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8. Abbreviations and acronyms must be limited to those of general use, and must not be used in titles or abstracts.
9. Long and repetitive introductory information must be avoided, with preference given to the most recent and unpublished data. Repetition of the same information in the Abstract, Introduction, and Discussion must be avoided.
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An original article is a report of an original investigative research on the areas of Dermatologic Surgery, Cutaneous Oncology, Dermatology and Cosmiatric applied Technology. Examples include experimental studies, clinical studies, descriptions, comparisons of evaluation techniques or methods, and studies from related areas (pharmaceutical studies in Cosmetic Dermatology). Maximum limits: 4,000 words, 10 illustrations, and 35 references.

Abstract: Include sections labeled: Introduction, Objective, Methods, Results, and Conclusions (maximum 200 words). Do not state that results or other data will be presented and discussed.

Introduction: Describe the motivation for conducting the study and the current level of knowledge on the subject. The last paragraph should specify the main question or objective of the study, as well as the main hypothesis tested, if applicable.

Methods: Explain how the study was conducted, and include the following information:

a -*Type of study*: Describe the design, specifying retrospective or prospective, type of randomization (simple random, matched random, or stratified sampling, etc.), blind, comparative, controlled by placebo, etc.

b -*Place*: Indicate where the study was conducted (private or public institution), state that the study was approved by the Ethics on Research Committee of the institution, and describe the selection procedures, inclusion and exclusion criteria, and the number of patients at the beginning of the study.

c -*Procedures*: Describe the main characteristics of the interventions performed, including a detailed description of the technique, so that the investigative study can be replicated.

d -*Description of evaluation methods.*

e -*Statistical analysis*: Explain the type of analysis (descriptive and/or comparative), describing the planning of the sampling (representative of the universe to be studied), analysis and statistical tests, with the level of significance adopted. The use of unusual statistical analysis is supported; however, in such cases, the author should give a detailed description of the method.

Results: Detail the main results. This must include specific estimations and dispersion measurements (for example, mean and standard error), or interval estimations (for example, confidence intervals), as well as the descriptive levels of the statistical tests used (for example, p-value). Those findings must also be interpreted from a clinical point of view.

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Conclusions: Concisely address only the proposed objectives. The same emphasis should be given to studies with positive or negative results.

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7- IMAGING DIAGNOSIS

Articles developing subjects or clinical cases, in which imaging based examination (dermoscopy, confocal microscopy, ultrasound and other methods) are crucial for the diagnosis or treatment. Maximum limits: An unstructured abstract of up to 100 words, full article/text of up to 1,200 words, 6 illustrations, and 5 references.

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Letters may include objective and constructive comments about published articles. Maximum limits: 600 words and 5 references.

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Sumário / *Table of contents*

Hyaluronic acid in the rejuvenation of the upper third of the face: review and update. Part 2: temporal and supraorbital regions

Ácido hialuronico no rejuvenescimento do terço superior da face: revisão e atualização. Parte 2: regiões temporal e supraórbitária

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ABSTRACT

Noninvasive techniques for facial rejuvenation have grown exponentially in recent years. The greater understanding of the anatomical changes involved in the aging process was followed by a rapid evolution in the approach of these alterations and a great development of substances and technologies used for this purpose.

Volume replacement, particularly with hyaluronic acid, has been standing out due to its widespread availability and ease of use, immediate and long-lasting results, reversibility, and safety when properly used. The objective of this sequential article is to offer a review of the literature and an update on the use of hyaluronic acid cutaneous fillers in the rejuvenation of the temporal and supraorbital regions.

Keywords: dermal fillers; hyaluronic acid; rejuvenation

RESUMO

As técnicas não invasivas para rejuvenescimento facial tiveram crescimento exponencial nos últimos anos. O maior entendimento das alterações anatômicas envolvidas no processo do envelhecimento foi acompanhado por rápida evolução na forma de abordar estas alterações e pela expansão de substâncias e tecnologias usadas para este fim.

A reposição de volume, particularmente com o ácido hialurônico vem ocupando lugar de destaque pela facilidade de obtenção e utilização, resultados imediatos e duradouros, reversibilidade e segurança quando bem utilizados.

O objetivo deste segundo artigo é oferecer revisão da literatura e atualização sobre o uso de preenchedores de ácido hialurônico no rejuvenescimento das regiões temporal e supraorbitária.

Palavras-chave: *Preenchedores dérmicos, ácido hialurônico; rejuvenescimento*

INTRODUCTION

As already discussed in part 1 of this article, rejuvenation techniques using hyaluronic acid (HA) for the upper third of the face require that the physician has a deep anatomical knowledge (including soft tissues as well as bone and neurovascular structures) and an understanding of the innate or acquired facial volume deficiencies and the properties and characteristics of available products.[1] In this second part, we will discuss the temporal and supraorbital regions included in the upper third of the face.

Continuing Medical Education

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1. TEMPORAL REGION

A young face shows a subtle transition among the different regions and good coverage on bone prominences—especially on the temples, which should be flat or slightly concave in women, whereas local convexity provides the physiognomy with a more masculine appearance. Volume loss in this region is an early sign of aging; however, it may also occur in young adults who have a low body fat rate.[2,3] Volume replacement in the temples replaces the local concavity for the young face's convexity; provides sustenance to the external portion of the eyes and lateral eyebrow elevation; and attenuates periorbital wrinkles.[4]

1.a Temporal region anatomy

Temporal fossae are bilateral, shallow depressions of the skullcap that are delimited, for didactic purposes, as follows: upper limit, temporal line; anterior, lateral wall of the orbit; inferior, zygomatic arch; and posterior, implantation area of the scalp, where the skin is thicker and more vascularized (Figure 1).[5-8] In the last years, several articles describing the anatomy of the temples for the use of fillers were published.[3,6,7,9] Among them, the work by Sykes et al. stands out; it identifies, from the temporal fossa's surface and towards its depth, six structural levels: skin (layer 1); subcutaneous cellular tissue (layer 2); superficial fascia, also referred to as temporofacial fascia (layer 3); loose areolar tissue (layer 4); deep temporal fascia (layer 5); and temporal muscle (layer 6).[7]

The temporoparietal fascia – or superficial temporal fascia – lies directly under the subcutaneous fat of the temporal region and represents the cephalic extension of the SMAS (superficial musculoaponeurotic system), which begins above the zygomatic arch and goes along the cranial aponeurosis of the forehead and scalp.[5]

The loose areolar tissue has thickening areas, forming two fibrous septa: one superior (coinciding with the temporal upper line) and one inferior, which divides the temporal region into upper and lower compartments. Near the end of the eyebrow, these two septa merge.[6]

The deep temporal fascia, known as temporal muscle fascia, covers this muscle and runs as one superiorly just to divide into two (intermediate and deep) at the lower temporal compartment, about 2-3 cm from the zygomatic arch. This division occurs to encompass a temporal fat compartment that is contiguous to the malar fat, located below the orbicularis oculi muscle (Soof – sub-orbicularis oculi fat). For this reason, instead of superficial temple compartment, some authors suggest calling this compartment "suprazygomatic fat of the temple," as opposed to another deeper one that is contiguous to the oral fat and that could be called "deep or retrozygomatic fat of the temple".[6]

The temporal muscle is fan-shaped, thinner at the upper portion, and inferiorly thicker and fibrous. It is firmly anchored in the temporal bone, from which it can execute its masticatory function of elevating and retracting the mandible.[6,10] The layers

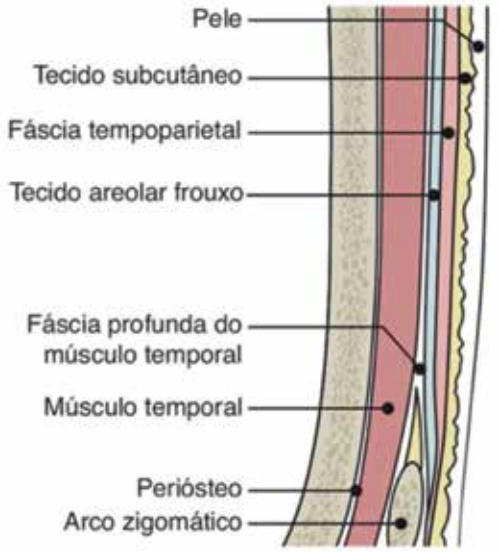

Figure 2: Temporal fossa layers

Figure 1: Delimitation of the temporal anatomical area

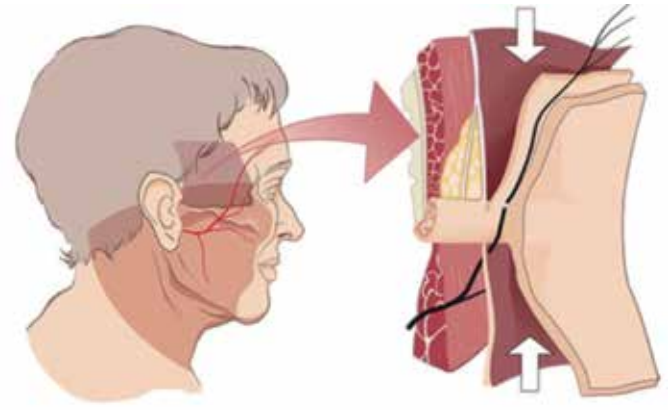

Figure 3: Surfacing of the facial nerve at the temporal fossa

forming the temporal fossa are illustrated in Figure 2. The blood vessels irrigating the temporal fossa are all branches of the external carotid and are located in three planes: superficial vessels (superficial temporal artery and veins) at the subcutaneous plane above the temporoparietal fascia; middle temporal vessels below this fascia and above the superficial temporal fascia layer; and deep vessels located below the temporal muscle and above the deep temporal fascia layer.[3] A recent study conducted by Korean anatomists suggests that site showing the lowest risk of vascular lesion in the temple when administering a supraperiosteal injection would correspond to an area of the width of a finger above of the zygomatic arch.[11]

In the temple, the temporal branch of the facial nerve deeply emerges (at the deep temporal fascia), then surfaces above the middle portion of the zygoma to sit below the temporoparietal fascia or inside the SMAS (Figure 3). This nerve innervates the orbicularis, corrugator, and frontalis muscles of the corresponding side.

1.b Temporal aging

Facial changes due to aging occur both at soft tissues and bones. In the temporal region, fat compartments lose volume, the muscle is atrophied and thinned, and the bone retracts and becomes even more concave. All these changes gradually evidence the bone prominences of the zygomatic arch and temporal line until the appearance becomes skeletal and aged.[3,9,12]

Raspaldo rated the temporal aging in four stages (Figure 4): In stage 1. the temporal fossa shows no volume changes and is linear or convex. In stage 2, the first aging signs can be perceived, with a slight depression. In stage 3, the temporal fossa concavity is evidenced, with some vessels becoming visible and the eyebrows drooping. In stage 4, major "skeletonizing" and concavity of the temporal fossa are observed, making bones, veins and arteries clearly visible (Chart 1).[13]

1.c Correction techniques

The temporal region can be safely filled in three planes: subcutaneous (superficial to the temporoparietal fascia), loose areolar tissue (between the superficial and deep temporal fasciae) and submuscular (at the periosteum).[3,5,7]

The selection of both the depth to deposit the filler and the product to be used will depend on the patient's need and the physician's preference and experience (Chart 2).

Overall, replacing volume near the temporal merging line reduces the skeletal appearance, while filling near the hairline makes the facial contour recover the "oval" shape considered attractive in women and lose the "peanut" shape acquired with aging.[2,14]

The injection can be in bolus, pillars, linear, fanning, retrograde, or anterograde. In superficial layers, the fanning technique and the use of more fluid and less thick HA are preferable, and, below the temporal muscle, "Depot or Bolus Technique" and products containing HA with high G' and high cohesiveness are used. Both techniques should be preceded by aspiration prior to injection (to minimize the risk of intravascular injection) and followed by uniform massage.[2]

Needle or cannula gauges vary depending on the viscosity and cohesiveness of the selected hyaluronic acid and, again, the

Chart 1: Temporal aging levels, according to Raspaldo H.[13]

Level 1	Normal or convex
Level 2	First signs of temporal depression
Level 3	Temporal concavity, some visible vessels and droopy eyebrow tails
Level 4	Deep concavity or "skeletonizing" of the temporal fossa with clearly visible vessels

Chart 2: Indication of products for temporal filling, according to the injection plane

Subcutaneous	Emervel Classic, Belotero Balance ou Soft, Restylane, Teosyal Global, Vollift ou Volbella, Princess Filler, Perfectha Derm
Below the temporoparietal fascia	Emervel Deep, Belotero Intense, Juvederm Ultra ou Ultra Plus XC, Princess Volume, Perlane, Teosyal Deep, Perfectha Deep
Submuscular	Emervel Volume, Belotero Volume, Perfectha Subskin, Teosyal Ultimate, Juvederm Voluma

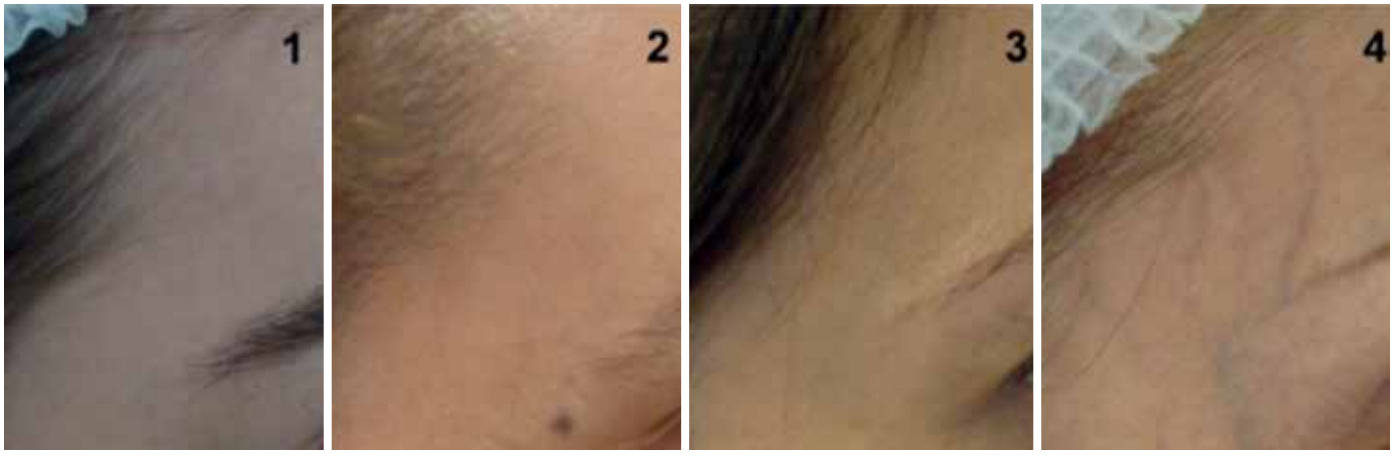

Figura 4: Temporal aging rating, according to Raspaldo H. [13]

physician's preference. In general, deep filling techniques are performed with needles and the superficial filling ones, with cannulas.

In the literature, variations in temporal volume replacement are found, as detailed below:

1.c.1. Deep filling

Raspaldo[13]

In the technique described by Raspaldo,[13] 27G needles are used to inject the product in the form of bolus under the deep temporal fascia with the purpose of providing higher projection and more volume and avoiding the facial nerve. For such, he suggests dividing the temporal region in quadrants (anteroinferior and superior and posterior-inferior and superior) from the crossing of two imaginary lines: one vertical at the zygomatic arch midpoint and one horizontal from the outer corner of the eye to the hairline (Figure 5). Injection should start with the anteroinferior quadrant, followed by the anterosuperior quadrant, then the posterior quadrants, in case of severe depression. He also suggests that the volume to be injected varies according to the temporal aging stage: In stage 1. no treatment is needed; in stage 2, 0.4-1.0 ml of hyaluronic acid/side is replaced; in stage 3, the volume reaches 2 ml; and in stage 4, it may reach 4 ml. following injection, gentle massages help shape the product.

One up/One over (Arthur Swift15)

A single-puncture injection using a 27G needle vertically positioned, 1 cm above the temporal merging line and 1 cm laterally, parallel to the supraorbital ridge. Digital pressure to detect arterial pulse, previous aspiration of venous reflux, and to maintain the needle tip at the bone surface ensures a safe plan for the filler's deposit. This site—close to the temporal crest, where the muscle is less thick—is relatively avascular. The use of highly cohesive, viscous HA in this deep plane and single injection will cause circumferential dispersion towards the zygomatic arch (Canopy Effect). The index finger of the nondominant hand should be positioned behind the injection site to avoid the product to disperse in the area close to the scalp. This technique tends to be more economical, as it typically uses 0.25-0.75 ml of HA per temple. The author does not recommend deep deposits with the needle above the zygomatic arch due to the presence of branches of the second portion of the internal maxillary artery, of which embolization could result in ipsilateral palate necrosis.[15]

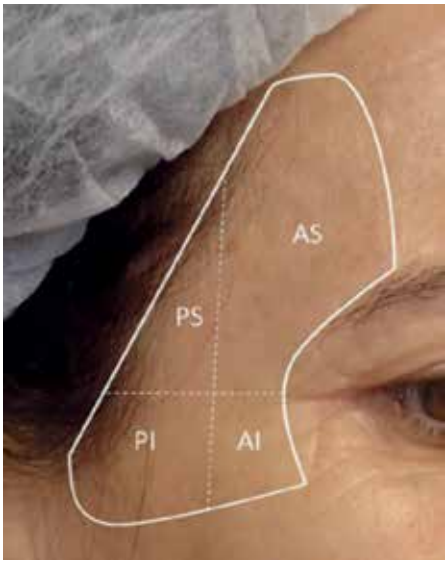

Figure 5: Scheme of the temporal quadrants

Three-point approach (Marmur16)

A three-point temporal filling technique, with HA being diluted in variable quantities – from 0.2-0.4 ml – of saline solution or lidocaine with epinephrine and 25-30G needles. The first selected point is located at the central portion of the temporal fossa, usually at 1.5-2 cm from the lateral corner of the eye. Once the palpation with the fingers puts local pulsation away, deeply inject 0.1-0.4 ml of the diluted HA. The second point is superior and posterior to the first, and it is only indicated to complement irregularities and depressions, when needed. The third point is located at the lateral forehead close to the temporal merging line, promoting the temple's gradual transition to the forehead and eyebrow elevation.

Breithaupt[3]

Breithaupt uses a 27G or 30G needle and delimits an optimal injection window, in which the administration would be safer if placed juxtaperiosteally. He suggests beginning by palpating and drawing the superficial temporal artery in order to avoiding it. The window begins at the eyebrow tail, at the junction with the temporal merging line (superomedial limit). The injections should be administered below and posterior to this line, 1.5 cm or the width of a finger above the zygomatic arch, and in front of the temple's hairline. The injection should be perpendicular to the bone, with previous aspiration being also suggested.

1c.2. Superficial filling

Moradi[6,17]

Moradi and colleagues prefer to use hyaluronic acid more superficially, at the subcutaneous or immediately below the temporoparietal fascia. With a 30G needle, the authors penetrate the skin at 90° up to the dermis, then place it at a 45° angle to inject the product. They inject volumes of 0.05-0.1 ml/injection site and make a fan-like dispersion (Fanning technique). These authors also use careful local massage following product injection.

Recently, however, a histopathologic study of corpses evidenced the presence of HA-based fillers at deeper planes (temporal fascia and temporal muscle), even when a superficial plane of filling had been adopted.[18]

Considering the risk of vascular injuries at intermediary planes, in order to ensure a safe injection, the use of cannulas for more superficial injections is recommended. The favorite ones are 25-27G. The entry hole is made with a larger gauge needle, located below or above the site to correct. The cannula should be introduced at the same angle and direction of the needle used in the entry hole; otherwise, there will be resistance and another puncture may be required. The movements should be perpendicular to the branches of the superficial temporal artery. The filler is deposited in small aliquots, in a retrograde manner, in tunnels spread throughout the region. Next, local gentle massage for molding is performed.[5] The post-procedure result is illustrated in Figure 6.

The preferred HAs are more fluid, less viscous, and less concentrated (see Chart 2). Products that are too thick tend to form accumulations, are more difficult to shape in superficial

planes, and gives an irregular or undulated appearance to the treated area. Even when using an appropriate material, too superficial or intradermal injection, which could make the filler visible and grey-blueish (Tyndall effect), should be avoided.[5]

Immediately after each injection, local, gentle compression for about 1-2 minutes are performed to avoid bleedings and ecchymoses. Cold compresses can be applied at the end of the procedure.

2. SUPRAORBITAL REGION

2.a. Normal aspects

The upper lid/eyebrow complex of youngsters is characterized by homogeneous abundance de soft tissues, extending from the orbital ridge to the upper end of the eyebrow hair portion, in a continuous transition to the temporal region.[19]

The ideal eyebrow position has been related to some anatomical references: it usually begins in the area corresponding to the intersection of a perpendicular line drawn from the alar base of the nose to the inner corner of the eye to the oblique straight-line intersection that begins at the alar base and passes through the lateral corner of the eye. Ideally, the beginning or head of the brow should be positioned at the same height as its tail (in women, the end of the eyebrow may be higher than the beginning), while the medial portion should be thicker, and becomes less dense as it progresses laterally, with its apex projecting over the oblique line that begins at the alar base and passes through the lateral limbus. In women, the peak should be positioned slightly above the orbital arch and in men, it should be at the height of the orbital rim (Figure 7).

2.b. Aging

The supraorbital region is one of the first to show signs of senility. This is easily observed in the photo essay by the photographer, Nicholas Nixon, who annually took pictures of four sisters for 40 years (1974-2004); they were between 15 and 25 years old when he started. The picture taken 10 years after the first one shows that their eyebrows considerably descend, lose the projection seen in the first pictures, and shadows in the forehead and temples become visible.

Loss of skin and soft tissue elasticity, gravitational action, and bone remodeling contribute to brow aging and ptosis. Computerized tomography studies showed that the orbital rim goes through thickening recess or reduction at its superomedial and inferolateral aspects, becoming larger and more inclined.[12,20]

Such changes cause the loss of sustenance of the supraorbital components. The aging process can manifest in two ways: **1**) The loss of sustenance promotes ptosis of the supraorbital tissues, cutaneous flaccidity, drooping of brows, and local skin excess (Figure 8); **2**) in addition to bone reabsorption, the fat pads disappear and the skin tends to juxtapose the orbital rim,

Figure 6: Result obtained after temporal filling

Figure 7: Ideal position of eyebrows in men and women

especially at the medial portion, manifesting as an upper central shadow, called "A-frame deformity," in milder cases (Figure 9), and as a deepening and "skeletonizing" of the entire upper orbit, in more severe cases.[21,22]

2.c. Anatomy of the supraorbital region

In this area, in addition to skin, subcutaneous and epicranial aponeurosis, there is the orbital portion of the orbicularis oculi muscle, and below it there is a fat compartment called Roof (Retro Orbicularis Oculi Fat) and then the periosteum of the orbital rim. It is the Roof that provides the eyebrows with their shape and projection. A volume loss in this compartment causes retreat, projection loss, and drooping of the entire brow in relation to the orbital ridge, as well as an aged appearance of the entire supraorbital region.[6]

As described in the previous article, in the glabella, the irrigation of the supraorbital region is performed by the supratrochlear arteries (which emerge from the supratrochlear foramen, located between 17 mm and 22 mm from the facial midline, often corresponding to the height of the eye corner) and the supraorbital arteries (which emerge from the supraorbital foramens and leave the orbital rim at the height of the midpupillary line).[1] Laterally, the irrigation is performed by the temporal arteries.

2 d. Correction techniques

Some authors noticed improvement of the appearance of the eyes after brow volume replacement. Expanded eyebrows reflect more light; eliminate unwanted shadows; and even increase the height, projection, and balance of the upper third of the face.

Initially, the treatment was performed using autologous fat. In the last years, it has been replaced by hyaluronic acid, which is more promptly available and easier and safer to inject, as it can be dissolved with the use of hyaluronidase in cases of vascular occlusion or unsatisfactory outcomes.

Prior to the procedure, topical anesthesia may be applied with creams that should be left on the site for about 30 minutes. Antisepsis is performed with chlorhexidine 4%.

More viscous HA Fillers are ideal for this region to avoid occlusions and vascular embolisms and for higher firmness of the tissue.

The most generally accepted technique—and used by the authors—is applied by using (25-27G) cannulas.[4,14] Preferably, the entry is at the lateral region, at the eyebrow tail. Using the non-dominant hand, the brow is elevated, placing it away from the orbital rim. It is kept clamped while the cannula goes in, making the creation of a tunnel easier, through which the filler is injected. The injection plane is below the orbital portion of the orbicularis oculi muscle, into the retro-orbicularis fat (Roof). The filler (Belotero Intense, Juvederm Ultra or Ultra Plus, Restylane Perlane, Vollift, Volbella, Princess Volume, Emervel Deep, or Perfectha Deep) should be deposited gradually, in an anterograde and retrograde manner, always above the orbital rim. The push-ahead (anterograde) technique allows the injected material to elevate the region before the needle tip, thereby decreasing the risk of ecchymoses. Subsequently, the cannula is removed and reinserted ahead to complete the filling (Figure 10).

It can also be directed upwards to the peak site of the eyebrow to highlight it. To know where to position it, one should imagine an oblique line linking the nasal ala to the lateral limbus. The upper continuation of this line crosses the brow at its apex. Another way of finding it is by measuring the distance between the eyes (intercanthal distance) and horizontally using this measure in the eyebrow from the inner corner of the eye.[10,14] Specific corrections at specific sites can be performed with a 27G needle, for a final finishing, when necessary. Manual modeling of the filler is posteriorly performed to promote symmetry, homogeneity, and anterior projection. Edema on the first two days and local sensitivity are expected effects. Overcorrection should be avoided, as it could lead to an artificial result.

To correct the "A-frame" deformity, previously described, the filler (Belotero Balance or Soft, Volift, Restylane, Princess Filler, Perfectha Derm, or Emervel Touch) should be deposited right below the beginning of the eyebrow. The cannula is horizontally positioned below the brow, using a lateral entry, and the deposit is performed into the retro-orbicularis fat, just above the periosteum, where important vascular bundles emerge from the bone. Small quantities (0.1-0.2 ml/side) are normally enough to obtain natural results.

Figure 8: Supraorbital aging with skin excess and flaccidity

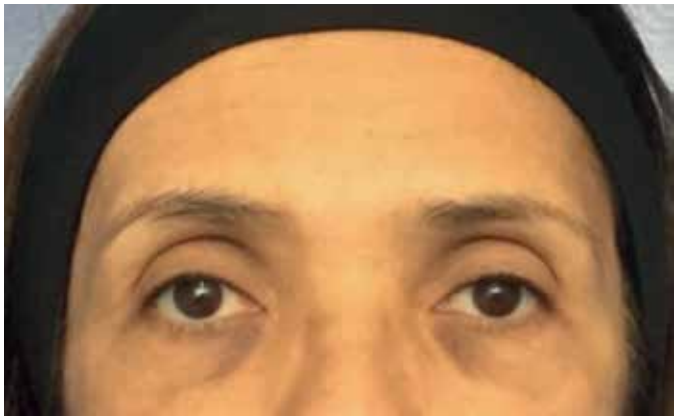

Figure 9: "Skeletonizing" and "A-frame deformity" in the supraorbital region

Figure 10: Periorbital before and after HA injection: Local elevation and projection and rejuvenated appearance

On the same injection plane, some experienced authors prefer to perform the procedure with thin, short needles (30G, ½). Lambros prefers to inject in three directions at each puncture, distributing the filler to five entries into each eyebrow. The mean injection volume is 0.5 ml per side.[6] Liew, in turn, who also uses thin needles, suggests the microdrop technique in a retrograde, slow supraperiosteal injection; for such, he uses three entry holes on average. These two authors complement the procedure with massage and filler molding at the wanted site.[21]

The product lasts longer in this area (2-4 years) due to the little mobility of the adjacent muscle and the supraperiosteal injection. Anatomical studies of corpses confirmed the clinical findings, by showing that the HA filler that is injected under eyebrows tends to remain at the injected site, retained by the dense fibrous septa existing inside retro-orbicularis fat (Roof).[23]

It is important to stress that the full periorbital rejuvenation treatment includes approaching the glabella—which projects and positions the beginning of the eyebrows—and the temples, which do the same with the tail. These two techniques were discussed in part I and II of this article.[1]

3. COMPLICATIONS

Frequently, reactions such as edema, venous congestion, bleeding, and ecchymosis may occur at the injection site, which are usually self-limited, especially in cases where the injection is performed too superficially. Some patients have tenderness at the injection site, which typically lasts only one day, although it may persist for more time during mastication, mainly after intra or submuscular injection.[5]

Another adverse effect is the presence of local nodules when a more viscous product is injected too superficially.

More serious – and rare – complications found in the literature include: infections (biofilm), granulomatous reactions due to foreign body, cutaneous necrosis, and blindness.[3,17]

In the temporal region, the superficial temporal artery's embolization or compression can cause skin damage to the area it irrigates: forehead, eyebrows, upper lateral eyelid portion and lateral scalp portion. The lesion at the temporal branch of the facial nerve, in turn, will cause inability to frown the forehead and elevate the eyebrow.

In a recent literature review, Beleznay and colleagues found five confirmed cases of blindness after temples' filling – only 1 with HA, 3 with fat and 1 with silicone.[24]

There are several anastomoses between the superficial temporal arteries (branches of the external carotid) and the supraorbital and supratrochlear arteries (branches of the internal carotid). The proposed mechanism leading to blindness would be the intravascular injection and the filler's retrograde embolization. If the involved vessels have a small gauge, even a small quantity of HA – if injected rapidly – can overpower the blood pressure and find less proximal resistance, migrating in a retrograde manner. When the applicator stops the injection's pressure, the blood pressure impels the material to distal retinal arteries, thereby causing occlusion and potential blindness.[24]

The highest risk, however, lies in the medial-temporal vein, which connects with the cavernous sinus through periorbital veins. Because it is larger than arteries at the same plane, if inadvertently occluded, this vein can lead to embolization of the cavernous sinus, and by retrograde flux, to occlusion of the central retinal artery.[3,11,24]

If vascular occlusion is noticed through the presence of livedo reticularis, local whitening, or acute pain complaint, the procedure should be immediately interrupted. The site and neighboring area should be inundated with hyaluronidase[25,26] (preferably injected with a cannula) and massaged. In cases of retinal vessels, after 90 minutes of occlusion, damages are irreversible. Other measures that could be tried are local heat, massage, oral anticoagulants, and hyperbaric chamber.

CONCLUSION

The appearance of the temporal fossa and periorbital area have a major impact on facial aging. The use of hyaluronic acid fillers allows recovering local volume and projection, thereby providing a younger, more harmonic look in a natural, safe, and outpatient manner. Patients should be treated in accordance with the local aging stage, and having a good knowledge of the anatomy, injection techniques, and products is essential to obtain good results with minimal complications. ●

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STATEMENT OF PARTICIPATION:

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Guidance of the coauthors
Review, correction and co-elaboration of all the text topics

Gabriel Ângelo de Araújo Sampaio:
Elaboration and Bibliographical research and review of supraorbital area (eyebrow and upper lid)

Natássia Pinheiro de Lavor Queiroz:
Bibliographical research and review of the temporal region.

