Surgical treatment of scars

Abordagem cirúrgica de cicatrizes

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ABSTRACT

Patients with scars often seek dermatologists for improving the symptoms (pruritus, pain), aesthetics and functionality (for example, to improve the range of motion in the joints). After anamnesis and description of the scar, the patient should be informed about the best repair techniques, based on scientific evidence and the physician's personal experience. The authors describe the main surgical techniques to treat scars, such as Z-plasty, W-plasty, dermabrasion, among others

Palavras-chave: cicatrix; surgery; dermabrasion

RESUMO

Pacientes frequentemente procuram o dermatologista para melhorar os sintomas (prurido e dor) e os aspectos estéticos e funcionais (amplitude do movimento nas articulaçoes) de suas cicatrizes. Após anamnese e descrição da cicatriz, devemos esclarecer o paciente sobre as melhores técnicas para seu reparo, com base em evidências científicas e em nossa experiência pessoal. Descrevemos as principais técnicas cirúrgicas para a abordagem de cicatrizes, como a z-plastia, w-plastia, dermoabrasão, entre outras.

Palavras-chave: cicatrizes; cirurgia; dermabrasão

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INTRODUCTION

After surgery or trauma, preventing the formation of abnormal scars is the priority. In the case of surgical procedures, prevention starts before surgery, extending intraoperatively.[1-3]

The goal is always to make the scar to become as unnoticeable as possible, paralleled to cutaneous folds and tension lines, leveled with the surrounding skin, not producing any distortion, and similar in color to the adjacent tissues. If located in the face, it should be on the periphery, in the transition area between two cosmetic units or directly on the midline.[1-3]

Preventing the occurrence of a pathological scar is undoubtedly more effective than treating one. To avoid any unnecessary wound, with the patient being prone or not to hypertrophic scars or keloids, seems an obvious solution, however this is not always feasible.[2]

According to the International Advisory Panel on Scar Management, scars can be classified as mature, immature, linear hypertrophic, widespread hypertrophic scars, minor keloid and major keloid.[1]

SCAR BEARING PATIENT ANAMNESIS

Most patients are not able to define precisely what a scar is, nevertheless they know when it does not look good and has changed its physical appearance. The patient's subjective opinion arises as a standard for judging the success or failure of any procedure. Currently, some measurement scales assist physicians to gauge the degree of patient satisfaction regarding the appearance of his or her scars. The Vancouver Scar Scale (VSS) is quite complex and requires precision equipment for taking some measurements. The Visual Analog Scale (VAS) is simpler and more practical.[2, 4]

In cases of surgical revision of scars, it is important that the surgeon prepares patients for the surgeries' outcomes, describing the procedure as an attempt to modify, adjust, reposition, improve or repair a scar. It is also useful to clarify what is the actual patient's dissatisfaction with his or her scar: if it is linked to the aesthetics; if there is pain, pruritus, tightness or some other local discomfort; if there is dysfunction (for example in burn scars in the axillary region, where there is retraction, leading to difficulty in abducting the upper limb). Scars may also have associated emotional factors (for example, the recollection of an accident), causing patients to desire to erase unpleasant memories or even try to improve the appearance of a scar to impress a girlfriend or ask for a promotion. [2]

Scars are differentiated by their size, contour deviations, tension, color, texture, pattern, direction, and by the way they blends to adjacent tissue. Among the useful descriptive terms for the clinical analysis of scars are: location, direction relative to the skin's tension lines, level (elevated, depressed or atrophic), maturation (mature, hypertrophic or keloid), color (hypo- or hyperpigmented), texture, shape (trapdoor, network, star or linear), length and width (Chart 1).[5]

After performing the scar's anamnesis and description, it is necessary to explain the best techniques to the patients, based on scientific evidence and surgical experience.

Some issues should be considered during the preoperative anamnesis:

1- Patients with unrealistic expectations

It is important to highlight that the surgical revision will improve, however not erase the scar, and several surgical procedures might be necessary in order to obtain the best result, which can take months or years. [1]

2- Necessary time for the surgical revision of a scar

Due to the continuous collagen remodeling, it takes roughly 12-18 months for a scar to become mature and attain between 70% and 80% in elasticity. Immature scars are prone to hypertrophy and lead to bad results after surgical revisions. Nonetheless, if an early intervention is necessary, it is most advisable that it be performed after a period of 8 to 12 weeks in adults, and 6 months for children under seven years of age.[1]

3- Nutritional aspects and history of medication use

A balanced diet is essential for the synthesis of proteins, which may affect the cicatrization process in vegan (lacto-egg restricted) and vegetarian individuals. In addition, patients adhere to complex anticoagulation schemes with increasing frequency. There is much controversy, however dermatologic surgery in general bears low risk, and major and fatal bleedings resulting in the reduction of the hematocrit are extremely rare. However, the consequences of thrombotic events (strokes, myocardial infarction, pulmonary embolism) in a context of discontinuation of anticoagulants are devastating. For most cutaneous procedures, the necessary anticoagulation (for secondary prophylaxis of thrombotic events) should not be discontinued perioperatively. The risk of a major bleeding or complications resulting from dermatologic surgery does not increase in patients taking aspirin or warfarin. Generally, the risk of bleeding is considered greater in the presence of antiplatelet agents than of anticoagulants. The guidance of a general practitioner or cardiologist, as well as the realization of at least one coagulogram, should always be considered.[1, 2]

4- Smoking habits

Tobacco causes hypoxia, thrombogenesis, vasoconstriction, aberrant cell function and delayed wound healing.

It is recommended that patients stop smoking during the four weeks prior to surgery and do not resume the habit for the following four weeks, aiming at achieving a better healing and results. [1]

PHASES OF THE HEALING PROCESS AND BIOCHEMICAL ALTERATIONS

The healing process occurs in three phases: inflammatory, proliferative and repair or maturation, however some authors have suggested a more complete classification, dividing the process into five main phases: coagulation, inflammation, proliferation, wound contraction and remodeling. [6]

Chart 1: Classification of scars

Mature scar	Flat, scar light-colored scar
Immature scar	Erythematous, sometimes pruriginous or painful scar, slightly elevated in the remodeling process. Many will usually mature over time and become flat, assuming pigmentation similar to that of surrounding skin, though it can be paler or slightly darker
Linear hypertrophic scar (surgical or traumatic, for example)	Erythematous, elevated and sometimes pruriginous scar, confined to the original surgical incision's borders. Generally occurs weeks after the surgery. These scars can quickly increase in size during a period of 3 to 6 months and then, after a static phase, start to regress. They usually mature to assume the appearance of a slightly elevated "rope" with an increase in width, which is variable. The complete maturation process can have a duration of up to 2 years.
Diffuse hypertrophic scar (burn)	Diffuse erythematous, sometimes pruriginous scar, which remains within the burn wound's limits.
Minor keloid	Focally elevated, pruriginous scar, that extends to the normal tissue. It can develop within one year after the injury has been inflicted and does not regress on its own. Its simple excision is usually followed by recurrence. Typical Location: earlobes. It often originates from a minor trauma and may continue to grow for years.
Major keloid	Large (greater than 5mm) and elevated scar, possibly pruriginous and painful, extending beyond the normal tissue.

The inflammatory phase starts immediately after the wound is inflicted, with the release of vasoconstrictor substances, especially thromboxane A2 and prostaglandins, by the cell membranes. The injured endothelium and platelets stimulate the coagulation cascade in order to attain hemostasis. The granules released by platelets contain transforming growth factor beta (TGF-β), platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), epidermal growth factor (EGF), prostaglandins and thromboxanes, which attract neutrophils to the wound, helping in the bacterial destruction. They are gradually replaced by macrophages after a period of 48 to 96 hours, and figure as the main cells before fibroblasts migrate and start to replicate. They play a fundamental role in ending the debridement that was started by neutrophils, and their greatest contribution is the secretion of cytokines and growth factors, in addition to their participation in the angiogenesis and fibroplasia processes, and extracellular matrix synthesis – crucial developments regarding the transition into the proliferative phase. [6,7]

The proliferative phase consists of four basic steps: epithelialization, angiogenesis, granulation tissue formation and collagen deposition. It starts approximately on the fourth day following the injury has been inflicted and lasts approximately up to the end of the second week. If the basal membrane is untouched, the epithelial cells migrate upwards, and the normal layers of the epidermis are restored in three days. If the basal membrane has been damaged, the epithelial cells located in the edges of the wound begin to proliferate in an attempt to restore the protective barrier.[6,7]

Delayed epithelization (after 10 to 14 days) dramatically increases the incidence of hypertrophic scarring. Therefore, it is mandatory to achieve a rapid healing in order to prevent the formation of excessive scarring. [6,7]

Angiogenesis is stimulated by the tumor necrosis factor alpha (TNF-α), being characterized by endothelial cell migration and formation of capillary, processes that are fundamental for the adequate healing.[6,7]

The final part of the proliferative phase is granulation tissue formation, with fibroblasts and endothelial cells being the main cells figuring in this stage. The fibroblasts migrate from the surrounding tissues to the wound; nevertheless they must be activated in order to leave their state of quiescence. The most important growth factor for the activation and proliferation of fibroblasts is the PDGF. Transforming growth factor β is then released, stimulating fibroblasts to produce collagen type I and to transform into myofibroblasts, which promote wound contraction. [6,7]

Among growth factors involved in the healing process, some are noteworthy: PDGF (induces cell proliferation, chemotaxis and matrix synthesis), EGF (stimulates epithelialization), TGF-α (transformer growth factor alpha, responsible for the angiogenesis and epithelialization), fibroblast factor (stimulates cell proliferation and angiogenesis), and TGF-β (responsible for the increase in matrix synthesis).[6,7]

The fact that the deposition of collagen occurs in an organized way, turns this process into the highest clinically important step in the maturation or remodeling phase. The collagen

that is initially produced is thinner than that present in normal skin and is oriented parallel to the skin. Over time, the initial collagen (collagen type III) is reabsorbed and a thicker collagen is produced and arranged along the tension lines. These changes are reflected in increased tensile strength of the wound. The reorganization of the new matrix is an important process of healing. Fibroblasts and leukocytes secrete collagenase, promoting the lysis of the old matrix. The best healing occurs when there is balance between the synthesis of new matrix and the lysis of the old one. Even one year after the wound will present less organized collagen than that of healthy skin, and the tension force will never return to 100%, reaching about 80% three months after.[6, 7]

FACTORS THAT INFLUENCE THE HEALING PROCESS

Wounds subject to tension as a result of movement, specific body site and loss of tissue are particularly at increased risk of hypertrophic scarring. In this manner, in case of cutaneous damage, it is important to perform the primary closure early and under low or inexistent tension. Large sized wounds have increased tension in the closure. Also, the proper debriding of contaminated wounds is crucial, for the infection hampers the healing process. Other important steps are: to promote a good hemostasis, manipulate the tissue gently, limit the presence of foreign bodies in the form of debris (washing the wound thoroughly with saline to remove all devitalized tissue and debris) and avoid using braided polyfilament suture materials like silk, which causes severe tissue reaction. Wounds that coincide with the skin's tension lines experience better healing than those that are misaligned with them. Electrocautery should be minimal near the wound's borders. Before closure, all dead space should be obliterated and the traumatized edges of the wound, excised.[1-3, 8, 9]

Favorable locations for a good healing include: eyelids, pre-auricular region and forehead. Unfavorable locations include: nasal tip, mentum, chest area, shoulders, dorsum and lower limbs. The differences in the healing process are linked to the skin's level of tension and thickness, and number of sebaceous glands in the body region.[1-3, 8, 9]

Children develop worse scars than those of elder patients due to the presence of a higher content of elastin in the skin, which leads to increased tension on the skin's edges. Patients with systemic diseases, such as diabetes mellitus and chronic renal failure, or those using immunosuppressants are more susceptible to infections and poor wound healing.[1-3, 8, 9]

TECHNIQUES FOR THE SURGICAL REVISION OF SCARS

There is a great diversity of closure techniques, which can vary from a simple primary elliptical closure to a complex advancement flap. The elliptical fusiform closure can be the first choice in the repair of a scar aligned with tension lines, however it usually results in a longer scar and can lead to recurrence in the case of keloids and hypertrophic scars.[1-3, 8]

Z-PLASTY

The first study on the Z-plasty was published by Horner in 1837. This technique is currently the most popular for the revision of scars. It is often used to stretch scars that have contractures.[1-3]

Based on geometrical principles, it consists in a double transposition flap, where the scar to be excised is located along the central axis of the Z, with two peripheral parallel axes. After implementing the transposition, the central axis will become perpendicular to the original center's axis, and the scar will assume a more favorable position regarding the tension lines. Indications for the Z-plasty: scars that form angles in excess of 30º with the skin's tension lines, those presenting retraction and those with "spider web" shape. Using the Pythagorean theorem, Limberg demonstrated in 1929 the theoretical gains from Z-plasty. In practice, however, the gains in length are smaller due to the tissue's elasticity. Thus, wider angles lead to higher gains in length; however this implies in a reduction of the scar's width, entailing the creation of an inadequate transversal tension. The flaps are designed with angles ranging from 30º to 75º. Angles less than 30º might cause the necrosis of the tip while angles greater than 75º produce flaps that are difficult to rotate, leading to the formation of "dog ears" in addition to increased tension. The optimal angle to be used is 60°.[1-3, 8, 10, 11]

There are advantages in performing several Z-plasties – rather than a single one – along the scar's entire length (Figures 1 to 2).

Advantages

- The scar becomes irregular, therefore becoming less visible than a single straight line.
- It generates multiple different tension vectors, which helps preventing the scar's widening and contracture
- There is less need for long peripheral axes
- More length can be obtained with less transversal shortening

Disadvantages

- The scar becomes longer
- There are at least two additional scars
- At least one portion of the final scar might be positioned along the tension lines

Variations of the Z-plasty

Two opposing Z shapes, as in mirrored images. The Z shaped incisions are performed in opposite directions, and the flaps are interposed. It offers the advantage of a significant elongation in areas of limited availability of skin, release of canthal membranes or cicatricial contracture.[1-3, 8] Unequal triangles (asymmetrical Z-plasty): areas of variable cutaneous elasticity, such as the scars' ends, can be revised using uneven triangular flaps by changing the angle. The Z's "arm" falling on the less elastic side is made to be longer than the other.[1-3, 8]

HALF Z-PLASTY

It is used when the adjacent skin in one of the scar's sides is elastic while the other is not. The inelastic side is removed via

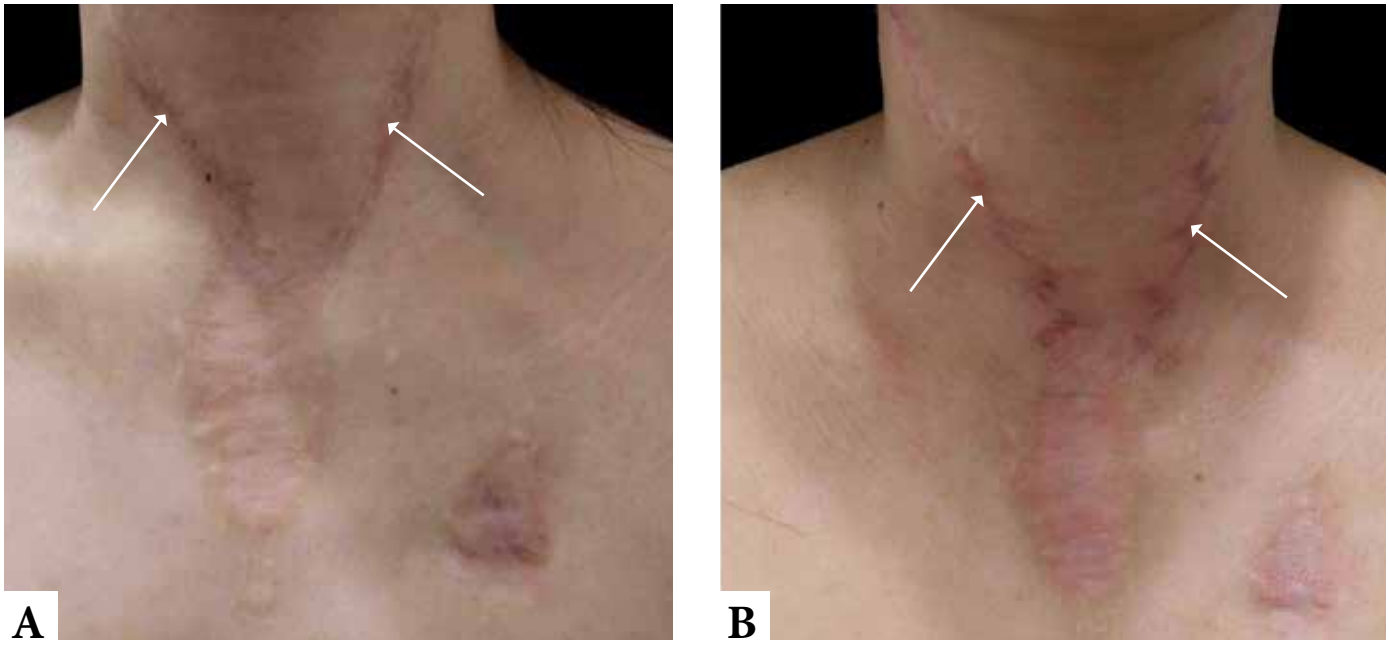

Figure 1: A. Preoperative frontal view of a scar in the cervical region; **B.** Postoperative frontal view of scar in the cervical region, multiple z-plasties

an incision aimed at releasing the scar, while a triangular flap on the normal side is transposed in order to fill the defect created. It is particularly useful to release scar contractures at the interface between normal and cicatricial skin.[1-3, 8]

FOUR-FLAP Z-PLASTY (Limberg FLAP)

The angles of the Z on both of the scar's ends are kept at 90º and then each flap is sub-divided into 45º flaps. The four-flap Z-plasty has the advantage of a providing a significant gain in length and is particularly interesting for the release of severe scar contractures that hamper or limit the normal flexing, such as in the case of the first interdigital space's skin or in axillary contractures after burns.[1-3, 8]

PLANIMETRIC Z-PLASTY

In this case, the central Z-plasty's incision is prolonged, and the technique is used to interrupt the scar and stretch the skin into a flatter surface. The triangle created by the Z shape is dissected and undermined in order to be used as a graft.[1-3, 8]

S-PLASTY

It is used for the treatment of oval contracted scars when large triangular transposition flaps are required – for example, in tracheostomy sequels. The final rounding of the flap ensures a better outcome for the scar.[1-3, 8, 11]

W-PLASTY

It was created in 1937 – 100 years after Z-plasty emerged – by Ombrédanne aimed at improving irregular linear scars, in which most of the axes are aligned with the tension lines. In W-plasty, a certain amount of normal tissue is excised with the scar. The final outcome consists of an irregular scar, so that multiple Ws are aligned side by side.[1-3, 8, 11, 12]

Indications

- Short scars perpendicular to the tension lines
- Scars/incisions on curved surfaces like the jaw
- Scars/incisions in concave areas

W-plasty should only be performed in areas where there is no lateral laxity of tissues, for example on the forehead, temples, chin, cheeks etc (Figure 3).

W-plasty consists of several small triangular advancement flaps on both sides of the scar so that the closure occurs by interposition, projecting the "W" shaped flaps in a way to prevent the formation of "dog ears", which can be difficult to execute. Shortening the "W"'s axes as it gets closer to the excision's ends contributes for a good closure. The terminal portion should be conceived in a way to produce a 30º angle on each extremity. Alternatively, a fusiform excision can be performed perpendicularly to the terminal "arm" of the W at each end.[1-3, 8, 11, 12]

ADVANTAGES

- Easy to plan and execute
- Breaks down a straight scar in several small segments, many of which are located along the lines of tension

DISADVANTAGES

- A surplus of surrounding tissue is necessary
- The regular repetitive pattern causes the scar to be visible
- The scar may become longer

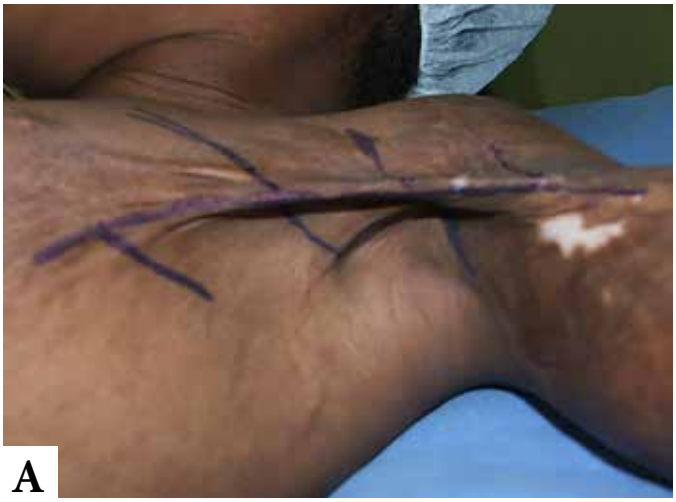

Figure 2: A - Preoperative, scar in the shape of a "rope" in the left axilla

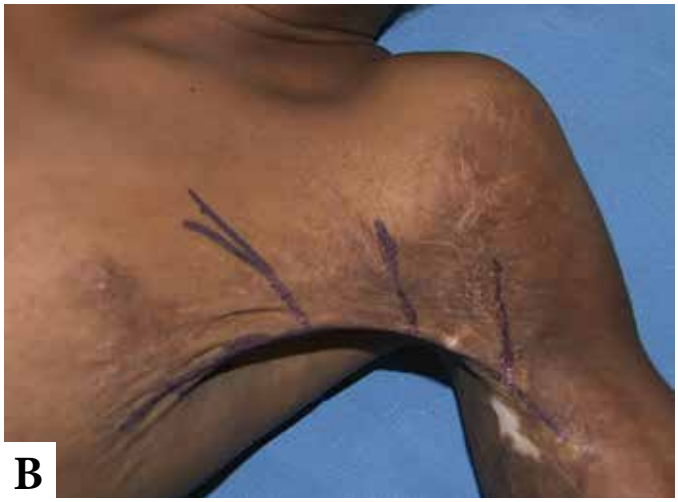

Figure 2: B - Preoperative, scar in the shape of a "rope" in the left axilla with relaxed skin's tension lines

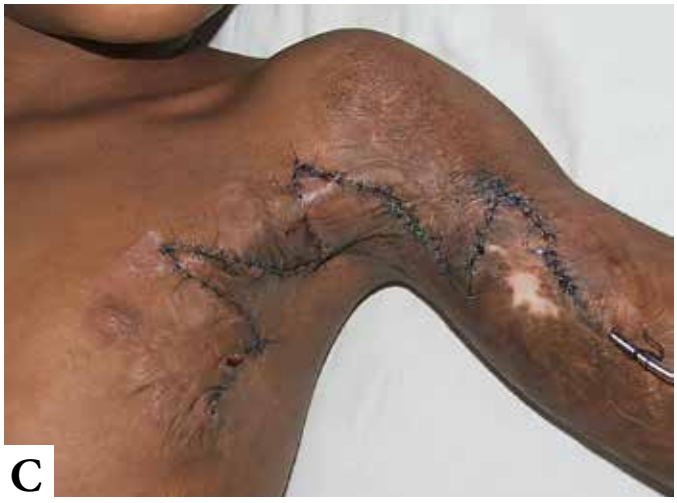

Figure 2: C - Postoperative, scar in the shape of a "rope"

GEOMETRIC BROKEN LINES

Designed to convert a long linear scar into a randomly irregular scar. Interdigitating geometric lines are drawn so that the triangles, rectangles, squares and even semicircles are created on both sides of the scar at random. Most of the lines should be along the tension lines. After excision along these lines, the advancement flaps on both sides interdigitate to create a randomly irregular scar. As it should be made in W-plasty, the ends must be closed using a 30º angle in order to avoid the formation of "dog ears", which may occur if wider angles are used. Alternatively a fusiform excision can be carried out at the end, perpendicular to the terminal axis of the excision.[1-3, 8, 11]

Advantages

- It has all the advantages mentioned above, which are linked to the break down of a linear scar into several small segments
- Furthermore, the random irregular pattern causes the scar to be less visible than one that underwent W-plasty or multiple Z-plasties.

Disadvantages

- It is difficult to plan and implement
- The excision of normal tissue implies that it must be performed in areas where there is excess sagging from peripheral tissues

V-Y PLASTY AND V-Y ADVANCEMENT FLAP

These techniques are indicated for stretching scars in cases of small contracted scars, improving the "trap door" type deformities, and the elevation or depression of the free margin – as in the eyes and mouth – in case a scar causes ectropion or eclabium, respectively. An anatomical point can be raised or depressed using the V-Y repair.[1-3, 8, 11]

A V shaped incision is made along the contracted scar, followed by an extensive dissection aimed at releasing the scar and aid in the contraction of the wound's base. The V shaped flap is pulled toward the open portion of the V and the defect is closed side-to-side in the shape of a Y.[1-3, 8, 11]

Another use for the V-Y plasty is wound closure after excision of circular or oval defects, especially in hairy areas, such as the scalp and brow. In these areas, the Y's "arms" are camouflaged by the presence of hair.[1-3, 8, 11]

SUBCISION AND CUTANEOUS FILLING

Some scars become very depressed due to loss of subcutaneous tissue or fibrosis. In such cases, the rupture of fibrous septa with a 16 or 18G or Nokor needle can be a good option.[1-3, 8, 11]

Cutaneous filling with autologous fat or hyaluronic acid can be performed subsequently.[1-3, 8, 11]

THE TREATMENT OF EXTENSIVE SCARS IN MULTIPLE STAGES

Wide scars, such as those resulting from burns, might not improve with a procedure carried out in single step, like a primary closure. These scars need to be treated with a number of excisions or with cutaneous expanders.[1-3, 8, 11]

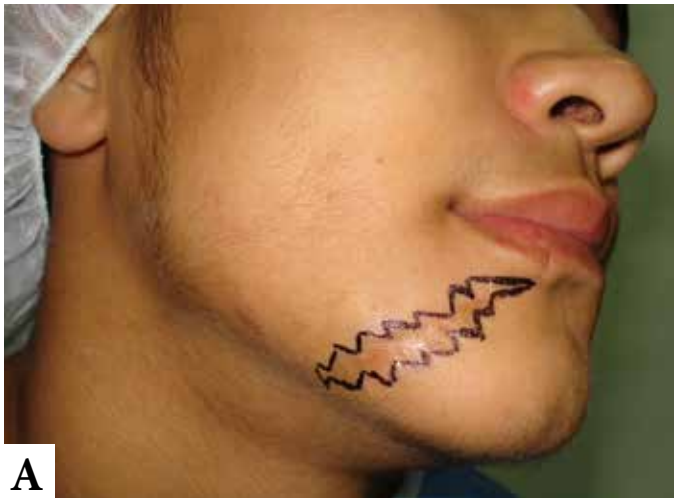

Figure 3: A - Scar located in the jaw, preoperative with W-plasty markings

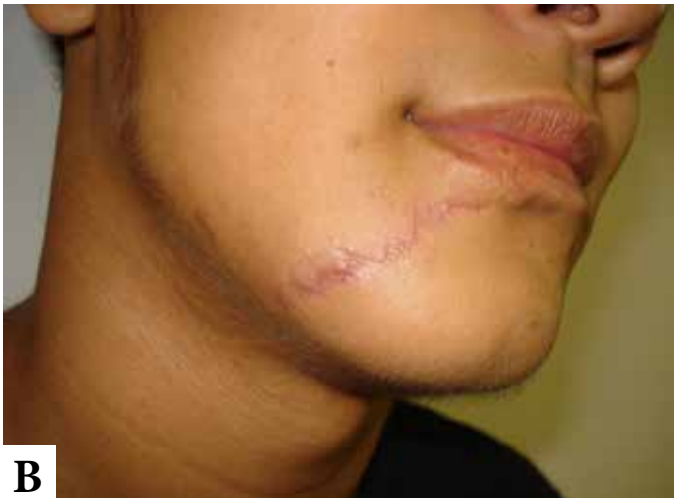

Figure 3: B - Scar located in the jaw, W-plasty postoperative

DERMABRASION

Dermabrasion dates from 1,500 B.C., when sandstone was used to revise scars in Egypt. Its use for correcting acne scars was very popular, when Yarborough demonstrated it could also be used in the surgical treatment of scars. The ideal Fitzpatrick skin phototypes for this procedure are I to III. Modern dermabrasion is performed using a power source, and a handpiece, where a diamond fraise or a brush is coupled. Manual dermabrasion can be performed with sterile wet sandpaper. It removes the epidermis and superficial dermis, leading to the re-orientation of collagen fibers, which become parallel to the wound's tension lines, with improvement of the scar's contour after the procedure.[1-3, 8, 11]

The ideal timing for undergoing dermabrasion is 6 to 12 weeks after the injury has been inflicted. At this timepoint, the wound will have adequate tensile strength, and collagen remodeling will still be taking place.[1-3, 8, 11]

Isotretinoin should be suspended from 6 to 12 months prior dermabrasion aimed at preventing the formation of hypertrophic scars and keloid. Topical tretinoin can be used 2 weeks before (to expedite re-epithelialization) and continued postoperatively (to prevent postoperative hyperpigmentation). History of tendency hypertrophic scarring and keloids should also be discarded.[1-3, 8, 11]

The skin should be kept tensioned both by tumescent anesthesia injections and mechanical stretching. The area undergoing dermabrasion should be painted with gentian violet. The dermabrasion tool must be held unidirectionally and perpendicularly to the handpiece's rotation plane. The first pass should be performed at an angle of 45° from the axis of the scar, and subsequent passes must be carried out at right angles regarding the first pass' direction. The presence of diffuse and bleeding means that the papillary dermis has been reached. The presence of a yellow coloring arranged in parallel strands indicates that the superficial reticular dermis has been reached, while the presence of eroded strands indicates that the deep dermis has been reached, which must be avoided at all cost, since the result is an unacceptable scarring.[1-3, 8, 11]

In the postoperative, the surgical wound must be maintained in a moist environment, which helps re-epithelialization that will complete in 7 to 10 days. This can be done using wet dressings or by frequently washing and application of inert ointments. Post-inflammatory hyperpigmentation can be prevented with the prescription of retinoic acid (0.05% cream, once a day) and hydroquinone (4% cream, twice daily). Avoiding the exposure to sunlight and using sunscreen are very important measures. The erythema lasts from a few weeks to months, and can be mitigated with the use of local or systemic corticosteroids.[1-3, 8, 11]

POST-OPERATIVE CARE

Nutrition

Suture dehiscence and other complications are common in patients with malnutrition and can be detected based on low levels of serum albumin. Several micronutrients (vitamins A, C, B complex, zinc and other antioxidants) are essential for a proper healing and their supplementation can accelerate this process, eventually affecting the appearance of the scar. It is prudent to verify whether the patient is nutritionally prepared, in order not to experience this complication type during the healing process.[3]

Dressings

Wounds should be kept in a moist and hydrated environment, protected with occlusive or semi-occlusive dressings up until epithelialization is complete, which requires up to 48 hours in a sutured wound.[2, 3]

Pruritus can be managed with the use of antihistamines, such as fexofenadine or loratadine, with fewer effects on the CNS. Antihistamines also have antifibrotic effects on scars.[2, 3]

Sutures should be removed in a timely manner in order to prevent "train track"-like suture marks. For facial wounds, sutures must be removed within five days and, if necessary, adhesive tapes can be used on the borders. Patients should be instructed

to use sunscreen on exposed areas of the body aimed at preventing hypertrophic scars.[2,3]

Silicone

The latest guidelines for the treatment of scars advocate the use of therapy with silicone as prevention and first-line treatment for keloids and hypertrophic scars. Silicone tapes, sheets and gels are currently the noninvasive, gold standard treatment in such cases. Silicone tapes have the disadvantages of needing to be fixed and annoying some patients with the fact that they sometimes remain visible in certain body parts. The treatment should start soon after the removal of the suture, for it is more effective in the scar's dynamic immature phase and not as effective in older scars. The suggested mechanisms of action are: hydration of the tissue, increasing the scar's temperature, induction of tissular hypoxia or production of a local static field. Silicone also reduces the activity of mast cells, the levels of interleukin 1 and the production of extracellular matrix, all leading to decreased collagen synthesis. Silicone gel has also proven to be effective in the prevention of hypertrophic scars. A recent review by Cochrane quotes thirteen studies involving 559 patients concluding that there is evidence of benefits with the use of silicone tape, which prevents abnormal wound healing in high risk individuals.[13,14]

The use of silicone in topical gel or sheets requires that the entire scar is covered for at least 12 hours per day – ideally for 24 hours per day, except for when the skin is being cleansed. It can be used isolatedly or as an adjuvant therapy after excisions and is effective for a treatment period of 4 to 6 months.[13,14]

Massaging the scars can improve the patients' pain, pruritus and anxiety, however there is not enough evidence that can isolatedly improve scars' results.

