

# RELEVANCE AND IMPACT OF INCLUDING SHOULDER MUSCLES IN TREATMENT OF

## POST-STROKE UPPER LIMB SPASTICITY

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### INTRODUCTION

Upper limb spasticity (ULS) is common after stroke and shoulder muscles (SM) are often involved.<sup>1,2</sup> Non interventional large studies have shown that SM are not injected as frequently as the prevalence of their involvement would lead to expect.

### OBJECTIVES

As a reference spasticity clinic, we aim to describe our 16 year experience in treating post-stroke upper limb spasticity with botulinum toxin type A (BoNTA), including shoulder muscles (SM).

### MATERIALS AND METHODS

This is an observational cross-sectional study. Data were collected, prospectively, from specific clinical forms of outpatients treated in 2014 and all their treatment sessions between 2001 and 2016.

We describe: diagnosis; age at stroke; interval stroke to first BoNTA treatment; follow-up time; ULS Modified Ashworth Scale (MAS); muscle selection; toxin doses (3 BoNTA formulations); adverse events (AE) and patient satisfaction. Data collected/treated with Excel<sup>®</sup>.

### RESULTS

#### SAMPLE DEMOGRAPHICS

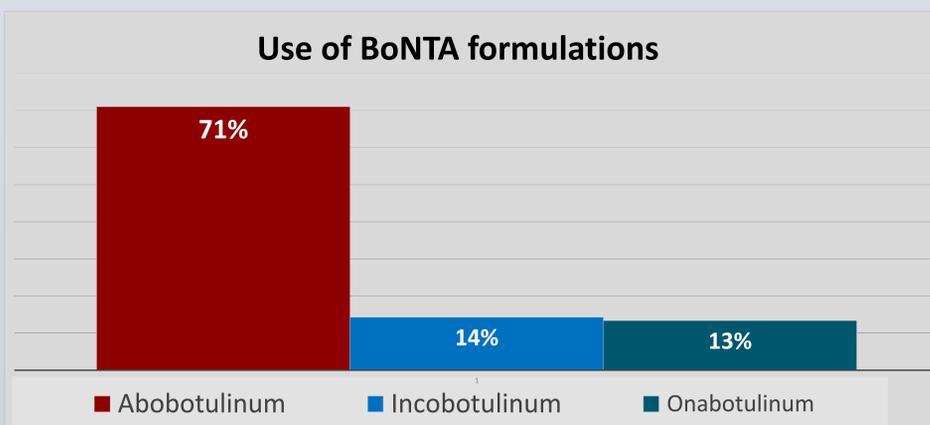
From 117 stroke patients submitted to 1057 BoNTA sessions, 86 (74%) were injected in at least 1 SM. Mean age was 53 years, and male gender was more affected (58%). Regarding etiology, ischemic was the most frequent (60%) compared to the haemorrhagic (40%). Stroke localization: most of the lesions were hemispheric, 50% on the left hemisphere and 42% on the right. Average interval from stroke to first BoNTA application was 0,96 years and follow-up was 4.76 years (0.27-13.45).

Patients injected in Shoulder Muscles	
	N=86
Mean age (years)	53.2 (SD13.3)
Gender	
Male	58%
Female	42%
Etiology	
Ischemic	60%
Haemorrhagic	40%
Stroke localization	
Right hemisphere	42%
Left hemisphere	50%
Infratentorial	4%
Not specified	4%
Average stroke to 1 <sup>st</sup> BoNTA interval	0,96 years
Median follow-up time	4.76 years (0,27-13,45)