Continued medical education questions - CMEQ

1. **Regarding the anatomy of the forehead and glabella, it is incorrect to say that:**
   - **a)** We divide the skin in this region into five layers: skin, subcutaneous cellular tissue, galea aponeurotica, loose areolar tissue, periosteum;
   - **b)** There are four fat compartments in the frontalis region: upper, lower, medial, and lateral;
   - **c)** The limits of the upper third of the face are: hairline, temporal line, nasal dorsum, eyebrows, and glabella;
   - **d)** The glide plane corresponds to the supraperiosteal and subgaleal space, nearly avascular, where the hyaluronic acid is preferably injected;
   - **e)** The main neurovascular bundles of the forehead and glabella are: supratrochlear (medial) and supraorbital (lateral).

2. **Regarding the frontal rejuvenation with hyaluronic acid, mark the incorrect alternative:**
   - **a)** The filling can be performed in bolus, at the supraperiosteal plane, in a linear sequence, creating sustenance towers in frontal volumizing (technique described by Solish);
   - **b)** The filling can be performed superficially, at the intradermal plane (superficial dermis), with needles, using the technique described by Moradi;
   - **c)** The 3D Forehead Reflation technique, described by Carruthers, preconizes frontal volumizing through three entry points (glabella and bilateral eyebrow tail), with a needle, at the supraperiosteal plane, containing hyper-diluted hyaluronic acid;
   - **d)** Filling with a needle is preferably performed at the intramuscular plane;
   - **e)** Filling with a cannula is submuscular and can be accessed through lateral and medial fat compartments of the forehead.

3. **Regarding the filling of the glabellar region, mark the incorrect alternative:**
   - **a)** The injection into the procerus muscle region is performed by clamping the intramuscular plane with the fingers;
   - **b)** It can be accessed through the fat compartment of the forehead by using cannulas, both medially (superiorly) and laterally through the eyebrow edge;
   - **c)** The superficial filling involves risks, and according to the literature, it is only safe when performed by the technique known as Blanching Technique;
   - **d)** The supraperiosteal injection with a needle in bolus at the glabella is anterograde and with radial dispersion through the same site (Fanning Technique) by digital massage;
   - **e)** Clamping it with the nondominant hand avoids the hyaluronic acid's dispersion to the lateral edges of the nose.

4. **Among the conducts adopted for cases of vascular obstruction at the upper third of the face with hyaluronic acid, we have not included:**
   - **a)** vasodilators (pentoxifylline, sildenafil);
   - **b)** platelet antiaggregant (clopidogrel, acetylsalicylic acid);
   - **c)** hyaluronidase;
   - **d)** cold compresses;
   - **e)** antibiotic therapy.

5. **The temporal branch of the facial nerve, which surfaces above the zygomatic medial portion, when lesioned during filling, causes paresis of the muscles:**
   - **a)** orbicularis, risorius, and zygomaticus;
   - **b)** orbicularis, frontalis, and corrugator;
   - **c)** orbicularis, zygomaticus, and frontalis;
   - **d)** risorius, zygomaticus, and frontalis;
   - **e)** orbicularis, frontalis, and levator palpebrae.

6. **Amaurosis cases during filling of the upper third of the face occur due to final embolization of the:**
   - **a)** supratrochlear artery;
   - **b)** supraorbital artery;
   - **c)** superficial temporal artery;
   - **d)** internal maxillary artery;
   - **e)** central retinal and posterior ciliary artery.

7. **Among the temporal filling advantages, we have not included:**
   - **a)** Sustenance of the external portion of the eye;
   - **b)** Lateral elevation of the eyebrow;
   - **c)** Attenuation of periorbital wrinkles;
   - **d)** Composition of the facial harmonization and contour;
   - **e)** Highlighting the concavity inherent to the youngster's temple.

8. **Among the temporal filling techniques, mark the incorrect one:**
   - **a)** Raspaldo rated the temporal aging into four levels and quadrants that should be filled with deep bolus, into the submuscular plane;
   - **b)** In the technique described by Arthur Swift (One up/One over), the index finger of the nondominant hand should be positioned at the orbital ridge of the temple in order to avoid dispersion of the hyaluronic acid in this site (Canopy Effect);
   - **c)** In the technique described as Three-Point Approach (Marmur), the temporal filling is deeply performed into three points using a needle with hyaluronic acid re-diluted in saline solution or lidocaine;
   - **d)** In Breithaupt's technique, the filling is performed in a single bolus into the central window of the temple in a supraperiosteal manner;
   - **e)** The superficial temporal injection, described by Moradi, is performed with cannulas or needles subcutaneously, right above the superficial temporal fascia.

9. **Regarding the filling techniques for the supraorbital region, mark the incorrect alternative:**
   - **a)** The filling with cannulas is performed into the retro-orbital fat, known as Roof, below the orbital muscle;
   - **b)** The filling with needles should be performed intradermally, above the orbital muscle;
   - **c)** The filling with needles can be performed in the form of "fan", through three needle insertion points, as described by Lambros;
   - **d)** The filling with needles can be performed into supraperiostial points, through small bolus, as described by Liew;
   - **e)** The A-frame deformity, caused by the medial orbital bone's reabsorption, is preferably corrected with cannula submuscularly, with small volumes of filler;

10. **Regarding the use of hyaluronic acid in the upper third of the face, mark the correct alternative:**
    - **a)** Its duration does not vary when associated with botulinum toxin treatment;
    - **b)** Currently, it replaces the use of botulinum toxin, making it obsolete;
    - **c)** The selection of the hyaluronic acid, according to its viscosity and cohesiveness, is independent of the selected filling plane;
    - **d)** Every area of the upper third of the face is safe for the filling with hyaluronic acid, since they do not pose risks of vascular complications and do not need deep anatomical or advanced technical knowledge from the dermatologist physician;
    - **e)** This is the product of choice for filling in this region, when compared with the other options (polylactic acid and calcium hydroxyapatite), because it features immediate, predictable result; molding ability; versatility; and reversibility.

Key

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1B, 2C, 3D, 4D, 5B, 6E, 7B, 8B, 9E, 10D

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High-frequency electrosurgery in ice-pick scars: pre and post treatment comparative study

Eletrocirurgia de alta frequência em cicatrizes do tipo ice-picks: estudo comparativo prévio e posterior ao tratamento

DOI: http://dx.doi.org/10.5935/scd1984-8773.201792917

ABSTRACT

Introduction: Acne scars result from inflammation of acne vulgaris and are a frequent cause of complaints in dermatology practices. Atrophic scars are the most common, and may be classified into superficial, medium, and deep. There are several treatment options for deep atrophic scars, however they have limited efficacy in general, undesirable side effects and are expensive.

Objective: To evaluate the treatment of deep atrophic scars with high frequency electrosurgery.

Methods: Ten patients with deep atrophic acne scars received 3 high frequency electrosurgery treatment sessions with intervals of 1 month. The following were used to evaluate the outcome 1 month after the last session: histological aspects of selected scars as compared to the baseline; ratings attributed to the results by the patients (worsened, unchanged or improved); and standardized photographs at baseline and 1 month after the last session performed by a physician not related to the study, who also rated the results (worsened, unchanged or improved).

Results: Histological analysis evidenced a reduction in local fibrosis. All patients noticed improvement in the lesions. The evaluator dermatologist physician verified the presence of clinical improvement in all patients.

Conclusion: High frequency electrosurgery is a straightforward, inexpensive and effective method for the treatment of atrophic deep acne scars.

Keywords: cicatrix; acne vulgaris; electrosurgery

RESUMO

Introdução: *Cicatrizes de acne são causa frequente de consulta ao dermatologista, ocorrendo como resultado do processo inflamatório da acne vulgar. As cicatrizes atróficas são as mais comuns, podendo apresentar-se como superficiais, médias ou profundas. Existem várias opções de tratamento para cicatrizes atróficas profundas, porém, geralmente, apresentam eficácia limitada, efeitos colaterais indesejáveis e custo elevado.*

Objetivo*: Avaliar o tratamento de cicatrizes atróficas profundas com eletrocirurgia de alta frequência.*

Métodos*: Dez pacientes com cicatrizes de acne atróficas profundas receberam três sessões de tratamento com eletrocirurgia de alta frequência com intervalos de um mês entre elas. Um mês após a última sessão foram avaliados: aspectos histológicos de cicatrizes selecionadas, antes e um mês após a última sessão; opinião dos pacientes classificando os resultados em piora, ausência de melhora ou melhora das lesões; e avaliação de fotografias padronizadas antes e um mês após a última sessão, por médico não vinculado à pesquisa que também classificou os resultados em piora, ausência de melhora ou melhora das lesões.*

Resultados*: Na análise histológica foi evidenciada redução de fibrose local; na opinião de todos os pacientes o resultado evidenciou melhora das lesões; todos também apresentaram melhora clínica das lesões avaliadas por dermatologista.*

***Conclusão**: A eletrocirurgia de alta frequência é método simples, de baixo custo e eficaz no tratamento de cicatrizes de acne atróficas e profundas.*

Palavras-chave: *cicatriz; acne vulgar; eletrocirurgia*

Original Articles

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INTRODUCTION

Acne is a common condition that affects roughly 80% of adolescents,[1] and permanent scars may arise as a result of the inflammatory process that occurs in acne vulgaris, [2] affecting up to 95% of acne patients. Their cause is associated with both the severity of the underlying condition and the delay in beginning the treatment.[3] Depressed atrophic scars are classified as non-distensible (superficial, medium and deep) and distensible.[4] This is the most common type of scar, which occurs due to the action of inflammatory mediators and enzymatic degradation of collagen fibers and subcutaneous fat, resulting in lesions that often have a whitish background caused by deep fibrosis.[5]

According to the depth of the damage, atrophic non-distensible scars can be superficial, medium or deep, the latter being known as ice picks (up to 1mm in diameter) or dystrophic (above 1mm). They compromise the dermis in its full extension, reaching the subcutaneous. The various treatment options for this type of scar include chemical peeling, dermabrasion, ablative and non-ablative fractional lasers, punch excision, grafts, subcision, and combined methods, nevertheless these methods are generally associated with limited effectiveness, undesirable side effects and high costs.[1]

The search for treatment for acne scars is a frequent cause of consultation with Dermatologists since there is a negative impact on the affected patient's quality of life.[6] It is known that acne scars are associated with frustration, sadness and anxiety, and might even constitute a risk factor for suicide.[7]

In light of those facts and in order to find a new treatment option for atrophic and deep acne scars, the authors of the present article evaluated the use of high frequency electrosurgery (HFES) applied with a needle punctually to the scar, in order to promote immediate retraction and decrease of local fibrosis. The method is simple, cost effective, and easy to apply, yielding positive results by destroying the scar, decreasing its diameter and stimulating local tissue regeneration.

METHODS

A prospective, non-randomized study was carried out with 10 patients from the Dermatologic Surgery Ambulatory of the Facudade de Medicina de São José do Rio Preto (Famerp) clinically diagnosed with deep atrophic acne scars (Figure 1). The selected patients did not bear active acne, with some bearing Grade I lesions only. Higher-grade acne lesions were excluded from the selection. The patients were not receiving any type of treatment for scars and were in use of sunscreen. For the control of facial oiliness, only soap was used.

The selected patients received HFES treatment performed with the assistance of a fine tip in the shape of a needle. The application was carried out with a Wavetronic® device (Loktal, São Paulo, Brazil) in a way that the needle-shaped tip or a 30G needle (13 x 0.3mm) was placed in the center of the atrophic scar, exerting pressure on the skin, with the 5W electric current being subsequently activated, with the device set at the mode "Blend/Low Blend" (Figures 2 and 3). Immediately after the electrical discharge, the scar underwent retraction, elevation and whitening (Figures 4 and 5).

Three sessions were performed in each patient at one-month intervals. The evaluation methods employed were: i) biopsies of selected scars for anatomopathological study, before and one month after the last session; ii) subjective evaluation of the patients' opinion (outcomes received one of the following ratings: *worsening*, *absence of improvement* or *improvement* of the lesions); and iii) evaluation of standardized photographs before and one month after the last session. A physician not related to the study evaluated the images, also attributing the ratings *worsening*, *absence of improvement* or *improvement* to the lesions.

Figure 1: Atrophic deep acne scars indicated by the arrow

Figure 2: Performance of high frequency electrosurgery with 30G needle (13 x 0.3mm) in atrophic deep acne scar
Note: Previous biopsy of the scar is shown alongside the same scar being treated

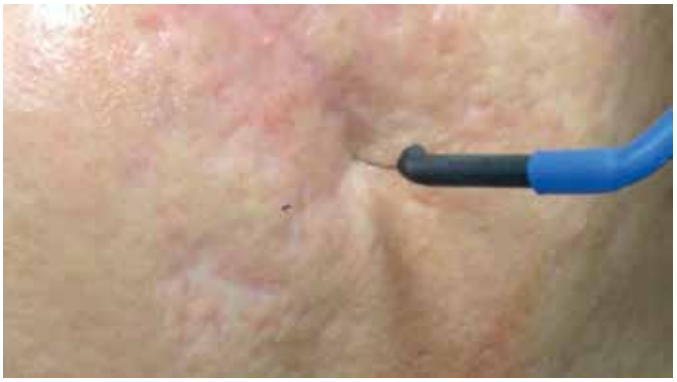

Figure 3: Performance of high frequency electrosurgery with needle-shaped tip in atrophic deep acne scar

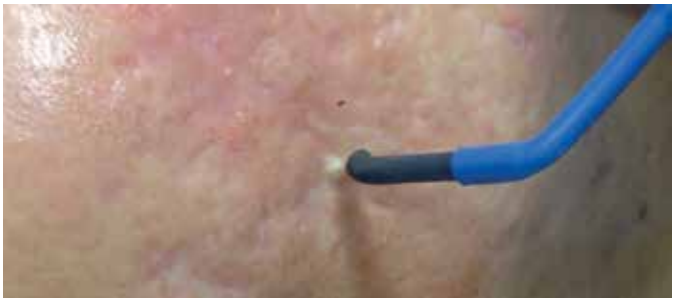

Figure 4: Retraction, elevation and whitening of an atrophic deep acne scar during the electrical discharge

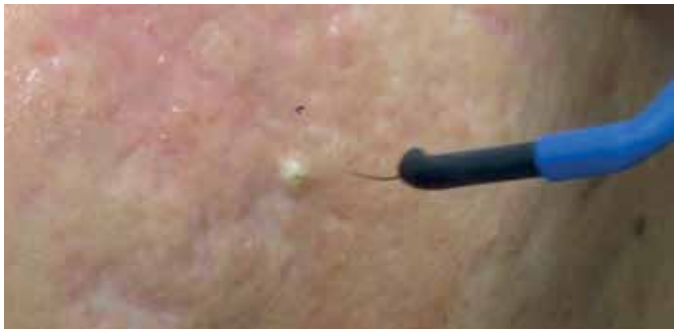

Figure 5: Retraction, elevation and whitening of an atrophic deep acne scar after the electrical discharge

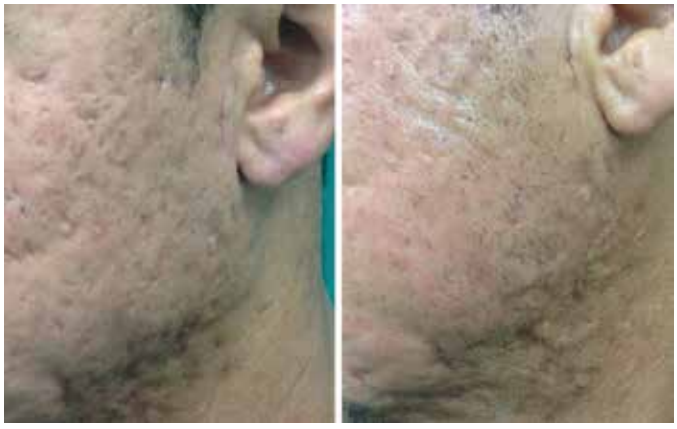

Figure 6: Comparison of photographs taken before the treatment (left) and one month after the last treatment session (right)

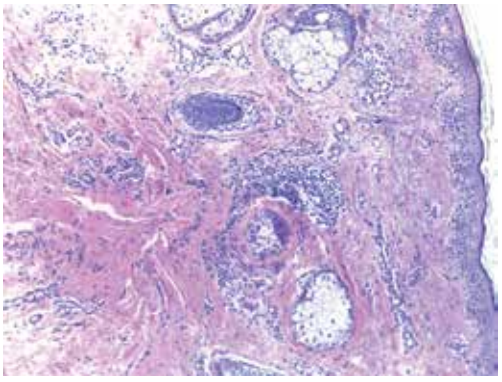

Figure 7: Biopsy of atrophic deep acne scar performed before the HFES treatment reveals fibrosis and perivascular and periadnexal lymphocytic inflammatory infiltrate in the upper and middle dermis

RESULTS

The objective analysis of the photographs, performed by a dermatologist physician not related to the study, attributed the rating *improvement* to the scars of all participants. Reduction of local fibrosis and scar elevation were observed after the procedure (Figure 6).

In addition, in the subjective evaluation carried out by the patients, all participants attributed the rating *improvement* of the lesion to the final outcomes.

After the electrosurgery session, mild local erythemas emerged, with the subsequent formation of a discrete crust on the scar that resolved within 7 to 9 days after the procedure. The patients were instructed not to manipulate the crusts and to use sunscreen in the lesion's location.

In the anatomopathological study of the biopsies performed before the procedure, fibrosis and perivascular and periadnexal lymphocytic inflammatory infiltrate were observed in the upper and middle dermis (Figure 7). It was possible to observe only epidermal atrophy in the biopsy performed one month after the last treatment session, with the dermis remaining unaltered, with absence of fibrosis and inflammatory infiltrate (Figure 8).

DISCUSSION

For being a simple and traditional procedure, HFES has been used to treat several skin conditions for more than 50 years, having become part of the routine of most dermatologist physicians. It acts by means of a high-frequency electromagnetic wave, which is transformed into heat due to local resistance when penetrating the tissues, resulting in the boiling of the intracellular water, causing the rupture of the cell due to an increase in its internal pressure, in turn generating tissue clotting and coagulation.[4,8,9]

As a result, when HFES is applied to atrophic and deep acne scars, destruction of local fibrosis and consequent tissue remodeling takes place, which can be seen in the biopsies performed after the procedure.

There are other options, simpler and less expensive than laser therapy, for treating atrophic scars, however they may be associated with some undesirable side effects. The CROSS technique (Chemical Reconstruction of Skin Scars) consists in the

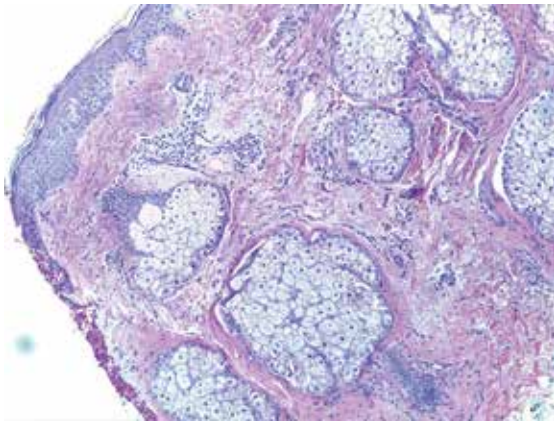

Figure 8: Biopsy performed one month after the last treatment session reveals slight epidermal atrophy and unaltered dermis

spot application of trichloroacetic acid on atrophic scars in order to stimulate neocollagenesis. However, this technique may be associated with adverse events such as hypopigmentation, hyperpigmentation and formation of residual scars on normal skin around the initial scar. [10,11]

The technique that employs full thickness skin micrografts performed with minipunchs consists of the excision of the atrophic scars using punchs, followed by the implantation of micrografts at the site of excision. The scar is removed and replaced by a slightly larger skin graft, usually harvested from the postauricular area. Some grafts will level with the skin's surface; others will remain elevated, meaning that a new therapeutic intervention is often necessary to achieve leveling.

The application of HFES with the needle-shaped tip allows that the electrosurgery's action be restricted to the site of fibrosis, avoiding possible complications secondary to the application in the healthy skin around the lesion. Also, it provides enhanced safety in higher phototypes. In this manner, the present study allowed the observation of a new, straightforward and cost effective option for efficaciously treating acne scars, which is one of the major causes of consultations to dermatologist physicians.

CONCLUSION

Based on the reported cases, HFES was proven effective and safe in the treatment of atrophic and deep acne scars. As a result, it emerges as a more accessible treatment option for both patients and physicians, since it employs a technology that is widely used in dermatology practices and can contribute to the treatment of an important complaint that has a considerable psychosocial impact.

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DECLARATION OF PARTICIPATION:

Carlos Roberto Antonio: Study guidance, creator of the described technique.

Lívia Arroyo Trídico: Patient follow-up.

Cíntia Maria Garcia Marchi: application of the technique on the selected patients.

Joao Roberto Antonio: Head of the ambulatory where the study was carried out, preparation of the paper.

Solange Corrêa Garcia Pires D'Ávila: Histological analysis of biopsies performed before and after the procedure.

Percutaneous collagen induction with needles in scars developed after automobile accidents: esthetical and functional correction

Indução percutânea de colágeno com agulhas em cicatrizes após acidentes automobilísticos: correção cosmética e funcional

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ABSTRACT

Introduction: The use of microneedling techniques has become increasingly important in the correction of scars.

Objective: To evaluate the results of percutaneous induction of collagen with needles in scars developed after automobile accidents.

Methods: A retrospective, descriptive and monocentric study analyzed medical records containing standardized photographs taken at baseline and 3 months after a single microneedling session, in 9 patients diagnosed with post-traumatic scars who were treated using the same protocol. Clinical and photographic evaluations of the treatment were performed by the investigator 3 months after the procedure according to a category scale (very good, good, reasonable, poor). Patient satisfaction questionnaires were also applied at this experimental timepoint.

Results: The clinical and photographic evaluation classified 5 patients as very good and 4 as good regarding the results achieved. All patients reported satisfaction with the outcomes.

Conclusions: The use of needle-induced percutaneous collagen yielded good esthetical and functional results in scars developed following accidental trauma. Adverse effects were not observed, which suggests that the described procedure has a good safety profile.

Keywords: therapeutics; accidents; cicatrix

RESUMO

***Introdução**: A utilização de técnicas com microagulhas vem adquirindo importância crescente na correção de cicatrizes.*

***Objetivo**: Estudo retrospectivo, descritivo e unicêntrico, avaliando os resultados da indução percutânea de colágeno com agulhas em cicatrizes desenvolvidas após acidentes automobilísticos.*

***Métodos**: Foram considerados registros em prontuários e fotografias padronizadas feitas antes e três meses depois de sessão única de microagulhamento, de nove pacientes com diagnóstico de cicatrizes pós-traumáticas tratados pelo mesmo protocolo. As avaliações clínica e fotográfica do tratamento, de acordo com escala de categorias – muito bom, bom, razoável, ruim –, foram realizadas pelo investigador três meses após o procedimento, quando também foram aplicados questionários de satisfação aos pacientes.*

***Resultados**: Na avaliação clínica e por meio de fotografias, o autor considerou cinco pacientes com resultados muito bons e quatro com resultados bons. 100% dos pacientes relataram satisfação com os resultados.*

***Conclusões**: Observam-se bons resultados cosmético e funcional em cicatrizes após trauma acidental com a utilização da indução percutânea de colágeno com agulha. Não se observaram efeitos adversos, o que nos permite sugerir que o procedimento apresentou bom perfil de segurança.*

***Palavras-chave**: terapêutica; acidente; cicatrizes*

Original Articles

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INTRODUCTION

There is an increasing trend in accidents involving automobiles that result in unsightly scars, often with functional impairment, leading to a strong impact on the quality of life of the victims.[1] These lesions are usually polymorphic, which usually require the association of techniques aimed at obtaining therapeutic gain. Secondary to the inflammatory injury, changes in the color, texture, elasticity and uniformity of the skin's surface occur – in block or isolatedly, on the face – in the epidermis, dermis and hypodermis. Some techniques and technologies have been used for the correction of post-traumatic sequelae with variable and, in some cases, unsatisfactory results.[2] The use of needles for correcting scarring lesions, initially proposed by Orentreich and Orentreich[3] as a subcutaneous incision, has been widely used in Dermatology. This treatment aims at releasing fibrotic fibers and replacing cicatricial collagen with new collagen, being also proposed for its variants, such as dermal tunneling (TD®), [4] whose principle is the same involved in the percutaneous induction of collagen with needles (IPCA®). In IPCA®, a polyethylene cylinder with an average of 190 embedded sterile stainless steel needles that pierce the epidermis and protrudes into the dermis without de-epithelializing the treated area, resulting in 2.5mm deep injuries according to the classification of Lima et al.[5] In the present article, the author proposes the use of IPCA® according to a standard protocol of treatment in a group of patients bearing scars resulting from accidents involving automobiles.

METHODS

The study was carried out in compliance with the ethical principles of the Declaration of Helsinki (2013 revision), retrospectively evaluating (from January 2014 to January 2017) the medical records of two women and seven men who had been treated at the Dermatological Surgery and Cosmiatry Ambulatory, Santa Casa de Misericórdia, in the Brazilian Northeast city of Recife. The patients had scars on the face and upper limbs that resulted from accidents involving automobiles and were all treated with the IPCA® technique.

The treatment was performed in a procedure room carefully prepared for surgical interventions. Following antisepsis with 2% chlorhexidine and anesthesia with 2% lidocaine solution without vasoconstrictor injected into the skin with flexible cannula 22G (1: 2 of 0.9% saline + 10% of the total volume in 8.4% sodium bicarbonate, aimed at neutralizing the lidocaine's low Ph., offering more comfort to the patient), the intervention was initiated. Next, a roller with 2.5mm-long micro-needles (Dr. Roller®, Mooham Enterprise Co. Gyeonggi-do, South Korea) was used to perform right-to-left, top-down and, finally, diagonal movements, producing linear bands with multiple micropunctures that up until a uniform pattern of purpura caused by deep injuries was obtained.[5] (Figure 1) All patients underwent one microneedling session according to the methodology described above, performed by the same physician. The patients' ages ranged from 23 to 41 years. Their Fitzpatrick phototype classification ranged from II to IV. The clinical and photographic evaluations of the treatment, rated according to a categorical scale (very good, good, reasonable and poor), were performed by the investigator three months after the procedure, when questionnaires aimed at assessing the patients' satisfaction were also applied. Shortly after the procedure, the patients received gauze and micropore adhesive tape dressings. No topical medication was applied after the intervention. The patients were instructed to remove the dressing under running water in the shower on the following day and to begin applying a skin regenerator up until the seventh day, when the use of a commercial SPF 60 sunscreen should be initiated.

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RESULTS

Based on the clinical and photographic evaluation, the author considered that 55% (5 patients) had very good results and 45% (4 patients) had good results. All patients (100%) reported satisfaction with the outcomes. Pain during the treatment was considered tolerable. In the postoperative period, none of the 9 patients reported discomfort or needed to use analgesics. With a significant reduction of edema and hematoma, resumption of professional activities took place between the seventh and the tenth day after the procedure. Complications such as infection and hypertrophic scars were not observed in this group. Two patients had mild transient postinflammatory hyperpigmentation, with total remission over a period of 20 to 30 days, secondary to the introduction of the use of a whitening

Figure 1: Upper limb of a patient immediately after the intervention; deep injuries.

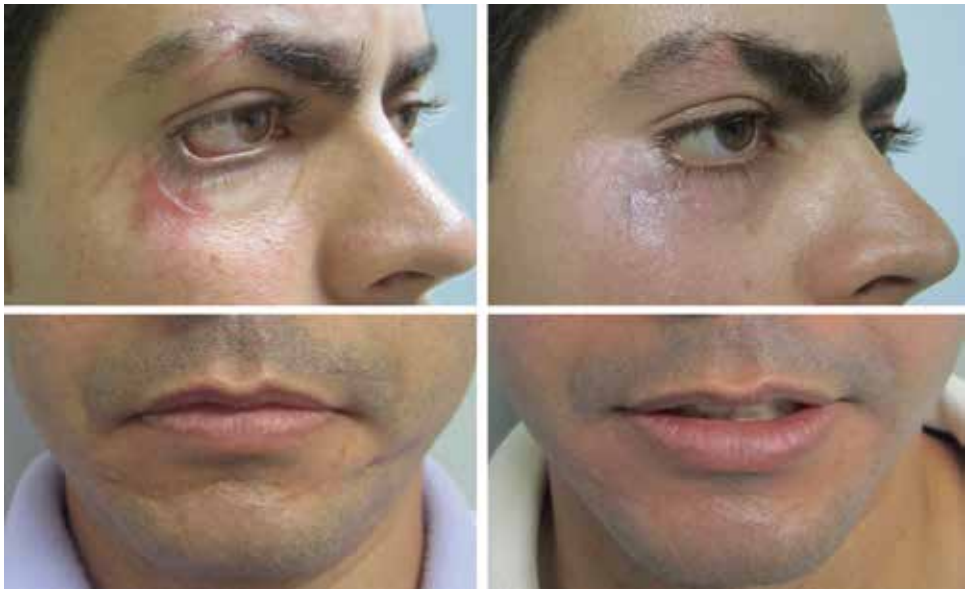

Figura 2: Patient before and 90 days after the treatment.

cream during the night. Seven of the 9 patients who complained of some functional impairment resulting from retraction of the scars described substantial improvement after the treatment. One of these patients additionally reported a reduction of tearing and the end of the need of using eyewashes for ocular lubrication, which was routinely used after having been involved in a car accident (Figure 2). Of the patients evaluated, 7 have already completed 24 months of follow-up after undergoing the procedure, maintaining satisfactory outcomes.

DISCUSSION

Despite the many options currently available for the correction of scars, their treatment remains a major challenge.[6] This new approach is aimed at improving the cosmetic and functional gains in areas of often difficult intervention, such as the periorbital region. In the evaluated group, the outcomes were satisfactory and compatible with the author's and patients' expectations, allowing the suggestion for the inclusion of the proposed methodology in the therapeutic armamentarium used to treat polymorphic scars of patients who have suffered accidents involving automobiles. Pain and discomfort reported by the patients in the intra- and postoperative periods were compatible with those expected for this type of procedure. The absence of postoperative complications stimulates the author to expand the use of the methodology for treating other patients. The technique should be evaluated in other groups with a view to confirm the outcomes and conclusions offered by the present paper.

CONCLUSION

Good cosmetic and functional outcomes were observed with the use of IPCA® in scars produced by trauma involving car accidents. No adverse effects were observed, which allows the author to suggest that the procedure has a good safety profile.

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DECLARATION OF PARTICIPATION:

Emerson Vasconcelos de Andrade Lima: Participated in the preparation of the present paper, performed the technique, carried out the patients selection, performed photographic records and the follow up in the postoperative period.

Anogenital condylomas in children: descriptive analysis of 20 cases

Condilomas anogenitais em crianças: análise descritiva de 20 casos

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ABSTRACT

Introduction: The occurrence of anogenital warts in children is relatively rare, however it generates distress for the family and the physician regarding the possible association with sexual abuse.

Objective: To demonstrate cases of anogenital wart in children and the therapeutic options used.

Methods: Retrospective descriptive study of anogenital warts in children under 12 years of age, with a mean age of 4 years, treated between 2011 and 2015, in a sexually transmitted diseases public outpatient clinic in the Brazilian Southeast city of São Paulo.

