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Publication Date

2019

DOI

10.1016/j.prdoa.2019.06.002

Clinical Parkinsonism & Related Disorders 1 (2019) 8–9

Contents lists available at ScienceDirect

Clinical Parkinsonism & Related Disorders

journal homepage: www.elsevier.com/locate/prdoa

Cervical dystonia: Injecting botulinum neurotoxin into semispinalis capitis improves goose-neck posture

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ARTICLE INFO

Article history:
Received 20 May 2019
Received in revised form 13 June 2019
Accepted 13 June 2019
Available online 15 July 2019

Keywords:
Cervical dystonia
Botulinum toxin
Anterocollis
Retrocaput
Goose-neck posture

ABSTRACT

We describe a patient with goose-neck posture as the presenting form of cervical dystonia. In our case, the bilateral semispinalis capitis muscles were hypertrophic, thick, and overactive while both splenius capitis and sternocleidomastoid muscles were normal. In this single case experience, we demonstrated that the semispinalis capitis muscle may play a primary role in causing a goose-neck posture and the observed forward sagittal shift may be a compensatory or overflow activity of neck flexor muscles. Therefore, botulinum toxin injection to the semispinalis capitis muscles can be considered in the management of patients with goose-neck posture.

1. Introduction

Cervical dystonia is a neurological disorder characterized by abnormalities of head and neck posture due to the involuntary contraction of the neck muscles [1]. This is the most common focal dystonia in adults [2]. To date, neurotoxin botulinum is considered the first choice in treating patients with cervical dystonia [3]. The treatment with BoNT fails in approximately 15 to 30%, and most of them have complex cervical dystonia [4]. Goose-neck posture, one of the complex cervical dystonias, is a combination of retrocaput and anterocollis that causes the head to move sagittally forward and the chin to move upward. The treatment for goose-neck posture is rather difficult and often requires electromyography (EMG) guidance [5]. The goose-neck posture is thought to be due to contraction of the splenius capitis and sternocleidomastoid muscles bilaterally and improves with injection of botulinum neurotoxin into these muscles [5,6]. However, the main role of the semispinalis capitis in goose-neck posture has not been reported.

2. Case report

This 67-year-old female patient presented with a 5-year-old goose-neck posture abnormality. Initially, the patient complained of tension in the back of the neck and irregular extension movement of the head. Physical examination found a dystonic movement with a backward extension of the head and a forward sagittal shift of the neck that caused the chin to be pushed forward (Fig. 1). Brain and neck MRI were normal. After informed consent, her neck was investigated using ultrasound and EMG. The semispinalis capitis muscles were hypertrophic and overactive bilaterally (Fig. 2) and the trapezius muscles also showed increased activity bilaterally. We did not find increased activity of the splenius capitis, levator scapula, or sternocleidomastoid muscles bilaterally. Seventy five units of abobotulinum toxin were injected into each of the lateral and medial aspects of each semispinalis capitis; 50 units of abobotulinum toxin were injected into each upper part of the trapezius. On examination 2 weeks postinjection, the patient had improved significantly in both head extension and forward sagittal shift, with minor neck pain (Fig. 1).

3. Discussion

Recently, the classification of cervical dystonia based on head (caput) and neck (collis) posture was used to identify the muscles for botulinum neurotoxin injection [7]. There are 11 cervical dystonia postures:

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http://dx.doi.org/10.1016/j.prdoa.2019.06.002

Fig. 1. Pre- and post-treatment.

