

# Nonablative radiofrequency in the treatment of refractory vulvar lichen sclerosis: A case series



Rodrigo Rossi Balbinotti, MD,<sup>a,b</sup> Fernanda Santos Grossi, MD,<sup>a,b</sup> Amanda Vilaverde Perez, MD,<sup>b</sup> Mariana Sbaraini, MD,<sup>c</sup> Luciana Borges Chagas, MD,<sup>b</sup> Aline Caldart Tregnago, MD,<sup>d</sup> and Janete Vettorazzi, PhD<sup>a,b,c</sup>  
*Porto Alegre and Caxias do Sul, Rio Grande do Sul, Brazil*

**Key words:** lichen sclerosis; radiofrequency; skin; vulva.

## INTRODUCTION

Vulvar lichen sclerosis (VLS) is a chronic lymphocyte-mediated inflammatory dermatosis that mainly affects postmenopausal women. It affects both the dermis and the epidermis and is characterized by the symptom of vulvar pruritus and the presence of pearly white plaques, which can group together and progressively assume a parched and wrinkled skin appearance.<sup>1-3</sup> The etiology of VLS is still unknown; however, there is evidence of a multifactorial basis. The standard treatment is high-potency topical steroid ointment; however, in addition to presenting various side effects and not curing the disease, this treatment is not always effective. Patients who do not respond to this treatment have VLS that is considered refractory to therapeutic options,<sup>1,2,4-6</sup> making the investigation and experimentation of new therapies important.<sup>1,2</sup> Nonablative radiofrequency (NARF), due to its controlled thermal effect, promotes vasodilation, increased circulation, an increase in defense cells, greater cellular nutrition, and hydration.<sup>7-11</sup> The histopathologic results found with the use of NARF in dermatology and in the treatment of genitourinary syndrome of menopause suggest the applicability of this method. The clinical cases described in this article are of women with VLS who had already undergone other treatments without success and responded to the use of NARF, and in whom

### Abbreviations used:

NARF: nonablative radiofrequency  
 VLS: vulvar lichen sclerosis

histologic or vulvoscopic developments were registered through imaging. Symptoms were classified using a visual pain scale, colored and adapted, graduated from 0 to 10, forming part of questionnaires applied before and after treatment. The protocol used in these cases included the application of 3 sessions of NARF, each of 15 minutes at a temperature of 41°C, with a monthly interval between them.

## CASE SERIES

### Case 1

A 61-year-old woman presented to the clinic with complaints of dyspareunia (scale 8/10), vulvar itching (9/10), vulvar pain (8/10), and lack of libido. She had been diagnosed with VLS at 40 years. On examination, she had thickened skin, ulcerated lesions in the vulvar region, vulvar vestibule stenosis, fissures, and encapsulation of the clitoris. She initially received treatment with clobetasol ointment, but failed to show any improvement. A partial vulvectomy was performed, also with a nonsatisfactory response. No improvement was obtained with the use of topical testosterone in the genital region,

From the Post Graduation Program in Health Sciences: Gynecology and Obstetrics, Faculty of Medicine (FAMED), Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre<sup>a</sup>; Nucleus of Studies and Research in Sexuality of Rio Grande do Sul (NEPeSex), CNPq, Porto Alegre<sup>b</sup>; Postgraduate Program in Health Sciences: Cardiology and Cardiovascular Sciences, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre<sup>c</sup>; Centro de Patologia Médica, Caxias do Sul<sup>d</sup>; and Gynecology and Obstetrics Service Hospital de Clínicas de Porto Alegre, Porto Alegre.<sup>e</sup>

Funding sources: None.

IRB approval status: Not applicable.