Results: The authors demonstrated 20 cases – of which 12 were female and 8 were male. The preferred location for the lesions was the perianal region (70%), with 30% of the children presenting extragenital warts. The treatment of choice in 65% of cases was the application of topical medication (podophyllin and imiquimod). The longest time to cure was 20 weeks.

Conclusions: Anogenital condyloma was more frequent in girls, the mean age was 4 years, and the most affected site was the perianal region. The lesions had good therapeutic response with the application of the topical treatment of choice.

Keywords: condylomata acuminata; warts; child; child abuse, sexual; therapeutics

RESUMO

***Introdução**: A ocorrência de verruga anogenital em crianças é relativamente infrequente, porém gera angústias para a família e para o médico diante da possível associação com abuso sexual.*

***Objetivo**: Demonstrar casos de verruga anogenital em crianças e opções terapêuticas utilizadas.*

***Métodos**: Estudo retrospectivo descritivo de verrugas anogenitais em menores de 12 anos de idade, com média de idade de quatro anos, atendidos entre 2011 e 2015, em ambulatório público de doenças sexualmente transmissíveis na cidade de São Paulo.*

***Resultados**: Demonstramos 20 casos, sendo 12 crianças do sexo feminino e oito do sexo masculino. A localização preferencial das lesões foi em região perianal (70%), e 30% das crianças apresentavam verruga extragenital. O tratamento de escolha em 65% dos casos foi com medicamentos tópicos (podofilina e imiquimode). O tempo máximo para a cura foi de 20 semanas.*

***Conclusões**: O condiloma anogenital foi mais frequente em meninas, a média de idade foi de quatro anos, a localização mais acometida foi a região perianal e apresentou boa resposta terapêutica com o tratamento tópico de escolha.*

***Palavras-chave**: condiloma acuminado; verrugas; criança; maus-tratos sexuais infantis; terapêutica*

INTRODUCTION

Anogenital warts result from human papillomavirus (HPV) infection.[1] Reports of pediatric cases have been increasingly published in the medical literature,[1] however little is known about the actual epidemiology of HPV in this age group.[2] The diagnosis of anogenital condyloma causes distress to both the physician and the patient's family in the face of possible association with sexual abuse. Knowledge about HPV infection through nonsexual contact is important when considering the implications of an investigation of sexual abuse.3 The inter-

pretation of anogenital condyloma in children as evidence of sexual abuse is controversial, since the prevalence of HPV in sexually abused children ranges from 5% to 33% while in children without suspected abuse is roughly 16% .[2] In light of this fact, the presence of anogenital warts in children may be the result of sexual abuse, which, however, does not seem to be the main means of contagion of these lesions. Other manners of transmission can not be excluded or forgotten at the time of the investigation.[2,3]

OBJECTIVE

The objective of the present study was to review the cases of genital warts in children treated at a public ambulatory specializing in a sexually transmitted diseases outpatient public unit, their clinical characteristics and therapeutic responses.

METHOD

A retrospective descriptive study analyzed cases of anogenital warts in children of up to 12 years of age treated at the Sexually Transmissible Disorders (STD) Ambulatory in the city of São Paulo, between 2011 and 2015.

RESULTS

Twenty patients were treated (12 female and 8 were male), of whom 60% (12) presented exclusively perianal warts, 20% (4) had warts concomitantly affecting genital and anal regions, and 20% (4) had warts only in the genitalia (10% penile and 10% vulvar, with 2 patients each). Of the patients evaluated, 30% (6) had extragenital warts. People who had close contact with the patients were also evaluated for the presence of warts. Four relatives (20%) had genital warts (2 fathers, 1 mother and 1 sister), and 4 relatives (20%) had extragenital warts (Table 1). In 55% of cases, diagnosis was achieved by the association of clinical and dermoscopic methods, without confirmatory histological examination. Histological examination was performed in 9 children. Of the 20 children studied, 18 had their lesions treated, while 1 was still being followed up, and 1 did not attend the follow up session. The treatment of choice in 65% of the cases employed topical medication (20% podophyllin and 5% imiquimod), meaning : 6 children (30%) were treated with imiquimod alone, 3 (15%) were treated with podophyllin, and 4 (20%) with imiquimod and podophyllin. Imiquimod at a 5% concentration was used in cream (one sachet applied in the affected region at night on Mondays, Wednesdays and Fridays, washing 8 hours after). Podophyllin at a 20% concentration was used in in solid petrolatum, applied weekly by the physician at the outpatient clinic, with instructions for cleansing the region 4 hours after the application. Four patients (20%) underwent the combined therapy of one of the topical agents followed by a destructive method (chemosurgery with 90% trichloroacetic acid, electrocauterization or cryotherapy), with complete resolution of the picture. One patient had been taken by her mother to another medical service, where electrocauterization was performed with unsatisfactory aesthetic outcome, prompting the search for our service. The maximum time to achieve cure was 20 weeks.

DISCUSSION

Non-sexual HPV transmission can occur in a number of ways that include direct or indirect personal contact with contaminated objects or surfaces and vertical transmission. Syrjänen and Puranen conducted a review of the various acquisition modes of HPV and anogenital warts in children (from birth to 12 years of age), demonstrating the presence of a high prevalence of disease transmitted by means other than sexual contact.[4] In 185 patients with anogenital warts, 67 (36%) had a known source of acquisition, such as autoinoculation, nonsexual transmission from other family members, and possible vertical transmission from the mother.[4] In a study by Jones et al., the suspicion of sexual abuse was reported in only 3 (2%) of 131 patients, showing that clinical evidence of HPV does not usually correlate with that occurrence.[3] It is important to note that the existence of people who have close contact with the patients or even caregivers with warts on the hands does not rule out the possibility of abuse, since abuse is not limited to sexual contact. In addition, children are not cared for only by family members. Many are under the care of others, making research extremely complex and invasive. In the present study, a multidisciplinary team evaluated patients and their families, and psychological and pediatric evaluations were included to address the psychosocial and family contexts, aiming at avoiding the possibility of abuse.

The prevalence of other STDs in the context of child sexual abuse is 4%. This investigation is mandatory in the declared or evident cases, with positive results being a strong indication of its occurrence in all other cases.[1] All 20 patients in the present study underwent serology tests for HIV, syphilis, hepatitis B and C, with absence of diagnosis of any of these infections in the studied population.

The diagnostic method used in the study was an association of clinical and dermoscopic techniques in 55% of the cases, without confirmatory histological examination. As described by Verasey Veasey et al., clinical and dermoscopic examinations yield sufficient criteria to confirm the diagnosis of anogenital warts.[5] In the case of lesions in children, reaching diagnosis while avoiding invasive procedures is an advantage.

There is no consensus for the treatment of anogenital warts, including those that affect children.[6,7] The therapeutic choice should be individualized, and in the experience of the medical service in question, preference is given to topical, less traumatizing treatments that evolve with fewer sequelae (Figure 1). In the patients studied in this paper, the topical therapies used included 5% imiquimod in cream and 20% podophyllin in solid petrolatum. Although there are restrictions on the use of these therapies in patients under 12 years of age, some studies indicate their use in children at lower ages.7-10 The therapy of choice was 5% imiquimod, with 20% podophyllin therapy being chosen when there was no possibility of buying the product. In patients whose topical therapy was proven ineffective, destructive therapies were associated with resolution of the condition. Four patients (20%) underwent combined topical therapy followed by destructive therapy, with total resolution of the condition.

Table 1: Characteristics of treated patients bearing anogenital warts.

PATIENT	GENDER	AGE	LOCATION	EXTRAGENITAL WARTS	WARTS IN CLOSE PEOPLE	
					ANOGENITALS	EXTRAANOGENITAL
1	M	6 YEARS	Perianal	Yes	No	No
2	M	1 YEAR	Perianal	No	Yes, Mother	No
3	M	3 YEARS	Perianal	Yes	No	No
4	F	3 YEARS	Perianal	No	Yes, Father	Yes, Father
5	F	7 YEARS	Vulvar	No	No	No
6	F	5 YEARS	Perianal	Yes	No	Yes, Mother e Sister
7	M	2 YEARS	Perianal	No	No	Yes, Mother
8	F	2 YEARS	Anogenital	No	No	No
9	F	10 YEARS	Anogenital	Yes	No	No
10	F	1 YEAR	Vulvar	Yes	No	Yes, Mother
11	F	1 YEAR	Perianal	Yes	No	No
12	F	2 YEARS	Perianal	No	No	No
13	F	2 YEARS	Perianal	No	Yes, Sister	No
14	M	9 YEARS	Perianal	No	No	No
15	M	10 YEARS	Penile	No	No	No
16	M	9 YEARS	Penile	No	No	No
17	F	7 YEARS	Perianal	No	Yes, Father	No
18	F	2 YEARS	Anogenital	No	No	No
19	F	3 YEARS	Anogenital	No	No	No
20	M	2 YEARS	Perianal	No	No	No

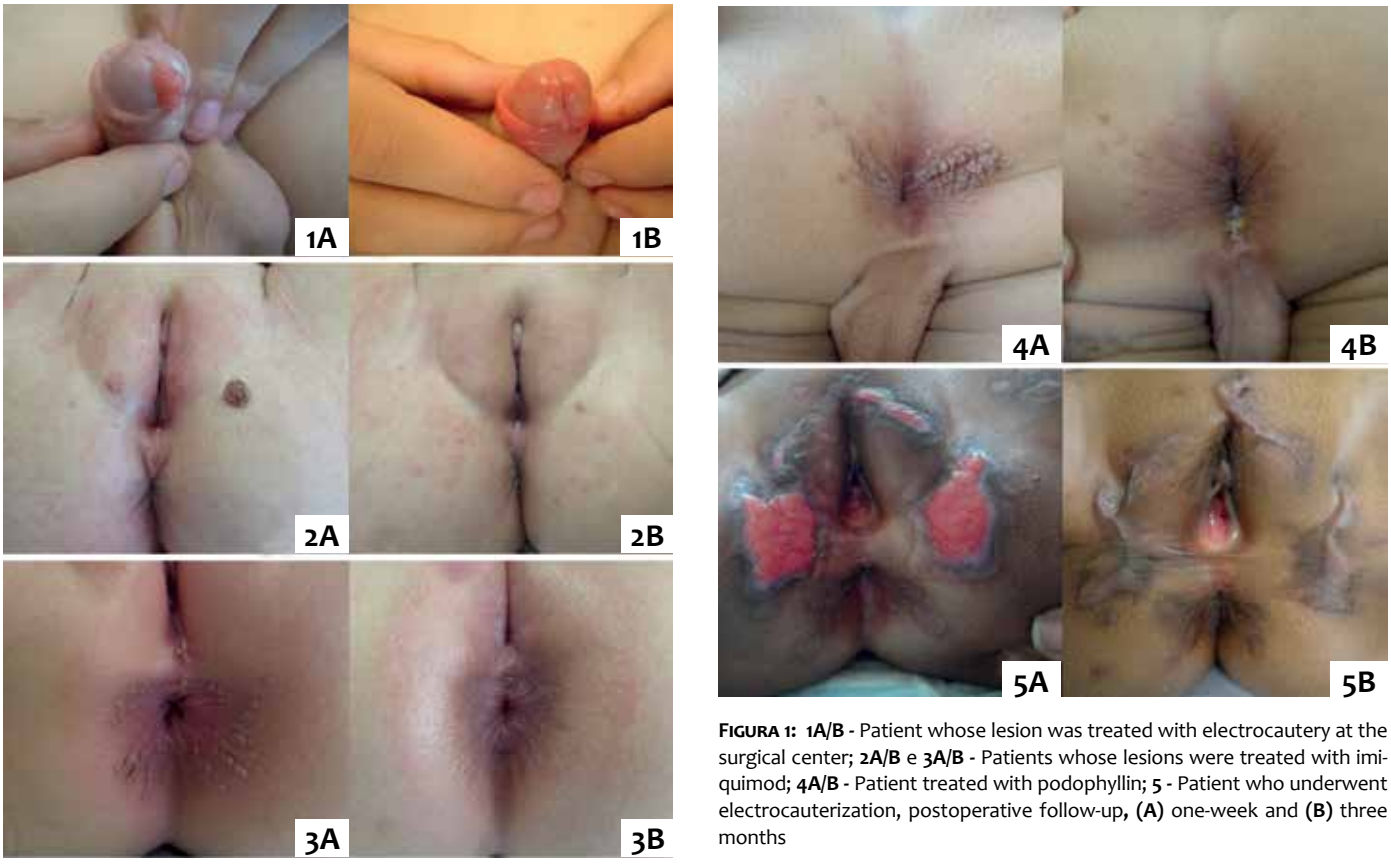

Figura 1: 1A/B - Patient whose lesion was treated with electrocautery at the surgical center; **2A/B** e **3A/B -** Patients whose lesions were treated with imiquimod; **4A/B -** Patient treated with podophyllin; **5 -** Patient who underwent electrocauterization, postoperative follow-up, **(A)** one-week and **(B)** three months

One patient was dissatisfied with aesthetic damage resulting from electrocauterization performed at another medical service, thus exemplifying the risk of performing destructive therapies in the treatment of anogenital warts (Figure 1). There was no correlation between the time to cure (20 weeks maximum) and the location of the lesions, nor between cure and adopted therapy. The combined treatment was longer, probably due to the fact that it was indicated in more complex cases, with a greater number of lesions and difficulty to conduct an adequate ambulatorial follow-up. The authors do not believe age is a factor of therapeutic difficulty.

CONCLUSION

Anogenital warts in children pose a challenge to the physician not only due to the diagnosis, but also for issues that accompany the picture, among them, the way of acquiring the lesion and the best therapeutic approach. It is critical to examine the child and the people who have close contact with him / her in search for lesions, and to request serologies for STD screening. According to the literature, the prevalence of sexual abuse as a means of transmission of the lesions does not seem to be the main one.

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DECLARATION OF PARTICIPATION:

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Marina Dall'Antonia: Obtaining, analyzing and interpreting data.

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Use of the pinch technique to reduce the pain in scalp microneedling: a comparative study

Utilização da técnica da prega para diminuir a dor no microagulhamento do couro cabeludo: estudo comparativo a comparative study

DOI: http://dx.doi.org/10.5935/scd1984-8773.201792999

ABSTRACT

Introduction: Microneedling has been performed in several areas of Dermatology, including the treatment of androgenetic alopecia. However, one of its major limitations is pain, which occurs both with the use of rollers with multiple fine needles and with motorized devices equipped with microneedles.

Objective: To describe a new technique aimed at minimizing pain during the microneedling in the scalp.

Methods: An observational, prospective and comparative study of the microneedling effects was performed with a motorized device, with and without folding the skin by using the thumb and index finger of the surgeon's non-dominant hand. This procedure was termed "pinch technique" by the authors.

The pain was assessed by the patient based on a visual analogue scale, and the data analyzed with the Student's t-test, in order to verify the existence of statistical difference between the data sets.

Results: Fourteen patients bearers of androgenetic alopecia (13 men and 1 woman) were treated. The analysis of the data on the pain reported by the patients suggested that the arithmetic mean of the data obtained from the areas where the technique was not applied was greater than that obtained in areas where the technique was employed.

Conclusions: The described technique was proven effective in reducing pain during the microneedling procedure. That outcome resulted from the alteration of the perception of pain due to the tactile stimulus and the increase in the distance of the needles regarding the galea, which is richly innervated.

Keywords: Ambulatory surgical procedures; Alopecia; Needles

RESUMO

***Introdução**: O microgulhamento vem sendo realizado em diversas áreas da Dermatologia, incluíndo o tratamento da alopecia androgenética. Porém, um dos seus maiores limitantes é a dor, que ocorre tanto com o uso de cilindros agulhados, como com aparelhos motorizados dotados de microagulhas.*

Objetivo: descrever uma nova técnica para minimizar a dor durante o microagulhamento do couro cabeludo.

***Métodos**: estudo observacional, prospectivo e comparativo, do microagulhamento realizado com aparelho motorizado, utilizando ou não o pregueamento da pele da área a ser tratada, entre os dedos polegar e indicador da mão não dominante do cirurgião. Este procedimento teve a denominação pelos autores, de Técnica da Prega.*

A dor foi avaliada pelo paciente com base em escala visual analógica, e os dados submetidos ao teste t-Student, a fim de verificar a existência de diferença estatística entre os dados analisados.

***Resultados**: foram tratados 14 pacientes portadores de alopecia androgenética, 13 homens e 1 mulher. Após análise dos dados sobre a dor referida pelos pacientes, observou-se que a média aritmética dos dados das áreas não submetidas à Técnica da Prega era mais alta do que a média dos dados das áreas submetidas à referida técnica.*

***Conclusões**: A técnica descrita mostrou-se eficaz na diminuição da dor durante o procedimento de microagulhamento do couro cabeludo, em consequência da alteração da percepção dolorosa pelo estímulo tátil, e pelo distanciamento das agulhas em relação à gálea que é ricamente inervada.*

***Palavras-chave**: Procedimentos cirúrgicos ambulatórios; alopecia; agulhas*

Original Articles

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INTRODUCTION

Microneedling is part of the therapeutic armamentarium of contemporary dermatology. It has recently gained an important role in trichology, emerging as an excellent method to be combined with the clinical treatment of androgenetic alopecia. Studies show that microneedling releases platelet-derived and epidermal growth factors by activating the wound regeneration process that takes place after the skin undergoes perforation caused by microneedling. They also show that microneedling promotes stimulation and overexpression of genes related to hair growth, such as those of Wnt3a and Wnt10 path.[1] The procedure is straightforward and can be performed with cylinders or motor-powered devices containing microneedles, with the patient's pain and anxiety being challenges to be overcome.

In both types of devices, it is possible to use needles 0.5 to 2.5mm long, with the intensity of the pain being proportional to the length of the used needle. When needles penetrate up to 0.25mm into the skin, the procedure is painless, however with longer needles, the pain varies from mild to severe.

The present study was aimed at evaluating a procedure termed the pinch technique by the authors. In this technique, digital pressure is applied in order to fold the skin of the area to be treated as a way to decrease the pain described by the patient during the microneedling procedure.

METHODS

An observational, prospective and comparative study was carried out, observing the ethical principles of the Declaration of Helsinki. The pain described as a consequence of microneedling performed with the conventional technique was compared with that resulting from the procedure performed with the pinch technique. Patients with androgenetic alopecia were selected at the trichology ambulatory of the Hospital do Servidor Público Municipal de São Paulo, Brazil. The inclusion criteria were: age above 18 years and clinically evident androgenetic alopecia. The exclusion criteria were: blood dyscrasias, history of bleeding or use of oral anticoagulants, presence of autoimmune diseases, Koebner's phenomenon, or any health condition or use of medication that, in the opinion of the dermatologist physician, rendered them ineligible. Topical anesthesia (14% lidocaine associated with 7% tetracaine, in gel vehicle dispensed by Drogaderma, Brazil) was applied and maintained for 30 minutes in the scalp of the patients, followed by asepsis with 1% aqueous chlorhexidine. The scalp was divided into quadrants with a tape arranged linearly from the highest point of the right ear's helix up until the corresponding point in the left ear, and another arranged from the glabellar region to the bony protuberance of the occipital region. Next, squares with sides measuring 2cm were demarcated in each of the quadrants, from the point where the tapes intersected on the scalp, forming two anterior superior quadrants and two inferior posterior quadrants (Figure 1). The patients underwent a microneedling session with the assistance of the Cheyenne® tattooing device (Cheyenne®, Germany), with the energy parameter set at 70Hz and queued needles model 17-bp-Magnum (Cheyenne®, Germany), with an adjustable depth of 1mm. The microneedling procedure, without the use of medication, was performed in the four squares previously demarcated. In the left hemicranium (T1: posterior; T3: anterior) it was performed with the conventional technique. In the right hemicranium (T2: posterior, T4: anterior), the pinch technique was used during the microneedling procedure, meaning that the area of the scalp to be treated was pinched between the surgeon's non-dominant hand's thumb and index finger (Figure 2). The final goal was to obtain similar bleeding dews in the quadrants (Figures 3 and 4). After 30 seconds, the pain was evaluated by the patient based on the visual analogue scale (VAS) – a simple, practical tool deemed as reproducible for the measurement of pain. In order to perform the photographic records, an 8-megapixel Apple iPhone 6's digital camera was used under identical environmental conditions immediately after the procedure. The data were later on analyzed using the Student's t-test (Microsoft Excel software), aimed at verifying the presence of statistical difference, with a significance level of 5%.

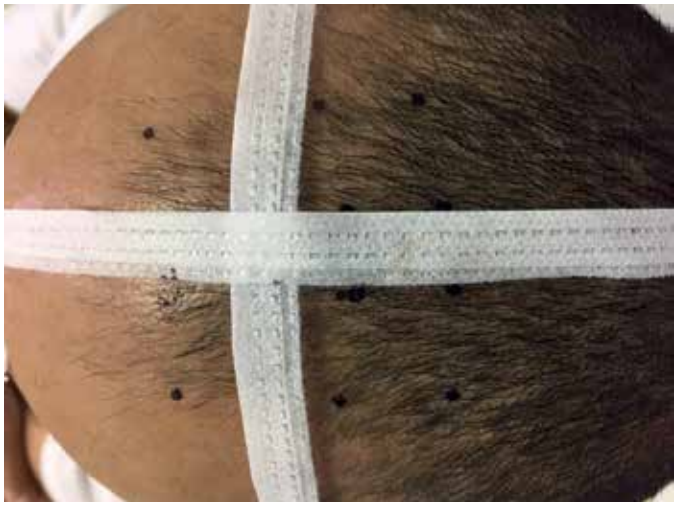

Figure 1: Demarcation of the quadrants

Figure 2: Implementation of the technique

RESULTS

The patients were numbered from 1 to 14: 13 males and 1 female, minimum age = 29 years, maximum age = 70, mean age = 44 years. Fitzpatrick's phototypes ranged from II to IV.

After the patients have attributed scores to their own pain sensation (Table 1) based on the VAS, it was possible to observe that the arithmetic means of the posterior quadrants (T1 = 5.43, T2 = 3.50) were statistically different from each other. A similar result was observed in the anterior quadrants (T3 = 6,14, T4 = 3,43), demonstrating the effectiveness of the pinch technique in reducing the pain during the microneedling procedure in the scalp.

Despite the fact that the arithmetic mean was higher in the anterior region, the comparison between the left (T1 and T3) and right (T2 and T4) hemicrania indicated that the results were statistically similar for a 5% level of significance. Of the 14 patients included in the study, [2] did not present altered perception of pain (patients 2 and 13) and 1 (patient number 7) reported a worsening of the pain sensation.

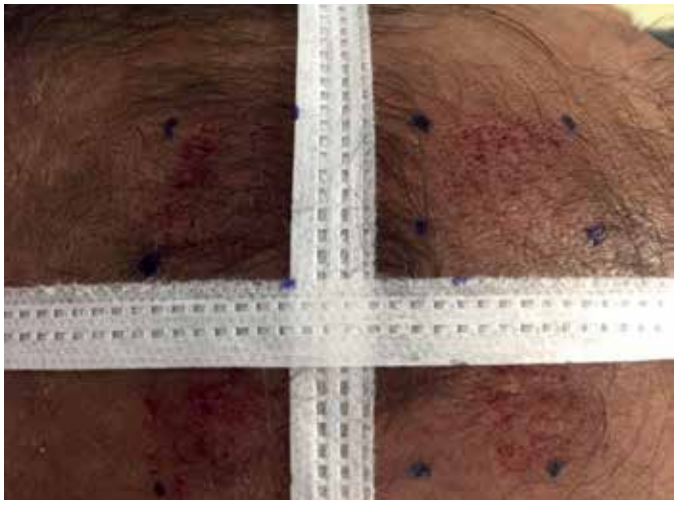

Figure 3: Post-microneedling

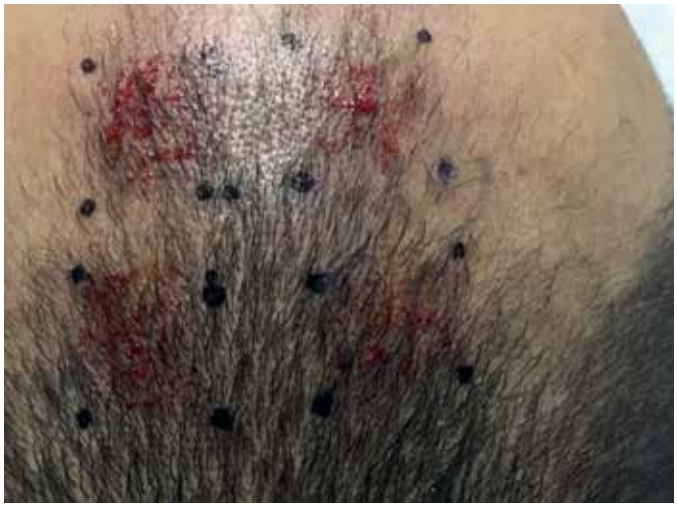

Figure 4: Comparison of the bleeding dews

Table 1: Analysis of the patients' pain sensation intensity during the microneedling procedure in the scalp

Patients	T1 *a	T2 *b	T3 *a
1	6	4	8
2	7	7	9
3	4	3	4
4	6	3	7
5	7	5	7
6	6	4	7
7	5	6	7
8	8	2	5
9	2	1	2
10	5	2	6
11	5	4	7
12	6	3	7
13	2	2	3
14	7	3	7
Mean	**5,43**	**3,50**	**6,14**

*a Test T (5%): T1 and T3 are statistically similar, however are statistically different from T2 and T4.

*b Test T (5%): T2 and T4 are statistically similar, however are statistically different from T1 and T3.

T1: posterior region without the pinch technique

T2: posterior region with the pinch technique

T3: Anterior region without the pinch technique

T4: Anterior region with the pinch technique

DISCUSSION

The microneedling procedure described in Dermatology as a tool in the treatment of cutaneous aging and acne scars by stimulating the synthesis of collagen has had its use expanded for treating alopecia.[1] Pain during minimally invasive skin procedures is caused by the activation of two nocireceptors: the small and slightly myelinated Aδ fibers and the non-myelinated C fibers. Painful stimuli are carried by these nerve fibers to the dorsal spinal ganglion and then to the central nervous system, being received into the cortex.[2,3] Pain modulation occurs mainly through the interaction of Aδ with C fibers, inhibitory interneurons of the spinal cord, and cortical control by the brain.[3] Vibratory analgesia seems to be explained by the interaction between two cortical areas that encode pain and touch, respectively.[4] Pain can be quantified by several described methods, the most accepted being the quantification by VAS, which assigns grades from 0 to 10 to the pain perceived during a procedure. Grades 1 and 2 refer to mild pain; Grades 3 to 7, to moderate pain; and Grades 8 to 10 to intense pain.[5] Classical analgesia using topical anesthetics, such as lidocaine and prilocaine creams applied 30-60 minutes prior to microneedling, is not enough to eliminate the pain inherent in the procedure. Therefore, it is important to combine non-anesthetic analgesia techniques; such as vibratory and tactile stimuli.[5] Microneedling causes pain by mechanical stimulation, and can be mechanic-chemical when associated with the infusion of low-pH drugs into the dermis. When exerting pressure or vibration

during the procedure, more than one type of sensorial stimulus reaches the cortex, "deceiving" the pain bearer, which can be interpreted as a reduction of the pain sensation.[3,4] In this manner, this new technique decreases the patient's perception of pain, due to the association of another neuro sensitive stimulus at the site. Comparing the anterior and posterior regions, the perception of pain was more intense in the first, however without statistical significance. It is believed that this difference is due to the scalp's anatomy, given the presence of a greater amount of sensory nerves in the frontal region and the smaller amount present in the parietal region. Based on the patients' self-perceived VAS, the vast majority described improvement – with statistical significance – in the pain associated to the pinch technique. The authors of the present article believe that this technique decreases the pain caused by the procedure by altering its perception based both on the tactile stimulus and the formation of a cushion in the fold caused by the pinch, which reduces the proximity of the needles to the galea, which is richly innervated. The pinch technique is straightforward, costless, reproducible, and can be performed in any region of the scalp (Figure 5). It may, however, be more difficult to perform in some patients who have a less elastic scalp. The procedure is technician-dependent and requires adequate training for its effective implementation.

Figure 5: Fold caused by the pinch in the frontal region of the scalp

CONCLUSION

Minimally invasive procedures for treating alopecia have been shown to be effective and gaining relevance world wide, however pain remains a limiting factor to patient adherence. The use of the pinch technique allows achieving the desired result with greater patient comfort and at no additional cost.

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DECLARATION OF PARTICIPATION:

Marina de Souza Barletta: created the technique, performed the described procedure in the patients, designed and assisted in the writing of the paper.

Leticia Arsie Contin: performed the described procedure in the patients, designed and assisted in the writing of the paper.

Fernanda Freitas de Brito: performed the described procedure in the patients, designed and assisted in the writing of the paper.

Gabriela Nero Mitsuushi: performed the described procedure in the patients, designed and assisted in the writing of the paper.

Kedima Caldeira Nassif: performed the described procedure in the patients, designed and assisted in the writing of the paper.

Livia Mendes Sabia: performed the described procedure in the patients, designed and assisted in the writing of the paper.

Clinical evaluation of the efficacy and safety of an active moisturizer-barrier repairer as an adjuvant treatment in atopic dermatitis in children

Estudo clínico para avaliar a eficácia e segurança de um hidratante ativo reparador de barreira como auxiliar no tratamento de dermatite atópica em crianças

DOI: http://dx.doi.org/10.5935/scd1984-8773.201792941

ABSTRACT

Introduction: The use of moisturizers improves the skin barrier's function and might be useful in atopic dermatitis.

Objectives: To assess the efficacy and safety of an active moisturizer-barrier repairer based on glycerin, erythritol, Imperata cylindrica and homarine as an adjuvant treatment in atopic dermatitis.

Methods: Application of the moisturizer in children with mild to moderate atopic dermatitis for 1 month, with subjective and objective evaluations after 15 and 30 days.

Results: Data from 35 children – 20 girls (57.15%), 15 boys (42.86%) / 26 Caucasians (74.29%), 6 mulattos (17.14%), 3 dark skinned (8.57%) – aged 1 to 10 years (mean age = 5.6) were analyzed. The values of the variables sleeping disorders, dryness, desquamation, pruritus and softness of the skin had significantly decreased on the 30th day of treatment as compared to the baseline. The objective evaluation of the severity using the Scoring Atopic Dermatitis severity index revealed a decrease to 9.30 from 25.27 ($p < 0.0001$). There was a reduction in the use of dexchlorpheniramine and hydrocortisone to 5.72% each on the 30th day, from 25.71% ($p = 0.0233$) and 34.29% ($p = 0.0075$) on the 15th day, respectively.

Conclusions: The use of the moisturizer for 30 days improved the analyzed symptoms with a significant reduction in the Scoring Atopic Dermatitis severity index with decreased need for antihistamines and topical corticosteroids. The use of a suitable moisturizer was effective and safe as an adjuvant treatment for children with atopic dermatitis.

