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# Increasing incidence of syphilis: A case report of non-resolving papulosquamous rash and role of a biopsy in the prevention of delayed diagnosis

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## Abstract

Syphilis is a sexually transmitted infection that is undergoing a resurgence in Canada and around the world. If not diagnosed correctly, syphilis can progress to its secondary and tertiary stages, affecting numerous organ systems. We present a case of a 41-year-old female who developed a papulosquamous rash, initially diagnosed as varicella with progression to a widespread and painful rash over 3 months. Based on clinical, histological, and serological findings, she was later diagnosed with secondary syphilis and successfully treated with intramuscular penicillin. This case underscores the importance of accurate diagnosis and treatment of syphilis to prevent systemic complications. We advocate for increased awareness among frontline providers with a proactive approach to diagnosis and management, including thorough history and physical examination, low threshold for performing serological testing, biopsy for lesions that do not resolve as expected with management, and multidisciplinary involvement for complex presentations of syphilis.

## Keywords

Syphilis, secondary syphilis, papulosquamous rash, diagnosis

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## Introduction

Syphilis, a sexually transmitted infection caused by the bacterium *Treponema pallidum*, remains a significant global public health concern. Recent years have witnessed shifts in the epidemiology of syphilis with a surge documented in Canada.[1] This trend is underscored by a comparison of syphilis rates, increasing from 5.1 per 100,000 population in 2011 to 24.7 per 100,000 in 2020.[1] In addition, there is an increase in the rate of congenital syphilis cases, increasing from 1.2 to 13.4 per 100,000 live births over the same period.[1] The resurgence of syphilis is not exclusive to Canada, as other developed countries such as the United States and the United Kingdom have experienced parallel challenges.[2,3] In 2022, UK reported their highest syphilis case levels since 1948.[3]

Risk factors for syphilis are outlined in Table 1, with a mixture of behavioral and epidemiological risk factors. The reasons for this surge in syphilis cases remain unclear with hypotheses including decreased condom use, increased drug use during sexual activity, and other socio-behavioral factors.[4]

Secondary syphilis results from hematogenous and lymphatic dissemination of *Treponema* bacteria and is one of the most common stage presentations of syphilis.[17] Secondary syphilis offers an opportunity for diagnosis with its most common presentation as a papulosquamous but non-pruritic

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**Table 1.** Risk factors for *Treponema* infection.[1,5–16]

| Behavioral | Epidemiological |
|---|---|
| Barrierless sexual activity involving contact with oral, genital, or anal mucosa | Previous syphilis infection or other STBBI |
| Having multiple sexual partners | HIV infection |
| Sexual contact with a known case of syphilis or other STBBI | Population groups and/or communities experiencing high prevalence of syphilis (and other STBBI) |
| Substance use, including chemsex | Having experienced homelessness and/or street involvement |
| Decrease in safer sex practices such as reduction in the use of condoms or drugs while having sex | HAART |
| Use of the internet to meet sex partners | Disparities in healthcare access, insufficient public health investment in monitoring and prevention such as in low-income communities |
| Misconception of oral sex as being safer | Mistrust of the healthcare system among Indigenous populations, Black communities, individuals who use substances, and other marginalized communities |

STBBI: sexually transmitted or blood-borne infection; HAART: highly active antiretroviral treatment.

rash.[18] It may also be associated with neurosyphilis, ocular or auditory syphilis, as well as other nonspecific signs like systemic illness involving different organ systems. Wart-like skin lesions in the genital area known as condyloma lata, alopecia (hair loss), and hepatitis may also occur in this stage.[19,20] Herein, we describe a case from British Columbia with secondary syphilis, presenting with rash for 3 months prior to accurate diagnosis and management.

## Case report

A 41-year-old female patient with Fitzpatrick skin type 5 developed a painless and non-pruritic papulosquamous rash on her back, appearing as 5–8 mm diameter, well-circumscribed, red, and raised lesions with scale (Figure 1(a)). The patient presented to the emergency department 1 week after the onset of the rash. A diagnosis of varicella was made based on clinical findings, and the patient was provided with a prescription for valacyclovir.

Over the next month, the patient's rash continued to spread to her face, scalp, palms, and soles. She presented to her family physician, who provided a prescription for cephalexin with no improvement.

