Microwave Energy for Managing Hidradenitis Suppurativa

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Background & Synopsis

Treating hidradenitis suppurativa (HS) remains challenging due to its chronic, recurring nature and resistance to conventional therapies including antibiotics, anti-inflammatories, and surgery[1,2]. The associated pain, drainage, malodor, and scarring also significantly impact patients' mental and physical quality of life, necessitating the need for more effective treatments. While the pathogenesis of HS is complex, the migration and excessive accumulation of inflammatory cells, particularly neutrophils, within HS lesions is a significant component of the disease[3,4]. Light and laser-based devices can promote the resolution of HS lesions through follicular destruction and anti-inflammatory effects of heat generated in the tissue[1,5]. Short-term heating of tissue to fever-like levels over 41°C, known as hyperthermic temperatures, suppress inflammation by inhibiting of neutrophil migration[6,7]. The use of microwave energy (ME) has the potential to rapidly heat HS lesions to hyperthermic temperatures, reduce inflammation, and allow lesions to heal more effectively than lasers and light, but this has yet to be examined. It has been reported that ablative approaches using ME-based devices may worsen HS by generating new lesions and leading to other adverse events[5,8].

Six cases presented here demonstrate the use of precise and brief surface-based applications of ME to HS lesions from an FDA-cleared microwave device to generate localized hyperthermic conditions in HS lesions. Reductions in pain, erythema, inflammation and drainage were observed in the treated HS lesions. In several cases, these treatments led to the clearance of moderate and small HS lesions. These cases strongly support the need for further research to fully understand the mechanisms driving these outcomes. If additional studies support the observations described here, ME treatments could represent a novel, non-invasive treatment modality for the management of HS.

Objective

Assess the feasibility and impact of treating HS lesions with sub-ablative heat generated by microwave energy (ME) as a novel, non-invasive treatment option.

Methods

- A total of 23 HS lesions from 6 patients were treated with ME energy
- Medical device that generates 8Ghz ME was used for treatments
- Treatments consisted of 5 repetitive 2s pulses of 4 to 6W ME to full area of lesions
- Treatment sessions repeated 3 to 5 times with variable intervals (see data below)
- One patient received ME as monotherapy, 5 others received concurrent treatments, including isotretinoin, adalimumab, or secukinumab, spironolactone, benzoyl peroxide wash and clindamycin.

Microwave generator medical device

* The microwave device and consumables were provided by Emblation Ltd. to support this work.

Examples of Patient Data & Outcomes

Patient 1

HS lesions in left lateral abdomen
1 persistent lesion
Pt also on minocycline, benzoyl peroxide wash and clindamycin

Tx1 settings: 4W | 2s | 5x — Pain before Tx: 5
Tx2 settings: 4W | 2s | 5x
Tx3 settings: 4W | 2s | 5x
Tx4 settings: 6W | 2s | 5x
Tx5 settings: 6W | 2s | 5x — No Pain

Outcome

Pt states lesion is painless

Lesions visibly improves through 3rd Tx.

Long gap until 4th Tx demonstrates regression of lesion, which improves again after a single treatment as seen on day 70

Patient 2

Hurley Stage 3 patient - HS lesions in left axillae
3 persistent lesions treated; 1 lesion emerged during course of Tx
Pt previously on adalimumab with no change, started secukinumab at time of 1st ME treatment

Tx1 settings: 4W | 2s | 5x
Tx2 settings: 4W | 2s | 5x
Tx3 settings: 4W | 2s | 5x

Outcome

1 lesion resolved, 3 persisted

Pain reduction reported for all

Color Circles
Red Tx site
Green Resolution site
Yellow Persisting / no Tx

Patient 3

4 persistent folliculitis-like lesions in axillae; 1 lesion emerged during course of Tx
Pt previously on isotrentinoin, then adalimumab but lesions didn't resolve. Pt currently on spironolactone.
Pt and clinician had concern these lesions would develop into full HS

Tx1 settings: 4W | 2s | 5x — Pain before Tx: 2
Tx2 settings: 4W | 2s | 5x
Tx3 settings: 4W | 2s | 5x
All but 1 of lesions resolved — No Pain

Outcome

Pt reported after day 23 that all lesions resolved

Pt now on spironolactone with annual follow ups

Patient 4

HS lesions in left abdomen
1 of 7 persistent lesions shown
Pt was on adalimumab, in process of switching to secukinumab after 4th treatment

Tx1: 4W | 2s | 5x — Pain before Tx: 6
Tx2: 4W | 2s | 5x
Tx3: 4W | 2s | 5x
Tx4: 4W | 2s | 5x — Pain at time of Tx: 3

Outcome

Lesion has post-inflamatory hyperpigmentation, otherwise clinically resolved

No longer draining or painful

Patient 5

Single HS lesion in left groin
ME used as a monotherapy

Tx1: 4W | 2s | 5x — Pain before Tx: 8
Tx2: 4W | 2s | 5x
Tx3: 4W | 2s | 5x
Tx4: 4W | 2s | 5x — Pain at time of Tx: 1

Outcome

Pt did not wish to take medications for a single lesion.

Significant clinical improvement observed.

Pt reports full absence of pain, no drainage

Patient 6

HS lesions in left axillae
2 persistent lesions treated; 1 lesion emerged during course of Tx
Pt on minocycline oral and benzoyl peroxide wash, started secukinumab after I&D

Tx1: 4W | 2s | 5x — Pain before Tx: 8
Tx2: 4W | 2s | 5x
Tx3: 4W | 2s | 5x
Tx4: 4W | 2s | 5x — Pain at time of Tx: 2
I & D of new lesion — Previously Tx sites not involved
FU to I&D

Outcome

The two lesions being treated seem to remain inactive.

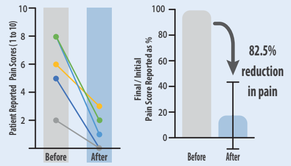
However, the emergence of a new lesion that was severe and required incision and drainage discouraged continued ME

LESION QUALIFIERS

Total number of lesions treated: **23**

Number of lesions with pain reduction after ME: **ALL**

Lesion severity	Minor	Moderate	Severe
Resolved	7	1	1
Improvement	0	2	4
No change	0	7	1



*Note: Only 5 patient Pain Scores shown. Patient 2 was lost to follow-up, no final Pain Score reported

Results and Conclusions

- ME treatments reduced HS lesion erythema, inflammation, drainage, and patient-reported pain in six patient cases.
- Several lesions resolved completely after treatment.
- Patients receiving concurrent ME treatment alongside biologicals and antibiotics experienced faster improvements compared to typical treatment timelines.
- One patient treated with ME as a monotherapy showed similar benefits to those receiving ME as an adjuvant therapy.
- These cases highlight the need for further research and clinical investigations to better understand the efficacy of ME as a treatment for HS and to elucidate its mechanism of action.

References

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