Other treatments, such as onion extract, vitamin E and cream containing imiquimod have insufficient evidence proving their benefits or cause side effects, meaning that they are not recommended for routine use.[13,14]

EMERGING TRENDS IN THE SURGICAL REEVISION OF SCARS

Autologous fat grafting

Adipose stem cells have a regenerating potential that can improve scars and the overlying tissue's quality. Studies in animals have shown improvement in the scar's coloration and texture, increased by the vascular endothelial growth factor, in addition to a reduction of fibrosis markers. [1]

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Questions for continuing medical education – CME

1. A patient bearing post-burn scar in the axilla for over one year, with formation of fibrous cord and difficulty to abduct the upper limb. Which alternative leads to faster and more effective results?
- **a)** Dermabrasion and intralesional infiltration of corticosteroids
- **b)** Geometric broken lines surgical technique and radiotherapy
- **c)** Subcision and cutaneous filling
- **d)** Multiple Z-plasty
- **e)** Ablative CO2 laser

2. Which factor facilitates the healing process, leading to a more satisfactory outcome?
- **a)** Cut or bruise injury
- **b)** Injury aligned with the skin's tension lines
- **c)** Occlusive dressings
- **d)** Use of topical vitamin E
- **e)** Patient with restricted vegetarian diet ("vegan")

3. Regarding the stages of the healing process, it is possible to state that:
- **a)** Angiogenesis is an important part of the inflammatory phase of the healing process, hence the onset of erythema at this moment
- **b)** Studies show that in guinea pigs, the proliferative phase is longer than in humans
- **c)** The inflammatory phase is characterized by the release of interleukins (IL), and leukopenia
- **d)** Delayed epithelialization (after 10 to 14 days) dramatically reduces the incidence of hypertrophic scars
- **e)** The surgical wound's maturation phase is the most important and can last up to 1 year

4. The best indication for the W-plasty is:
- **a)** Scars in the mandibular region
- **b)** Scars in areas of tissular laxity, for it facilitates the closure of the "Ws"
- **c)** Ulcers in the legs
- **d)** Keloids in the chest region
- **e)** Long scars on convex surfaces

5. Regarding the surgical techniques for revising scars, select the incorrect statement:
- **a)** The V-Y technique should be considered in small contracted scars, and elevation or depression of free margins, such as in the eyes and mouth
- **b)** In Z-plasty, flaps are designed with angles ranging from 30º to 75º
- **c)** The broken geometric lines technique is difficult to plan and execute
- **d)** S-plasty is used for the treatment of contracted oval scars, such as those arising from tracheostomies
- **e)** The Z-plasty shortens the final scar without creating additional scars

6. In order to obtain scars with good aesthetic appearance, the following measures should be taken, except for:
- **a)** Using silicone gel immediately after the removal of the suture aimed at preventing the formation of hypertrophic scars and keloids
- b) An early intervention aimed at revising the scar is necessary, and it is wisest to do it after 45 days in adults
- **c)** Detailed anamnesis with history of hypertrophic scars and keloids, medication use and patient expectations
- **d)** Always observe the skin's tension lines
- **e)** Using the correct tension on the suture and removing the stitches at the recommended time

7. Of the following statements, which is TRUE regarding scars?
- **a)** Dermatologists do not have to worry so much about the hemostasis of the surgical wound, since cutaneous bleeding is minimal
- **b)** The assessment of a scar do not depend on its development time and surgical interference should occur at any time
- **c)** Scars are differentiated by their size, contour deviations, tension, color, texture, pattern and direction. Scar evaluation scales have not been used due to the little availability of scientific evidence
- **d)** A scar's location has little influence on its final aesthetic outcome, while absorbable suture is crucial for the external closure of the wound
- **e)** Scars do not have impacts on the patients' quality of life and scales should not be used for evaluation

8. Among the drugs that can affect hemostasis and the healing process, and that deserve attention in the anamnesis, are:
- **a)** Anti-depressants and anti-arrhythmics
- **b)** Antihypertensives and antiepileptics
- **c)** Statins and steroids
- **d)** Platelet antiaggregant and oral isotretinoin
- **e)** Iron and vitamin C

9. The Z-plasty was created in 1837, and only one of the below is FALSE about it:
- **a)** Up until these days, this is the most popular technique for revising scars
- **b)** Z-plasty is always indicated for post-thyroidectomy hypertrophic scars
- **c)** It is often used to stretch scars with contractures
- **d)** The ideal angle to be used is 60º
- **e)** The scar turns irregular, thus becoming less visible than a single straight line

10. Regarding dermabrasion, select the best option:
- **a)** Dermabrasion should ideally be performed 120 weeks after the injury has been inflicted
- **b)** The first pass should be performed at 45º from the scar's axis, and subsequent passes must be carried out perpendicularly to the first one
- **c)** Erythema lasts up to a maximum of 30 days
- **d)** Initially used for the treatment of acne scars, it is currently widely used in surgical scars
- **e)** Post-inflammatory hyperpigmentation can be prevented with the prescription of tranexamic acid

Key

Histological changes of collagen types after different modalities of dermal remodeling treatment: a literature review. 2015;7(4):285-92.

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

Answers must be submitted online using the website www.surgicalcosmetic.org.br.
The deadline for submitting answers will be provided by e-mail with a direct access link to the journal.

Original Articles

Comparative study: Hands rejuvenation treatment using intense pulsed light isolatedly or associated with 1,340nm non-ablative fractional laser

Estudo comparativo: tratamento do rejuvenescimento de mãos utilizando a luz intensa pulsada isolada ou associada ao laser fracionado não ablativo 1340nm

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ABSTRACT

Introduction: The dorsum of the hands is a visible part of the body and needs special attention regarding rejuvenation treatments. The combination of different techniques in this area is important to increase the effectiveness of the treatments.

Objective: This study was aimed to evaluate the clinical efficacy of a fractional non-ablative laser (1,340nm Nd:YAP) combined with intense pulsed light (IPL) for rejuvenating the hands.

Methods: A prospective comparative study evaluated 11 patients complaining of aging on hands, for 90 days. Two sessions were carried out with a two-week interval using IPL and 1,340nm Nd:YAP laser. The left hand was treated with 1,340nm Nd:YAP laser associated with IPL and the right hand with isolated IPL. The improvement was rated using scores from 1 to 4, evaluating the parameters: wrinkles, pigmentation, brightness, keratosis and overall rejuvenation observing the elasticity and filling of visible structures such as bones, tendons and vessels.

Results: By analyzing the frequencies of the categories of the variables, it was possible to observe that there was a higher frequency of improvement in the left hand. For the comparative analysis of the studied variables, the mean value of each variable computed for each hand, evidenciated that the variable overall rejuvenation and the left hand showed more marked improvements for the studied characteristics. Ten among 11 patients had a higher satisfaction degree with the combined treatment, with absence of significant adverse effects.

Conclusion: The association of 1,340nm laser to the IPL was shown to be safe and more effective than isolated intense pulsed light in the rejuvenation of the hands.

Keywords: lasers; rejuvenation; hand

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INTRODUCTION

Skin aging is a multifactorial and complex phenomenon involving intrinsic factors that combine with extrinsic alterations, the latter being mainly caused by exposure to the sunlight.[1-5] As with the face, the hands are areas of the body surface that experience intense exposure to sunlight, incurring important and visible changes, however it is often overlooked in the planning of rejuvenation treatments.[6] The search for therapies for the hands has increased significantly, probably due to the fact that they can reveal the true age of an individual.[7]

The cutaneous aging of the hands involves two main processes: the alteration in the skin's texture and loss of volume. The change in the texture involves the pigmentation of the skin, atrophy and the emergence of wrinkles.[8] The loss of volume takes place due to decreases in the subcutaneous tissue and muscles.[9] Excessive exposure to sunlight entails photoaging, as well as the appearance of lesions such as solar purpura, actinic and seborrheic keratoses, leukoderma and melanosis.[7] The combination of extrinsic alterations with intrinsic aging affects the deeper layers of the skin, causing a decrease in elasticity, the atrophy of the dermis and subcutaneous tissue (causing wrinkle signs),[6] loss of brightness and emergence of vascular structures (predominantly veins), 9 and the widening of joint structures and even bony prominences.[7]

A therapy for rejuvenating the hands requires multifactorial clinical evaluation of the dorsum of the hands 8 as well as a method to assess the degree of aging of this region, both aimed at planning and executing treatments safely (Chart 1). This is a very vascularized region with exposure of nerve and tendon structures, and thin epidermis and dermis, with decreased number of adnexal units as compared to the face.[7, 10]

In this manner, the dermatologist should be aware of proper evaluation methods and precise indications for the treatments 10 to be carried out, avoiding complications 11 such as pigmentary disorders and unsightly scars.

Several treatments are used for rejuvenating the hands 7, 10-12 (Chart 2) and the search for effective treatments led to the use of combined technologies.

The objective of the present study is to evaluate, using a prospective comparative study, the rejuvenation of hands treated with the association of intense pulsed light (IPL) and 1,340nm non-ablative fractional laser (NAFL).

Chart 1: Rejuvenation treatment of the hands

- cutaneous fillers and injectable moisturizers
- transfer of autologous fat
- sclerotherapy
- intravenous vascular ablation
- chemical peels
- laser, pulsed light and LED
- photodynamic therapy
- non-ablative fractional lasers

METHODS

A prospective, single-center, comparative study was carried out with 14 patients from the Dermatologic Ambulatory of the Faculdade de Medicina de Jundiaí (*Jundiaí Medical School*), located in the city of Jundiaí, in the Southeast Brazilian State of São Paulo. The patients selected were aged between 44 and 75 years, had Fitzpatrick skin phototypes ranging from I to III, and Glogau degree of aging adapted to the hands 13 from moderate to severe. All patients included had not undergone treatment in the hands region in the previous six months. All participants were properly informed about the risks, benefits and potential complications of the study's therapy, having signed the Free and Informed Term of Consent.

Exclusion criteria included: infection in the treated site, history of keloidal scarring, known connective tissue or autoimmune disease, Raynaud's phenomenon or alterations in the circulatory system, pregnancy or lactation, the presence of a lesion with suspected malignancy on dermoscopy, previous history of allergy to anesthetics and unrealistic expectations regarding the treatment.

All patients were prepared for treatment with the application of topical anesthetic with 4% lidocaine 30 minutes before the session. The platform used in the treatment was the Etherea® (Industra Technologies, São Paulo, Brazil) and the IPL-Sq® and Proodeep handpieces – non-ablative fractional 1,340nm Nd:YAP laser (Neodimiun:Ytrium Aluminum Perovskite). The right hand was treated only with IPL using 540/580nm filter, 10-21J/cm2 fluence, 15-30ms pulse duration. The contralateral hand was treated with IPL (set on the same parameters described above), associated with 1,340nm NAFL set on 60mJ fluence, 10ms pulse duration, 100mtz/m2, using a single pass without overlapping and air-based cooling. The order of application of IPL and NAFL in left hand was random, according to the availability of the handpieces. The reaction of the skin following the two treatments in the immediate port-procedure was similar in all patients, with comparable levels of edema and erythema.

The patients underwent two sessions with an interval of one month. Photographic records were performed in all patients (before the treatment (D0), 30 days after each session (D30 and D60). A subjective medical evaluation was carried out and a self-administered questionnaire implemented, aiming at analyzing the data and final outcomes at 90 days. After the procedure, patients were instructed to avoid exposure to sunlight and apply sunscreen daily (broad protection spectrum against UVA and UVB - SPF 50) on treated area until full recovery. In addition, patients were advised to avoid contact with substances that could irritate or sensitize the treatment region in the first week after the application.

A dermatologist physician not related to the study and subjective evaluation carried out by each patient assessed the treatment's clinical efficacy. A sequential photographic documentation was also performed. Comparative evaluations were performed before the treatment (D0), 30 days after the first session (D1), 30 days after the second session (D2) and 90 days after the start of the study (D3). The parameters used for the clini-

Chart 2: Glogau aging scale adapted to the hands

Degree of aging	Chronological age	Clinical alterations
Medium	28-35 years	discreet wrinkles with absence of changes in pigmentation, loss of elasticity and turgor
Moderate	35-50 years	visible wrinkles, pigmentary lesions and actinic keratoses, loss of elasticity and turgor
Advanced	50-60 years	visible wrinkles completely covering the hand's dorsum, presence of pigmentary alterations, actinic and seborrheic keratoses, vascular purpura, vascular prominence and sinking of the skin on flexion of the hand
Severe	65-80 years	visible and severe wrinkles, pigmentary changes, actinic and seborrheic keratoses, neoplastic or non-neoplastic lesions, permanent sinking of the skin with prominence of vessels, tendons and bones

cal evaluation were: *wrinkles*, *pigmentation*, *brightness*, *keratoses* and *overall rejuvenation* (the latter specifically observing the elasticity and the filling of visible structures such as bones, tendons and vessels). The subjective evaluation was carried out by the own patients and was limited to: the *preference for techniques*, *sensitivity*, *adverse effects* and *expected visible results* for the quality of the skin in the treated area.

The data analysis was performed using the statistical package SPSS version 18.0. Categorical variables were described using absolute frequencies and percentage relative frequencies. The binomial test was used to compare the improvement between the hands. Scores ranging from 1 to 4 were used to rate the improvement (1 = *exceptional*, 2 = *marked*, 3 = *little* and 4 = *unchanged*). Quantitative variables were described using mean values and standard deviation, and were compared using the Student t test for paired samples. A significance level of 5% was adopted.

RESULTS

The patients were evaluated during 90 days, between the first treatment and the last clinical evaluation. Eleven patients aged between 44 and 75 years (ten women and one man) completed the study (Fitzpatrick skin phototype I to IV, moderate to severe degrees of aging in the Glogau scale modified for the hands). The analysis of the frequencies of the categories using the Binomial test ($p = 0.012$), revealed that the improvement in the left hand had been greater than that in the right hand. Table 1 presents the frequencies of the different degrees of improvement for the hands, with statistically significant emphasis for the parameters: *wrinkles*, *pigmentation*, *keratoses* and *overall rejuvenation* in the left hand.

For the comparative analysis between the parameters studied, the mean value for each parameter and hand was computed (Table 2). It was possible to observe that the parameter with the best response was that of *global rejuvenation* and that the left hand has had a more representative improvement for the studied characteristics. Moreover, it was also observed that there was an improvement in the parameter *brightness* in both hands, with no statistically significant difference.

The overall rejuvenation received the *exceptional* and *marked* improvement scores in all treatments. In the dermatologic evaluation, the best clinical results were observed on the left hand, which was treated with the association of IPL with 1,340nm NAFL, in 100% of patients.

In the patients' subjective evaluation, 90.9% (10:11 patients) experienced a higher rate of satisfaction with the combined treatment. They had already shown an evident satisfaction level after the first re-assessment (before the second session), expressing their interest in maintaining the treatment carried out.

The side effects reported were: crusts (81.8% of patients, 9:11) and blisters (36.3%, 4:11), after the second session, possibly caused by a flaw in the application technique.

DISCUSSION

The hands are considered a part of the body that reveals an individual's age because of its being exposed most of the time.[9] They have many particularities, which should be carefully evaluated so that the right treatment is chosen.[6] There are several options for rejuvenating hands, such as peelings,[9,10] radiofrequency[14], cutaneous fillers[15, 16], that can improve the quality of the skin, contribute to the stimulation of collagen and help to prevent melanocytic and premalignant lesions in the back of hands. Nonetheless, these treatments are deemed of limited improvement when used as monotherapies.[17]

Intense Pulsed Light has been successfully used over the last decade in the photorejuvenation of the hands' region. 18 It has filters with varying wavelengths that can be used according to the skins' phototypes, allowing that different targets and depths be reached. 19 The greatest advantage of IPL is the ability to simultaneously correct telangiectasias, erythemas and pigmentary lesions, such as melanoses, ephelides and benign lentigines with minimal patient's downtime and very tolerable discomfort.[7]

Studies show that the main complaints of patients with aging hands regard pigmentary changes,[20, 21] such as lentigines and solar melanoses. IPL is considered a safe procedure, since its effects depend on specialized medical evaluation capable of determining the parameters of potency and pulse duration according to the target-chromophore and the skin's phototype.

Table 1: Descriptive table of improvement in the left and right hands

Variables	Right hand		Left hand	
Wrinkles		N	%	N %
exceptional	-	-	1	9,1
marked	3	27,3	8	72,7
little	7	63,6	2	18,2
unchanged	1	9,1	-	-
Pigmentation				
exceptional	-	-	3	27,3
marked	7	63,6	6	54,5
little	4	36,4	2	18,2
unchanged	-	-	-	-
Brightness				
exceptional	-	-	-	-
marked	6	54,5	7	63,6
little	5	45,5	4	36,4
unchanged	-	-	-	-
Global rejuvenation				
exceptional	-	-	2	18,2
marked	7	63,6	7	63,6
little	4	36,4	2	18,2
unchanged	-	-	-	-
Keratosis				
exceptional	-	-	3	27,3
marked	5	45,5	6	54,5
little	6	54,5	2	18,2
unchanged				

Data presented as frequencies and percentages

Moreover, one of the major advantages of IPL is that it allows simultaneous correction of pigmented and vascular lesions (erythema and telangiectasias), having become a procedure that generates results and benefits in the rejuvenating treatment of the hands. It is also considered a safe procedure for combination with other treatment methods, such as laser.

In the present study, it was possible to observe a significant improvement in hyperpigmented lesions treated with IPL. Furthermore, dermal heating has been demonstrated to lead to histological improvement, with induction of neocollagenesis in the papillary and reticular dermis, promoting improvement in the skin texture and reduction of fine lines.[22] Goldman et al. performed two IPL monthly treatment sessions in 23 patients with dermal elastosis and solar lentigines on the dorsum of the hands. They observed excellent results in 100% of cases treated, with improvement of lesions and overall skin quality, and no significant adverse effects.[4]

Non-ablative fractional laser acts causing damage in the dermis by creating thermal microzones and collagen remodeling with minimal effects in the skin. It allows rapid tissular repair with few adverse effects. Despite the fact that many studies have shown promising results in the treatment of facial rejuvenation using non-ablative fractional laser, there are few published papers on the rejuvenation of the hands using this technique. Also, there is no knowledge of studies evaluating the association of the two techniques for global rejuvenation treatments.

With the aging of the hands, the skin's thickness and individual capacity for regeneration and neocollagenesis decreases.[9] Therefore it is important to perform a treatment that stimulates collagen and improves the skin's texture,[4] clinically improving the appearance of atrophy, which evidences deep structures of the hand's anatomy, such as bones, tendons and vessels. The present study on the use of 1,340nm NAFL can assist in the rejuvenation of the hands due to its deep penetration into the dermis,[7] stimulating the production of collagen and promoting overall rejuvenation.

Other studies described the use of NAFL for rejuvenating the hands. Goldberg used Nd:YAG NAFL for remodeling the collagen in ten patients, having demonstrated that after three sessions (performed with four-week intervals) all patients showed significant improvement in the skin's appearance within six months of follow up, with histologic increase of collagen formation.[23] Later on, Lupo et al.[24] conducted a randomized study of 50 patients who received treatment for wrinkles with two passes of 1,320nm Nd:YAG, with moderate improvement of 40% in wrinkles after 15 months of follow-up.

In another study, 1,320nm Nd:YAG was used for treating the aging of the dorsum of the hands in seven patients with, with a greater number of sessions than that of the present study (six monthly sessions), leading to an improvement ranging from1% to 19%.[25] The objective and subjective clinical results obtained in the present study reinforce the data found in a study by Sadick,

Table 2: Improvement comparison between the right and left hands (1 to 4 scale, 1 = exceptional and 4 = unchanged)

Parameters	Right hand	Left hand	P
Wrinkles	2,82±0,60	2,09±0,54	<0,001
Pigmentation	2,36±0,51	1,91±0,70	0,016
Brightness	2,45±0,52	2,36±0,51	0,341
Global rejuvenation	2,36±0,51	2,00±0,63	0,038
Keratosis	2,55±0,52	1,91±0,70	0,011

Data presented as mean ± standard deviation, compared by the Student t-test for paired samples

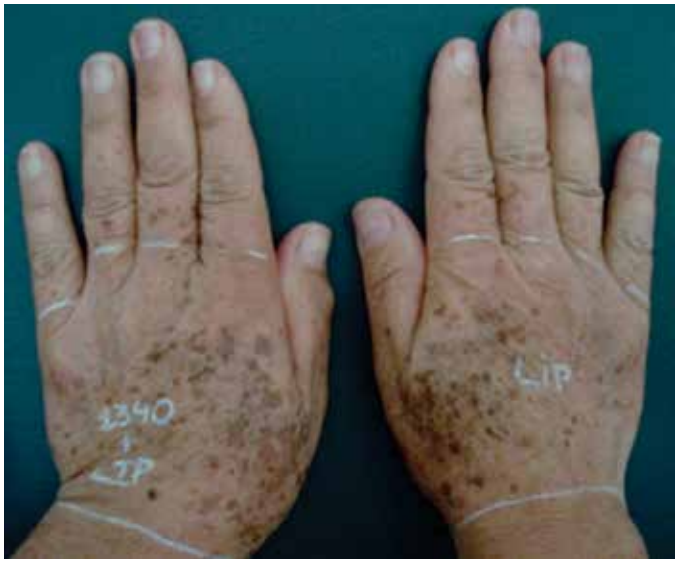

Figure 1: D0 (before the treatment)

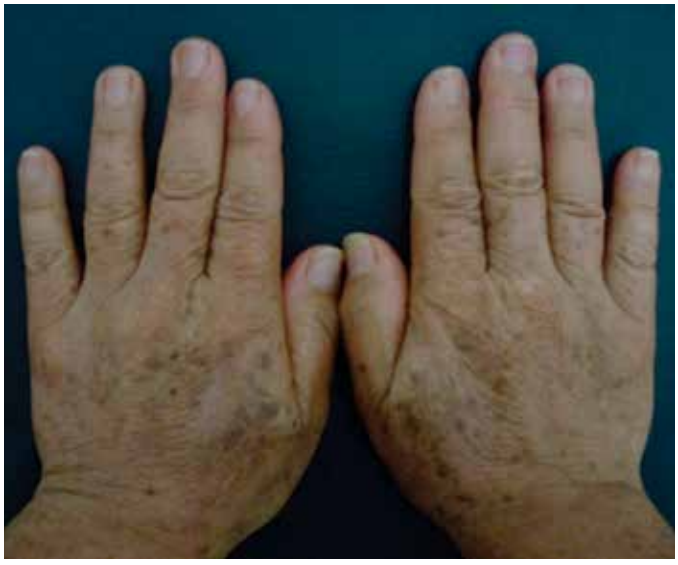

Figure 3: D3 (90 days after)

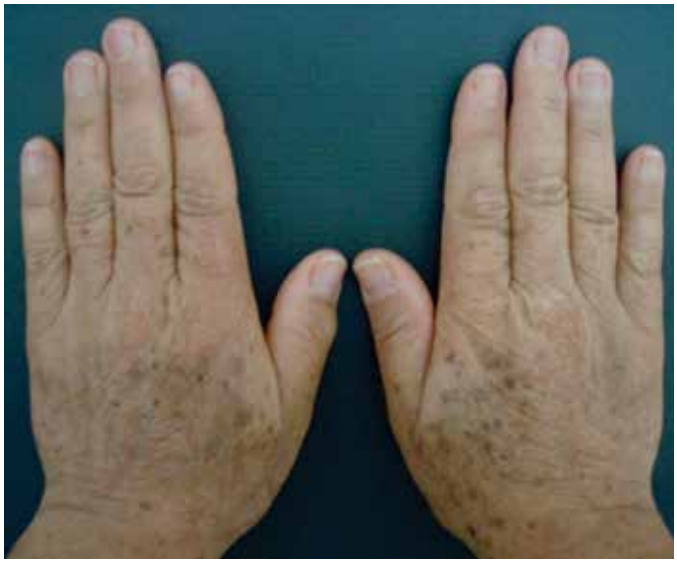

Figure 2: D1 (30 days after)

who claims that non-ablative laser is capable of improving the skin's photodamage and that clinical improvement is related to collagen remodeling in the dermis.[26]

The present study demonstrates in an unprecedented way that the combination of techniques led to a faster result, for it was able not only to improve the melanocytic lesions with the application of IPL, but also yield the benefits of collagen increase with the associated use of NAFL, aiming at comprehensively treating aging hands. Other studies have already shown clinical improvement of these pigmentary alterations using LIP [9] as monotherapy. However, it was possible to observe that the association with 1,340nm Nd:YAP resulted in an improved regeneration capacity, with the stimulation of collagen even leading to good responses in lesions lighter in color, which had uniform whitening with fewer sessions, without the compromising of the safety (Figures 1 to 3).

The safety of the procedure was achieved with the use of the advanced technology Square-Wave® Pulse (IPL-Sq®), that promotes energy delivery in a controlled and micro-processed way, uniformly releasing energy throughout the pulse.

It is important to note that the combination of techniques leads to the ideal treatment, fundamentally where melanocytic and vascular lesions are treated with IPL and collagen stimulation and the texture of the hand's skin are approached more effectively with the use of 1,340nm NAFL.

It was also possible to observe that in the short and medium terms (up until 90 days after the first session), patients had

already had good clinical outcomes that progressively improved with the neocollagenesis process.

The parameters used in the present study were safely approached, thus avoiding even minimum adverse effects. Most patients experienced the emergence of crusts, which improved progressively and did not develop into post-inflammatory hyperpigmentation. All adverse events were managed with photoprotection, resulting in the absence of complications reported in other studies, such as hypopigmentation, burns or unsightly scars.

CONCLUSION

Despite the small sample with treated patients, the treatment combining IPL and 1,340nm NAFL was demonstrated to be safe and more effective for rejuvenating the hands when compared to that with isolated IPL. The assessment of the degree of aging is a valuable tool for the safe implementation of the combined action in the rejuvenating treatment of the hands, increasing the possibility of achieving optimal results. Based on the present study's findings, the combination therapy can be considered a choice that leads to success in the rejuvenation treatment of the hands. The combination of IPL and 1,340nm NAFL techniques results in more beautiful hands with rejuvenated appearance. ●

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Original Articles

Dermachemabrasion: a safe and effective treatment for rhinophyma

Dermoquimioabrasão: um tratamento eficaz e seguro para o rinofima

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ABSTRACT

Introduction: *Rhinophyma is the final stage of rosacea. It leads to the stigmatization of the patient.*
Objective: *To establish the safety and efficacy of dermachemabrasion in the treatment of rhinophyma.*
Methods: *The method, which consists of tangential excision and dermabrasion with sandpaper followed by 30% trichloroacetic acid on the previously sanded area, was prospectively applied in 7 patients. The excised material was histologically studied aiming at detecting hidden neoplasias. Safety and efficacy were evaluated clinically and through standardized photographic records.*
Results: *The patients' ages ranged from 57 to 68 years (6 men, 1 woman). The complete reepithelialization occurred within 7 to 14 days. The 7 patients progressed without infection, with satisfactory reepithelialization and results from the aesthetic point of view, with absence of dyschromias or scarring. The histological analysis revealed the presence of a hidden neoplasia (superficial basal cell carcinoma) in one case.*
Conclusion: *Dermachemabrasion is a low cost, simple to execute and effective treatment that leads to excellent cosmetic results in addition to having the advantage of the possibility of histological analysis, which is extremely important, since there are reports of hidden malignancy in rhinophyma.*
Keywords: *rhinophyma; treatment outcome; dermabrasion; trichloroacetic acid*

RESUMO

Introdução: Rinofima é o estágio final da rosácea. Leva à estigmatização do paciente.
Objetivo: Estabelecer a segurança e eficácia da dermoquimioabrasão no tratamento do rinofima.
Métodos: Prospectivamente o método, que consiste em exerese tangencial e dermoabrasão com lixa d'água seguida da utilização de ATA a 30% sobre a área previamente abrasada, foi aplicado em sete pacientes. O material excisado foi estudado histologicamente para detectar neoplasias ocultas. A segurança e eficácia foram avaliadas clinicamente e por registros fotográficos padronizados.
Resultados: A idade dos pacientes variou de 57 a 68 anos, sendo seis homens e uma mulher. A reepitelização completa ocorreu entre sete e 14 dias. Os sete pacientes apresentaram evolução sem infecções, com reepitelização e resultado satisfatórios do ponto de vista estético, com ausência de discromias ou cicatrizes. Em um dos casos, a análise histopatológica revelou a presença de neoplasia oculta (carcinoma basocelular superficial).
Conclusão: A dermoquimioabrasão é tratamento eficaz, de baixo custo, simples execução e excelente resultado cosmético, além de ter como vantagem a possibilidade de análise histopatológica, que é de extrema importância, desde que existem casos descritos de neoplasia oculta no rinofima.
Palavras-chave: rinofima; resultado de tratamento; dermabrasão; acido tricloroacético

INTRODUCTION

The *rhinophyma* term comes from the Greek "growth of the nose." It is considered the final stage of rosacea even though only a minority of patients develops into that stage. It arises as a chronic inflammation with long development, usually of years.[1,2]

It is clinically characterized by a globose nose with irregular exophytic growths, due to the progressive increase of connective tissue, hyperplasia of the sebaceous glands and vascular ectasia. The most affected population is that of men over 40 years of age, with a frequency of 5:1 regarding women.[1,2]

The picture often leads to stigmatization of the patient, interfering in their personal and professional lives.

Furthermore, there are reports in the literature of hidden neoplasias associated with rhinophyma. It is estimated that hidden basal cell carcinomas occur in a percentage ranging from 3% to 10% in cases of rhinophyma, while other types of skin cancers, including cutaneous metastases, have also been found simulating rhinophyma.[3,4,] The development time of rhinophyma seems to be closely associated with a higher risk of developing malignancy location.[4]

Among the various treatments described in the literature, the use of 90% trichloroacetic acid (TCA), dermabrasion, shaving associated with dermabrasion, cryosurgery and CO2 laser stand out.[5] There are reports of the use of high frequency devices (radio frequency) for the treatment of rhinophyma with good results and short recovery time, however this method has the disadvantage of not allowing histologic evaluation.[6] There is also a study describing 28 patients who underwent the association of decortication/dermabrasion with electrocoagulation.[7]

The term chemabrasion was described by Stagnone,[8] in 1977 and consists in performing medium chemical peeling with Jessner's solution and 20% to 35% TCA applied across the face and upper third of the cervical region, followed by dermabrasion with diamond fraises. The purpose of this procedure is to reduce the skin's resistance and minimize demarcation lines in areas that will not be abraded.[9]

The objective of the present study was to establish the safety and efficacy of a new combination of methods for treating rhinophyma, called dermochemabrasion, which consists in tangential excision and dermabrasion with sandpaper followed by the use of 30% TCA on the area previously abraded.

