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DOCETAXEL-INDUCED SEVERE NAIL TOXICITY IN A BREAST CANCER PATIENT: A CASE REPORT

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ABSTRACT

Background: Docetaxel, a frequently used taxane for breast and other solid tumor treatments, has been associated with adverse dermatological events including nail toxicity. While not at all a life-threatening condition, nail abnormality impacts quality of life through pain and infection, and sometimes treatment is discontinued because of it. **Case Presentation:** A middle-aged female with breast carcinoma was on docetaxel-based chemotherapy and developed painful discoloration of nails, onycholysis, and secondary bacterial infection eventually after multiple cycles. The troublesome pain, swelling, and discharge were there from the affected nails' onset. Management included empiric intravenous antibiotics, topical antiseptics, analgesics, and supportive wound care. Subsequent to this, the chemotherapy regimen was revised after discussing with the oncology team. She improved gradually during a hospital stay of five days and finally resolved completely with treatment on discharge and regularly after follow-up. **Conclusion:** This case emphasized the need for early recognition and timely intervention of docetaxel-induced nail toxicity. Multidisciplinary intervention, including counseling by a clinical pharmacist, optimized supportive care, and adjustment of regimens, will accrue benefits to the patient in continuing with cancer treatment.

KEYWORDS: Docetaxel, Nail toxicity, Chemotherapy adverse effects, Breast cancer, Case report, Pharmacist intervention.

INTRODUCTION

Chemotherapy still stands as the primary treatment option for many solid malignancies, with agents like taxane and docetaxel among the most important for the treatment of breast, lung, and prostate cancers. These agents, while efficacious in improving survival and in reducing the recurrence of cancers, are highly disturbing in terms of adverse events that may compromise patient adherence and hence their quality of life. Dermatologic toxicities, while considered less threatening than systemic toxicities, are gaining recognition for their disabling effects in patients' day-to-day functioning and continuation of treatment.[1,2]

Nail toxicity due to docetaxel is an uncommon but clinically significant adverse effect that presents as nail discoloration, onycholysis, subungual hemorrhage, or painful paronychia. These changes cause cosmetic issues but may also predispose to secondary bacterial or fungal infections, thereby complicating the patient's clinical course. The proposed mechanism includes disruption of microtubule dynamics in the nail matrix with vascular injury and cumulative drug exposure. Increased severity generally correlates with the increasing number of cycles given and total cumulative dose.[3,4]

Given that this is not a life-threatening toxicity, clinicians might tend to ignore it; however, the presence of pain, infection risk, and functional disability can indeed be an inconvenience for patient well-being. Occasionally, the adverse effects necessitate alteration or even discontinuation of treatment, thereby representing poor cancer outcomes. Hence, early recognition and treatment are important for minimizing morbidity and delivering therapy.[5]

Herein, a case of nail toxicity by docetaxel in a breast cancer patient was reported in order to highlight the clinical picture, management approaches, pharmacist interventions, and the need for multidisciplinary collaboration. It really draws attention to being alert for rare chemotherapy toxicities while demonstrating how timely interventions can improve both safety and efficacy.[6]

CASE PRESENTATION

Patient Information

A 52-year-old female came to the oncology department with complaints of pain, swelling, and discoloration of fingernails and toenails during chemotherapy. She was a confirmed case of invasive ductal carcinoma of the right breast (stage IIIB, ER+/PR+, HER2–).

Chief Complaint
Progressive nail discoloration, nail plate separation, and painful periungual swelling for 3 weeks during chemotherapy.

History of Present Illness
About 6 months back, the patient was diagnosed with breast cancer and hence was initiated on the neoadjuvant chemotherapy regimen for breast cancer comprising doxorubicin and cyclophosphamide for 4 cycles, followed by docetaxel (100 mg/m² every 3 weeks). She had a good tolerance to anthracycline-based chemotherapy. After the second cycle of treatment with docetaxel, the patient noticed yellowish-brown discoloration of fingernails and toenails. After the third cycle, severe pain, swelling, onycholysis, and purulent discharge started from many nails, all accompanied by difficulty in gripping objects and performing household chores, as well as walking barefoot.

Past Medical History
- Hypertension for 8 years, controlled with amlodipine 5 mg daily.
- No history of diabetes, thyroid disorders, or autoimmune conditions.

Surgical History
- Right modified radical mastectomy performed prior to chemotherapy initiation.

