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Case Report

Underrecognized phototoxicity from prolonged doxycycline therapy: a case highlighting early nail involvement

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ABSTRACT

A 27-year-old man developed photo-onycholysis and a facial phototoxic rash after taking doxycycline, cefuroxime and aceclofenac for about 40 days following incision and drainage of a wrist abscess. He had no other illness. The wound healed well and his laboratory results were unremarkable, but several fingernails turned reddish-brown and became so tender that light pressure was painful, and both cheeks developed erythematous maculopapular lesions. The toenails were normal. There was no separation of the nail plate, no pitting and no subungual debris, so the usual morphological clues to photo-onycholysis were absent. Other causes were excluded clinically, and of the three drugs he had taken only doxycycline is an established cause of this reaction. Causality assessment using the Naranjo scale gave a score of 5, indicating a probable adverse drug reaction. All three drugs were stopped and the patient was counselled about ultraviolet A protection and nail care; the rash and the nail changes settled over eight weeks without progressing to detachment. Two aspects of the case deserve emphasis. The nail changes were inflammatory and painful but pre-lytic, a stage at which the diagnosis is easily missed, and the reaction occurred during a north Indian winter rather than in summer or in a returning traveller, which is the setting of most published reports. The case is also a reminder that a short course would have sufficed after drainage of an uncomplicated abscess, and that the reaction would not have occurred had the prescription been stopped on time.

Keywords: Doxycycline, Photo-onycholysis, Phototoxicity, Adverse drug reaction, Antimicrobial stewardship, Naranjo algorithm

INTRODUCTION

Doxycycline is one of the most widely prescribed oral antibiotics in the world. It is used for skin and soft tissue infection, respiratory infection, rickettsial and spirochaetal disease and malaria chemoprophylaxis, and it is generally well tolerated.[1,2] Its most characteristic dermatological adverse effect is photosensitivity. The reaction is phototoxic rather than allergic, and it depends on dose: patients treated for acne developed erythemal responses more often and more severely on 200 mg daily than on 100 mg daily.[3] Cumulative exposures therefore matters as much as the daily dose, which is precisely the situation of a patient who stays on treatment longer than intended.[4]

Photo-onycholysis, in which the nail plate separates from the nail bed after ultraviolet exposure in someone taking a photosensitising drug, is among the least common of these reactions and also among the most distinctive. Baran and Juhlin studied 15 affected patients and described three morphological subtypes. They also showed that 3% to 20% of incident ultraviolet radiation passes through the normal fingernail, which behaves like a convex lens and concentrates that radiation on the nail bed.[5]How often this happens with doxycycline is simply not known. A systematic review found very few publications, almost all of them single cases or pharmacovigilance signals.[2] Reports to the Netherlands Pharmacovigilance Centre described the reaction in patients on 100 mg daily for Lyme prophylaxis, with cases clustering in summer.[6]

Others have followed brief or incidental sun exposure, which suggests that susceptibility varies a good deal between individuals.[7]

We report this case for two reasons. The nail changes were tender and inflammatory but had not yet progressed to visible separation, a stage that is easy to dismiss or to attribute to something else and the reaction developed during a north Indian winter, in a patient who had continued his antibiotics for about 40 days for a problem that needed only a few days of treatment.

CASE REPORT

A 27-year-old man with no addictions and no known illness noticed a small blister over the left lateral wrist in early January 2026, probably from friction. It became swollen and pustular over the following days. He underwent incision and drainage at a local healthcare centre and was started on doxycycline, cefuroxime and aceclofenac. The wound settled steadily, but he continued all three drugs for approximately 40 days, having understood that he should take them until the wrist looked completely normal.

He came to us in mid-February with a red rash over both cheeks and reddish-brown discolouration of several fingernails. The nails hurt on even mild pressure, which was what prompted him to seek advice. He denied yellow nail discolouration, hair loss, Raynaud phenomenon, joint pain, breathlessness, fever, dry eyes or mouth, and swelling of the feet. He was haemodynamically stable and the systemic examination was normal. There were erythematous maculopapular lesions over both zygomatic areas (Figure 1), and tender discolouration of the left second, third and fourth and the right third fingernails, without separation of the nail plate, pitting or subungual debris (Figure 2). The toenails were entirely normal. The wrist wound was healing well, with healthy granulation tissue and no surrounding erythema or discharge (Figure 3).