Keywords: dermatitis, atopic; hygroscopic agents; child

RESUMO

Introdução: *O uso de hidratantes melhora a função de barreira cutânea e pode ser útil na dermatite atópica.*

Objetivos: *Avaliar eficácia e segurança de hidratante ativo reparador de barreira à base de glicerina, erythritol, Imperata cilindrica e homarine como tratamento auxiliar da dermatite atópica.*

Métodos: *Aplicação de hidratante em crianças com dermatite atópica de leve a moderada durante um mês, com avaliações subjetivas e objetivas após 15 e 30 dias.*

Resultados: *Foram analisados os dados de 35 crianças, de um a dez anos, quanto a: alterações do sono, ressecamento, descamação, prurido e maciez da pele, que tiveram redução significativa da visita inicial em relação à final. A avaliação objetiva do índice de gravidade Scorad (score on atopic dermatitis) revelou redução de 25.27 para 9.30 ($p < 0.0001$). Houve redução no uso de dexclorfeniramina de 25.71% no 15o dia para 5.72% no 30o dia ($p = 0.0233$) e de 34.29% no 15o dia para 5.72% no 30o dia com hidrocortisona ($p = 0.0075$).*

Conclusões: *O uso do hidratante durante 30 dias melhorou os sintomas analisados, com significativa diminuição do índice de gravidade e menor necessidade de anti-histamínicos e corticosteroides tópicos. A utilização de hidratante adequado foi eficaz e segura como auxiliar para crianças com dermatite atópica.*

Palavras-chave: *dermatite atópica; higroscópicos; criança*

Original Articles

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INTRODUCTION

Atopic dermatitis (AD) is a chronic, recurrent and pruriginous inflammatory skin disease resulting from a complex interdependence of genetic, immunological, and environmental factors.[1] It occurs most often in childhood, however may persist into adulthood in roughly 40-60% of cases,[2,3] causing substantial psychological and physical discomfort for patients and their families, with a considerable impact on the quality of life.[4]

In most cases, its signs and symptoms emerge in early childhood. It is estimated that 50% of new cases occur in the first year of life, with 85% of cases beginning before the age of five. It is the most important chronic dermatologic disease in this age group.[1] The cardinal symptom of AD is pruritus, even in infants and young children, leading to restlessness or difficulty to fall asleep. Xerosis is another frequent sign in AD, resulting from several alterations in barrier function, such as increased transepidermal water loss, decreased ceramides 1 and 3, decreased fatty acids and cholesterol in the skin. Eczematous lesions vary according to the age group, being predominantly acute up to two years of age, subacute up until puberty and chronic in adults, however with surges at any time of life.[1]

The clinical diagnostic criteria of Hanifin and Hajka were introduced in 1980 and are still currently used for the diagnosis of AD in clinical studies, taking into account the main signs and symptoms of the condition.[5]

Basic control of AD requires efficient control of surges by treating inflammatory symptoms and promoting the reestablishment of the skin's barrier homeostasis, in addition to avoiding aggravating or triggering factors of the disease.[6] Topical and immunomodulatory corticosteroids are the first line of treatment for disease surges, while long-term control is based on the use of moisturizers aimed at maintaining the skin's barrier integrity, relieving pruritus and preventing further surges.[7-9] Although some studies have shown that the use of moisturizers increase the therapeutic response and improve results, there are few reports on the isolated application of these products in children bearing mild and moderate conditions.[10,11]

For these reasons, the authors of the present study investigated the effects of a formulation containing moisturizing ingredients (glycerin and erythritol), lipid components (ceramides and omegas), and botanical active principles with osmoregulatory properties (Imperata cylindrica and homarine) for reducing the severity of the lesions, relieving pruritus, and improving cutaneous hydration, sleeping disorders and tolerability in pediatric patients with mild to moderate AD.

OBJECTIVE

To evaluate the efficacy and tolerability of a topical moisturizing product used as an adjuvant in the treatment of mild to moderate AD in children.

METHODS

The present study was analyzed and approved by the Research Ethics Committee of the Complexo Hospitalar Padre Bento de Guarulhos, in the Brazilian State of São Paulo. At least one individual legally responsible for the patient (the mothers, in general) signed the Free and Informed Term of Consent after having received an explanation and understanding the scientific purpose of the results. Children who were already literate, read and signed the Term of Consent.

The inclusion criteria were:

- both genders, aged between 3 months and 10 years of age;
- presence of pruritus;
- presence of mild eczema according to the severity score SCORAD (Score On AD)5
- at least 1 week without using moisturizer and / or corticosteroid orally;
- at least 1 month without injectable corticosteroid;
- at least 72 hours without using antihistamine;
- no known history of allergic reaction to products of the same category as the test product or to the supportive products;
- absence of diseases that, at the discretion of the investigator, could interfere with the clinical evaluation or the visitation schedule.

The investigator excluded the children according to the following criteria: those who had carried any risk or bore any condition that could interfere with the study's objectives; those with history and obvious clinical signs of intense exposure to the sun; female patients who had undergone menarche. During the course of the study, the following events also triggered the exclusion of patients: history and obvious clinical signs of intense exposure of the body to the sun since the previous visit; use of oral or injectable corticosteroids; application of another body moisturizing product; any other reason that, at medical discretion, offered a risk to the patient or interfered with the purpose of the study; failure to use investigated product for 3 consecutive days or 7 non-consecutive days during the 30 days of the treatment.

Study Design

Forty patients bearing AD were selected according to the Hanifin and Rajka criteria to undergo a clinical, open, prospective, phase IV study.[5]

The individuals responsible for the patients were instructed to apply the moisturizing product once a day throughout the skin after having bathed the patient. Evaluations were carried out at baseline (D0), 15 days after (D15) and 30 days after (D30). During the 30 days of the study, patients were allowed to use a rescue medication, with oral dexchlorpheniramine, at the recommended dose for the age, for pruritus symptoms; and hydrocortisone cream twice a day in case of skin lesions. The responsible parties were given a diary in which they should record signs, symptoms and use of the rescue medication during the 30 days of observation. The moisturizer's safety was assessed at visits D15 and D30 through reports of adverse events and the completion of tolerability questionnaires. The SCORAD Index – based on the extent of the lesions, on the degree of xerosis, and on the presence of erythema, edema, crusts, scratching signs, lichenification, as well as the intensity of daytime and nighttime pruritus[9] – in addition to the evaluation of pruritus, intensity of symptoms,

sleeping disorders and the clinical examination of the lesions at D0, D15 and D30, were used by the researchers for the clinical analysis of efficacy. Only children with SCORAD degrees considered mild or moderate were selected for the study. In the subjective analysis based on questionnaires filled out by the responsible parties, the following variables were considered: sleeping disorders; degree of pruritus (in a scale ranging from 1 to 10), skin's dryness, desquamation, degree of hydration and softness.

STATISTICAL ANALYSIS

In order to describe the profile of the sample according to the studied variables, frequency tables of the categorical variables were prepared with absolute frequency values (n), percentages (%) and descriptive statistics of the numerical variables, with values mean values, standard deviations, minimum and maximum values and medians.

ANOVA for repeated measures was used to compare numerical scores. The data were transformed into ranks due to the absence of normal. The McNemar's test was employed to compare categorical results.

The adopted level of significance was 5% (0.05) and the statistical analysis was performed using the software SAS (Statistical Analysis System), version 9.4., SAS Institute Inc, 2002-2015, Cary, NC, USA.

RESULTS

Patient profile

Of the 40 children selected, 5 were excluded due lack of compliance with the study's protocol, such as use of oral corticosteroids and failure to attend D15 or D30 visits. Thirty-five children were considered in the final analysis.

The predominant profile of the patients who completed the study was Caucasian children (Table 1) of 1 to 10 years of age (mean = 5.6 years, median = 6 years).

Subjective analysis

All parameters evaluated in the patients who completed the study showed significant variation of the scores between the baseline visit (D0) and the experimental points D15 and D30. There was no significant variation in outcomes between timepoints D15 and D30, except for pruritus, which presented a significant reduction (Table 2).

Clinical evaluation

For the sample that concluded the study, there was a significant decrease in the SCORAD between D0 (baseline) and D15, D0 and D30, and D15 and D30. Regarding the intensity of symptoms, pruritus and sleeping disorders, there was a significant reduction of the scores in the comparison between visits D0 and D15, and D0 and D30 (Table 3).

Another parameter analyzed regarding the moisturizer's effectiveness was the comparison between the use of supportive medications – namely dexchlorpheniramine and hydrocortisone – in visits D15 and D30. As observed in Table 4, there was a clear decrease in the need for dexchlorpheniramine and hydrocortisone between the two visits.

Table 1: Demographic data of the studied patients (n = 35)

Genre	Frequency	%
Female	20	57,14
Male	15	42,86
Color		
Caucasian	26	74,29
Brown/Mullato	6	17,14
African descent	3	8,57
Far East	–	–

There was a statistically significant reduction in the use of both dexchlorpheniramine and hydrocortisone between visits D15 and D30.

Tolerability

The tolerability was considered excellent by 94.29% of patients in D15 and by 97.14% in D30. There was no report of either regular or poor tolerability. Regarding the sensations of pruritus, burning, pinching and comfort, there was no significant change in results between visits D15 and D30, with adequate tolerability during the period of product use.

DISCUSSION

AD is deemed as one of the most prevalent childhood dermatological diseases. In Brazil, it affects 5 to 10% of children under 12 years of age, depending on the geographic region. It causes a great impact in the life of these children and their families, especially due to the appearance of the skin lesions and pruritus – always present and in varying degrees. Dry skin is one of the main signs of AD, with several repercussions for the body.

Increasing evidence suggests that skin barrier dysfunctions promote the development of and worsen AD.[12] Defective synthesis of ceramides, in special of the types 1 and 3, has been linked to xerosis in AD.[13] Alterations in at least three clusters of genes encoding structural proteins, epidermal proteases and protease inhibitors promote predisposition to an altered epidermal barrier and increased risk for AD.[14] The strong association between genetic defects of the barrier and environmental aggressions that cause damage to it, suggests that this dysfunction is a primary event in the development of the condition.[15] There are important changes in lipids in AD, such as reductions in ceramides and increased hydrolysis of sphingomyelin.[14,15] The impairment of the barrier function is currently considered an important etiologic factor in the pathogenesis of AD in a significant number of patients. Filaggrin is key for the formation of the skin barrier and factors of natural humidification (a set of substances with hygroscopic functions that are metabolized from the hydrolysis of filaggrin). These factors prevent transepidermal water loss, blocking the entry of irritants, allergens, infectious agents and chemical offenders.[16,17] In addition to filaggrin, the so-called envelope proteins – loricrin, involucrin and claudin –

Table 2: Analysis of the patients' subjective questionnaire results in experimental timepoints D0, D15 and D30

Sleep disturbance (n = 35)	D0	D15	D30
Mean value	3	1,17	0,86
Median	1	–	–
Standard deviation	3,34	1,92	1,82
Minimum	–	–	–
Maximum	10	7	7
p	< 0,0001		
Dryness (n = 35)	**D0**	**D15**	**D30**
Mean value	5,60	3,34	2,66
Median	6	3	2
Standard deviation	2,20	2,15	2,06
Minimum	–	–	–
Maximum	10	7	7
p	0,0001		
Desquamation (n = 35)	**D0**	**D15**	**D30**
Mean value	1,97	0,49	0,20
Median	2	–	–
Standard deviation	2,28	1.04	0,87
Minimum	–	–	–
Maximum	8	5	5
p	<0.0001		
Hydration (n = 35)	**D0**	**D15**	**D30**
Mean value	4,14	7,14	7,40
Median	4	7	8
Standard deviation	1,82	1,91	2,08
Minimum	–	3	3
Maximum	8	10	10
p	< 0,0001		
Pruritus (n = 35)	**D0**	**D15**	**D30**
Mean value	5,14	2,40	1,66
Median	5	2	1
Standard deviation	2,51	2,13	2,04
Minimum	–	–	–
Maximum	9	8	7
p	< 0,0001		
Softness (n = 35)	**D0**	**D15**	**D30**
Mean value	4,66	7,26	7,83
Median	5	7	8
Standard deviation	1,85	1,60	1,40
Minimum	–	4	4
Maximum	8	10	10
p	< 0,0001		

Table 3: Analysis of SCORAD results on visits D0, D15 and D30

SCORAD(n = 35)	D0	D15	D30
Mean value	25.27	12.24	9.30
Median	25.10	10.15	7.15
Standard deviation	10.17	8.06	8.74
Minimum	8.20	0.00	0.00
Maximum	50.00	33.80	36.40
p			

Table 4: Use of oral dexchlorpheniramine (for the control of pruritus) and hydrocortisone cream (for skin lesions) at experimental timepoints D15 and D30

Use of oral dexchlorpheniramine	D15	D30
Yes	9 (25,71%)	2 (5,72%)
No	26 (74,29%)	33 (94,28%)
Use of hydrocortisone		
Yes	12 (34,29%)	2 (5,72%)
No	23 (65,71%)	33 (94,28%)

p value for dexchlorpheniramine D15 x D30: 0.0233
p value for hydrocortisone D15 x D30: 0.0075

had proven their importance in the formation of the skin barrier, with a relevant role also in the dryness of the atopic skin.[17] Today, all consensus guidelines for the control of AD consider not only cutaneous hydration, but also the recovery of the impaired barrier function, a crucial part of the short and long-term control of the condition.[16-19]

In line with the literature, there was predominance of the female gender for this age group in this study.[1,4] Caucasians were the majority, which reflects the profile of the ambulatory's care. The age group was in line with the expected: from 1 to 10 years of age, with a mean value of 5.6 years (Table 1).

The assessed product significantly improved the clinical picture of the studied children, regarding both the dryness and the degree of eczema. The subjective analysis of variables such as sleep disturbances, skin dryness and desquamation had a statistically significant reduction in timepoints D15 and D30, reflecting the effectiveness of the product used (Table 2). The degree of pruritus was also the subject of questioning for mothers (in the case of younger children) and for the patients themselves (in cases where they understood the question). The analog scale used in the questionnaires ranged from 0 to 10 points, with an initial mean value of 5.14, progressing to 1.66 after one month of treatment. In the literature, there are several studies reporting the efficiency of cutaneous hydration in improving pruritus in patients with AD.[20,21] The most likely mechanism underpinning the improvement of pruritus with the use of moisturizers is probably

linked to the recovery of the skin barrier.[22] Despite the fact that it is a variable that suffers great subjective influence, the degree of softness of the skin evidenced a clear difference between the baseline and the final experimental timepoint (Table 2).

The researcher physicians, also evaluated participating children objectively, in special with the assistance of the SCORAD, which is one of the severity indexes most commonly described in the literature.

As can be seen in Table 3, there was a significant reduction of the SCORAD between the baseline and D15, and between D15 and D30, confirming the literature data, showing that cutaneous hydration decreased the signs and symptoms of mild to moderate AD. The SCORAD is probably the most commonly used and widely accepted severity score in the literature. It is based on the objective criteria obtained with clinical examination and on the degrees of daytime and nighttime pruritus. Aiming at reducing the subjectivism, evaluations were always performed by two physicians.

A major concern in the treatment of AD is the chronic use of corticosteroids, especially in the pediatric age group.[9] A number of reports have shown side effects of topical corticosteroids, such as atrophy, acne, systemic absorption, glaucoma, and cataracts.[9,23-25] Some studies have already demonstrated a corticosteroid-sparing effect with regular use of moisturizers, in addition to reduction of pruritus.[26,27] Table 4 shows a clear reduction in the need for administration of the antihistamine dexchlorpheniramine between visits D15 and D30 (25.71% of the cases to 5.72%), objectively demonstrating the decrease in pruritus symptoms. Likewise, hydrocortisone was less frequently used in the second fortnight of product use, with a reduction from 34.29% to 5.72%, indicating the presence of the capability of sparing the corticosteroid contained in the moisturizer applied in the children. Based on literature data and in order to simplify the care with the children, the authors of the present article chose to apply the moisturizer only once a day after bathing.[28] This does not seem to have influenced the outcomes, with good action having been evidenced from both the subjective and objective standpoints – including that of the corticosteroid-sparing effect.

More recently, reviews have corroborated the therapeutic action of moisturizers on the skin of patients bearing AD.[29] Their cost effectiveness has been proven in maintaining the patients' improvement, which makes them useful in the short and long term.[30] Specifically in children, the association of moisturizers with the treatment showed beneficial effects, reducing the corticosteroids' risks and side effects.[31,32] In the more recent literature, moisturizers are classified as true therapeutic agents in AD,[31,32] which was confirmed by the present study.

In light of this, the authors of the present article reiterate the view that the use of suitable moisturizers in AD patients is no longer considered adjuvant, but an essential part of the treatment. The correct balance in the moisturizer's formulation, with ceramides, fatty acids, cholesterol and other components, is necessary for the sound correction of the impaired skin barrier.[1,9] On the other hand, atopic patients often have sensitive skin, preferably being treated with products without irritants, perfumes or any aggressive agent.[7-9] The moisturizer evaluated in the present study has hydrating substances, such as glycerin and erythritol, lipid components (ceramides and omega acids) and osmoregulators (Imperata cylindrica and homarine). In the literature there is strong evidence of the action of glycerin-based moisturizers in the recovery of atopic skin. However, comparative studies of moisturizers are scarce.[33] A systematic review of literature on the use of moisturizers in AD has shown that the most well-documented studies were performed on glycerin and urea.33 Nevertheless, those on glycerin alone were the most subject to methodological deviations.33 Erythritol is a humectant compound with an action similar to that of the glycerin, which strengthens its effect.34 There are also studies in the literature that have proved the osmoregulatory capacity of Imperata cylindrica.[35] In this manner, the present study showed that the addition of other humectants and osmoregulators yields better outcomes, as compared to the isolated use of glycerin. The outcomes of the present study demonstrated a significant reduction in the SCORAD, with a baseline mean value of 25.27 that progressed to 9.30 by the end of the study, as well as improvement of pruritus and of the subjective and objective evaluations of AD.

CONCLUSIONS

The daily application of the moisturizer tested in the present study for 30 days reduced the symptoms of pruritus and dryness, and improved softness and hydration. In the objective analysis, there was a significant decrease in SCORAD, with the moisturizer also reducing the need for the use of antihistaminic and topical corticosteroids. Tolerability was considered excellent throughout the period of use of the moisturizer. Therefore, the present study demonstrated that the application of adequate moisturizers in patients with AD is a crucial part of the therapeutic armamentarium. ●

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DECLARATION OF PARTICIPATION:

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Maria do Rosario Vidigal: Co-researcher, evaluation of patients.

Natalia Ivanoff dos Reis: Co-researcher, review literature, evaluation of patients.

Lucia Romanó Santos: Co- researcher, literature review, evaluation of patients.

Anita Rotter: Co-researcher, preparation of the study protocol.

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Evaluation of the effects of acoustic wave therapy on keloids

Avaliação dos efeitos da terapia por ondas acústicas em queloides

Original Articles

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ABSTRACT

Introduction: Acoustic wave therapy stimulates tissue regeneration and healing processes. Therefore, it is expected that this treatment modality might have effects on scars.

Objective: To evaluate the efficacy and safety of acoustic wave therapy in the improvement of keloids.

Methods: An open, prospective, monocentric study was carried out with 20 participants with clinical diagnosis of keloid. Weekly sessions of acoustic wave therapy were performed, for eight weeks. Participants were assessed at baseline and at 1 and 12 weeks after the end of the treatment. The investigators took measurements of elasticity and performed clinical evaluations based on the Vancouver Scars Scale. At the end of the treatment the participants' satisfaction with the treatment was evaluated.

Results: After the treatment, the percentage of participants with keloid thickness between 2mm and 5mm decreased to 47% (from 71%), increasing the percentage of participants with reduced keloid thickness in the total sample (<2mm, to 41% from 24%). Some participants also had improvement in the keloids' vascularization and pliability. No treatment-related adverse events have been reported.

Conclusions: Acoustic wave treatment is safe and can be effective in the improvement of the keloid's functionality and some clinical aspects.

Keywords: keloid; cicatrix; scales

RESUMO

***Introdução**: A terapia por ondas acústicas estimula os processos de regeneração e recuperação dos tecidos. Nesse sentido, espera-se que esse equipamento possa atuar em cicatrizes.*

***Objetivo:** Avaliar a eficácia e segurança da terapia por ondas acústicas na melhora de queloides.*

***Métodos:** Estudo aberto, prospectivo, unicêntrico que incluiu 20 participantes com diagnóstico clínico de queloide. Foram realizadas oito sessões de terapia por ondas acústicas, uma por semana, durante oito semanas. Os participantes foram avaliados no momento basal e uma e 12 semanas após o término do tratamento. Medidas de elasticidade e avaliação clínica pela Escala de Cicatrizes de Vancouver foram realizadas. Ao final do tratamento foi observada a satisfação dos participantes com o tratamento.*

***Resultados:** Após o tratamento, a percentagem de participantes com espessura do queloide entre dois e 5mm caiu de 71% para 47%, aumentando a percentagem de participantes com espessura menor do queloide na amostra total (<2mm, de 24% para 41%). Os aspectos da vascularização e flexibilidade também apresentaram melhora em alguns participantes. Não foram relatados eventos adversos relacionados ao tratamento.*

***Conclusões:** O tratamento por ondas acústicas é seguro e pode ser eficaz na melhora funcional de lesões de queloide e de alguns aspectos clínicos da lesão.*

***Palavras-chave:** queloide; cicatriz; escalas*

INTRODUCTION

Acoustic wave therapy (AWT®) is a non-invasive technique that relies on the mechanical stimulation of tissues by acoustic waves. This method originated from extracorporeal shock wave lithotripsy used in urology. For cosmetic purposes, much lower intensity is applied, thus it stimulates the healing and regeneration processes while avoiding tissue destruction.[1]

Acoustic waves stimulate cells, increase microcirculation and local metabolism, and trigger the release of signaling substances.[1] When applied over the scar tissue, they seem to promote scar remodeling through the rupture of collagen fibers. The AWT® has been used in the treatment of connective tissue fibrosis, such as Peyronie's disease, burns and hypertrophic scars.[2,3] The results obtained in the treatment of fibrosis and scarring suggest that this technique may also be effective in the treatment of keloids.

Hypertrophic scars and keloids result from the excessive growth of dense fibrous tissue, which may take place after surgical incision or injuries caused by trauma.[4] Whereas hypertrophic scars are characterized by remaining restricted to the borders of the original injury, presenting its shape, keloids grow beyond the borders of the original wound, and are usually symptomatic, associated with pruritus, pain and pulling sensation. In general, they do not resolve spontaneously.[5]

Different treatment modalities have already been tested for keloids, such as surgical resection, radiation, lasers,[6] radiofrequency,[7] superficial or intralesional cryotherapy,[8,9] application of pressure,[4] and intralesional injections.[10] Several actives have been used in intralesional treatment as monotherapy or in combination with other treatments or actives. Triamcinolone acetonide,[11] 5-fluoracil,[12-14] bleomycin sulphate,[15,16] and verapamil[17,18] are some of the most studied treatments. Despite this range of therapeutic modalities, there is no consensus on which is the best approach for the treatment of keloids.[4]

The present study evaluated the efficacy and safety of AWT® for the improvement of keloids.

METHODOLOGY

An open, prospective, monocentric study was conducted from 2013 to 2016 at the Brazilian Center for Studies in Dermatology, in Porto Alegre, Brazil. The study was approved by the Ethics Committee of Moinhos de Vento Hospital Association. All the subjects signed an Informed Consent prior to their inclusion in the study.

Subjects

Twenty healthy subjects aged between 18 and 60 years and with keloid were included in the study.

The main inclusion criterion was to have at least one keloid lesion measuring at least 2 cm2 in any part of the body, except for the face and areas of bone prominence. The main exclusion criteria were: pregnancy, lactation or intention to become pregnant during the study period, inflammation or active infection in the study area, and having undergone any treatment for keloids in the six weeks previous the study start.

Treatment protocol

All the subjects followed the same protocol, composed by 1 session per week for 8 weeks, totaling 8 sessions. The minimum interval between sessions was 5 days.

The AWT® was performed with C-Actor® handpiece of Cellactor SC1 (Storz Medical AG, Switzerland), which is a high-intensity electromagnetic system that generates planar acoustic waves. The treatment was applied to one keloid per subject, with back and forth movements and slight pressure. Each treatment session consisted of 250 (± 10%) pulses per cm2, with energy varying from 0.56 to 0.88mJ / cm2, as recommended by the manufacturer. A long standoff made of silicone was used to concentrate the energy of the equipment, and a layer of ultrasound gel was applied after cleansing the skin for better contact and transmission of energy. All treatment sessions were performed by trained professionals.

Evaluations

Each subject attended to 3 evaluation visits: baseline (T0), 1 week after the end of the 8-session treatment (T1) and 12 weeks after (T2). At the baseline visit (T0), the investigators carried out a clinical and physical evaluation, verified the inclusion and exclusion criteria, reviewed the patient's medical history and medications use, and assessed the keloid elasticity and its classification according to the Vancouver Scars Scale.[19] Women of childbearing potential underwent a urinary pregnancy test.

Clinical and keloid evaluation, in addition to the verification of possible adverse events, were performed in all visits after the treatment. All evaluations were performed by a dermatologist.

The Vancouver Scar Scale (VSS)

The primary outcome was defined as the clinical improvement of keloid lesions assessed by the Vancouver Scars Scale,[19] -a validated scale to evaluate scars (Table 1).

Elasticity measurements

The elasticity of the keloid lesion was evaluated at all visits with the assistance of the Cutometer® MPA 580 device (Courage-Khazaka, Germany). The R5 parameter – which indicates the variation of skin elasticity – was defined as the evaluation parameter. It varies between 0 and 1 (the closer to 1, the more elastic is the skin).

Measurements were taken at the midpoint of each lesion (treated area), and on the internal part of the right forearm, at the midpoint between the wrist and the antecubital fossa medial line, on the ventral surface (control-area).

Patient satisfaction questionnaire

In all follow up visits after the end of the last session, the subjects answered a satisfaction questionnaire. They were asked to describe their perception about the improvement of pain and discomfort when moving the treated region, and about the improvement in the appearance of the scar using the following ratings: significantly improved, improved, slightly improved, unchanged, slightly worsened, worsened, significantly worsened, or not applicable (when no pain or discomfort was perceived in the keloid area). In addition, subjects answered whether they were satisfied with the treatment and whether they would undergo it again.

Table 1: Vancouver Scar Scale (VSS)

Characteristics		Score
Height	Flat	0
	<2mm	1
	2–5mm	2
	> 5mm	3
Vascularity	Normal	0
	Pink	1
	Red	2
	Purple	3
Pigmentation	Normal	0
	Hypopigmented	1
	Hyperpigmented	2
Pliability	Normal	0
	Supple	1
	Yielding	2
	Firm	3
	Ropes	4
	Contracture	5
	TOTAL	**13**

Statistical analysis

Demographic data were presented descriptively for the intention-to-treat population. The outcomes of the evaluations considered the population per protocol. Categorical variables were presented as percentages and quantitative variables as mean values ± standard deviation. Differences in the elasticity and in the final mean value of the scars scale were tested with ANOVA for repeated measures.

RESULTS

Twenty-two subjects were evaluated, but two did not start the treatment, and were therefore excluded from data evaluation. Of the 20 enrolled subjects , 17 completed the study, and three were unavailable to complete the study: 2 withdrew during the treatment period, and 1 after the follow-up visit at the end of the last session.

The mean age of the subjects was 37.8 ± 12.4 years (range: 19-61), and most were women. Half of the subjects were Fitzpatrick phototypes II and III, while the other half were phototypes IV and V. The demographic data of the 20 subjects who started the treatment are described in Table 2.

Graphs 1a-d show the proportion of subjects at each visit, for each Vancouver Scar Scale scoring item. Keloid height varied from 2mm to 5mm for most of the subjects (71%, n = 12) at baseline. After 8 treatment sessions, less than half of the subjects (47%, n = 8) still presented keloids height between 2mm and 5mm, and the proportion of subjects presenting keloid height less than 2mm increased from 24% (n = 4) at baseline to 41% (n = 7) after the end of the treatment. One subject who had a keloid height of less than 2mm at the baseline presented a flat lesion after treatment.

Vascularization did not normalize in any case, either before or after the end of the treatment. Pink coloration was observed in 41% of the subjects at baseline, increasing to 59% in the post-treatment follow-up evaluations. The proportion of subjects who presented reddish coloration decreased from 35% at baseline to 24% in the post-treatment follow-up evaluations, and purpuric coloration decreased from 24% to 18%. Present in most subjects at baseline (76%; n = 13), hyperpigmentation decreased to 65% (n = 11) and 71% (n = 12) in subsequent evaluations.

The pliability of the keloid was graded as contracture in 24% (n = 4) of the subjects at baseline, in 12% (n = 2) one week after treatment and in 6% (n = 1) 12 weeks after treatment. The proportion of keloid lesions considered yielding and supple increased from 29% and 6%, respectively, to 35% and 12% one week after treatment, and to 41% and 12% 12 weeks after treatment.

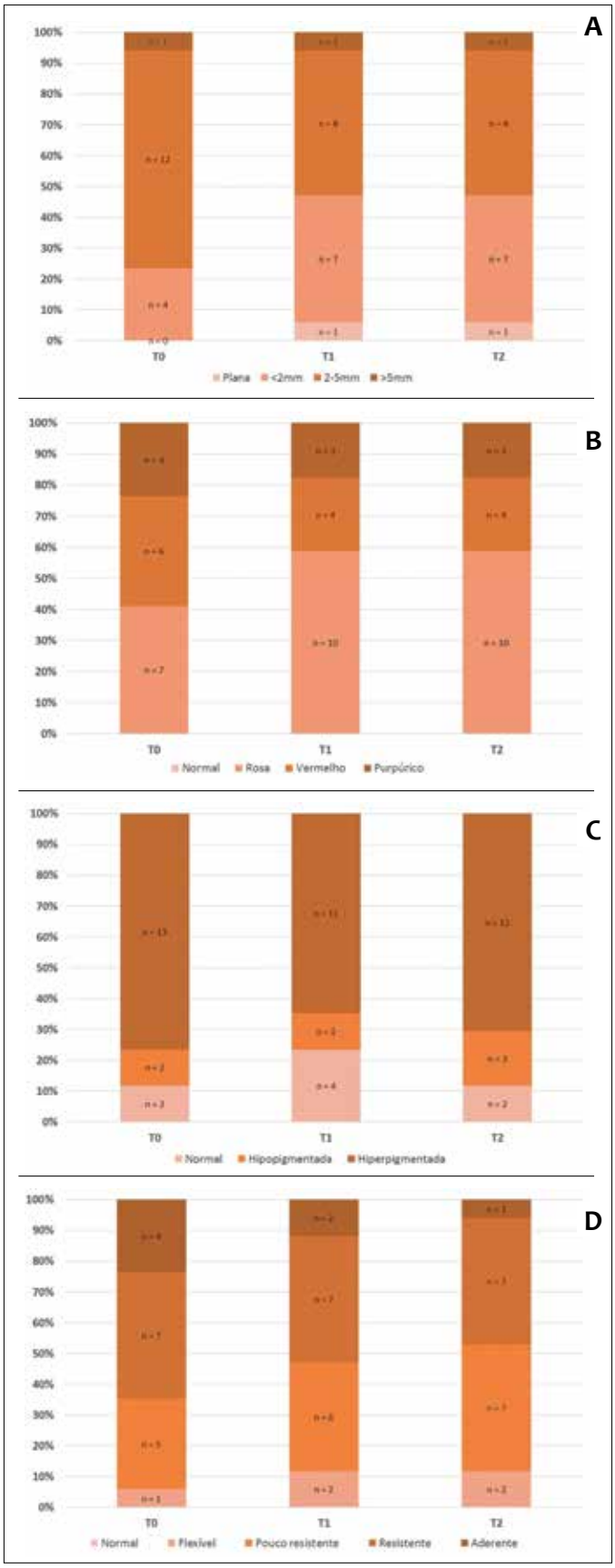
The mean total VSS score presented a statistically significant reduction in the follow up evaluations when compared to the baseline value (Graph 2). Nevertheless, only a slight improvement could be perceived by visual observation (Figure 3A and B).

