Annales de chirurgie plastique esthétique (2016) 61, 10—15

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com

ORIGINAL ARTICLE

Long-term sequelae treatment of peripheral facial paralysis with botulinum toxin type A: Repartition and kinetics of doses used

Traitement au long cours par toxine botulique de type A dans les séquelles de paralysies faciales périphériques : répartitions et cinétiques des posologies

M. Risoud, N. Aljudaibi, V. Duquennoy-Martinot, P. Guerreschi *

Service de chirurgie plastique et reconstructrice, hôpital Roger-Salengro, CHRU Lille, 2, rue E.-Laine, 59037 Lille cedex, France

Received 16 March 2015; accepted 5 April 2015

KEYWORDS
Facial palsy;
Botulinum toxin;
Dosage;
Kinetics

Summary
Study objectives. — Botulinum toxin is a key therapeutic tool in the comprehensive treatment of peripheral facial paralysis. It fights spasms, synkinesis and overactivity of the different skin muscles responsible of facial expressions. Even though injection techniques as well as target muscles have been well identified, doses used remain quite imprecise and often not detailed muscle by muscle, further more dosage progression has not been monitored over time. Our retrospective study is the first one to refine the repartition of botulinum toxin doses on each of the relevant skin muscles and assess dosage kinetics.
Patients and methods. — Thirty patients were included since 2008 with a mean follow-up of 2.3 years. Each patient had at least 3 injections, with a delay of 4 to 6 months between each injection.
Results. — Mean doses are indicated for each muscle injected on the paralyzed and healthy sides. Dose kinetics suggests an initial dosage increase after the first injection followed by a decrease over time. No treatment resistance was observed.
Conclusion. — Our study represents a didactic help in using botulinum toxin for sequelae of peripheral facial paralysis by providing more details on the effective mean doses for each muscle and their progression over time.

* Corresponding author.
E-mail address: pierguerreschi@gmail.com (P. Guerreschi).

http://dx.doi.org/10.1016/j.anplas.2015.04.002
0294-1260/

MOTS CLÉS
Paralysie faciale ;
Toxine botulique ;
Posologies ;
Cinétique

Résumé
But de l'étude. — La toxine botulique est une arme thérapeutique clé dans le traitement global des séquelles de paralysie faciale périphérique. Elle lutte contre les spasmes, les syncinésies et l'hyperactivité des différents muscles peauciers responsables de la mimique. Alors que les techniques d'injection ainsi que les muscles cibles sont bien identifiés, les posologies employées restent imprécises, souvent non détaillées muscle par muscle, sans étudier leur évolution dans le temps. Notre étude rétrospective est la première à préciser la répartition des doses de toxine botulique sur chacun des muscles peauciers concernés et la cinétique des posologies.
Patients et méthode. — Trente patients ont été inclus depuis 2008 avec une durée de suivi moyenne de 2,3 ans. Chaque patient a eu au moins 3 séances d'injection espacées de 4 à 6 mois. Les doses moyennes sont précisées pour chaque muscle injecté du côté paralysé et du côté sain.
Résultats. — Sur l'ensemble des séances ($n = 108$) : la dose totale moyenne était 20,2 UI $\pm$ 11,7 répartie comme suit entre les 2 côtés : 9,8 UI $\pm$ 7,2 pour le côté sain, 10,4 UI $\pm$ 9,9 pour le côté paralysé. Les muscles peauciers ciblés sont les muscles hyperactifs du côté sain et les muscles spastiques du côté paralysés ainsi que les co-contractions plus fréquentes du côté paralysé. La cinétique des posologies suggère une augmentation initiale des doses après la première séance suivie d'une diminution au fil du temps. Aucune résistance au traitement n'a été relevée.
Conclusion. — Notre étude constitue une aide didactique à l'utilisation de la toxine botulique pour les séquelles de paralysie faciale périphérique en apportant des précisions sur les doses moyennes utiles pour chaque muscle et leur évolution dans le temps.

Introduction

Botulinum toxin has been increasingly used for therapeutic means since the first injections performed by Scott et al. in the seventies to treat strabismus [1]. Its use in sequelae of peripheral facial paralysis dates back from 1989 [2]. Its objective is to relieve compensating muscle overactivity on the healthy side (hypertonia) while reducing spasms and synkinesis on the paralyzed side in order to obtain facial symmetry at rest and during facial expressions. The relevance of botulinum toxin in clinical improvement has been demonstrated in several studies [3—10], providing a better quality of life for these patients [8,11]. Techniques and injection sites were already described many times over [4,7,8,10]. Regarding dosage alone, only the total doses injected have been detailed [3,7]. However, these doses remain empirical. Data from the literature never present injections frameworks and mean doses needed to restore facial symmetry for each muscle group. Furthermore, there are no studies regarding the progression of these doses overtime in the context of repeated injections.

Our study is the first to evaluate the repartition of botulinum toxin type A doses on the various facial muscles in the treatment of sequelae of peripheral facial paralysis.

An analysis of botulinum toxin type A dose kinetics over several sessions was also conducted.

Material and methods

We conducted a retrospective, observational, monocenter study within the Reconstructive and Cosmetic Plastic Surgery department of the Teaching University Hospital of Lille.

Study population

Patients included presented with debilitating sequelae of unilateral peripheral facial paralysis with synkinesis on the paralyzed side and/or hypertonia on the healthy side. Only patients treated at least 3 times by botulinum toxin type A were included.

Toxin used and injection technique

We used botulinum toxin type A (Botox®, Allergan laboratories Incorporated, Irvine, California, USA) with two different doses. The low dose was 1.25 IU/0.1 mL (50 IU of Botox suspended in 4 mL of NaCl 9‰); the high dose was 2.5 IU/0.1 mL (50 IU of Botox suspended in 2 mL of NaCl 9‰). The intramuscular injection of toxin was performed with a 1-mL Tuberculin syringe and a 26-gauge needle measuring 10 mm. The injection sites for each muscle were those commonly used. The injected muscles were the overactive muscles on the healthy side and the spastic or synkinetic muscles on the paralyzed side.

Data collection

Data were collected in a retrospective manner by one single examiner from the medical charts of eligible patients. One chart concerning facial diplegia was excluded. Collected epidemiological data were: sex, paralyzed side, etiology of the paralysis, delay before the first consultation for Botox injection, presence or not of anxiety-depressive disorders, eventual history of previous surgical management: decompression of the facial nerve or dynamic reanimation technique of the paralyzed face (lengthening temporalis myoplasty, hypoglossal-facial anastomosis, lengthening of the levator muscle of the upper eyelid according to Paul Tessier, transfer of the digastric muscle). Doses injected were noted (total dose and dose per muscle), on the healthy and paralyzed sides. The doses were noted for the first 3 sessions (for all patients) and the last session (for patients