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CASE REPORT

# Yaws: The forgotten tropical skin disease

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## Abstract
Yaws is a rare skin disease endemic to tropical countries caused by *Treponema pertenue*. It is highly infectious and spreads through physical contact. In Malaysia, it was presumably eradicated during the 1960s, with the last reported case published in 1985. Due to its rarity, the disease often goes unrecognised and misdiagnosed. Here, we report the case of a 5-year-old aboriginal boy diagnosed with secondary yaws who presented with fever and an incidental finding of chronic painless ulcerated nodules and plaques on his lower limbs and gluteal region. His diagnosis was confirmed serologically with a venereal disease research laboratory lab test and he was successfully treated with a single dose of intramuscular benzathine penicillin G. Primary care physicians should not ignore this disease since its early recognition and appropriate treatment is vital to its eradication, especially in high-risk communities.

## Introduction
Yaws, or *Framboesia tropica*, is a long-forgotten tropical skin infection caused by a highly infectious gram-negative spiral-shaped bacterium known as *Treponema pallidum pertenue*.[1–6] It spreads via direct skin-to-skin contact with an infected lesion and is most prevalent in children between the ages of 2 and 15 years old. Boys are reportedly more prone to infection because they are physically active and more likely to acquire abrasions in the lower limbs.[2–3] It is also known as a poor man's disease because it mainly affects populations living in the isolated and rural areas of tropical countries, where the climate is warm and humid.[3] Yaws is frequently missed due to healthcare providers' inexperience. It is diagnosed clinically and requires serological confirmation.[5–7] The fact that it spreads through physical contact makes it highly contagious, especially among family members. Treating patients whilst also administering prophylaxis and contact screening household members is of great importance.

## Case Report
A 5-year-old boy of aboriginal descent from the 'Batek' tribe presented to the district hospital with a one-day history of fever, lethargy and pallor. The initial investigation showed haemoglobin of 3.9 mg/dL, an eosinophil count of 2.3% and a total white blood cell (TWC) of 11.3 cells 10^9L. He was then admitted for further workup. During admission, his mother reported skin lesions on his lower limbs that worsened over four months. The lesions began as a small, solid, rounded skin bump on his left ankle, which became larger, more prominent and subsequently produced yellow discharge. As the weeks progressed, similar lesions appeared on his buttocks and thighs. He denied any pain from these lesions or at any joints.

On physical examination, he was alert and conscious but pale. His temperature was 37.8°C. There was a yellow-crusted, ulcerated nodule on his left ankle (**Figure 1**) and multiple granulomatous plaques on his buttocks and thighs (**Figure 2**). The nodule was non-tender but exuded a yellow discharge. His other vital signs and systems examinations were unremarkable.