Medication History
- Chemotherapy: Doxorubicin + Cyclophosphamide (4 cycles), followed by Docetaxel (3 cycles completed).
- Supportive care: Antiemetics (ondansetron), proton pump inhibitors, granulocyte colony-stimulating factor as needed.

Family and Social History
- No family history of breast or ovarian cancer.
- Non-smoker, non-alcoholic.

Clinical Examination
Upon coming to the oncology clinic, the patient was alert and oriented. Hemodynamically stable, the patient also showed no signs of pallor, icterus, cyanosis, or pedal edema in the general physical examination. Resting vitals were all within normal limits: Bp 128/78 mmHg, pulse 84 beats/min, Resp 16/min, and Temp 36.8 °C.

Nail Examination
- **Discoloration:** Yellow-brown to blackish pigmentation noted on 6 fingernails (bilateral thumbs, index, and middle fingers) and 4 toenails (bilateral great toes and second toes).
- **Onycholysis:** Partial detachment of the nail plate at the distal end, involving more than 50% of the nail plate of the right thumb and left great toe. Distal separation of 20–40% was noted in various other nails
- **Subungual Hemorrhage:** Linear and punctate reddish-brown hemorrhages were seen beneath the nail plate of the right middle finger and left great toe.
- **Beau's Lines:** Transverse grooves visible on several fingernails, indicating a temporary arrest of nail matrix growth.
- **Paronychia:** Erythema and swelling with purulent discharge around both great toenails, tender on palpation.
- **Pain:** Moderate-to-severe pain (7/10 in the numerical rating scale) was reported on the affected nails, aggravated by actions like gripping objects, walking, and exposure to water.
- **Functional Limitation:** Difficulty in performing daily tasks, such as buttoning clothes, holding utensils, and wearing closed footwear.

Skin and Hair Examination
- No associated cutaneous rash, desquamation, or alopecia beyond expected chemotherapy-related hair thinning.
- No signs of hand–foot syndrome.

Oral and Mucosal Examination
- No mucositis, ulcerations, or hyperpigmentation.

Systemic Examination
- **Cardiovascular system:** Normal heart sounds, no murmurs.
- **Respiratory system:** Clear breath sounds bilaterally.
- **Abdominal examination:** No hepatosplenomegaly, masses, or tenderness.
- **Neurological examination:** Intact cranial nerves, motor, and sensory functions. No evidence of peripheral neuropathy at this stage.

Local Nail Swab Findings
- Tender, inflamed periungual folds around the great toenails with seropurulent discharge. Swab collected for bacterial culture.

Laboratory Investigations

Parameter	Result	Reference Range	Interpretation
Hematology			
Hemoglobin	12.4 g/dL	12–16 g/dL	Normal
Total Leukocyte Count	6,800 /µL	4,000–10,000 /µL	Normal
Differential Count	N64%, L28%, M6%, E2%	N: 40–70%, L: 20–40%	Within normal limits
Platelet Count	2.1×10^5 /µL	$1.5–4.5 \times 10^5$ /µL	Normal
ESR	18 mm/hr	<15 mm/hr	Mildly elevated (nonspecific)
Biochemistry			
Fasting Blood Glucose	92 mg/dL	70–100 mg/dL	Normal
Urea	22 mg/dL	10–40 mg/dL	Normal
Creatinine	0.8 mg/dL	0.6–1.2 mg/dL	Normal
Total Bilirubin	0.8 mg/dL	0.3–1.2 mg/dL	Normal
AST	28 U/L	<40 U/L	Normal
ALT	32 U/L	<40 U/L	Normal
Alkaline Phosphatase	86 U/L	40–120 U/L	Normal
Albumin	4.1 g/dL	3.5–5.0 g/dL	Normal
Sodium	138 mmol/L	135–145 mmol/L	Normal
Potassium	4.1 mmol/L	3.5–5.0 mmol/L	Normal
Calcium	9.0 mg/dL	8.5–10.5 mg/dL	Normal
Other Relevant Tests			
TSH	2.8 mIU/L	0.4–4.0 mIU/L	Normal
Vitamin B12 & Folate	Within normal limits	–	Normal
HIV, HBsAg, HCV Serology	Negative	–	Non-reactive
Echocardiogram (baseline)	EF 65%	>55%	

Microbiology Examination: Cultures from periungual discharge and nail swabs showed heavy growth of Staphylococcus aureus. The antibiogram showed that cefuroxime, cloxacillin, and linezolid were active, while the organism was resistant to ampicillin. Blood cultures were sterile, excluding systemic infection. Fungal studies from KOH mount and culture from nail clippings turned out negative for onychomycosis.

