

**Case report**

**Alopecia as the presenting symptom of syphilis**

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**Abstract**

Alopecia can be one of the many symptoms of secondary syphilis and the clinical presentations include essential syphilitic alopecia or symptomatic syphilitic alopecia. In this report, we present a case of a patient with essential syphilitic alopecia whose sole presenting symptom of syphilis was alopecia. Despite an initial negative rapid plasma reagin (RPR) test, he was ultimately found to have syphilis on scalp biopsy. His alopecia improved following treatment with benzathine penicillin. This presentation serves as a reminder to clinicians to be cognizant of alopecia as a presenting sign of syphilis. A review of the specificity and sensitivity of the typical tests used for the diagnosis is presented.

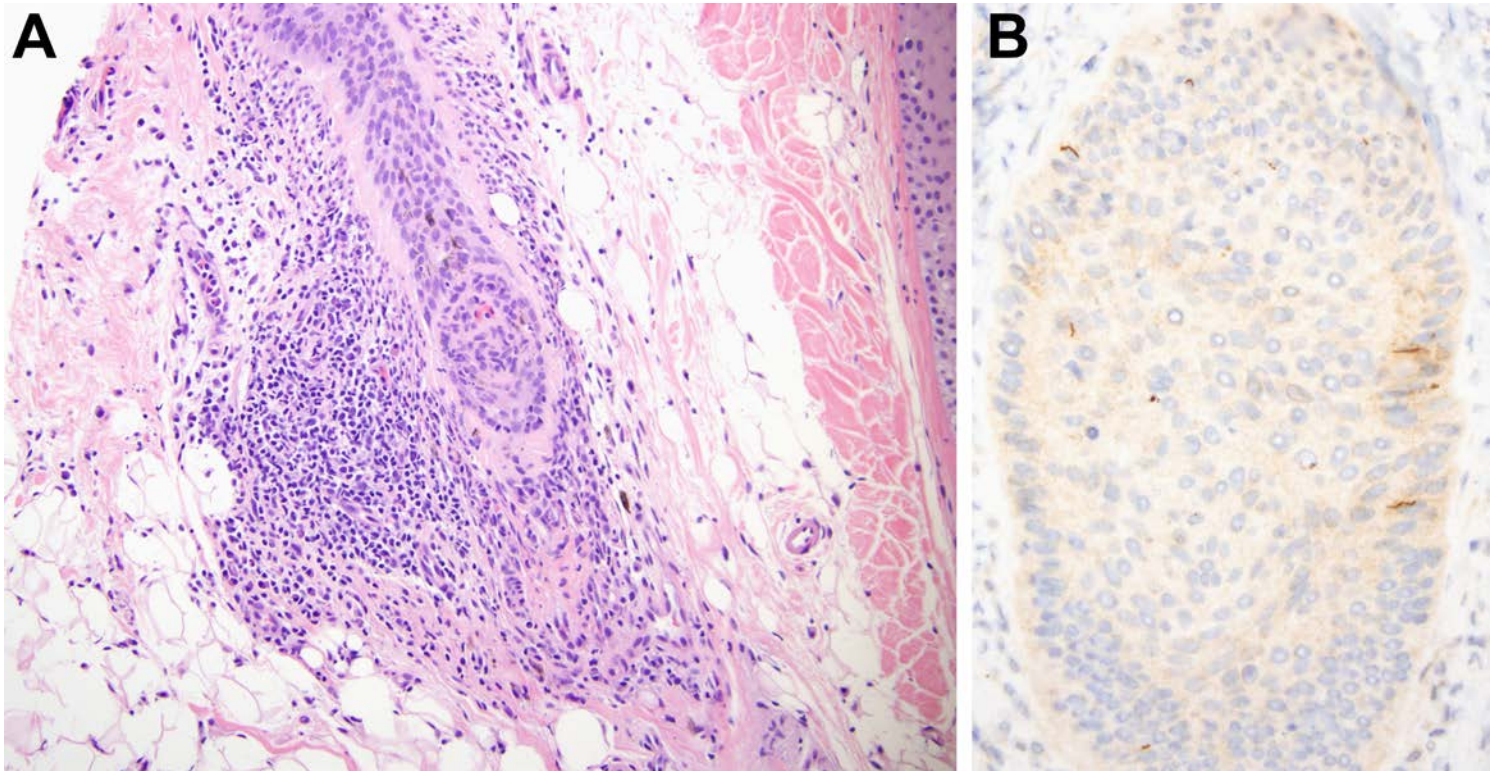
**Case synopsis**

A 50-year-old man presented to the UC Davis Dermatology Department with a diagnosis of telogen effluvium associated with a three-month history of diffuse hair loss as well as diarrhea and a twelve-pound weight loss. His alopecia was otherwise asymptomatic. He reported no hospitalizations, surgeries, or changes in medications over the past 6 months. He reported being in a monogamous relationship for 12 years and denied lesions on his genitalia, rashes, or any urethral discharge. He denied any history of illicit drug use or blood transfusions.



**Figure 1.** A) Patchy diffuse alopecia of the entire occipital scalp. B) Second view of the temporal scalp.

Physical exam revealed patchy, non-scarring, non-erythematous alopecia that diffusely involved his entire scalp (Figure 1). His eyebrow, facial, and body hair were preserved. There was no pitting of his fingernails or toenails. The results of his hair pull test were negative.



**Figure 2.** A) P Peribulbar inflammatory infiltrates with lymphocytes and plasma cells are present. B) Immunohistochemical stain for *Treponema pallidum* highlights corkscrew-shaped organisms within the hair follicle epithelium.