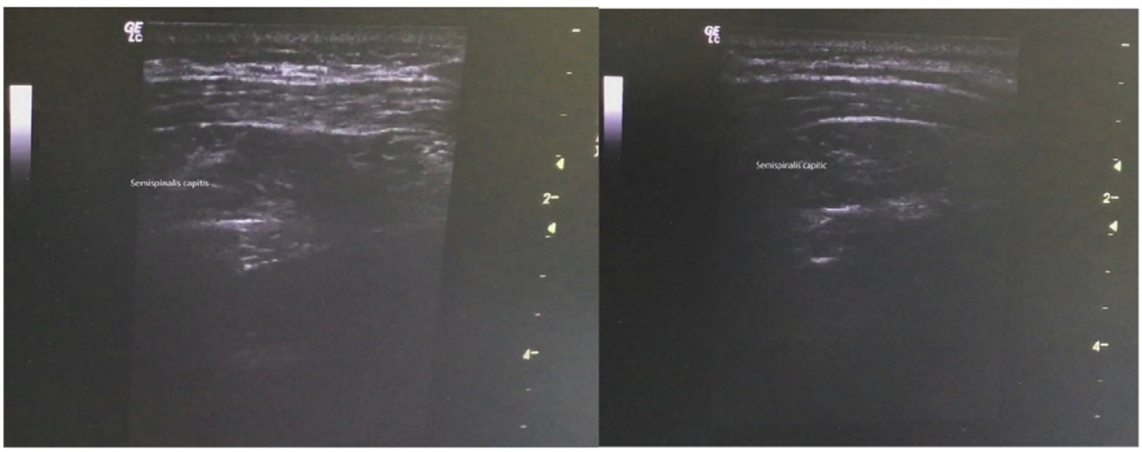

Fig. 2. Hypertrophic semispinalis capitis muscles.

torticollis, torticaput, laterocollis, laterocaput, retrocollis, retrocaput, anterocollis, anterocaput, lateral shift of the head (Balinese dance), posterior sagittal shift (double chin), and anterior sagittal shift (goose neck). In the goose-neck posture, the muscles causing retrocaput are the splenius capitis, upper part of the trapezius, obliquus capitis inferior, and the semispinalis capitis. The muscles causing anterocollis are the medial scalene, levator scapulae, and longus colli [8].

Flowers et al. [5] reported 7 cervical dystonia patients with goose-neck posture. They noted increased dystonic activity in the splenius capitis and sternocleidomastoid muscles and injected abobotulinum toxin into these muscles bilaterally. Average improvement effect was 73% (range 70–90%). The authors injected the splenius capitis alone in 6 cases; one case was injected into both muscles. Among the muscles that cause retrocaput, semispinalis capitis is a strong extensor of the head while the other muscles are strong rotators of the head [9]. In our patient, the bilateral semispinalis capitis muscles were hypertrophic, thick, and overactive while both splenius capitis and sternocleidomastoid muscles were normal. In this single case experience, we demonstrated that the semispinalis capitis muscle may play a primary role in causing a goose-neck posture and the observed forward sagittal shift may be a compensatory or overflow activity of neck flexor muscles. Therefore, botulinum toxin injection to the semispinalis capitis muscles can be considered in the management of patients with goose-neck posture.

Conflict of interest

Tai Ngoc Tran has received honoraria/lecture fees from Abbott, Boehringer-Ingelheim, Ipsen Pharmaceuticals, Medtronic, and Novartis. Thuong Huyen Thi Dang has nothing to declare Minh Le has nothing to declare Daniel Truong serves as an editor in chief for the Journal of Clinical Parkinsonism and Related Disorders, as an associate editor for the journal of Neurological Sciences and on the editorial board of Parkinsonism Related Disorders, Journal of Neural Transmission, Translational Neurodegeneration and eNS. Daniel Truong has research grants from Ipsen, Merz, Auspex, Daiichi Sankyo Pharma, AbbVie, Kyowa, Lundbeck Ltd., Neurocrine, Sunovion Pharmaceuticals Inc., Acadia, Accorda, Cynapsus, Neuroderm, Prexton Therapeutics, and Intec. He receives honoraria for services as a consultant or advisory committee member for Alexza Pharmaceuticals, Inc.; Adamas Pharmaceuticals; Merz and US World Meds. He has received speaking fees from Neurocrine, Teva and Accorda. He receives royalties from Cambridge University Press, Wiley Publishing and Demos Publishing Company and honoraria from Elsevier publishing company.

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