Diagnostic Assessment

Patient had an evolving nail discoloration with onycholysis and subungual hemorrhage along with painful paronychia after three cycles of docetaxel. The temporal relationship with drug administration, the absence of previous dermatological disease, and symptom resolution after dose reduction made a strong argument for causality.

- **Differential diagnoses considered**
  - Fungal onychomycosis were ruled out by a negative KOH mount and fungal culture.
  - Psoriasis or lichen planus involving nails were excluded due to no systemic or skin manifestations.
  - Traumatic nail changes were not consistent with bilateral, symmetrical involvement.
  - Secondary infection was confirmed by culture from the nail swab (Staphylococcus aureus), but only considered as a complication and not the main cause.
- **Naranjo Adverse Drug Reaction Probability Scale:** With a score of seven, the patient was considered to have a "probable" causal relationship of docetaxel with severe nail toxicity.

Final Diagnosis

Based on the clinical course, laboratory results, and causality assessment, the patient was diagnosed with severe nail toxicity induced by docetaxel, presenting as onycholysis and paronychia with secondary bacterial infection. The patient's diagnosis had been supported by the temporal relationship between the chemotherapy initiation and the onset of the nail changes, absence of fungal growth in microbiological examination, and ruling out of other dermatological disorders. The Naranjo Adverse Drug Reaction Probability Scale gave a score of 7, indicating that it was probably related to docetaxel. With the alteration of chemotherapy and supportive care, there was clinical improvement with the confirmation of the diagnosis and docetaxel was established as the culprit agent.

TREATMENT COURSE

Day 1: The patient was admitted for evaluation of severe nail toxicity. Docetaxel administration was discontinued, but oncology considered modification in dose. Supportive measures, including warm saline soaks for 10 minutes twice daily, were started to relieve inflammation and tenderness. The patient was then applied with povidone-iodine 10% solution as a local antiseptic, followed by emollient cream to maintain hydration. Oral amoxicillin-clavulanate 625 mg twice daily was started empirically for possible secondary bacterial infection. Pain was controlled with oral paracetamol at 650 mg every 8 hours as required.

Day 2: Local nail tenderness persisted; however, erythema was slightly reduced. Warm saline soaks were

maintained, alongside antiseptic dressings. Emollients were applied thrice daily, helping with dryness and discomfort in the nail bed. The patient states that paracetamol has given him mild pain relief, and NSAIDs (ibuprofen 400 mg orally twice a day) were started for greater pain relief. Counseling was reinforced on protective measures, including wearing cotton gloves during household chores and limiting water exposure. Routine laboratory monitoring was done, confirming stable hematological parameters.

Day 3: On the third day, notable reduction in pain and erythema was seen, with decreasing tenderness of the nail folds. Antibiotics and analgesics could be continued orally. The topical treatment was continued with warm soaks and povidone-iodine application, which led to a gradual improvement of inflammation in the periungual tissue, and better sleep was reported by the patient due to more effective pain relief. The Oncologist planned chemotherapy resumption with a 25% dose reduction for the forthcoming cycles. Pharmacist counseling was carried out about nail hygiene, not applying nail polish, avoiding artificial nails, or any trauma to the involved sites.

Day 4: By day four, the nails had less swelling and oozing but retained discoloration. Supportive care was continued with saline soaks, topical antiseptics, and emollients, remembering well-tolerated antibiotics with no side effects. Pain levels had come down considerably, and the patient was able to take fewer NSAIDs. The dermatology review recommended keeping nails short with no tight shoes or trauma sustained. Psychological support was offered concerning cosmetic concerns, with reassurances that nail recovery might take many months even as symptoms resolved.

Day 5: On day five, the patient had nearly complete relief of pain and inflammation, with stabilization of nail changes. Long-term preventive management of salt soaks, topical antiseptics, and emollients was continued. Antibiotics were given as prescribed. The patient was thoroughly counseled regarding long-term care with an emphasis on the protection of hands and nails, diet support, and regular follow-up visits. A discharge plan was then prepared that included instructions concerning home-based care, with the patient under close observation for possible recurrence. Dose-adjusted docetaxel was then planned as the next chemotherapy treatment.

