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Case Report

Leg Tremor, An Anxious Patient, A Challenging Treatment

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***Abstract* — Orthostatic tremor (OT) is one of the rare abnormal movement conditions characterized by leg tremors of 13-18 Hz upon standing and is often diminished upon walking or sitting. The exact pathophysiology of OT is still not fully understood, and it is uncertain whether the tremor causes unsteadiness on standing or vice versa. Treatment is a tremendous challenge. Medication toxicity with ineffective medications may likely cause distress to the patients and the physicians. Gabapentin, clonazepam, levodopa, and pregabalin are among the medications that have been used. We herein report on an elderly patient with OT, distressed, and anxious who improved significantly with physiotherapy as an adjunct therapy to the conventional medications.**

***Keywords* — Orthostatic tremor; tremor; physiotherapy; abnormal movement**

I. INTRODUCTION

Orthostatic tremor (OT) is a rare abnormal movement condition characterised by leg tremors upon standing. It was initially described by Pazzaglia et al. in 1970 [1] and subsequently further described by Heilman [2] in 1984 who coined the term "orthostatic tremor". The condition is not life-threatening, and patients seldom report falls. However, it can be disabling and markedly affects the patient's quality of life, thus contributing to huge anxiety among the patients [3].

It is hypothesised that pathological ponto-cerebello-thalamo-primary motor cortical activations and mesiofrontal deactivation are the underlying features in the development of OT [4]. Conditions like vitamin B12 deficiency, parkinsonism, and Grave's disease have been reported to be associated with OT [5]. Diagnosis is primarily by clinical judgment, with electromyography as the supporting investigation, which typically demonstrates a leg tremor of 13-18 Hz [6]. The tremor is manifested during isometric contraction of the legs, in the stance phase and not during the swing phase of walking [7]. Weight-bearing like leaning on a bar or using a walking stick makes the tremor disappear [8]. However, as the disease progresses, some patients would experience tremor even when sitting [7].

We report a case of an elderly man with OT who was unable to tolerate the adverse effect of the medicine prescribed and found symptom control in regular physiotherapy. This case highlights the challenges in managing OT and emphasises the importance of physiotherapy as a non-pharmacological treatment that is non-invasive and tolerable by most patients.

II. CASE REPORT

A 70-year-old gentleman presented with a 10-year history of tremulous legs while standing. His legs shook whenever he was standing, and it disappeared when he walked or sat down. He could stand for a few seconds before he needed to move or lean onto something to reduce his leg tremors. Activities that required him to stand for an extensive period made him anxious to the extent where he needed to make some adjustments to his routine, utilising his surrounding environment to reduce his leg tremors. For example, when he was queuing at the bank, he would hold onto a bar or an umbrella. During a shower, he needed to sit. These tremor episodes cause significant distress and embarrassment to the patient, especially in his workplace, where he was required to stand and meet people. Otherwise, he experienced no trouble walking and never had a fall.

Nevertheless, he had never consulted any medical experts for the past decade. He has hypertension and is an occasional alcohol drinker. No family member had the same problem. Lower limb examination showed no muscle wasting or fasciculation when lying down, but there were calf muscle flickers when he was standing. Tandem gait was abnormal, with broad-based gait demonstrated. Otherwise, he had normal muscle power, tone, and reflexes. There were neither signs of parkinsonism nor cerebellar syndromes. Proprioception and other sensory examinations were intact. Other neurological and systemic examinations were unremarkable. His basic blood investigations, including thyroid function and vitamin B12 level, were normal. Magnetic resonance imaging of the brain showed no significant finding. He was not keen on further tests and refused electromyography or nerve conduction study. Diagnosis of the primary OT was made based on clinical presentation.

The patient was started on clonazepam 0.5mg OD and levodopa 50mg BD. However, the clonazepam made him very drowsy, even at a low dose, and he discontinued it after two days. Clonazepam was then switched to gabapentin 600mg OD with an increased dose of levodopa 100mg BD. His standing time extended slightly to 8 to 10 seconds before the tremor appeared. However, he claimed it was inadequate to control his tremor and made him more irritable and anxious.