METHODS

In this prospective, single-center study 7 patients bearers of rhinophyma were treated with dermochemabrasion at the Corrective Dermatology Clinic of the Hospital Universitário Pedro Ernesto do Rio de Janeiro, from June 2010 to July 2014.

In compliance with the legal requirements, the procedures carried out in the present study were approved by the Clinical Studies and Research Committee of the institution where it was performed, with involved patients having signed the free and informed term of consent.

Patients were instructed to avoid the use of medications such as aspirin, ginkgo biloba and vitamin E in the preoperative period, and that comorbidities such as systemic arterial hypertension and diabetes be controlled.

Dermochemabrasion: steps of the surgical technique

After asepsis and antisepsis, anesthetic blocks were performed of the infraorbital nerves (in the paranasal areas), infratrochlear nerves (in the base of the nose, below the glabella and close to the inner canthus) and nasociliary nerves (at the junction of cartilage and bone in the dorsum of the nose).[1,2] The anesthetic blocks were properly complemented by infiltrative anesthesia with 1% lidocaine and 1:100,000 epinephrine.

The first surgical step consisted in the tangential excision (shave) with number 15 scalpel blade. Thin layers were removed from the hyperplastic tissue up until the symmetry and nose contour were reconstructed. The material excised from all patients was sent for histology for detection of hidden neoplasias. Next, manual abrasion with number 100 wet sandpaper was carried out aiming at leveling the tissues. The final step was the chemical cauterization of the abraded area with 30% TCA to obtain coagulation and hemostasis of the surgical wound (Figure 1).

The dressing was prepared in the following order: topical antibiotic, PVC plastic film, gauze and medical tape. The plastic film acts blocking the nerve endings, controlling the postoperative pain. Patients were instructed to perform the daily re-application of the bandage for a week. After this period, sunscreen should be used daily up until the erythema disappeared, with the skin color returning to natural.

In order to evaluate the safety and efficacy of this therapeutic proposal, clinical evaluations and standardized photographic records were performed before and at 7, 14, 30 and 120 days after the procedure. The three first records were aimed at evaluating the duration of the re-epithelialization period and the presence of infections. One hundred and twenty days after, the patients returned to control the final outcome. The skin's thickness in the treated areas, the presence of large pores, the evenness of the cutaneous relief and the presence of dyschromias and scars were assessed on this visit.

RESULTS

The patients' ages ranged from 57 to 68 years (6 men, 1 woman / Fitzpatrick phototypes III and IV). Complete reepithelialization occurred between 7 and 14 days. All patients progressed with absence of infections, satisfactory reepithelialization and resolution of exophytic tissues (Figures 2 to 4). Therefore, all patients obtained satisfactory final outcomes from the aesthetic point of view, with absence of dyschromias or scarring. In 6 of the cases described – except for one, where a superficial basal cell carcinoma was detected – the histology excluded hidden cutaneous neoplasias.

DISCUSSION

Rhinophyma is a stigmatizing condition. Different surgical treatments have been described in the literature, however

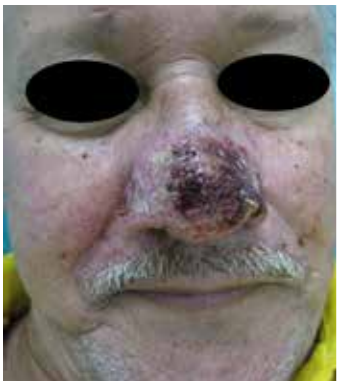

Figure 1: Immediate postoperative

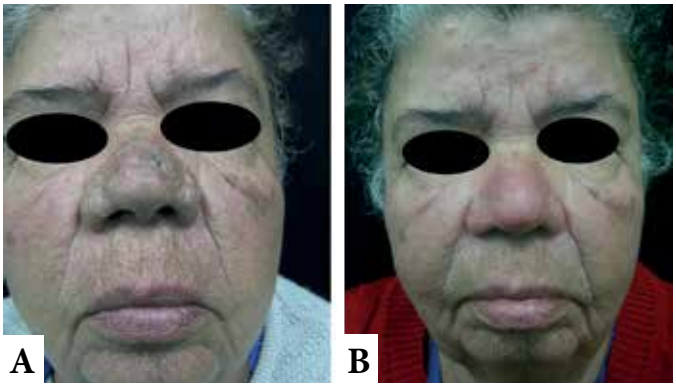

Figure 2: A - before the dermochemabrasion; **B -** 30 days after the procedure

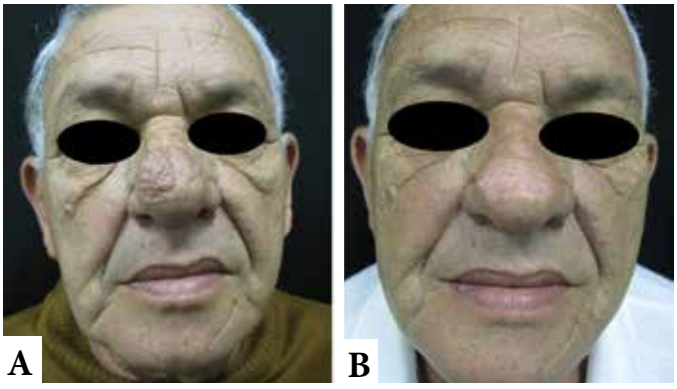

Figure 3: A - before the dermochemabrasion; **B -** 120 days after the procedure

Figure 4: A - before the dermochemabrasion; **B -** 120 days after the procedure

there is no consensus on the best technique. Today there are multiple therapies published for the treatment of rhinophyma aimed at restoring the normal appearance of the nose.

Radioelectrosurgery has been widely used, and specific electrodes have been developed to treat this condition. Its advantage is the possibility to simultaneously remove tissue and control the bleeding, offering enough comfort to the surgeon.[6]

In 2014, an innovative and simple to implement technique was described to treat this condition exclusively using high concentrations of TCA.[10] However, the greatest advantage of the technique is the possibility of histological examination of the removed material, which also allows the diagnosis of benign or malignant tumors hidden in the exophytic tissue that is characteristic of rhinophyma. The procedure also allows visual control of the planes to be reached, whose limit lies between the medium reticular and deep dermis. This protects the base of the cutaneous appendages, thus preventing scarring, lending safety and effectiveness to the technique.

CONCLUSION

Dermochemabrasion is a treatment characterized by its effectiveness, low cost, straightforward implementation and excellent cosmetic outcome, in addition to the advantage of allowing histologic analysis – the latter being of great importance, since there are cases of hidden neoplasia in rhinophyma described in the literature.[3,4]

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Multicenter, prospective, comparative, randomized, double-blind clinical study comparing two botulinum toxin type A formulations registered in Brazil for the treatment of glabellar wrinkles

Estudo clínico multicêntrico, prospectivo, comparativo, randomizado e duplo cego, entre duas formulações de toxina botulínica tipo A registradas no Brasil para o tratamento das rugas da glabela

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ABSTRACT

Introduction: Although there are differences arising from diverse formulations, botulinum toxin type A is widely marketed in Brazil.

Objective: To compare the efficacy and tolerability of two botulinum toxin type A formulations registered in Brazil: Botulinum toxin type A (Toxin 1) and Onabotulinumtoxin A (Toxin 2), in the treatment of glabellar expression lines through a multicenter prospective, comparative, randomized, double-blind study.

Methods: One hundred fifty-seven patients were randomized at a 1:1 (Toxin 1:Toxin 2) ratio for receiving 20U toxin for the treatment of the glabella's dynamic wrinkles. Photographic records were taken at maximum frowning in five protocol visits by independent evaluators. The assessment of results included: i) percentage of patients with improvement ≥ 1 point in the four-point facial wrinkles scale, at maximum frowning, fifteen days after the treatment; ii) improvement in the static glabellar wrinkles; iii) pain and iv) duration of effect of the toxin.

Results: According to the independent evaluators, two weeks after injection, the rate of response at maximum frowning was 98.4% in the group treated with Toxin 1 and 98.2% in the group treated with Toxin 2. For individuals who received Toxin 1, the authors found an effect's duration of 84.5 ± 38.8 days, while for those who received Toxin 2, the effect's duration was 89.9 ± 41.1 days (p = 0.4303).

Conclusions: Botulinum toxin type A (Toxin 1) and Toxin 2 have similar effectivenesses in the treatment of dynamic glabellar wrinkles. Both preparations were well tolerated.

Keywords: botulinum toxin type A; wrinkles; Prosigne; Botox

RESUMO

Introdução*: Embora existam diferenças decorrentes de formulações diversificadas, a toxina botulínica tipo A é amplamente comercializada no Brasil.*

Objetivo*: Comparar a eficácia e a tolerabilidade de duas formulações de toxina botulínica A registradas no Brasil: Toxina botulínica tipo A (denominada Toxina 1) e Onabotulinumtoxin A (Toxina 2), no tratamento de linhas de expressão glabelares, por meio de um estudo multicêntrico, prospectivo, comparativo, randomizado e duplo-cego.*

Métodos*: 157 pacientes foram randomizadas em um 1:1 (Toxina 1:Toxina 2) para receber 20U de toxina para tratamento das rugas dinâmicas da glabela. Houve registro fotográfico em franzimento máximo, nas cinco visitas do protocolo, por avaliadores independentes. A avaliação dos resultados incluiu: percentagem de resposta de pacientes com melhora de ≥1 ponto em escala facial de rugas de quatro pontos, no máximo de franzimento após 15 dias de tratamento, melhora de rugas estáticas glabelares, dor e duração do efeito da toxina.*

Resultado*: Duas semanas após a injeção, a taxa de resposta ao máximo franzido era 98,4% no grupo tratado com Toxina 1 e 98,2% no grupo tratado com Toxina 2, segundo os avaliadores independentes. Encontramos, para os indivíduos que receberam Toxina 1, a duração do efeito de 84,5 ± 38,8 dias e de 89,9 ± 41,1 dias para aqueles que receberam Toxina 2 (p = 0,4303).*

Conclusões*: A toxina botulínica do tipo A denominada Toxina 1 é igualmente eficaz à denominada Toxina 2 no tratamento das rugas dinâmicas glabelares. Ambas as preparações foram bem toleradas.*

Palavras-chave: *toxina botulínica tipo A; rugas; Prosigne; Botox*

Original Articles

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INTRODUCTION

Botulinum neurotoxin inhibits the release of acetylcholine from the nerve endings, mainly acting on the cholinergic synapses.[1,2] It is widely studied both in the basic sciences and in the medical specialties (dermatology, neurology, ophthalmology and others) for the treatment of diseases and numerous aesthetic corrections.[3-23]

The seven different serotypes of botulinum neurotoxin (A-G) affect the human nervous system. However, type A preparations are commonly used in the clinical practice for their immunological profile, availability, duration, safety and efficacy.[18,21] Due to the fact that they are biological products, the marketed formulations of botulinum neurotoxin type A can not be considered bioequivalent or generic. The variation among the various versions generates numerous controversies about the strengths, diffusion characteristics, pain on application, effect duration and other aspects.[21-24] In this manner, many studies (experimental and/or clinical) are performed to elucidate these questions. Yet, there are not answers to all questions; Nonetheless, the studies that have already been published suggest that the toxins marketed in the medical segment are effective and safe, and despite these differences, it is possible to find conversion values between them, allowing their interchange in therapeutic practice.[21-23]

The present study compares the efficacy and non-inferiority of the serotype A botulinum toxin Prosigne® (Toxin 1) with that of Botox (Toxin 2), paralleling the clinical performance of two different commercial applications, using a 1:1 conversion factor (Toxin 1: Toxin 2) for the treatment of dynamic glabellar wrinkles of healthy volunteers.

METHODS

Research subjects

All volunteers were recruited in three research centers: the Department of Dermatology of the Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (FMUSP); Cosmiatry, Surgery and Oncology Unit (Unicco), Department of Dermatology of the Escola Paulista de Medicina da Universidade Federal de São Paulo (EPM/Unifesp); and Kolderma Instituto de Pesquisa Clínica Ltda. After having read, understood and been clarified on doubts by the study's researcher physicians, all patients included in the study signed a Free and Informed Term of Consent (FITC) before any procedure related to the study was performed. The study protocol and all material provided to patients were submitted and approved by the Research Ethics Committee (REC) of the participating centers. The present study followed the guidelines and the principles of good clinical practice standards, Brazilian National Health Council's Resolutions 196/96, 251/97 and complementary ones, and the Helsinki Declaration of 1975, revised in 2000.

The criteria for inclusion were: healthy patients, aged between 35 and 50 years, female, Fitzpatrick' skin phototypes I to IV, absence of previous use of injectable botulinum toxin, presence of dynamic glabellar wrinkles grades 2 or 3 (according to the four-point scale [0-3] glabellar wrinkles severity classification 25, and static glabellar wrinkles grades 1 or 2 at rest (using a similar rating scale). Exclusion criteria were: coagulation disorders, previous use of any formulation containing botulinum toxin, use of drugs that alter the coagulation during the seven days prior to inclusion in the study, aminoglycoside antibiotics, cyclosporine, chloroquine and hydroxychloroquine, use of D-penicillamine or any substance that interferes with neuromuscular transmission, infection at the injection site, hypersensitivity to botulinum toxin or any other component of the formulation, use of muscle relaxant medication one month before inclusion in the study, previous procedures in the glabellar region, hypermetabolism, previous neuromuscular disorder, pregnancy and lactation, history of adverse event to any drug included in this study, history of severe allergic episode, anaphylaxis, urticaria or urticaria lesion, Steven Johnson's disease, participation in a current clinical study or in the 12 months prior to inclusion, or any condition that, according to the investigator physician, rendered the volunteer inadequate to the study.

Study design

A multicentric, comparative, randomized, double-blind, non-inferiority study was performed to compare two botulinum toxins type A: Prosigne® (Toxin 1) and Botox® (Toxin 2), in the treatment of dynamic wrinkles of the glabella, in the period 2012-2014.

The primary objective was the *evaluation of the improvement of at least one point in the severity scale of dynamic glabellar wrinkles, through clinical examination and photographic analysis, 15 days after the application of Toxins 1 and 2, according to three independent physicians.*

As secondary objectives, the following items were evaluated:

1) *duration of the toxins' effect in the treatment of glabellar dynamic wrinkles using photographic records at maximum frown, in five protocol visits (V), by independent evaluator physicians (effect duration defined as the maintenance of the improvement of at least one point on the glabellar wrinkles scale from V2 to V5)*;

2) *evaluation of the improvement of at least one point on the severity of static glabellar wrinkles 120 days after (V5) the application of toxins 1 or 2*;

3) *tolerability to botulinum toxin type A using the pain visual analogue scale [26] (VAS) immediately after the application of the toxin.*

The pain VAS consists in a 100mm long horizontal straight line on which the patient marks a point representing the intensity of his or her instantaneous pain. Its ends (0 and 100) correspond to the absence of and maximum pain that the patient might feel, respectively. Values less than 30mm are deemed to represent mild pain; those between 31mm to 70mm represent moderate levels of pain; values greater than 71mm correspond to severe levels of pain.

All patients underwent detailed medical history analysis and clinical examination by trained dermatologist physicians, as well as evaluation of glabellar wrinkles at rest and in motion, according to a standardized frowning scale of the region, in five visits (Day 0 [V1], day 15 [V2], day 60 [V], day 90 [V4], and day 120 [V5]). The severity assessment of dynamic glabellar wrinkles was performed using a four-point severity scale (A = 0 [absence of wrinkles], B = 1 [mild wrinkles]; C = 2 [moderate wrinkles], D = 3 [severe wrinkles]).

Standardized digital photographic records were taken (at rest and at maximum frowning) for each patient, before and after the treatment period and on all visits, aimed at comparing and evaluating the treatment's clinical response and side effects. The following tasks were carried out during the visits: classification of the wrinkles' severity, evaluation of the pain sensation on injection, and evaluation of patient satisfaction after the treatment. The study's flowchart is shown in Figure 1.

Randomization of patients

The patients were divided randomly into two groups, each receiving either Toxin 1 or Toxin 2, at the 1:1 ratio (one Prosigne® unit corresponding to one Botox® unit). The randomization was performed in blocks of four, using the Random Allocation Software 1.0 to allocate patients in groups.

Intervention

Each patient received a total dose of 20U of Toxin 1 or Toxin 2, in a random manner, in the glabella region (at V1).

Medicaments and injections

Toxin 1: Prosigne® (Cristália, SP, Brazil), 50U botulinum toxin type A with excipient (gelatin, dextran and sucrose). Toxin 2: Botox® (Allergan Inc., Irvine, CA, USA), 100U botulinum toxin type A with excipient (human albumin and sodium chloride), Both toxins were vacuum-packaged in sterile vials. Before dilution and application of the injection, the products were kept in the refrigerator at a temperature between 2°C and 8°C.

The toxins' vials were reconstituted immediately before the application. Toxin 1: 50U toxin 1, 0.5ml 0.9% sterile saline without preservatives, with a final dilution of 1U/0.1ml. Toxin 2: 100U toxin 2, 1ml 0.9% sterile of saline without preservatives, with a final dilution of 1U/0.1ml.

The Toxin 1 and Toxin 2 vials were reconstituted by a researcher physician, who aspirated 20 units of each product using 1ml capacity BD syringes with short needles, and delivered them to the second researcher, who performed the injections of the already diluted toxins unknowingly which product was in the syringe. The applicator physician injected the product in the volunteer's glabella according to the following protocol: 4U dose of botulinum toxin per point of injection in the treatment site (2 points in the corrugator muscles, 2 points in the orbicularis oculi muscle, and 1 point in the procerus muscle, totaling 5 points and 20U in the glabella region) (Figure 2).

Reporting adverse events

The patients were instructed to observe and report any secondary effects (duration and severity, for instance) following the injection session (V1) and at each follow-up visit (V2 to V5). They were also questioned about the presence of pain in the injection area, hematomas or any other unusual observation worth noting.

Analysis carried out by independent evaluator physicians

Three independent evaluators analyzed all photographs taken during the study and rated the severity of the glabellar wrinkles according to scale standardized for the present study. In cases of partial discrepancy in the assessment carried out by the

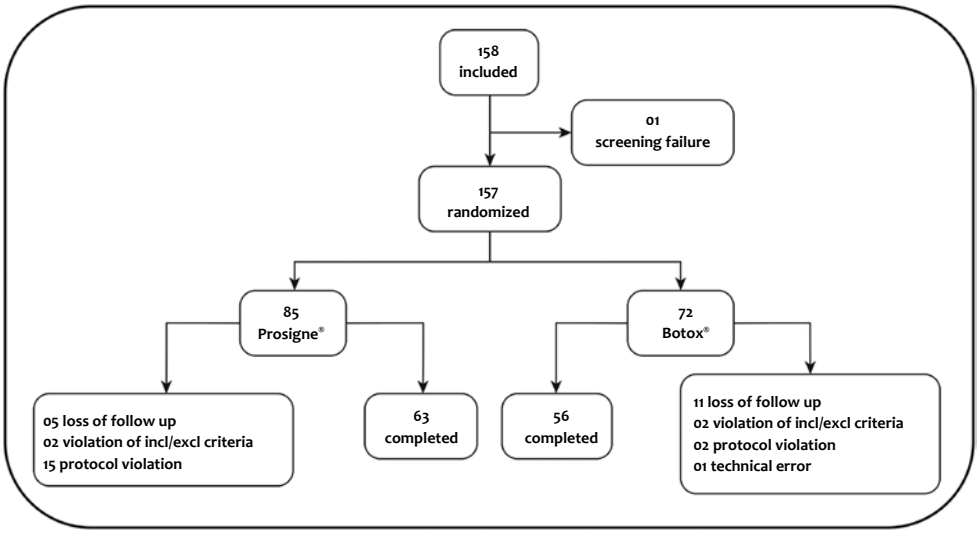


Figure 1:
Study's diagram

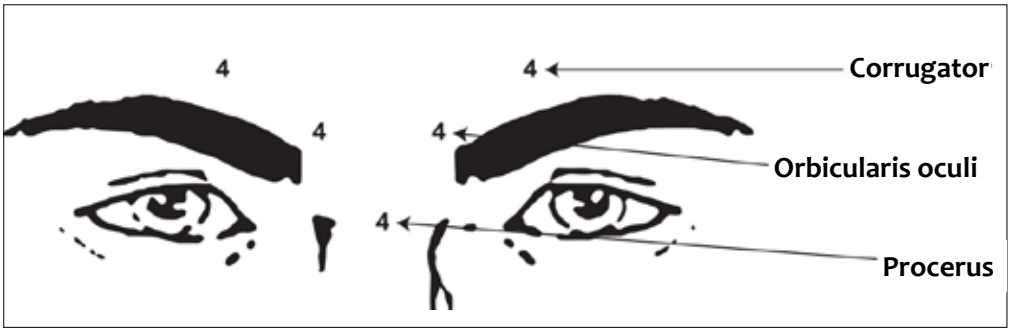


Figure 2: Standardization of application points: 4U of botulinum toxins 1 and 2 were injected in each of the five points of the glabella

three evaluator physicians, the patient was rated according to the majority's assessment. When there was total discrepancy between evaluations, the lowest rating was considered for the analysis of effectiveness.

Statistical study: sample size and data analysis

The sample size estimation formula for percentages of two parallel samples was used to demonstrate the non-inferiority, with a prefixed error β = 20% (Software: nQuery 4.0 PTE01a). In order to demonstrate the non-inferiority of the test substance (Toxin 1), a value was chosen that represented the greatest difference without meaning inferiority with respect to the reference product (Toxin 2), i.e. the greatest clinically acceptable difference (non-inferiority margin). Assuming that the real difference between the groups was equal to 0, with a 15% non-inferiority margin, a 5% significance and a 95% percentage of answers 15 days after the application of the products, 100 evaluable patients (50 in each group) would be enough to demonstrate Toxin 1's non-inferiority as compared to Toxin 2 for the treatment of dynamic glabellar wrinkles. Considering that possible follow up losses and other protocol violations could occur in 20% of cases, were recruited at least 120 individuals. The statistical analysis was performed with the Statistica software, using the unpaired parametric t-test and ANOVA (repeated measures' variance analysis in one factor and nonparametric Chi-square/Fisher tests, with a 5% significance level).

The homogeneity was assessed using the Levene and Tukey's unequal N HSD tests for *posthoc* comparisons. The sphericity was taken into account in the ANOVA calculation (Greenhouse/Geisser & Huynh/Feldt adjustments and Mauchley's test). Although this was not provided in the ANOVA's application protocol, a decision was made for using it, in order for the significance did not become inflated.

The confidence interval (95% CI) of the difference in the proportion of answerers in the two groups (improvement of at least one point in the severity of glabellar dynamic wrinkles after 15 days) was used to demonstrate the non-inferiority. The confidence interval (95% CI) for the difference in the proportion of answerers was also calculated (improvement of at least one point in the severity of static glabellar wrinkles after 120 days).

RESULTS

One hundred and fifty-eight female patients, aged from 35 to 50 years (median = 45 years) were included. Of these, one was excluded before the randomization and did not receive the application due to the fact she was younger than 35. As a result, 157 research subjects were randomized to receive treatment with Toxin 1 or 2. There were six losses of follow up on Visit 2 (V2) (1 linked to Toxin 1 and 5 linked to Toxin 2), because of the patients' difficulty to attend visits on the dates preset in the protocol. From V2 (15 days) to V6 (120 days), there were 16 follow up losses due to missed visits (patients were unreachable or could not follow the study's schedule). One hundred nineteen patients completed the study (56 and 63 in the research arms Toxin 1 and Toxin 2, respectively). (Figure 1)

The sample was homogeneous regarding the biodemographic data, with absence of differences between the two groups. The average age was 43.9 years for group Toxin 1 and 43.7 years for group Toxin 2.

Primary objective's results

According to the opinion of the independent evaluators, both Toxin 1 and Toxin 2 were significantly effective in improving at least one point in the severity of the dynamic glabellar wrinkles 15 days after the application (Figure 3). In the present study, 98.4% and 98.2% of individuals achieved this goal in the groups Toxin 1 and Toxin 2, respectively, according to the per protocol (PP) analysis, 95% CI = [-4.8% to 4.4%]; and 97.1% and 91.0%, 95% CI = [-13.9 to 1.9%], respectively, according to the intent to treat (ITT) analysis. It was already expected that the difference between answerers of the two products would be less than 15%, which in fact was observed with the 95% CI in the PP and ITT analyses, meaning that Toxin 1 was not inferior to Toxin 2, regarding their effect on dynamic glabellar wrinkles. Likewise, the evaluation of the study's investigators found 98.4% 95 and 95.5% of patients, regarding Toxins 1 and 2 respectively, with an improvement of at least one point on the severity of dynamic glabellar wrinkles. The opinions of the independent evaluators and study's researchers coincided in 89.7% of cases receiving Toxin 1 and in 92% of those receiving Toxin 2 (Figure 4).

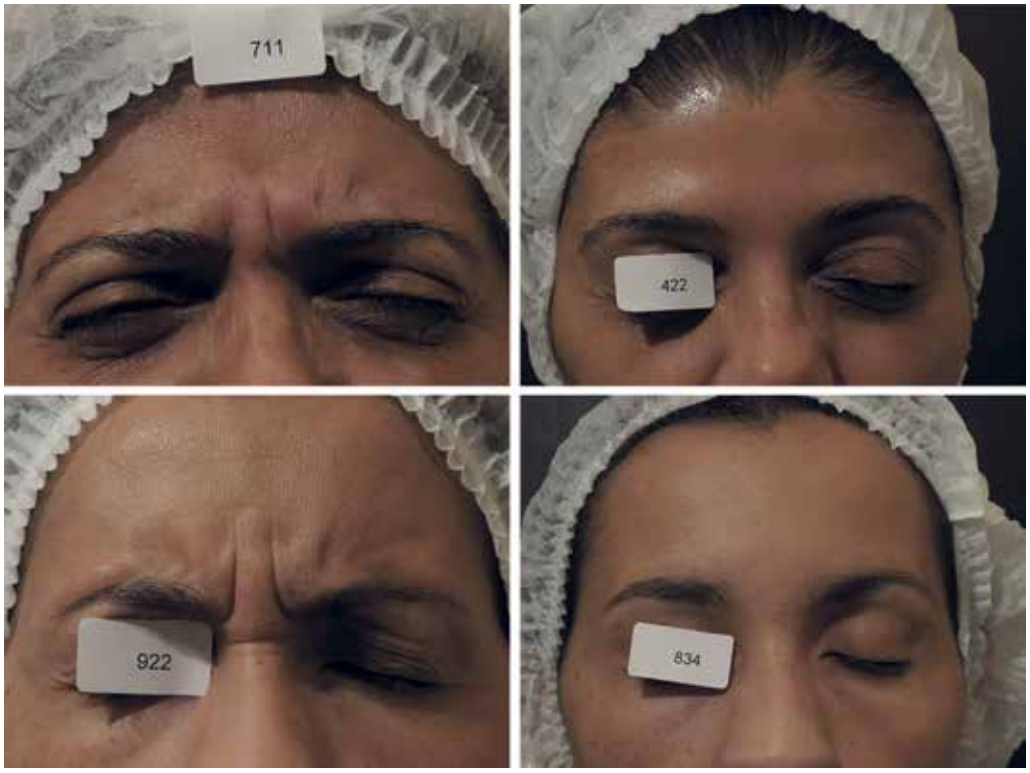


Figure 3: Clinical photographs of the patients of the Botox® and Prosigne® groups, respectively before and 15 days after the treatment (always taken with maximum frowning of the glabella)

Secondary objectives' results

One of the secondary objectives was to *evaluate the improvement of at least one point on the scale of severity of static glabellar wrinkles 120 days after the application of the toxin, according to the evaluation of three independent evaluator physicians.* Only 7 patients (10, 8%) in the Toxin 1 group and 12 (17.9%) in Toxin 2 group had this level of improvement, with absence of statistically significant differences between them. In the opinion of the study's researchers, this improvement was 44.9% and 53.9% in Toxin 1 and 2 groups, respectively, with absence of statistical difference between the groups. The opinions of the study's researchers and those of the independent evaluators coincided in 58.2% of cases receiving Toxin 1 and in 46.2% of those receiving Toxin 2 (Figure 5).

The second secondary objective was *to evaluate the duration of the botulinum toxin's effect in dynamic wrinkles on maximum frown, according the evaluation of photographs carried out by the independent evaluators, verifying for how long the improvement of at least one point on the scale of glabellar wrinkles remained*. For the patients who received Toxin 1, the present study found that toxin's effect duration was 84.5 ± 38.8 days, and 89.9 ± 41.1 days for those who received Toxin 2, with no statistically significant difference (p = 0.4303). In the opinion of the study's researchers, the toxin duration for dynamic wrinkles was 76.8 ± 46.6 and 88.1 ± 43.6 days for Toxin 1 and 2 groups, also with absence of statistically significant difference between the groups (p = 0.1455-nS) (Figure 6).

Aiming at achieving the third secondary objective, the authors of the present article studied the tolerability of the medication during the injection of Toxins 1 and 2, using a visual analogue scale (VAS) of pain immediately after the toxin application. There was absence of difference between the groups (p = 0.2839-ns). Likewise, there was no difference between the two products (p = 0.4805-ns) regarding pain at the end of the day on which the toxin was applied (Table 1).

Adverse events experienced by individuals in both groups did not differ significantly (p = 0.4507-ns) and 44.4% and 66.7% were of mild intensity, while 54.2% and 33.3% were moderate, in Toxin 1 and Toxin 2 groups, respectively. Most adverse events, such as mild pain, erythema and self-limited bleeding at the injection site, were not serious and improved spontaneously.

DISCUSSION

Serotype A botulinum toxin is a well-established option for the treatment of dynamic wrinkles of the face. The crystalline form of botulinum toxin type A has been introduced in the medical practice in 1980, for the treatment of strabismus. Since then numerous other indications have arisen, including blepharospasm, facial spasm, spasticity and diverse cosmetic uses such as dynamic facial wrinkles and hyperhidrosis (axillae, palms and other locations). 1, 3-11, 15-18

Botox® (onabotulinumtoxina A - BoNT/A) is produced in Ireland by Allergan Pharmaceuticals Ireland. In Brazil, it is imported and distributed by Allergan Produtos Farmacêuticos Ltda., São Paulo. It was the first toxin type to be marketed for cosmetic purposes and serves as a baseline in the comparison of efficacy among toxins type A. In 1988, the research team at the Lanzhou Institute of Biological Products produced and made available a highly pure and stable Chinese botulinum toxin type A, under the trade name BTX-A®.