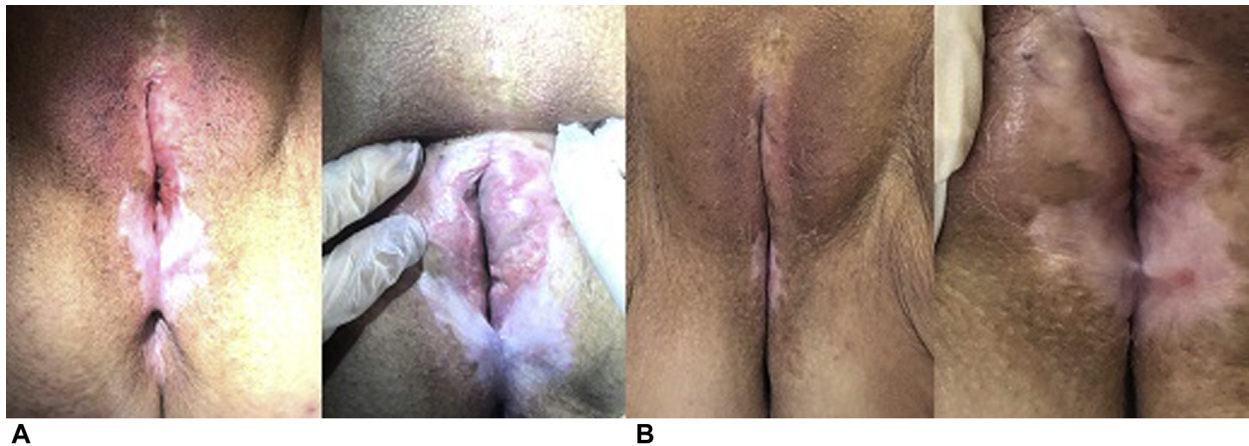
Correspondence to: Amanda Vilaverde Perez, MD, Faculty of Medicine, Universidade Federal do Rio Grande do Sul (UFRGS), Rua Ramiro Barcelos 2350, Porto Alegre, RS 90035007, Brazil. E-mail: [amandavperez@gmail.com](mailto:amandavperez@gmail.com).

JAAD Case Reports 2021;17:122-5.

2352-5126

© 2021 by the American Academy of Dermatology, Inc. Published by Elsevier, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jidcr.2021.09.028>



**Fig 1.** Case 1. Appearance of the vulva at rest and under manipulation (**A**) before and (**B**) after treatment.

but there was a partial response to the use of tacrolimus and pimecrolimus. The use of clobetasol 3 times a week was maintained. She underwent a second vulvectomy and, while still using steroids, required fat grafting in the vulva due to changes in vulvar architecture and esthetics. Due to the worsening of signs and symptoms, she was submitted to the NARF treatment protocol. Photographic records were taken before the start of treatment and 30 days after the last application (Fig 1, A and B). Symptoms reported after treatment were dyspareunia (2/10) and vulvar pain (2/10). The patient denied itching and had resumed sexual activity with more pleasure. The appearance of the vulva was characterized by the absence of fissures and less skin thickening.

### Case 2

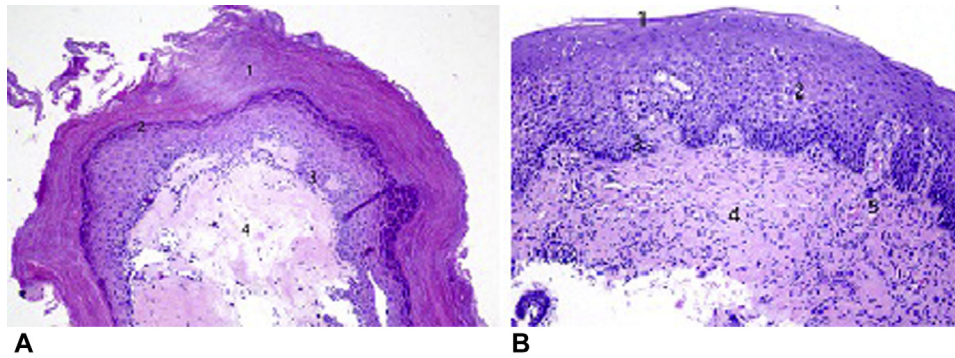
A 61-year-old woman presented to the clinic with complaints of dyspareunia (8/10) and vulvar itching (9/10). She had been diagnosed with VLS at the age of 60 years. On examination, she had thickened skin and fissures in the vulvar vestibule. She was initially treated with clobetasol ointment, without improvement, for 1 year. Due to the worsening of signs and symptoms, she underwent treatment with NARF. Images of the histologic sections of vulvar biopsies were taken before the start of treatment and after 30 days of the third session (Fig 2, A and B). Symptoms reported 30 days after the last application were dyspareunia (2/10) and vulvar itching (2/10). The posttreatment histologic findings revealed absence of hyperkeratosis, thickening of epithelial layers, a less organized basal layer with preserved maturation, less dense and more hypercellular collagen in the papillary dermis, and presence of new vessels.