Two months after the initial presentation, the patient developed a fever and her lesions became painful with some bleeding and crusting. She presented to the emergency department for a second time, where skin biopsies of the right arm and right inner leg were taken. On histology, the samples demonstrated irregular epidermal acanthosis with complete effacement of the dermal–epidermal junction (Figure 1(b)) by a brisk lymphoplasmacytic reaction with admixed neutrophils (Figure 1(c)). Immunohistochemistry demonstrated numerous spirochete organisms within the epidermis of the samples (Figure 1(d)), in keeping with a clinical diagnosis of *T. pallidum* infection.

The patient was subsequently referred to the Infectious Disease Tropical Medicine clinic and Public Health more than 3 months after the initial presentation. *T. pallidum* antibody enzyme immunoassay, syphilis rapid plasma reagin (1:32), and *Treponema pallidum* particle agglutination were confirmatory. Serology testing for hepatitis B and C as well as human immunodeficiency virus were non-reactive. The patient received intramuscular penicillin with improvement in her skin lesions. Over time, her lesions flattened with hyperpigmentation and stopped being painful or pruritic. The patient reported bilateral hearing loss at the time of presentation to an Infectious Disease specialist but was improving post-antibiotics. Subsequent ophthalmology eye examinations, lumbar puncture, and neuroimaging were unremarkable. Six months post treatment, the patient continues to have persistent post-inflammatory hyperpigmentation in all areas of prior skin lesions.

On further review of the patient's history, she was born in Sudan and immigrated to Canada in 2001. Her last trip to Sudan was in 2008. She has not recently traveled to any parts of the world that are considered endemic for diseases caused by nonvenereal spirochetal infections, such as bejel, yaws, and pinta. The patient noted that she had one sexual partner over her lifetime and that the last time they had sexual intercourse was earlier in 2023. She did not know if her partner had additional sexual partners.

## Discussion

Recognizing and treating syphilis promptly is crucial to prevent progression to advanced stages with vital organ involvement and complex systemic manifestations such as cardiovascular syphilis, neurosyphilis, and gummatous syphilis.[5] This is illustrated by our case report, where timely recognition could have prevented the development of widespread and painful lesions and the subsequent long-lasting post-inflammatory hyperpigmentation. Swift access to care and antibiotics is vital for managing syphilis effectively and mitigating its impact on the patient's well-being.