Baseline investigations were unremarkable (Table 1). Haemoglobin, total leucocyte count and platelet count were normal, with a borderline eosinophil fraction of 6% on the differential count. Inflammatory markers were not raised, renal function was preserved and liver enzymes were normal.

Differential diagnosis

Psoriatic nail disease was unlikely: there was no pitting, no oil-drop discolouration, no subungual hyperkeratosis, and no plaques, scalp lesions or arthritis, and the onset had been acute rather than gradual. Onychomycosis was unlikely in the absence of nail thickening or subungual debris, and the nails improved without antifungal treatment. There was no history of injury to suggest traumatic onycholysis or subungual haematoma, and the involvement of several non-adjacent digits argued against a mechanical cause. Nothing clinically suggested thyroid-associated onycholysis, and there were no bullae, skin fragility or scarring over the dorsa of the hands to suggest porphyria cutanea tarda or pseudoporphyria. The diffuse blue-grey pigmentation seen with minocycline looks quite different from the tender, localised, reddish-brown change we saw. He had taken no fluoroquinolone or psoralen.[8]

The concomitant drugs also had to be considered. Cefuroxime is not a recognised photosensitiser. Aceclofenac, like other non-steroidal anti-inflammatory drugs, can occasionally cause photosensitivity, but this usually takes the form of a pseudoporphyria-like or eczematous eruption on the skin rather than injury confined to the nail bed. Doxycycline was therefore the only drug he had taken that is an established cause of photo-onycholysis, and the pattern of fingernail involvement with sparing of the shoe-covered toenails fitted it well.

Treatment and outcome

We made a clinical diagnosis of doxycycline-induced photo-onycholysis, based on the involvement of sun-exposed fingernails with sparing of the toenails, the timing in relation to a prolonged course of doxycycline, and the exclusion of alternatives. Dermoscopy and nail clipping for potassium hydroxide microscopy were planned, but the patient improved and chose telephonic follow-up, so neither could be done.

Causality was assessed formally with the Naranjo adverse drug reaction probability scale.[9] The case scored +1 for previous conclusive reports, +2 for the event appearing after the drug was given, +1 for improvement after withdrawal and +1 for objective documentation by clinical photographs. Because he was taking two other drugs, one of which can rarely cause photosensitivity, we scored the item on alternative causes as "do not know" rather than claiming that none existed. Rechallenge, placebo challenge and drug concentration measurement were neither performed nor justifiable. The total of 5 places the reaction in the probable category.

Since the primary infection had resolved and antimicrobial therapy had been more than adequate, all three drugs were stopped. We advised strict photoprotection for four to six weeks, using a broad-spectrum sunscreen with high ultraviolet A protection on exposed areas, protective clothing, and avoidance of the midday sun. For the nails we suggested regular trimming, avoidance of trauma and less prolonged contact with water.

On telephonic follow-up he reported that the facial rash had faded and the nails had improved considerably over about eight weeks, without ever progressing to frank separation. We counselled him to avoid doxycycline and other tetracyclines in future and adverse drug reaction is recorded to avoid re-exposure.

Table 1: Baseline laboratory investigations.

Investigation	Reference range	Result
Haemoglobin (gm/dl)	13-17	14.2
Total leucocyte count (/mm^3)	4,000-11,000	8,200
Differential eosinophil count (%)	1-6	6
Platelet count (×10^3/µl)	150-450	245
Erythrocyte sedimentation rate (mm/hour)	0-15	12
C-reactive protein (mg/l)	<10	4.2
Blood urea (mg/dl)	15-40	32
Serum creatinine (mg/dl)	0.7-1.3	0.9
Alanine aminotransferase (U/l)	7-56	28
Aspartate aminotransferase (U/l)	10-40	32

gm/dl: grams per decilitre; ×103/µl: thousand cells per microlitre; mm/hour: millimetres per hour; mg/l: milligrams per litre; mg/dl: milligrams per decilitre; U/l: units per litre

Figure 1: Bilateral erythematous maculopapular phototoxic eruption distributed symmetrically over the zygomatic regions of the face (red arrow) following prolonged doxycycline exposure.