He was referred to a physiotherapist, and he experienced some improvement after a few sessions. His symptoms deteriorated again when the physiotherapy sessions were withheld for two months due to the implementation of the COVID-19 Movement Control Order (MCO). Meanwhile, the medications were adjusted to no avail. Pregabalin 50mg twice a day made him unable to focus on his daily work, and gabapentin 600mg once a day caused significant leg swelling.

Once the MCO was relaxed, he resumed his weekly physiotherapy sessions, which consisted of cycling, balance training, lower limb strengthening exercises, and gym ball exercises. He continued regular cycling with a stationary bike at home. He showed tremendous improvement and could stand steadily longer for nearly 40 seconds. The patient was extremely pleased with the progress. His symptoms were manageable with physiotherapy and medications, namely gabapentin 300mg OD and levodopa 200mg BD.

III. DISCUSSION

Treating OT is primarily focused on controlling the symptoms. However, managing a geriatric patient with OT is proven to be far more challenging. The benefit of pharmacological treatment is limited. Clonazepam has shown mild-to-moderate benefit in at least 50% of the patients [9]. However, the sedative effect can be poorly tolerated, as it was seen in this patient, even at a minimal dose. Other options, including gabapentin and pregabalin, have also shown symptom improvement [9]. Unfortunately, these treatments have similar adverse effects which can be pronounced especially among the elderly. Treatment with dopamine agonists like levodopa has shown conflicting reports. In one open-label study, 600mg per day of levodopa treatment for two months has shown to improve symptoms; however, the benefit was not long-lasting and there was no remarkable change in the patient's overall condition [10]. Nonetheless, this patient's levodopa dose was titrated, as he tolerated it well. Another Parkinson's treatment, pramipexole, a dopamine agonist, was effective in a case report [11]. Anticonvulsants, such as valproate [9] and perampanel [12] can also be considered.

Apart from pharmacological treatment, invasive non-pharmacological therapies for OT like spinal cord stimulation therapy and deep brain stimulation (DBS) have been documented [13]. Spinal cord stimulator has shown marked improvement in symptoms in some isolated cases [13]. However, considering the cost and its controversial use, they are not the best option for this patient. On the other hand, DBS improves unsteadiness and increases stance time [14].

The role of physiotherapy in OT is not discussed widely in the present literature. Physiotherapy improves outcomes in stroke patients [15, 16] and other neurological disorders, such as Parkinson's disease and multiple sclerosis [17, 18]. Physiotherapy is documented to improve gait and reduce the number of falls among Parkinson's patients [17]. Patients with multiple sclerosis who received physiotherapy reported a decrease in mobility-related distress and reduced anxiety [18]. Supportive rehabilitation may assist patients with increasing functional impairment [19]. In this case, muscle strengthening, and balance exercises are likely to have benefited the patient and increased confidence in his stance. Apart from physiotherapy, another non-invasive modality with promising results is transcranial direct current stimulation (tDCS). TDCS has been reported to improve stability among patients with OT by reducing tremor amplitude and frequency [20].

Table 1. Summary of treatment option for orthostatic tremor

Pharmacological treatment	Clonazepam Gabapentin Pregabalin Levodopa Pramipexole Valproate Perampanel
Non-pharmacological treatment	Spinal cord stimulation Deep brain stimulation Transcranial direct current stimulation Physiotherapy & Rehabilitation

IV. CONCLUSIONS

Overall, non-pharmacological treatment of OT should be explored hand in hand with pharmacological options. The management should be in line with the patient's expectation for symptom control and the progression of the disease. Supportive physiotherapy and rehabilitation are other approaches that should not be forgotten by the treating clinicians. It is well tolerated, less invasive, and cost-effective. Given the nature of the disease, which potentially could be progressive and disabling to most patients, and the lack of effective pharmacological treatment, more studies should be focused on the role of physiotherapy in controlling the symptoms of OT.

CONSENT TO PARTICIPATE

Written informed consent was obtained from the patient for the anonymized information to be published in this article.

CONFLICT OF INTERESTS

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