In 1997, after pre-clinical and clinical studies, the People's Republic of China's National Committee for Drug Evaluation

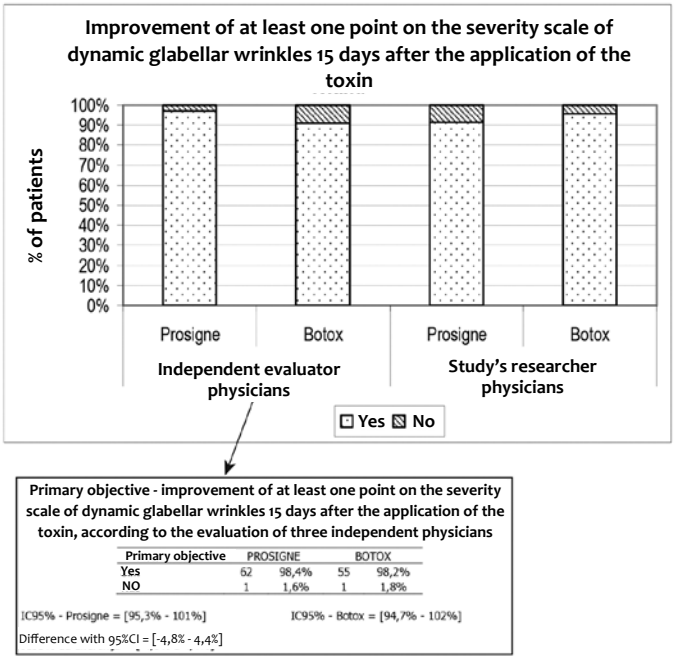


FIGURE 4: Graphic representation of the primary objective of the study: improvement of at least one point on the severity scale of dynamic glabellar wrinkles 15 days after the application of the toxin, according to the evaluation of three independent physicians (outline highlighted in orange). The evaluation of the study's researchers is also depicted

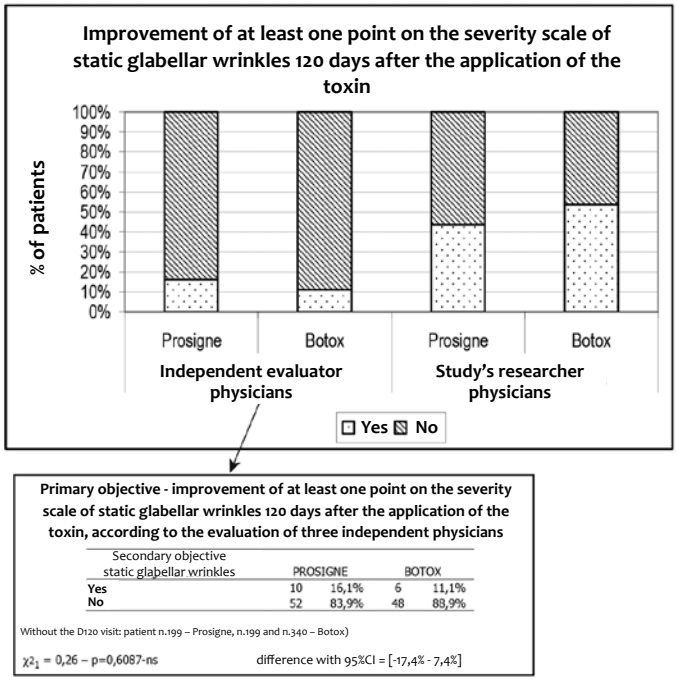
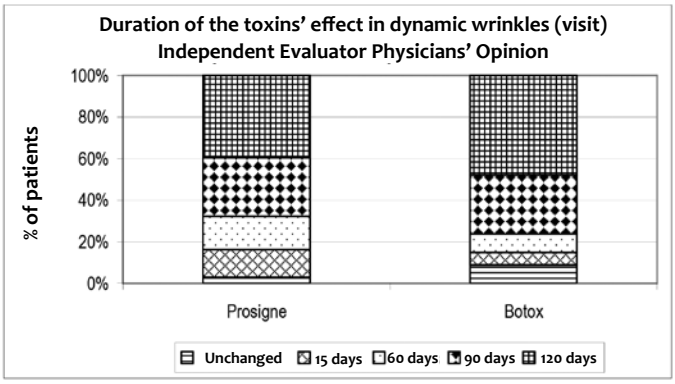
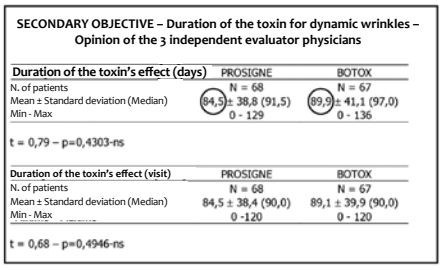


FIGURE 5: First secondary objective's results (highlighted in orange): improvement of at least one point on the severity scale of static glabellar wrinkles 120 days after the injection of the toxins, without statistically significant difference between them. The study's researcher physicians' evaluation is also depicted





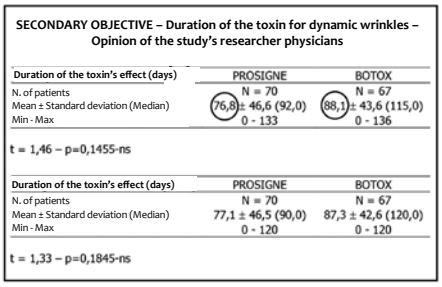


FIGURE 6: Second secondary objective's results (highlighted in orange): duration (in days) of the toxins effect in the dynamic wrinkles, on maximum frown, based on the photographic evaluation performed by the independent evaluator physicians, verifying the duration of the improvement of the at one point on the scale of glabellar wrinkles, without statistically significant difference. The study's researcher physicians' evaluation is also depicted (days are also highlighted in orange)

approved its use for medical treatment, specifically for: hemifacial spasm, blepharospasm and strabismus. 5-9 In Brazil, the National Health Surveillance Agency (ANVISA) approved BTX-A® for clinical use in 2003, and for cosmetic use in 2005, under the trade name Prosigne®. The product is currently marketed in Brazil (by Cristália Produtos Químicos Farmacêuticos Ltda., São Paulo) and in many European countries, Asia and America.

Botulinum toxins are biological products, meaning that the concept of bioequivalence of different formulations does not apply; nevertheless it is possible to interchange commercial formulations among them in light of the results of comparative clinical trials of these different products. In this manner, the present study provided valuable data for the understanding of the botulinum toxin type A Prosigne® (Toxin 1) in comparison to that marketed under the trade name Botox® (Toxin 2).

Table 1: Third secondary objective's results: tolerance to pain (assessed using the pain VAS) immediately after the application of toxins 1 and 2 and at the end of the day on which the application occurred. There was absence of difference between the groups

Visual Analogue Scale of pain (cm)	PROSIGNE	BOTOX
At the end of the day on which the toxin was applied	N=69	N=67
Mean ± standard deviation (Median)	0,64 ± 1,46 (0,0)	0,49 ± 1,07 (0,0)
Min - Max	0 - 7	0 - 5,8

t = 0,71 - p=0,4805-ns

The present study achieved its primary objective of improvement of at least one point on the severity scale of glabellar dynamic wrinkles, 15 days after the injection of Toxin 1 or 2, according to the evaluation of three independent physician evaluators. In this way, 15 days after the treatment, both toxins were significantly effective in improving at least one point on the severity scale of dynamic glabellar wrinkles, according to the opinion of the independent evaluators and the study's researchers. It was expected that the difference between answerers in the two groups would be less than 15%, a fact that materialized in light of the 95% CI, both in the PP and in the ITT populations. In addition, the fact that there was agreement between the evaluations of the independent evaluators and that of the study's researchers stands out.

Moreover, the study brought other relevant information to light linked to the fact that one of the secondary objectives was to evaluate the improvement of at least one point on the severity scale of static glabellar wrinkles, 120 days after the toxin application, according to the evaluation of three independent physician evaluators.

The second secondary objective was to evaluate the duration of the botulinum toxin effect in dynamic wrinkles on maximum frown through the independent analysis of photographs by independent physicians, verifying the duration of the improvement of at least one point on the severity scale of glabellar wrinkles. On this front, there was no statistically significant difference, in the opinion of both the study's researchers and the independent evaluators.

The third secondary objective was to evaluate the tolerability to the medications during the injection of Toxins 1 and 2, according to a pain VAS, immediately after the application of the toxin. No difference was observed between the groups. Also, no difference was evidenced between the two products regarding the pain sensation at the end of the day on which the application of the toxin was performed.

Adverse events experienced by individuals did not differ significantly between the two groups. Most were not serious, being of mild or moderate intensity. Among them were mild pain, erythema and self-limiting bleeding in the injection site, which improved with local manual compression. This is aligned with events that have been observed in several studies, in which the intramuscular injection of any substance possibly caused local pain, abnormal sensitivity to compression, hematoma or ecchymosis formation and/or local injury. These are all mild and expected events.

The present study's findings, together replicate the results of other controlled clinical studies comparing Botox® and Prosigne®, showing that the formulations are equivalent in the treatment of blepharospasm and hemifacial spasm, cervical dystonia, hyperactivity of the detrusor muscle and spasticity. 18, 20, 22-24

CONCLUSION

Te results of the comparative analyses have shown that Toxins 1 and 2 are equally effective and safe in improving at least one point on the severity scale of dynamic glabellar wrinkles 15 days after the application, in the opinion of both the study researchers and the independent evaluator physicians.

ACKNOWLEDGEMENTS

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Original Articles

Dermal Tunneling (TD®): a therapeutic option for static glabellar wrinkles

Tunelização dérmica (TD®): uma opção terapêutica para rugas glabelares estáticas

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ABSTRACT

Introduction: Despite the existence of well-established therapeutic approaches, static glabellar wrinkles arise as a challenge. The subincision is a technique commonly used for the improvement of these lesions.

Objectives: The present article proposes a new methodology for the undermining of static glabellar wrinkles termed and registered by the author as Dermal Tunneling (TD®).

Methods: Twelve patients who underwent dermal tunneling carried out by the same physician, according to the same methodology, were retrospectively assessed through direct observation, photographic analysis and self-assessment questionnaires.

Results: All patients reported that the results were good or very good. The evaluation carried out by two independent dermatologists, based on before and after photographs, showed that two patients had regular outcomes (25% improvement), five had good outcomes (50% improvement) and five had very good outcomes (75% improvement).

Conclusion: Dermal Tunneling (TD®) can be considered an effective, safe and reproducible treatment.

Keywords: wrinkle; skin; therapeutics

RESUMO

Introdução*: As rugas glabelares estáticas apresentam-se como um desafio, apesar das propostas terapêuticas consagradas. A subincisão é técnica comumente utilizada para a melhoria dessas lesões.*

Objetivos*: O presente artigo propõe nova metodologia para o descolamento de rugas glabelares estáticas nomeada tunelização dérmica (TD®) pelo autor e assim registrada.*

Metodologia*: Doze pacientes submetidos à tunelização dérmica com o mesmo profissional e seguindo a mesma metodologia foram retrospectivamente avaliados, mediante observação direta, análise fotográfica e questionários de autoavaliação aplicado aos pacientes.*

Resultados*: Todos os pacientes relataram ou registraram nos questionários de autoavaliação que os resultados foram bons ou muito bons. A avaliação por dois dermatologistas independentes, com base em fotos de antes e depois, demonstrou dois pacientes com resultado regular (25% de melhora), cinco com bom (50% de melhora) e cinco com muito bom (75% de melhora).*

Conclusão*: A tunelização dérmica (TD®) pode ser considerada tratamento efetivo, seguro e passível de ser reproduzido.*

Palavras-chave: *ruga; pele; terapêutica*

INTRODUCTION

The presence of wrinkles on the forehead and glabella – even in the absence of contraction of the corresponding muscles – gives rise to static lines, which are usually difficult to be soothed.[1] The use of botulinum toxin leads to good results in dynamic wrinkles, nevertheless the response is unsatisfactory regarding deep static wrinkles, entailing that the treatment is commonly supplemented with cutaneous fillers.[1,2] Subcutaneous incision has also been proposed for the treatment of these rhytids, which are usually comparable to scars due to their depth, rigidity and inflexibility. Initially described by Orentreich and Orentreich,[3] this technique is based on the rupture of fibrotic bundles and the triggering of inflammatory response, including bleeding, which culminates in the production of collagen.[3,4] Needles with specific characteristics have been used by different authors to perform this technique, among them the 19G, 20G, 21G, 18G[1,5] Nokor, with particular technical advantages.[4–6] Adverse effects such as edema, hematoma and pain can be evidenced in the immediate post-procedure period. Among possible late complications are post-inflammatory hyperpigmentation, overcorrection of the treated depression and fibrotic nodules.[4] These complications can be prevented or adequately managed when an experienced and discerning professional performs the intervention.[7] The present paper proposes the correction of glabellar static wrinkles using a new device and an easily implementable methodology called Dermal Tunneling (TD® - from the Portuguese *Tunelização Dérmica*).

METHODS

Medical records of 12 patients who attended the author's private practice and the Cosmiatry Clinic of the hospital Santa Casa de Misericórdia do Recife (PE, Brazil) were retrospectively evaluated from January 2013 to January 2015. All patients had static glabellar wrinkles and were treated with TD®, having undergone the same procedure, which was performed by the same doctor. All patients had never received any kind of treatment in the glabellar area before. Photographic records were performed by the same researcher, using the same digital camera and under the same lighting conditions, immediately before and two months after a single intervention. The assessment of the results was performed through the analytical photographic comparisons carried out by two independent dermatologist physicians according to the following scale: moderate (25% improvement), good (50% improvement), very good (75% improvement) and excellent (100% improvement). A self-assessment questionnaire was applied to the patients aimed at evaluating their satisfaction with the procedure's outcome, according to the following ratings: bad, good, very good and excellent.

The study complied with the guidelines recommended by the Declaration of Helsinki.

Description of the surgical technique

The device used to perform the TD® is a sterile aspiration needle, 1.20 x 25mm 18G x 1". The treatment should be performed in a procedure room carefully prepared for surgery. Fist of all, the area to be treated was marked, with lines having been drawn on the static wrinkles to be corrected. Next, antisepsis with 2% chlorhexidine was carried out and infiltrative anesthesia with 2% lidocaine (without vasoconstrictor) was performed. The aspiration needle was then introduced transepidermally up until the depth of the dermis, at the most distal point of the wrinkle (point A). Then was moved toward the base of the wrinkle (point B), producing a path in the shape of a tunnel. In order to achieve that, the needle was moved back and forth, with every movement performed between A and B progressively creating a tunnel. It is proposed that three or four tunnels be produced using the same procedure – introducing the needle in same initial orifice (point A) and moving it toward the base of the wrinkle (point B). This process results in the creation of three or four vertical hematic columns arranged in parallel, causing the detachment of the bundles and in the hematic filling of the wrinkle (Figure 1). After the procedure, the patients received micropored dressing (which was removed on the following day) and were instructed to use only industrialized SPF 60 sunscreen.

RESULTS

In the self-assessment questionnaires, all 12 patients (7 women, 5 men) rated the outcomes as good or very good. Based on before-and-after photographs, the assessment carried out by two independent dermatologist physicians revealed a similar perception of the degree of improvement: two patients had 25%

Figure 1: Diagram depicting the movement performed with the 18G aspiration needle**. (A)** Apex of the wrinkle; **(B)** Base of the wrinkle

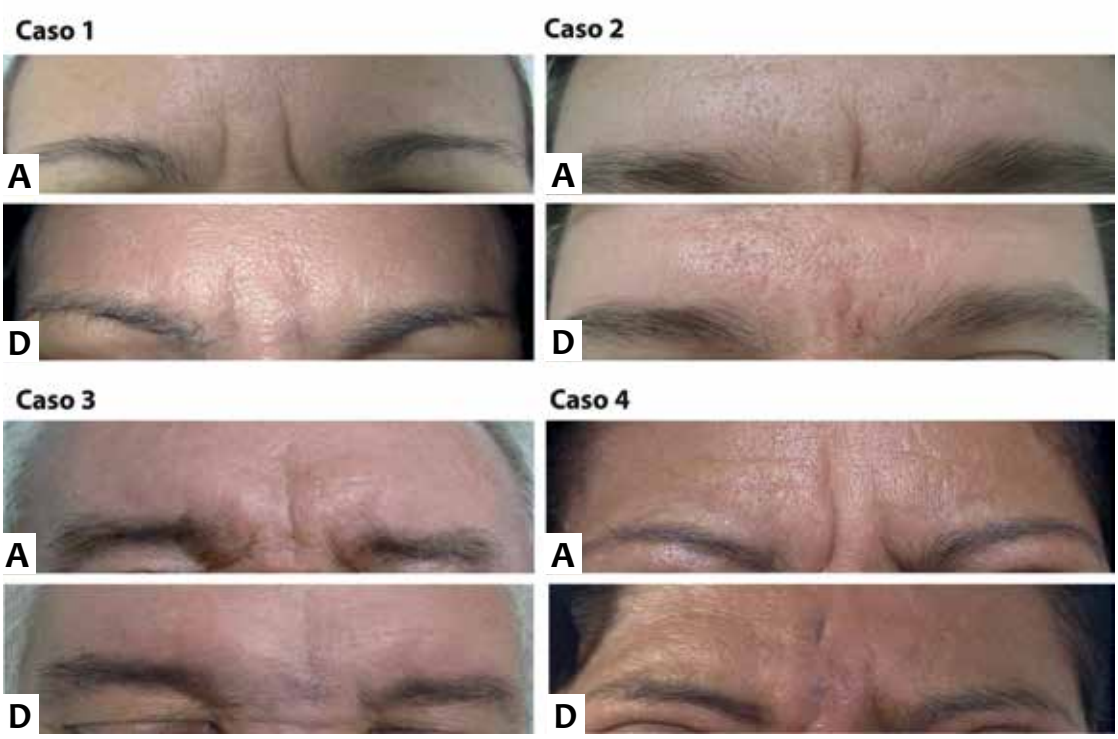

Figura 2: : Outcomes of four patients treated with the dermal tunneling technique before (D) and 60 days after the intervention (A)

improvement (moderate), five had 50% improvement (good), and five had 75% improvement (very good). The pain during treatment was considered tolerable. The patients studied were aged between 42 to 60 years, and had Fitzpatrick phototypes (1975) ranging from II to IV. The return to professional activities took place between the fifth and seventh day after the procedure, with significant reduction of the edema and hematoma. There was absence of complications, such as infection, overcorrection, postinflammatory hyperpigmentation, or persistent fibrotic nodules (Figure 2). Among the patients evaluated, five have already been followed up for 24 months, with permanence of the satisfactory outcomes.

DISCUSSION

Despite the great number of proposals put forward, the treatment of glabellar wrinkles is still a challenge with difficult solution.[2] They are a frequent complaint in dermatologic practices and are often only partially corrected with the application of botulinum toxin, for even when attenuated, they continue to cause annoyance due to their static wrinkle condition.[8] The filling of this almost cicatricial depression with hyaluronic acid offers dubious safety, due to the risk of intravascular injection and variable results.[2, 8]

The author proposes a new surgical approach to these lesions, based on an attempt to optimize the results observed with the already existing undermining techniques,[3, 5] standardizing the intervention methodology and the specific tools, and which can be reproduced by other physicians in many patients.

CONCLUSIONS

The dermal tunneling (TD®) technique, following the methodology described above, was effective in treating static glabellar wrinkles.

The outcomes were promising and consistent with the expectations of the author and patients, giving rise to the suggestion of inclusion of the proposed methodology in the therapeutic armamentarium to treat these lesions.

Pain and discomfort reported by the patients in the intra- and postoperative were in line with the expected.

The absence of complications in the postoperative encourages the treatment of other patients.

The author suggests the assessment of the technique in other groups aiming at confirming the results and conclusions presented in this paper.

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Original Articles

A new proposal for the evaluation of an antioxidant cosmeceutical in the treatment of the skin affected by the effects of urban life

Uma nova proposta para avaliação de cosmecêutico antioxidante no tratamento da pele afetada pelos efeitos da vida urbana

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ABSTRACT

Introduction: Modern life in large urban centers exposes its residents to new factors related to extrinsic aging, such as pollution, poor diet and emotional stress. Treatments proposed for this cause of aging include the use of cosmeceutical products with antioxidant action.

Objective: To evaluate a formulation containing antioxidant substances in the treatment of skin affected by the effects of urban life.

Methods: Prospective clinical study evaluating 33 volunteers residing in urban centers. Clinical and instrumental measurements were carried out through the use of specific questionnaires and images captured using a VISIA device at baseline and twenty-eight days after using the product twice a day, in combination with sunscreen.

Results: The comparison of the data obtained from questionnaires applied in the initial and final visits showed a statistically significant improvement in most of the analyzed variables. There was a reduction of 15.78% in the extrinsic aging score. The image analysis demonstrated a statistically significant improvement ($p < 0.05$) for the variables color uniformity and reduction of pores.

Conclusions: The use of the combination of active antioxidant substances led to an improvement in clinical and instrumental parameters of extrinsic aging caused by the phenomena linked to urban life ("urban damage"), arising as an alternative for this new indication.

Keywords: cosmetics; antioxidants; environmental pollution

RESUMO

***Introdução**: A vida moderna nos grandes centros urbanos expõe seus moradores a novos fatores relacionados ao envelhecimento extrínseco, como a poluição, a dieta inadequada e o estresse emocional. Tratamentos propostos para esse padrão de envelhecimento incluem o uso de cosmecêuticos com ação antioxidante.*

***Objetivo**: Avaliar uma formulação contendo antioxidantes no tratamento da pele contra os efeitos da vida urbana.*

***Métodos**: Estudo clínico prospectivo, com avaliação de 33 voluntárias moradoras de centros urbanos. Medidas de avaliação clínica e instrumental, mediante a utilização de questionários específicos e imagens captadas pelo equipamento VISIA, foram realizadas nas visitas inicial e 28 dias após uso do produto aplicado duas vezes ao dia em associação à aplicação de fotoprotetor.*

***Resultados**: As comparações dos dados obtidos nos questionários utilizados, nas visitas inicial e final demonstraram melhora estatisticamente significativa na maioria dos itens. Houve redução de 15,78% no escore de envelhecimento extrínseco. A análise das imagens demonstrou melhora estatisticamente significativa ($p < 0,05$) para os itens "uniformidade de cor" e "redução de poros".*

***Conclusões**: O uso da associação de ativos antioxidantes promoveu melhora nos parâmetros clínicos e instrumentais do envelhecimento extrínseco relacionado aos fenômenos envolvidos na vida urbana, denominados "danos urbanos", apresentando-se como alternativa para essa nova indicação.*

***Palavras-chave:** cosméticos; antioxidantes; poluição ambiental*

INTRODUCTION

Aging is one of the most important subjects of contemporary medicine. This is due to the population's increasing life expectancy and, at the same time, the current search for ways to slow down the aging process.

When specifically referring to cutaneous aging, sunlight is recognized as the most important environmental factor, exerting oxidative action on the skin through solar radiation, particularly UV radiation.

More recently, however, science has been trying to evaluate other environmental factors (in addition to solar radiation) that can contribute to accelerate extrinsic cutaneous aging process.

Modern life, particularly in urban centers, offers a lifestyle that is considerably different from past ones, with exposure to new environmental factors, such as pollution, tobacco, unhealthy diet, emotional stress, irregular sleep and a fast pace of life.

This set of elements present in modern life in large urban centers, promoters of the phenomena related to aging in general – and particularly to skin aging – can be called "urban damage."

For didactic purposes, the authors of the present study highlight three phenomena related to the urban damage that have been more intensely studied recently: environmental pollution, unhealthy diet and emotional stress.

Environmental pollution and aging

The effects of pollution on human health have been studied for many years, in special regarding its effects on the cardiorespiratory system. It is know, however, that the skin – the largest organ in the human body and whose main characteristic is its interaction with the external environment – should also suffer the consequences of frequent contact with pollutants.

Based on data from an encompassing epidemiological study conducted in Germany, Vierkotter et al.[1] showed, in 2010, that chronic exposure to pollutants related to the traffic of automotive vehicles was significantly associated with the premature aging of the skin, becoming the first most apparent indication of the participation of pollution in the aging process. According to Vierkotter, the formation of pigmented lesions was the clearest clinical sign related to the exposure to pollution.

Despite their correlation with pollution being weaker than that of pigmentary lesions, melanoses (mainly located on the forehead, malar regions and on the hands' dorsa), findings with presence of seborrheic keratoses, telangiectasia, sagging and wrinkles were also considered.

An extensive epidemiological study (Taizhou) 2 was conducted with over 4,000 Chinese women, to investigate the influence of environmental factors (particularly pollution) and the signs of extrinsic aging in the Chinese population.

In addition, two other studies also conducted in China suggested the presence of correlation between deep wrinkles and fossil fuels in cooks working with fossil fuels.[3, 4]

The mechanism by which pollutants trigger the aging process is not yet fully understood, nonetheless the model presented by Krutman et al. 2 in 2014 is the most widely accepted to date.

Particulate matter (PM) and ozone (generated by the reaction of volatile organic compounds with solar radiation) have important roles in this model, determining a set of changes in the skin barrier and the activation of receptors and cytokines, which will, at the end of the process, activate clinical alterations manifested in extrinsic aging.

It remains unclear whether the particulate matter (PM) is able to trigger oxidative stress on its own. However, it is known that these particles are carriers of organic chemical compounds, such as polyaromatic hydrocarbons (PAHs), which are highly lipolytic compounds that easily penetrate the skin.

Two other studies[5, 6] found a strong association between premature skin aging and exposure to soot, a mixture of carbon particles coated with PAHs.

Polyaromatic hydrocarbons are potent ligands for the AhR (Aryl hydrocarbon Receptor), which is a transcription factor expressed in keratinocytes and melanocytes.

The AhR is a protein complex present in cytoplasm of all vertebrate cells. Its primary function is the participation in the metabolism of external chemical agents such as dioxins, the PAHs and their related compounds.

After activation, the AhR migrates to the cell's nucleus, binding to the DNA's XRE sequence and triggering a transcriptional process, with the generation of reactive oxygen species and activation of proinflammatory and pro-melanogenic cytokines, interfering in the aging and pigmentation processes, with the onset of dermatoses, such as sensitive skin, atopic dermatitis and also carcinogenesis process.

The ozone produced in the atmosphere (resulting from the action of environmental pollutants in contact with sunlight – not to be confounded with the ozone in the stratosphere, which is able to filter radiation such as UVC – does not act directly in the viable skin, however can trigger oxidative stress, including depletion of the vitamins C and E, as well as lipid peroxidation of membranes in the presence of malondialdehyde (MDA).

In addition to participating in the extrinsic aging process, pollution seems to be closely related to the development of sensitive skin.[7-10] Although it is not directly related to the aging process, patients with sensitive skin become more prone to early development of aging, due to the chronic inflammation established in the skin.

Poor diet and the glycation phenomenon

Another phenomenon observed in modern life is poor diet. Food high in carbohydrates and saturated fats in addition to the excessive consumption of fried food, rather than cooked or grilled dishes, are typical examples of the diet in major urban centers.

The relationship between poor diet and aging seems to be explained by the glycation phenomenon.

Glycation is the non-enzymatic reaction between reducing sugars (such as glucose) and proteins, lipids or nucleic acids. This reaction results in the formation substances known as AGEs (Advanced Glycation End products).[11]

The AGEs may be endogenously produced or acquired by diet,[11] and its excessive deposition in tissues is implied in diseases related to aging and diabetes, such as diabetic angiopathy, macular retinal degeneration and osteoarthritis.

The skin is an organ where AGEs are deposited, and the phenomenon has been studied not only in cases of diabetes but also regarding the aging process. The presence of autofluorescence in the AGEs has been linked to chronological aging in different studies.[12, 13]

Emotional stress and skin aging

One of the characteristics of modern urban life is the constant emotional stress to which individuals are subjected.

Emotional stress affects the physical and psychological health, interfering with the homeostasis of different organs – the skin among them – also being implicated as an accelerating factor of aging of the body as a whole and, in particular, of the skin. [14]

The activation of hormones involved in the biological response to stress (sympathetic and parasympathetic systems and adrenocortical axis, for instance) ends up interfering with cell homeostasis, generating a greater amount of reactive oxygen species (ROS), which will, as it is already known, interfere with the collagen's and extracellular matrix's production/destruction balance, and influence the melanocytes' activity, resulting in the acceleration of the aging process.[14]

Strategies to reduce the damage cause by urban life

Prevention of the aging resulting from urban life requires that some actions be taken in order to improve the quality of life. These are preventive and remedial measures based on the use of cosmeceuticals and nutraceuticals, isolatedly or combined.

New active principles have been proposed that are capable of reducing the damage triggered by pollution, AGEs (glycation) and emotional stress, through different mechanisms (competing mechanisms on specific receptors, antioxidant action, reduction of generation or elimination of the already formed AGEs).

Some products based on antioxidant technologies, are proposed to be used isolatedly or in combination with other products, aiming at reducing symptoms and signs related to extrinsic aging, and promoting improvement in the perception of the skin's quality by individuals exposed to urban damage.

Resveratrol

Among the proposed new active principles is resveratrol. An extensive review study 15 discusses the benefits of this phenolic derivative – namely its antioxidant activity, particularly emphasized in the prevention of the aging process – in diverse dermatologic conditions.The authors emphasize that the use of resveratrol microspheres contributes to improved stability of the formulation and provides sustained delivery of the active principle to the skin.

In an *in vitro* study with fibroblast culture, a combination of resveratrol with other active antioxidants has proven effective in the inhibition of nuclear translocation of AhR, thus preventing the activation of the genes responsible for the damaging effects of pollution (in this case assessed using cigarette smoke).[16]

The purpose of the present study was to evaluate the efficacy of a new cosmeceutical substance with antioxidant action in the prevention of the effects of damages caused by urban life.

The study's quantitative analysis was challenging and specific questionnaires were used to evaluate the patients' quality of life (adapted to the urban damage). In addition the SCINEXA questionnaire, developed and validated for analysis of the extrinsic aging specifically related to environmental pollution, was applied. Furthermore, instrumental assessments based on the capture of images were carried out aimed at complementing the study's assessment.

METHODS

Study design

A clinical, open and monadic study was carried out with the assistance of clinical and instrumental evaluations.

Studied population

Thirty female volunteers were recruited and selected (25 to 55 years of age, complete secondary education, living in urban areas, with the self-perception of having been living a stressed life, with inadequate sleeping and eating habits).

The study was conducted at the Medcin Instituto da Pele, a private practice specializing in dermatology, in accordance with the Good Clinical Practice principles and the Brazilian National Health Council's Resolution 466 (December 12, 2012). In addition, the study protocol was previously analyzed and approved by an independent Research Ethics Committee.

Procedures

On the first visit, after having signed the Free and Informed Term of Consent, each volunteer underwent an initial dermatologic evaluation aimed at checking the inclusion/exclusion criteria.

Two questionnaires, which will be detailed in the next section, were applied to assess the effects of pollution/urban life.

After clinical assessment, the volunteers underwent photographic record of the neck region with the Visia device (Canfield Imaging Systems).

The volunteers then received three products to use at home: a neutral cleanser, a standardized SPF 30 sunscreen, and the test-product.

After 28 days of use, the volunteers returned for the final evaluation, with the application of the same questionnaires applied in the initial visit and the capture of images using the VISIA device.

Questionnaires

The clinical evaluation of the intrinsic and extrinsic aging, termed SCINEXA, was validated by Vierkötter et al. in 2009,[17] as a noninvasive clinical scoring method to assess the skin aging that takes into account both intrinsic and extrinsic factors. Using 5 parameters indicative of intrinsic aging and 18 parameters characteristic of extrinsic aging, this scale allowed the differentiation between intrinsic and extrinsic cutaneous aging.

In 2010, Vierkötter et al. 1 presented a modified score for SCINEXA, in which the extrinsic cutaneous aging was represented by *Pigmented spots*, *deep wrinkles*, *solar elastosis* and *telangiectasia*, while *sagging* and *seborrheic keratosis* were parameters of intrinsic cutaneous aging. Based on the existing number of lesions, the following scores were attributed: 0 (absence of pigmented spots or seborrheic keratosis, for – extrinsic and intrinsic aging, respectively); 5 (presence of 1 to 10 spots or seborrheic keratosis); 30 (presence of 11 to 50 spots); and 75 (presence of more than 50 spots or seborrheic keratosis).

Deep wrinkles, telangiectasia and sagging were scored with 0 (absent) to 5 (very intense presence of signs). Solar elastosis was assessed as existent (yes) or non-existent (no).

Chart 1 shows the modified SCINEXA scale, as proposed by Vierkötter.[1]

For the evaluation of the quality of urban life, a five-point scale questionnaire was applied based on a variation of the CosmeceutiQol questionnaire, 18 developed and validated for the assessment of cosmeceutical products used to improve the quality of life of users.

For the present study, some questions were adjusted to specifically assess the effectiveness of a cosmeceutical in the improvement in the quality of urban life (Chart 2).

Image-based quantitative analysis

VISIA® Complexion Analysis (Canfield)

The equipment uses digital technology and ultraviolet lighting to photograph the most superficial layers of the face.

Based on these images, a software runs a detailed analysis of the conditions of the skin. In the present study, the device performed the analysis of pore count and color uniformity in all experimental timepoints. The captured images were analyzed using the ImagePro software.