### Case 3

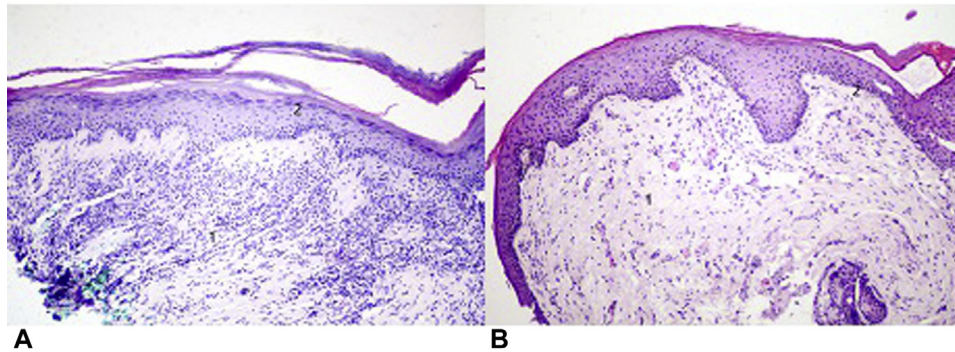
A 58-year-old woman, diagnosed with VLS 23 years previously, presented to the clinic with complaints of dyspareunia (9/10), vulvar itching (4/10), vulvar pain (7/10). She reported occasional bleeding during sexual intercourse. On examination, she had significant atrophy and thinning of the skin, loss of vulvar architecture with flattening of the anatomic creases, encapsulation of the clitoris, and a fissure near the clitoris on the left. She had been treated with steroid ointments for all these years. Due to the lack of improvement in symptoms and the presence of skin thinning (a possible consequence to the prolonged use of topical treatment), NARF was performed. Histologic sections of vulvar biopsies were performed before the beginning of treatment and 30 days after the last session (Fig 3, A and B). Symptoms reported 30 days after the last application were dyspareunia (3/10) and vulvar itching (2/10), and she denied vulvar pain. The patient gave a 9/10 score to the treatment, according to a numbered visual scale. The posttreatment histologic analysis showed significant reduction of the inflammation with minimal fibrosis remaining in the papillary dermis.

### DISCUSSION

VLS is a chronic disease that is difficult to control. The most frequent symptoms include itching, local irritation, dysuria, dyspareunia, fissures, genital pain, and stenosis. Genital atrophy is a consequence of the chronicity of the process and can sometimes hinder or even prevent sexual activity. The standard treatment for VLS is high-potency corticosteroid ointment, which, however, has side effects, such as skin atrophy, stretch marks, and depigmentation of the skin. It does



**Fig 2.** Case 2. Histologic findings on vulvar skin biopsy. **A**, Before treatment there was marked hyperkeratosis with hypergranulosis. The dermis showed hypocellular dense collagen in the papillary dermis with scant inflammatory cells. **B**, After treatment, there was no hyperkeratosis, with thickening of epithelial layers, less organized basal layer, hypercellular and less dense collagen in the papillary dermis, and neovascularization. (**A** and **B**, Hematoxylin-eosin stain; original magnifications: **A**,  $\times 100$ ; **B**,  $\times 200$ .)



**Fig 3.** Case 3. Histologic findings on vulvar skin biopsy. **A**, Before treatment, there was moderate hyperkeratosis with hypergranulosis. The dermis showed dense inflammatory infiltrate composed mainly of lymphocytes in a background of dense collagen. **B**, After treatment, minimal hyperkeratosis with prominent reduction of the inflammation was observed. Neovascularization was observed in the papillary dermis. (**A** and **B**, Hematoxylin-eosin stain; original magnifications: **A**,  $\times 100$ ; **B**,  $\times 100$ .)

not promote healing, and in many cases refractory to this therapy, other treatment options are tested.

Energy-based therapies have been used with good results in dermatology and in genitourinary syndromes, showing positive effects on the skin and genital mucosa. In NARF, the heating promotes fibroblast stimulation, with greater production of collagen and neocollagenesis. This effect depends on the temperature reached and the exposure time of the tissue. The NARF emitter device contains sensors that continuously inform the temperature reached, which allows fine control of the applied energy, minimizing risks and optimizing results. By not promoting ablation, the risk of fibrosis, an unwanted effect of thermo-ablative therapies, is also reduced.

The protocol used in these cases includes 5 fields of the vulva: the large right lip, large left lip, small

right lip, small left lip, and the clitoral region or posterior commissure, depending on the extension of VLS of each patient. The radiofrequency device has a specific software for external application (vulvar skin), in which each of these 5 topographies is treated for 3 minutes, time that starts as soon as a temperature of  $41^{\circ}\text{C}$  is reached. The temperature is continuously measured and maintained through a sensor on the heat-emitting metal plate. The handle is protected by a condom and the vulva receives a generous layer of ultrasound gel. The active part of the probe is passed slowly and with wide sweeps in each treatment zone, exerting light to moderate pressure. Subsequent applications took place at monthly intervals, totaling 3 sessions for each patient. None of them reported discomfort or had any complications related to the treatment.

