Therapeutic use of botulinum toxin

Therapeutic use of botulinic toxin

El uso terapéutico de la toxina botulínica

RESUMO

Objetivo: Analisar a eficácia da Toxina Botulínica tipo A para procedimentos na saúde bem como sua serventia, auxiliando assim na qualidade de vida, uma vez que o envelhecimento traz modificações estéticas como rugas, alteração da elasticidade e tônus da pele. O tratamento usando esse tipo de toxina está ganhando força nos últimos anos, devido à grande aplicabilidade em tratamentos na área da saúde. Método: Foi aplicada uma revisão de literatura com pesquisas realizadas nas bases de dados PubMed, Lilacs, SciELO, Medline e Bireme. Resultados: Entende-se que a toxina botulínica tipo A é usada para inúmeros procedimentos estéticos apresentando resultados satisfatórios, podendo ainda ser empregada em uma gama de procedimentos de saúde. Conclusão: A toxina deve ser utilizada com precaução, visto que, existem alguns efeitos adversos, mas a toxina botulínica tipo A é eficaz e eficiente não só no rejuvenescimento facial, mas também em outros aspectos.

DESCRITORES: Estética; Toxinas Botulínicas Tipo A; Saúde; Qualidade de Vida; Terapêutica.

ABSTRACT

Objective: To analyze the effectiveness of Botulinum Toxin type A for health procedures as well as its usefulness, thus helping in the quality of life, since aging brings aesthetic changes such as wrinkles, changes in skin elasticity and tone. Treatment using this type of toxin has been gaining strength in recent years, due to its wide applicability in health care treatments. Method: A literature review was applied with searches made in the PubMed, Lilacs, SciELO, Medline and Bireme databases. Results: It is understood that botulinum toxin type A is used for a number of aesthetic procedures with satisfactory results, and it can also be used in a range of health procedures. Conclusion: The toxin should be used with caution, since there are some adverse effects, but botulinum toxin type A is effective and efficient not only in facial rejuvenation, but also in other aspects

DESCRIPTORS: Esthetics; Botulinum Toxins, Type A; Health; Quality of Life; Therapeutics.

RESUMEN

Objetivo: Analizar la efectividad de la Toxina Botulínica tipo A para procedimientos de salud así como su utilidad, contribuyendo en la calidad de vida, ya que el envejecimiento trae consigo cambios estéticos como arrugas, cambios en la elasticidad y tono de la piel. El tratamiento con este tipo de toxina ha ido ganando fuerza en los últimos años, debido a su amplia aplicabilidad en los tratamientos sanitarios. Método: Se aplicó una revisión de la literatura con búsquedas realizadas en las bases PubMed, Lilacs, SciELO, Medline y Bireme. Resultados: Se entiende que la toxina botulínica tipo A se usa para una serie de procedimientos estéticos con resultados satisfactorios, y también puede usarse en una variedad de procedimientos de salud. Conclusión: La toxina debe usarse con precaución, ya que existen algunos efectos adversos, pero la toxina botulínica tipo A es efectiva no solo en el rejuvenecimiento facial, sino también en otros aspectos.

DESCRIPTORES: Estética; Toxinas Botulínicas tipo A; Salud; Calidad de Vida; Terapia.

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Stephanie Sophia Rodrigues Dos Santos
Undergraduate student in Biomedicine, Centro Universitário Estácio de Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0003-2490-1965

José Caçulo Vieira Neto Santana
Graduating in Biomedicine, Centro Universitário Estácio de Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0001-5280-5247

Jeaninne Karolynne Passos Dos Santos
Undergraduate student in Biomedicine, Centro Universitário Estácio de Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0001-5333-562X

Juliana Oliveira Tavares
Graduating in Biomedicine, Centro Universitário Estácio de Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0003-1055-8625

Mayra Morgana Martins De Moura
Graduated in Biomedicine (UNILUS), Specialist in Aesthetic Biomedicine (FACIS), Member of the Brazilian Association of Facial Harmonization, São Paulo, São Paulo, Brazil
ORCID: 0000-0002-4773-1834

Milena Dos Anjos Castro Lessa
Nursing Student, Estácio University Center of Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0003-3428-1624

Lorena Xavier Conceição Santos
Advisor/Professor at Centro Universitário Estácio de Sergipe, Graduated in Biological Sciences and Master in Health and Environment from Tiradentes University, PhD in Development and Environment from the Federal University of Sergipe, Aracaju, Sergipe, Brazil
ORCID: 0000-0001-5995-2442

