Original Article

Clinical evaluation of the effectiveness of andiroba oil in burns caused by hair removal with intense pulsed light: a prospective, comparative and double-blind study

Avaliação clínica da eficácia do óleo de andiroba na queimadura pós-depilação com luz intensa pulsada: estudo prospectivo, comparativo e duplo-cego

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ABSTRACT

Introduction: Intense pulsed light is commonly used for hair removal. Corticosteroids of low or medium potency are generally employed for pain and inflammatory reaction relief following such procedures. Botanical compounds, such as andiroba oil emulsion, have been proven to have moisturizing and anti-inflammatory effects.

Objective: To compare the effectiveness of andiroba oil emulsion to desonide as an option to topical corticosteroids.

Methods: A prospective, comparative, double-blind study evaluated nine female patients who underwent hair removal with intense pulsed light in the inguinal region. The patients were treated immediately after the procedure with desonide on one side and andiroba oil emulsion on the other. The patients rated the pain sensation using a visual analog pain scale, and an observer dermatologist physician evaluated the inflammatory reaction caused by the procedure, comparing the two sides blindly.

Results: There were no significant differences in pain relief or inflammation between the two products. The analgesic and anti-inflammatory potential of andiroba oil emulsion practically equaled that of desonide.

Conclusions: This pilot study's results indicate that andiroba oil emulsion can be a treatment option following photoepilation.

Keywords: Burns; Hair Removal; therapeutics; glucocorticoids; wetting agentes.

RESUMO

Introdução: *A depilação com luz intensa pulsada é método de uso corrente, utlizando-se geralmente corticosteroides de baixa ou média potência para o alívio da dor e a reação inflamatória que se seguem ao procedimento. Compostos botânicos, como a emulsão de óleo de andiroba, têm demonstrado efeitos hidratantes e anti-inflamatórios.*

Objetivo: *Como opção aos corticosteroides tópicos, os autores testam a eficácia da emulsão do óleo de andiroba comparando-a à da desonida.*

Métodos: *Foi desenhado estudo prospectivo, comparativo e duplo-cego com nove pacientes do sexo feminino, submetidas à depilação com luz intensa pulsada na região inguinal e tratadas imediatamente após o procedimento com desonida num lado e emulsão de óleo de andiroba no outro lado, aleatoriamente. As pacientes avaliaram a sensação de dor segundo a escala visual analógica de dor, e uma médica dermatologista observadora avaliou a reação inflamatória gerada pelo procedimento, comparando-se os dois lados de forma cega.*

Resultados: *Não houve diferenças significativas no alívio da dor e da reação inflamatória, na comparação dos dois produtos. O potencial analgésico e anti-inflamatório da emulsão do óleo de andiroba praticamente equivaleu ao da desonida.*

Conclusões: *Os resultados deste estudo-piloto indicam que a emulsão do óleo de andiroba pode ser opção no tratamento após a fotoepilação.*

Palavras-chave: *queimaduras; remoção de cabelo; terapêutica; glucocorticoides; umectantes.*

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Received on: 19 August 2012
Approved on: 12 September 2012

This study was carried out at the authors' private practice in Rio de Janeiro (RJ), Brazil.

Financial support: None
Conflict of interest: None

INTRODUÇÃO

Intense pulsed light (IPL) systems are high-intensity pulsed sources that emit polychromatic light across a broad spectrum of wavelengths – from 515-1,200nm. As with lasers, the active mechanism is selective photothermolysis; however, unlike the latter, the pulse duration can be selected with the assistance of filters.1 The ability to vary the fluence, duration, and interval of the pulses makes the system very versatile and flexible, allowing it to be used in the vascular, pigmentary, and epilatory modes, and in skin photorejuvenation. It is an alternative to lasers in the treatment of various types of vascular lesions, such as flat angiomas, telangiectasias, rosacea, and Poikiloderma of Civatte, among others.[1] Photoepilation is a highly effective option that presents lasting results and few side effects. The technique is based on the selective thermal destruction of a specific target: the germ cells of hair follicles. Since melanin is the hair follicles' main chromophore, light wavelengths of 600-1,100nm can be used effectively and safely to carry out their selective photothermolysis.[2,3] The most common response to photoepilation includes perifollicular erythema-edema and a slight burning sensation that lasts from a few hours up to two days. The use of cooling compresses and low-and medium-strength topical corticosteroids is recommended for a few days. If blistering occurs in areas with a potential for infection (e.g., inguinal region, perineum) antibiotic creams can be used. Crusts, when they occur, can be left for periods ranging from 5-10 days, and hairs for up to 45 days, depending on the area. Patients are instructed not to manipulate the region or expose them selves to sunlight, to wear light and comfortable clothing, and to apply sunscreen to treated areas.

