Letter to Editor

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Pathogenetic, Diagnostic, Therapeutic and Prognostic Role of Age in Diabetic Peripheral Neuropathy

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Abstract

This letter to editor was directed to explore the underlying evidence behind the pathogenetic, diagnostic, therapeutic and prognostic role of age in diabetic peripheral neuropathy (DPN) in order to establish an inter-relationship between physiology and pathology in the pathophysiology of DPN in its symptoms, signs, clinical presentation and impact on individual's life.

Keywords: Age; Ageing; Older people; Geriatric neurology, Elderly.

Pathogenetically, Valensi *et al*[1] assessed peripheral neuropathy in 135 diabetic patients (28 insulin-dependent diabetes mellitus (IDDM), 85 non-insulin-dependent diabetes mellitus (NIDDM), and 22 insulin-treated NIDDM patients) to determine the risk factors for neuropathy and microangiopathy. The clinical neurological stage was found to correlate with age and in women, nine electrophysiological parameters were more abnormal and correlated with age which demonstrated that age to have an effect on peripheral nerve function in DPN.

Diagnostically, Albers et al[2] evaluated nerve conduction measures of 429 patients from a multicenter diabetic neuropathy study and found that patients with type II diabetes were older than type I patients (54.5 versus 39.1 years). Age was found to be confounding the effects of gender and diabetes type upon nerve conduction measures, with similar effects as that of gender for type-2 DM but not for type-1 DM.

Armstrong *et al*[3] generated age-related reference values from 120 healthy volunteers and found that vibration perception thresholds (VPT) deteriorated significantly with age; expiratory inspiratory (E:I) ratio had a variable relationship with age for patients which appeared to be located below the 5th percentile of normal data. Higher age was found in patients with neuropathy than for those without neuropathy[4] and old age was demonstrated to be a risk factor for carpal tunnel syndrome in DPN by Comi *et al.*[5] Age above 40-years in people with DPN was also associated with presence of cholesterol gallbladder stone and had undergone

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operation for cholelithiasis.[6]

Prognostically, the role of age as a confounding factor was realized and thoughtfully implemented in many case-control studies using age-matched controls by Beylot *et al*[7] who studied the blood pressure response to standing and the heart rate variations during deep breathing (HRV) and standing; Mueller et al[8] who studied the gait characteristics, the plantar-flexor peak torques, and ankle range of motion; Resnick *et al*[9] who evaluated pressure sensation, vibration perception threshold, and electrophysiologic function of the peroneal nerve; Salsich *et al*[10] who assessed the relationships between plantar flexor (PF) muscle stiffness, strength (concentric peak torque), and dorsiflexion (DF) range of motion (ROM); and by Salsich *et al*[11] who measured passive ankle stiffness and dorsiflexion (DF) range of motion.

Surprisingly, the therapeutic role of ageing was not found in the existing knowledge base, and there is good scope for studying anti-ageing therapies and their role in DPN.

References

1. Valensi P, Giroux C, Seeboth-Ghalayini B, Attali JR. Diabetic peripheral neuropathy: effects of age, duration of diabetes, glycemic control, and vascular factors. *J Diabetes Complications*. 1997; 11(1): 27-34.
2. Albers JW, Brown MB, Sima AA, Greene DA. Nerve conduction measures in mild diabetic neuropathy in the Early Diabetes Intervention Trial: the effects of age, sex, type of diabetes, disease duration, and anthropometric factors. Tolrestat Study Group for the Early Diabetes Intervention Trial. *Neurology*. 1996; 46(1): 85-91.
3. Armstrong FM, Bradbury JE, Ellis SH, Owens DR, Rosen I, Sonksen P, *et al*. A study of peripheral diabetic neuropathy. The application of age-related reference values. *Diabet Med*. 1991; 8Spec No: S94-9.
4. Matsumoto T, Ohashi Y, Yamada N, Kikuchi M. Hyperglycemia as a major determinant of distal polyneuropathy independent of age and diabetes duration in patients with recently diagnosed diabetes. *Diabetes Res Clin Pract*. 1994; 26(2): 109-13.
5. Comi G, Lozza L, Galardi G, Ghilardi MF, Medaglini S, Canal N. Presence of carpal tunnel syndrome in diabetics: effect of age, sex, diabetes duration and polyneuropathy. *Acta Diabetol Lat*. 1985; 22(3): 259-62.
6. Tanno N, Koizumi M, Goto Y. The relationship between cholelithiasis and diabetes mellitus: discussion of age, obesity, hyperlipidemia and neuropathy. *Tohoku J Exp Med*. 1988; 154(1): 11-20.
7. Beylot M, Haro M, Orgiazzi J, Noel G. Abnormalities of heart rate and arterial blood pressure regulation in diabetes mellitus. Relation with age, duration of diabetes and presence of peripheral neuropathy. *Diabete Metab*. 1983; 9(3): 204-11.
8. Mueller MJ, Minor SD, Sahrmann SA, Schaaf JA, Strube MJ. Differences in the gait characteristics of patients with diabetes and peripheral neuropathy compared with age-matched controls. *Phys Ther*. 1994; 74(4): 299-308.
9. Resnick HE, Stansberry KB, Harris TB, Tirivedi M, Smith K, Morgan P, *et al*. Diabetes, peripheral neuropathy, and old age disability. *Muscle Nerve*. 2002; 25(1): 43-50.
10. Salsich GB, Brown M, Mueller MJ. Relationships between plantar flexor muscle stiffness, strength, and range of motion in subjects with diabetes-peripheral neuropathy compared to age-matched controls. *J Orthop Sports Phys Ther*. 2000; 30(8): 473-83.
11. Salsich GB, Mueller MJ, Sahrmann SA. Passive ankle stiffness in subjects with diabetes and peripheral neuropathy versus an age-matched comparison group. *Phys Ther*. 2000; 80(4): 352-62.