Raphaella Ingrid Santana Oliveira
Advisor/Professor at Centro Universitário Estácio de Sergipe, Graduated in Biomedicine and Master in Industrial Biotechnology from Universidade Tiradentes, Aracaju, Sergipe, Brazil
ORCID: 0000-0002-7027-9049

INTRODUCTION

Aging provides the human being with several functional transformations in the body such as changes in the nervous system, decrease in the intensity of reflexes until an aesthetic remodeling. 1 Among the aesthetic changes, changes in the skin, wrinkles, loss of elasticity and skin tone can be pointed out, being more noticeable on the face and upper limbs. Because of these changes, aesthetic resources include procedures that improve the skin as well as prevent problems caused by aging. 1,2

Among the procedures that exist, botulinum toxin type A (BTA) stands out for serving both sexes and dissimilar age groups. 1,2 This toxin binds to the plaque of presynaptic cholinergic neuromuscular endings by inhibiting the release of acetylcholine at these endings. 2,3 At the molecular level, this toxin enables extracellular interaction with lipoproteins present in cholinergic nerve endings and in the intracellular blockade of acetylcholine release. 2,3

Botulinum toxin is also used to treat some dystonias, which according to Ordinance n° 376, of November 10, 2009, of the Ministry of Health 4, are neurological dysfunctions caused by the involuntary and sustained contraction of an isolated muscle or a muscle group, which may be primary (idiopathic) or secondary to other diseases. Dystonias can cause abnormal movements and postures, which can be disabling and often painful. However, not every involuntary muscle contraction is considered dystonia. Also according to this ordinance, the treatment of dystonias is basically symptomatic and is based on relieving muscle contractions, reversing movements, abnormal postures and associated pain, in addition to preventing contractures and deformities. 4 BTA is an approved option for this treatment and is considered the treatment of choice for most focal and segmental dystonias. In addition, the use of BTA occurs because it is considered a neurotoxin produced by the bacterium Clostridium botulinum, which performs rapid growth in culture and provides stable crystallization, which allows for effective purification and longer duration of its therapeutic effects. 5

Among the aesthetic changes, changes in the skin, wrinkles, loss of elasticity and skin tone can be pointed out, being more noticeable on the face and upper limbs

Botulinum Toxin (BT) has become one of the most popular non-surgical procedures in the United States and also in Brazil, in which it has been released since 1992 by the Ministry of Health. 6 It was the beginning of a variety of minimally invasive techniques for aging, that is, the era of injectables, which use intradermal or subcutaneous injections to enable facial rejuvenation. 2,6

However, it was noted that botulinum

Chart 1 – Structure of the selection of articles on botulinum toxin in the SciELO, Medline, PubMed, Lilacs and Bireme databases, from August to November 2020.

Identification	→	Total publications = 1.942.	→	SciELO, Medline, PubMed. Lilacs and Bireme.
Eligibility	→	Studies selected for evaluation by eligibility = 137.	→	Excluded for not responding to the proposed theme = 1.805.
Selection	→	Studies selected through reading, title and abstract = 22.	→	Excluded for not having a title and abstract that respond to the proposed theme = 115.
Inclusion	→	Sample = 14.		

Source: The Authors, 2020.

toxin is used in several areas, bringing efficient and satisfactory results since BT appears as a less invasive method and is increasingly used in the process, both of facial rejuvenation and in other health fields, on a world level. 7,8 We know that with the aging of the world, care in the skin aging process that cannot be reversed is anticipated. In this way, the health market in aesthetics offers effective measures to rejuvenate through procedures that use BTA as a corrector, providing an improvement in the general appearance, thus delaying premature skin aging, as well as assisting in health treatments, minimizing the need for invasive procedures. However, the efficacy and safety of using this procedure are questioned. Thus, the study aimed to report the importance of the therapeutic use of botulinum toxin in the treatment of various pathologies.

METHODS

The present work was developed under the exploratory method, adopting bibliographic research as its main ally, based on analyzes of books, scientific articles and websites that contributed to the enhancement of the respective article. It corresponds to an integrative review based on evidence, which is characterized by being a type of research that ensures the synthesis of knowledge through the literature on a given topic and the incorporation of the study results in practice.

For the construction of the study, the following steps were followed: definition of the theme for the elaboration of the integrative review; specification of study selection methods (inclusion and exclusion criteria); analysis, evaluation and categorization of studies that were included in the production; data extraction and presentation of the review/synthesis of the knowledge produced.

