

CAMPTOCORMIA TREATMENT WITH INCOBOTULINUMTOXINA (XEOMIN®) IN PATIENTS WITH PARKINSON'S DISEASE

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Etiology and pathogenesis of camptocormia

Camptocormia (CC) in patients with Parkinson's disease (PD) typically originates from axial segmental dystonia and/or focal paravertebral muscle myopathy; however, the exact mechanisms remain unknown. No apparent link has been observed between the severity of CC and levodopa administration regimen or daily dose.

Two hypotheses for the pathogenesis of CC have been formulated:

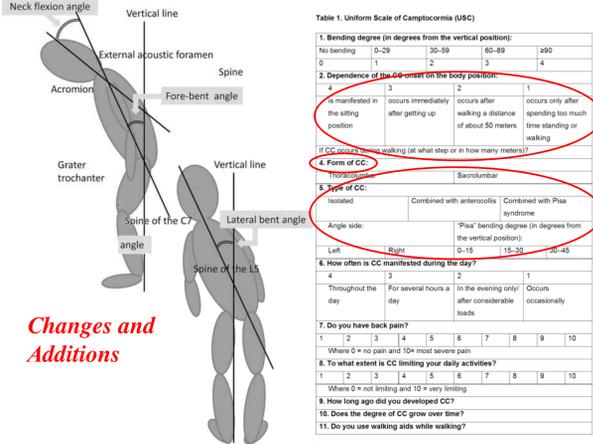
Myopathic hypothesis (Wrede et al.)¹ & Dystonic hypothesis (Jankovic)²

Aims

- To determine a full scale for patient assessment
- To review CC treatment in PD by using botulinum neurotoxin (BoNT) injection
- To test the main BoNT injection adopted regimens
- To determine the most efficient CC treatment regimen

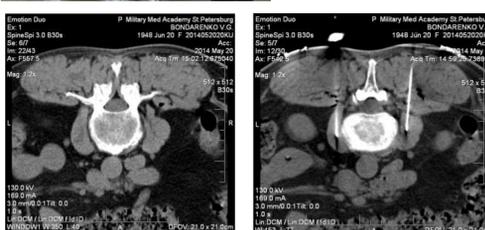
Methods

In our study, we examined 18 patients with CC. The bending body angle from the vertical position ranged from 40 to 60 degrees. To determine the full scale for assessment of patients with CC, we developed a 'Uniform Scale of Camptocormia' (USC), based on a modification of Nils G. Margraf's scale,³ which also included an assessment of "Pisa" syndrome (Table 1), form of CC etc.



- Patients underwent Electromyography (EMG) and Ultrasound US muscle assessment of the abdominal wall and electromyography of m. Psoas major (PM).
- Computed tomography (CT) and US were used to control the BoNT injection:
 - CT-based monitoring was used for BoNT injected into PM;
 - US guidance was used to monitor injection into abdominal muscles
- IncobotulinumtoxinA (Xeomin) was used. The dose injected into each muscle was maximal and was based on the recommendations set out in Wolfgang Jost's Atlas.

Method of injection PM with CT control



Method of injection PM with US control

For those occasions when we are unable to arrange the CT control we have developed a special method of accessing PM major under the US.



We used convex transducer and a method of so-called "separate introduction" when the needle is not inserted under the sensor but at a distance from it.

Study phase 1

Position and results

Our goal during the first phase of our study was to determine the most efficient BoNT (incobotulinumtoxinA) injection regimen for the treatment of CC. The effect is assessed according to the USC (the bending angle from the vertical body position).

For this purpose, 18 patients were divided into 3 representative groups of 6 people:

- In the first group, the target muscles were rectus abdominis (70 U on each side) and obliquus abdominis ext. (30 U on each side). The total amount was 200 U

-No effect was observed in the first group;

- In the second group, the target muscles were obliquus abdominis int. (60 U on each side), obliquus abdominis ext. (60 U on each side). The total amount was 240 U

- The second group had an insignificant and unsustainable effect (straightening of up to 20 degrees from the original body position);

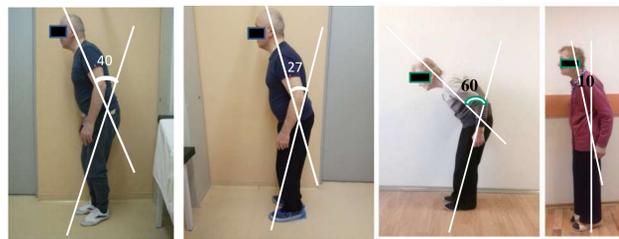
- In the third group, the target muscles were psoas major (100 U on each side) and obliquus abdominis int. (50 U on each side).