RESULTS

A - Clinical efficacy

Thirty-five volunteers were evaluated, with the inclusion of 33 of them. One did not return for the final evaluation. It was not possible to verify the reason for the non-attendance, with the event being therefore classified as a loss of follow up. Thirty-two volunteers completed the study, with absence of reactions referred or observed in the body site evaluated.

EVALUATION OF THE URBAN QUALITY OF LIFE

In order to evaluate the quality of urban life, the volunteers were asked to express their opinions regarding the conditions of the skin at the time of evaluation, which took place before the application of the products (D0) and 28 days after continuous use (D28).

The analysis of the data obtained was performed considering the descriptive data, mean values, statistical test (Student t-test) and percentage of improvement.

Table 1 shows the results the questionnaire assessing the quality of life.

Chart 1: Modified SCINEXA scale [1]

Signs of skin aging	Location	Scale
Extrinsic signs		
Pigmented spots [1] (solar melanosis)	Forehead	( ) 0 ( ) 1-10 ( ) 11-50 ( ) > 50
	Malar	( ) 0 ( ) 1-10 ( ) 11-50 ( ) > 50
Deep wrinkles[2]	Fronte	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Periorbital regions	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5	
Subpalpebral regions	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5	
Upper lip	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5	
Nasolabial fold	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5	
Solar elastosis	Malar	( ) Yes ( ) No
Telangiectasia	Malar	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Intrinsic signs		
Flacidez[2]	Inversion of the facial youth triangle	( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Seborrheic keratosis	Upper body	( ) 0 ( ) 1-10 ( ) 11-50 ( ) > 50

[1] *Escala para manchas de pigmentação e queratose seborreica possui graduação (em parênteses) de acordo com o valor escolhido – 0 (0), 1-10 (5), 11-50 (30), > 50 (75) = 1The scale for pigmented spots and seborrheic keratosis has a gradation (in brackets) according to the value chosen: 0 (0), 1-10 (5), 11-50 (30), > 50 (75).*

[2] *Graduação com escala fotográfica, em que 0 = sem presença de sinais e 5 = presença muito severa de sinais = 2 Gradation with photographic scale, where 0 = absence of signs, and 5 = very intense presence of signs.*

Chart 2: Quality of urban life questionnaire

The following questions refer to the volunteer's skin and how he or she feels today, and only today Choose the best answer for each question, marking it with an "X"	Ye,s absolutely (5)	Yes (4)	Yes, a little (3)	No, in any way (2) (1)
Today my skin has few spots and a more uniform color				
Today my skin is fair in color (less reddish)				
Today my skin is more resistant (less sensitive), and endures better the effects of pollution				
Today I feel my skin is smooth, with less fine lines				
Today I feel my skin is hydrated				
Today I feel my skin is clean				
Today I feel my skin is rejuvenated				
Today my skin feels smooth to the touch				
Today I feel my skin is fresh				
Today I feel my skin is toned				
Today I feel my skin is bright, radiant				
Today I feel my skin is restored and not fatigued				
Today I feel my skin is revitalized				

THE SIGNS OF CUTANEOUS AGING (SCINEXA SCALE)

In order to evaluate the signs of cutaneous aging the SCINEXA scale was applied, according to which the researcher physician evaluated the extrinsic and intrinsic signs prior to the application of the products (D0) and 28 days after their continued use (D28).

The analysis of the data obtained was performed taking into account descriptive data, mean values, statistical test (Student t-test) and percentage of reduction of the cutaneous signs of aging.

Table 2 presents the descriptive data of the parameters evaluated using the SCINEXA scale.

Graph 1 depicts the improvement in the score of extrinsic signals after 30 days of test-product use.

SKIN UNIFORMITY EFFECTIVENESS AND PORES' SIZE EVALUATION

Photographs taken before the application (D0) and 28 days after continued use (D28) assisted in the evaluation of the effectiveness of the skin's uniformity and the pores' size. The analysis of the images was performed using the software Image Pro® Plus 6.0, with the subsequent analysis of the data obtained being carried out with the statistical software SPSS version 21.

In the statistical analysis, the paired t-test was used for the comparison of data originary from the same volunteer on the experimental timepoints, with a significance level of 95% ($p < 0.05$).

Table 3 shows the results of the instrumental evaluations for color uniformity and pores' size.

It was possible to observe that there was a statistically significant reduction in the coefficient of variation of the skin's color, meaning that the skin's color became more uniform. It

Table 1: Quality of life questionnaire: results on the initial and final visits

Question	Mean value on To	Mean value on T28	Difference between the mean values (%)	p value
Today my skin has few spots and a more uniform color	3,53	3,94	11,50	0,062**
Today my skin is fair in color (less reddish)	3,91	3,88	- 0,80	0,902
Today my skin is more resistant (less sensitive), and endures better the effects of pollution	3	4,19	39,58	< 0,001*
Today I feel my skin is smooth, with less fine lines	3,09	3,84	24,24	0,006*
Today I feel my skin is hydrated	3	4,19	39,58	< 0,001*
Today I feel my skin is clean	3,59	41,3	14,78	0,0024*
Today I feel my skin is rejuvenated	3,38	3,88	14,81	0,125
Today my skin feels smooth to the touch	3,03	4,13	36,08	0,001*
Today I feel my skin is fresh	3,09	4,22	36,36	< 0,001*
Today I feel my skin is toned	2,81	4,16	47,78	< 0,001*
Today I feel my skin is bright, radiant	2,75	3,78	37,50	0,002*
Today I feel my skin is restored and not fatigued	2,75	3,91	42,05	< 0,001*
Today I feel my skin is invigorated	2,97	4,09	37,89	< 0,001*

*/ * = significant at a 5% level ** = significant at a 15% level*

could also be observed that there was a statistical significant average reduction in the pores' size.

DISCUSSION

The aging of the world population is one of the most important phenomena of the 21st century, having become the subject of interest and concern from different segments of the society.

In dermatology, this has translated into a concern for the physical well being, associated with a young and healthy appearance, which is a frequent request of patients in dermatologic practices. As a result, the understanding of the phenomena involved in the aging process, as well as actions aimed at preventing and treating it, are essential chapters in modern dermatology practice.

The events linked to chronological aging (intrinsic) and, in special, to photoaging, are better known and studied. The daily use of measures of protection against sunlight, particularly the use of sunscreens, is widely recognized as a crucial measure in an aging prevention program.

More recently, however, investigators have sought to assess the impact of other extrinsic factors in the aging process. Among these factors, the phenomena inherent to modern urban life – pollution, emotional stress and poor diet – are the most frequently studied. This set of phenomena is generically termed "urban damage", and the demand for mechanisms to prevent it has also been of interest to researchers.

The generation of reactive oxygen species is common all the mentioned phenomena, meaning that cosmeceutical products containing specific antioxidant active principles are instrumental for the concept of prevention of urban damage.

The present study has evaluated a new cosmeceutical containing active principles with recognized antioxidant action, such resveratrol microspheres combined to caffeic and ferulic acids, and blueberry extract, whose therapeutic proposal is to prevent urban damage.

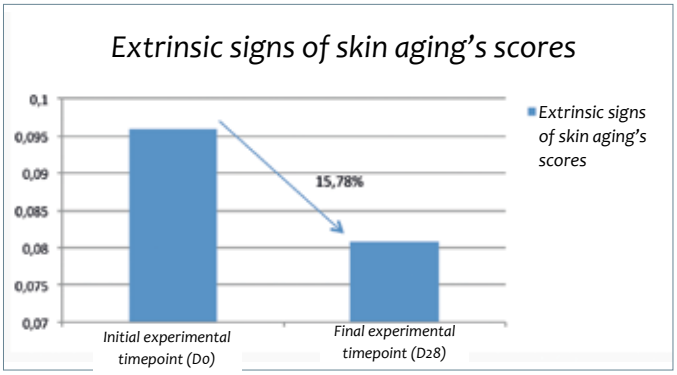
The present study has evaluated 33 volunteers living in urban areas and whose life style demands exposure to the unwholesome factors of modern life in large cities, such as accelerated pace of life, continued stress and inadequate nutrition.

The selected evaluation criteria were the use of a questionnaire about the quality of life and use of the cosmeceutical product 18 (adjusted to the urban damage criteria), a second

Tabela 2: Descriptive data of the parameters evaluated by the SCINEXA scale on the initial and final visits

Extrinsic signs of skin aging							
Signs	**Location**	**Média**				**Variation Do x D28**	**p value (Do x D28)**
		To	Stdev	T28	Stdev		
Pigmentation spots (solar melanosis)	Face	5,63	14,63	4,69	13,97	- 16,67%	0,245
	Malar	9,53	15,68	7,53	14,90	- 20,98%	0,077**
Deep wrinkles[2]	Face	1,16	1,30	1,03	1,26	- 10,81%	0,161
	Periorbital regions	0,91	1,17	0,84	1,08	- 6,90%	0,423
	Subpalpebral regions	0,84	1,30	0,81	1,26	- 3,70%	0,745
	Upper lip	0,72	1,02	0,63	0,91	- 13,04%	0,184
	Nasolabial sulcus	1,47	1,37	1,44	1,27	- 2,13%	0,768
Solar elastosis	Malar	1,56	0,50	1,56	0,50	0,00%	-
Telangiectasia	Malar	0,22	0,42	0,19	0,40	- 14,29%	0,325
Extrinsic signs scores	0,10	0,14	0,08	0,12	- 15,78%	0,147	
Intrinsic signs of skin aging							
Signs	**Location**	**Mean values**				**Variation Do x D28**	**p value (Do x D28)**
		To	Stdev	T28	Stdev		
Sagging[2]	Inversion of the facial triangle of youth	1,03	1,20	0,94	1,11	- 9,09%	0,184
Seborrheic keratosis[1]	In the upper part of the body	0,31	1,23	0,31	1,23	0,00%	-
Intrinsic signs scores		0,02	0,02	0,02	0,02	- 6,98%	0,184

** = *significant at a 10% level*



Graph 1: Average scores of the skin's extrinsic aging at baseline and final experimental time point

questionnaire evaluating the extrinsic aging 1, 17 (already described and previously validated for use in a study on the effects of pollution on the skin) and two instrumental criteria based on the assessment of images regarding the skin's color uniformity and quantity of pores.

Regarding the questionnaire aimed at assessing the quality of life, the authors verified that most of the variables (10 from 13) had a statistically significant improvement after 28 days use of the product. The data demonstrated that the product's use offered some kind of benefit, improving the volunteers' perception regarding the quality of their skin.

Observing the data drawn from the SCINEXA questionnaire for the evaluation of clinical signs resulting from extrinsic aging, it was possible to observe an improvement in the evaluated variables, except for "seborrheic keratosis" and "solar elastosis".

Yet, only one of them ("melanosis in the malar region") had improvement with some degree of statistical significance ($p < 0.1$).

Due to the fact that the presence of melanosis, keratosis, deep wrinkles and telangiectasia are well-established clinical signs, the SCINEXA scale determines a very strict assessment for the proposal of use of an antioxidant product for 28 days. Notwithstanding, it is important to note that the 15.35% improvement in the extrinsic aging score can be considered very relevant due to the short period of use.

Table 3: Results of the instrumental measurements of color and pores

Measure	Initial experimental timepoint	Final experimental timepoint	Change (%)	Statistical significance (p < 0,05)
Skin color variation coefficient (%)	6,56	6,27	- 4,42	Sim
Average size of pores (pixels)	32,6	31	- 4,9	Sim

Regarding the image based evaluation; a statistically significant improvement was detected in the skin's color uniformity and presence/intensity of pores, meaning that the test product was capable of promoting a whitening effect by reducing the heterogeneous pigmentation of the aged skin. The product also had the effect of reducing the number of "pores", corresponding to an additional benefit noticed by the patients, especially due to the link existing between the presence of "pores" and dirt on the skin.

CONCLUSION

The continued use for 28 days of a new cosmeceutical product containing active principles with recognized antioxidant action led to positive outcomes in volunteers exposed to the so-called "urban damage" phenomena. As a result, there was a reduction in the signs and symptoms related to extrinsic aging, promotion of the skin's uniformity and reduction of pores, with a contribution to the perception of improvement in the quality of life of individuals exposed to the phenomena of modern urban life.

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Thinning of the lower third of the face using botulinum toxin in the masseter muscle

Afinamento do terço inferior da face com uso de toxina botulínica no músculo masseter

Review article

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ABSTRACT

The width of the lower third of the face is mainly determined by the size and shape of the jawbone, the thickness of the masseter muscle and the volume of adjacent subcutaneous tissue. The ideal, culturally recognized pattern for a male face corresponds to a wider lower third and a mandibular angle tending to 90º, while a female face should have a more oval appearance or the shape of a heart, and the middle third wider than the lower third. In order to achieve these aesthetically ideal proportions, botulinum toxin type A (BoNTA) has been successfully applied in the masseter muscle, which is one of the determinates of the lower face's width. Te present article reviews the current literature on the use of botulinum toxin for this purpose, offering the experience of the authors in this practice, aiming at achieving a more harmonious facial contour.

Keywords: botulinum toxins, type A; masseter muscle; hypertrophy

RESUMO

A largura do terço inferior da face tem como principais determinantes o tamanho e a forma do osso mandibular, a espessura do músculo masseter e o volume de tecido celular subcutâneo adjacente.

Culturalmente o que é considerado ideal para a face masculina é terço inferior mais largo e ângulo mandibular mais reto, enquanto a face feminina deve apresentar aspecto mais oval ou em coração, com a largura do terço médio da face maior do que a do terço inferior.

Para atingir essas medidas esteticamente ideais a toxina botulínica tipo A (BoNTA) tem sido utilizada com sucesso através de sua aplicação no músculo masseter, um dos determinates da largura do terço inferior da face. Dessa forma, este artigo faz uma revisão do que a literatura atual descreve com o uso da toxina botulínica para essa finalidade, complementando com a experiência dos autores nessa prática para a obtenção de um contorno facial mais harmonioso.

Palavras-chave: toxinas botulínicas tipo A; músculo masseter; hipertrofia

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INTRODUCTION

The contour of the face is a determining factor in differentiating beauty for men and women. The male face is square and composed of well-marked angles, and the middle and lower thirds have equal widths. On the other hand, the female face tends to be more delicate, with oval or triangular shape, with the lower third thinner than the superolateral projection of the zygomatic arch.[1]

The so-called *angle of beauty* emerged from the evaluation of the geometry of the facial contour of people considered beautiful.[2] This angle is formed by the intersection of a line drawn parallel to the midline of the face with the crossing point of two other lines (one coinciding with the mandibular body and the other a projection of the ascending branch of the mandible).

In patients with masseter hypertrophy or increased parotid, this angle is acute. In patients with triangular shaped face or when the contour of the inferior third of the face is attenuated, this angle becomes less acute. Still according to the author, the ideal angle would be between 9º and 12º (Figure 1).[3]

The hypertrophy of the masseter muscle is a benign condition of unknown etiology, most frequent in people aged between 20 and 40 years, with no gender preference, and that can be unilateral or bilateral. It is common among Asians and contributes to the conformation of broad faces. It is less common in Caucasians, however can be associated with bruxism and temporomandibular joint pain.

Several surgical procedures have been described aimed at correcting this condition, mainly involving the resection of the mandibular angle and/or masseter muscles, in order to make the inferior third of the face thinner. As with in any surgical procedure, it is necessary to highlight the general risks associated with it – in this case, the specific risk of facial nerve lesion. In addition, patients who usually wish to undergo facial contouring procedures are in their economically active age and do not want to be away from work for long periods, which makes more difficult a choice for the surgical procedure.[4,5]

In this respect, and with the development of conservative therapy, several articles have demonstrated the successful use of BoNTA as an alternative to the surgical treatment of masseteric hypertrophy, in this way avoiding long recovery times and, more recently, its use for the attenuation of the facial contour.

BoNTA has been successfully used for many years for cosmetic purposes, aiming at preventing and smoothening wrinkles and expression lines in the upper face. Its benefits have already been widely described in the lower face with the purpose to achieve a more harmonious facial contour. More recently, these applications have been demonstrated in clinical trials of greater impact, allowing further refinement of the technique.[3-4]

The technique was initially developed with a focus on Asian patients, whose ethnic characteristics include prominence of the mandibular angle, however it has more recently been also applied in Caucasians. In 2001, To et al. reported the first use of BoNTA with purely aesthetic purpose in the contour of the lower face.[2,4,6,7]

After being introduced in the human body, BoNTA is directed to the neuromuscular junction, where it binds to high affinity presynaptic receptors. It is then internalized and subsequently cleaves a membrane protein, which is responsible for the

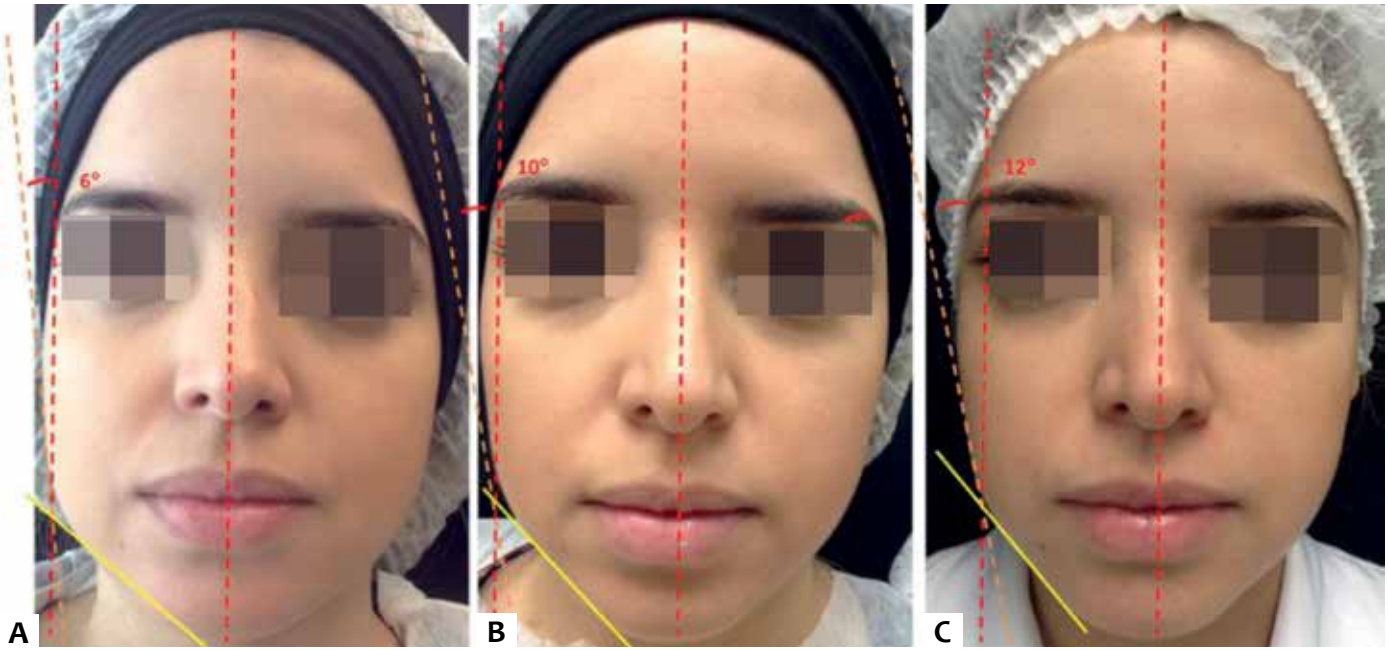

Figure 1: The angle of beauty. A less acute angle after the remodeling of the lower third of the face. (a) Pre-treatment. (b) Three months after the application. (c) Six months after the application.

exocytosis of acetylcholine. This cascade results in the blocking of the release of acetylcholine and consequently inhibition of muscle contraction by chemical denervation.

The muscle treated begins to weaken within 2 to 20 days.

The use of BoNTA in the treatment of facial contour is aimed at reducing the function of the masseter muscle, causing atrophy, since the muscle's hyperactivity

and conditions such as bruxism may be associated with its hypertrophy.[3, 6, 7]

ANATOMY

The masseter is the largest and strongest muscle of mastication. It is comprised of three overlapping layers, which originate from the zygomatic arch and insert in the ascending arch of the mandible, thus allowing the muscle to fulfill its function of lifting and closing the jawbone. The masseter's superficial portion arises from the zygomatic process of the maxilla and the anterior two thirds of the zygomatic arch's border. The middle portion originates from the deep surface of the zygomatic arch's anterior two-thirds and posterior third's inferior edge. The deep portion arises from the deep surface of the zygomatic arch. The three layers merge while the fibers are directed backwards and downwards in order to insert in the lateral surface of the angle, branches and coronoid process of mandible. The thickest palpable region, when the patients are clenching their teeth, is located where these fibers overlap. This muscle is innervated by the masseteric nerve, which arises from the anterior division of the mandibular branch of the trigeminal nerve. Its vascular supply is derived from facial transverse branch of the superficial temporal artery, the masseteric branch of the maxillary artery and facial arteries.[1]

DISCUSSION ABOUT THE TECHNIQUES

The technique for applying BoNTA aiming at remodeling the inferior third of the face is very similar to the application for the treatment of hypertrophy of the masseter muscle and consists in the injection of one to six points distributed along the muscle's body.[2, 4, 5, 8-16]

Most articles suggest an application distributed in three points – two inferior points close to the mandible, and a superior one.[12-17]

The injection points are located below the line drawn from the tragus to the corner of the mouth (a line that delimits the lower facial third) and approximately 1.5cm above the mandibular angle. This prevents the paralysis of the zygomatic and risorius muscles and/or lesions in the parotid gland's duct. For the demarcation of the anterior and posterior borders of the masseter muscle, the patient is asked to clench his or her teeth, allowing thus that muscle be palpated in its entire length. Although there is no consensus in the literature regarding doses – that can range from 10U to 300U of BoNTA per area, with great discrepancy among authors – an average dose of 20U per hemiface are described as being sufficient to soothe the facial contour in the Caucasian population.[9-18]

Patients of Asian origin and with masseter hypertrophy and/or bruxism, may require higher doses. In cases of unilateral or asymmetric hypertrophy, doses should be adjusted.[3, 19]

Despite the fact that the injected points are located in the lower portion of the masseter, the disuse of the muscle caused by the injection of BoNTA leads to muscle atrophy as a whole.

After the application, the effect on the muscles follows a progressive course, with the patients already reporting changes in the contour of the inferior third of the face in 2 to 4 weeks, which becomes more clinically apparent between 8 and 12 weeks.[8, 20]

YU et al. evaluated the masseter's thickness using 3D images obtained by computerized tomography before and after 3 months of the BoNTA application observing a reduction of roughly 30% in the initial volume of the muscle.[4]

In most studies, the peak effect also coincided with the period of greatest patient satisfaction. The positive aspect is that there is a time interval between the recoveries of the function and of the muscle volume. The muscle's action returns after 12 weeks, while its volume being recovered only after 16 weeks. Furthermore, the time required for recovery of the muscle volume increases with patient age. In addition, although the atrophy of the fibers is reversible and temporary, the muscle volume appears not to return to the pre-treatment state, even after the complete recovery of its function after the BoNTA effect has receded, with a more natural outcome arising with the passing of the time.[2, 7, 8, 21, 22]

Moreover, the authors suggest that successive doses at

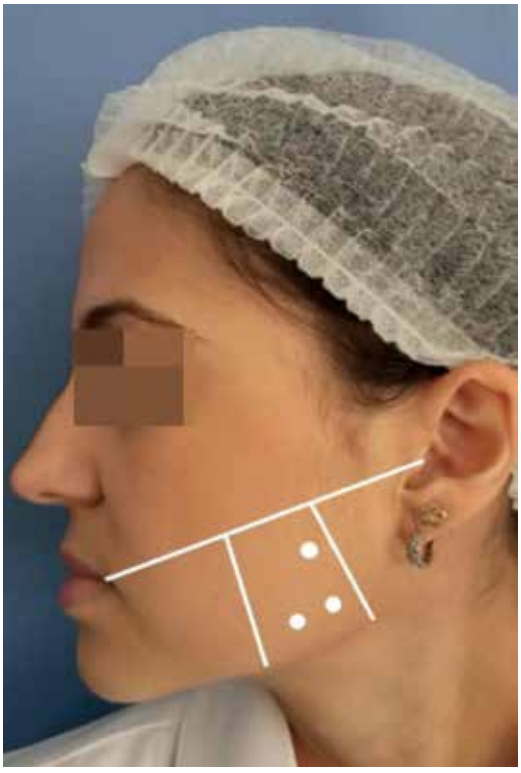

Figure 2: BoNTA application points

regular intervals allow gradual thinning and necessity of lower doses in subsequent applications, since the muscle volume tends to decrease.[18, 23, 24]

Complementary techniques with lipolytic substances, hyaluronic acid and radio frequency can be combined to optimize the facial contour.[12, 25]

Regarding side effects, the most commonly reported is the reduction or asymmetry of the rise of the corner of the mouth while in the smiling position. Other rarer and also transient complaints were: masticatory weakness, changes in facial expressions caused by injection points in high and close to the zygomatic bone locations, dry mouth due to temporary decrease of salivary secretion from the parotid gland, and bulging in parts diverse from the injection site during mastication in patients who underwent application in a single site. All side effects were temporary and did not affect the daily life of patients. The decrease in bite force began one week after the procedure, with complete recovery in 3 weeks. The possible reason for this is the compensation by other muscles participating in the masticatory function. There was no evidence, however, of compensatory hypertrophy.[4, 21]

A change in the smile can occur when the BoNTA application points are very close to the anterior border of the masseter muscle, with the neurotoxin spreading into the risorius muscle, which connects the masseter to the corner of the mouth. Bulgings identified during mastication should be treated with a new BoNTA injection in the surrounding area.[4, 6, 8]

The best results are obtained in patients with well-developed masseters, aligned facial contours, without protrusive bones and small amounts of adipose tissue around the chin or cheekbones. Patients with round faces due to the bone structure, excess of adipose tissue, highly developed parotid gland or little tissue elasticity may experience poor outcomes.[8]

The application should be repeated at intervals of 4 to 6 months, until the desired facial contour is achieved.[4, 26]

THE AUTHORS' EXPERIENCE

The authors' experience with the application of botulinum toxin for the aesthetic treatment of the masseter muscle is performing the injection of, on average, 5 to 10 onabotulinumtoxin A units per point, at three points distributed within the defined limits: two located inferiorly and one located superoposteriorly (Figure 2). The injection is performed perpendicularly to the skin, reaching the deep intramuscular plane.

The reduction of the masseter muscle was gradual during the weeks after the treatment, with a significant reduction over the 6 months after the application. (Figures 3 and 4).

Aligned with the literature, one of the treatment's side effects was the decrease in the amplitude of the smile due to the risorius muscle's proximity to the range of action of the toxin during the application (Figure 5).

CONCLUSION

The application of BoNTA has proven to be a straight-

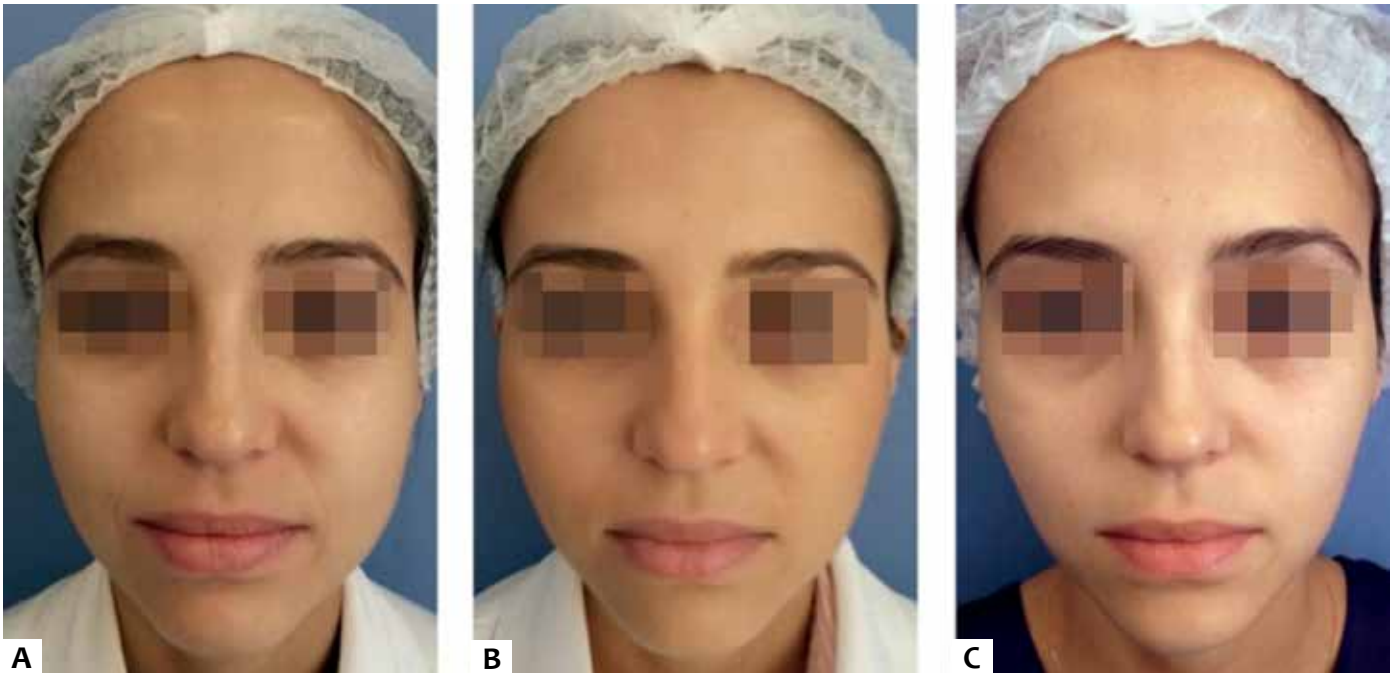

Figure 3: (a) Pre-treatment. (b) Three months after the application.(c) Six months after, with the thinning of the lower third

Figure 4: (a) Pre-treatment. (b) Six months after the application

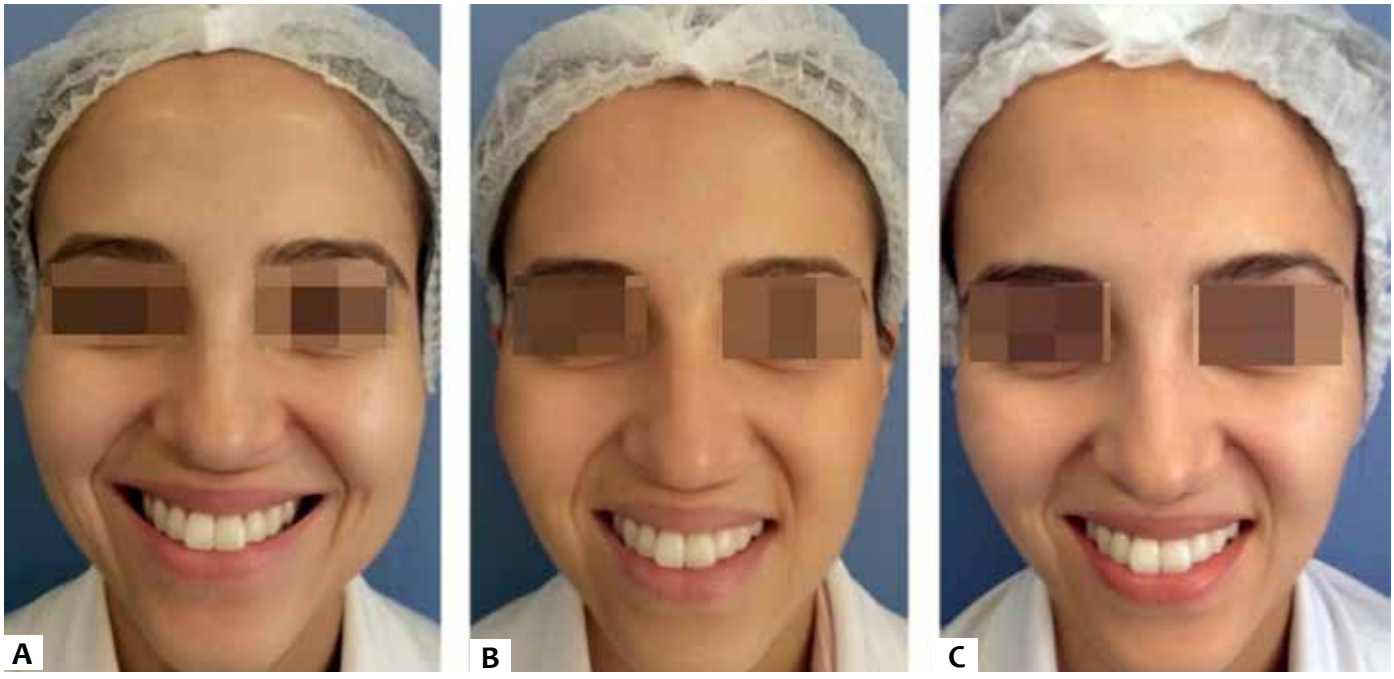

Figure 5: (a) Pre-treatment. (b) Three months after the application, reduced amplitude and asymmetry in the smile. (c) Six months after, with improved smile amplitude and thinning of the lower third of the contour

forward and safe method leading to good clinical outcomes in patients who wish to soothe the contour of the inferior third of the face, without being exposed to the risks of surgery or long recovery periods. The chemical denervation's effects begin to be noticed after 2 weeks, with reduced strength of the masseter. The clinical changes in the contour and thinning of the face become more evident in 3 months as a result of the masseter's atrophy and have an average duration of 9 months. There is absence of reports of serious complications. In conclusion, the treatment becomes an option accessible to patients who want narrow faces, which convey the real features of a feminine face.

