

## *Pseudomonas* toe web infection and autosensitisation dermatitis: Diagnostic and therapeutic challenge

Dear Editors,

Bacterial toe web infection or foot bacterial intertrigo is a condition characterised by malodorous maceration of both the foot and interdigital spaces due to bacterial infection often accompanied by itching and pain. As gram-negative bacteria, predominantly *Pseudomonas aeruginosa*, are the most common causative organisms, the term gram-negative bacterial toe web infection (GNBTWI) is widely accepted. Although GNBTWI is a commonly observed disease, data regarding this condition and complications are limited in the available literature, and the available studies are randomised controlled trials.<sup>1,2</sup>

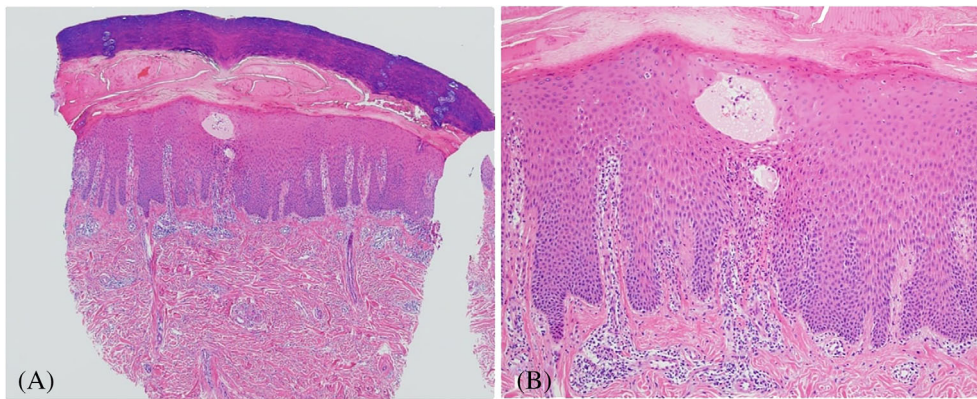
A 47-year-old male patient presented with erythematous macerations on his interdigital spaces, with severe itching and malodor (Figure 1A,B). He had worked as a construction worker for several years. The patient reported that multiple papulovesicles occurred at first, which became confluent and macerated. Oozing was observed on his macerations; however, greenish

discharge was not observed. Subsequently, eczematous skin lesions developed on both palms and fingers, which he described as distinct lesions (Figure 1C,E). The patient had no underlying disease, and no abnormality was found on the blood test. Potassium hydroxide (KOH) examination and fungal culture from the toe web showed no evidence of dermatophytic infection. Microbiological swab from the toe showed the growth of *P aeruginosa*, which is susceptible to ciprofloxacin. Biopsy of the finger papules showed autosensitisation dermatitis (Figure 2). He was administered 250 mg ciprofloxacin orally twice daily for 2 weeks, and gauze dressing and topical ointment comprising tobramycin were applied on his feet. On his hands, a topical steroid was applied. Lesions on both the foot and hand showed gradual improvement, with minimal discharge.

GNBTWI was first described as a specific dermatologic entity by Amonette and Rosenberg in 1973. Clinical



**FIGURE 1** Clinical presentation of gram-negative bacterial toe web infection: A,B, Beefy red erosive patches with well-demarcated punch-out edge on the interdigital spaces of the feet. C,D, Erythematous papules and erosions on the hands, palms, and fingers




**FIGURE**  
2 Histopathologic features of papule on the finger: A, acanthosis and parakeratosis with mild spongiosis are present in epidermis (H&E, ×40), B, Perivascular lymphohistiocytic infiltration, swelling of endothelial cells, and oedema are present in papillary dermis (H&E, ×100)

presentations include papulovesicles, pustules, macerations, and malodorous discharge in the interdigital spaces and toe web.<sup>3</sup> A well-demarcated punched-out edge is characteristic of GNBTWI, as shown in Figure 1A,B.<sup>4</sup> For its diagnosis and treatment, microbiological swab and mycological examination should be performed to identify the underlying mycosis, causative organism, and antibiogram. For *P aeruginosa* toe web infection, 250 to 500 mg ciprofloxacin administered orally twice daily for 2 weeks is effective. Autosensitisation dermatitis is the most common complication of GNBTWI; however, limited data are available in the literature.<sup>1</sup> This is likely because of its hypersensitivity to various epidermal cytokines released from the bacterial infection and wound. Treatment of GNBTWI-induced autosensitisation dermatitis is essentially similar to that of a primary infection. After 2 weeks of systemic ciprofloxacin treatment, with gauze dressing on his feet and topical application of an ointment on his feet and hands, the lesions gradually improved in our patient.

Diagnosing GNBTWI is often challenging because other infections such as tinea pedis or pitted keratolysis, eczematous dermatitis, and even malignancy can mimic GNBTWI. Accurate diagnosis should precede treatment as inappropriate topical or systemic agents may prolong disease, aggravate skin lesions, and induce auto-sensitisation. Furthermore, elimination of predisposing factors should also be considered. As our patient was a construction worker, he wore occlusive boots, making his foot humid. Hojyo-Tomoka et al. demonstrated that proliferation of *Pseudomonas* may be directly proportional to skin hydration.<sup>5</sup> In our case, the patient was instructed to remove the occlusive boots to eliminate the predisposing factors.

Herein, we described a case with typical clinical manifestations of toe web infection caused by *P aeruginosa*

with autosensitisation dermatitis. Clinicians must be knowledgeable about GNBTWI, especially when toe web intertrigo seems to be recalcitrant, to achieve proper diagnosis and initiate treatment and to control the predisposing factors.

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