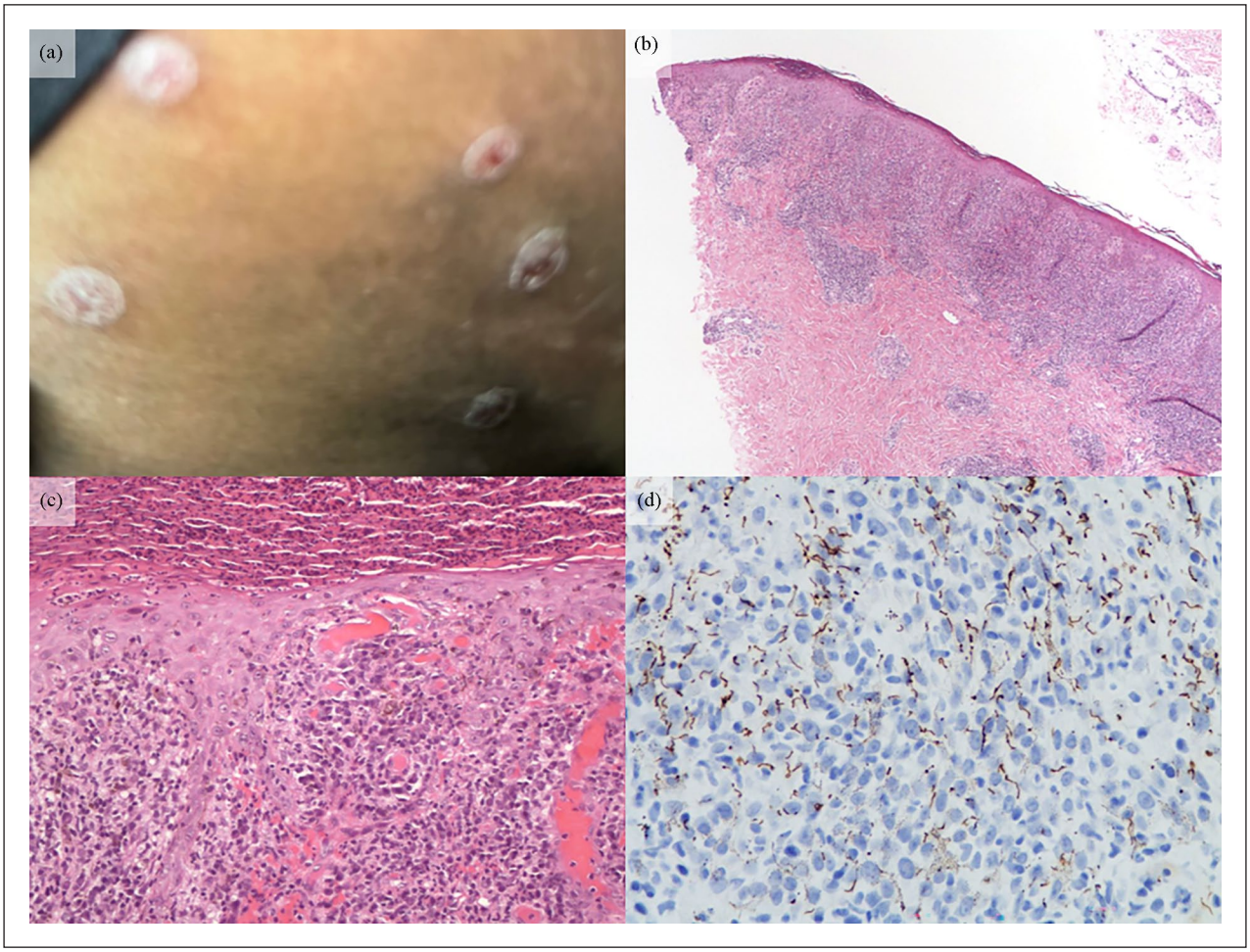


**Figure 1.** Clinical and histologic presentation of rash. Multiple round, raised scaly lesions on the patient's skin, measuring 5–8 mm in diameter each (a). On skin biopsy, there is effacement of the epidermal–dermal junction through a brisk inflammatory reaction (b), composed of predominantly small lymphocytes, plasma cells, and admixed neutrophils in the overlying parakeratotic scale (c). Immunohistochemistry shows numerous *Treponema* spirochete organisms throughout the epidermis (d).

In considering our patient's case, the accurate diagnosis could have been facilitated through a comprehensive clinical history, including potential travel exposures and sexual history, and maintaining a broad differential when confronted with a clinical presentation of papulosquamous rash (papules and/or plaques with overlying scale). Secondary syphilis often masquerades other dermatological conditions, and a broad differential diagnosis for such a rash should be considered (Table 2). A rash that persists despite attempts at conservative management may benefit from a skin biopsy, as noted in this case. Consideration for serology testing to screen for syphilis at the time of initial presentation may have potentially avoided the need for skin biopsy and facilitated faster access to definitive management.

In conclusion, considering the rising prevalence of syphilis, it is important to adopt a proactive stance in diagnosis, which can be achieved through having a low threshold for performing serological testing or biopsy of suspicious lesions. Clinical investigations should include systemic

**Table 2.** Clinical differential diagnosis of secondary syphilis.[21]

| | |
|---|---|
| Cutaneous papulosquamous rash (raised papules and plaques with overlying scale) | Pityriasis rosea<br>Guttate psoriasis<br>Viral exanthem<br>Lichen planus<br>Pityriasis lichenoides chronica<br>Primary HIV infection<br>Drug reaction<br>Eczema (nummular, papular)<br>Folliculitis |
| Involvement of mucosal membranes (oral split papules, mucous patches, pharynx inflammation) | Lichen planus<br>Chronic aphthous ulcers<br>Hand, foot, and mouth disease (viral illness)<br>Herpangina<br>Angular cheilitis (perleche) |
| Involvement of genital skin/mucosa (condyloma lata) | Viral wart associated with human papillomavirus<br>Bowenoid papulosis<br>Squamous cell carcinoma |

evaluation due to the different treatment requirements needed at different stages of syphilis, particularly for central nervous system involvement. Lastly, given that many patients will initially present to their primary care physician, a multidisciplinary approach is critical to ensure that there is an efficient pathway to consult specialists when complex cases arise.

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