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Clinical and dermoscopic correlation of reactive perforating collagenosis

Correlação clínica e dermatoscópica da colagenose perfurante reativa

Diagnostic imaging

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ABSTRACT

The acquired perforating dermatosis is constituted by a group of diseases whose main characteristic is the transepithelial elimination of altered dermal material. It has the clinical appearance of crateriform papules or nodules, with central keratotic plug, which may suggest some kind of transepithelial purging; nevertheless the final diagnosis is histologic. The dermoscopic examination is a useful tool that helps to exclude similar dermatoses, such as nodular prurigo and hypertrophic lichen planus. The present article discusses the clinical and dermoscopic correlation of this dermatosis.

Keywords: dermoscopy; prurigo; diagnosis, differential

RESUMO

A dermatose perfurante adquirida é formada por um grupo de dermatoses que tem por característica a eliminação transepitelial de material dérmico alterado. Clinicamente se apresenta como pápulas ou nódulos crateriformes, com tampão queratótico central, o que pode sugerir algum tipo de eliminação transepitelial; porém o diagnóstico final é histopatológico. A realização da dermatoscopia é ferramenta útil, ajudando a afastar outras dermatoses similares, como o prurigo nodular e o líquen plano hipertrófico. Discute-se neste artigo a correlação clínica e dermatoscópica dessa dermatose.

Palavras-chave: dermoscopia; prurigo; diagnóstico diferencial

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INTRODUCTION

Acquired perforating dermatosis (APD) constitutes a group of dermatoses that are characterized by transepithelial elimination of altered dermal material (collagen, elastic fibers and/or hair follicle).[1-3] It occurs in adulthood and is commonly associated with diabetes mellitus and chronic kidney disease (up to 10% of patients undergoing dialysis). It is also found in association with liver failure, hypothyroidism, hyperparathyroidism, pulmonary fibrosis, HIV/AIDS, scabies and malign neoplasias.[4]

From the clinical point of view, there is emergence of papules or crateriform nodules with a central keratotic plug that may have follicular pattern. The most affected body sites are the extensor surface of the limbs and the trunk. Itching is common, with frequent excoriations and crusting. New lesions can arise through the Koebner phenomenon.[2]

In light of histologic findings, APD can be classified into: reactive perforating collagenosis, serpiginous perforating elastosis, perforating folliculitis and Kyrle's disease. There can be superposition of more than one type in the same patient, the coexistence being more common in dialysis patients. In this way, it is recommended that more than one biopsy be carried out.[1]

There is no established standard treatment; the most frequently mentioned in the literature are: topical/intralesional corticosteroid, retinoid, allopurinol and phototherapy. Where there is an underlying disease, its control can lead to the improvement of APD. Pruritus can be controlled with anti-histamines.

In this paper, the authors describe two cases of APD, correlating clinical and dermoscopic aspects.

CASE REPORTS

Case 1: A 63 year-old male patient experienced the abrupt onset of intensely pruritic lesions on the dorsum, which quickly progressed to the cervical region and proximal members in two weeks. The dermatological examination revealed: multiple umbilicated papules and nodules, of brownish color and varying sizes, some of follicular pattern, with central keratotic plug (Figure 1). Comorbidities: hypertension, diabetes mellitus, ischemic heart disease, peripheral vascular disease and chronic renal insufficiency/dialysis. The dermoscopic examination with polarized light allowed observing a peripheral brown-grayish amorphous area with a white keratotic center, with depressed appearance and presence of a yellowish area (Figures 2 and 3). The histology of the specimen (obtained through a fusiform excision on the dorsum) showed continuity in the papillary dermis, covered by a thick necrotic crust containing cellular debris, neutrophils, verticalized collagen fibers with transepithelial elimination, characterizing a reactive perforating collagenosis (RPC) (Figure 4). The patient was treated with 0.05% betamethasone dipropionate and topical 3% salicylic acid, in addition to 15mg/

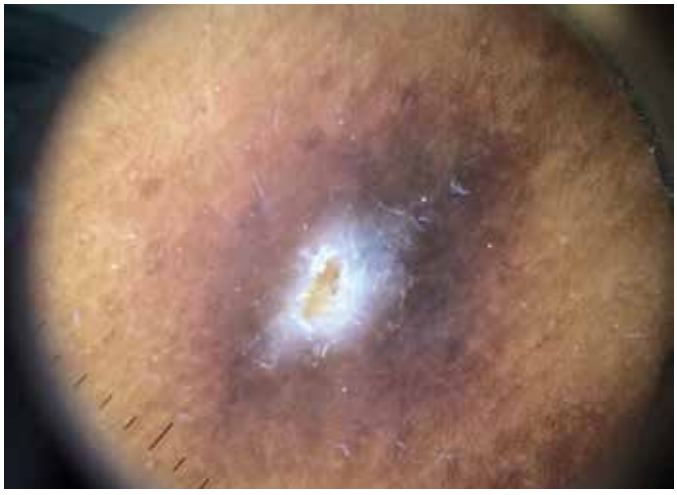

Figure 2: Dermoscopy of the old lesion: brown-grayish amorphous area on the periphery with white keratotic center of depressed appearance and presence of a yellowish area

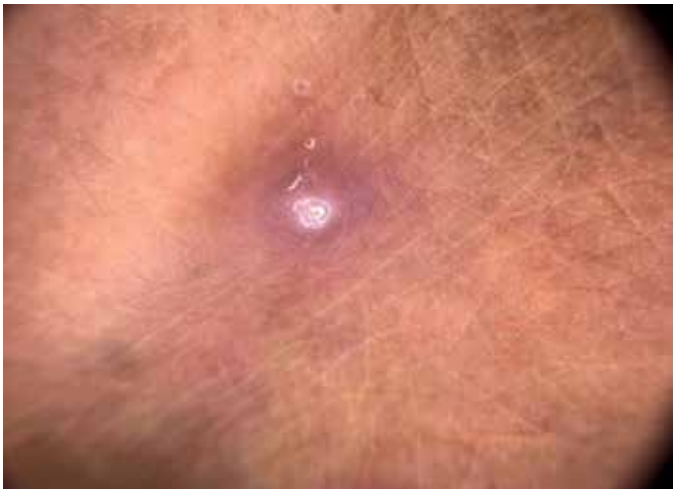

Figure 1: Multiple papules and crateriform nodules with central keratotic plug in the dorsum

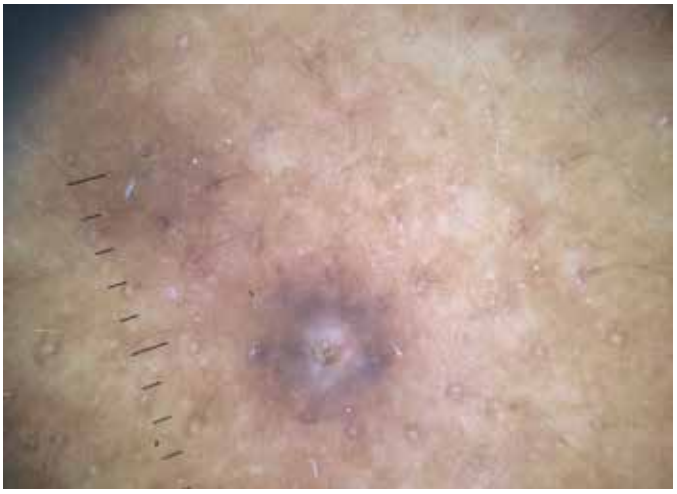

Figure 3: Dermoscopy of the initial lesion: amorphous brown-grayish area on the periphery, discreet keratotic white center and yellowish area

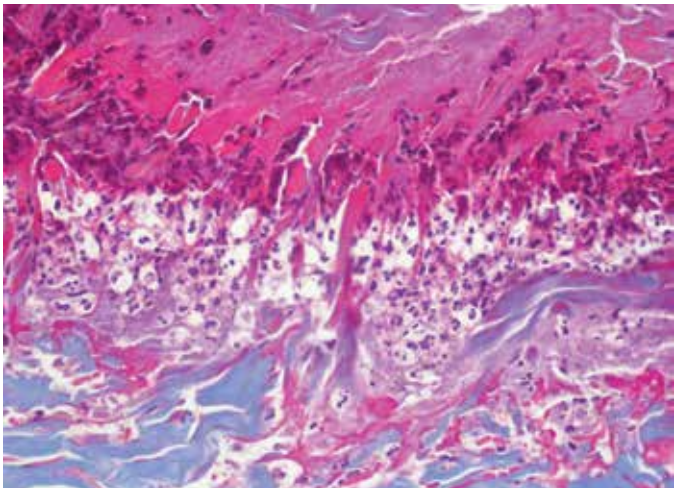

Figure 4: Segment with continuity solution of the dermis covered by fibrin-leukocyte crust with cellular debris and elimination of fibers (verticalized) (Masson's trichrome staining, 200x)

day mirtazapine for controlling the pruritus. It showed improvement in 30 days.

Case 2: A 46 year-old male patient reported the appearance of pruritic lesions in the upper limbs six months before. The dermatological examination revealed multiple brownish papules with central keratotic plug (Figure 5). Background: hypertension, diabetes, chronic renal failure requiring dialysis. Dermoscopy with polarized light revealed a peripheral erythematous-grayish amorphous area, with white keratotic center, depressed appearance and a small yellow-brownish area. The histology showed similar findings to those of the previous case. The patient was treated with betamethasone valerate twice a day, with improvement of the picture and the absence of new lesions.

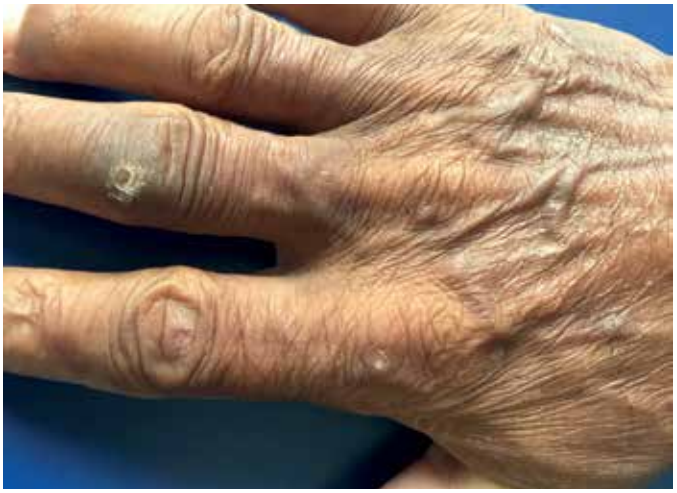

Figure 5: Multiple papules with central keratotic plug on the dorsum of the hand

DISCUSSION

Reactive perforating collagenosis is characterized by the transepidermal elimination of collagen. It can be primary (a possible autosomal recessive inheritance) or secondary (acquired), associated with systemic diseases.[3] The clinical and epidemiological findings in the present report were consistent with the literature (adult diabetic and renal patient, requiring dialysis, with multiple keratotic, umbilicated, pruritic papules prevalent in the trunk).

The pathogenesis is not known and alterations in fibroelastic bundles can be partly explained by the diabetes. In addition, trauma would be another contributing factor, as the Koebner phenomenon is observed in sites with injuries, insect bites, herpes zoster and acne scars.[3]

The final diagnosis was confirmed by the histology, with the observation of a cupuliform depression filled with degenerated basophilic material, and the presence of foci of ulceration and vertically oriented collagen fibers crossing the dermal-epidermal junction that are better visualized using the Masson's trichrome staining (it stains the collagen in blue). In addition to the biopsy, performing dermoscopy is a useful tool, helping to exclude similar dermatoses, such as nodular prurigo and hypertrophic lichen planus. According to Errichete et al., the white starburst pattern (white lines arranged radially) on erythematous-brownish background is seen in nodular prurigo, while there is presence of whitish crossed lines (Wickham striae) in hypertrophic lichen planus.[5] In the authors' dermoscopic analysis, it was possible to observe a central white area, yellow plugs of keratin with variable size (possibly corresponding to the area of fibrosis and extrusion of dermal material), a keratotic collarette with a brown-grayish amorphous or erythematous area surrounding it, possibly due to inflammatory reaction. The absence of other described patterns helped the authors to exclude those dermatoses.

With the two cases described in the present paper, the authors highlight the peculiar clinical presentation of perforating dermatosis and the importance of dermoscopy as an auxiliary method in the diagnosis.

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New Techniques

Easy to perform technique for the reconstruction of the lower lip

Técnica de fácil execução para reconstruçao do lábio inferior

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ABSTRACT

The lips are a preferred site for carcinomas. Roughly 95% of tumors in the lips involve the lower lip, with 90% being squamous cell carcinomas. Surgery is the treatment of choice and has a good prognosis when diagnosis is performed early. Defects involving less than half of the lower lip can be closed using the edge-to-edge technique, whereas larger defects require greater technical complexity of methods and have increased risk of complications. The present article describes a straightforward technique for reconstructing these defects, using edge-to-edge suture, without necessity of V or W shaped excisions, and with good aesthetic and functional outcomes.

Keywords: carcinoma, squamous cell; lip neoplasms; reconstructive surgical procedures

RESUMO

Os lábios são frequentemente sede de carcinomas. Cerca de 95% dos tumores dos lábios envolvem o lábio inferior, sendo 90% carcinomas espinocelulares. A cirurgia é o tratamento de escolha, tendo bom prognóstico quando é feito diagnóstico precoce. Defeitos envolvendo menos da metade do lábio inferior podem ser fechados borda a borda; defeitos maiores exigem métodos de maior complexidade técnica e com maior risco de complicações. Descrevemos uma técnica para reconstrução desses defeitos, de execução simples, com sutura borda a borda, sem necessidade de excisão em V ou em W, e com bom resultado estético e funcional.

Palavras-chave: *carcinoma de células escamosas; neoplasias labiais; procedimentos cirúrgicos reconstrutivos*

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Nonmelanoma skin cancer is the most common tumor in Caucasians. Its preferred locations are the head and neck.[1] Lips are often affected, with 95% of tumors in this region being located in the lower lip. In most cases, these are squamous cell carcinomas (SCCs).[2]

The lower lip SCC corresponds to a percentage ranging from 25% to 30% of all oral cancers. It affects more men over 50 years of age, who have had significant exposure to the sun throughout their lives. Risk factors such as smoking habits, drinking alcohol and immunosuppression following kidney transplantation can be associated with this neoplasm.[3]

Despite the good prognosis when diagnosed at an early stage, the occurrence of lymph node metastases can reach 20% of cases.[3]

The treatment of choice for these tumors of the lower lip is surgery with a safety margin. Mohs surgery has been used with increasing frequency and good results, however it is not widely available in the Brazilian medical care services, being expensive and of complex implementation, therefore inaccessible to most patients. The excisional surgery in such cases should be carried out with a 7mm to 10 mm safety margin, which leads to recurrence rates and clinical outcomes similar to those of the Mohs

surgery,[3] in addition to having a shorter execution time, being cost effective and technically simpler.

Lesions involving up to half of the lower lip can be primarily sutured.[4] Smaller lesions can be excised in a "V" shape, while larger lesions are excised using the "W", in order to avoid trespassing the mental sulcus.[4]

Defects larger than half of the lower lip generally cannot be primarily closed without increasing the tension at the edges of the wound and causing the occurrence of microstomy. As a result, it is necessary to carry out flaps with tissue originally from the upper lip and perioral regions.[5]

The likelihood of having to implement this type of flap often inhibits dermatologic surgeons, who choose not to perform surgeries on the lower lip due to the great technical difficulty, the long surgical time and the high risk of complications. The technique described in the present paper is fast and easy to perform, with good outcomes and low risk of complications.

It consists in the resection of the tumor with a 5mm to 8 mm safety margin and total tissue thickness (including the oral mucosa), so as to obtain a rectangular defect. The suture is initially carried out in the lateral edges, bringing THE POINTS B´AND D / A´AND C TOGETHER, AS WELL AS THE BORDERS of the vermilion, FINISHING with the suture of the vermilion (Figure 1).

Figure 2 depicts the initial marking of rectangular shape and the final aspect of the surgery. Figure 3 shows the late postoperative period in the same patient, with good aesthetic result. The surgery, like any edge-to-edge reconstruction of the lower lip, causes a discreet initial microstomy, which improves after a few months of development.

DISCUSSION

The lower lip SCC is a common tumor in the dermatological sphere. The treatment of choice is surgical, with good prognosis when performed early. Nevertheless, there is a significant risk of cervical metastases, and the search for affected lymph nodes is included in the initial clinical evaluation of these patients.

The choice of the technique to be used in the reconstruction of the lower lip should consider the functional and aesthetic aspects of the lips, in addition to the size of the defect. Defects smaller than half of the lower lip can be corrected with edge-to-edge suture. It is important to note that this type of reconstruction always leads to some degree of microstomy. Although there are a number of techniques for the reconstruction of defects greater than half of the lower lip, most of them involve complex surgeries, often difficult to implement for the dermatologic surgeon. The authors have described a simple technique that can be performed by dermatologic surgeons under local anesthesia and leads to good aesthetic and functional results.

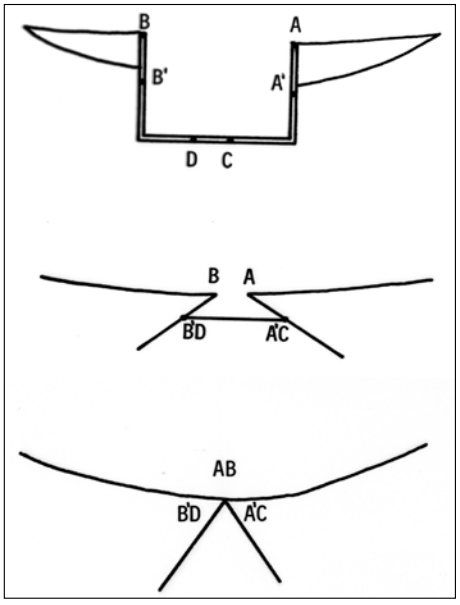

Figure 1: Surgery steps – exeresis in rectangular shape; Suture starting in the lateral margins of the defect; Final appearance

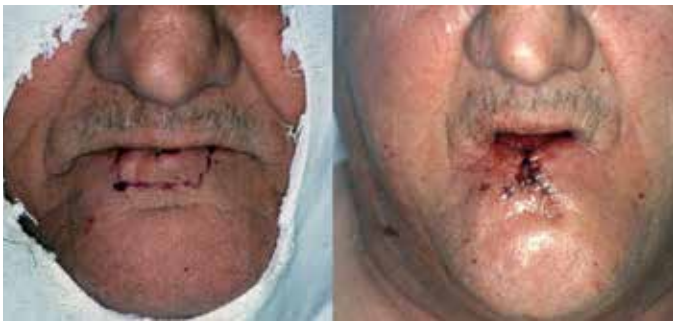

Figure 2: Marking of the area to be excised – rectangular shape; Final appearance after suture

Figure 3: Late postoperative with good outcome

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New Techniques

Approaching a cutaneous tumor in the external auditory canal

Abordagem de tumor cutâneo no conduto auditivo externo

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ABSTRACT

Lesions in difficult locations within the auricular pavilion have been a major challenge for dermatologic surgeons, since access to their surgical approach tends to be complicated. In this article, the authors describe a case of basal cell carcinoma affecting the lower part of the left auricular concha that was resected by Mohs micrographic surgery, whose approach proved to be challenging. The authors describe a tactic to gain better access and visibility of the surgical field and facilitate the implementation of the procedure.

Keywords: ear auricle; Mohs surgery; carcinoma, basal cell

RESUMO

Lesões de difícil localização no pavilhão auricular têm-se mostrado um grande desafio para os cirurgiões dermatológicos, pois o acesso para sua abordagem cirúrgica tende a ser complicado. Neste artigo relata-se um caso de carcinoma basocelular acometendo a parte inferior da concha auricular esquerda, submetido à ressecção por cirurgia micrográfica de Mohs cuja abordagem mostrou-se desafiadora. Descrevemos uma tática para obter melhor acesso e visibilidade do campo cirúrgico e facilitar a execução do procedimento.

Palavras-chave: *pavilhão auricular; cirurgia de Mohs; carcinoma basocelular*

INTRODUCTION

The ear has one of the most complex shapes among those of the structures of the head, owing to the fact that it has convexities and concavities, which hamper the surgical approach and reconstruction. As a result, knowledge of the auricular pavilion's anatomy is crucial for surgeons.

The ear is not only a cutaneous cartilaginous appendix attached to the lateral portion of the cephalic segment, but also a geometrically complex structure, comprising the auricular pavilion, external auditory meatus and the exterior tympanic membrane.[1,2] It is located anteriorly to the mastoid process and posteriorly to the temporomandibular joint, and has a three-di-

mensional, slender fibro-cartilaginous structure, covered with a thin layer of skin, with concavities and convexities. Except for the lobe, all particularities of the relief are direct reflections of the cartilaginous framework.[3] This cartilage forms an almost complete circle around the auditory meatus. The middle part of the concha's cartilage draws nearer the mastoid bone and acts as the backbone of the ear.[1]

The auricular concha is a concave depression that connects to the external auditory meatus, posteriorly, superiorly and inferiorly circling it. It is divided into: cymba (the uppermost and smaller portion) and cavum (the larger inferior portion). These two structures are separated by the crus helix, and have their lower portion delimited by the tragus, intertragic notch and antitragus (Figure 1).[2,3]

Various skin tumors – both melanoma and non-melanoma – can be found in the ear. Non-melanoma skin cancers are the most common tumors in the world. The head is the most common body site for these types of tumors, which predominantly arise in the ear, nose, periocular region, chin and jaw. Tumors in these areas have greater risk of recurrence and metastasis.[4]

While nonmelanoma skin cancers in the ear correspond to only 6% of all cutaneous neoplasias,[5] they are known for having high recurrence rates, even when treated with Mohs micrographic surgery (MMC). Squamous cell carcinomas that are located in the ear have higher rates of metastasis and recurrence. Due to their complex anatomy and problematic visualization, tumor lesions in the ear are difficult to detect by the patient him or herself and may not be noticed,[5] with late diagnosis.

The greatest risk factor for the development of basal cell carcinomas (BCC) and squamous cell carcinomas (SCC) is exposure to ultraviolet radiation; nonetheless there are differences in the pattern of exposure to the sun regarding these two subtypes of cancer. The development of SCC is associated with cumulative exposure to the sun over a lifetime, the skin type and sensitivity to the sun, whereas the development of BCC varies depending on its histological subtype.[4]

Although SCCs located in the auricular pavilion and in the lip are more aggressive than those located in other parts of the head and neck, recent studies have shown that some BCC subtypes are even more invasive when located in the ear.[6] It is known that, when located on the ear, more aggressive subtypes of BCC are more likely to have more Mohs surgery stages when compared to other locations.[7] One hypothesis for this would be the difficulty of defining clinical margins on the ear's surface due to its curvatures and minimal access to the tissue. The ear's anatomy hampers surgical approach in many of its areas. This paper shows a surgical maneuver aimed at obtaining more visibility and better surgical access to the concha region and external meatus, simplifying the procedure.

METHODS

A tumor lesion with prior histological diagnosis of sclerodermiform BCC, located in the anterior part of the concha, close to the external acoustic meatus, in the left auricular pavilion was treated.

The case of an 80 year-old patient with history of multiple BCCs in the face is described. The patient presented a new tumor, with six months of development. The lesion was clinically characterized by an infiltrated plate with pearly borders and ulcerated center, affecting the left auricular pavilion's concha and part of the external auditory meatus, measuring approximately 2cm in diameter. Physical examination of the tumor portion that affected the external auditory meatus was hampered due to the fact that this portion was covered by the ear tragus.

SURGICAL PROCEDURE STEPS

1. Marking of the lesion with the assistance of dermoscopy (Figure 2).
2. Blocking of the auricular pavilion and tumescent anesthesia in the region.
3. Performance of two parallel incisions (the first between the supratragic incisure and the upper apex of the tragus, and the second between the lower apex of the tragus and the intertragic incisure), both with approximately 1cm in length, in the skin and cartilage (Figure 3).
4. Preparation of two stitches with 4.0 nylon (one from the upper apex of the tragus up until the superior pre-auricular region and the other from the lower apex of the tragus up until the inferior pre-auricular region) called restoration stitches and aimed at moving the tragus medially to improve access and visualization of the acoustic meatus (Figure 4).
5. Measurement of lesion's size (10mm x 13mm) and removal of tumor without margins (debulking).
6. Excision of the peritumoral tissue with lateral margins of 2 mm and depth up until the perichondrium, followed by hemostasis.
7. The specimen was prepared for analysis of all of its margins using intraoperative freezing, according to the MMS technique.
8. Microscopic analysis showed free margins in the first phase of the MMS.
9. Final measurement of the defect (17mm x 12mm).
10. Removal of the restoration stitches.
11. Edge-to-edge closing of the supratragic and infratragic incisions with 5.0 monocryl, close to the auditory meatus and stitches with 5.0 nylon in the distal region of the auditory meatus (Figure 4).
12. Second intention healing of the tumor's surgical wound (Figure 5).
13. Dressing with petroleum jelly.

DISCUSSION

Lesions located in the auricular pavilion, especially those located in the inferoanterior region of the concha and external auditory meatus, are a challenging for dermatologic surgeons. The greatest challenge is to approach these lesions, since visualizing and accessing them is hampered by the tragus, which is located anteriorly to them. The technique demonstrated in the present paper is straightforward and can be very useful for sur-

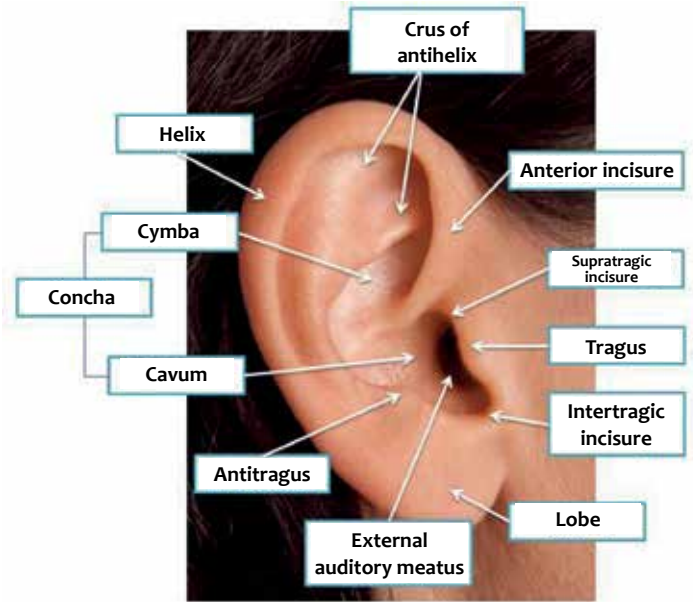

Figure 1: Auricular pavilion's anatomy. Description of the anatomy of the auricular pavilion

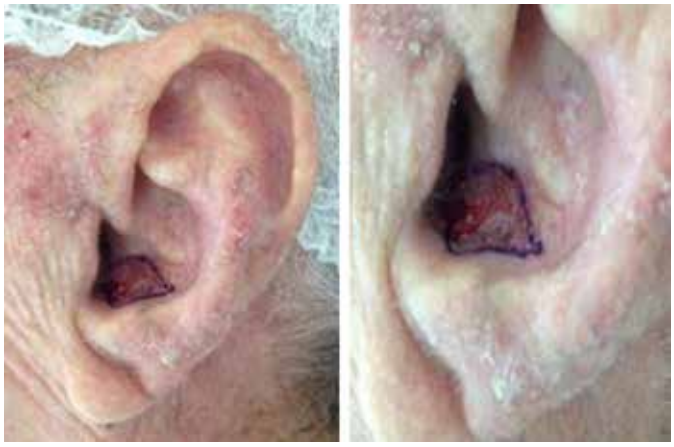

Figure 2: Clinics of the lesion. Tumor lesion with roughly 2cm in diameter characterized by an infiltrated plate with pearly borders and ulcerated center, affecting the left auricular pavilion's concha and part of the external auditory meatus

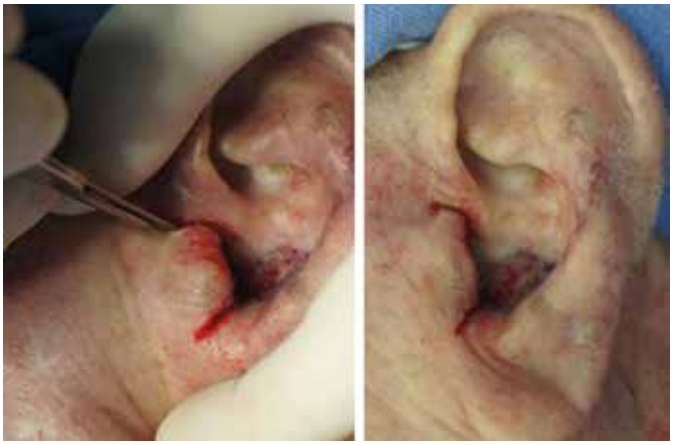

Figure 3: Surgical approach. Two parallel incisions (the first between the supratragic incisure and the upper apex of the tragus, and the second between the lower apex of the tragus and the intertragic incisure), both with approximately 1cm in length, in the skin and cartilage

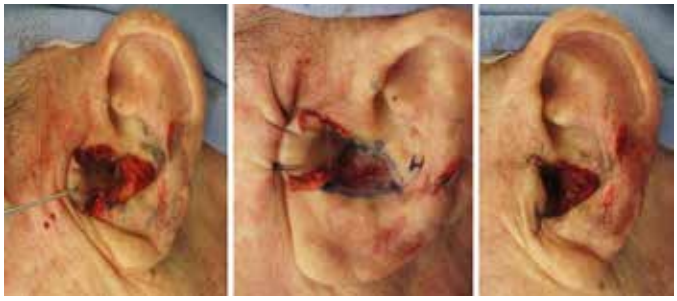

Figure 4: Restoration stitches. Preparation of two stitches: (one at from superior apex of the tragus up until the superior pre-auricular region and other from the inferior apex of the tragus up until the inferior pre-auricular region)

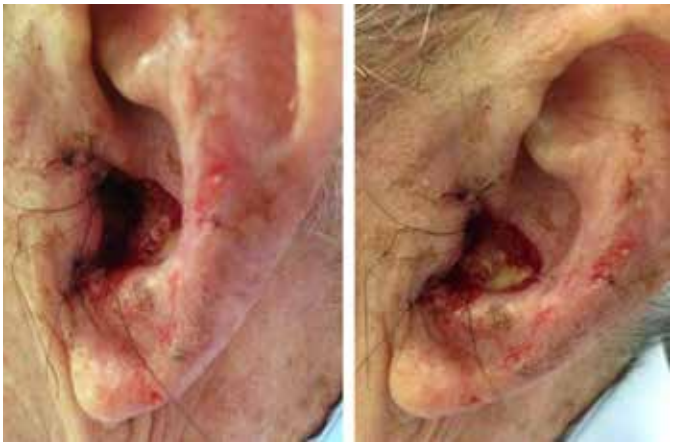

Figure 5: Postoperative. Healing of the tumor's surgical wound by secondary intention

geries in these areas, for it allows better visualization and surgeon access to these anatomical regions.