The skin elasticity values in the keloid lesion and in the control-area, assessed with Cutometer®, are described in Table 3.

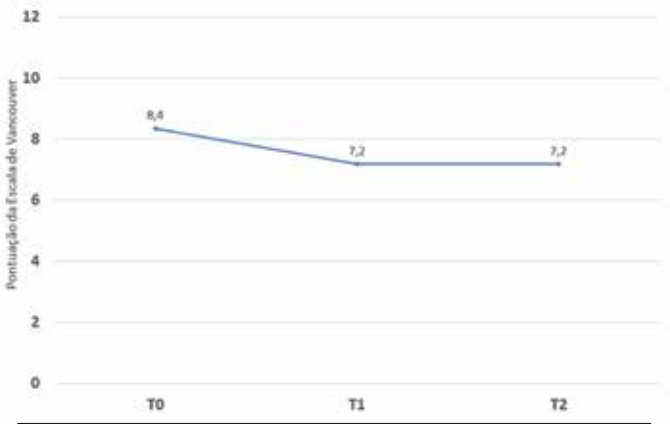
Table 2: : Demographic data

	N = 20
Mean age (years; mean ± SD)	38 ± 12,3
Gender n (%)	
Male	4 (20)
Female	16 (80)
Fitzpatrick phototype n (%)	
II	4 (20)
III	6 (30)
IV	4 (20)
V	6 (30)
Smoking habits n (%)	1 (5)
Concomitant medication n (%)	6 (30)
None	3 (15)
Contraceptives	2 (10)
Antihypertensives	1 (5)
Antidepressants	1 (5)
Diuretic	1 (5)
Antilipemic	1 (5)
Antihyperglycemic	7 (35)
Antiasthmatic	1 (5)
Vitamin complex	

Standard Deviation



Grafic 1: Proportion of subjects before, one week and 12 weeks after treatment on each item on the Vancouver Scar Scale



Grafic 2: Vancouver Scar Scale average scores over the study period for all the sample.

No statistically significant difference was observed in the results obtained before and after treatment in both areas.

Among the subjects who completed the study, 76.5% considered the treatment protocol improved the keloid's appearance. The same proportion of subjects was satisfied with the treatment, and 82.4% would undergo the procedure again. At the beginning of the study, 14 subjects had discomfort when moving the area affected by the keloid, and 11 subjects had pain. After treatment, 12 (85.7%) reported improvement in discomfort and 9 (81.8%) reported improvement in pain.

No treatment-related adverse events have been reported. Two subjects presented adverse events, both not related to their participation in the study.

DISCUSSION

The treatment of keloid is challenging, with limited therapeutic options capable to reach positive outcomes in the aesthetical appearance of the lesion. In the present study, the authors evaluated the effects of a protocol comprising eight sessions of acoustic wave therapy to improve the clinical appearance of keloid lesions in different areas of the body.

The proportion of patients presenting with more severe degrees of keloid height, vascularity, and pliability decreased after treatment, as did the mean of the overall VSS score. However, the clinical improvement was poor from the aesthetic point of view. The photographic and visual evaluations did not show clearly clinical improvement in the appearance of the treated lesions (Figure 3A and B).

Even though no significant aesthetic improvement was obtained in the treated lesions, it was possible to observe a high proportion of subjects satisfied with the treatment. Studies evaluating the efficacy of other treatment modalities for keloid, such as bleomycin sulphate and intralesional corticosteroid injections, have also showed a high percentage of satisfied patients.[20,21] Improvement in discomfort and pain due to movement was observed in more than 80% of the subjects who reported these symptoms at baseline. Manca et al. observed pain reduction in up to 94% of the patients evaluated in their study.[20] They con-

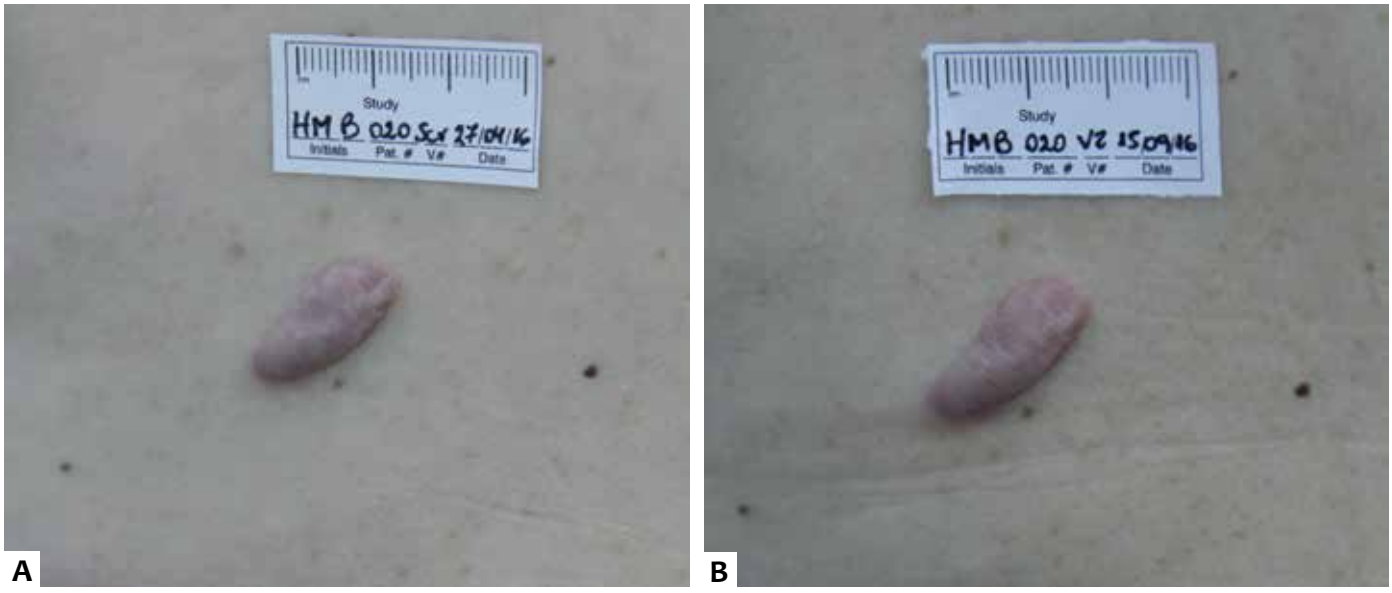


Figure 3: Clinical appearance of the keloid in the left scapular region (**A**) at baseline and (**B**) at 12 weeks after the end of the treatment, showing slight clinical improvement in keloid height

Table 3: Cutometer® R5 parameter, which indicates the skin's elasticity change (mean ± standard error)

	T0	T1	T2	
	n = 17	n = 17	n = 17	P*
Keloid	0,65 ± 0,44	0,61 ± 0,38	0,63 ± 0,45	> 0,05
Control area	0,82 ± 0,33	0,88 ± 0,31	0,83 ± 0,38	> 0,05

*ANOVA for repeated measures.

sidered that satisfaction is mainly linked to the improvement in the clinical symptoms of pain and discomfort under movement. Another hypothesis is that the high satisfaction of the subjects was linked to the low expectations regarding the effectiveness of the treatments for this condition.

The evaluation of skin elasticity using an elastometer did not indicate significant changes in the keloid area after the treatment as compared to pre-treatment conditions. Draaijers et al.[22] described the validity of this methodology for the evaluation of elasticity in scars. Van Leeuwen et al.[9] reported a 57% improvement in the elasticity of successfully treated lesions. However, they observed worsening of 50% in recurrent lesions.

CONCLUSIONS

The present study showed that AWT® is safe and effective in the functional improvement of keloids. The treatment did not significantly change keloid scars, since no lesion completely disappeared or changed types (for example, from keloid to hypertrophic scar). Improvements in keloid height, vascularity and pliability were observed in a proportion of patients after the 8-week session protocol. Comparative studies with larger samples or even in association with other procedures may provide additional data on the effectiveness of this treatment, also for other types of scars.

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DECLARATION OF PARTICIPATION:

Doris Hexsel: Study design, data acquisition, analysis and interpretation, manuscript drafting and revision, supervision of the study.

Fernanda Oliveira Camozzato: Data acquisition, analysis and interpretation, manuscript drafting and revision.

Aline Flor Silva: Data acquisition, manuscript drafting and revision.

Carolina Siega: Data acquisition, analysis and interpretation, manuscript drafting and revision, supervision of the study.

Original Articles

Randomized study comparing onabotulinum toxin diluted in lidocaine and epinephrine versus saline solution for the treatment of periocular lines

Estudo randomizado comparando toxina onabotulínica diluída em lidocaína e epinefrina versus solução salina para o tratamento das linhas perioculares

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ABSTRACT

Introduction: Standard dilution of botulinum toxin is performed with 0.9% saline solution. Some studies show that when diluted in lidocaine and epinephrine, the toxin preserves its function without compromising effectiveness or safety.

Objective: To establish whether the paralyzing effect of ona-toxin type A reconstituted in anesthetic (2% lidocaine) and vasoconstrictor agent (1: 50,000 epinephrine) is as effective as that of the same toxin reconstituted in saline solution, at 48 hours, 1 week, 2, 4, 12 and 24 weeks, for the treatment of periocular lines. To compare the tolerance to pain between the two reconstitution alternatives.

Methods: Fifteen patients with periocular wrinkles were randomized to receive onabotulinum toxin diluted in lidocaine with epinephrine or in saline. Re-evaluations were carried out in 48 hours, 1 week, 2, 4, 12 and 24 weeks.

Results: The data indicate that there was no difference in the symmetry and durability of the botulinum toxin, nor in the pain during the application.

Conclusions: There was no statistically significant difference in the frequency of lateral periocular muscle paralysis and symmetry resulting from the applications of onabotulinum toxin reconstituted in lidocaine with epinephrine or in saline solution. This outcome is consistent with those of previous studies.

Keywords: botulinum toxins, type A; dilution; lidocaine

RESUMO

Introdução: *A diluição-padrão da toxina botulínica é feita com solução salina 0,9%. Alguns estudos mostram que diluída em lidocaína e epinefrina a toxina mantém sua função sem comprometer a eficácia ou segurança.*

Objetivo: *Estabelecer se o efeito paralisante da toxina onabotulínica tipo A reconstituída em anestésico (lidocaína a 2%) e agente vasoconstritor (epinefrina 1:50.000) é tão efetivo quanto o da mesma toxina reconstituída em solução salina em 48 horas, uma semana, duas, quatro,12 e 24 semanas para o tratamento de linhas perioculares e comparar a tolerância à dor de uma e outra possibilidade.*

Métodos: *15 pacientes com rugas perioculares foram randomizadas para receber toxina onabotulínica diluída em lidocaína com adrenalina ou diluída em solução salina e foram reavaliadas em 48 horas, uma semana, duas, quatro, 12 e 24 semanas.*

Resultados: *Os dados indicam que não houve diferença na simetria e na durabilidade da toxina botulínica, nem tampouco na dor durante a aplicação.*

Conclusões: *Não houve diferença estatisticamente significativa na frequência de paralisia muscular periocular lateral e na simetria decorrente das aplicações de toxina botulínica reconstituída em lidocaína com epinefrina ou em solução salina, resultado consistente com estudos prévios.*

Palavras-chave: *toxinas botulínicas tipo A; diluição; lidocaína*

INTRODUCTION

The injection of botulinum toxin (BT) aimed at treating facial wrinkles is one of the most widely performed procedures worldwide.[1] Botulinum toxin is a powerful neurotoxin derived from the bacterium Clostridium botulinum that acts on the neuromuscular junction by inhibiting the release of acetylcholine, causing a temporary neuromuscular blockade.[2] The bacterium produces several BT serotypes – namely A, B, Ca, Cb, D, E, F, G [3] – of which the strongest is serotype A, which is most commonly used for cosmetic treatments.[4] Serotype A BT cleaves Snap-25 (25KDa synaptosome-associated protein), from the Snare complex (soluble NSF attachment receptor).[5] The effects of BT on the target muscles decrease over time as Snap-25 protein regenerates and muscle contractility is restored.[6]

Botulinum toxin was approved by the US' FDA (Food and Drug Administration) for cosmetic use in 2002 regarding the treatment of the glabellar complex muscles, and in 2013 for periocular lines. It is used off-label for all other facial cosmetic indications.[7] There are currently 3 types of A toxins approved by the FDA for cosmetic use in the glabellar lines: onabotulinum toxin A, abobotulinum toxin A and incobotulinum toxin A.[8]

The standard dilution of BT is carried out with 0.9% saline.[9-11] Some studies show that when diluted in 1% lidocaine and 1:100,000 epinephrine, BT keeps its function without compromising effectiveness or safety.[12-14] The advantage of reconstituting it in lidocaine and epinephrine is that there is an increase in its short-term efficacy, accelerating the onset of the effect and reducing the discomfort associated with injections.[15] In most patients, the full effect of botulinum toxin-induced paralysis is imperceptible before 48 to 72 hours after application,12 and the effect lasts for 3 to 4 months.[15]

The present study was carried out to establish whether the paralyzing effect of the onabotulinum toxin type A reconstituted in anesthetic (2% lidocaine) and vasoconstricting agent (1:50,000 epinephrine) is as effective as that of the same toxin reconstituted in saline solution after 48 hours, 1 week, 2 weeks, 4 weeks, 12 weeks and 24 weeks, for the treatment of periocular lines, and to compare pain tolerance in the two possibilities.

METHODS

A randomized, double-blind clinical trial was conducted between June 2016 and February 2017. Patients aged 25-55 years with lateral periocular wrinkles treated at the Dermatology Ambulatory of the Santa Casa de Porto Alegre were invited to take part in the study. Fifteen individuals were selected using a convenience sampling method. All signed a Free and Informed Term of Consent and completed the study. Patients meeting the following criteria were excluded: bearers of neuromuscular disease, allergy to botulinum toxin type A, lidocaine, or epinephrine, facial paralysis or asymmetric mimicry, with history of botulinum toxin application in the periocular region less than 12 months before, history of facelift, use of medications that interfere with the neuromuscular junction (aminoglycosides and calcium channel blockers).

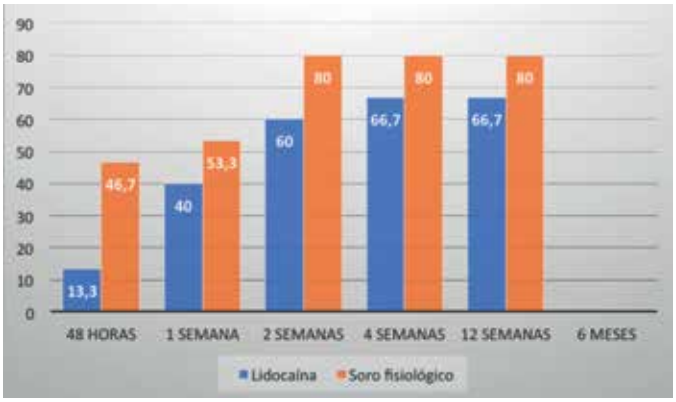
A blinded investigator applied 6U of onabotulinum toxin A diluted in saline to the lateral part of the orbicularis oculi muscles on one of the sides. On the other side, the same amount was applied, however the substance was reconstituted in 2% lidocaine and 1:50,000 epinephrine. Two U of BT were applied in three points. Patients were instructed to avoid manipulation or massage at the treated site, lying flat for 4 hours, and perform physical exercises during the 24 hours after the applied.

In order to evaluate the functional state of the mimetic musculature, photographs were taken and videos made of the patients' faces at rest and forcing the smile to the maximum, before and after the procedure. The same records were taken in the 6 subsequent experimental timepoints (48 hours, 1 week, 2 weeks, 4 weeks, 12 and 24 weeks after). Questionnaires aimed at assessing satisfaction, adverse effects, pain, and treatment durability were answered by the patients throughout the study. Following the procedure, an evaluator blinded to the difference in dilutions between the treated sides (standard solution and experimental dilution) analyzed the photographs, videos and answers to the questionnaires at each step.

The data were entered in an MS Excel spreadsheet and then exported to the SPSS v.20.0 software for statistical analysis. The categorical variables were described by frequency and percentage, while the quantitative variables were described by mean values and standard deviations. The McNemar test was used to compare variables between the sides treated with the different dilutions. A significance level of 5% was considered. The study project was approved by the institution's Research Ethics Committee (n. 58100316.8.0000.5335) and in compliance with the Declaration of Helsinki.

RESULTS

Data were collected from 15 female patients. The mean age was 39.1 years (SD = 7.9, min = 25, max = 52). Regarding previous treatments, 9 (60%) patients had never undergone the procedure before, 2 (13.3%) had undergone it once, 1 (6.7%)



Graph 1: Comparison of the paralysis between sides treated with lidocaine or saline solution at each experimental timepoint

No adverse effects have been reported

had undergone it twice, 2 (13.3%) had undergone it five times and one (6.7%), six times.

The majority of patients had paralysis within 48 hours (Table 1), and both paralysis and symmetry within 2 weeks (Table 2). The sides applied with lidocaine and saline solution were compared at each experimental timepoint of the evaluation (Graph 1). There was no statistically significant difference between the sides in any of the evaluated timepoints.

Ten (66.7%) patients reported pain. Three (20.0%) patients reported pain regarding the side treated with lidocaine, while 8 (53.3%) reported pain in the side diluted with saline. There was no statistically significant difference (P = 0.180).

Whitening effect was observed in 6 (40.0%) patients, all on the side treated with lidocaine. It is important to note that it was not possible to compute the statistical significance, since no patient showed whitening on the side treated with saline solution.

DISCUSSION

The present study's main objective was to establish whether the paralyzing effect of onabotulinum toxin A reconstituted with anesthetic (2% lidocaine) and vasoconstrictor agent (1:50,000 epinephrine) is as effective as that of the same toxin reconstituted with saline solution at 48 hours, 1 week, 2 weeks, 4 weeks, 12 weeks and 24 weeks, for the treatment of periocular lines. This study found no statistically significant difference in the paralyzing effect in any of the experimental timepoints in which the patients in both groups (lidocaine and saline solution) were evaluated and compared with the assistance of photographs and videos. Other authors have reported symmetry when comparing the two types of dilution 1 week after the application.[12,16]

The present study also assessed the tolerance to pain, evidencing that there was no decrease in pain on the side treated with saline when compared to the side treated with lidocaine. Lidocaine tends to be painful due to its acid pH, which does not seem to offer an advantage regarding the minimization of pain during the application of BT.[17] Gassner et al. studied 10 volunteers, reporting an immediate and statistically significant paralyzing effect when BT was diluted in 1% lidocaine and 1:100,000 epinephrine.[12] Kim et al. investigated the satisfaction of 181 patients who received BT type A reconstituted in 1% lidocaine with 1:100,000 epinephrine, describing the immediate paralytic effect caused by the anesthetic as positive.[18] In addition, epinephrine is mentioned in some articles as beneficial for minimizing the diffusion of BT.[12,13,19]

The present study's results are limited due to the small sample size. In this manner, a non-significant value allowed to state that there was no difference between the different types of dilutions or, alternatively, the sample was too small to allow detection of any difference. The present study used 2% lidocaine and 1:50,000 epinephrine, while other studies found in the literature employed 1% lidocaine and 1:100,000 epinephrine. The study did not propose to evaluate the doses necessary to achieve better clinical outcomes in the periocular region, since it used similar doses in all patients, aiming at verifying the paralysis and symmetry effects related to the two different types of dilution. Finally, the blinded evaluator carried out a subjective assessment of the photographs and videos due to the fact that there was no objective scale of measurement.

Table 1: Presence of paralysis and symmetry at the different experimental timepoints

Time	n (%)
48 HOURS	1 (6,7)
1 WEEKS	3 (20)
2 WEEKS	9 (60)
4 WEEKS	10 (66,7)
12 WEEKS	10 (66,7)
6 MONTHS	-

Table 2: Presence of paralysis at the different experimental timepoints

Time	n (%)
48 HOURS	8 (53,3)
1 WEEKS	11 (73,3)
2 WEEKS	12 (80)
4 WEEKS	12 (80)
12 WEEKS	12 (80)
6 MONTHS	-

Table 3: Comparison of the presence of paralysis between sides treated either with lidocaine and saline solution, at different experimental timepoints

Time	Lidocaine	Saline	P
48 HOURS	2 (13,3)	7 (46,7)	0,125
1 WEEKS	6 (40)	8 (53,3)	0,727
2 WEEKS	9 (60)	12 (80)	0,250
4 WEEKS	10 (66,7)	12 (80,0)	0,500
12 WEEKS	10 (66,7)	12 (80,0)	0,500
6 MONTHS	-	-	1,000

CONCLUSION

In line with the literature, the present study did not evidence statistically significant difference in the frequency of lateral periocular muscle paralysis and symmetry in the application of BT reconstituted with lidocaine and epinephrine as compared with that reconstituted only with saline solution. The data suggest that the effects durability was similar in both groups. Also, the pain sensation during the application was not inferior to that in the lidocaine group.

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Mariana Silveira Ferreira: Bibliographic survey, structuring of the study project, patient randomization and selection, preparation of photographs and videos, photographic and video based reassessment of patients.

Ana Paula Schwarzbach: Bibliographic survey, structuring of the study project, patient randomization and selection, photographs and videos, preparation of photographs and videos, photographic and video based reassessment of patients.

Original Articles

The use of platelet-rich plasma in the treatment of acne and its scars: a pilot study

O uso do plasma rico em plaquetas no tratamento da acne e suas cicatrizes: estudo-piloto

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ABSTRACT

Introduction: Acne is a multifactorial disease where inflammatory lesions usually appear as papules, pustules and comedones. It is more common in people aged between 11 and 30 years, and occurs in various body sites where there are high concentrations of pilosebaceous glands. Acne has different classifications and treatments. More recently, platelet growth factors have been used as an alternative therapy for acne scars.
Objective: The present study is aimed at describing a case of nodule-cystic acne and acne scars Grades 1, 2 and 3b treated with platelet rich plasma and highlighting the effectiveness of the treatment.
Methods: Platelet rich plasma was applied for three months in the left side of the face of a patient bearing acne.
Results: In the clinical and photographic evaluations, there was improvement in the skin appearance and quality, less number of lesions and decrease of pain.
Conclusions: The present study has demonstrated the effectiveness of platelet rich plasma as a treatment for acne and resulting scars.
Keywords: platelet-rich plasma; acne vulgaris; cicatrix

RESUMO

Introdução: *A acne é doença multifatorial em que se evidenciam lesões inflamatórias constituídas por: pápulas, pústulas e comedões. É mais comum dos 11 aos 30 anos de idade, ocorrendo em várias regiões do corpo em que há altas concentrações de unidades pilossebáceas. A acne tem diferentes classificações e tratamentos. Recentemente, os fatores de crescimento de plaquetas têm sido indicados como terapia alternativa para cicatrizes da acne.*
Objetivo: *Descrever o caso de paciente com acne nódulo-cística e cicatrizes de acne graus 1, 2 e 3b tratado com plasma rico em plaquetas e, ao mesmo tempo, destacar a eficácia do tratamento.*
Métodos: *Aplicação de plasma rico em plaquetas durante três meses no lado esquerdo da face de um paciente.*
***Resultados*:** *De acordo com avaliações clínica e fotográfica, houve melhora na aparência e qualidade da pele, observando-se menor número de lesões e diminuição de fenômenos dolorosos.*
***Conclusões*:** *O presente estudo demonstrou a eficácia do plasma rico em plaquetas como tratamento para a acne assim como suas cicatrizes.*
Palavras-chave: *plasma rico em plaquetas; acne vulgar; cicatriz*

INTRODUCTION

Acne is a multifactorial disease in which the inflammatory lesions arise in the form of papules, pustules and comedones. It is most common in people aged between 11 and 30 years, and can occur in many regions of the body, usually where there are high concentrations of pilosebaceous units.[1-3]. There are different classification systems that assist in the diagnosis of its seve-

rity. One of the most relevant is that created by the Latin American Group for the Study of Acne (Glea - *Grupo Latino-Americano para o Estudo da Acne*), which uses four classification categories. The first category regards the patient's age (it can be neonatal acne if arising during the first 30 days of life; infant acne, when it arises between the first month and the second year of life; childhood acne, if it emerges between two and seven years of age; pre-adolescence acne if it occurs between eight and 11 years of age; adolescence acne, if arising between 12 and 24 years of age; and the adult acne if it occurs after the age of 25. The second category is based on the predominant type of lesion (comedonian, which can refer to open, closed or both types of lesions; papulopustular, when the predominant lesions are papules and pustules; and nodule-cystic, characterized by deep inflammatory lesions that can leave severe scars or cases that extend to the cervical region and trunk. The third category classifies the acne according to its degree of severity (mild, moderate or severe); while the fourth and last category includes special forms (such as acne conglobata and fulminans, which share some characteristics of acne vulgaris, nevertheless present the possibility of systemic compromise).[4,5] Acne's inflammatory lesions lead to permanent complications, such as scars, which in 95% of the cases are located on the face.[1,6] These scars, which worsen with age, may have psychosocial implications that manifest as low self-esteem, sadness, anger and even embarrassment.[6,7] Epidemiological data on these acne scars are not very clear, however it is estimated that they occur in 95% of patients with acne.[8]

The pathophysiology of scars caused by acne has been associated with loss or overproduction of collagen due to the presence of an imbalance in the reorganization phase of the tissue's architecture, when fibroblasts and keratinocytes produce enzymes such as metalloproteinases, which are responsible for the remodeling of damaged tissue. [7-9]

Scars can be classified as atrophic or hypertrophic, when there is loss or overproduction of collagen, respectively. Atrophic scars are more common and can be sub-classified into icepick, rolling and box depending on their width, depth and shape. Another scar classification system is the Goodman and Baron scale, which can attribute one of four grades to the lesions: 1,7,8 Grade 1 corresponds to the macular disease, in which erythematous macules, which may be hyperpigmented and hypopigmented, can be observed; Grade 2 corresponds to a mild degree of the disease, characterized by atrophic and hypertrophic scars that are barely visible and easy to conceal with makeup; Grade 3 refers to a moderate degree of the disease, in which atrophic and hypertrophic scars are more visible and not easily concealed by makeup, however they become imperceptible with the distension of the skin; the fourth grade represents the most serious picture, in which scars can not be easily hidden.[10]

These scars are known as sequelae from acne and can become permanent and difficult to treat. Its psychosocial implications are a priority in the treatment of patients with acne.[1,10] There are a variety of treatments, such as chemical dermabrasion, laser, lipografting and cutaneous filling based treatments. Nonetheless, all these treatments offer limited results, and some lead to negative side effects.[11] There are topical treatments, such as retinoids (e.g. adapalene), isotretinoin, antimicrobials (e.g. benzoyl peroxide and azelaic acid), and systemic therapies, such as those performed with retinoids, steroid and non-steroidal hormones, and antibiotics.[2]

Platelet-rich plasma (PRP) is a fraction of blood with a high platelet concentration (above the baseline concentration of 150,000-350,000/μl).[11] Platelets contain growth factors that are secreted by platelet granules and include transforming growth factors (TGFs), platelet-derived growth factors (PDGFs), vascular endothelial growth factor (VEGF), platelet-derived endothelial growth factor (PDEGF), insulin-like growth factor (IGF), epithelial cells growth factor (ECGF), platelet-derived angiogenesis factor (PDAF), platelet factor 4 (PF4) and other molecules with important roles in healing, including cell proliferation, migration and differentiation, collagen synthesis, granulation tissue formation and angiogenesis. [6,10,11]

It has been observed that PRP can smooth the scars, resulting in a better appearance regardless of skin tone. The PRP's mechanism of action in the scars consists of causing mild inflammation, which triggers the healing cascade and the production of growth factors that help to form new vessels (angiogenesis) for tissue repair. Thanks to this process, the new collagen develops and matures, becoming elastic, lending the smoothness appearance to the scars.[11] The advantages of PRP lies in the fact that it is an autologous product, excluding the possibilities of treatment rejection and the necessity for a donor, as well as any transmissible infection. However, there are some contraindications, such as presence of cancer, chemotherapy, platelet dysfunction syndrome, critical thrombocytopenia, anticoagulation therapy and others. Side effects include pain, bruising and cutaneous dyschromias, which usually disappear shortly after the application.[3]

The purpose of the present pilot study is to describe the case of patient with nodule-cystic acne and acne scars Grade 1, 2 and 3b treated with PRP, at the same time highlighting the effectiveness of the treatment.

METHODS

The application of PRP in the studied patient, who signed a Term of Consent, was approved by the Ethics Committee of the Antonio Nariño University, Bogotá, Colombia. A patient with the following characteristics was chosen for the study: male, 21 years of age, having bore moderate papulopustular acne (GLEA), affected by inflammatory papules, pustules and cysts for three years. According to the Goodman and Baron scale,12 the patient had Grade 1 erythematous cutaneous lesions in the face and neck, Grade 2 atrophic scars in the face, and Grade 3b atrophic scars in the neck and face. The right hand side of the patient's, which was not treated with PRP, had mild papulopustular acne and Grade 1 and 2 scars on the face and neck region. The patient had not received other treatments prior to the application of PRP.

Preparation of PRP

The PRP was collected in a hospital setting, according to a protocol previously standardized by the researchers: 49.5

ml of venous blood sample were harvested from the cephalic vein and transferred to tubes containing 0.5 ml of sodium citrate (Vacutainer® Ref 369714; BD Biosciences). One of the tubes was reserved for the baseline platelet count. The remaining samples were centrifuged for 10 minutes at 240g, 20°C (Thermoscientific Sorvall ST16 centrifuge). Approximately 8 ml of PRP were obtained with this process. Ten percent (10%) calcium gluconate were added in order to activate the platelets.

Procedure

Aimed at partially alleviating pain, approximately 90 minutes before starting the application, the target region was treated with topical anesthetic cream Roxicaina® 2% (lidocaine hydrochloride, Ropsohn, Colombia), followed by gentle cleansing with distilled water. According to the study's centrifugation protocol, it was possible to increase the concentration of the basal platelets by 2.8 times, resulting in the use of about 865,000pl/ul (baseline platelet count = 309,000pl ul).[13] Blood cell counts were performed in each blood sample, on each application (Table 1). The injection sites were determined observing 1cm intervals, with the application of 0.5ml of autologous platelet-rich plasma on the left side of the face and neck. Multiple subdermal injections were performed, with minimal erythema and edema being obsereved for up to three hours after treatment. No analgesic drugs or ice were used after the treatment. The patient was instructed to avoid direct exposure to the sunlight during the treatment and use wide spectrum SPF 50 sunscreen daily. The patient underwent 3 treatments with intervals of 1 month between each session.

RESULTS

The papules, pustules and comedones decreased in number and size, with marked improvement in the cervical region. On the treated side, the papules and pustules improved from moderate to mild after treatment, while on the untreated side, the improvement was negligible. The appearance of the skin improved due to improvements in the depth and dimensions of the scars. The skin became smoother and more uniform in appearance and on palpation. Grade 1 erythematous cutaneous lesions in the face and cervical region almost completely disappeared, and Grade 2 lesions in the face and Grade 3b in the face and cervical region decreased significantly (Figure 1). The clinical and photographic evaluations were performed 30 days after the last PRP session. The patient reported intense satisfaction with the results, including decreased skin lesions, improved skin quality and less pain.