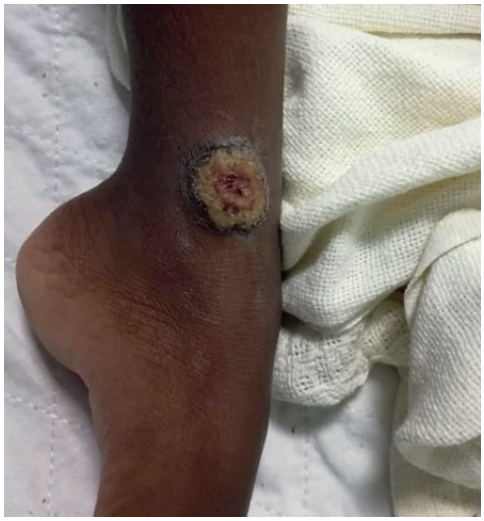

**Figure 1:** Nodule with yellow crust on the patient's left ankle shows the 'mother yaw'.

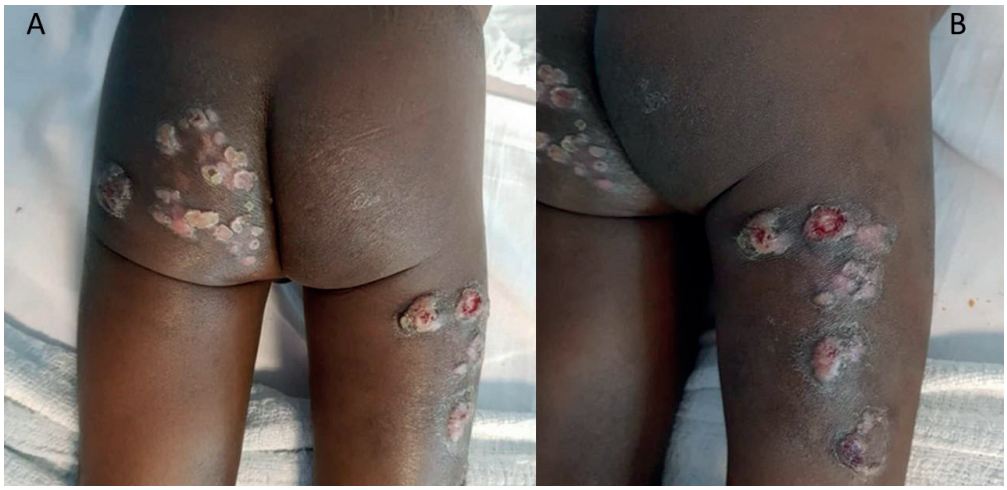


**Figure 2A**. Granulomatous lesions on the left gluteus and right thigh. **B**. Closer view of the granulomatous plaques on the posterior and lateral aspect of the right thigh following a lymphatic drainage pattern.

He was initially treated for a bacterial skin infection due to documented fever on admission and was started on syrup cloxacillin and KMNO4 dressing. He was also transfused with two pints of packed cells. He underwent a Mantoux test for tuberculosis and serological tests for *Treponema* to rule out possible causes of the tropical skin infection. Only the *Treponema pallidum* hemagglutination (TPHA) test and the rapid plasma reagent (RPR) came back as positive with a high titre of 1:256. His haematology workup showed features of iron deficiency anaemia, whilst other biochemistry investigations were unremarkable.

A senior dermatologist then diagnosed his skin lesions as yaws based on the clinical and serological findings. The patient received a single dose of 1.2 million units (MU) of intramuscular benzathine penicillin G and cloxacillin was stopped. At his 1-week follow-up, his lesions appeared as hypopigmented scarring with no residual plaques (**Figure 3**).

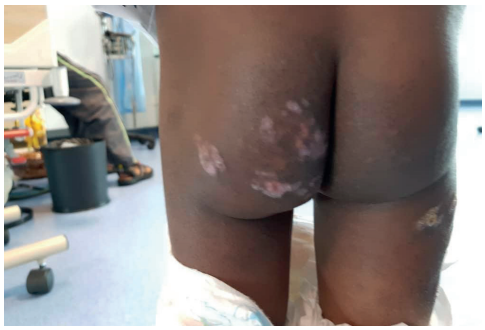

**Figure 3.** The granulomatous plaques became flat and hypopigmented at 1-week post-treatment with IM benzathine penicillin G.drainage pattern.

His immediate household contacts (including neighbours) were asymptomatic. However, they were screened serologically through a venereal disease research laboratory (VDRL) and given an empirical treatment with a single oral azithromycin dose of 30 mg/kg for children and 2 g for adults.

## Discussion

In Malaysia, the earliest recorded campaign against yaws was carried out by Viswaligam in 1920, who treated cases of yaws in four states—Negeri Sembilan, Pahang, Perak and Selangor. At that time, the median number of cases reported annually was over 12,200.[5] In 1954, with the assistance of the World Health Organization, a yaws elimination unit was established in the Ministry of Health and was thought to be successful.[5] However, sporadic cases reappeared in the 1970s and the last available reports were published in 1989.[2,7,9]

Yaws occur mostly in children and thrives in humid, tropical regions, causing ulcers on the thin skin covering bones.[3–7] Clinically, yaws is divided into primary, secondary and tertiary phases. The primary lesion, known as the 'mother yaw', usually appears on the lower extremities as a localised painless papule that progresses into an ulcerated nodule (as seen in our case). It takes weeks to years after the primary infection occurs for secondary lesions to appear.[6–9] Secondary lesions are the result of the lymphatic and hematogenous spread of the organisms and can present as a solitary papillomatous nodule, an ulcer or develop as multiple scaly discoid plaques with or without bone pain.[6–8] If left untreated, bone deformity and destruction can manifest as late or tertiary

yaws, usually 5–10 years after inoculation.[3,8] In 65–85% of reported cases, the primary lesion is found on the legs and ankles and may spontaneously heal after 3 to 6 months.[9–10] Our patient's skin manifestation appeared 4 months after the initial lesion on his ankle, which matches the description of secondary yaws without arthralgia.