The patients in this case series were chronic users of steroid ointment or underwent other treatment modalities to alleviate the symptoms and sequelae of VLS. In view of the partial responses evidenced in all treatments, the persistence of symptoms, and the repercussions of the disease and the treatments on quality of life, sexuality and vulvar aesthetics, an alternative treatment with NARF was proposed. Histologic analysis performed after 3 applications of NARF demonstrated an increase in epithelial maturation, improvement in the organization of the basal layer, thickening of the mucosa, and an increase in the granular layer. Neocollagenesis was also observed, with random collagen arrangements, increases in the number of fibroblasts and in the density of the stroma, and a reduction in the inflammatory process. Vulvoscopy imaging records showed an improvement in the appearance of the vulvar skin, and the answers to the questionnaires revealed an improvement in the symptoms presented by the patients.

In conclusion, as with the other treatments currently available for this pathology, NARF showed better results in some patients than in others, but it was beneficial in all cases reported. NARF may represent an important tool for the treatment of VLS. It is a safe resource, with minimal or no discomfort during application, easy adherence, and great practicality. Randomized clinical trials might be able to quantify the equivalence or superiority of this method compared with standard treatment.

**Conflicts of interest**

None disclosed.

**REFERENCES**

1. Federação Brasileira das Associações de Ginecologia e Obstetrícia (FEBRASGO). Dermatoses Vulvares (Líquens). In: Manual de orientação em Trato Genital Inferior. Nilma Antas Neves; 2010. Accessed March 15, 2021. [https://www.febrasgo.org.br/images/arquivos/manuais/Manual\\_de\\_Patologia\\_do\\_Trato\\_Genital\\_Inferior/Manual-PTGI-Cap-05-Dermatoses-Vulvares-Liquens.pdf](https://www.febrasgo.org.br/images/arquivos/manuais/Manual_de_Patologia_do_Trato_Genital_Inferior/Manual-PTGI-Cap-05-Dermatoses-Vulvares-Liquens.pdf)
2. Belotto RA, Chavantes MC, Tardivo JP, et al. Therapeutic comparison between treatments for vulvar lichen sclerosus: study protocol of a randomized prospective and controlled trial. *BMC Womens Health*. 2017;17(1):61.
3. Guerrero A, Venkatesan A. Inflammatory vulvar dermatoses. *Clin Obstet Gynecol*. 2015;58(3):464-475.
4. Virgili A, Borghi A, Toni G, Minghetti S, Corazza M. First randomized trial on clobetasol propionate and mometasone furoate in the treatment of vulvar lichen sclerosus: results of efficacy and tolerability. *Br J Dermatol*. 2014;171(2):388-396.
5. Kirtschig G, Becker K, Günthert A, et al. Evidence-based (S3) guideline on (anogenital) lichen sclerosus. *J Eur Acad Dermatol Venereol*. 2015;29(10):e1-e43.
6. Pounds R, Tahir S, Dawson C, Woodman C, Luesley D, Yap J. A survey on the use of topical steroids in patients treated for lichen sclerosus-associated vulval squamous cell carcinoma. *J Obstet Gynaecol*. 2018;38(2):265-269.
7. Vanaman Wilson MJ, Bolton J, Jones IT, Wu DC, Calame A, Goldman MP. Histologic and clinical changes in vulvovaginal tissue after treatment with a transcutaneous temperature-controlled radiofrequency device. *Dermatol Surg*. 2018;44(5):705-713.
8. Lee A, Fischer G. Diagnosis and treatment of vulvar lichen sclerosus: an update for dermatologists. *Am J Clin Dermatol*. 2018;19(5):695-706.
9. Tadir Y, Gaspar A, Lev-Sagie A, et al. Light and energy based therapeutics for genitourinary syndrome of menopause: consensus and controversies. *Lasers Surg Med*. 2017;49(2):137-159.
10. Vettorazzi J, Valério EG, Perez AV, et al. The effects of lichen sclerosus and its treatments on sexuality: case report. *Open J Obstet Gynecol*. 2019;9(6):755-763.
11. Bonjorno AR, Gomes TB, Pereira MC, et al. Radiofrequency therapy in esthetic dermatology: a review of clinical evidences. *J Cosmet Dermatol*. 2020;19(2):278-281.