DISCUSSION

Acne is a condition with physical and psychological implications resulting from dermatological disorders manifested in highly visible body areas, such as the face. Some recent studies have assessed the treatment of acne with autologous PRP in combination with other therapies, which entailed difficulty in evaluating the intrinsic performance of PRP as an isolated treatment for acne.

Table 1: Average of three blood cell counts (red blood cells)

Complete blood count	Results	Ref
Red series		
Blood Cells	5600000	4500000-5500000mm3
Hemoglobin	16.80	14-18gr%
Hematocrit	48.70	45-54%
MCV (mean corpuscular volume)	87.00	80-100fL
MCH (mean corpuscular hemoglobin)	30.00	2-32pg
MCCH (mean concentration of corpuscular hemoglobin)	34.50	32-36g/dl
RDW-SD (amplitude of variation of erythrocytes)	41.00	35-55fL
Hemosedimentation	5.0	0.0-7.1mm/1 hora
White series		
Leukocytes	7380	5000-10000mm3
Differential count		
Neutrophils	49.20	35-65%
Lymphocytes	39.60	25-40%
Eosinophils	2.70	0,5-5%
Monocytes	7.50	3-10%
Basophils	0.90	até 1%
Platelet series		
Platelets	309000	150000-4500000mm3

In the present study, the authors used PRP as an isolated therapy, observing a significant decrease in the size and number of papules. In addition, pain reduction and better healing were achieved. Similar studies have used PRP in combination with other therapies (e.g. antibiotic therapy), also improving the patient's condition, reducing the risk of superinfection of primary skin lesions, papules and comedones.[6] The use of autologous PRP obtained in sterile conditions, coupled with a standardized methodology, can become a safe and effective alternative to treat conditions like acne. It is important to conduct studies with more patients and similar conditions in order to determine outcomes that will contribute to its implementation.

CONCLUSION

Platelet rich plasma is a good choice for the treatment of acne and atrophic scars reminiscent of the course of the disease. In addition, for being autologous, it reduces the possibility of side effects, such as skin dryness and rejection. It was demonstrated that PRP accelerates the healing process, regulates inflammation and promotes healing by inhibiting the P. acnes bacteria, additionally restoring collagen.[7,10,2] The PRP's mechanism of action

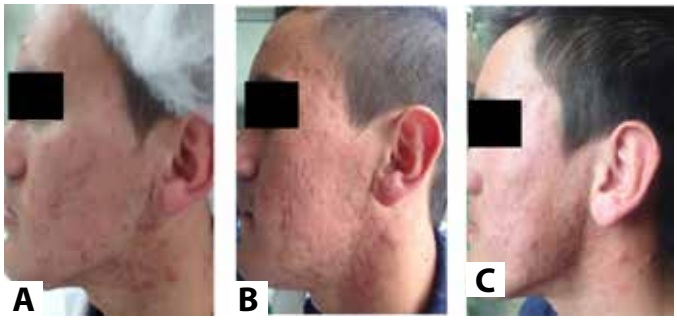

Figure 1: Patient with cystic acne before and during the treatment with PRP. **A -** Image obtained before the first PRP application; **B -** Image obtained 1 week after the second application; **C -** Image obtained 1 week after the 3rd and last applications

also involves the release of powerful antimicrobial peptides from the platelets' alpha granules. Although there are few studies on the PRP's effectiveness in acne, it emerges as a potential therapeutic option in Dermatology and Aesthetic Medicine.

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DECLARATION OF PARTICIPATION:

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Valentina Casas Romero:
Preparation of the Discussion Section in Spanish; translation into English, preparation of the Introduction Section (patient description and classification of the patient's scars).

William Hernando Merchan Rubiano:
Preparation of Table 1, preparation of the Discussion Section in Spanish, processing of the Figure 1, preparation of the Introduction Section, patient description (classification of the patient's acne and scars in Spanish).

Review articles with technical notes from the author

Use of the percutaneous collagen induction technique in the treatment of postinflammatory hyperpigmentation

Uso da técnica de indução percutânea de colágeno no tratamento da hiperpigmentação pós-inflamatória

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ABSTRACT

Post-inflammatory hyperpigmentation is a common consequence of inflammatory dermatoses that tends to affect patients with higher phototypes more frequently and severely. It can be caused by any skin inflammation or lesion, including acne, eczema, contact dermatitis or burns. Topical therapies are generally effective, however in some cases the post-inflammatory hyperpigmentation is resistant to conventional treatments, such as chemical peels and laser therapy. The percutaneous collagen induction technique can be used in postinflammatory hyperpigmentation with good response. The authors describe a case of hyperchromia resulting from a burn caused by Alexandrite laser for hair removal that was resistant to conventional treatments. Based on the literature review and their clinical experience, the authors suggest that the percutaneous collagen induction technique – also known as microneedling – may be included in the therapeutic armamentarium for the treatment of postinflammatory skin hyperpigmentation, especially when there is resistance to conventional treatments.

Keywords: hyperpigmentation; therapeutics; needles

RESUMO

Hiperpigmentação pós-inflamatória é sequela comum de dermatoses inflamatórias que tende a afetar com maiores freqüência e gravidade pacientes com fototipos altos. Pode ser causada por qualquer inflamação ou lesão de pele. Terapias tópicas geralmente são eficazes, mas em alguns casos esse tipo de hipercromia se mostra resistente aos tratamentos convencionais. A técnica de indução percutânea de colágeno pode ser usada na hiperpigmentação pós-inflamatória com boa resposta. Descreve-se a experiencia dos autores em um caso desse tipo de hipercromia após queimadura por laser de Alexandrite resistente aos tratamentos convencionais. Com base na revisão de literatura e em nossa experiência clínica sugerimos que a técnica de indução percutânea de colágeno, também conhecida como microagulhamento, possa ser incluída em nosso arsenal terapêutico no tratamento da hiperpigmentação pós-inflamatória cutânea, principalmente quando essa se mostrar resistente aos tratamentos convencionais.

***Palavras-chave**: hiperpigmentação; terapêutica; agulhas*

INTRODUCTION

Post-inflammatory hyperpigmentation is a common consequence of inflammatory dermatoses; it tends to affect darker skinned patients with more frequency and severity.

Epidemiological studies show that dyschromias, including post-inflammatory hyperpigmentation, are among the most common complaints in darker racial groups/ethnicities seeking dermatological care.[1]

Disorders that cause hyperpigmentation of the skin are frequent, the most common being melasma, lentigos and post--inflammatory hyperpigmentation (PIH).[2]

PIH probably occurs due to the increased production or deposition of melanin in the epidermis or dermis by the melanocytes. Typically, epidermal lesions will show a dark-brown, brown or beige color, whereas dermal hypermelanosis tends to be blue-gray in color.[3]

Multiple endogenous or exogenous inflammatory conditions can result in PIH.[3]

Generally, any inflammation or lesion on the skin can result in pigmentation (hyper/hypopigmentation), and PIH can be seen in many skin conditions, such as acne, eczema and contact dermatitis.[4]

At least two processes are involved in hyperpigmentation after cutaneous inflammation resulting in epidermal or dermal melanosis.[5]

The first one is pigmentary incontinence that follows destruction of the basal layer of the skin. The consequence of this process is the buildup of melanophages in the upper dermis. The macrophage can phagocytose the degenerated basal keratinocyte and the melanocytes, both containing great amounts of melanin, remaining in the upper dermis for some time.

The other process involves the epidermal inflammatory response, resulting in oxidation of the arachidonic acid into prostaglandins and leukotrienes.

These mediators stimulate epidermal melanocytes, that lead to increased melanin production and pigment transfer to the surrounding keratinocytes.

In other words, the epidermal hypermelanosis results from excessive stimulation and subsequent transfer to the melanin granules.[5]

Although its pathophysiology is still unknown, PIH can be explained by the regulation of skin pigmentation, parallel to the transfer between keratinocytes and melanocytes. There is evidence of the role of the interactions between epithelial and mesenchymal cells through the release of fibroblast growth factors. Among them, the keratinocyte growth factor (KGF), alone or in combination with interleukin-1a, induces melanin deposition in vitro and hyperpigmented lesions in vivo. Besides, moderate increase in KGF and upregulation of its receptors were observed in solar lentigo lesions, suggesting the participation of this growth factor in the appearance of hypepigmented patches.[4]

Some studies have quantified changes in the number of melanocytes associated with PIH secondary to exogenous causes, with findings of increased melanocyte count.

Changes in melanocyte density and their features are also seen secondary to inflammation; besides, an increase in dermal melanocytes after cutaneous exposure to certain agents was observed, as well as melanocyte increase, that vary according to the agent.

One can say that there is a correlation between the degree of hyperpigmentation and the intensity and duration of the exposure to PIH causal factors.[6]

Even though it does not cause any systemic problems, PIH can have a negative impact in the patient's quality of life and lead to serious psychological consequences, explaining why patients seek treatment for the patches.[1,3]

PIH treatment must be commenced early to help speed its resolution, and should begin with the precipitating inflammatory condition. First line therapy usually consists of the use of topical bleaching agents, including use of sunscreens and topical tyrosinase inhibitors, such as hydroquinone, azelaic and kojic, acids, and arbutin. Other bleaching agents include retinoids, mequinol, ascorbic acid, niacinamide, N-acetylglucosamine and soy in emerging therapies. Topical therapy is usually effective for the treatment of epidermal post-inflammatory hyperpigmentation; however, some procedures, such as laser therapy and chemical peels, can help treat refractory hyperpigmentation. It is worth highlighting that it is important to be careful with more aggressive skin treatments, in order to avoid irritation and worsening of the PIH.[1]

We must point out that the treatment for PIH is many times difficult and lengthy.[2]

Some studies suggest that the lesions that are not amenable to medical or surgical therapy can somewhat improve with cosmetic camouflage,[3] what we, the authors, believe that, in real life, can be very frustrating for the physician and the patient.

In the most recent years, percutaneous collagen induction technique started to be described as a therapeutic option in the treatment of hyperpigmented skin, but its use is usually associated with the loss of integrity of the stratum corneum, aiming at facilitating the transport of transdermal drugs. The microneedles, measuring from a few dozens to a few hundreds of microns, usually in an array, help the so-called drug delivery.[7,8]

In the percutaneous collagen induction technique, multiple perforations are made in the epidermis without destroying it, stimulating the collagen and thickening the skin.[9]

The use of needles for collagen stimulation was described in 1995 when Orentreich and Orentreich reported the method known as subcision for the treatment of scars.[10]

In 1997, Camirand and Doucet wrote about the use of a tattoo pistol without pigment to stimulate regeneration of the skin, whereby there would be replacement of the subdermal collagen by new collagen fibers and elastin after rupture of the damaged subdermal collagen.[10]

Based on these principles, the therapy of percutaneous collagen induction was developed in 2006.[10]

The device used for the procedure is a roller covered with fine needles in which, according to the manufacturer, there is variable amount and length of needles, from 0.25 to 3mm with approximately 0.1mm diameter.[10]

Because it is a procedure that opens channels between epidermal keratinocytes, topical agents can be used to enhance treatment results.[9,11,12]

A healing inflammatory process is triggered by the lesion caused by the needles, which has three phases: injury, healing and maturation.

In the injury phase, there is platelet and neutrophil release, that will be responsible for the release of growth factors that will act on keratinocytes and fibroblasts.

In the healing phase, neutrophils are replaced by monocytes and angiogenesis, epithelization and fibroblast proliferation occur, followed by collagen type III, elastin, glycosaminoglycan and proteoglycan production. In parallel, fibroblast growth factor is secreted by monocytes. The fibronectin matrix is formed approximately five days after injury, allowing the deposit of collagen below the basal layer of the epidermis.

In the maturation phase, collagen type III, that is predominant in the initial phase of the healing process, is slowly replaced by collagen type I, more long-lasting.[11,12]

This technique was recently described not to promote collagen improvement, but to treat facial melasma unresponsive to conventional treatment.[13] In this study, the procedure was done without using the drug delivery technique, that is, without using topical agents during the procedure, yielding satisfactory bleaching results in 100% of patients.

AUTHORS EXPERIENCE

Female patient, 30 years old, complained of hyperchromic round patches bilaterally on the groins, after burn with Alexandrite laser hair removal done 20 months back (Figure 1). Topical products were applied, such as hydroquinone and triple combination for prolonged time, with no response. A chemical peel session using Jessner's solution was initially performed, with mild bleaching of the inguinal patches, followed by two more similar treatments, with no clinical response (Figure 2). One year after failing the previous treatments for PIH, the percutaneous collagen induction technique was performed, using the Genosys device (Genosys Brazil. PLK Log. Health/Medical/Pharmaceuticals) with 0.5mm length needles.

The procedure was performed under topical anesthesia, with 4% lidocaine (Dermomax, Ferndale Industries Inc., USA – Biosintética Farmacêutica, Aché Laboratórios Farmacêuticos).

After disinfection with 2% chlorhexidine in aqueous solution, back and forth movements were performed with moderate pressure on the affected area, with approximately 10 passes in the same direction and at least 4 overlaps until pin-point bleeding was obtained. The area was cleaned with saline after the treatment and no substance was applied aiming at drug delivery. Dressings were applied without removing the blood from the area.

The patient was advised to use fusidic acid and mometasone in the area once daily for three days, and skin regenerator twice daily until complete healing of the skin injury caused.

The patient was advised to restart using topical bleaching agents on the area approximately one week after the procedure; 20% azelaic acid in the morning and 4% hydroquinone cream at night. The patient was reassessed two months after the procedure, when a significant bleaching of the lesions was observed (Figure 3).

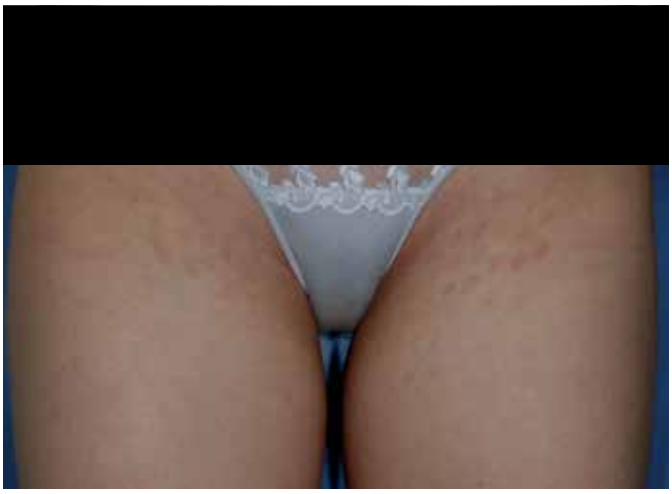

Figure 1: Before treatment

Figure 2: After two Jessner's chemical peel sessions

Although she declared to be very satisfied with the treatment, she still had some patches; thus, a new treatment of percutaneous collagen induction, identical to the first one, was performed after three months, with almost complete resolution of the patches in 45 days (Figure 4).

DISCUSSION

Post-inflammatory hyperpigmentation is a common consequence of inflammatory dermatoses and it can be caused by any skin inflammation. Even though its pathogenesis has not yet been elucidated, PIH probably occurs due to an increase of melanin production or deposition in the epidermis and/or dermis by melanocytes, that are the result of excessive stimulation and subsequent transfer to melanin granules.[3]

Early treatment is recommended for PIH, in order to speed its resolution, and it should start with management of the

causative inflammatory condition. Usually, first line therapy consists on the use of topical bleaching agents, including sunscreens and topical tyrosinase inhibitors, such as hydroquinone, azelaic and kojic acids, and arbutin. Topical therapy is usually effective for the treatment of epidermal post-inflammatory hyperpigmentation; however, some procedures such as laser therapy and chemical peels are also helpful in treating refractory hyperpigmentation. However, in performing these procedures, one must realize that more aggressive skin treatments can worsen PIH.[1] It is not uncommon for conventional treatments to be ineffective and slow. In these cases, percutaneous collagen induction comes as a new therapeutic approach. Despite not knowing exactly how the microneedling acts in the reduction of hyperchromia, the effect can take place due to the opening of the skin channels, promoting elimination of the pigment and also due to the activation of growth factors that, as already mentioned, are involved in the process of PIH and can be modified by using this technique.[11,12]

CONCLUSION

The effect of microneedling used alone in the treatment of skin hyperpigmentation can be a promising therapy, although there is need for further studies to help clarify the mechanism of action and maybe even establish better treatment protocols to enhance the technique's therapeutic effects.

Figure 3: Após uma sessão de indução percutânea de colágeno

Figure 4: Após duas sessões de indução percutânea de colágeno

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Metaanalysis on the subject and data interpretation.

Nancy Vanessa Paranhos Mazon
Data collection, analysis and interpretation.

Diagnostic imaging

Clinical and dermoscopic diagnosis of a case of exuberant macular amyloidosis

Diagnóstico clínico e dermatoscópico de um caso de amiloidose maculosa exuberante

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ABSTRACT

Amyloidosis is characterized by the deposition of a modified protein. It can affect the skin by accumulating in the papillary dermis. In general, it develops with brownish maculae predominant in the interscapular region, and rarely coursing with generalized forms. This report describes a 59 year-old female patient who had had a spot in the lower back for 43 years, which in the last 8 years had progressively spread for the entire body. Dermoscopy has proven extremely effective in locating the various foci of pigmentary incontinence, which together with apoptotic keratinocytes constitute the pathophysiological basis for the formation of the amyloid protein.

Keywords: amyloidosis; congo red; dermoscopy

RESUMO

A amiloidose é entidade caracterizada pela deposição de uma proteína modificada. Pode acometer a pele depositando-se na derme papilar. Em geral cursa com máculas acastanhadas predominantes na região interescapular e raramente com formas generalizadas. O presente relato refere-se a paciente do sexo feminino com queixa de manchas hipercrômicas de aumento progressivo para todo o corpo. A dermatoscopia se mostrou extremamente eficaz para a localização dos diversos focos de incontinência pigmentar, que junto com os queratinócitos apoptótico constituem a base fisiopatológica para a formação da proteína amiloide.

***Palavras-chave**: amiloidose; vermelho-congo; dermatoscopia*

Amyloidosis is a buildup, in any affected organ, of an abnormal protein which is the result of the combination of polysaccharides and globulin. Macular amyloidosis is the most common subtype of cutaneous amyloidosis. It typically presents with pigmentation in a reticular or wavy pattern on the interscapular region, affecting the extensor aspect of arms, forearms and legs1 to a lesser extent, rarely becoming generalized. Histopathology shows deposits of amyloid substance in the papillary dermis and, when stained with congo red under polarized light microscopy, shows greenish birefringence.[2] Areas of pigmentary incontinence are also seen on the same location.[3] We followed a 59-year-old female patient, born and living in São José dos Campos (SP), who presented with a complaint of a brownish patch in the sacrum for 43 years and progressive enlargement over the past 8 years.

On physical examination, the patient had brownish patches, some of them reticulated, interspersed with normal skin all over the body, sparing only fingers, feet and scalp (Figure 1). On dermoscopy, multiple brown waves on the inferior aspect of the

right leg, formed by brownish squared structures with fine streaks in the center of the lesion were of interest (Figures 2 and 3). She denied previous health issues or use of regular medications. Histopathology showed with apoptotic keratinocytes in the epidermis and enlargement of the papillary dermis, with deposition of hyaline eosinophilic globules, besides melanophages and mild superficial perivascular lymphomononuclear infiltrate (Figure 4).

Cutaneous amyloidosis can be classified in primary and secondary. Of the primary forms, macular amyloidosis, like the case described, is the most common type. Still, the generalized presentation, such as our patient's, is rarely seen in clinical practice.[1] Diffuse forms can simulate nevoid pigmentation, such as the poikilodermatous form.[2] Clinically, brown-gray patches, with varying diameters between 2-3mm are seen. The reticular or serpiginous pattern is typical. The diagnosis, initially clinical and

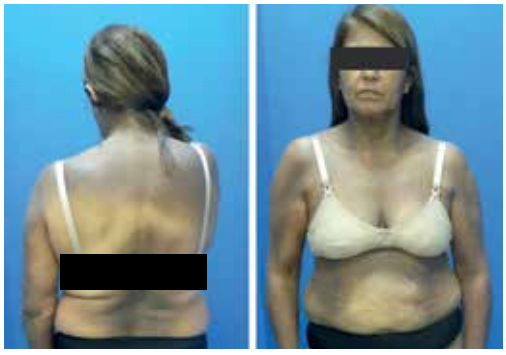

Figure 1: Profuse lesions on admission

Figure 2: Macroscopic image of the right thigh

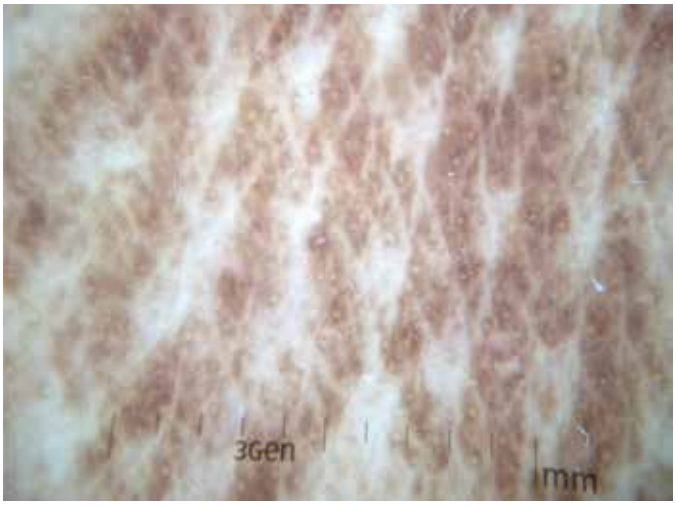

Figure 3: Dermoscopic image of the patient's right thigh

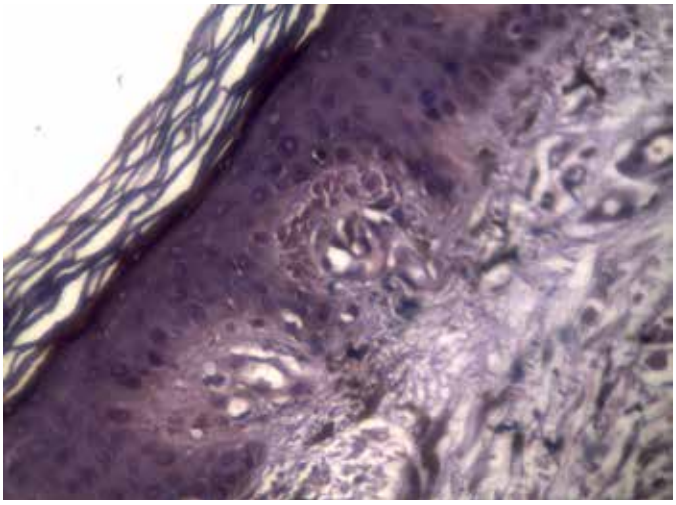

Figure 4: Congo red staining showing amyloid protein buildup in the patient's skin

easily mistaken for many other conditions including lichen simplex chronicus, atrophic lichen planus, lichen sclerosus, atopic dermatitis, hemocromatosis, xanthoma, pitiriasis versicolor, toxic melanoderma, among others, can be differentiated on dermoscopy by the findings of multiple small brown central cubes with fine streaks radiating from the center (Figures 5 and 6). The distinctive histopathological feature is amyloid substance deposition in previously healthy skin without deposition in other organs. It is more commonly

seen in Central and South Americas, Middle East and Asia, perhaps because of cultural habits. There are associated genetic factors as well, as we can see familial cases described in the literature. Other associated factors include ultraviolet B radiation (UVB), Epstein-Barr virus and race.[3] During puberty, this type of amyloidosis affects both sexes equally, but there is female predominance between 20 to 50 years of age.[3,4]

The treatment for this condition is generally disappointing. Topical superpotent steroids are usually used for a short

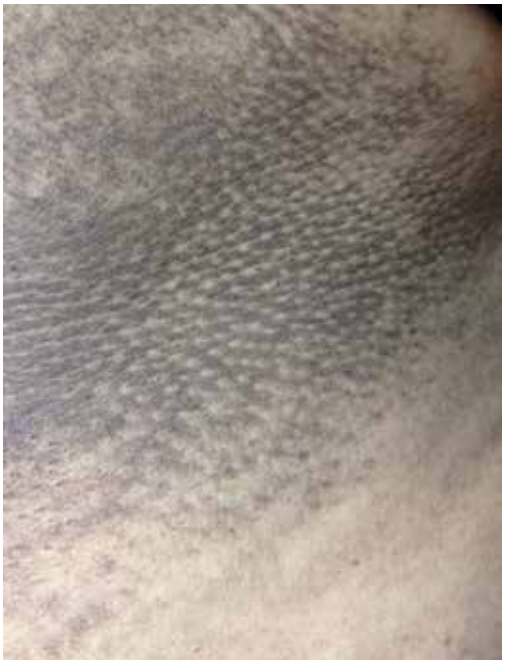

Figure 5: Macroscopic image of the left flank

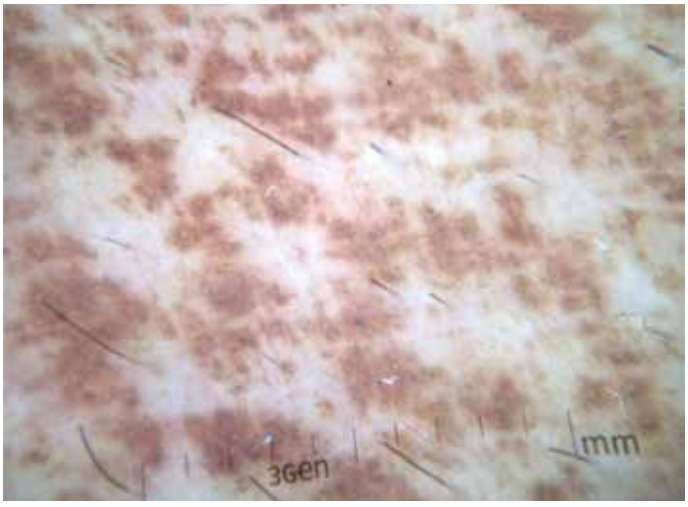

Figura 6: Dermoscopic image of the patient's left flank

time. Calcipotriol and phototherapy are similarly of limited use.[5] Dimethyl sulfoxide can improve pigmentation, but it completely recurs upon discontinuation.[3]

We demonstrate a florid case of disseminated macular amyloidosis, with characteristic dermoscopic pattern that helps differentiating from other conditions that are clinically similar. There is no question about the importance of the histopathological examination, but we highlight the importance of dermoscopy for the diagnosis of yet another dermatological condition.

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Denise Steiner:
Intellectual participation in the therapeutic approach
Critical review of the literature Intellectual participation in the therapeutic approach
Critical review of the manuscript
Critical review of the manuscript

Penile paraffinoma necrosis after mineral oil injection applied by a non-medical professional

Necrose de parafinoma peniano após injeção de óleo mineral por profissional não médico

Case report

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ABSTRACT

Paraffinoma results from the implantation of mineral oil in the skin, being characterized by inflammatory reaction of foreign body type, with variable latency period. Initial lesions consist of hardened nodules, which can ulcerate, fistulate or necrose. This technique was widely used for aesthetic purposes in the 20th century, and is no longer performed by physicians. However, it is still used by non-medical professionals or by the patients themselves, mainly in the genital region, aimed at improving sexual activity. This paper reports a case of implantation of mineral oil in the penis, performed by a non-medical professional, for aesthetic purposes that evolved with necrosis after three years.

Keywords: granuloma, foreign-body; mineral oil; necrosis; penis

RESUMO

Parafinoma decorre da implantação de óleo mineral na pele, sendo caracterizado por reação inflamatória do tipo corpo estranho com período de latência variável. As lesões iniciais são nódulos endurecidos, que podem ulcerar, fistulizar ou necrosar. Esta técnica foi muito utilizada para fins estéticos no século XX, não sendo mais realizada por médicos. Contudo, ainda é empregada por profissionais não médicos ou pelos próprios pacientes, principalmente na região genital, para melhoria da prática sexual. Relata-se caso de implante de óleo mineral no pênis, realizado por profissional não médico para fins estéticos, que evoluiu com necrose após três anos.

Palavras-chave: granuloma de corpo estranho; óleo mineral; necrose; pênis

INTRODUCTION

Paraffinoma is an adverse reaction after injection of mineral, plant or animal oils in the subcutaneous tissue or skin. It is characterized by a non-allergic foreign body-type granulomatous reaction on histopathology.[1-3] The latency period between the injection of the substance and initiation of the reaction is variable, from a few days to many years.[3-6] This technique was often used in the 20th century for cosmetic purposes.[1,6]

Complications of this practice are reported since 1906 and contributed to its discontinuation in many countries. Nowadays, it is still performed by non-medical professionals and by patients, mainly for penis enlargement, in Asian and east Euro-

pean countries.[4,6,7] Lesions start as indurated solitary or confluent nodules, forming plaques in the subcutaneous tissue and skin. Sometimes there is ulcer formation and fistulas with purulent or oily discharge and, in more advanced cases, necrosis of the affected area.[3,7-10]

LITERATURE REVIEW:

Paraffinoma or oleoma, also known as mineral oil granuloma, is the histological pattern that appears after injection of substances with saturated hydrocarbon chains in the skin or subcutaneous tissue. Due to the inability of human enzymes to degrade these substances, a foreign body-type granulomatous reaction can occur, in which part of the subcutaneous tissue is replaced by cysts of different sizes. They manifest clinically as indurated nodules that can also be associated with lymphatic drainage obstruction, caused by the non-absorbable substance. This lesion can occur within a few days or manifest years after injection of the substance.[1-6]

The injection of non-absorbable substances such as oils is an ancient and obsolete practice used since the beginning of the 20th century, aiming at correcting imperfections and improving cosmetic appearance.[3,6,10] The first report of the use of these substances for cosmetic purposes is from 1899, when Gersuny injected mineral oil into a boy's scrotum after bilateral orchiectomy due to tuberculosis.[1-8]

This practice was abandoned by physicians due to disastrous adverse reactions, but is still performed by non-medical professionals and by patients.[2,5,6,9] Of the penile enhancement techniques used by these professionals, the most common are inoculation of semiliquid substances and the implantation of penile spheres. These spheres are composed of metal or plastic, measure around 1 cm and contain non-absorbable liquid substances, such as mineral oil, in their interior. They are injected into the subcutaneous tissue above Buck's fascia (Figure 1).[10]

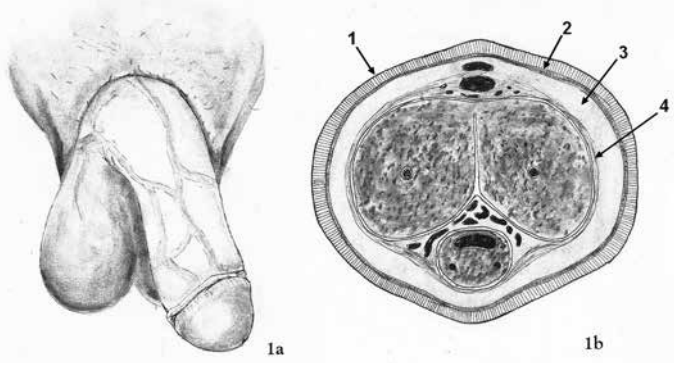

Figure 1: A - Illustration of the penile shaft, showing the subcutaneous tissue area; **B -** Coronal view of the penis shaft, demonstrating the anatomy in this area: 1 - skin, 2 – dartos fascia, 3 – subcutaneous tissue and 4 – Buck's fascia, involving corpora cavernosa and corpus spongiosum

Figura original desenhada por Victoria Bispo dos Santos baseada nos livros Testut L, et al.[11] e Platzer W.[12]

Even though there are reports of immediate effects and good cosmetic results as volume enhancement for the modification of the shaft contour, mineral oil injection triggers short and long term complications: skin inflammation, edema, abscess, lymphangitis, ulcers, local migration, corpora cavernosa invasion, phimosis, paraphimosis, erectile dysfunction, urinary disturbances and, in advanced cases, skin necrosis of the penile shaft.[3,6-10] The inflammation associated with the injection of mineral oil can rarely lead to the development of squamous cell carcinoma.[1,6,10]

The treatment of choice is surgery, aiming at removing the paraffinoma. Antibiotics and oral steroids can be required, apart from surgical intervention. In the case of necrosis, surgical or chemical debridement is indicated, associated with supportive measures as steroids, tetracyclines or colchicine due to the difficulty in completely removing the substance injected.[3,5,6,8-10]

CASE REPORT

Thirty-eight-year-old male patient, Caucasian, professional tattoo artist underwent application of mineral oil spheres in the penis 3 years ago, by a non-medical professional (tattoo artist), with the purpose of modifying the penile surface. After two years, he noticed rupture of the spheres, with flattening of the implants and subsequent induration of the shaft's skin. He did not seek medical care immediately. With the progression of the lesion, he decided to seek a plastic surgeon, that surgically debrided it. The clinical course was not satisfactory, and resulted in necrosis of the penile shaft's skin.