The theme of this article was chosen due to its high functionality and permissiveness in several treatments in the health area and with the purpose of adding information to the public, since it is a poorly understood topic. After defining the topic, data collection for this review was undertaken through investigation of scientific articles found in biological science databases in general, such as Medline, PubMed, SciELO (Scientific Electronic Library Online), Lilacs and Bireme, in the period from August to November 2020. The descriptors chosen for these articles to be selected were: botulinum toxin type A, wrinkles and expression lines.

After reading the articles found, the original articles available online in full for free, published in Portuguese from 2008 to 2020, indexed in the aforementioned databases, were defined as inclusion criteria for the selection of studies. Theses, dissertations and fact sheets, abstract unavailable online and works that, according to the title and/or abstract, did not meet the objectives of the study were used as exclusion criteria.

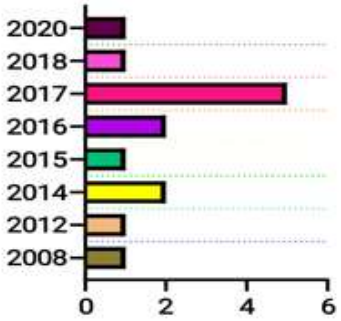
The analysis and synthesis of the data extracted from the selected articles were performed in a descriptive way, allowing to observe, count, describe and classify the data, in order to gather the knowledge produced on the topic explored in the review. In addition to the selective, analytical and interpretative reading of the most relevant data for the elaboration of the text, it was possible to evaluate the results presented through graphs prepared by the GraphPad PRISM® version 5.00 program.

RESULTS

The search made it possible to find 1,942 articles using the selected descriptors mentioned in the methodology and, after using the eligibility criteria, the search was reduced to 137 publications suitable for use. After reading the titles and abstracts of these pre-selected studies, 79 articles were excluded based on the title and 36 based on the abstract. Thus, 22 articles were considered potentially relevant, where they were fully analyzed. Of these, after reading them in full, 14 were considered eligible to fulfill the objective of the study (Chart 1).

Therefore, Graph 1 demonstrates how many articles were found between the years 2008 and 2020.

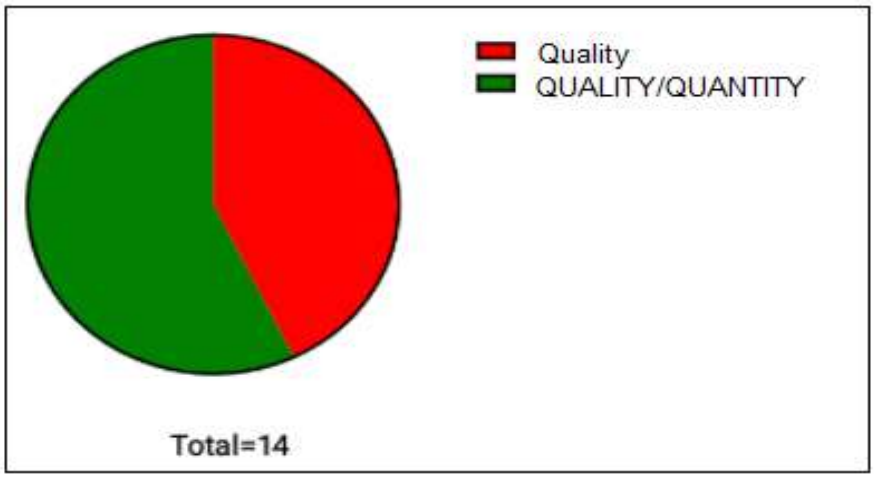
Graph 1 – Distribution of years of publication of articles in the study period.



Source: The Authors, 2020.

Graph 2 demonstrates the methods used, that is, whether it was a qualitative or qualitative/quantitative research in the articles that were selected between the years 2008 to 2020.

Graph 2 – Distribution of study methods of the articles studied.



Source: The Authors, 2020.

DISCUSSION

In view of the bibliographic research, it is noted that Brazil is the fourth largest beauty and personal care market in the world, according to Forbes Magazine, and the third country with the largest aesthetic market in the world, behind only the United States and China. 9

When this information is related to the topic of study, of the 1,942 articles found, only 14 were used with relevance to the topic addressed, and that in a course of 12 years, which translates into, on average, one article per year, according to the Graphs 1 and 2. This result suggests a lack of studies on the subject, and the answers reached by Brazil could be better if there was a correlation with its scientific growth. 10

After analyzing the researched data, it was found that several methods were used to prove the effectiveness of botulinum toxin type A. Thus, the article by Chaves and Paula can be noted 7, in which the authors argue that the main demand for the use of BTA is to reduce or prevent the appearance of wrinkles, which are caused by intense contractions of the facial muscles.

