Wound Sleuth

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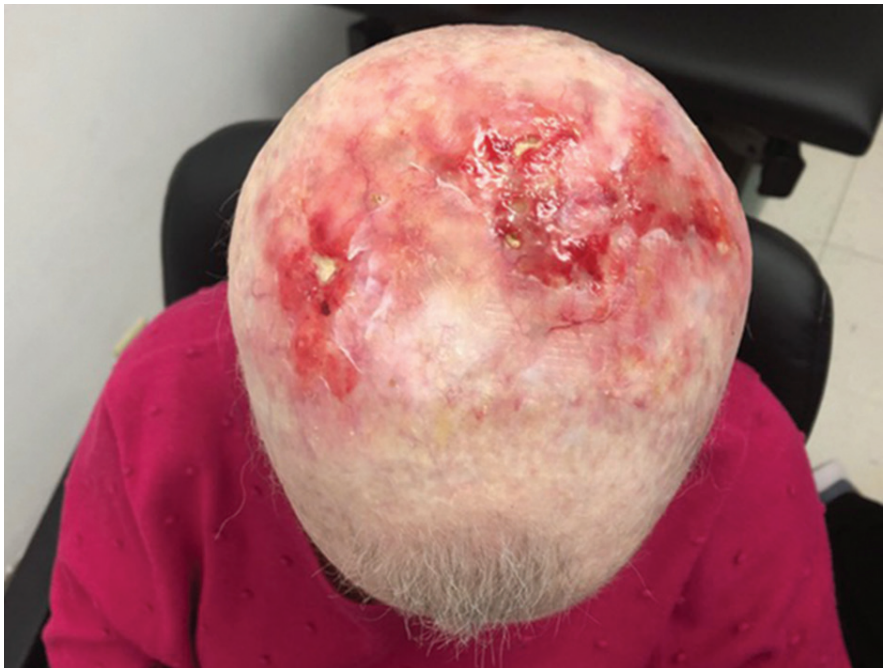
An Ulcerated Scalp

Mrs. D is a 70-year-old female who was first seen in 2005 for ulcerations on her scalp. At that time the four areas of ulceration were pustular, moist, mildly itchy and increasing in number and size, although not painful. She has a history of asthma, osteoporosis, complete hair loss, thyroid surgery, recurrent scalp infections (often with methicillin-resistant *Staphylococcus aureus* [MRSA]), actinic keratosis (red, scaly, precancerous lesions), and has had a basal cell carcinoma removed from her face (2007). She wears a hairpiece to cover her hair loss.



Questions for the Reader

Q What is the cause/diagnosis, and how would you investigate this patient?

A Mrs. D had radiation to her scalp, in Italy, at four years of age to treat a fungal infection (possible tinea capitis)—at a time when there was no effective systemic or topical therapy for this condition. There is limited evidence to support the effectiveness of radiation therapy for human tinea capitis.

These areas of ulceration are caused by late radiation changes associated with thinning of the skin, and loss of skin appendages (hair follicles, sweat glands), along with the risk of local inflammation, infection and malignant transformation. A skin biopsy to rule out other diagnoses should be performed along with blood work and an X-ray of the scalp to rule out infiltration in the scalp from malignant transformation or contiguous osteomyelitis.

Q What other diagnoses/causes would you consider?

A There are a number of other conditions you might consider. See Table 1: Differential Diagnoses for a list.

Management

These wounds were classified as maintenance wounds, because some areas would close and others remained open. Biopsies were required for lesions sus-

Table 1: Differential Diagnoses

Lesion	Clinical Characteristics & Treatment
Basal cell carcinoma	• Easy bleeding, telangiectasia (fine thread-like blood vessels, pearly borders and possible central ulceration). • Requires removal.
Squamous cell carcinoma	• Keratin associated with depth of the margin and may have a cutaneous horn protruding from the surface. • Requires removal.
Actinic keratosis	• Red, scaly lesions that can be thin and easily palpated. • Thick lesions may be associated with a cutaneous horn. • Atypical cells and can progress to squamous cell. • Requires observation, cryotherapy, chemical treatment, surgical removal.
Psoriasis of scalp	• Silvery scale and underlying erythema that spreads discretely beyond the scalp. • Requires treatment with topical corticosteroids, retinoids, medicated shampoo, coal tar, ultraviolet light. Systemic treatment includes oral or injected medications such as corticosteroids, retinoids, biologics.
Seborrheic dermatitis	• Fine greasy scale and underlying erythema in scalp, eyebrows and facial creases. • Requires anti-seborrheic shampoo, topical steroids.
Chronic cellulitis	• Painful erythema and swelling, warm to touch, may have exposed bone. • Requires oral antibiotics (generally that target gram-positive and gram-negative bacteria), severe cases require intravenous antibiotics. May also need appropriate wound care measures depending on the presentation
Local infection – Critical colonization	• Non-healing ulcer, exudate, red, friable granulation, debris, odour. • Requires topical treatment with ionized silver, delayed-release iodine, PHMB/chlorhexidine, crystal violet and methylene blue foam.

picious of malignancy. An anti-inflammatory antibiotic (doxycycline) was prescribed. For an effect against methicillin-resistant *Staphylococcus aureus* (MRSA), the doxycycline was administered in a dose of 100 mg twice daily with anti-inflammatory effects at doses of 40 to 100 mg.

For local wound care, the area was cleansed with a chlorhexidine solution (a mouthwash with a water base, used off label because there is no stinging or burning effect), and the open areas were covered with a non-adherent dressing containing slow-release povidone-iodine, and a secondary non-adherent dressing was held in place with a soft silicone tape. This enabled the patient to wear her wig comfortably. Debridement of crust was performed on an as needed basis. 5-fluorouracil topical cream, a false nucleotide that interferes with DNA as an anti-neoplastic agent, was recommended as an option for the topical treatment of potential premalignant actinic keratoses and superficial basal cell carcinoma. This cream was applied twice a week to identify and remove any potential superficial skin cancers.

The patient actively performs regular skin checks and applies sun protection.

Conclusion

Mrs D's case illustrates the importance of a detailed history and addressing the patient's concerns, in addition to treating the wound. Due to her history of radiation treatment during childhood, which created a large amount of scar tissue, she needs to be monitored for secondary complications: infection, persistent inflammation or malignant transformation. Her scarring and non-reversible hair loss have had a significant impact on her physical and emotional well-being, but she is grateful for the long-term support from her husband and health-care providers.

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