

## Musclerelaxant Local Injection as an Useful Test Before Botulinum Toxin a Treatment for Facial Rejuvenation

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### Abstract

Botulinum toxin type A is currently used in the nonsurgical esthetic treatment of the upper face to ameliorate glabellar and periorbital wrinkles. However, both patient and physician have to wait for some days before the clinical effects of botulinum toxin become apparent. Moreover, a number of patients scheduled for such treatment may become anxious about the final result. We have carried out an innovative, effective, safe and rapid test (curare test) with a short duration of action by carefully injection of very low doses vecuronium, a common muscle relaxant for general anaesthesia, for determining patient response prior to treatment with botulinum toxin. This blockade by vecuronium produces a reversible and short-acting glabellar and periorbital muscle relaxation without risk of systemic muscular complication. Between 10 and 15 minutes after the initial treatment, both physician and patient evaluated the clinical results. On the basis of curare test, the physician decided if additional treatment was necessary. About 30 minutes after the curare test, botulinum toxin, A treatment was initiated with a total dose ranging from 50 to 80 units. Three consecutive female patients were undergone the new test. Compliance and satisfaction with the test and the botulinum toxin treatment were evaluated. No side effects were recorded. Follow-up after 30 days confirmed the high level of satisfaction of every patient for the curare-botulinum toxin sequential combination.

### Introduction

The use of botulinum toxin type A has revolutionized the non-surgical esthetic treatment of the upper face. In fact, botulinum-induced chemo denervation has become an integral part of the plastic surgery armamentarium [1,2] for the treatment of aesthetic problems such as glabellar and periorbital wrinkles. However, both patient and physician have to wait for some days before the clinical effects of botulinum toxin become apparent. Moreover, a number of patients scheduled for such treatment may become anxious about the final result. Therefore, an effective, safe and rapid test with a short duration of action could be useful for determining patient response prior to treatment with botulinum toxin. Botulinum neurotoxins act by inhibiting the release of acetylcholine from vesicles on presynaptic nerve endings. This blockade produces a reversible but long-acting denervation which impairs muscle function; on the contrary, non-depolarizing muscle relaxants induce a specific competitive pre-synaptic and post-synaptic neuromuscular blockade which is rapidly reversible.

### Case Report

These clinical experiences on the local administration of a muscle relaxant at very low doses in selected patients in one or more muscles involved in the surgical technique, without a systemic paralysis, were an useful basis to utilize a similar philosophy to develop a pre-botulinum test for inducing rapid and short-acting glabellar and periorbital muscle relaxation

without risk of systemic muscular complication.

So, we have carried out a preliminary investigation in this field, after obtaining bioethical approval from the local committee and informed consent from patients scheduled for treatment with botulinum. Vecuronium was chosen as muscle relaxant, in virtue of its not painful injection in the soft tissues, for the curare test before treatment with botulinum. On the basis of theoretical calculations, a solution of 0.05 mg/ml of vecuronium in saline was prepared and a maximum of 5 ml was established for administration to patients. Injections of vecuronium solution were performed according to the classic modalities used for botulinum toxin. Demographic data of the first 3 consecutive female patients to undergo the new test are summarized in Table 1. Resuscitation devices and drugs were promptly available if necessary; in addition, sugammadex was available as antidotic drug for immediately blocking muscle relaxant systemic action. Photographic documentation of the patients face in both a resting position and in exaggerated expression was taken before and after the curare test and botulinum treatment. Technical details of the vecuronium injections are shown in Table 2. Between 10 and 15 minutes after the initial treatment, both physician and patient evaluated the clinical results. On the basis of curare test, the physician decided if additional treatment was necessary. About 30 minutes after the curare test, botulinum toxin, A treatment was initiated with a total dose ranging from 50 to 80 units. Compliance and satisfaction with the test and the botulinum toxin treatment were evaluated. No

*Table 1: Demographics of the first three patients to undergo the curare test prior to treatment with botulinum toxin A for facial rejuvenation.*

Initials of the name	Age (yrs)	Weight (Kg)	Height (cm)	Cigarettes/day
RM	42	57	160	40
LM	43	57	169	10
ZL	42	60	170	2

*Table 2: Characteristics and response after vecuronium injection (curare test) prior to treatment with botulinum toxin A.*

Initials of the name	injections of vecuronium (nr)	Injections of botulinum (nr)	Total dose of vecuronium (mg)	Action of vecuronium (min)
RM	12	14	0.075	23
LM	23	25	0.12	20
ZL	18	18	0.09	20

side effects were recorded. Follow-up after 30 days confirmed the high level of satisfaction of every patient for the curare-botulinum toxin sequential combination.

**Discussion**

In surgical anesthesia muscle relaxants are administered intravenously to induce and maintain muscular paralysis during the pharmacological sleep. However, Videira [3] reported an unusual case in which pancuronium, an amino steroid muscle relaxant, was directly injected into masseter muscles for a difficult reduction of mandibular dislocation. The locally injected dose was very low in comparison with the current dosage used in general anesthesia. Very low dose of curare prevent systemic muscular weakness that can result in respiratory arrest.

More recently, one of us [4] showed that in the hip surgery carried out with a mininvasive anterolateral surgical incision with detachment free technique, the injection of 10 mg rocuronium

(a similar aminosteroid muscle relaxant) in different sites of gluteus medius may offer in 15-20 seconds a complete paralysis of the muscle without inducing general function impairment of remaining musculature; of course, the Hohmann bone lever may be easily inserted and managed without stretching or forcing the gluteus medius. No modification in time of Train-Of-Four (TOF) monitoring was observed and an apparent complete local muscle relaxation lasted more than 40 minutes, a time sufficient to complete the surgery. A similar result was obtained in surgery of shoulder for treatment of irreparable rotator cuff tears [4]: just before transfer of the proximal part of latissimus dorsi myofascial muscle, the surgeon locally injected 10 mg rocuronium as total dose, obtaining a prompt effective relaxation suitable to permit an easy transfer of the muscular flag without any traction of its fibers.

In conclusion, the preliminary experience obtained with very low doses of vecuronium injected locally prior to treatment with botulinum toxin A has been very satisfactory both for the patient and the physician. As a result, we believe that a wider application of the test might be useful to better predict the effects of botulinic chemo denervation as nonsurgical treatment for wrinkles of the upper face.

**References**

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