The diagnosis is straightforward in known endemic communities but increasingly challenging in countries like Malaysia, which lacks experienced medical personnel and active community health programmes to educate and identify yaws. Differential diagnosis is extensive and includes other tropical diseases such as mycobacterial disease, cutaneous leishmaniasis and fungal infections.[7,10] Since primary healthcare providers can be unfamiliar with the disease and its diverse clinical presentation, cases of yaws are likely under-reported or misdiagnosed. Our patient was initially treated for a cutaneous bacterial skin infection due to his presentation of clinical symptoms of fever and sociodemographic background as an aboriginal child.

Similar serological tests can be used to diagnose both yaws and syphilis. The non-treponemal agglutination tests (RPR and VDRL) show a positive result in untreated cases and can be used as a cure test because they usually revert to negative after successful treatment.[8–9] The TPHA and *Treponema pallidum* particle agglutination assay are more specific but remain positive for life, even after successful treatment. The inability to serologically differentiate yaws and syphilis can be an issue where the prevalence of syphilis is high. Yaws is still endemic because the existing serological tests cannot distinguish between them and patients are likely treated as having syphilis.[7]

Since the 1940s, the mainstay treatment for primary and secondary yaws involves a single dose of 2.4 MU of intramuscular benzathine penicillin G (for adults) and 1.2 MU for children under 10 years old.[4,6] A single oral dose of azithromycin (30 mg/kg single dose; maximum dose 2 g) is also effective. However, in a meta-analysis of antibiotic treatments for trachoma, 10–15% of patients had side effects (e.g., nausea and vomiting) after a single dose of azithromycin.7 Some patients with previous exposure to macrolides from other infections are also more likely to develop resistance.[7–8] Our patient was given 1.2 MU intramuscular penicillin to reduce the risk of side effects and antibiotic resistance.

The cure rate of yaws was more than 90% and a successful outcome is measured by the improvement of skin lesions and a 4-fold reduction in the VDRL titre at least 1 year after the initial treatment.[9,11] In this case, a skin biopsy was not performed since the mother did not consent to it. Also, a repeat titre was not performed later due to the patient defaulting on his subsequent appointments. In communities and endemic areas, a high suspicion for yaws should be propagated and attempts should be made to confirm the diagnosis serologically. Diagnosis of the specific *Treponema* species is necessary based on epidemiological data (children without a history of sexual relations and a VDRL-negative mother) since no histological, biochemical, immunologic or microbiological techniques can distinguish between *Treponema* species.[8–10]

## Conclusion

This case highlights a highly infectious tropical skin disease that was forgotten, which delayed appropriate treatment for our patient. This disease should be suspected in patients that fulfil the epidemiological and clinical criteria. Our physicians must be trained to identify the presentation and accurate management of yaws, especially those who work amongst impoverished communities in rural areas. Health education and mass screening for affected communities are crucial to teach them to remain alert for this disease and advocate for prompt treatment to eliminate it.

## Acknowledgements

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## Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

## Consent for Publication

As legal guardian to the child patient, the patient's mother provided written and verbal informed consent for the publication of this case report.

**How does this paper make a difference to general practice?**

- A chronic painless papular skin lesion that grows into an exudative ulcer in a patient below the age of 15 should prompt general practitioners (GPs) to collect detailed medical history and perform serological VDRL tests to exclude yaws.
- GPs are usually the first point of contact for infectious diseases in endemic areas. To avoid possible clusters of infections in such communities, prophylactic treatment could be initiated by GPs using single-dose oral azithromycin.
- The eradication of this forgotten disease can be achieved if the symptoms and early signs of yaws can be recognised and treated comprehensively by GPs.

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