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You're the flight surgeon for a combat aviation brigade. A 33-yr-old active duty female pilot presents to your clinic concerned about an asymmetrically shaped, small "black spot," approximately 5 mm × 3 mm on her left forearm. The surrounding skin is edematous and erythematous, well-demarcated, ovoid in shape, approximately 11 cm × 5 cm. There appear to be small vesicles forming just proximal to the black spot. The area of concern is painless, nonpruritic, and cool to the touch. She denies scraping or picking at the black lesion.

She is a competitive athlete on the All-Army obstacle course team and recently competed in a race on the Central Coast of California 7 d prior to her visit. Originally, she noticed the black spot a few hours after the race (**Fig. 1A**). At that time it was flat and had no visible break in the skin. Other lesions, which were pruritic, appeared at various intervals over the next 6 d and were spreading on her upper extremities (**Fig. 1B**), chest, and back. The race occurred on the mountains and through heavily vegetated trails. She mentioned there were abundant amounts of poison oak on the course and believes she has been exposed, but is primarily concerned about the black spot on her left forearm and its current appearance 1 wk after the race (**Fig. 1C**).

Her medical history is unremarkable. Her father was diagnosed with melanoma and she admits to having "too much" sun exposure while growing up in Florida. She has never had any lesions like this in the past. She is unsure if she has been exposed to poison ivy before. She denies any medication, herbal supplements, or drug/alcohol use.

1. What is your diagnosis for the black spot?

A. Brown recluse spider bite.
B. Black spot poison ivy.
C. Excoriated insect bite with mild surrounding cellulitis.
D. Melanoma.

ANSWER/DISCUSSION

1. B. The diagnosis of poison ivy dermatitis is typically made based on a history of exposure and a characteristic pattern of a well-demarcated contact dermatitis in areas of skin that could have come in contact with the plant. Typically, poison ivy exposure presents with linear streaks that are pruritic. In her case, a rare presentation of black spot poison ivy was diagnosed on her left arm with the typical presentation on the other extremities and chest. For this presentation to appear as a black spot, there must be a high concentration of urushiol from the *Toxicodendron* plant species. The darkening of the oleoresin occurs in nature because of chemical change that requires the presence of dopa-oxidase, tyrosine, moisture, and oxygen.[4] The spot may appear as soon as 6 h after exposure depending on the concentration.[1] The black spot is initially asymptomatic and takes days before symptoms occur.

Her concern was a brown recluse bite that may look very similar. For a brown recluse bite, you may be able to identify small cutaneous puncture marks with surrounding erythema. The bite may be a red plaque or a papule with central pallor, sometimes with vesiculation around the site, which is very similar to the patient's presentation. Pain will likely be present, but the lesion is self-limited and resolves without further complications in approximately 1 wk. However, in some patients, the lesion will develop a dark, depressed center over the ensuing 24 to 48 h, culminating in a dry eschar that ulcerates.[5] Brown recluse spiders are very unlikely to be in the central and northern parts of California. They are typically found in the Midwest and southern states.[5] The time presentation, symptoms, location of the leading events, and the lack of punctured skin likely rule out the brown recluse bite.

An excoriated insect bite with mild surrounding cellulitis was ruled out. The patient was not having any other symptoms such as fevers or chills and the surrounding area was not warm to the touch. The black spot was still below the skin and there was no evidence of skin excoriation.

The black spot does have features similar to melanoma, but can be ruled out based on the sudden appearance and symptoms of the lesion.

2. What ancillary workup is indicated?

A. None needed.
B. Dermoscopy.
C. Shaving biopsy.
D. Punch biopsy.

ANSWER/DISCUSSION

2. A. In this case, no further workup was needed. The diagnosis of black spot poison ivy was made based on history and clinical findings.