One month after the procedure, the patient was seen as an outpatient, complaining of local intense pain, but had no urinary complaints nor fever. On examination, there were indurated areas and violaceous erythema on the dorsal aspect and necrosis on the ventral aspect of the penis' shaft. Penile shaft and glans edema was also observed (Figure 2), with no enlarged glands or meatal discharge. The scrotum was spared. On the day of the consultation, he was taking cephalexin 500mg q.i.d. We opted to continue treatment with cephalexin, adding collagenase with topical chloramphenicol, prednisone (60mg/day) and oral dipyrone.

After one week the patient returned, still complaining of severe local pain and fever (37.8°C). The dorsal aspect was still edematous, indurated, had a violaceous erythema and necrosis of the superficial tissues. However, the ventral aspect of the penis showed some improvement, with no necrosis and some granulation areas. He was then examined by the urology team that initially ruled out urethral lesions. Ciprofloxacin 500mg t.d.s and clindamycin 600mg t.d.s were initiated, both orally. The dose of prednisone was maintained, but the topical treatment was changed to 2% hydrogel because of its selective chemical debridement effect. After 21 days, the patient returned with improvement of the lesions on both aspects of the penis (Figure 3). The antibiotics were discontinued and tapering of prednisone begun.

The patient was also assessed by a plastic surgeon, who opted to do a surgical approach. First, a subcutaneous tunnel was

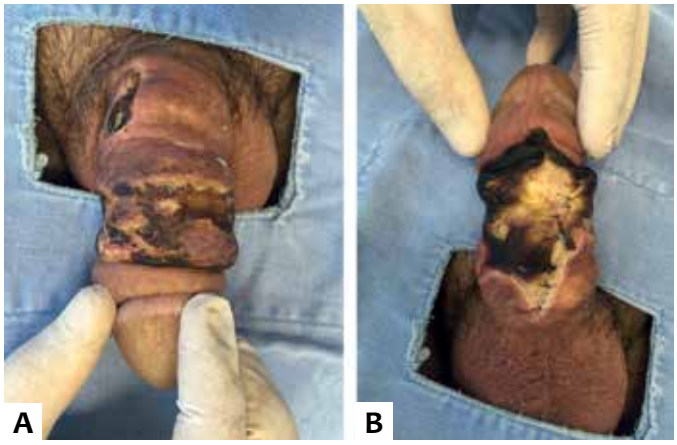

Figura 2: A - Dorsal aspect of the penis shaft with areas of necrosis interspersed with areas of skin edema and violaceous erythema; **B –** Ventral aspect of the penis shaft with an extensive area of necrosis; note the stitches from the previous surgery

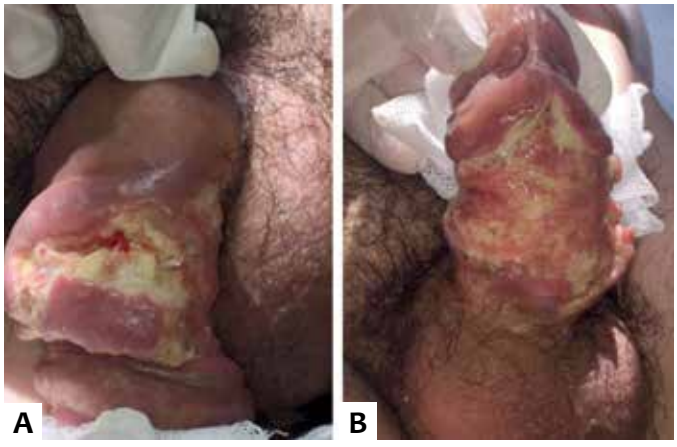

Figura 3: A - Dorsal aspect of the penile shaft after 21 days of treatment with 2% hydrogel; note the white-yellow exudate on the necrotic area; edema and erythema still present; **B** - Ventral aspect of the penile shaft after 21 days of treatment with 2% hydrogel. Granulation tissue all over the necrosed area, showing the effectiveness of the debridement and healing

designed on the scrotum so that the penis could pass through it. On the second stage, a graft with skin from the scrotum was place

DISCUSSION

The complications derived from paraffinoma can manifest within a few days of injection or years later. As in this case, where they appeared 2 years after placement of the implant. Usually, indurated nodules are observed, and those can ulcerate and fistulate, having as differential diagnoses genital ulcers of many etiologies. Albeit rare, necrosis can occur, compromising urinary and sexual functions of the organ.[3,6-10] In this case, the patient's penile urethra was apparently not damaged according to the urologist's evaluation, and he had no trouble passing urine despite the edema. The erectile function of the penis was also spared, despite the complaint of pain. The urology team offered to perform uretherocystoscopy after clinical improvement of the necrosis for a better assessment of the urethra.

The recommended treatment will vary according to the clinical presentation. Surgery for removal of the indurated nodules is initially indicated, and it must be performed as early as possible. In this case, the patient sought medical care only after one year of having the lesion. In cases of more severe complications, such as necrosis, chemical or surgical debridement must be performed.[5,6,8-10]

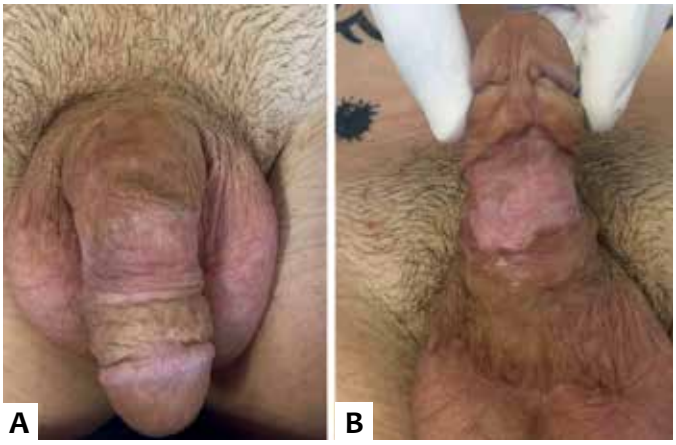

Figura 4: Complete wound healing after 4 months of treatment with 2% hydrogel on the dorsal aspect; **A** and ventral **B** of the penile shaft

CONCLUSION

Although paraffinomas are extremely rare nowadays, physicians must be vigilant for its recognition, since many patients will not admit to clandestine mineral oil injection. Early diagnosis is crucial for a good prognosis of the affected organ. In the case of male genital implants, a multidisciplinary approach, with urology and plastic surgery, is necessary.

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Triamcinolone post-treatment complication of pachydermodactyly

Complicação pós-tratamento de paquidermodactilia com triancinolona

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ABSTRACT

Pachydermodactyly is a rare, benign and acquired form of digital fibromatosis characterized by the thickening of soft tissues in the lateral regions of the proximal interphalangeal joints, typically of the digiti II, III and IV of both hands. In most cases it is associated with repeated digital microtraumas. The authors of the present article report the case of a 22-year-old patient with a typical clinical presentation of the condition. The treatment with triamcinolone injections led to a partial reduction of the thickening, in addition to hypopigmentation and hyperemia, meaning it was an unfavorable option. Although rare and benign, this typical clinical condition deserves attention, and unnecessary and costly investigations, as well as inappropriate treatments should be avoided.

Keywords: hand dermatoses; soft tissue neoplasms; fingers; young adult; glucocorticoids; cumulative trauma disorders; fibroma; treatment outcome

RESUMO

Paquidermodactilia é forma rara, benigna e adquirida de fibromatose digital caracterizada por espessamento de partes moles nas regiões laterais das articulações interfalangeanas proximais, tipicamente dos II, III e IV dedos de ambas as mãos. É associada, em grande parte dos casos, a microtraumas digitais repetidos. Relatamos o caso de um paciente de 22 anos de idade, com apresentação clínica típica da doença. O tratamento com infiltrações de triancinolona levou a redução parcial do espessamento, além de hipopigmentação e hiperemia, não tendo sido uma boa opção. Apesar de rara e benigna, essa condição clínica típica deve ser considerada, evitando-se investigações desnecessárias e onerosas, assim como tratamentos inapropriados.

Palavras-chave: dermatoses da mão; neoplasias de tecidos moles; dedos; adulto jovem; glucocorticoides; transtornos traumáticos cumulativos; fibroma; resultado de tratamento

INTRODUCTION

Pachydermodactyly (PDD) was initially described by Bazex et al. in 1973 as a "digital pachyderma of the first phalanges".[1] Two years later, Verbov, based on the Greek words pachy (thick), dermo (skin) and dactylos (finger), named it as a variant of the true interphalangeal pad.[2] PDD is a rare, benign and acquired form of digital fibromatosis, characterized by the thickening of soft tissue in the lateral aspect of the proximal interphalangeal joints (PIJ). A review article identified only 161 reported cases, being more common in men during puberty and young adults.[3]

Case report

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CASE REPORT

Twenty-two-year-old male patient, college student, complains of progressive increase in volume on the base of his fingers over the past 5 years. He reports repeat minor trauma during his teens due to the habit of cracking his knuckles and constantly touching his fingers. He denied systemic signs or symptoms. Physical examination revealed increase in finger volume on the base of the PIJ, affecting the 2nd, 3rd and 4th fingers of both hands (Figure 1). The changes were asymptomatic, with no loss of finger movement and his main concern was the cosmetic appearance. Histopathology of an elliptical skin biopsy of the PIJ region of the 3rd left finger showed compact hyperkeratosis and mild acanthosis of the epidermis, besides thickening of the collagen fibers and mild hyalinization in the papillary and reticular dermis, with no inflammation in the dermis nor any changes on the appendages (Figure 2). Hands and wrists radiograph showed thickening of soft tissue close to the PIJ of the fingers, with no bony or joint space changes (Figure 3). The diagnosis of pachydermodactyly was then made, and the patient was informed of its benign nature. Despite knowing that, the patient requested treatment for cosmetic reasons.

We opted to treat with 20mg/ml triamcinolone acetonide solution. As the initial approach, we injected into the affected area, PIJ of the 4th finger of the left hand, to see if there was going to be any adverse reaction to the medication, and there was none. Two weeks later, the procedure was performed again in the PIJ of the 2nd, 3rd, and 4th fingers of both hands. On review after 3 months, there was a mild reduction in volume in the PIJ area of the 4th left finger and 2nd right finger, with erythematous (secondary to neovascularization) and hypopigmented areas, common steroid side effects. The patient opted to have another session in the areas he considered the worst: PIJ of the 4th left finger and 2nd and 4th right fingers. Two months later, more reduction, although mild, of volume was observed; nonetheless, there was increase in hyperemia and hypopigmentation. The comparison between pre- and post-treatment can be seen in figures 4, 5 and 6.

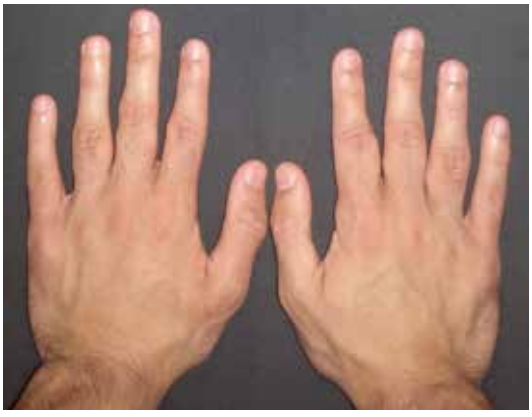

Figura 1: Increase in finger volume at the base of the PIJ, affecting the 2nd, 3rd and 4th fingers of both hands

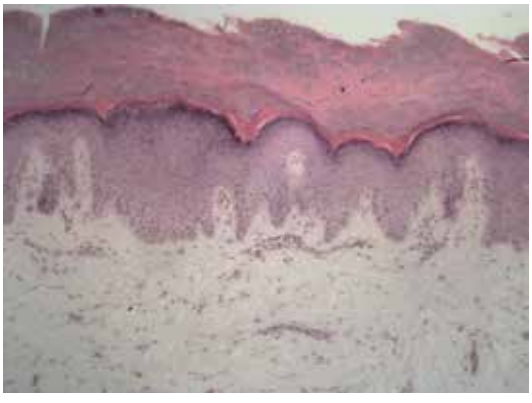

Figure 2: Epidermis showing compact hyperkeratosis and mild acanthosis, collagen fiber thickening and mild discrete hyalinization in the papillary and reticular dermis. No inflammation is seen

DISCUSSION

The exact etiology of PDD is unknown. It is likely to be a consequence of repeated minor traumas associated to friction, interlacing and cracking the knuckles, as in this case and others.[4,5,6] However, there are reports of unknown cause with no history of repeated minor traumas or touching the hands.[6,7]

The typical presentation of PDD is edema and asymptomatic thickening of the periarticular soft tissue of the PIJ of the 2nd-4th fingers, occurring symmetrically in both hands, with no bone abnormalities, synovitis or restriction of movement. The thickening is mainly located on the radial and ulnar distribution. There can be lichenification and scaling on the affected areas.[5] In some cases, pain.[7] Unilateral PDD was also described.[8] Less often, the thumbs can also be thickened.[6] Our patient had the typical presentation, bilateral and symmetrical, on the PIJ of the 2nd to the 4th fingers.

PDD was already described in association with: Dupuytren's contracture, Asperger syndrome, Ehlers-Danlos syndrome, carpal tunnel syndrome, tuberous sclerosis, gynecomastia, feet syndactyly, atrophia maculosa varioliformis cutis, and Tourette syndrome.[3]

Differential diagnosis includes many conditions: true interphalangeal pad, pseudo-knuckle pad, collagenous plaques of the hands, juvenile digital fibromatosis, juvenile hyaline fibromatosis, nodular fibromatosis of the skin, acromegaly, thyroid disease, fibrous inflammatory conditions, among others.[5]

Histologically, there is hyperkeratosis, acanthosis, thickening of the dermis, increase in fibroblasts and collagen deposits, thickening of the basement membrane and of the eccrine sweat glands, intense build-up of mucopolysaccharides, poor demarcation between papillary and reticular dermis, mucin deposits between type III and V collagen fibers with reduction in type I collagen.[3]

Hand radiographs and magnetic resonance imaging (MRI) show thickening of soft tissues with no bone involvement or articular abnormalities, as in this case.[3,7]

Chen et al.6 proposed the following diagnostic criteria:

- asymptomatic patient
- no morning stiffness
- no pain on movement or tenderness on palpation
- non-circumferential thickening of the radial or ulnar fingers

Figure 3: Soft tissue thickening adjacent to the PIJ of the fingers, not affecting the bones or articular spaces

Figure 4: General comparison between before and after treatment

Figure 5: Comparison of the left hand pre- and post-treatment. Small volume reduction mainly in the PIJ of the 4th finger, with hypopigmentation and hyperemia of the 3rd and 4th fingers

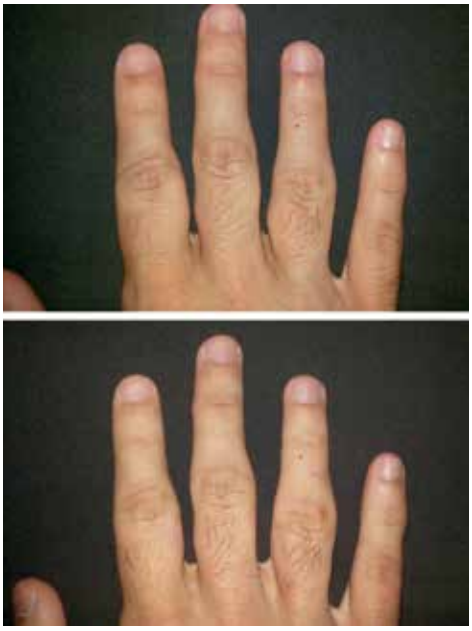

Figure 6: Comparison between pre- and post-treatment right hand). Small volume reduction, mainly in the PIJ of the 2nd and 4th fingers, with hypopigmentation and hyperemia

• laboratory tests showing non-specific results
• plain radiographs only showing thickening of soft tissues.

With the typical findings, additional work up such as MRI or skin biopsy are not usually necessary for the diagnosis. In our case, histopathology findings were useful to exclude similar conditions and to support the clinical and radiographic findings of PDD.

There is no effective well-established treatment for PDD at present. There are reports of thickening regression upon ceasing digital friction.[4] There are reports showing that oral Tranilast for 6 months, an antiallergic drug, improved thickening.[7] Triamcinolone injections reduced the volume after 2 sessions in 1 month, with mild hypopigmentation.[9] In our patient, the injections resulted in partial reduction with subsequent hypopigmentation and hyperemia, not making it a good option from the cosmetic point of view. Surgical excision can also be an option.[10]

We concluded that triamcinolone injections may not be a good option due to the possibility of secondary hypopigmentation and hyperemia, besides subtle reduction of volume. Although rare and benign, this typical condition must be considered, avoiding unnecessary and costly investigations, as well as inappropriate treatments.

To Dr. Annair Freitas do Valle, our gratitude for the application of the medication.

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Case report

Lasers and cutaneous fillers: possible complications

Lasers e preenchimentos: possíveis complicações

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ABSTRACT

The treatment of acne scars – a common dermatological complaint and cause of anxiety for patients – is challenging, usually consisting of multiple serial methods. The authors of the present article describe a case where hyaluronic acid cutaneous filling and fractional CO2 laser were indicated, with an unusual complication occurring due to the short time interval between the applications of the techniques.

The article discuses the need for a close and frank physician / patient relationship aimed at containing patient anxiety as well as studies determining the optimal time interval between therapeutic approaches in the treatment of acne scars.

Keywords: acne vulgaris; laser therapy; physician-patient relations; hyaluronic acid; follow-up studies

RESUMO

O tratamento das cicatrizes de acne, queixa dermatológica comum e motivo de ansiedade para os pacientes é desafiante, consistindo geralmente em múltiplas abordagens seriadas. Descreve-se um caso em que foram indicados preenchimento com ácido hialurônico e laser fracionado de CO2, tendo ocorrido complicação inusitada, devido ao curto intervalo de tempo entre a utilização das técnicas.

Discutem-se a necessidade de relação médico/paciente estreita e confidente para conter a ansiedade dos pacientes e de estudos que determinem o intervalo ideal entre as abordagens terapêuticas no tratamento das cicatrizes de acne.

***Palavras-chave**: acne vulgar; terapia a laser; relações médico/paciente; ácido hialurônico; seguimentos*

INTRODUCTION

Acne vulgaris is a prevalent inflammatory condition that can progress with permanent scarring. Multiple approaches were described according to the features of the lesion. For the distensible lesions, hyaluronic acid dermal fillers are the first line of treatment.[1] For the non-distensible lesions, of the renowned surgical techniques and chemical peels,[2] one of the most potent and effective option is ablative fractional CO_2 laser.[3]

These techniques can be combined and repeated in reports in the literature determining the intervals or number of sessions.

Hyaluronic acid is a polysaccharide that is a structural component of the skin, subcutaneous and connective tissues.[4] Restylane® (Galderma, São Paulo, Brazil), approved by the Food and Drug Administration (FDA) and indicated for the treatment of severe wrinkles and deep folds is one of the many brands of

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[1,4]-butanediol diglycidyl ether (BDDE)-crosslinked hyaluronic acid sold worldwide.

Ablative fractional CO_2 laser is intensely absorbed by water in the tissues, creates thermal phenomena in the structures that contain this element and leads to epidermal turnover and collagen stimulation, allowing for improvements in patients with photoaging, stretch marks and acne scarring. In regard to side effects, pain, edema, and erythema can be expected, which can last around 10 days, and also late phenomena such as hyperpigmentation, hypopigmentation and scars. Other possible complications include bacterial, fungal or viral infections, contact dermatitis to topical agents used for the procedure and pruritus.[1]

The objective of this study is to report an unusual complication resulting from the combined treatment of hyaluronic acid injections and fractional CO_2 laser in a patient with acne scarring.

A similar report was not found in the literature.

CASE REPORT

Thirty-five-year-old female patient, phototype III, who had the habit of daily and intense sun exposure, with no comorbidities, on oral contraceptive pill, had acne since she was 15 years old. At 17 years of age, she underwent treatment with oral isotretinoin, with acne remission at the cumulative dose of 120mg/kg. When she was 20 years old, she started using oxandrolone 20mg/day three-monthly, and developed cyclic recurrence and remission of acne. She sought treatment for the scarring during the remission period. On examination, she had distensible and non-distensible scars in the malar regions (Figure 1). Ablative fractionated CO_2 laser (two monthly treatments) and hyaluronic acid filler injection (three monthly treatments) were indicated. Due to the patient's anxiety, the first CO_2 laser treatment was performed 5 days after hyaluronic acid injection. Immediately after laser treatment, performed with the usual potency and density, edema, erythema and dark crusts with exudate were observed, corresponding to the release of dehydrated hyaluronic acid (Figure 2). After 5 days the edema, erythema and exudate regressed, but the crusts and peeling persisted for another 8 days (Figure 3). Two weeks later, the patient had recurrence of acne, with pustular and erythematous lesions on the malar regions (Figure 4). Three months after the CO_2 treatment, she had complete remission of the condition (Figure 5).

DISCUSSION

Acne is a common condition in adolescence, with high frequency (85%), being common spontaneous regression after 20 years of age.[1] The most relevant complications are skin scarring and psychosocial sequelae, usually persistent.[2] In this setting, acne can trigger psychodermatological conditions such as low self-esteem, social isolation 30μm. The laser acts generating heat and coagulation up to 85°C, carbonization above 85°C and vaporization at 100°C. It is likely that this heat transfer was responsible for the dehydration of the hyaluronic acid, creating darkened crusts as observed in the reported case.[4] Interestingly, there was complete regeneration of the tissue after 3 months,

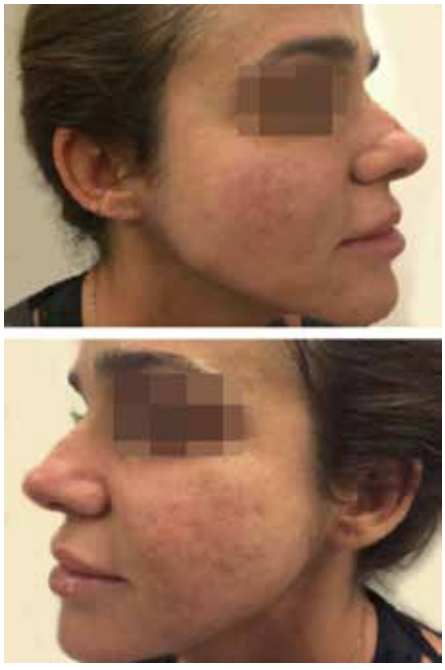

Figure 1: Before treatment

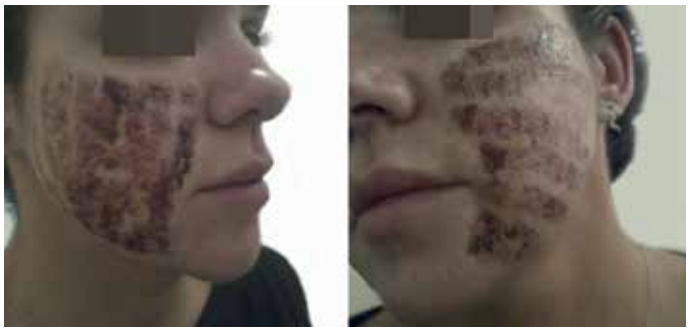

Figure 2: Immediately after treatment

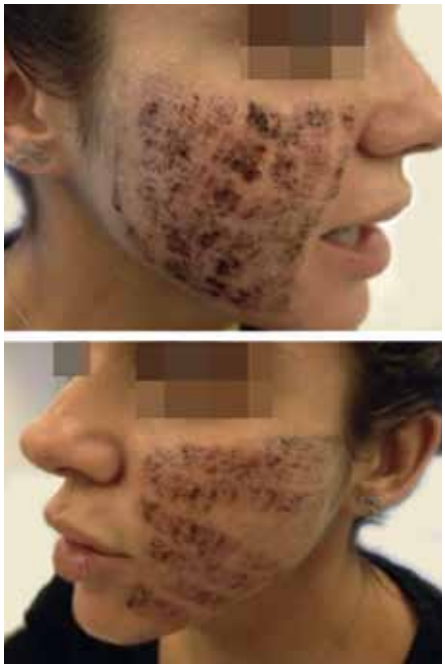

Figure 3: 5 days after laser treatment

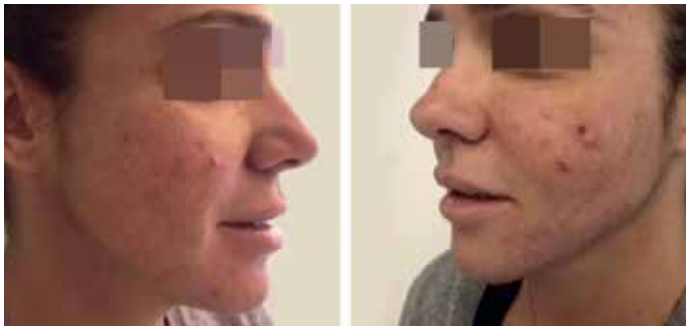

Figure 4: 15 days after CO2 laser

Figure 5: 3 months after CO2 laser

what indicates that the crusts did not correspond to necrotic tissue, but probably to the hyaluronic acid deteriorated by heat. Post-inflammatory hyperpigmentation was not observed. This side effect was very common with the use of non-ablative fractional and depression. In one study, the 5 most reported symptoms were frequent picking of lesions, anxiety (88.3%), displeasure of having acne (70%), fear of acne never ceasing and dissatisfaction regarding physical appearance (63.3%). In the reported case, the patient had anxiety, and this psychodermatological condition incited the promptness of the medical consultation.[5]

There are studies in the literature that evaluate the use radiofrequency and pulsed light after injectable hyaluronic acid treatment,[3] yet there are no citations regarding its association with CO_2 laser. The depth of penetration of the CO_2 depends on the amount of water in the tissue and reaches between 20 and 30μm. The laser acts generating heat and coagulation up to 85°C, carbonization above 85°C and vaporization at 100°C. It is likely that this heat transfer was responsible for the dehydration of the hyaluronic acid, creating darkened crusts as observed in the reported case.[4] Interestingly, there was complete regeneration of the tissue after 3 months, what indicates that the crusts did not correspond to necrotic tissue, but probably to the hyaluronic acid deteriorated by heat. Post-inflammatory hyperpigmentation was not observed. This side effect was very common with the use of non-ablative fractional CO_2 , laser, but became rare with fractional laser use.[2]

We also highlight that the expected scarring with excessive cutaneous thermal ablation did not happen in this patient, confirming the hypothesis that the dark crusts corresponded to the heat action in the epidermis, superficial dermis and the hyaluronic acid that was previously injected into the skin.[1] In another study, hyaluronic acid (Restylane®, Sweden) was injected into pig skin and after 2 weeks the same area was treated with ablative laser. In the histopathology, they observed that there were no morphological changes in the hyaluronic acid but its duration decreased and its presence impaired laser efficacy.[4]

CONCLUSION

Acne scarring treatment is challenging and at times disappointing, usually consisting in multiple sequential approaches. This determines the need of a close and reliable relationship between the physician and the patient to help with the patient's anxiety and sometimes frustration. On the other hand, there are no studies that determine the ideal interval between the therapeutic approaches in the treatment of these scars. Thus, in the setting of multiple interventions, it is crucial to establish protocols with planned steps and to respect the intervals in order to avoid complications as the one reported in this study.

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Surgical repair of severe rhinophyma

Correção cirúrgica de rinofima grave

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ABSTRACT

Rosacea can develop into phyma, which is characterized by hypertrophy of sebaceous glands and proliferation of connective tissue and blood vessels. Regarded as a serious complication, phymas are more common in men, being more frequent in the nose – when it is called rhinophyma. Rosacea and rhinophyma can cause functional and aesthetic impairment, leading to a worsening in the patients' quality of life. Pharmacological and physical therapies are performed in initial stages, however phymatous variants of the condition respond poorly to the first. The authors of the present article report a case of surgical correction of a giant rhinophyma using the shaving and electrocoagulation techniques, with excellent aesthetic and functional outcomes.

Keywords: rhinophyma; rosaceae; electrosurgery

RESUMO

A rosácea pode manifestar-se com a formação de fima, que se caracteriza por hipertrofia de glândulas sebáceas e proliferação de tecido conectivo e vasos sanguíneos. Considerada complicação grave, a fima é mais comum em homens, e mais frequente no nariz, quando é denominada rinofima. Rosácea e rinofima podem trazer prejuízos funcionais e estéticos com piora da qualidade de vida dos pacientes. Nos estádios iniciais realizam-se terapêuticas farmacológicas, às quais, porém, a forma fimatosa responde pobremente. Relatamos um caso de correção cirúrgica de rinofima gigante pela técnica de shaving e eletrocoagulação, com excelente resultado cosmético e funcional.

***Palavras-chave**: rinofima; rosácea; eletrocirurgia*

INTRODUCTION

Rosacea is a chronic inflammatory skin condition occurring most commonly in women, with multifactorial etiology.[1] Phyma is currently considered a manifestation of rosacea that, in contrast, affects more commonly men and that can be recurrent or appear as a consequence of chronic inflammation.[2] Rhinophyma is the most frequent presentation, characterized by uneven thickening of the nose, from mild to florid, with dilated infundibula and telangiectases. On the histology, it is represented by a pattern similar to rosacea, with a lymphocytic and plasmacytic inflammatory infiltrate around the vessels and the infundibulum, associated with hyperplasia of sebaceous glands and peculiar angulated vessels. In the florid forms, a fibrotic pattern can be seen, with thickening of the dermis and reduction or absence of pilosebaceous follicles.[3]

Phymatous changes, despite benign, cause severe cosmetic problems and occasionally functional impairment.