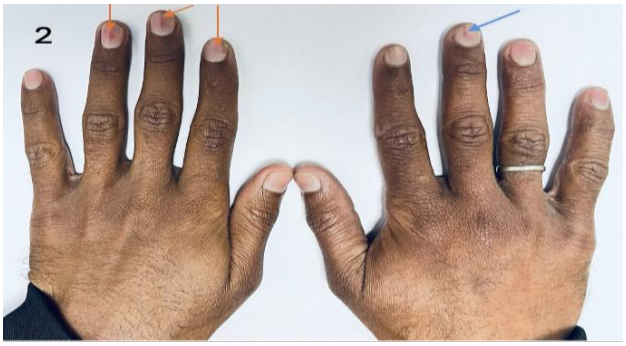

Figure 2: Multiple fingernails showing central reddish-brown discolouration with early inflammatory change involving the left index, middle and ring fingernails (orange arrow) and the right middle fingernail (blue arrow), associated with tenderness but without overt separation of the nail plate from the nail bed, consistent with early doxycycline-induced photo-onycholysis.

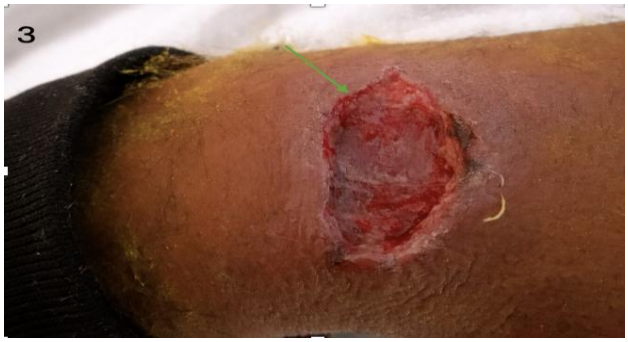

Figure 3: Healing ulcer (green arrow) over the left lateral wrist following incision and drainage, showing healthy granulation tissue without surrounding erythema or active purulent discharge.

DISCUSSION

The mechanism of photo-onycholysis is photochemical rather than immunological.[5] Doxycycline absorbs ultraviolet radiation and is converted to a stable photoproduct, lumidoxycycline. Both the parent drug and the photoproduct are phototoxic in vitro, concentrating in cell membranes and mitochondria and causing cytotoxicity that increases with radiant exposure.[10] Among the tetracyclines, doxycycline is one of the most potent photosensitisers in experimental photohaemolysis models, whereas minocycline is essentially inert; that difference is worth remembering when a tetracycline has to be prescribed during months of intense sunlight.[11] The nail is a vulnerable site because the translucent plate lets a measurable fraction of ultraviolet radiation through and focuses it onto a nail bed that has no melanin, no sebum and no stratum granulosum. Damage can therefore occur there even when the surrounding skin is spared.[5]

The wavelengths that trigger the reaction lie mainly in the ultraviolet A1 range, 340 to 400 nm.[2] This has a practical consequence that is easy to overlook when counselling patients. Sunscreens sold on the strength of their sun protection factor alone are graded against ultraviolet B erythema and may do rather little at these longer wavelengths. A patient taking doxycycline needs a preparation with a high ultraviolet A protection factor, and needs to know that window glass and thin clothing do not reliably keep ultraviolet A1 out.

All three of the subtypes described by Baran and Juhlin assume that the nail plate has already separated.[5] Our patient fitted none of them. He had central reddish-brown discolouration of four fingernails and marked tenderness, but no detachment, no sharply demarcated proximal border and no subungual debris. We would suggest that this is a pre-lytic inflammatory phase, in which the nail bed has been injured photochemically but the mechanical consequence, loss of adhesion and then separation as the nail grows out, has not yet become visible. Pain and erythema preceding detachment are mentioned in several reports, but almost always in retrospect, once onycholysis

has made the diagnosis obvious. Recognising the stage while it is happening is important as stopping the drug then may prevent the lytic phase and this is the point at which the diagnosis is likely to be missed.

