Case Report

The use of Botulinum Toxin in digital reconstruction of patients affected by Raynaud’s phenomenon: a case report

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ABSTRACT

Background: Surgical reconstruction in patients affected by Raynaud’s phenomenon is a challenging procedure due to the vascular impairment, which prevents flap survival and secondary healing. Botulinum Neurotoxin-A showed vasodilatory and angiogenic properties in animal studies, increasing blood flow in flap surgery.

Case presentation: We report an off-label application of Botulinum Neurotoxin-A used for digital reconstruction in a patient affected by Raynaud’s phenomenon, in order to enhance flap survival and avoid digital amputation. Complete flap survival and symptomatic relief were achieved.

Conclusions: This new approach may be extremely valuable when performing flap reconstruction in patients affected by RP, allowing for increased vascular safety as well as symptomatic improvement.

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Background

Raynaud’s phenomenon (RP) is a transient digital ischemia that occurs following exposure to cold temperature or emotional distress. The exaggerated vasospastic response induces a triphasic course of paleness, cyanosis and erythema, often associated with pain and paresthesia [1]. Nonhealing ulceration is the most feared complication, further hampering hand function. The compromised local vascularization may not allow for secondary healing, thus often leading to bone exposure. In such cases, flap reconstruction is mandatory to avoid amputation. However, the local vasospasm may severely jeopardize flap survival and, thus, RP is often considered a contraindication to finger amputation, with the vascular impairment, which prevents flap survival and secondary healing. Botulinum Neurotoxin-A was primarily conceived to inhibit muscle contraction. Once internalized in the nerve terminal, the toxin cleaves the synaptosomal associated protein-25 (SNAP-25), thus blocking acetylcholine and other vesicles migration and release. Recently, several papers reported the off-label use of BoNT-A in RP, achieving both symptomatic and functional improvements [2]. Moreover, experimental studies described a beneficial effect on flap vascularization and survival, although all limited to animal models [3, 4]. As a consequence, pre-operative BoNT-A injection may be a valuable tool to achieve safer reconstruction when performing digital flaps in patients affected by RP, with the added bonus of symptomatic improvement. The aim of this paper is to describe a previously unreported technique to improve digital flap survival in RP patients by mean of BoNT-A injection.

Case Presentation

A 39-year old patient, affected by scleroderma, was referred to our Department for a non-healing ulceration with bone exposure and partial necrosis at the distal phalanx of the index finger of the left hand (Figure 1a). The patient had previously undergone intravenous administration of iloprost (0.05 mg) and local treatment with polyurethane foam, with no improvement. Amputation of the distal phalanx and coverage with an advancement homo-digital volar skin flap were planned. One week before surgery, BoNT-A injections were performed. Specifically, 100 IU of BoNT-A (Botox®, Allergan, Inc., Irvine, CA) were reconstituted in 2 mL of preservative-free saline solution. Injections were performed in both hands, targeting each neurovascular bundle in the palm at the level of the A1 pulley [5]. Ten IU were injected for each neurovascular bundle. Moreover, 10 IU were injected sub dermally just proximally to the pedicle of the planned flap and gently massaged. (Figure 2). Two days after treatment, the patient reported pain reduction. One week later,
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Botulinum Toxin in Raynaud’s phenomenon

The authors declare that they have no conflict of interest

Informed consent:

Informed consent was obtained from all individual participants included in the study.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in

Conclusions

The described technique can be also used when other finger flaps are indicated, such as Moberg’s, Atasoy’s or Kutler’s [12-14]. Such an approach may be extremely valuable when performing flap reconstruction in patients affected by RP, allowing for increased vascular safety as well as symptomatic improvement.

Declarations

Conflict of Interest:
2008 (5). Informed consent was obtained from all patients for being included in the study.

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**REFERENCES**