LETTER TO EDITOR

VIBRATION SENSE IMPAIRMENT IN DIABETES MELLITUS

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Sir,

Diabetes is a chronic progressive disorder with increasing worldwide prevalence & is of much concern because of its devastating complications. Among this, nervous system is most frequently affected (2). Diabetes affects both large and small myelinated fibres & unmyelinated nerve fibres as well (6). Clinical symptom varies widely in peripheral neuropathy due to diabetes.

In majority of cases sensory symptoms predominate (3) & abnormality may be in proprioceptive or exteroceptive sensory system. VPT have added much to early diagnosis of peripheral neuropathy. Previous study showed that in mild to moderate diabetic neuropathy, the biothesiometer VPT serves excellent reliability and serves as an appropriate screening tool (4). Likelihood of neuropathy to be tested with superficial pain sensation testing or vibratory testing (5). VPT evaluates affection of peripheral nerve in a quantifiable manner (6). However contradictory report regarding VPT testing in peripheral neuropathy has been reported. One study stated that in diabetes patients without clinical evidence of neuropathy there were no correlations between either vibratory threshold or thermal threshold (10). VPT testing in diabetic neuropathy had done by many authors (6, 7, 8). But very few reports have been documented in our country. Therefore this study is done to assess if VPT testing can be applied in our country for early diagnosis of diabetic peripheral neuropathy. The use of biothesiometer has served a satisfactory tool for quantifying vibratory sense (8).

More over one study showed, very recently biothesiometry/QST study is being used for diagnosis of neuropathy specially of small & large fibre, which increases the sensitivity of detecting neuropathy from 30-90% or more (6).

In present study we have assessed the impairment of vibration perception threshold (VPT) that enables evaluation of affection of large myelinated (Aα & Aβ) fibres. We used Biothesiometer in our study that served a satisfactory tool for quantitating vibratory sense.

In order to differentiate between clinical neuropathy and no clinical neuropathy, Michigan Neuropathic Diabetic Scoring (MNDS) was used (2). This system gives a score in the range 0-8, based on evaluation of 4 different factors in the each leg. These factors are: appearance of foot (dry skin, callus, deformities, fissure, and infection), presence of ulcer, Achilles tendon reflex and vibration perception in the great toe (measured with a 128 Hz tuning fork). Scores 3 or higher had considered as clinical neuropathy case.

The studies on VPT were conducted in Department of Neurology, Medical College,
Kolkata with help of instrument (Neuropathy Analyser – Vibrotherm Dx) (vibration & thermal perception threshold detector). This instrument is manufactured by M/S Madras Engineering Services, Chennai.

In our study we have taken average of 6 specific points in both feet:

- Great toe
- 1st metatarsal
- 3rd metatarsal
- 5th metatarsal
- Instep
- Heel

First probe was applied to patient’s hand to explain the feel of vibration clearly. Then patient is asked to concentrate on feet & tell as soon as he starts feeling the vibration and value is noted. Quantification of vibratory sense was detected in 60 diabetic patients of which 30 had clinical neuropathy and 30 had no clinical neuropathy. During recording, the voltage was increased from 0 to 50 volts. The instrument specific normative data found after studying 100 controls are as follows:

- **Normal** – up to 15 volt
- **Grade I** – 16 to 25 Volt
- **Grade II** – >25 volt.

Chi-square test has been applied between the parameters.

The observation of results as in table I showed that, among the diabetic patients with clinical neuropathy 73.2% had abnormal VPT and, 26.6% & 46.6% shows grade I & grade II severity respectively, whereas, 26.6% show normal VPT. Interestingly even in diabetic patient without clinical neuropathy, 60% show grade I severity with VPT testing. So, maximum patients with clinical neuropathy show grade II severity with vibration perception threshold.

It is also observed from the table I that 12 (40%) patients having no clinical neuropathy belong to normal grade of VPT. 8 patients (26.6%) with clinical neuropathy develop grade I VPT, while 18 (60%) patients with no clinical neuropathy also have grade I severity. Whereas, 14 (46.6%) patients with clinical neuropathy were identified as grade II sufferer & no patient of grade II abnormality seen in subclinical neuropathy. Taking into consideration of 2 groups of patient with normal & abnormal severity, chi square test is done. It is observed that chisquare = 1.2 (P>0.05) ie, there is no significant difference between the symptomatic and asymptomatic cases.

In present study the result show diverse values of VPT testing. Most of the clinical neuropathic patients showed abnormal VPT either grade I or grade II, but 8 patients out of 30 do not have any abnormal VPT. Reason may be that VPT testing is more of subjective in nature. Similar findings have also been reported (6). Among the diabetic neuropathic patients, 14 had grade II abnormality and 8 had grade I abnormality. The reason for different grades of neuropathy may be due to variable duration of illness. The observation of VPT testing in diabetic patients without clinical neuropathy showed grade I severity in 60% patients. It means that certainly there is affection of nerve fibres in subclinical state without any symptoms. Therefore, every subclinical cases of neuropathy in diabetes should be assessed by VPT testing to find out the probability of
developing neuropathy. Van Deusen RW et al stated that in mild to moderate diabetic neuropathy the biothesiometer VPT serves excellent reliability and serves as an appropriate screening tool (4). Therefore, it may be advocated that therapy should be instituted in these subclinical cases of neuropathy on the basis of VPT abnormality to prevent disease progression along with glycemic control.

From this study we can conclude that all cases of diabetic patients irrespective of clinical symptoms of neuropathy should be assessed by VPT for early diagnosis & future therapy to prevent progression of disease.

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