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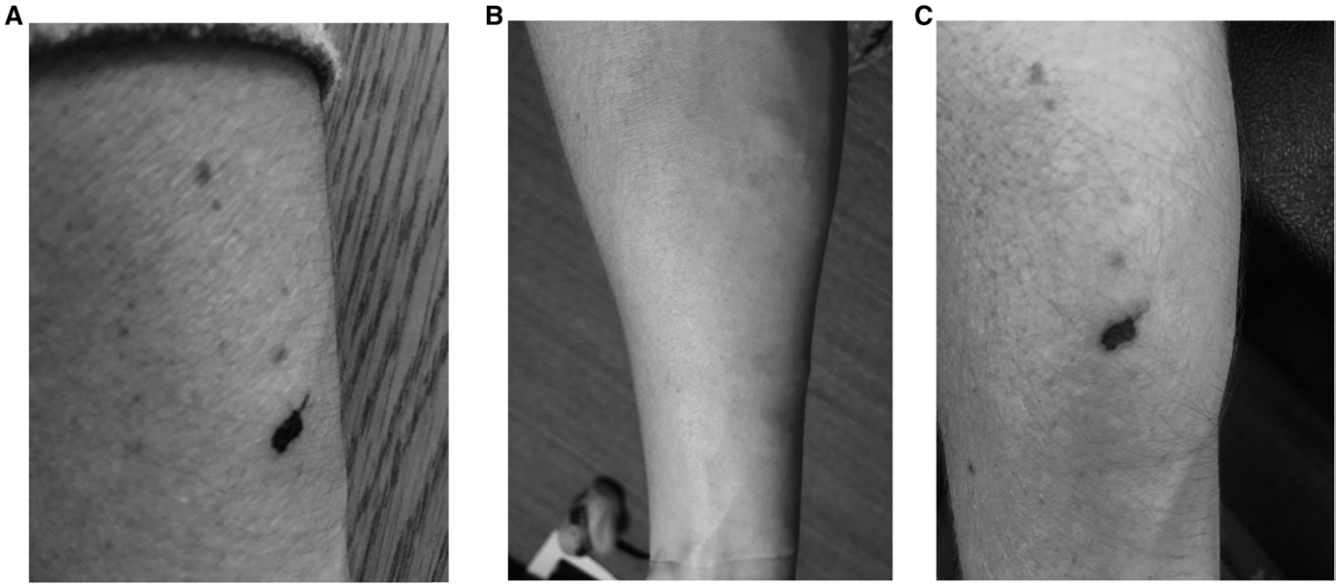

Fig. 1. Arm lesions. A) Left arm, black spot, macule, uneven borders, approximately 6 h after race. B) Right arm 7 d after race with multiple pruritic papules. C) Left arm, black spot, 7 d after race; edematous, erythematous, with small vesicles surrounding the black spot.

In some black spot poison ivy studies, providers performed a punch biopsy in several separate cases and revealed an amorphous yellow material in the stratum corneum and areas of coagulation necrosis in the epidermis in the black spot lesions.[1] Some authors found that dermoscopic appearance is unique for black spot poison ivy, but as a flight surgeon it is unlikely you will have this equipment available in the field and it is not necessary for diagnosis.[6]

3. How would you treat this?

A. Antihistamines.
B. Topical steroids.
C. Oral steroids.
D. Antibiotic.

ANSWER/DISCUSSION

3. B. and/or C. High-potency topical corticosteroids are most helpful early in poison ivy dermatitis and have been used in previous cases of black spot poison ivy to relieve symptoms. Low-potency steroids provide little relief. Patients with severe dermatitis on the face, genitals, or other sensitive areas may require systemic steroids instead of high-potency topical steroids due to side effects. In these situations, a 14- to 21-d course of oral prednisone is recommended. A shorter course, such as a Medrol dose pack, may cause a rebound dermatitis and should be avoided.[2] There is little evidence to support the use of antihistamines. Some patients may find relief through the sedating side-effects, which allow patients to sleep. The pruritus experienced by poison ivy dermatitis is not due to histamine release; rather, it represents a type IV sensitivity (cell-mediated) reaction. Antibiotics are not usually recommended unless you suspect a secondary infection.

Initially, the patient in this case refused the oral and topical steroids because her symptoms were mild. She returned to clinic a week later for follow-up and admitted that the pruritus worsened and she began to apply over-the-counter hydrocortisone cream on both extremities with little relief. Visually, the black spot lesion still remained subdermal, but the erythema and edema significantly decreased. There was still no pain to palpation. She was given high-potency topical steroids. About 4 wk after the initial appearance of the black spot, the lesion surfaced and eventually fell off, with a

