of polyneuropathy and more evidence of axonal loss than those with shorter duration and better control. A recent study that followed patients with diabetes and prediabetes found that over 10 years, sural amplitude decreased as hemoglobin A_{1c} increased, and for every 1% increase in hemoglobin

Diagnosis	Fasting Plasma Glucose (mg/dL)	HbA _{1c} (%)	2-h Oral Glucose Tolerance Test (mg/dL)
Normal	<100	<5.7	<140
Prediabetes	100–125	5.7–6.4	140–199
Diabetes	>126	>6.5	>200

Data from American Diabetes Association. (2) Classification and diagnosis of diabetes. *Diabetes Care* 2015;38 Suppl:S8–16.

Download English Version:

<https://daneshyari.com/en/article/11013558>

Download Persian Version:

<https://daneshyari.com/article/11013558>

[Daneshyari.com](https://daneshyari.com)