Some botanical compounds have been demonstrated to have useful properties and low toxicity at a low cost.[4,5] Andiroba (Carapaguianensis Aubl.) is a large tree that is commonly found in the Amazon region. Its fruit is a globe-shaped capsule that contains 4-16 seeds, from which an oil with a number of properties (including healing, anti-inflammatory, antiseptic, and antipyretic effects) can be extracted.4, 6 It is registered in ANVISA (the Brazilian National Health Surveillance Agency) as a hydrating substance, and its effectiveness is progressively being proven in the treatment of actinic dermatitis and compression bedsores, as well as in insect repellents, among other uses.[7]

This study proposes the use of andiroba oil emulsion as an alternative to the use of topical corticosteroids in skin burns resulting from IPL therapy. Its apparent high cutaneous penetration power and anti-inflammatory action motivated the authors to conduct the comparative study.

OBJECTIVE

To compare the anti-inflammatory and analgesic efficacy of andiroba oil emulsion vs. desonide in the treatment of first-degree burns resulting from IPL-based epilation.

METHOD

A prospective, comparative, double-blind study was carried out with nine patients who underwent IPL-based hair removal (Deka Minisilk FT®, DEKA Medical Inc. (San Francisco, CA, USA) at the authors' private practice. The criteria for inclusion were: female, aged 18-45, Fitzpatrick phototypes I to III, and healthy skin in areas to be epilated. Exclusion criteria were: cutaneous marks in the areas to be epilated; active dermatoses; pregnancy or lactation; history of allergic reactions to the products being tested; history of diseases that are aggravated or triggered by ultraviolet radiation; intense exposure to sunlight during the previous 15 days; use of immunosuppressant drugs, antihistamines, non-hormonal anti-inflammatories, or systemic corticosteroids up to two weeks prior to the procedure; use of oral or topical retinoids up to one month before the study; cosmetic or dermatologic treatment in the areas to be epilated during the month before the study; being a professional with direct interest in the study; immunodeficiency; atopy history; participating or having participated in another clinical study that ended less than seven days before the case selection; and dermographism.

All volunteers signed a free and informed consent document. The study was carried out according to the standards proposed by the Declaration of Helsinki in 2000.

The IPL-based hair removal procedure was carried out in the inguinal region by a female dermatologist physician. The parameters were defined according to each volunteer's phototype. No analgesics or anti-inflammatories were used locally or systemically before the procedure. Immediately after the hair removal, the dermatologist physician who performed the procedure randomly applied desonide on one side and Andiroba oil emulsion on the other side. Neither the patient (who assessed the pain) nor the observer dermatologist physician (who evaluated the degree of inflammation) were informed which product was applied on each side, characterizing a double-blind comparative study.

The patients compared the pain on each side using a visual analog scale (VAS): 0= no pain to10 = maximum pain (Figure 1). The evaluation of the degree of inflammation carried out by the observer dermatologist physician was based on the intensity of the erythema and the presence or absence of papules, where 0 = absence of erythema, 1 = mild, 2 = mild to moderate, 3 = moderate, 4 = moderate to intense, and 5 = intense erythema, and P = presence of papules. These assessments were conducted at T0 = immediately after treatment, T1 = immediately after the application of the product, T2 = five minutes after IPL, T3 = 30 minutes after IPL, and T4 = 60 minutes after IPL.

RESULTS

Nine female patients aged 22-34 (average age 27.55 years) with Fitzpatrick skin types I to III (Table 1) were included in the

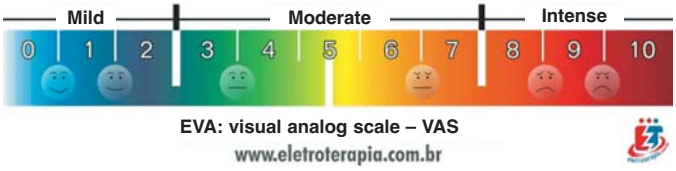

Figure 1: Pain assessment scale –VAS

study. Patients reported no significant differences in pain relief between the andiroba oil and corticosteroid. One patient reported feeling no difference, four patients reported feeling slight superiority on the side treated with the andiroba oil emulsion, and four patients reported slight superiority in the side with corticosteroid (Table 2).

Likewise, the dermatologist physician found no significant difference in erythema between the products. Intense erythema did not occur in patients at T0. The improvement in erythema was slightly better in three patients who were treated with corticosteroid and in three who were treated with desonide (Table 3).

