The role of polymyography in the treatment of cervical dystonia

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Dear Sirs,

We commend Dr. Jinnah and colleagues for evaluating the reasons for unsatisfactory response to botulinum toxin (BoNT) in 35 patients with cervical dystonia (CD) [1]. They found that unsatisfactory outcomes were largely driven by suboptimal BoNT doses, wrong muscle targeting, and/or complex movement patterns [1]. Only one patient was functionally resistant to BoNT [1]. Notably, the majority of patients (about 78 %) receiving repeated injections reached a satisfactory response after adjusting BoNT dosing and/or muscle targets, indicating the final outcomes crucially relied on the involved physicians' expertise [2]. Although their study was not designed to evaluate the role of polymyography, the authors do not support prior claims [3] that it might be useful to achieve optimal responses in these patients. Here, we wish to comment on the latter argument, providing novel data to suggest that use of polymyography is also important to obtain satisfactory responses to BoNT in these patients. As mentioned above, up to 78 % of patients receiving repeated injections had satisfactory responses following a mean number of 2 trials [1]. However, this could range from 1 to 8 trials [1]. Assuming a 3-month inter-trial interval, this implies that some patients had a satisfactory response only after 2 years. We can argue this would be on its own enough to warrant the use of the polymyography. Using such a technique would have likely reduced the time to achieve an optimal response, with obvious implications in terms of patients' quality of life. Moreover, while we agree that in most patients the clinical pattern is indicative of the muscle targets, this is not always the case. We have collected information on 29 non-responder CD patients, referred to us to perform a polymyography (Table 1A). The clinical phenotype and details of muscle targets and BoNT dosages prior to the referral were gathered. All patients underwent an 8-channel EMG recording as previously described [4], and 89.6 % (26/29) eventually achieved a satisfactory response. The remaining three had a predominant anterocollis likely with the involvement of (non-injectable) deep muscles of the neck, thus explaining the unresponsiveness (all three had a positive EDB test [5], ruling out functional resistance to BoNT). The main reasons for unresponsiveness are reported in Table 1B, selection of wrong muscles being the most common one. Worth noting, some of these patients were referred to us from clinicians with significant expertise in the field, thus highlighting the challenge of identifying the muscle targets on the basis of the clinical examination alone. This is supported by the fact that we failed to correlate the involvement of certain sets of muscles with specific phenotypes (data not shown), suggesting that different combinations of overactive muscles can give rise to similar phenotypes [4]. Additionally, we also found that in approximately 70 % of our patients, inappropriate injections were given into non-dystonic muscles (Fig. 1). It cannot be excluded that this was the case in a proportion of patients eventually having satisfactory responses in the work by Jinnah et al. This might further explain the discrepancy between their findings and ours, regarding low BoNT dosage as a reason for unresponsiveness. Sparing non-dystonic muscles might allow reducing the total BoNT dosage to use, further increasing the safety profile of the injections. Conversely, both studies are not suited to see whether a threshold between different BoNT dosages and the magnitude of the clinical response exists. Here, we wished to highlight the importance of the polymyography in the management of CD patients, apparently not responding to BoNT. We acknowledge that it is not widely available, but we hope it will be so in the near future. This would ultimately standardize treatment response across centres.

Table 1 (A) Demographic and clinical features in our cohort and (B) reasons for unresponsiveness

(A) Demographic and clinical features	
N (male/female)	29 (12/17)
Age, years (mean ± SD)	57.6 ± 9.9
Age at onset, years (mean ± SD)	41.0 ± 8.4
Disease duration, years (mean ± SD)	15.8 ± 9.9
Predominant phenotype	
Torticollis (*n*/%)	14/48.3
Laterocollis (*n*/%)	10/34.5
Anterocollis (*n*/%)	3/10.3
Complex (*n*/%)	3/10.3
Number of vectors involved	
1 (*n*/%)	2/6.9
>1 (*n*/%)	27/93.1
Additional features	
Shoulder displacement (*n*/%)	25/86.2
Head tremor (*n*/%)	9/31.1
(B) Main reasons for unresponsiveness	
Wrong muscle targets (%)	68.9
Low BoNT dosage (%)	20.7
Complex phenotype [e.g. anterocollis] (%)	10.3
Resistance to BoNT (%)	–

Figure 1. Percentage of patients in whom muscle targets were missed (left panel) or wrongly injected (right panel)