The authors Santos, Mattos and Fulco 11 corroborate, stating that BTA has been much sought after by both men and women, demonstrating great effectiveness in its application.

Neto 6 says that despite the adverse effects – which are few – botulinum toxin type A is also used for the treatment of blepharospasm (involuntary contraction of the eye muscles), strabismus, cervical dystonias (neuromuscular disorder involving the head and neck) and, recently, for the intervention of glabellar lines and severe primary axillary hyperhidrosis.

Also according to Neto 6, Other uses of BTA that are widely known, but not approved by the FDA, include spastic disorders associated with central nervous system injury or disease, such as: trauma, stroke, multiple sclerosis, and focal dystonias affecting the limbs, face, jaw and vocal cords. Treatment and prevention of chronic headaches and musculoskeletal pain are emerging with the use of this toxin. 6

To Brito and Barbosa 2, the BTA stands out in the aesthetic area due to its effectiveness with preventive and corrective actions, without the need for surgical procedures. Cordeiro 7 confirms that of the 20 women after 65 years who underwent treatment, more than 50% of them left with a very satisfactory result and none of them had an adverse effect.

However, it was also observed that some patients in the articles by Vidale 12, Dias 13 and Silva 14 presented reactions, because the injection of any substance in the skin causes localized reactions resulting from the trauma, the most common being pain and ecchymosis, and erythema, which is the redness of the skin, due to the vasodilation of the cutaneous capillaries and the edema, which is the fluid accumulation in the tissue.

When talking about dystonia, especially blepharospasm, the positive response rate with botulinum toxin is 90 to 95% of response, and in oromandibular dystonia, symptoms are reduced in about 70% of patients. 2 In cervical dystonia, the best results were obtained based on a careful neurological evaluation, where only the muscles involved were injected with an adequate dose, with an improvement in pain and general disability in 90% of the patients and about three quarters reached a considerable recovery. 15

In the case of foot dystonia, numerous studies show that BTA is responsible for decreasing the resistance of the foot to movement, increasing the area of movement and moderating pain, allowing better intervention by health professionals in the placement of prostheses, positioning of the foot in a straight line, in order to support the weight and even surgeries. 15

Despite complications such as blepharospasm, erythema, pain and ecchymosis, the effectiveness of botulinum toxin type A was perceived, as it is useful in the treatment not only of dynamic or functional wrinkles, but also in many other procedures that help control pain, intestinal tract disorders, ophthalmology, otorhinolaryngology, among others, that is, the use of BTA goes beyond an aesthetic treatment. 6

However, it is important to emphasize the possible immunization, as it is important to keep a minimum period of four months between applications. These re-applications in very short periods can lead to the formation of antibodies, reducing the duration of botulinum toxin, or causing its lack of effect. 15 Therefore, retouching

in applications should be avoided and the patient should be informed that, after the toxin is installed, constant reapplication can lead to immunogenicity; therefore, the professional must protect his patient. 8 Retouches should only be done in cases that really justify them, such as in cases of correction of asymmetries or some undesirable effect. 13

From this point of view, several benefits in the use of TB may be available, such as: use of a less invasive procedure that does not require general anesthesia for its application; permission for better monitoring of the wound healing process; improvement of self-esteem; minimization of the effects of hyperactivity of the face muscles, which is responsible for the appearance of dynamic wrinkles; face with a rested and relaxed appearance; avoids the stitch removal procedure required by surgical methods; can be used preventively, avoiding the formation of expression marks.1 4

Currently, a huge range of health professionals can make use of botulinum toxin, such as biomedical professionals and nurses. In this way, its fundamental role in welcoming and assisting the patient who undergoes aesthetic procedures is highlighted, in addition to its role in the treatment of individuals with pathologies, restrictions and care needs. Thus, it is understood that these professionals have basic training and competence in the specialty to work in the area and in such procedures. 16

CONCLUSION

The article described the therapeutic use of Botulinum Toxin and how this drug has been shown to be safe and effective for the treatment of patients with a variety of pathologies, providing significant relief from disabling symptoms in patients with neurological, ophthalmological, gynecological, urological, gastrointestinal disorders and especially in aesthetic dermatology. Thus, it can be concluded through this integrative literature review, that BTA has, alone or as an auxiliary procedure, essential utility in the treatment of expression marks resulting from aging, as well as therapeutic applications of great importance, presenting clinical efficacy, although repeated applications may lead to a reduction of these effects by immunization in some cases, it is clear that the adverse effects are few and sometimes may be related to the inflammatory reaction of the application or to the inactivation of the toxin.

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