Table 1: Demographic characteristics of patients injected in shoulder muscles

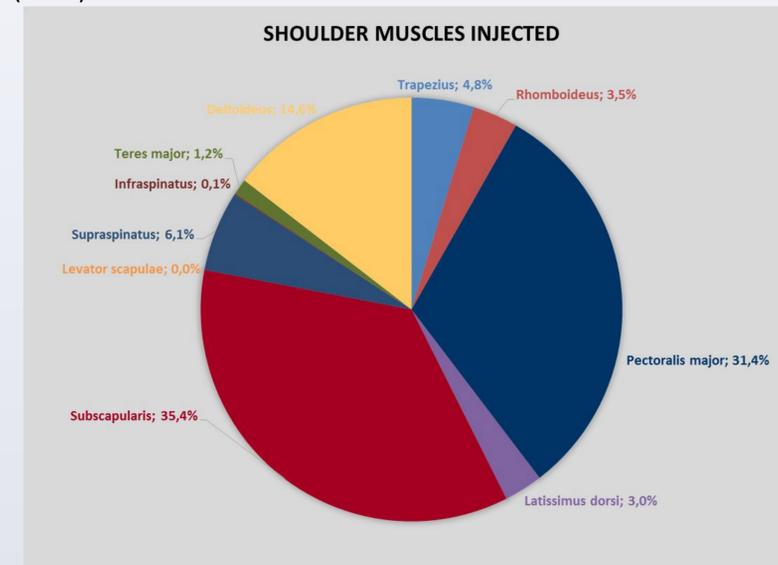
#### BoNTA TREATMENT SESSIONS

Of all BoNTA treatment sessions (1057), 90% included UL and 52% (547) included SM. Average composite shoulder MAS at baseline was 1,59 (SD 0.62). Abobotulinum was used in 71% of and mean total dose in shoulder muscles of 222 U (SD 115). Incobotulinum was used in 14%, and mean total dose of 81 U (SD, 49). Onobotulinum toxin was used in 13%, and mean total dose of 76 U (SD, 39).



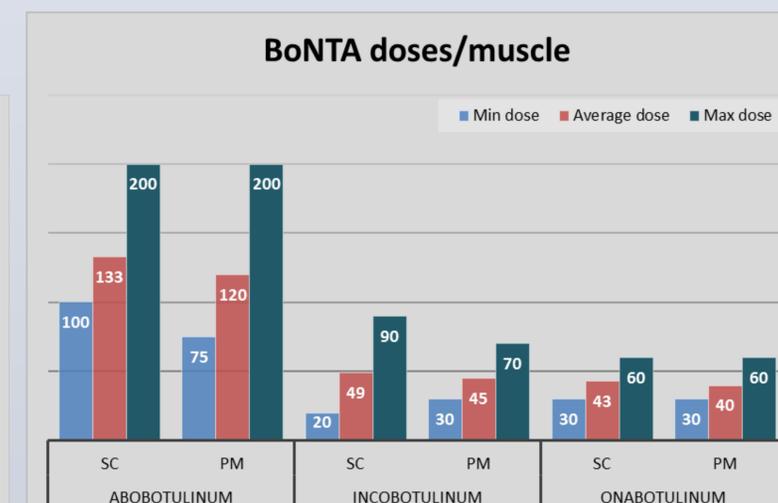
Graphic 1: Application frequency of BoNTA formulations

The most frequently treated SM were: subscapularis (35.4%) and pectoralis major (31.4%), followed by deltoideus (14.6%), supraspinatus (6.1%), trapezius (4.8%), rhomboideus (3.5%), latissimus dorsi (3.0%), teres major (1.2%) and infraspinatus (0.1%).



Graphic 2: Shoulder muscles injected

For the most injected muscles, average doses for each BoNTA formulation was: Abobotulinum toxin average dose for subscapularis was 133U (SD 37) and for pectoralis major was 120U (SD 30); Incobotulinum toxin average dose for subscapularis was 49U (SD 13) and for pectoralis major was 45U (SD 8); Onobotulinum toxin average dose for subscapularis was 43U (SD 8) and for pectoralis major was 40U (SD 10).



Graphic 3: BoNTA minimum, average and maximum dose for each formulation, for the most injected muscles; SC: Subscapularis; PM: Pectoralis major

### Patient/Clinician satisfaction

At follow-up, 280 BoNTA sessions were evaluated for satisfaction: patients were satisfied in 233 (83.2%) and clinicians in 236 (84.2%).

### Treatments adverse events:

During follow-up, there were 14 adverse events (2.5%), but only 2 were related to BoNTA treatments (mild and transient decrease in muscle strength).

### CONCLUSIONS

BoNTA injections including SM were very frequent and safe for ULS treatment in a relatively young group of patients, with moderate shoulder spasticity, who started treatment in the first year post stroke.

The most frequently injected SM were SC and PM, across all 3 BoNTA formulations. Doses were within label recommended ranges.

In a vast majority of sessions, patients and clinicians were satisfied with the treatment outcome.

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### References:

- 1: Turner-Stokes L, Fheodoroff K, Jacinto J, et al. BMJ Open 2013;3:e002771.
- 2: Fheodoroff K, Ashford S, Turner-Stokes L, et al. Toxins 2015, 7, 1192-1205.