The total amount was 300 U

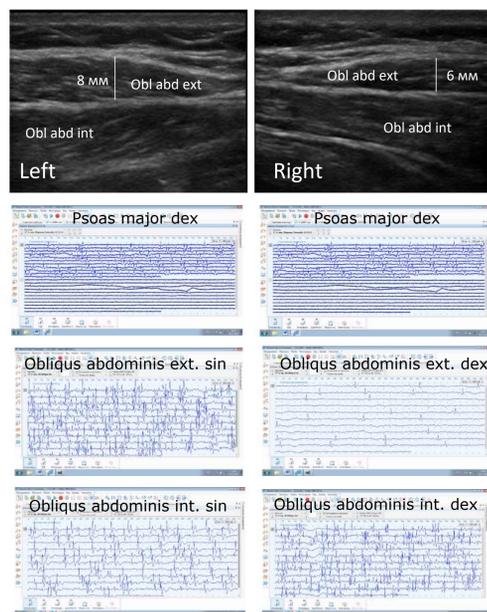
-The third group reached the maximum results. The duration of CC relief reached 5 months for 4 patients in this group.

2 patients (33.3%) 0–5 degrees;
2 patients (33.3%) 10–20 degrees;
2 patients (33.3%) 30 degrees.

✓ Therefore, the BoNT injection regimen used in the third group, which included m. psoas major and m. obliquus abdominis int., proved to be the most efficient.



US review & EMG of muscles in a patient with camptocormia and right Pisa syndrome



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In the course of assessing the study outcomes, a clinical picture of the symptoms in patients with a bending angle of 20–30 degrees was evaluated.

It was found that these patients could keep their vertical body position for a while, when they stood or sat still.

✓ These patients further reported that prior to BoNT injection they felt inner force bending them forward, but after BoNT injection they felt they did not have the strength to hold their body in a vertical position for long time, and that it bent under its own weight.

✓ **We assumed that this was because of a lack of power in the extensor muscles of the back, due to the development of secondary myopathy as a reaction to the long-term overstretching of the muscles.**



To evaluate the effectiveness of this treatment, we initiated the second phase of the study

Study phase 2. Position

Second phase of the study began when the treatment effect of the previous BoNT injection ended and symptoms of CC returned.

18 patients were assessed with the USC scale. The bending body angle from the vertical position ranged from 40 to 60 degrees.

All patients received injections of incobotulinumtoxinA into:

- PM (125 U on each side) and
- m. Obliquus abdominis int. (50 U on each side).

The total amount was 350 U.

Post-injection patients were divided into 2 representative groups consisting of 9 patients each.

The first group had physiotherapy sessions, massage and electrical stimulation but the second group did not.

Study phase 2. Results

In 2 months we assessed the effect in both groups according to the USC (the bending angle from a vertical body position).

The effect in the first group lasted for 5–6 months and:

- 5 patients (56%) reached a vertical body position;
- 3 patients (33%) reached 10 degrees;
- 1 patient (11%) reached 20 degrees.

The effect in the second group lasted 4–5 months and was as follows:

- 3 patients (33%) reached 5 degrees;
- 5 patients (56%) reached 10–20 degrees;
- 1 patient (11%) reported no effect.

✓ Therefore, the use of physiotherapy, massage and electrical stimulation of the back muscles was effective.



Conclusions

- The dose of 350 U of incobotulinumtoxinA injected into m. psoas major and m. obliquus abdominis internus was an effective therapy for treating CC in PD.
- Physiotherapy, massage, and electrical stimulation increased the effectiveness and duration of BoNT therapy.
- We got confirmation of dystonic EMG activity of the muscles in CC. This activity is most striking, in m. psoas major and m. obliquus abdominis internus and less pronounced in the obliquus abdominis externus. In addition, we have obtained asymmetric activity in the obliquus abdominis externus patients with Pisa syndrome.

Further research is required

References

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