

# Effects of mixed-technology CO<sub>2</sub> and Ga-As laser in patients with hidradenitis suppurativa—A case series



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**Key words:** hidradenitis suppurativa; mixed-technology CO<sub>2</sub> and Ga-As laser.

## INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic inflammatory condition with a complex pathophysiology, including genetic, environmental, and microbiological factors. One of the early pathogenic changes in the disease's development is considered to be follicular occlusion in apocrine gland-bearing skin. The natural history of HS is characterized by the recurrent development of inflammatory nodules, abscesses, and sinus tracts with subsequent scarring. The disease is associated with significant morbidity and requires long-lasting, continuous care. Over the last 2 decades, various laser treatments have increasingly been used in HS management, primarily ablative CO<sub>2</sub> (10,600 nm) with secondary intention healing and Nd:YAG (1064 nm) for selective destruction of the follicular unit.<sup>1</sup> Ablative fractional lasers (AFLs) have also been reported to improve scarring and, in combination with Nd:YAG, reduce inflammation.<sup>2</sup> To our knowledge, no reports on the use of non-ablative fractional lasers (NAFLs Ga-As, 1540 nm) exist to date, although NAFLs have been shown to improve inflammatory acne.<sup>3</sup>

## CASE SERIES

Our experience with 8 patients presenting with HS Hurley stages II and III who were treated with a combination of AFLs and NAFLs is set out below. Data from medical records were collected between

### Abbreviations used:

AFL:	ablative fractional laser
HS:	hidradenitis suppurativa
NAFL:	non-ablative fractional laser

November 2019 and April 2021, including treatment outcomes and patient characteristics (Table I).

Patients received treatment using mixed-technology CO<sub>2</sub> and Ga-As laser (YouLaser MT, Quanta System) and 2 different settings based on the Fitzpatrick skin type (Table II).

All patients had previously received both topical and at least 1 systemic treatment before the initiation of the treatment with the laser. The most common systemic treatments were adalimumab, tetracycline, acitretin, and metformin.

## DISCUSSION

All patients experienced improvement after NAFL + AFL treatment, with a reduction in the number of active lesions, reduced inflammation, and tenderness in treated nodules and less frequent flareups (Figs 1 and 2). In one of our best responders, all treated active inflamed lesions in 5 affected areas resolved after 6 rounds of treatment, also showing a good effect on 1 fistula and scarring. However, thereafter, new lesions occurred and treatment was continued. Two of the patients received >20

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Funding sources: None.

IRB approval status: Not applicable.

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JAAD Case Reports 2022;30:124-7.

2352-5126

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<https://doi.org/10.1016/j.jidcr.2022.10.022>

**Table I.** Mixed-technology CO<sub>2</sub> and Ga-As laser in patients with hidradenitis suppurativa

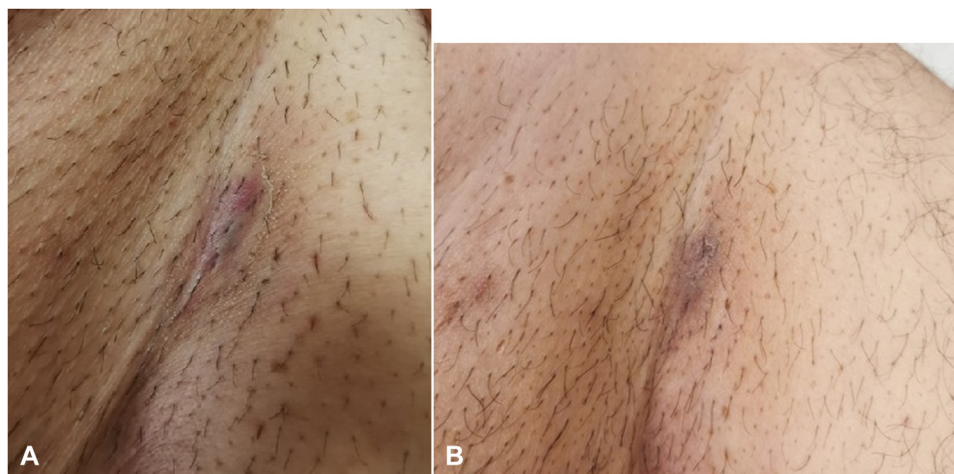
Patient no.	1	2	3	4	5	6	7	8
Sex	Female	Male	Female	Male	Male	Female	Female	Female
Age (y)	23	57	26	22	35	49	28	26
Duration of hidradenitis suppurativa (y)	3	7	1	8	9	42	15	4
Body mass index (kg/m <sup>2</sup> )	32	30.4	24.8	27.5	28	26.8	27.5	31
Hurley grade	III	II	II	II	II	II	II	II
Current status of smoking	Yes	No	No	No	No	No	No	Yes
Skin type (Fitzpatrick)	III	IV	IV	I-II	IV	IV	IV	I-III
Date of the first treatment	April 21	July 20	April 21	November 20	February 20	June 20	January 21	November 19
Family history	No	No	No	Yes	Yes	Yes	No	Yes
No. of affected body sites*	3	3	1	3	3	4	4	2
No. of treatments	5	33	5	19	14	26	8	19

\*Affected body sites: axilla, inguinal, genital, breast, gluteal and neck. Example; if both axillas were affected this was numbered as 1 affected body site.