Patients present with negative symptoms from the disease, such as low self-esteem and lessened social interactions.[4] Improving those symptoms promotes the individual's well-being.

Since the pharmacological treatment provides limited results for the phymatous form,[4] we report a florid case of rhinophyma treated surgically that resulted in significant improvement and subsequent improvement of the patient's quality of life.

CASE REPORT

Fifty-nine-year-old Caucasian male patient presented with the complaint of thickening of the nose for 10 years. On physical examination, the nose had increased size due to papulonodular mildly erythematous soft lesions, with a cribriform surface, localized on the nasal tip, and two pedunculated tumors with similar features on the nasal alae (Figures 1.A, 1.B, 2.A). There was also a subtle shift to the left of the oral fissure and partial occlusion of the nares by the lesions (Figure 2.B). The patient denied any comorbidities, but stated that the nasal growth interfered with inhalation.

The diagnosis of rhinophyma was proposed, and imaging studies were used (computerized tomography) to assess the extent and nature of the changes, revealing no deep tissue involvement (Figure 3).

As the condition was unsightly, stigmatizing and caused functional impairment of the nose, we opted for a surgical repair. The procedure was performed in one step, with local tumescent anesthesia. Shaving was performed with a flexible surgical blade (DermaBlade®, American Safety, United States), followed by hemostasis with monopolar diathermy using low energy currents.

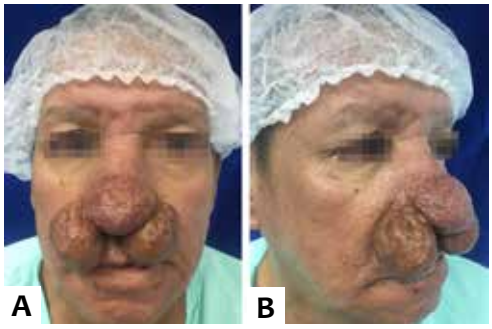

Figure 1. A e B Thickening of the nose due to erythematous papulonodular lesions, especially in the lower third (tip and alae)

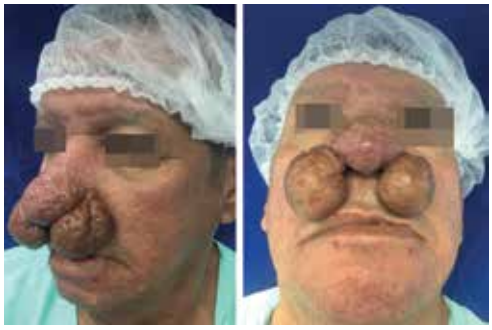

Figure 2: A e **B -** Partial occlusion of the nostrils and subtle shift of the oral opening to the left

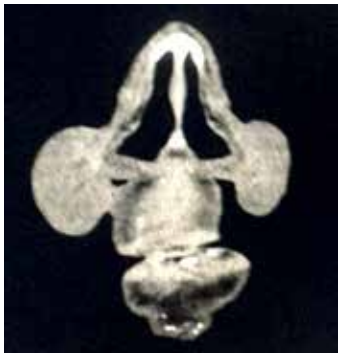

Figure 3: A e **B -** Thickening of the soft tissue in the alar region of the nose, bilaterally; no involvement of other tissues

Both pedunculated tumors measured approximately 4 cm in diameter (Figure 4). Samples were sent for histology, that showed fibrosis of the dermis and subcutaneous tissue and bulky sebaceous glands and perifollicular inflammatory infiltrate, confirming the diagnosis of rhinophyma (Figure 5).

Figures 6 to 8 show the immediate, intermediate (15 days) and late (1 month) post-operative periods. It is possible to observe excellent cosmetic and functional results with great patient satisfaction. Figure 8 shows the patient before surgery and 1 month after, with resolution of the nostril occlusion.

DISCUSSION

The etiology of rhinophyma (from Greek, rhis, nose and phyma, growth)[5] is unknown, currently considered serious progression of rosacea.[6] It can cause cosmetic and functional impairment, besides local irritation and pain.[6]

Patients with rosacea have high rates of anxiety and depression, higher than alcoholism.[7] They can also present with shyness and social phobia due to the skin condition.[8]

Aiming at clinical and quality of life improvement for the patient with rosacea, it is crucial to base the approach in the pharmacological, behavioral and physical therapies. Pharmacological therapy has low effectiveness for the phymatous presentations[4] and the surgical approach is usually advocated.[5] Destructive treat-

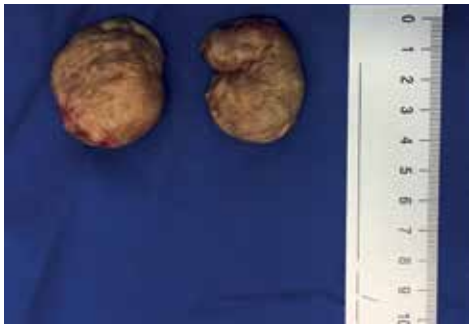

Figure 4: Result of the surgical repair corresponding to the pedunculated tumors of the nasal alae

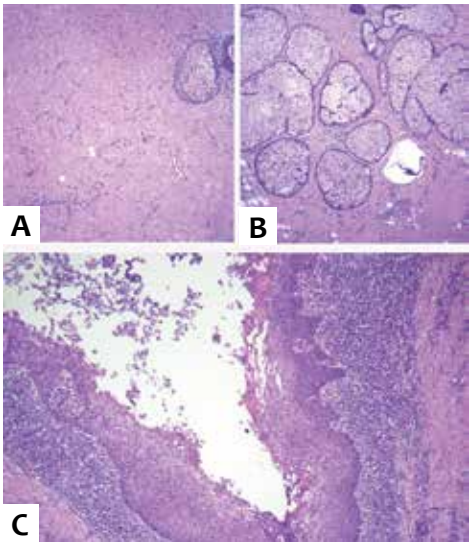

Figure 5: (Hematoxylin and eosin 50X)
A – Extensive replacement of the dermis and subcutaneous tissue with fibrosis
B – Bulky sebaceous glands amidst fibrosis
C – One of the many hair follicles with dilated lumen and wall filled with lymphoid inflammatory infiltrate

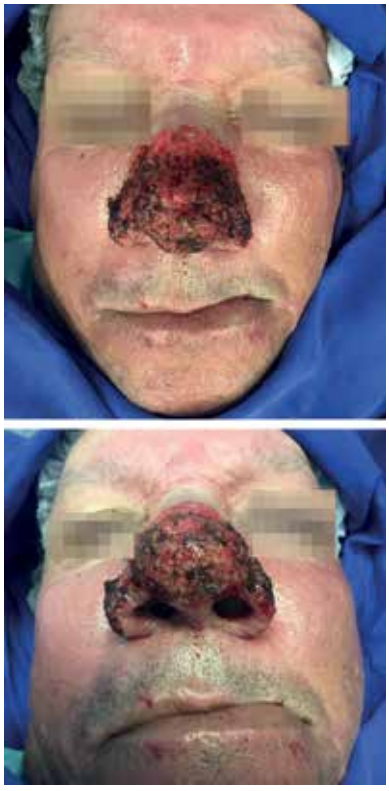

Figure 6: Immediate post-operative

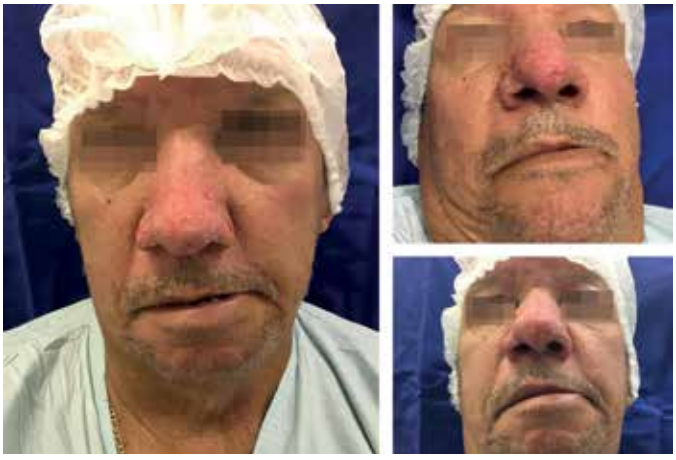

Figure 7: Result 15 days after procedure

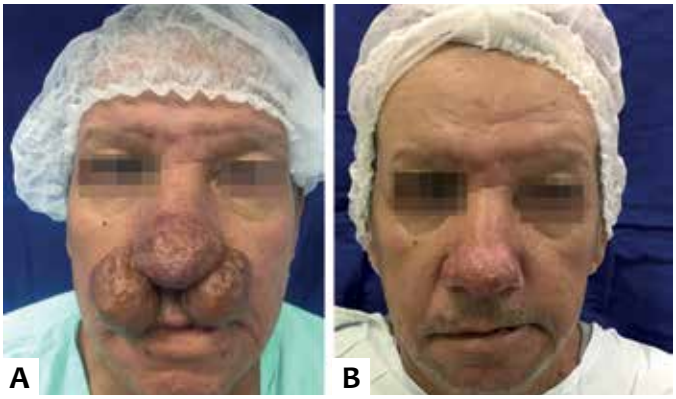

Figure 8: A - Rhinophyma with partial occlusion of the nostrils
B – Cosmetic and functional improvement after 30 days

ments can be performed with CO_2 laser, conventional ablative surgery, dermabrasion and electrosurgery.[4,9]

Of the surgical options, we chose shaving and cautery, a safe, effective and low cost option. In this case, it offered the patient an exceptional and very satisfactory result.

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Photograhps

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Surgical coordinator Manuscript review

Case report

Rotation flap for the reconstruction of the cutaneous upper lip after Mohs micrographic surgery

Retalho de rotação para reconstrução de lábio cutâneo superior após cirurgia micrográfica de Mohs

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ABSTRACT

Introduction: The cutaneous upper lip is often affected by malignant skin neoplasms. Surgical treatment is preferred for most lesions in this site. Whenever available, tumors in the perioral area should be managed with Mohs micrographic surgery.

Case report: The author of the present article describes the implementation of a rotation flap in the cutaneous upper lip of a patient who underwent Mohs micrographic surgery.

Discussion: There are a number of options for repairing surgical defects in the cutaneous upper lip. When primary closure is not possible, rotation flaps are considered because they allow camouflaging of the rotation arc in the nasolabial fold, and the other incisions in the perioral rhytids.

Keywords: lip neoplasms; Mohs surgery; surgical flaps

RESUMO

***Introdução**: O lábio cutâneo superior é frequentemente acometido por neoplasias malignas da pele. O tratamento cirúrgico é o preferível para a maioria das lesões nesse local. Sempre que disponível, a cirurgia micrográfica de Mohs deve ser considerada para essa área.*

***Relato de caso**: Descreve-se aplicação de retalho de rotação para lábio cutâneo superior em paciente submetido à cirurgia micrográfica de Mohs.*

***Discussão**: Há diferentes opções para restaurar defeitos cirúrgicos no lábio cutâneo superior. Quando fechamento primário não é possível, o retalho de rotação pode ser considerado. Ele permite camuflar o arco da rotação no sulco nasogeniano e as demais incisões nas rítides periorais.*

***Palavras-chave**: neoplasias labiais; cirurgia de Mohs; retalhos cirúrgicos*

Study conducted at the Department of Dermatology at Hospital Santa Casa de Curitiba and at the Department of Dermatology at Hospital de Clínicas of the Universidade Federal do Paraná – Curitiba (PR), Brazil.

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Conflict of interests: None

INTRODUCTION

The upper cutaneous lip is frequently affected by malignant neoplasms of the skin. Surgical treatment is preferred for most lesions on this region. Whenever available, Mohs micrographic surgery should be considered for this area, since the technique enables assessment of 100% of the surgical margins, besides saving healthy tissue.[1]

Surgical wounds in the upper cutaneous lip can be challenging to repair. The complexity of the wounds affecting this anatomical region is due to the proximity to multiple cosmetic subunits, its respective boundaries and to the fact that the lip is a free margin. An ideal reconstruction restores the color, texture and maintains the symmetry of the cupid's bow, philtrum, apical triangles, nasolabial fold and free margin of the lip, besides camouflaging incisions between anatomical subunits.[2]

There are many upper cutaneous lip repair options available according to the location, size, depth, elasticity and involvement of adjacent structures.[3,4] The case of a patient who underwent a rotation flap for repair of the upper cutaneous lip after Mohs micrographic surgery is described.

CASE REPORT

Fifty-year-old female patient came to the Department of Dermatology with a pearly erythematous plaque measuring 1.3 x 0.9 cm in the left upper cutaneous lip. Biopsy revealed an infiltrating basal cell carcinoma. The patient underwent Mohs surgery under local anesthesia (lidocaine and bupivacaine) reaching the free margins after two stages. The resulting defect measured 2.1 x 1.3 cm, affecting the left upper cutaneous lip (Figure 1). The underlying muscles were spared.

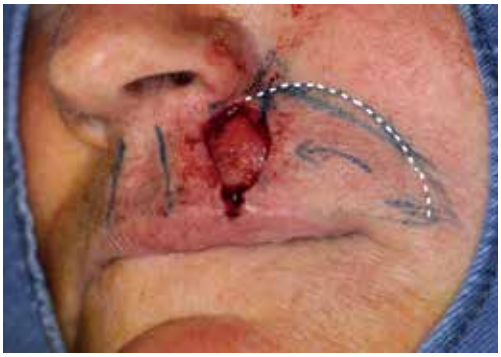

Figura 1: Surgical defect of 2.3 x 1.2 cm on the left upper cutaneous lip after removal of infiltrating basal cell carcinoma with Mohs surgery. Rotation flap designed with an arc (dotted line), a few millimeters above the nasolabial fold

Due to the size and location of the wound, a rotation flap was chosen for the repair (Figure 1). The rotation arc was drawn a few millimeters above the nasolabial fold. The defect edges were initially angulated, and the defect was extended to the inferior edge of the nose to camouflage the incisions. The flap was elevated and undermined above the orbicularis oris muscle in the perioral region and in the subcutaneous tissue close to the nasolabial fold. After hemostasis, the flap was positioned and sutured in two levels, with poliglecapronae-25 4.0 and mono nylon 5.0 (Figure 2). The external sutures were removed after 7 days. After 1 month, the surgical incisions were camouflaged within the inferior edge of the nose, the perioral wrinkles and nasolabial fold (Figure 3).

DISCUSSION

There are many repair options for the upper cutaneous lip. Primary closure is the ideal option when possible, with the longer axis of the ellipse positioned over the perioral relaxed skin tension lines, which tend to be perpendicular and diagonal to the horizontal lip axis.[3] Although it is possible to perform an M-plasty to reduce the size of the closure and to avoid going over the vermillion line, its involvement is usually not a problem as long as the vermillion borders are adequately aligned. It is better to advance to the vermillion border than to use a short ellipse and create a bulge or dog ear on the lip. Primary closures must be observed and avoided for they can generate tension that shift the inferior lip upon closure.[5] Every time that a considerable distortion is observed during primary closure such as in this case (Figure 4), other repair methods must be considered (Figure 5).

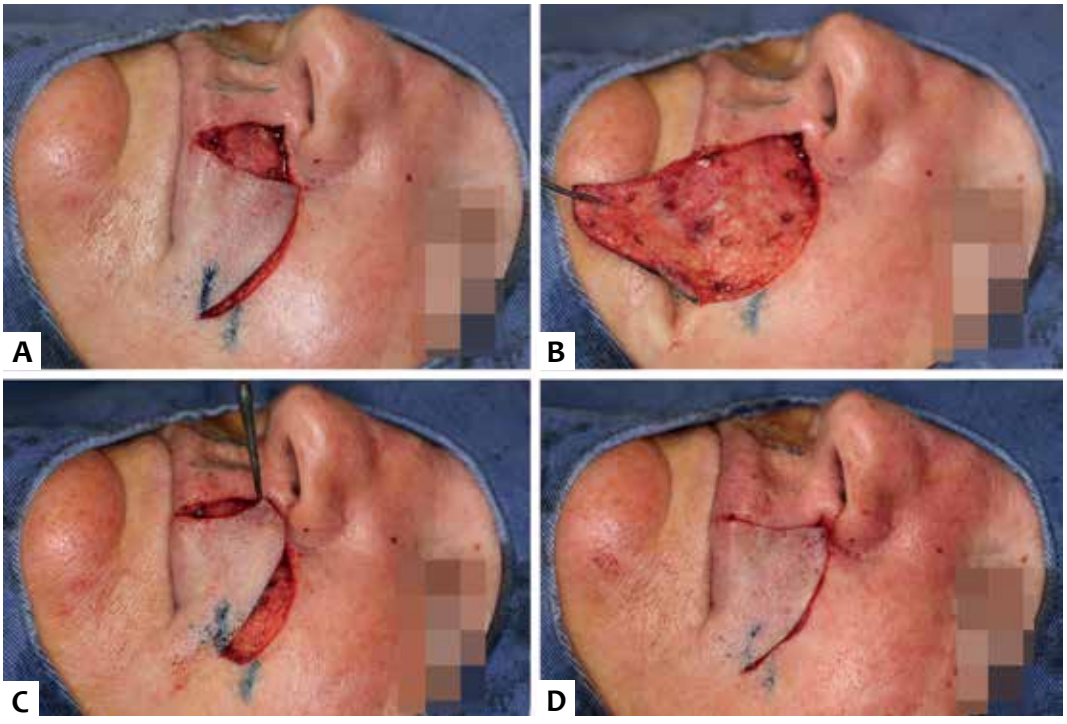

Figure 2: A – Incision of the flap**, B –** Elevation of the flap above the orbicularis oris muscle**, C –** Rotation of the flap towards the defect. Z-plasty at the flap base was not performed; **D –** Flap sutured with poliglecaprone-25 4.0 followed by mono nylon 5.0 (not shown in the picture)

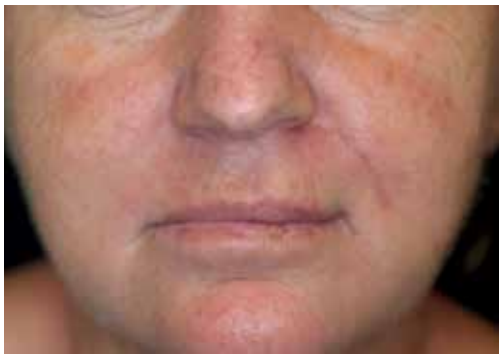

Figure 3: 1 month post-surgery. Incisions are camouflaged in the nasolabial fold and perioral wrinkles. The erythema on the incision tends to improve over time

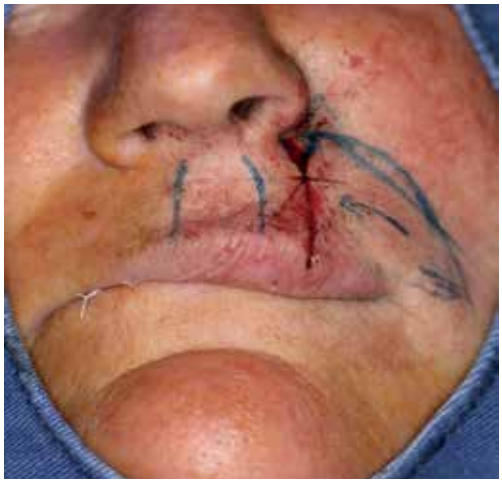

Figure 4: Considerable distortion of the philtrum, vermillion and nose after primary closure attempt

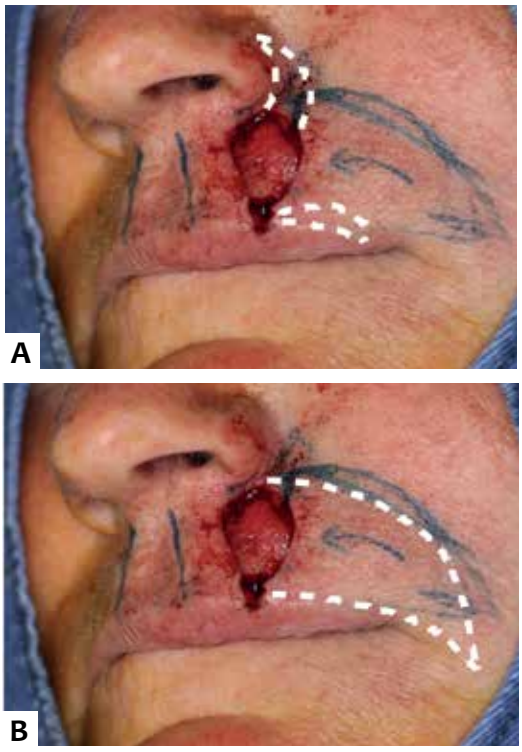

Figure 5: Other repair options were considered. **A –** Crescentic advancement flap. **B -** Island pedicle flap

Advancement flaps are useful for the repair of surgical wounds in the lateral region of the upper cutaneous lip because of the great amount of skin adjacent to the medial malar region. These flaps are usually designed along the vermillion border and the excessive tissue is removed in the relaxed skin tension lines of the perioral region. Redundant skin can be removed with Burrow triangles or crescents as to minimize the risk of vermillion distortion.[6] When the defect is located on the superior part of the upper cutaneous lip, the flap should be designed extending into the inferior nasal edge and removing a crescent adjacent to the nasal ala, as described by Webster, and the redundant inferior skin removed in the perioral relaxed skin tension lines.[7]

Another repair option for the defects on the superior part of the upper cutaneous lip are the rotation flaps, as shown in this case. The advantage of this option is the possibility of camouflaging the rotation arc in the nasolabial fold. The arc can be designed a few millimeters above the nasolabial fold since the malar region will shift medially as the flap rotates. The vertical incision of the flap is camouflaged in the perioral relaxed skin tension lines.[4]

Similarly, the island pedicle flap is useful for the repair of the upper cutaneous lip defects. Many of the incisions can be camouflaged in the nasolabial fold and inferior nasal edge. Care must be taken to avoid tension in the vermillion border by undermining the flap adequately.[8]

Transposition flaps can be useful for defects in this location when advancement or rotation flaps do not move satisfactory amount of tissue. The incisions can be partially camouflaged in the nasolabial fold. However, a disadvantage is the increased chance of trap door. Besides, transposition flaps in this location tend to obliterate the nasolabial fold more than the advancement or rotation flaps. Skin grafts are rarely used in this area due to the inadequate final color and texture.[9]

In this case, the rotation flap was performed with satisfactory results. There was no distortion and the incisions were camouflaged in the anatomical units or subunits. ●

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Intellectual participation in the propaedeutic and /or therapeutic conduct of studied cases
Data collection, analysis and interpretation
Study design and planning
Approval of the final version of the manuscript

Exuberant Koenen tumors: effective treatment with amputation of the nail apparatus and reconstruction with full thickness skin grafts

Tumores de Koenen exuberantes: tratamento efetivo com amputação do aparelho ungueal e reconstrução com enxerto de pele de espessura total

DOI: http://dx.doi.org/10.5935/scd1984-8773.201792834

ABSTRACT

Introduction: Tuberous sclerosis is a dominant autosomal genodermatosis, classically characterized by facial angiofibromas, fibrotic plaques, periungual fibromas, leaf-shaped hypochromic maculae and fibrous frontal plaques.

Case report: A patient bore this disease, with Koenen tumors in all nail beds of hands and feet, which were resistant to the conventional treatment – simple excision and electrosurgery. Amputation of the nail beds was performed followed by reconstruction with full thickness skin grafts.

Conclusion: The amputation of the nail apparatus and reconstruction with full thickness skin grafts in aggressive, recurrent or high morbidity cases can be an effective therapeutic option.

Keywords: dermatology; dermatologic surgical procedures; tuberous sclerosis; skin transplants

RESUMO

Introdução: *A esclerose tuberosa é genodermatose autossômica dominante, classicamente caracterizada por angiofibromas faciais, placas fibróticas, fibromas periungueais, máculas hipocrômicas em formato de folhas e placa fibrosa frontal.*

Relato do caso: *Paciente portador dessa doença, com tumores de Koenen em todos os leitos ungueais de mãos e pés, recorrentes ao tratamento convencional de exérese simples e eletrocirurgia. Foi realizada a amputação dos leitos ungueais seguida de reconstrução com enxerto cutâneo de espessura total.*

Conclusão: *A amputação dos aparelhos ungueais e reconstrução por enxerto cutâneo de espessura total para casos agressivos, recorrentes ou que determinem alto grau de morbidade, pode ser uma opção terapêutica efetiva.*

Palavras-chave: *dermatologia; procedimentos cirúrgicos dermatológicos; esclerose tuberosa; transplante de tecidos*

INTRODUCTION

Koenen tumors (KT) are a characteristic and one of the major criteria for the diagnosis of tuberous sclerosis complex (TSC). It usually appears after puberty in up to 50% of patients with TSC.[1]

TSC is an autosomal dominant genodermatosis classically characterized by facial angiofibromas, fibrotic plaques (Shagreen patch), periungual fibromas (KT), hypochromic leaf-shaped macules (ash leaves) and fibrous frontal plaque.[1,2] Seizure, mental retardation, hamartomas of the retina, subependymal nodules

Case report

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and hamartomas of the internal organs are common associations.[3] Half the families with TSC are linked to the 9q34 chromosome, with inactivating mutations of the tumor suppressor genes of the protein hamartin (TSC1) and the other half to the 16p13 chromosome with inactivating mutations of the tumor suppressor genes of the protein tuberin (TSC2). The hamartin/tuberin complex is an important inhibitor of tumor growth and its absence triggers the loss of inhibition over cell proliferation and migration.[1-3]

This study has the objective of demonstrating an unusual presentation and multiple florid KT, that were surgically treated.

CASE REPORT

We report the case of a 47-year-old female patient with a history of hypochromic, lenticular, confetti-like and leaf-shaped (ash leaves) lesions on her body since the first decade of life, progressing with papular lesions on the face (angiofibromas) and peduncular keratotic confluent lesions in all nail beds of both feet and hands (KTs), that were bigger in size but morphologically similar to periungual viral warts. She also had recurrent seizures.

The patient complained of pain in the toes and recurrent local infections, difficulty in walking and putting on shoes due to the lesions on the area. Multiple sessions of electrosurgery and simple excision were performed, but the lesions always recurred in less than 2 months of follow up. Because of the clinical picture's exuberance and morbidity, we opted to amputate all nail beds and reconstruct them with full thickness skin grafts (Figure 1). After 24 months of follow up, the patient remains with no lesions (Figure 2), with complete control of local pain and infections.

KT are periungual or subungual fibromas manifested as pink or skin-colored papules and nodules, that can be multiple and affect mainly the toes. On histology, they are characterized by stellate fibroblasts and dense collagen, with numerous ectatic blood vessels.[1,4]

Figure 1: Amputation of the nail beds and reconstruction with full thickness skin graft

Figure 2: Before and 24 months after surgical treatment

They usually vary between 5 to 10 mm in size, but can be much larger. This can be the only clinically obvious abnormality in 50% of TSC cases. The first tumors appear between 12 and 14 years of age, and progressively enlarge in number and in size with age. They sometimes become keratotic, similar to a fibrokeratoma or, more rarely and with few reports in the literature, to periungual viral warts.[1,2,4] In this case, the patient had a florid clinical picture, with elongated, keratotic and confluent fibromas, similar to viral warts. The tumors were so aggressive that they basically replaced the nail plate in most toes, leading to local pain, recurrent skin infections, difficulty in walking and in putting on shoes.

Various treatment techniques such as dermabrasion, chemical ablation, excision and laser ablation have been described in the literature with variable results in regard to duration, and there is still no consensus on a standard treatment. Recurrence is the norm.[5] Amputation of the nail apparatus and reconstruction with a full thickness skin graft can have removed the local stimulus for tumor formation, what explains the effectiveness of the therapeutic choice and lack of recurrence in all toes, despite the aggressiveness of the condition.

CONCLUSION

Amputation of the nail apparatus and reconstruction with full thickness skin graft for aggressive, recurrent or high morbidity cases of KT in patients with TSC can be an effective therapeutic option. More cases are needed with reports in the literature to confirm this hypothesis.

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Letter

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Comments: Hemiface comparative study of two phenol peels (Baker-Gordon and Hetter formulas) for the correction of facial rhytids

Comentários: Estudo comparativo de hemifaces entre dois peelings de fenol (fórmulas de Baker-Gordon e de Hetter), para a correção de rítides faciais

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Dear Editors,

We read the Vasconcelos et al 1 article with great interest. In our experience, the most worrisome hypochromia or achromia caused by phenol-croton peels occur after resolution of the erythema and post-inflammatory hyperpigmentation, usually longer than 6 months. Did the patients' and doctors' opinion change after extended follow up? The article needs a few corrections:

1 The Hetter's formula chosen was the "medium-heavy" of the 1996 Heresy Phenol Formulas.[2]

2 Croton oil concentrations were: (Table 1), Baker-Gordon: 2.1%. Hetter: 0.7%.[2]

3 Was the dose of analgesic used 1 100mg vial of 50 mg/ml tramadol? At home: what was the dose of tramadol used? The standard presentations usually contain 50 or 100 mg. Or was codeine prescribed, which standard dose is 30 mg?

We would also like to suggest that for future split-face studies, which are the gold standard to evaluate cosmetic facial treatments, the side for each individual be randomized, as we usually see that the left side is more prone to photoaging in countries where the driver seat is on the left side.[3]

Hetter's formulas have varying storage concentrations (croton oil 4% in phenol 84%) – which would be the most concentrated formula ever reported and that has only been used during Cross in icepick scars, earlobe incomplete tear repair and actinic cheilitis treatment,[4] –and the very light formula (croton oil 0.105% in phenol 27.5%) – which is the most diluted formula and safest to use on the eyelids.[2,4]

Dr. Hetter's comments

First of all, I would like to tell the authors that I was very happy to see a chemical peel clinical research article using the split-face approach to compare results of different component concentrations and formulas.[1] I have been encouraging this approach for a long time, but I have not seen many colleagues performing and following patients adequately as to lead to a publication. So, congratulations to the authors for the courage of employing this valuable technique.

What is disappointing about his article are some affirmations that were not based in facts.

1)I was identified as a Canadian plastic surgeon. That is incorrect.

2)They affirm that Dr. Baker started studying his formula in 1950. This is not true. Dr. Baker started studying his formula in 1960, together with Dr. Litton and Dr. Georgiade, as described in my article published in 2000, based on phone interviews with the three of them.

3)My study dates are described incorrectly in the Brazilian article, but are clearly informed in my articles.

Where did the authors gather these non-documented disinformations? The authors must publish correctly the all the wrong dates and facts as to ensure that scientific articles do not become a tabloid journalism or "fake news", so popular in this day and age. Sticking to documented facts is crucial in the scientific community.

The authors did not mention the pig study[5] conducted at Wisconsin University in 2002 and published in 2009 by Dr. Larson as main author, that verified the conclusions of my articles published in 2000.[2]

The authors apparently concluded that the phenol concentration is of primary importance. The clinical studies in my 2000 article2 and the study in pigs published in 2009[5] show many evidences that the croton oil concentration is more important. Phenol is required as a vehicle in which croton oil is dissolved. The amount of application layers or passes is also important and validated by the study performed in pigs. The presence of septisol also enhances the clinical effect, but croton oil has the primary action.●

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