CONCLUSION

Due to the complex anatomical structure of the region, approaching lesions located in difficult areas of the auricular pavilion is challenging for dermatologic surgeons. He authors of the present paper have demonstrated a new technique aimed at improving visibility of and access to the auricular concha and meatus, facilitating the surgical approach of lesions in those locations, which can be very useful for dermatologic surgery practice.

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New Techniques

Conservative surgery of subungual melanoma in situ

Cirurgia Conservadora em caso de melanoma subungueal in situ

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ABSTRACT

The subungual melanoma is considered a rare subtype of melanoma. It emerges in the ungual matrix, however can involve all components of the nail apparatus. This tumor is often underdiagnosed, which leads to a delay in proper treatment, resulting in a poorer prognosis. The final diagnosis should be confirmed by histology. Conservative surgery in the treatment of subungual melanoma (when in the early stages) is presently recognized by the international literature and offers an effective and curative treatment to the patient, preserving the functional ability. This article describes a case of subungual melanoma successfully treated with conservative surgery, with the preservation of the hallux.

Keywords: melanoma; nail diseases; ambulatory surgical procedures

RESUMO

O melanoma subungueal é considerado um subtipo raro de melanoma. Surge na matriz, mas pode envolver todos os componentes do aparelho ungueal. Este tumor é frequentemente subdiagnosticado, o que leva um atraso no tratamento adequado e consequentemente confere um pior prognóstico. O diagnóstico final deve ser confirmado com exame histopatológico. A cirurgia conservadora no tratamento do melanoma subungueal é atualmente reconhecida pela literatura internacional (quando em estágios iniciais), e oferece ao paciente um tratamento eficaz, curativo, preservando a habilidade funcional. Neste artigo relatamos um caso de melanoma subungueal tratado com êxito com a cirurgia conservadora, com preservação do dígito.

Palavras-chave: *melanoma; doenças da unha; procedimentos cirúrgicos ambulatórios*

INTRODUCTION

Cutaneous melanoma is the most dangerous skin tumor, causing 90% of deaths from skin cancers.[1] Subungual melanoma (SUM) is a rare subtype of melanoma, constituting 0.7% to 3.5% of all cases.[1, 2] It arises from the nail matrix, however it can involve other components of the nail unit.[3] This condition is often misdiagnosed, which leads to delayed proper treatment and uncertain diagnosis, especially due to the short distance of the ungual matrix to the bone. Some epidemiological data do not confirm the existence of any reasonable predisposing factor, such as genetic characteristics, family history or exposure to UV light. According to the author, there are variations. History of trauma has been described, ranging from 25% to 55%.[2] Up until 2002, the gold standard treatment was excisional biopsy followed by the amputation of the finger's distal phalanx aiming at pro-

viding a margin of at least 10mm. More recent population data suggest that the *in situ* melanoma (with Breslow thickness < 0.5 mm) can be adequately treated with wide local excision of the entire nail unit ("*en bloc*")[1, 2, 4], yet there is absence of high-level evidence.[4]

By the year 2014, the National Cancer Institute (USA) did not have guidelines for the treatment of SUM.[4] The present article aims at describing a case of SUM successfully treated with conservative surgery (resection of the nail unit, with preservation of the digit).

CASE REPORT

A 67 year-old woman sought care at the Fingernail Studies Center of the Instituto de Dermatologia Professor Rubem David Azulay, of the Santa Casa da Misericordia do Rio de Janeiro (Rio de Janeiro, RJ, Brazil), presenting a longitudinal pigmented spot on the right hallux's nail that had emerged 10 years before. There was a dark, 2mm wide streak in addition to two other (narrower and lighter in color) close the nail's lateral fold (Figure 1). There was presence of Hutchinson's sign, affecting the hyponychium and the proximal nail fold. There was no family history of melanoma or other skin cancer. The patient denied previous trauma and fungal infections. The dermoscopic examination evidenced subungual Hutchinson's sign.

A lateral longitudinal biopsy was performed, containing all elements of the nail unit: hyponychium, nail bed, nail plate, matrix, proximal and lateral folds, up until there was exposure of the bone.

The histology revealed lentiginous epidermal hyperplasia and atypical vacuolated melanocytes spreading in a pagetoid pattern. There was no involvement of the papillary dermis. These findings were compatible with *in situ* lentiginous melanoma (Figure 2). After proper marking around the nail unit with a margin of 10 mm, a decision was made for the complete excision of the nail apparatus, with subsequent dissection up until the bone structure, in an attempt to preserve the patient's functional capacity. Fifteen days after the surgery, the excised site was repaired with a full thickness graft with good results. The patient was followed for 165 days, with photographic records (Figure 3). By the time the present paper was sent for publication, there were no clinical signs of recurrence.

DISCUSSION

Some differential diagnoses (benign and malignant) of SUM, should be considered by dermatologists, including: trauma, subungual keratoacanthoma, junctional nevus, warts, radiodermatitis, squamous cell carcinoma, basal cell carcinoma, bone metastases, Bowen's disease and others.[5]

Levit et al. proposed a mnemonic method that facilitates diagnosis (*The ABC rule for clinical detection of subungual melanoma*).

Dermoscopy can be useful assisting in the differential diagnosis and facilitating the diagnosis *per se* however, unlike for other cutaneous sites, there are few conventional dermoscopic criteria for pigmented lesions in the nail.

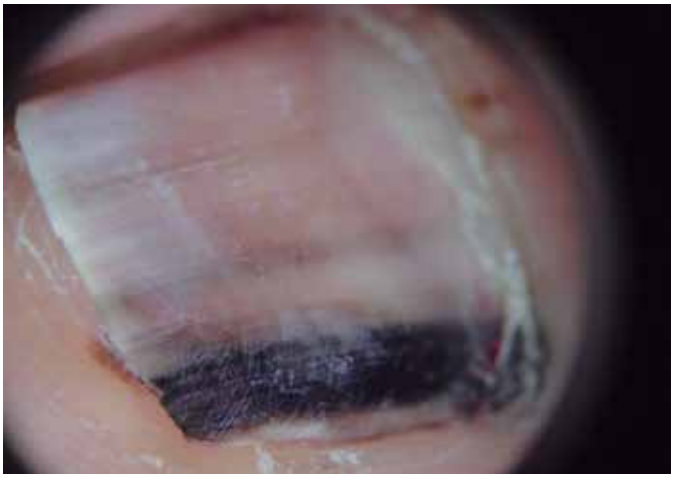

Figure 1: Two millimeters wide dark streak and two other lighter in color and narrower streaks, near the lateral nail fold

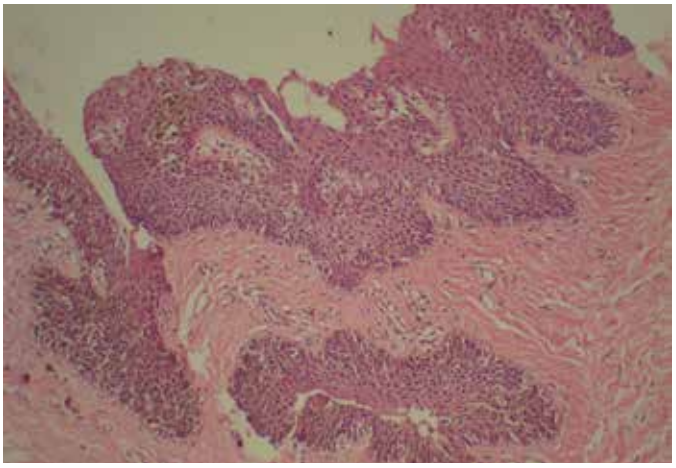

Figure 2: Lentiginous epidermal hyperplasia and atypical vacuolated melanocytes with pagetoid spread. There was no invasion of the papillary dermis

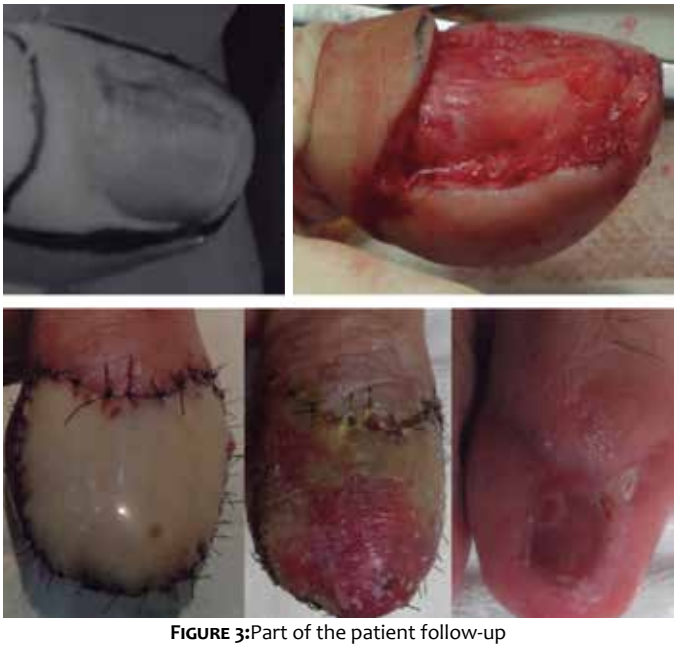

Figure 3: Part of the patient follow-up

The accumulation of melanin in the nail plate hampers the direct observation of the underlying nail matrix and bed. Dermatoscopes with polarized lights should not be used to examine nails due to the optical properties of the nail plate (convex shape). The use of a specific immersion gel to fill the cavities is required. Hirata et al. propose the dermoscopic examination of the nail bed and matrix, without the nail plate (assisted by a dermatoscope with polarized light) that allows the direct visualization of the pigment, revealing characteristics that can not be observed when the nail plate is interposed. As a result, this facilitates the selection of the adequate location for excisional biopsy. Nevertheless, this procedure does not substitute the dermoscopic examination of the nail plate[6] and is not usually used in all dermatology services. A subtle nonetheless important dermoscopic characteristic is the triangular longitudinal streak, since the proximal end is wider than the distal end. This fact implies that the lesion is growing, which strongly suggests the presence of SUM. Other findings that lead to the suspicion of SUM are:

- pigmented streaks with more than 6mm in width[7]
- presence of Hutchinson's sign[7]
- dystrophy and ulceration of the nail plate (it is always important to bear in mind that the melanoma can be an amelanocytic lesion, thus all lesions of the nail unit must undergo histologic study)[7]
- brown color background and presence of irregular longitudinal lines with interruptions in its parallelism[8]
- blood spots observed mainly in nail bleeding (they do not rule out the presence of melanoma)[8]
- micro-Hutchinson sign (pigmentation with color ranging from brown to black, in the cuticle and proximal nail fold)[8,9]
- irregular brown to black pigmentation and irregular thickness[10]

The final diagnosis should be confirmed by an appropriate histological examination. Excisional biopsies are considered the "gold standard" and are aimed at avoiding sampling errors. 2 In 2001, Clarkson et al. first described the treatment of subungual melanoma using the wide excision of the nail unit and repair with skin grafts. 6 Since then, some cases were published demonstrating the absence of recurrence after a minimum follow-up period of 2 years.[1,4,10]

The results of a histological analysis study of subungual melanomas justify that the conservative surgical treatment of early-stage lesion is possible due to the fact that the nail matrix seems to be more resistant to invasion than other structures, with late tendency of dermal invasion. Conservative resections are justified when the margins obtained are histologically free.

In conclusion, the surgical treatment of early stage subungual melanomas with wide excision of the nail unit, without amputation of the toe and followed by grafting is currently recognized by the international literature and offers safety, efficacy and resolution to the patient, preserving his or her functional capacity.

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Tumoral melanosis - a case report

Melanose tumoral - relato de caso

Case Reports

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ABSTRACT

Tumoral melanosis is a histological term used to refer to a nodular accumulation of melanophages in the dermis, which clinically arises as a pigmented lesion. It is usually associated with the regression of melanomas or of other melanocytic lesions. The authors present the case of a 45-year old man/woman with a pigmented macule on his/her left leg. The lesion was completely excised and diagnosed as a tumoral melanosis.

Keywords: melanoma; skin neoplasms; dermatoscopy

RESUMO

Melanose tumoral é um termo histológico utilizado para indicar um acúmulo nodular de melanófagos na derme, que se apresenta clinicamente como uma lesão pigmentada. É geralmente associada com regressão de melanoma ou de outras lesões melanocíticas. Os autores apresentam o caso de uma paciente feminina de 45 anos, com uma mácula pigmentada na perna esquerda. A lesão foi completamente excisada e diagnosticada como melanose tumoral.

Palavras-chave: *melanoma; skin neoplasms; dermatoscopy*

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CASE REPORT

A 45 year-old female patient, with Fitzpatrick's phototype II, sought medical help describing the appearance of a dark spot on the posterior part of the left leg, with spontaneous bleeding, one year before. A blackened lesion with irregular borders and 9mm in its largest diameter was evidenced by the dermatological examination (Figure 1). The dermoscopic examination revealed an asymmetric pigmented lesion, with light brown, dark brown, black and dark blue hues in a homogeneous area, as well as a white-grayish veil (Figure 2). There was absence of vascularization. The patient did not have personal history of skin cancer and family history was negative for melanoma and dysplastic nevus syndrome. Due to the size of the lesion and uneven pigmentation, excisional biopsy was indicated (Figures 3 and 4). Histologic examination revealed a rectified fragment of the epidermis, with nodular infiltrate containing numerous melanophages in the dermis.

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There were melanocytes in the epidermis or dermis – even in semi-serial sections – leading to the diagnosis of tumor melanosis. The examination of the entire cutaneous surface, mucous membranes and accessible lymph nodes was carried out, with absence of any evidence of melanoma. The patient was referred for evaluation of the retina and oncologic staging.

DISCUSSION

Nodular or tumor melanosis – also known as melanophagocytosis or melanophagic dermatitis – is a term used to denote the histological accumulation of melanophages in the dermis, clinically arising as a pigmented lesion with suspicion of melanoma.[1,2]

It is considered a rare condition and there is absence of reports in the literature of cases in children or adolescents.[3] Its importance is linked to the association with melanoma regression or satellite metastases.[1,2]

Smith and Stehlin described the regression phenomenon in the literature in 1965. It consists in the reduction of a tumor's volume due to the host's immune response, a frequent finding in melanomas.[4,5] Partial regression was observed in about 10% to 35% of primary melanomas, however the full phenomenon is considerably rare.[6,7]

Tumor melanosis is considered a rare variant of the totally regressed melanoma.[8,9] Its histology seems to correspond to that of residues of pre-existing malignant melanomas (MM).[10] Nevertheless, there are reports of cases of non-melanoma melanocytic lesions.[2]

In this manner, the nature of the underlying lesion cannot be determined until some melanoma residue is identified. Epithelial neoplasms, such as pigmented basal cell carcinoma and dysplastic nevi, Clark's nevus, Bowen's disease, fungoid mycosis and solar lentigo, are diagnoses that can be found following careful analysis.[8,9]

Histological findings suggestive of tumor melanosis after MM regression consist of hyperplasia of the epidermis, presence of melanophages in the dermis, focal fibroplasia, fibroplasmo-

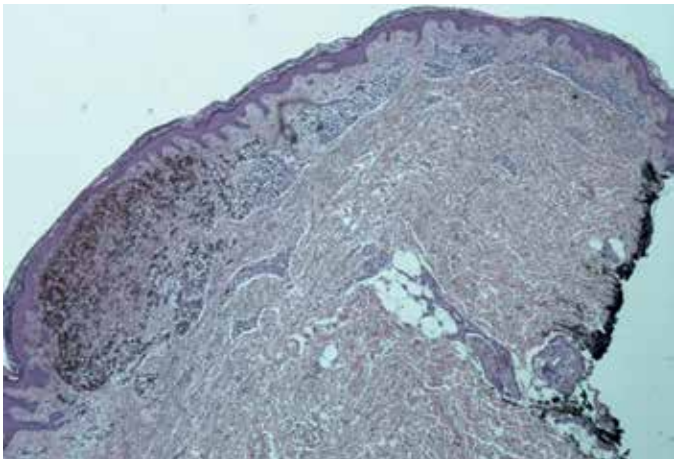

Figure 2: Asymmetric lesion. Epidermis with segmental atrophy. Presence of nodular infiltrate with numerous dermal melanophages below that area. Additional presence of mild superficial perivascular lymph histiocytic infiltrate with few melanophages on one side of the nodular infiltrate

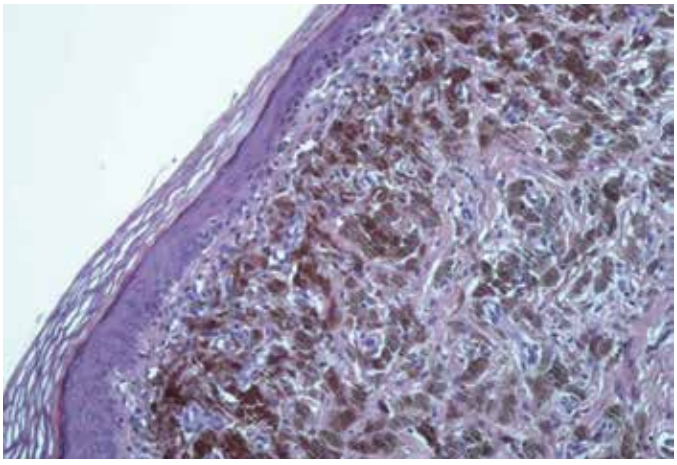

Figure 3: Detail of the dermal nodular infiltrate's atrophic epidermis with melanophages

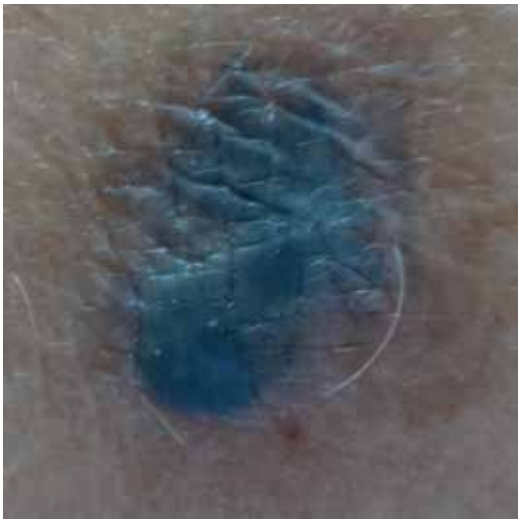

Figure 1: Asymmetric pigmented lesion with light brown, dark brown and black hues, a dark blue homogeneous area and the presence of a white-grayish veil. Absence of vascularization

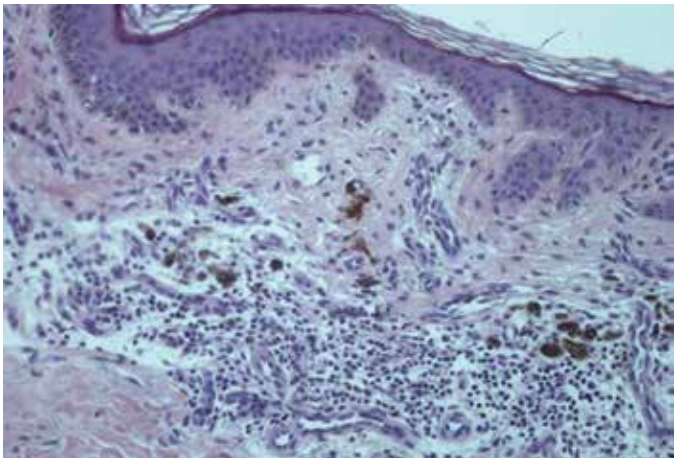

Figure 4: Detail of the perivascular infiltrate with few melanophages on one side of the nodular infiltrate

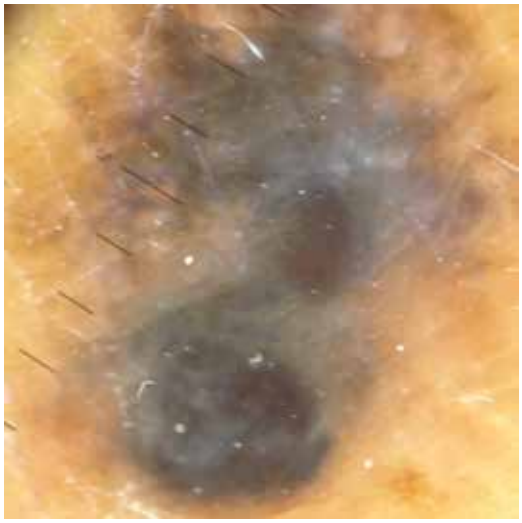

Figure 5: Darkened lesion with 9mm in its largest diameter, with irregular borders

cytic infiltrate and regression findings. Sometimes the diagnosis is confirmed by residual MM findings.[6] In case of doubt, the histogenesis of melanized cells, the immunohistochemistry, the positivity for CD68 and negativity for S-100, HMB-45 and Melan-A confirm the histiocytic nature of the lesions. [9]

Despite the fact that the careful sequential analysis of the cuts has not shown any sign of MM in the case studied, possibility of a completely regressed MM could not be excluded.

Unlike MMs, tumor melanosis cannot be treated, with absence of well-established prognosis or follow up in the literature – nonetheless attention should be devoted to the possibility of melanoma with total regression. There are cases of metastatic MMs arising after the diagnosis of tumor melanosis.[2, 9] Due to the uncertainty about the exact nature of the previous lesion (*in situ* melanoma, superficial melanoma or non-melanoma melanocytic lesions), the prognosis becomes impossible,[8, 9] resulting in the fact that therapeutic recommendations remain undefined to date.[9] The complete excision of the lesion with appropriate margins seems to be the appropriate approach. A powerful source of additional data can be the sentinel lymph node mapping.[8] It is suggested that a similar follow-up be implemented due to the high risk of melanoma,[9] however this possibility should be discussed with the patient. Due to the rarity of the condition and uncertainty of the prognosis, additional studies aiming at better monitoring these patients are necessary.

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Case Reports

The importance of a dermatologic surgeon's training in the conduction of surgical complications

A importância da formação do cirurgião dermatológico na condução de complicações cirúrgicas

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ABSTRACT

Having the mastery of surgical techniques, ability to deal with complications and the capacity to train residents in those skills are crucial to the good practice of a dermatologic surgeon. Furthermore, the transmission of clear and objective guidelines to patients has a direct impact on the outcomes of skin surgeries. The present article describes the case of the exeresis of a basal-squamous carcinoma in the scalp with the proposed closure by second intention that developed with infection and necrosis, requiring the team's knowledge and skills to work around the situation. The result of the combination of techniques was satisfactory, showing that proper training is key for a good surgical practice.

Keywords: skin neoplasms; reconstructive surgical procedures; bloodless medical and surgical procedures; internship and residency

RESUMO

O domínio das técnicas cirúrgicas, a aptidão de lidar com complicações e a habilidade de replicá-las aos residentes são peças fundamentais à boa prática do cirurgião dermatológico. Além disso, a transmissão de orientações claras e objetivas ao paciente tem impacto direto no desfecho de uma cirurgia de pele. Apresenta-se caso de exérese de carcinoma basoescamoso no couro cabeludo com proposta de fechamento por segunda intenção que evoluiu com infecção e necrose exigindo conhecimento e habilidade da equipe para contornar a situação. O resultado da associação de técnicas foi satisfatório demonstrando que o treinamento adequado é essencial à boa prática cirúrgica.

Palavras-chave: *neoplasias cutâneas; procedimentos cirúrgicos reconstrutivos; procedimentos médicos e cirúrgicos de sangue; internato e residência*

Dermatologic surgeons are key in the dermatological clinical practice. It is crucial that these professionals receive good and solid training in order to enable them to conduct surgical complications that are inherent in the practice of dermatologic surgery. It is also important to highlight that, for the success of a dermatologic surgery, the physician should make sure that the patient has understood all postoperative care prescribed, even the most basic instruction. The purpose of this paper is to describe a case of a simple initial surgical proposal that has developed with complications, demanding that the dermatologic team (surgeon and residents) mastered advanced techniques for the proper management of the condition, obtaining a satisfactory outcome.

CASE REPORT

The patient involved is a 76 year-old married man, rural worker, and originary from the Brazilian Mid West State of Goiás. The patient, who did not have comorbidities or was in regular use of medications, was referred to the dermatologic surgery clinic for the treatment of two tumors on the scalp (frontoparietal region) previously histologically diagnosed as basal squamous cell carcinoma and moderately differentiated squamous cell carcinoma, respectively (Figure 1). Due to the facts that the patient was healthy, well informed and accompanied by relatives and that performing a dermatologic surgery with intraoperative control of the margins (Mohs micrographic surgery) was unfeasible, a decision was made for the primary excision of the lesion with safety margins and healing by secondary intention. Systemic antibiotic prophylaxis was prescribed for the postoperative period, with the daily use of occlusive dressing at home, after cleansing the wound with saline solution and applying 1% silver sulfadiazine cream. However, the patient decided to seek support at a basic health center for the daily application of the dressing, where the non-medical professional who provided assistance performed the untimely debridement of the granulation tissue surrounding the wound, which caused necrosis of the underlying periosteum. The patient still developed infection in the surgical wound and impossibility of healing by secondary intention due to loss of tissue. The bone plate of the skull became exposed (Figure 2). Concerned about the appearance of the wound and having pain, the patient returned to the dermatologic surgery service. The authors decided to hospitalize the patient in order to control the local infection with parenteral antibiotic therapy. The care of the surgical wound was then carried out exclusively by a dermatologic surgeon and the department's residents. After the infection was controlled, there was still exposure of the bone plate, which needed to be corrected using a surgical flap/graft technique. A rotation flap was then performed on the bone plate of the parietal-occipital region, combined with a skin graft harvested from the thoracic region and applied to the temporal region of the scalp (Figures 3 and 4). The patient developed with partial loss of the flap and total success of the graft. The region with bone plate exposure could therefore be closed. The patient recovered uneventfully after the combination of surgical techniques, without further complications and with cure of the cancer, attending ambulatory follow up visits to date (Figure 5).

DISCUSSION

The reconstruction of defects in the scalp, even of small ones, is still a challenge for dermatologic surgeons due to the fact it is an inelastic, convex area and adhered to the galea aponeurotica.[1-3] Aimed at achieving good functional and cosmetic outcomes, it is recommended that the simplest possible reconstruction be performed.[1,4] This paper described a case of defects in the scalp after the removal of cutaneous neoplasias, with a simple initial surgical proposal, treated with excision and healing by secondary intention. Nevertheless, it progressed with complications and necrosis of the periosteum due to inadequate treatment of the wound, demanding that the surgeon mastered advanced techniques to properly manage the case. Healing by secondary intention is useful in post-surgical wounds following excision of cutaneous neoplasias for it decreases intraoperative morbidity and the cost of the procedure.[5] The granulation tissue is rarely infected, and the pain and bleeding are minimal, while the necessary care to the wound is simple. In addition, the slow

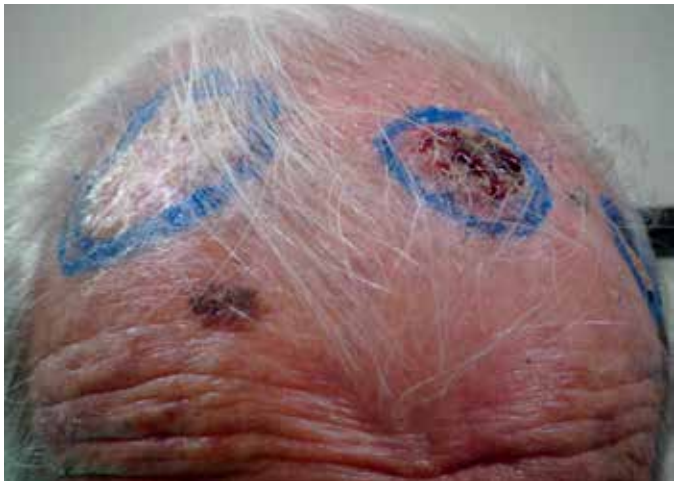

Figure 1: Moderately differentiated squamous cell carcinoma (left) and basal squamous cell carcinoma (right)

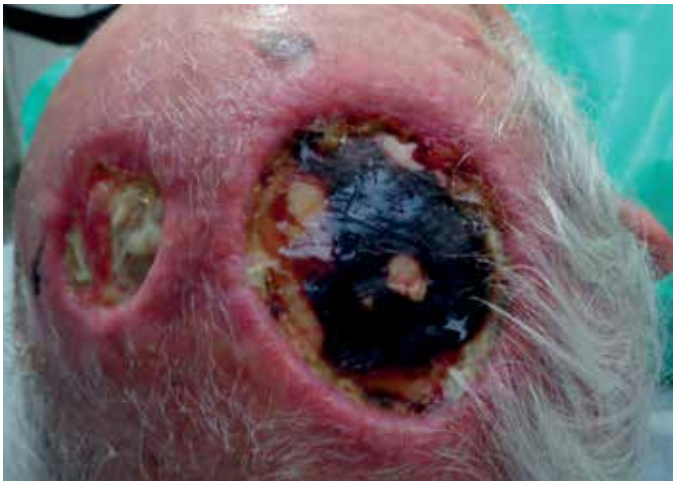

Figure 2: Bone plate exposed after necrosis and infection of the periosteum

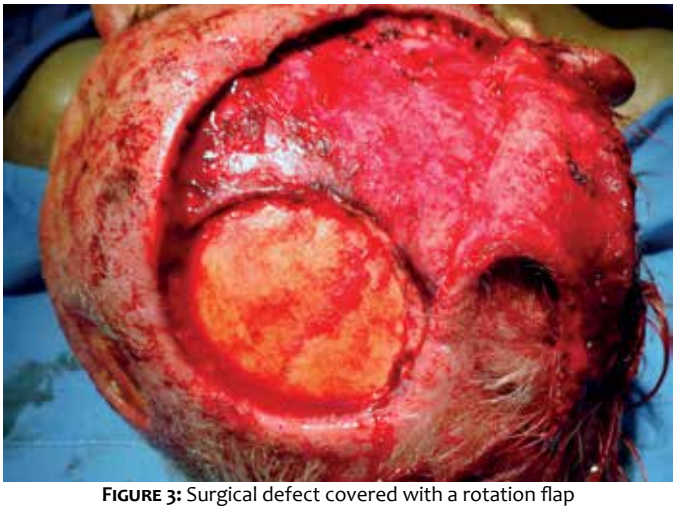

Figure 3: Surgical defect covered with a rotation flap

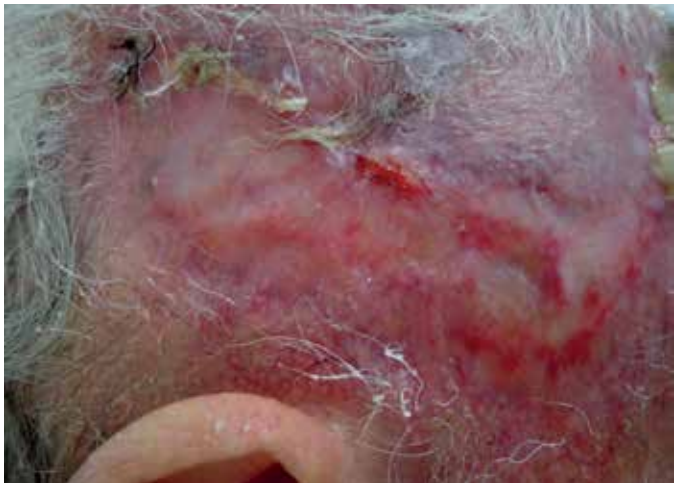

Figure 5: Healed right temporal region (two months after)

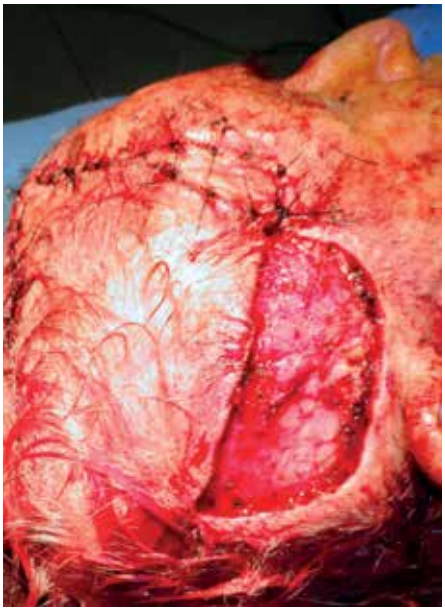

Figure 4: Surgical defect in the right temporal region, later covered with a skin graft from the thoracic region.

healing and repair process itself have protective action against possible recurrences. Furthermore, the absence of grafts or flaps facilitates the early detection of recurrence signs.[6] The location of the surgical defect is the defining factor for the healing by secondary intention's cosmetic outcome.[7] Complications with this technique are unusual and include exuberant granulation tissue, hypochromic and telangiectasic scars with distortion of the free borders. In the present case, the lack of periosteum after the necrosis compromised the viability of the technique. This paper highlights that the proper training of dermatologic surgeons is crucial for the success of the surgery, as it allows managing and resolving complications that can arise even with the use of simple techniques, such as wound healing by secondary intention. It also shows that the dermatologic surgeons should be able to perform new techniques, such as grafts or flaps, when his or her first choice technique for closing the surgical defect does not prove satisfactory.