Table 1: Distribution of study patients by age and phototype

N.	Age	Phototype
1	30	III
2	27	III
3	34	III
4	27	III
5	22	I
6	28	II
7	27	II
8	22	II
9	31	III

DISCUSSION

The focus of the treatment after IPL-based hair removal is directed towards the relief of patient discomfort and the attenuation of local inflammatory reactions. The thermal damage resulting from photoepilation was chosen for the present study due to its controllability and current popularity in medical uses, and because it has been proven to be a safe procedure. Both the pain intensity and the degree of relief are subjective and difficult-to-measure data, which are not practicable in laboratory animals. Due to ethical reasons, there was no control group in the present study. The products' anti-inflammatory capacities were assessed objectively by varying the intensities of erythema over a period of time following the procedure. The inguinal region was treated, which is exposed to little solar radiation. In order to obtain more reliable results – especially regarding the pain assessment – the comparison was carried out bilaterally and in the same patient, with the same parameters. The effectiveness of the andiroba oil emulsion was evaluated by comparing it with desonide, the effectiveness of which has already been proved.[8] While corticosteroids can cause adverse effects, thus far there have been no

Table 2: Patients assessment of pain using the visual analog scale (rated 0 to 10)

Patients	Costicosteroid								andiroba oil				
N.	T0	T1	T2	T3	T4				T0	T1	T2	T3	T4
1	2	1	0	0	0	x			2	1	1	0	0
2	7	2	0	0	0		x		7	2	0	0	0
3	7	0	1	0	0	x			7	4	1	1	0
4	2	2	0	1	0			x	2	1	0	0	0
5	5	1	0	0	0			x	5	0	0	0	0
6	8	3	0	0	0	x			8	5	4	2	0
7	7	0	0	0	0			x	8	0	0	0	0
8	7	2	0	0	0	x			7	3	0	1	0
9	7	6	2	0	0			x	7	3	0	0	0

Table 3: Erythema evaluation performed by the dermatologist physician: 0 = absence of erythema, 1 = mild, 2= mild to moderate, 3 = moderate, 4 = moderate to intense, 5 = intense, and P = presence of papules

Patients	Costicosteroid								Tegum®				
N.	T0	T1	T2	T3	T4				T0	T1	T2	T3	T4
1	1	1	1	1	1	x			1	2	2	2	2
2	2	2	2	2	0		x		1	1	1	1	0
3	1	2	2	1	1		x		1	2	2	1	1
4	2	2	2	2	2		x		1	1	1	1	1
5	3	1	1	0	0			x	4	2	2	0	0
6	3P	3P	1P	0	0	x			4P	4P	2P	1	1
7	3P	3P	3P	1P	0			x	4P	4P	3P	1	0
8	3P	3P	3P	1P	1	x			3P	3P	3P	1P	2
9	1P	2P	3	3	3			x	1P	1P	1	1	1

reports of adverse effects with the use of andiroba oil. In spite of the small sample size and the subjective interpretations, this study's preliminary results are encouraging, and indicate that andiroba oil emulsion can be a good option in the treatment of first-degree burns. Studies with larger samples and histological analysis are needed to confirm such findings.

This study also demonstrates the difficulty in assessing the relative effectiveness of topical products. The ever-increasing choice of topical medications makes it important that the choice of product is based on objective evidence of safety and efficacy.

CONCLUSION

These results indicate that andiroba oil emulsion is an effective treatment option following photoepilation. ●

REFERENCES

1. Catorze MG. Laser: fundamentos e indicações em dermatologia. Med Cutan Iber Lat Am. 2009;37(1):5-27.
2. Goldberg DJ. Current Trends in Intense Pulsed Light. J Clin Aesthet Dermatol. 201;5(6): 45-53.
3. Souza FHM, Ribeiro CF, Weigert S, Schmidt JV, Fabrício LZ, Ataíse DST. Estudo comparativo de uso de Laser de diodo (810nm) versus luz intensa pulsada (filtro 695nm) em epilação axilar. Surg Cosmet Dermatol. 2010;2(3):185-90.
4. Silva EN, Santana AC, Silva IM, Oliveira CM. Aspectos socioeconômicos da produção extrativista de óleos de andiroba e de copaíba na floresta nacional do Tapajós, Estado do Pará. Rev Ci. Agra. 2010;53(1):12-23.
5. Almeida LS, Gama JRV, Oliveira FA, Carvalho JOP, Gonçalves DCM, Araújo GC. Fitossociologia e uso múltiplo de espécies arbóreas em floresta manejada, comunidade Santo Antônio, município de Santarém, estado do Pará. Acta Amaz. 2012;42:185-94.
6. Ferreira AM, Souza BMV, Rigotti MA, Loureiro MRD.Utilização dos ácidos graxos no tratamento de feridas: uma revisão integrativa da literatura nacional Rev Esc Enferm USP. 2012; 46(3):745-5
7. Miot HA, Batistella RF, Batista KA, Volpato DEC, Augusto LST, Madeira NG, Haddad V, Miot LDB. Comparative study of the topical effectiveness of the andiroba oil (Carapa guianensis) and DEET 50% as repellent for Aedes sp . Rev Inst Med Trop S. Paulo 2004;46:253-6.
8. Carmignotto D. A, Burjato Júnior D. Avaliacao terapeutica da desonida, um novo corticosteroide topico, no tratamento da dermatite atopica. An Bras Dermatol. 1983;58:231-4.