The following laboratory tests were within normal limits: ferritin, thyroid stimulating hormone, total and free testosterone, vitamin B12 level, vitamin D level, tissue transglutaminase level, and inflammatory bowel disease antibody screen. His rapid plasma reagin (RPR) test was initially negative. He had a mildly elevated aspartate amino transferase at 44 U/L and mild anemia with a hematocrit of 39%. The hepatitis B surface antigen and hepatitis C antibody were negative. The HIV antigen and antibody screens were also negative. A scalp biopsy revealed increased catagen/telogen hairs and peribulbar inflammatory infiltrates with lymphocytes and plasma cells. Immunohistochemical staining for *Treponema pallidum* demonstrated the presence of corkscrew-shaped organisms in the hair follicle epithelium (Figure 2).

The patient was diagnosed with syphilitic alopecia and was treated with benzathine penicillin 2.4 million units. Upon further questioning, he revealed an unprotected sexual encounter 5 months prior to the onset of his alopecia. After the patient was diagnosed, his partner also tested positive for syphilis and received treatment with benzathine penicillin. RPR was repeated after the patient completed treatment and was elevated at 1:32. Also shortly after treatment, a *treponema pallidum* particle agglutination assay (TPPA) was drawn and found to be reactive. The patient was advised to return for repeat RPR 3 months, 6 months, and 12 months following the completion of treatment.

## Discussion

Syphilis is a sexually transmitted disease that is caused by the spirochete *Treponema pallidum* and mimics various dermatologic conditions. Syphilis infection can spread across years over multiple stages (Table 1).

According to a classification made by McCartney in 1940, syphilitic alopecia can be classified into symptomatic syphilitic alopecia and essential syphilitic alopecia [1, 2]. Symptomatic syphilitic alopecia is associated with other manifestations of secondary syphilis, whereas essential syphilitic alopecia has no other manifestations of secondary syphilis [1]. This case is consistent with essential syphilitic alopecia. Symptomatic syphilitic alopecia shows histopathological findings similar to

papulosquamous lesions of secondary syphilis. Essential syphilitic alopecia is characterized by either a telogen effluvium or alopecia areata –like pattern, similar to the patient’s appearance in this case. The main difference between these two entities, syphilitic alopecia and alopecia areata, is the demonstration of *Treponema pallidum* in syphilis. Reports of detection of organisms in the hair follicle epithelium, as in the present case, are rare [1].

