Movement Disorders
CLINICAL PRACTICE

Changing the Side of Pisa Syndrome: A Case of Over-Recovery with Botulinum Toxin

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Pisa syndrome (PS) is a disabling postural abnormality associated with neurodegenerative diseases, with a prevalence of 9% in Parkinson's disease.[1] Most authors define PS as an involuntary lateral trunk flexion (LTF) ≥10°, resolving in the supine position or by passive mobilization.[1] Rarely, PS onset is associated with the "metronome effect," an alternating trunk-leaning behavior toward both sides.[2] Adjustment of dopaminergic therapy and rehabilitation have been proposed as the first-line management of PS, with botulinum toxin (BoNT) representing the second-line treatment.[3] Although robust evidence on the effect of therapy modifications is lacking, the efficacy of BoNT was demonstrated in 2 small randomized controlled trials and 1 case series.[3–5] However, BoNT injection of axial muscles yielded variable results.

We report the case of a 76-year-old man with a 6-year history of idiopathic Parkinson's disease and an optimal response to levodopa who developed PS 4 years after Parkinson's disease diagnosis. The patient's PS had a duration of 24 months and presented with a chronic pattern of onset in the absence of a metronome effect. The extent of the LTF was 16.5° (Fig. 1A), the fulcrum at the T12 spinous process, and back pain 4/10 on the visual analog scale. Orthostatic spine X-ray and dorsal–lumbar spine magnetic resonance imaging excluded structural spine deformities and vertebral rotation. We injected 50 units of OnabotulinumtoxinA dissolved in 2 mL of saline within the left longissimus–thoracis and iliocostalis–lumborum muscles at the T12 level for a total of 100 units. The BoNT injections were performed under ultrasound and electromyography guidance to ensure targeting accuracy, as previously described.[4] A few days after treatment, the patient and caregiver noticed initial changes in the posture, followed by a complete relieving of the LTF with the possibility to maintain a straight standing posture. Concurrently, the patient complained of an accentuated back pain while walking. We examined the patient 10 days after BoNT injection and documented an 8° LTF on the opposite side (Fig. 1B) and resolution of the back pain. One month after BoNT injection, the opposite trunk flexion had disappeared, and the patient showed a remarkably improved PS, with a left LTF of 6.5° (Fig. 1C) and no associated back pain (visual analog scale, 0/10). Four months after BoNT, the therapy effect wore-off, and the LTF was 13°. The patient gave written informed consent for this study.

To our knowledge, this is the first case of PS with an iatrogenic metronome effect attributed to an excellent efficacy of BoNT injection. A functional disorder was ruled out because there were no signs of incongruence or inconsistency in both the history and examination of our patient, nor other suggestive functional disorder clinical features encompassing sudden onset, disappearance with distraction, increase with attention, or excessive fatigue. A placebo effect was never proved in randomized controlled trials analyzing the effect of BoNT in PS.[5] Thus, we observed that the treatment of specific paraspinal muscles at the fulcrum level could result in excellent efficacy, supporting the hypothesis that PS is a treatable condition even in its chronic phase and with low doses of BoNT. The correct targeting in patients without structural spine deformities could result in an excellent (or even exaggerated) efficacy of BoNT on LTF. In fact, the BoNT peak effect may lead to a transitory contralateral bending compensated by slow muscle reinnervation and adaptive postural reorganization. It is noteworthy that BoNT improved not only the trunk flexion but also resolved the associated back pain, as already reported.[4,5]

Clinical trials are needed to enhance the level of evidence on the efficacy of BoNT in treating PS, providing indications on optimal BoNT doses and targets.

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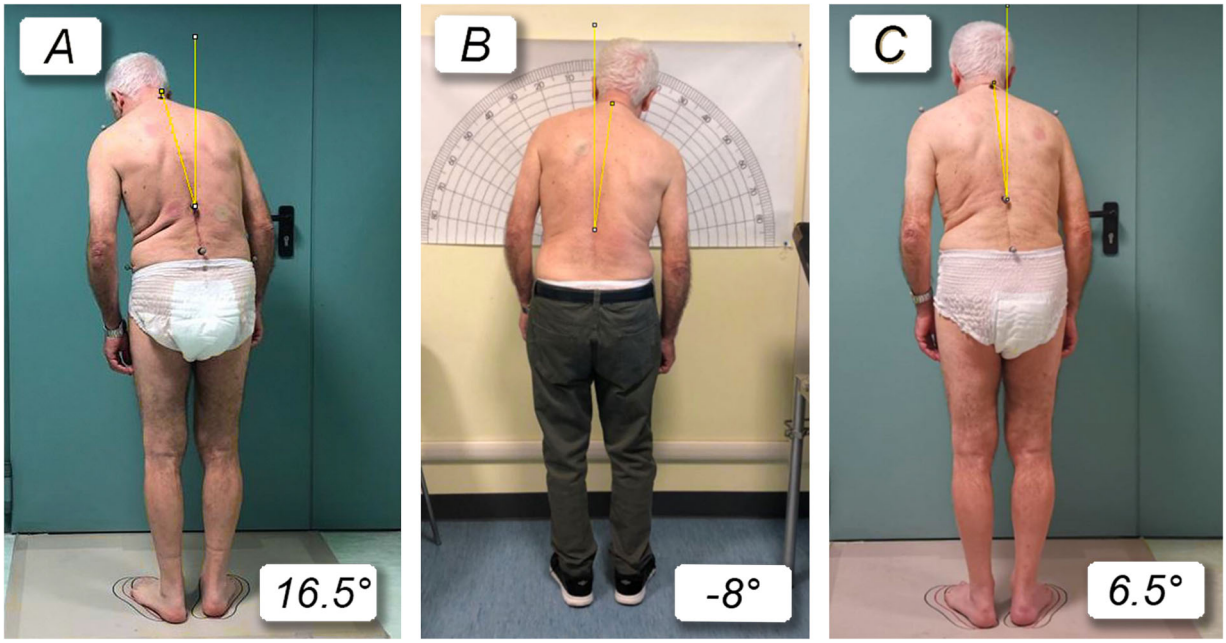

FIG. 1. Modification of Pisa syndrome after botulinum toxin injection. Iatrogenic metronome effect: (A) Pisa syndrome before botulinum toxin injection, (B) Pisa syndrome 10 days after botulinum toxin injection, and (C) Pisa syndrome 30 days after botulinum toxin injection.

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Author Roles

(1) Research Project: A. Conception, B. Organization, C. Execution, D. Clinical Activity for the Case; (2) Manuscript Preparation: A. Writing of the First Draft, B. Review and Critique.

C.A.A.: 1A, 1B, 1C, 1D, 2A
F.M.: 1C, 1D, 2A
C.Z.: 1D, 2B
S.B.: 1D, 2B
U.D.: 1D, 2B
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Disclosures

Ethical Compliance Statement: We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines. The patient gave written informed consent for this study. The study was approved by the local ethic committee—protocol number 0045381.

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