

# A case of radiation-induced localized exacerbation of hidradenitis suppurativa

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**Key words:** Hidradenitis suppurativa; radiotherapy.

## INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic inflammatory skin condition associated with a significant social and medical cost. Patients with HS may require emergency department care and inpatient care, and a study found that these patients have greater health care utilization compared with those with psoriasis.<sup>1</sup> The prevalence of HS in the United States has been reported as low as 0.05%<sup>2</sup> and as high as 4%.<sup>3</sup> It most commonly occurs in women with an average age of onset of 23 years.<sup>4</sup> Its destructive nature can be quite debilitating, and treatment is seldom curative. The typical lesions include recurrent, painful nodules and abscesses in intertriginous areas that may form sinus tracts.<sup>5</sup> The most common locations for HS lesions in women are the inframammary region and the groin, whereas for men they are the buttocks and the perineal area.<sup>4</sup>

HS is graded on severity based on the Hurley stages I to III. Numerous options have been investigated for the treatment of HS; however, most are ineffective in achieving complete remission. Treatment options are often chosen based on disease severity and impact of the disease on quality of life. Current treatment options include oral zinc supplementation; laser hair removal; carbon dioxide (CO<sub>2</sub>) laser ablation; oral antibiotics such as clindamycin plus rifampicin, dapsone, and tetracyclines; and surgical unroofing and more extensive surgical excision. Biologics and immunosuppressants are considered for more recalcitrant and symptomatic patients with stage III disease.<sup>4</sup> Recent research has also found that CO<sub>2</sub> laser therapy has comparable recurrence rates to those of wide excision.<sup>6</sup>

### Abbreviations used:

CO<sub>2</sub>: carbon dioxide  
DCIS: ductal carcinoma in situ  
HS: hidradenitis suppurative  
IL: interleukin

We report the case of a female patient who had a flare of HS over the entire radiation site after treatment for ductal carcinoma in-situ (DCIS). Radiotherapy commonly causes acute skin toxicity, which may include erythema, edema, and desquamation<sup>7</sup> but to date has not been linked to the development of HS. In the past, radiotherapy was actually used to treat early lesions of HS.<sup>4</sup>

## CASE REPORT

A 52-year-old woman with a history of HS of the axillae, inframammary folds, and groin presented with exacerbation of her disease. HS was diagnosed when she was in her 30s, and her disease had been quiescent since a 35-pound weight loss at age 40. She would have an occasional flare in the groin, axillae, and under her breasts but never needed any medical treatment. A few months before this flare, DCIS was diagnosed, and she underwent a lumpectomy along with 6 weeks of radiation to her right breast. Radiation dermatitis developed involving the right breast only. She had well-demarcated, thin, angulated erythematous, mildly scaly plaques on the right breast. She treated this inflammation with a petrolatum-based ointment several times daily until the redness resolved over several weeks. As the redness was resolving, she noted the development of

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Funding sources: None.

Conflicts of interest: None declared.

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JAAD Case Reports 2016;2:44-6.

2352-5126

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<http://dx.doi.org/10.1016/j.jidcr.2015.11.009>



**Fig 1.** Erythematous papules and open and closed comedones on the right breast developing after radiation dermatitis.

numerous inflammatory nodules limited to her right breast.

On examination, over her right breast and inframammary fold, she had open and closed comedones along with erythematous papules and nodules on the superior, lateral, and medial breast (Fig 1). The extent of the lesions and background of hyperpigmentation were strikingly contained within the distinct margins of the radiation treatment (Fig 2). She only had a resurgence of HS in the area affected by radiation. She did not receive hormone therapy after lumpectomy and radiation.

This flare of HS could be categorized as Hurley stage II disease because of the formation of recurrent abscesses with sinus tract formation. She began treatment of HS with oral doxycycline, topical clindamycin 1%, and zinc supplementation. She also received intralesional triamcinolone injections to the inflamed papules and nodules. The topical treatments proved to be too irritating because of the concomitant radiation dermatitis, and she did not notice benefit with the oral doxycycline. The steroid injections helped control her disease, however.

## DISCUSSION

The exact cause of HS is unknown. Many studies have elicited risk factors for HS, which include obesity, metabolic syndrome, psoriasis, Crohn's disease, smoking, and systemic inflammation in general.<sup>4,8</sup> Factors that have been associated with increased severity of disease include male sex, obesity, smoking pack-years, disease duration, and lesions in the axillary, perianal, and mammary regions.<sup>9</sup>

HS begins with follicular plugging that leads to ductal rupture and then secondary inflammation. Histologically, this results in perifolliculitis, follicular hyperkeratosis, follicular hyperplasia, and epidermal psoriasiform hyperplasia.<sup>4,10</sup> In addition to genetic, endocrine, and hormonal influences, the innate immune system is found to play an important role in the development of HS. Studies show that HS skin is associated with an influx of immune cells, including



**Fig 2.** Erythematous nodules, abscesses, and sinus tracts on the right breast in the area treated with radiation.

macrophages, dendritic cells, B cells, and CD3<sup>+</sup>, CD4<sup>+</sup>, and CD8<sup>+</sup> T cells. Patients with HS are also found to have an enhancement of pro-inflammatory cytokines, such as tumor necrosis factor alpha, interleukin (IL)-1 $\beta$ , IL-10, IL-17, IL-12, and IL-23. This enhancement has led to new developments in the treatment of HS with immunomodulators, such as infliximab, adalimumab, and ustekinumab.<sup>10</sup>

Considering the pathogenesis of HS, it is surprising that radiotherapy would cause an exacerbation of HS. Studies found that radiation decreases cutaneous immunosurveillance, which would decrease the number of immune cells in the skin, instead of increasing them, as seen in HS.<sup>11</sup> Radiotherapy also induces apoptosis in tumor cells along with causing the abscopal effect, which reduces the number of tumor cells outside of the area of radiation. This effect is not well understood but may be immune mediated by increasing the number of antigen-presenting cells and effector T cells in the skin owing to dying cancer cells that release antigens.<sup>12</sup> Radiotherapy, therefore, could cause an exacerbation of HS considering the influx of immune cells present in the skin of patients with active HS lesions. There is also a difference in the intensity of radiation used in the past to treat HS (3–8 Gy) compared with that used to treat DCIS (50 Gy).<sup>13</sup> The potential therefore exists to induce more apoptosis with more radiation inducing a greater immune response leading to a flare of HS.

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