The patient described here presented with no symptoms other than alopecia, diarrhea, and weight loss; he had a negative RPR. According to CDC guidelines, the diagnosis of syphilis can be made with one positive non-treponemal serological test or an anti-cardiolipin test and one positive treponemal serological test as seen in table 2 [3]. If a patient has a positive treponemal serological test, then an anticardiolipin test should follow [3]. If this test is negative, then a second treponemal test should be performed. If the result of this second treponemal test is positive then treatment should be administered. However, if the result is negative then no further treatment is necessary [3]. In low prevalence populations, the CDC recommends initially performing an anti-cardiolipin serological test and confirming positive results with a treponemal serological test [4].

In accordance with the CDC guidelines, an RPR test was performed [4], but initially was found to be negative. Although the sensitivity of the RPR test is fairly high at 86.4% [5], it is still less sensitive than other treponemal serological tests (Table 2). It is possible that this falsely negative result was the result of the prozone effect, which occurs when high antibody titers interfere with the antigen antibody lattice network formation necessary for obtaining a positive RPR result [6]. Although this effect can be avoided with dilutions of serum [6], dilutions are not routinely performed at this institution, further supporting the possibility of a prozone effect in this patient.

Despite advances in antibiotic development, penicillin remains the mainstay of treatment for syphilis. The recommended regimen for primary, secondary, and early latent infection is 2.4 million U of benzathine penicillin G given in a single intramuscular injection. Late latent infections can be treated with 3 weekly injections of 2.4 million U of benzathine penicillin G. Neurosyphilis can be treated with 12-24 million U/day via IM or IV for a total of 10-14 days [3, 7, 8]. Doxycycline, ceftriaxone, and tetracycline can be used as alternative treatments for syphilis when penicillin cannot be used, such as when a patient has a penicillin allergy [3, 7, 8].

**Table 1.** Stages of Syphilis

Stage	Timeline After Infection	Symptoms
Primary	2-6 weeks	Local: Primary Chancre
Secondary	4-10 weeks after infection	Hematogenous and lymphatic spread: fever, headache, anorexia, lymphadenopathy, alopecia
Tertiary	Years to decades	Dilated aorta, aortic regurgitation, carotid ostial stenosis, gummas

**Table 2.** Sensitivity and specificity of diagnostic tests for syphilis

	Sensitivity	Specificity
<b>PCR</b>		
Primary Syphilis	89.1% [9]	99.1% [9]
Secondary Syphilis	50% [9]	100% [9]
<b>Treponemal tests</b>		
T. pallidum particle agglutination assay (TPPA)	99.8% [10]	99.6% [10]
Enzyme Immunoassay (EIA)	100% [11]	99.5% [11]
<b>Anticardiolipin tests</b>		
Rapid plasma reagin (RPR)	86.4% [5]	94.3% [5]
Venereal Disease Research Laboratory (VDRL)	70.8% [12]	99% [12]

**Table 3.** Summary of treatments for syphilis



	Treatment	Dosage	Duration
Primary	Benzathine Penicillin	2.4 million U, IM	Single Dose
Secondary	Benzathine Penicillin	2.4 million U, IM	Single Dose
Early Latent	Benzathine Penicillin	2.4 million U, IM	Single Dose
Late latent (unknown duration)	Benzathine Penicillin	2.4 million U, 1x/week, IM	3 consecutive weeks
Neurosyphilis	Crystalline Penicillin	12-24 million IM, U daily 3-4 million U every 4 hours IV	10-14 days

## Conclusion

Alopecia is a symptom associated with syphilis, and as in the case we presented here, can be the sole presenting symptom of syphilis. Although, the current screening tests used for the detection of syphilis have relatively high sensitivities and specificities, they are not 100% effective in the detection of syphilis. It is therefore important to be cognizant of the various potential causes of alopecia and proceed to a biopsy if clinical suspicion still remains high in a case of non-scarring alopecia.

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