The published literature also has distinct seasonal and geographical findings. Cases come from the northern European summer, from travellers on malaria chemoprophylaxis, and from deliberate sunbathing.[2,6,7] Our patient was exposed between early January and mid-February in the sub-Himalayan plains of northern India and gave no history of unusual or recreational sun exposure. The ordinary ultraviolet radiation of a subtropical winter, combined with ordinary daytime activity, appears to have been enough. Clinicians working at these latitudes should not be reassured by the season, nor confine photoprotective advice to the summer months.

Our findings sit comfortably alongside the published cases. Badri and colleagues reported two patients who developed photo-onycholysis on conventional doses, showing that unusual dosing is not required.[12] Passier and colleagues drew attention to a summer cluster during Lyme prophylaxis at 100 mg daily.[6] In the case reported by Pazzaglia and colleagues the extra ultraviolet exposure amounted to an afternoon of beach play.[7] Roy and colleagues described an 11-year-old girl on doxycycline 100 mg daily for four weeks for lymphatic filariasis, whose distal fingernail plates detached symmetrically in the classical moon shape while the covered toenails were spared.[13] Elmas and Akdeniz described a 16-year-old boy on 200 mg daily for six weeks for brucellosis, with distal black-brown discolouration and half-moon edges after intense sun exposure.[14] Three themes recur across these reports: a clear temporal relationship to doxycycline, preferential involvement of the fingernails with sparing of the toenails, and slow spontaneous recovery once the drug is stopped. Our case is consistent with all three, and adds an earlier point on the same trajectory.

The most preventable part of this, was the duration of treatment. Guidelines recommend about five days of antimicrobial therapy for uncomplicated skin and soft tissue infection, extended only if the response is poor and note that a drained abscess in an immunocompetent patient without systemic features may need no systemic antibiotic at all.[1] Our patient took roughly eight times that. The reaction was not the effect of necessary treatment; it was the visible end of an avoidable prescription. That is a useful way to think about photo-onycholysis. Like antibiotic-associated diarrhoea or mucocutaneous candidiasis, it can be read as a marker of excessive antimicrobial exposure, and when a patient present with tetracycline phototoxicity the indication and duration of the prescription deserve as much attention as the rash.

Treatment is supportive. Stopping the drug promptly, photoprotection for four to six weeks and conservative nail care are enough in most patients. Reassurance, because the condition is benign and self-limiting and the affected nail grows out over three to six months. Mimics such as onychomycosis, psoriatic nail disease, thyroid-associated onycholysis, trauma and the porphyrias should be excluded so that patients are not treated unnecessarily.[8]

This report has limitations. Dermoscopy and potassium hydroxide microscopy could not be done, so the diagnosis rests on clinical assessment and exclusion rather than onychoscopic confirmation. The patient was taking two other drugs, and although neither is an established cause of photo-onycholysis, their presence weakens the causality assessment. The exact daily doses and the cumulative exposure could not be verified from the records of the treating facility. Follow-up was by telephone, so we have no photographs of the resolved state. Rechallenge was not attempted and would not have been justifiable. A single case can generate a hypothesis about the early phase of this reaction, but cannot establish it.

CONCLUSION

Doxycycline-induced photo-onycholysis is worth recognising before the nail plate separates. This case shows that the earliest clinically detectable stage is tender, reddish-brown discolouration of sun-exposed fingernails with sparing of the toenails, without the crescentic detachment on which the diagnosis conventionally depends, and that it can occur in winter at subtropical latitudes in a patient who reports no unusual sun exposure. Both observations extend a phenotype drawn largely from summer and travel-associated cases with established onycholysis, and both can be acted on at the bedside. The case also shows how avoidable this adverse effect often is, since a 40-day course after drainage of an uncomplicated wrist abscess exceeded the recommended duration and the reaction would not have happened had the prescription been stopped on time. Three things follow for practice: counsel patients about ultraviolet A protection whenever a tetracycline is prescribed, examine the fingernails of any patient who reports nail pain while taking one, and document the reaction clearly in the record and to the patient so that re-exposure is avoided.

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