**Table II.** Settings for mixed-technology CO<sub>2</sub> and Ga-As laser based on Fitzpatrick skin type

Settings	Skin type I-III		Skin type IV-VI	
	AFL (10,600 nm)	I-III NAFL (1540 nm)	AFL (10,600 nm)	IV-VI NAFL (1540 nm)
Power (W)	16.0	8.0	16.0	8.0
Pulse width (ms)	0.5	6.0	0.25	4.0
Energy (mJ)	8.0	48.0	4.0	32.0

AFL, Ablative fractional laser; NAFL, non-ablative fractional laser.



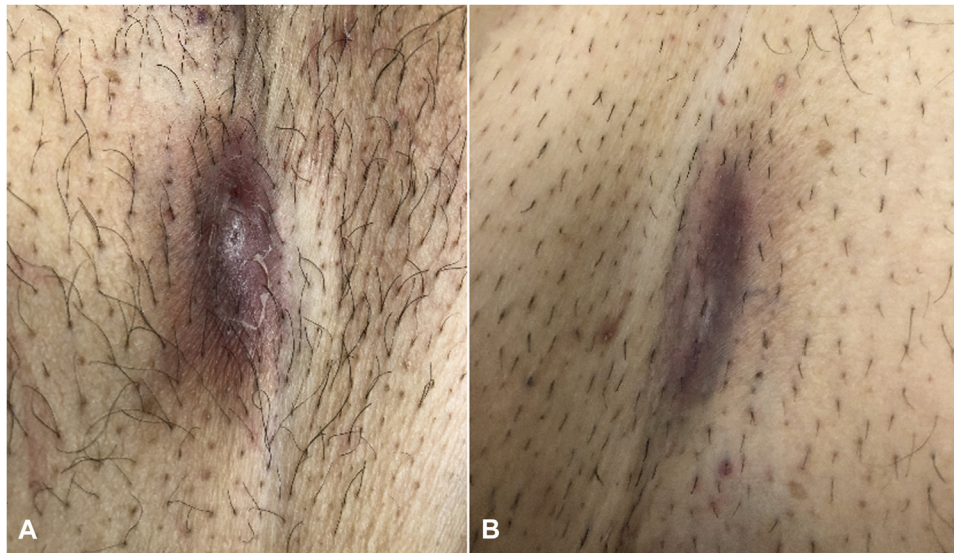
**Fig 1.** Inguinal hidradenitis suppurativa lesion (patient 2) (A) just after treatment and (B) 1 week later showing a marked reduction in inflammation.

treatments. These patients had active disease and experienced the positive effect of laser treatments on new lesions, although other treatment regimens were ineffective.

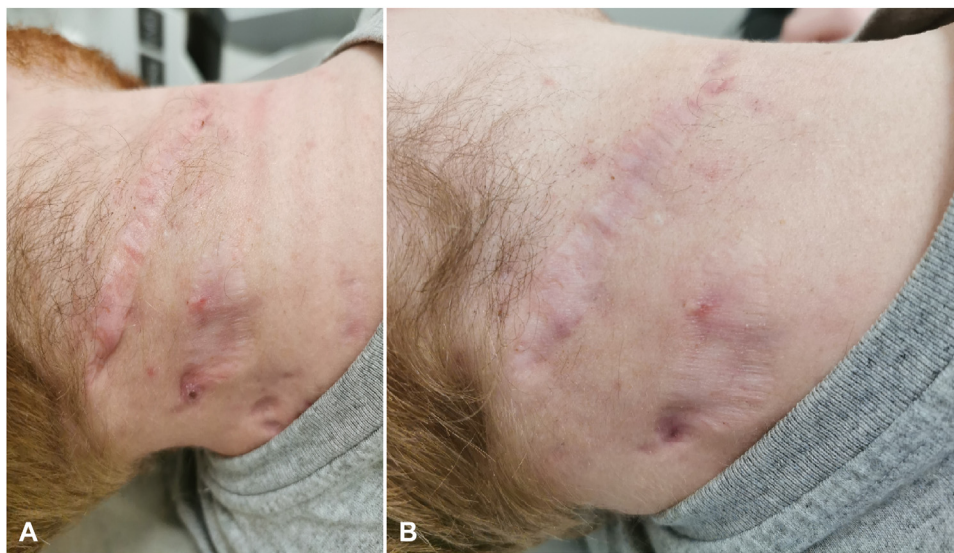
In accordance with previous studies, the mixed-technology laser (NAFL, AFL) was well tolerated by patients<sup>4</sup>; a temporary redness and slight burning sensation that lasted for 1 to 2 hours developed in all patients. At follow-up, hyperpigmentation or

scarring due to the intervention had not developed in any of the patients.

Mechanisms that could explain the positive effects observed with mixed-technology laser treatment are the reduction of follicular inflammation, remodeling of the extracellular matrix, reduction in sebum production, and follicular plugging, as well as possible effects on biofilm formation. Furthermore, AFLs increase the depth of penetration of NAFLs, possibly



**Fig 2.** Inguinal hidradenitis suppurativa lesion (patient 2) **(A)** before treatment **(B)** and after 9 treatments.



**Fig 3.** Hidradenitis suppurativa scars in the head and neck area (patient 4) **(A)** before and **(B)** after 3 rounds of treatment.

increasing their therapeutic effect.<sup>2</sup> The use of a fractional mode decreases the side effects and shortens the downtime. Another benefit observed in our patient was increased mobility in tissue scarred by the disease, which was a benefit that had also been observed when treating other conditions using only AFLs<sup>5</sup> (Fig 3).

In conclusion, the findings of this case series indicate that the combination of AFLs and NAFLs is a promising treatment for patients with HS. Studies are needed to confirm the effectiveness and safety of this

treatment, as well as investigate the mechanisms behind the effects.

#### Conflicts of interest

None disclosed.

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