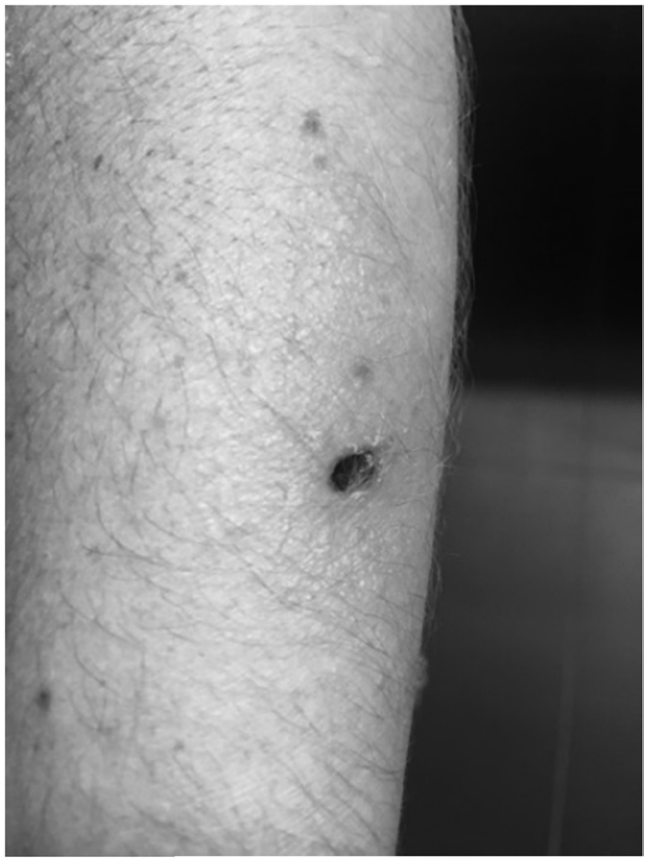

Fig. 2. Left arm, black spot, 1 mo after exposure.

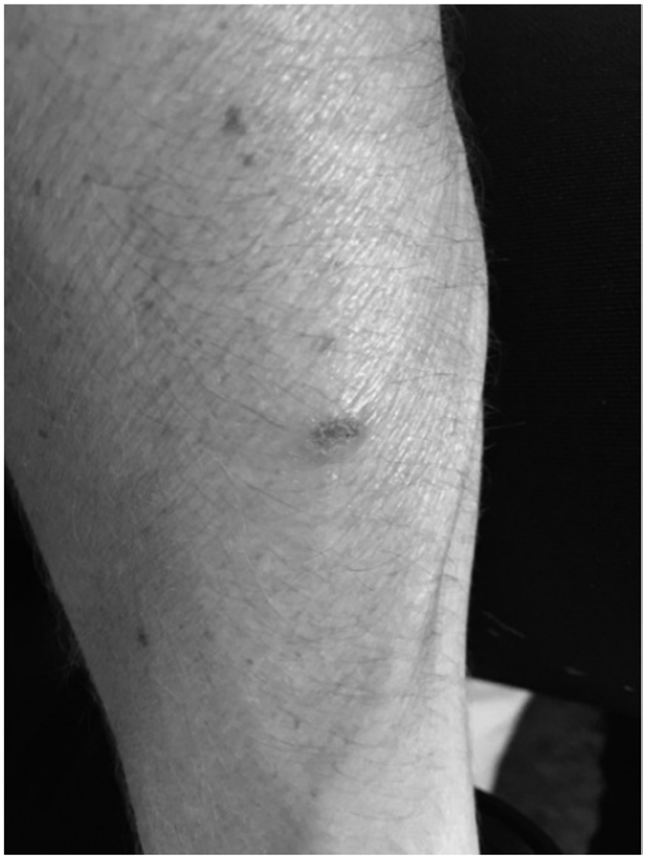

Fig. 3. Left arm 2 mo after exposure after the black spot was removed.

residual shallow depression that eventually resolved without scarring (**Fig. 2**).

4. What advice can you give her for her future races and prevention?

A. Wash skin immediately after suspected exposure.
B. Be aware of recurrent exposures if urushiol is on clothing or equipment.
C. Use over-the-counter prevention barriers.
D. All the above.

ANSWER/DISCUSSION

4. D. The most important step for her would be to immediately wash her body after the race with soap and water. At 10 min, 50% can be removed, at 15 min 25%, at 30 min only 10%, and after 30 min all of the oil has been absorbed.[3] There are several over-the-counter barrier creams she could apply prior to a race. If possible, she should wear long sleeves and pants during the race. Additionally, patients should be advised to wash clothes thoroughly when exposed to poison ivy. Even after washing in soap and hot water, there have been reported cases where clothing retained allergic properties. These fomites may cause dermatitis for months if left unwashed and in a dry environment.[7]

AEROMEDICAL DISPOSITION

The patient refused oral steroids, but agreed to use high-potency topical steroids. She was given a downslip for 1 wk until her symptoms subsided. Although there is not a specific policy in the Army, Air Force, Navy, or Federal Aviation Administration regarding poison ivy exposure and flight, her reaction was severe enough to be considered distracting or to interfere with the proper wearing of equipment. After 2 wk from her original visit, the pruritus subsided. At 2 mo since initial exposure, she still has a small, healing lesion where the black spot previous subsisted (**Fig. 3**). The literature states that these lesions could take months to completely heal and should not leave any scarring.[1]

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