CONCLUSION

The good dermatologist should be able to treat complications through vigorous clinical interventions, as well as to recognize infections and treat them promptly, thus avoiding systemic repercussions. Still, an additional reflection on the doctor/patient relationship is appropriate: Could it be that the instructions provided in the postoperative period were not sufficiently clear, leading the patient to seek the assistance of a professional from the basic health center? How could the patient have understood that he would be able to apply dressings at home, with only the help of relatives? Should it be stressed that in case of doubt the professional sought should be that who performed the procedure rather than any other? The answers to these questions need to be borne in mind when performing a dermatologic surgery, even those deemed of low complexity, for there is always a potential risk for complications.

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Multicentric granular cell tumor: a rare presentation

Tumor de células granulares multicêntrico: uma apresentação rara

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ABSTRACT

The granular cell tumor, also known as Abrikossoff tumor, is a rare neoplasm with controversial etiology that usually arises as a solitary benign lesion. The authors describe a case of multicentric granular cell tumor in a 13-year old patient treated with surgical excision.

Keywords: granular cell tumor; neoplasms, soft tissue neoplasms; S100 proteins

RESUMO

O tumor de células granulares, também conhecido como tumor de Abrikossoff, é neoplasia rara e de etiologia controversa, que se apresenta geralmente como lesão benigna solitária. Relata-se um caso de tumor de células granulares multicêntrico em paciente de 13 anos tratado com exérese cirúrgica.

Palavras-chave: *tumor de células granulares; neoplasias de tecidos moles; proteínas S100*

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INTRODUCTION

The granular cell tumor (GCT) – or Abrikossoff's tumor – was first described in 1926 by the Russian pathologist Alexei Ivanovich Abrikossoff. Some authors have suggested that these tumors represent approximately 0.5% of all soft tissue tumors, with a prevalence of 0.019% to 0.03% of all neoplasias.[1] It usually arises as a solitary nodular lesion that is painless, slow growing and benign, although multicentric (10%-25%) and malignant (1%-2%) variants have also been reported.[2]

These tumors mainly involve the cervicofacial region, particularly the tongue and palate, however they can affect the skin and other organs such as the esophagus, larynx, trachea, thyroid, with few reports of it occurring in the extremities.[2,3]

The granular cell tumor is most commonly found in middle-aged dark skin women.[2, 4-7] Its histogenesis is controversial, with several authors implicating diverse cell types in its origin, including muscle cells, histiocytes, fibroblasts, nerve sheath cells and undifferentiated mesenchymal cells. The neuroectodermal origin is generally considered due to the GCT's reactivity for neural markers like S-100.[1, 3-5, 7, 8]

CASE REPORT

A 13 year-old mulatto female patient presented nodular lesions that had emerged on the body approximately three years before. The lesions affected the scalp (Figure 1), right flank, right thigh, left palmar and right plantar regions (Figure 2), the latter being painful on deambulation.

The dermatological examination revealed nodular lesions, the largest located on the medial side of the right thigh, measuring 1cm and with hyperpigmentation in the overlying skin. The other lesions were normochromic. The examination of the oral cavity evidenced two yellowish nodular lesions on the left side of the tongue, (Figure 3) painless on palpation and measuring 1cm and 0.5 cm.

The surgical excisions of the lesions on the right flank, left palm and right thigh were carried out, all with granular cell tumor histology. The histological section of the skin allowed the observation of an intense infiltration of the dermis by polygonal cells with granular eosinophilic cytoplasm, with small dark nuclei (Figure 4). The PAS staining color was positive for the intracytoplasmic granules.

The patient is currently under clinical follow up for the other lesions, with absence of recurrence of the excised lesions.

Figure 1: Normochromic nodular lesion with firm consistency on the scalp

Figure 3: Two yellowish nodular lesions on the left side of the tongue

Figure 2: Normochromic nodular lesion in the plantar region of the right foot

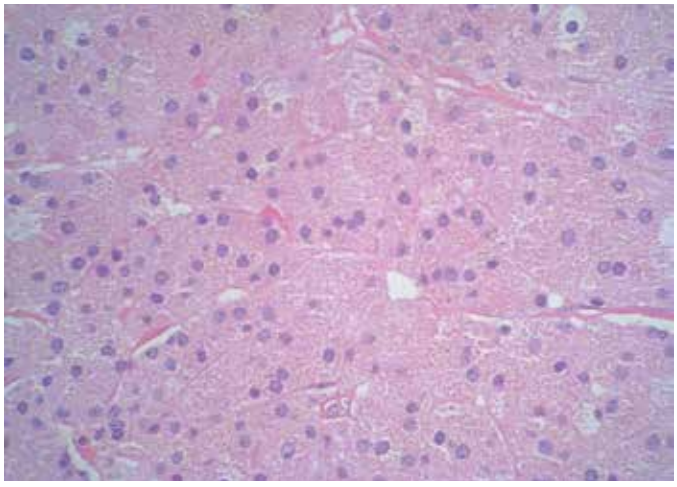

Figure 4: Histology of the lesion in the right flank. It is possible to observe clusters of polygonal cells with granular eosinophilic cytoplasm and rounded basophilic nuclei (HE x 200)

DISCUSSION

GCT is a rare neoplasm of uncertain etiology and histogenesis, occurring as a solitary, asymptomatic, slow growing, normochromic or brownish lesion. This tumor usually measures less than 3cm in its longest diameter, nevertheless it can be considerably larger than that. 3 Its preferred locations are the head and neck regions (50%), the tongue (35%) and the vulva (5.3%).[9] Although in most cases the lesion is solitary, nearly 25% of patients may have multiple lesions, as observed in the present case.[2,5]

The clinical diagnosis of GCT is difficult since the lesions are often unspecific and its identification usually occurs only through histological examination.[3] The clinical differential diagnosis includes dermatofibroma, adnexal tumors, compound melanocytic nevi, nodular prurigo, dermoid cyst and seborrheic keratoses.[7]

Histologically, the dermis contains a poorly circumscribed nodule constituted by polygonal cells pale in color, which can infiltrate the adjacent dermis. The cells have abundant cytoplasm, with PAS-positive granulation, slightly eosinophilic, with round dark nuclei.[3,7] Mature GCT (the classic form), with presumed Schwannian origin, are described as positive for S-100 protein and neurospecific enolase.[3]

Malignant granular cell tumors are perhaps the rarest of all soft tissue tumors, representing a percentage that varies from 1% to 2% of cases, with reports of occurrence in diverse locations.[2,3] The clinical features suggestive of malignancy include large size (> 4cm), necrotic and hemorrhagic areas, fast growth and invasion of adjacent organs.[9] The metastasization of this tumor to lymph nodes and lungs is common and highly aggressive, unresponsive to treatment and eventually lethal.[3]

A third GCT type has benign pathological characteristics, however presents malignant clinical behavior. Malignant GCT with benign histologic appearance are usually identified only after the metastatic and lymph node spread. Notwithstanding its histologic appearance, the GCT's biological potential is uncertain.[3] The treatment of choice is the complete surgical excision.[1-9]

If incompletely removed, this tumor has a high rate of local recurrence.[2-5,7,9] The use of radiotherapy and chemotherapy is recommended in the treatment of malignant forms of this tumor.[4,6] The present case report describes a clinical picture in a young patient, outside the most affected age group and with multiple lesions – some of them in the distal ends – constituting an unusual presentation of this rare tumor.

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Case Reports

Nodular amyloidosis: good response to surgical treatment

Amiloidose nodular: boa resposta ao tratamento cirúrgico

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ABSTRACT

Primary cutaneous nodular amyloidosis is a rare form of amyloidosis. The authors report the case of a 44-year old woman with nodules and plaques on the legs with three years of development and increase in the number and size of lesions. Clinical, histological and laboratory investigation dismissed the possibility of systemic amyloidosis, and the diagnosis of nodular amyloidosis was established. A decision was made for the surgical approach, using curettage and cauterization with good response to the proposed treatment.
Keywords: amyloidosis; curettage; cautery

RESUMO

A amiloidose nodular cutânea primária é forma rara de amiloidose. Reportamos o caso clínico de uma mulher de 44 anos apresentando nódulos e placas nas pernas com três anos de evolução e aumento do número e tamanho das lesões. Investigação clínica, histológica e laboratorial descartou a possibilidade de amiloidose sistêmica, e o diagnóstico de amiloidose nodular foi estabelecido. Optou-se pelo procedimento cirúrgico por meio de curetagem e eletrocauterização com boa resposta ao tratamento proposto.
Palavras-chave: *amiloidose; curetagem; cauterização*

INTRODUCTION

Amyloidosis is a condition characterized by the abnormal depositing of amyloid in the tissue. It can be limited to the skin (primary cutaneous amyloidosis) or involve other organs and tissues (systemic amyloidosis).[1-4] Among the forms of primary cutaneous amyloidosis, the macular, papular and nodular amyloidosis stand out, the latter being a rare condition that affects both genders equally, with a mean age at diagnosis of 60 years and predominantly acral clinical presentation.[2] The authors report a rare case of nodular amyloidosis, with good response to surgical treatment, including curettage and electrocautery.

CASE REPORT

A 44 year-old, white female patient, married, housewife, originary from the city of Piraju (in the Brazilian State of São Paulo) and currently living in Curitiba (in the Brazilian State of Paraná) reported nodular lesions that emerged three years before on both legs after the use of electric epilation, progres-

sively increasing in size and number. According to the patient description, the lesions were purplish at the onset, progressively becoming yellow-brownish at the time of the first medical consultation. She denied associated symptoms. In addition, the patient bears primary Sjögren's syndrome (diagnosed in 2010), and urinary incontinence, and uses eye drops (artificial tears) and artificial saliva. She denied the use of other medications or presence of allergies. The patient also reported having undergone cholecystectomy at twenty years of age and described two pregnancies (two normal deliveries). At clinical examination she had nodular lesions with yellow-brownish hue on the anterior side of the left and right legs, the largest measuring 5x3cm (Figure 1). Clinical hypothesis of vasculitis, Sweet's syndrome, traumatic blister and nodular amyloidosis were raised. A biopsy of the lesion on the left leg was carried out with the material being sent for histological analysis, which revealed a deposit of amyloid substance in the interstitium and around vessels (crystal violet staining) and the presence of large amounts of perivascular plasma cells. The systemic amyloidosis hypothesis was rejected after hematological investigation. Conservative treatment was initially conducted with intralesional corticosteroids interspersed with occlusive corticoid, with absence of response and dissatisfaction of the patient, who complained of local pain and discomfort. A decision was made for the surgical treatment of the lesions in the right leg (Figure 2), with curettage and electrocautery (Figure 3). The patient developed with local pain and difficult healing of the lesions (Figure 4), having been then referred to a specialized ambulatory for the nursing team care, when hydrogel, alginate and a non-adherent dressing were used locally. After the implementation of a multidisciplinary approach, the wounds presented significant improvement in the appearance, with good local healing and absence of recurrence in the primary lesions (Figures 5-7). The patient is currently receives ambulatory follow up.

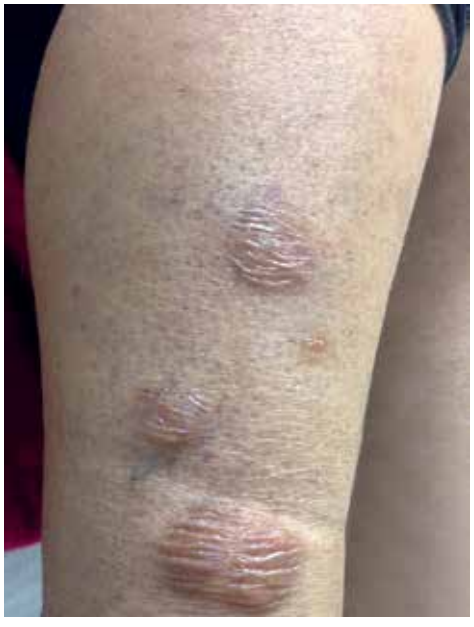

Figure 1: Plaques and brownish nodules in the anterolateral region of the right leg

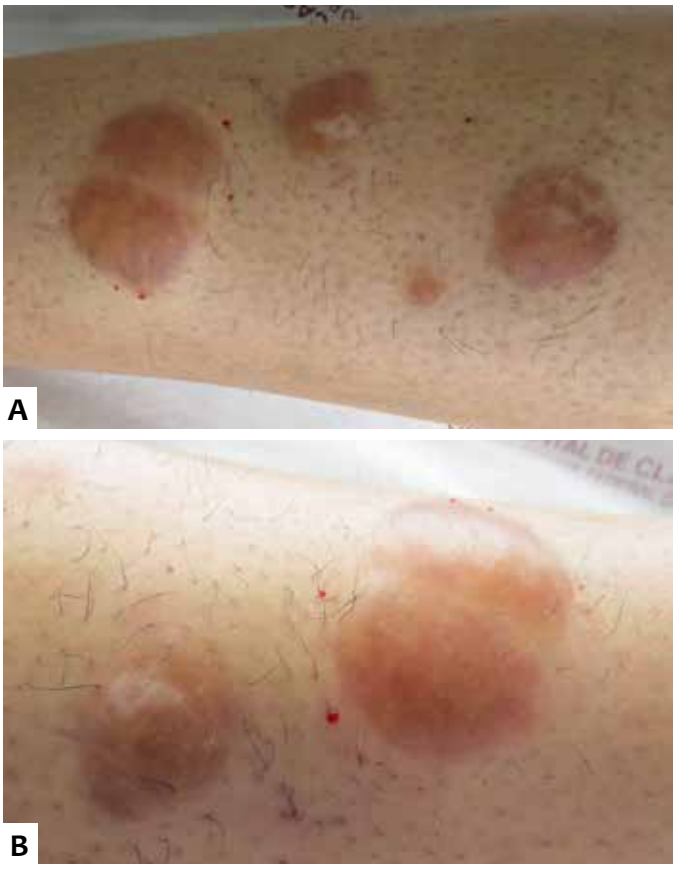

Figure 2: A - Area chosen for the procedure; **B.** Antisepsis and local injection of anesthetic

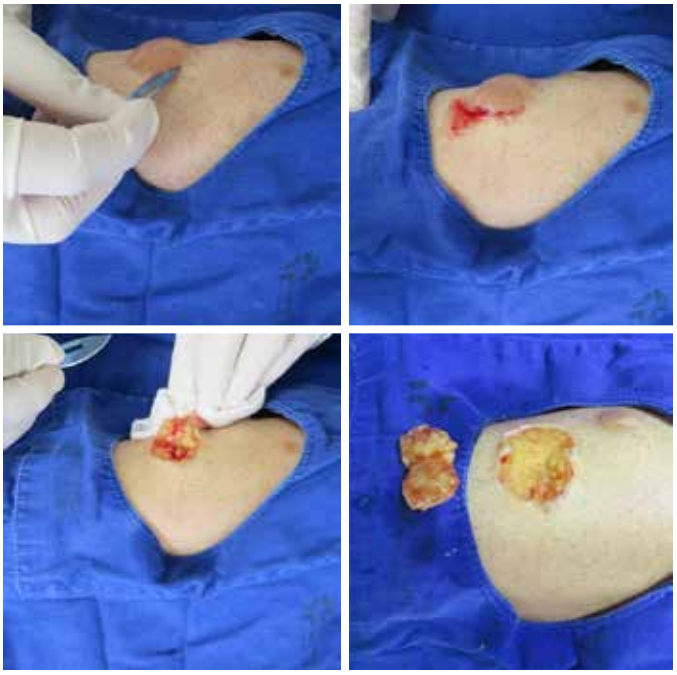

Figure 3: Excision of the lesion, with subsequent curettage and electrocautery

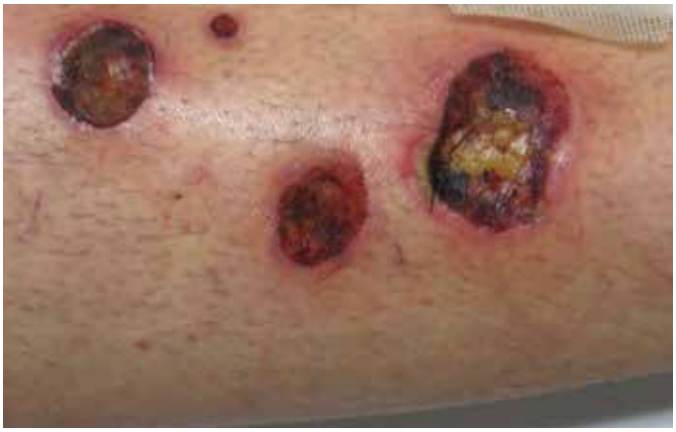

Figure 4: Eight days after the surgery. Perilesional erythema without other signs of inflammation

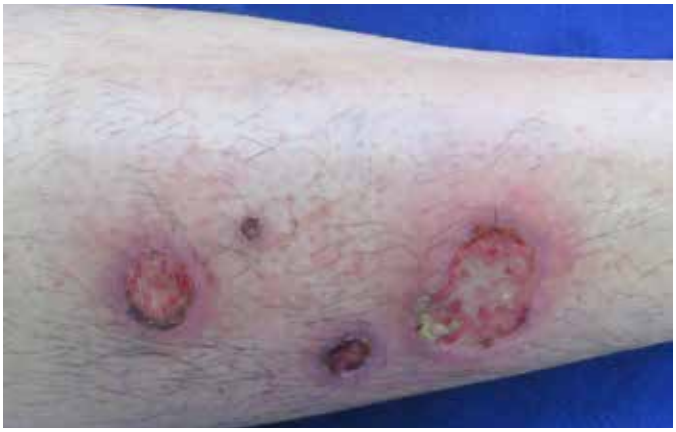

Figure 5: Thirty days after the surgery. Regressing perilesional erythema and presence of granulation tissue at the base of the lesions

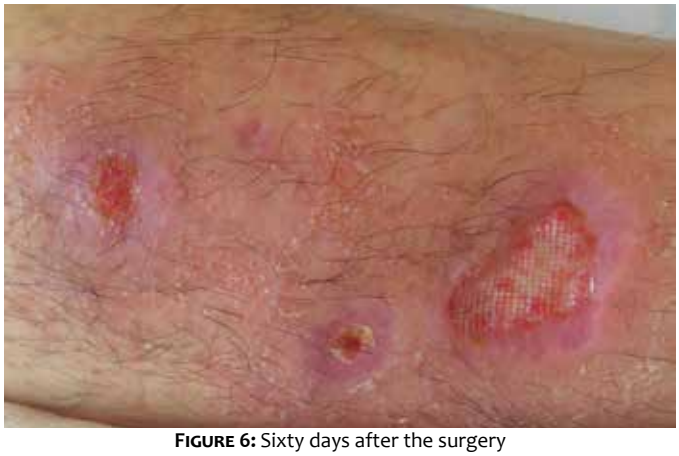

Figure 6: Sixty days after the surgery

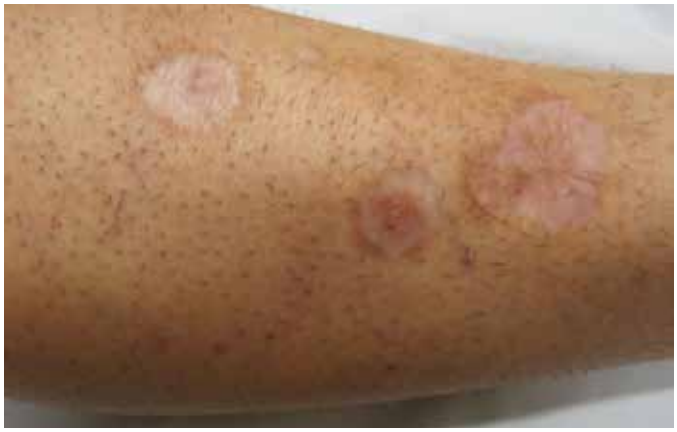

Figure 7: Late postoperative

DISCUSSION

In addition to being a rare entity, nodular amyloidosis is a difficult to treat condition. Therapeutic options include cryotherapy, electrocautery, curettage, CO_2 laser and intralesional injection of corticosteroids,[5, 6] however none of them lead to satisfactory results. The present case report describes a patient with nodular amyloidosis who progressed with difficult healing after surgical treatment. The multidisciplinary approach was crucial for the positive development of the lesions. Contrary to the results verified in the reviewed literature, the present case's outcome was satisfactory at the end of the proposed treatment.

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Pyogenic granuloma simulating malignant tumor in the scalp

Granuloma piogênico simulando tumor maligno de couro cabeludo

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ABSTRACT

Pyogenic granuloma or lobular capillary hemangioma is a benign skin and mucous membranes lesion whose etiology is not yet explained. The authors report an atypical and exuberant clinical case of this benign dermatologic condition, clinically simulating malignancy.

Keywords: granuloma, pyogenic; scalp dermatoses; hemangioma, capillary; melanoma

RESUMO

O granuloma piogênico ou hemangioma capilar lobular é lesão benigna de pele e membranas mucosas ainda sem etiologia elucidada. Relatamos caso clínico exuberante e atípico dessa afecção dermatológica benigna simulando clinicamente lesão maligna.

Palavras-chave: *granuloma piogênico; dermatoses do couro cabeludo; hemangioma capilar; melanoma*

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INTRODUCTION

Pyogenic granulomas are benign acquired capillary lesions that affect the skin and mucous membranes and whose pathogenesis is not yet elucidated.[1] It is hypothesized to result from mechanical trauma, however the participation of hormonal factors, medicaments, arteriovenous malformations and angiogenic growth factors have also been proposed.[2] It has the appearance of an exophytic, friable, fast growing and exulcerated papule or single nodule,[1,3] Due to the fact that some malignant tumors, such as nodular melanomas, mimic pyogenic granulomas, biopsy is necessary for histopathologic analysis in order to prevent delays in the diagnosis and improve the prognosis in case of malignant tumors.

The present report portrays an exuberant and atypical picture of benign dermatologic condition clinically mimicking a malignant lesion.

CASE REPORT

A nineteen year-old female patient sought the dermatology service complaining of the emergence of a lesion in the scalp eight months before, with rapid and progressive growth, accompanied by pain and a yellowish discharge. Dermatological examination showed an erythematous-purplish, well-defined, pedunculated nodule, with exulcerated surface, measuring 10cm in diameter, located on the scalp's vertex (Figure 1). The diagnostic hypotheses were: squamous cell carcinoma, melanoma, Kaposi's sarcoma, cutaneous metastasis, adnexal tumor and pyogenic granuloma. The excisional biopsy of the lesion was carried out (Figure 2), with the histological examination revealing proliferation of vascular structures lined by cells without atypia, suggesting the diagnosis of cutaneous hemangioma of the ulcerated pyogenic granuloma type (Figures 3 and 4). The patient has not had recurrence of the lesion during the two years following its removal.

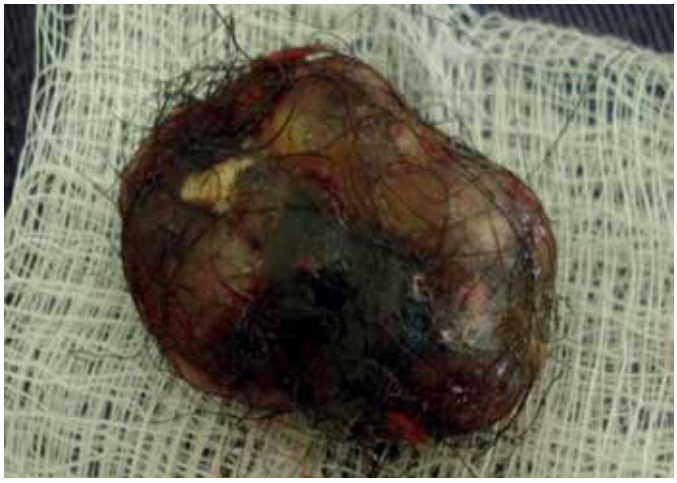

Figure 3: Proliferation of capillaries immersed in loose and edematous stroma

Figure 1: Well-delimited erythematous-purplish tumor with yellowish crusts and irregular surface, measuring 10cm in diameter, located on the scalp's vertex

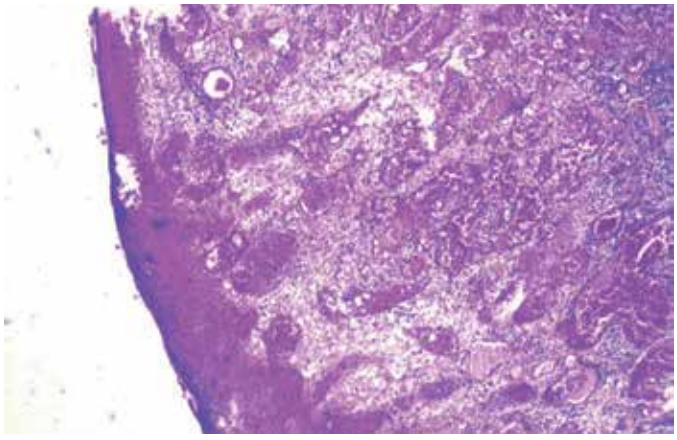

Figure 4: Proliferation of vascular structures lined with cells without atypia

Figure 2: Removed surgical specimen

DISCUSSION

The pyogenic granuloma or capillary lobular hemangioma characterizes a benign vascular proliferation that mainly occurs in body sites exposed to frequent trauma, such as the hands, arms, feet, face, and, less commonly, the trunk and scalp.[1,3] It can develop on labial and perianal mucous membranes. It is more prevalent in children and can occur in adults, particularly in pregnant women. Despite its own denomination, pyogenic granuloma is not related to the presence of suppuration, and no specific microorganism can be related to the lesion. In some cases it is associated with secondary infection.[4] Its etiology is unknown and is related to a hyperproliferative vascular reaction to a variety of stimuli such as trauma, viral infection, chronic ulcers, female sex hormones and the use of some medications, such as isotretinoin, capecitabine or indinavir.[1, 6] Clinically, it presents as a single, nodular or vegetating, friable lesion, varying in color from red to darkened blue. It can be sessile or pedun-

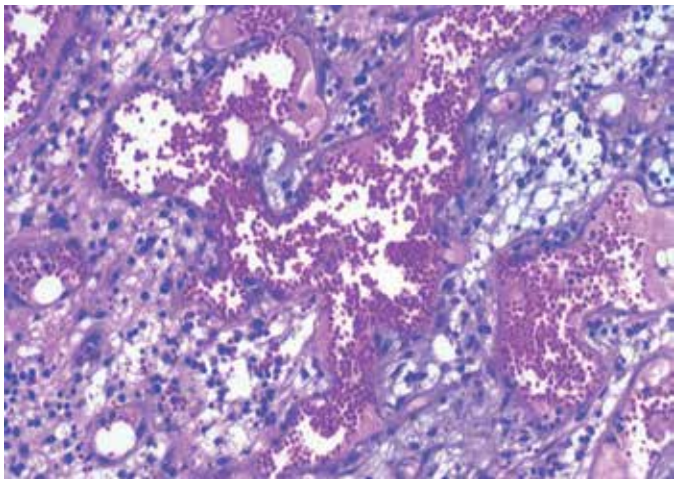

Figure 5: Intraoperative evidence of the tumor's pedicle

culated, and develops with rapid growth. It is usually painless, bleeds with minimal trauma and tends to recur.[1, 3] Its diagnosis is usually facilitated by history and clinical appearance, nevertheless in some situations it can mimic benign or malignant tumors. The main differential diagnoses are: keratoacanthoma, squamous cell carcinoma, basal cell carcinoma, inflamed seborrheic keratosis, melanocytic nevus, metastatic carcinoma, Kaposi's sarcoma, true hemangioma, vascular tumors of intermediate malignancy and amelanotic or desmoplastic melanoma.[4, 5] Due to the fact that some nodular melanomas mimic pyogenic granulomas, biopsy is necessary for pathological studies, thus avoiding delaying the diagnosis. The authors decided to use excisional biopsy in the patient in question, since it was a fast growing exuberant lesion in an atypical location, with suspected malignancy. During the procedure, the visualization of a pedicle in the lesion already suggested the clinical diagnosis of a benign lesion (Figure 5). The histologic examination of the removed specimen evidenced capillary proliferation with radiated pattern and loose edematous collagen matrix in the area near the surface, with the epidermis extending into the lesion's base, leading to the formation of an epidermal collarette and causing, in some cases, the formation of a peduncle. The lobular capillary hemangioma can present mixed inflammatory infiltrate and, in more advanced cases, fibrosis with septa intercepting the lesion can occur, producing a lobular pattern.[4–6] Pyogenic granulomas can regress spontaneously; nonetheless most of them require treatment, with the choice of modality depending on the lesion's size and location. The standard therapy is the complete surgical removal and elimination of causative factors. Some authors recommend the use of cryotherapy with carbon dioxide, chemical electrocautery, electrocoagulation and Nd:YAG laser.[7, 8] In the present case, a decision was made for performing an excisional biopsy due to the fact that it is a technique that offers low recurrence and rapid clinical resolution.

CONCLUSION

The present article describes an exuberant, atypical benign and relatively common dermatologic condition, clinically simulating malignancy. It highlights the importance of the detailed dermatologic clinical evaluation and the histological study for diagnostic confirmation.

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