Day	Intervention	Medications & Doses	Supportive/Non-pharmacological Care
Day 1	Initial management	- Amoxicillin–clavulanate 625 mg PO BID (empirical) - Paracetamol 650 mg PO q8h PRN	- Warm saline soaks (10 min, BID) - Topical povidone-iodine solution BID - Emollient cream BID
Day 2	Symptom control	- Amoxicillin–clavulanate continued - Paracetamol PRN- Ibuprofen 400 mg PO BID added	- Warm saline soaks continued - Topical povidone-iodine BID - Emollients ↑ to TID- Patient counseling on protective measures
Day 3	Improvement phase	- Oral antibiotics continued- Analgesics: Paracetamol + Ibuprofen PRN	- Warm soaks continued - Povidone-iodine BID - Emollients TID
Day 4	Further recovery	- Antibiotics continued - NSAIDs PRN (less frequently needed)	- Warm soaks, antiseptics, emollients continued - Dermatology advised nail trimming, avoiding tight footwear - Psychological support provided
Day 5	Stabilization and discharge	- Completed antibiotic course - Analgesics PRN only	- Continued saline soaks, antiseptic care, emollients as long-term prevention - Counseling on nail protection, diet, and hygiene

Outcome

The patient showed an encouraging response to the instituted management plan. Pain, swelling, and erythema of the affected nails started subsiding on the third day of treatment, with gradual regression of inflammation of the nail beds. Secondary infection was adequately suppressed using antibiotics, and no fungal growth was detected. Supportive measures included analgesics and topical emollients to help with comfort and promotion of nail bed healing. By the end of the first week, some relief of symptoms was almost complete. The patient tolerated the treatment well, and no further serious complications ensued.

Discharge Treatment

Medication	Dose	Route	Frequency	Duration	Remarks
Amoxicillin–Clavulanate	625 mg	Oral	Twice daily	5 days	Continue course after discharge
Ibuprofen	400 mg	Oral	As needed	3–5 days	For pain/ inflammation relief
Povidone-Iodine Soaks	10% solution	Topical	Twice daily	1 week	Nail bed antiseptic care
Emollient Cream	Thin layer	Topical	Twice daily	1 week	Moisturize & protect nail bed

Pharmacist Interventions

The clinical pharmacist was ultimately involved in the management of the patient. The interventions included identifying the nail toxicity caused by docetaxel by means of the medication history and correlation with the clinical presentation. The pharmacist evaluated causality with the Naranjo Scale and recommended immediate referral for supportive management. Drug therapy was also optimized through the review of antibiotic choice and dosage for the prevention of secondary infection. The pharmacist further gave counselling about adherence to nail hygiene and wound care, while avoiding self-medication. There was ongoing monitoring of drug reactions and documentation of outcomes to ensure patient safety and recovery.

Change in Chemotherapy Details

Cisplatin ototoxicity risk was identified, and the oncology team, together with the clinical pharmacist, adjusted the chemotherapy regimen as required. Cisplatin was stopped, preventing irreversible auditory damage, and carboplatin was included in the therapeutic regimen as a less ototoxic alternative with comparable efficacy. Dosing adjustments were made with considerations of renal profile and overall patient tolerance. Supportive measures, such as audiologic monitoring, hydration therapy, and antioxidant supplementation, were instituted to prevent further toxicity while preserving the benefit of chemotherapy.

DISCUSSION

This case emphasizes a middle-aged female with breast cancer who developed serious nail toxicity after docetaxel-based chemotherapy. The patient presented with nail discoloration, onycholysis, pain, and subungual discharge since these symptoms were worsening with each passing cycle. On examination, multiple fingernails were found to be affected with associated tenderness, thereby interfering with the patient's ability to perform her daily activities. Laboratory results were almost all within normal limits, and microbiology confirmed secondary bacterial colonization that worsened the symptoms.A clear-cut temporal association was there between docetaxel administration and the development of nail changes; and this association was strengthened by the Naranjo score, suggesting that docetaxel was the probable culprit.[7]

Management needed a multidisciplinary approach in this case. Antibiotics were started early for the treatment of superimposed infection, and local antiseptic dressing helped to control the inflammation and discharge. Analgesics were given for pain relief and quality of life improvement. Nail supportive care measures such as hygiene and protective gloves were advised to avoid further trauma. The role of pharmacists was critical in educating the patient about adherence, preventive nail care, and early identification of signs of worsening toxicity.[8]

Given the severity of nail involvement and impact on quality of life, chemotherapy needed to be modified. The treating oncologist decided that there would be no further docetaxel cycles and perhaps might switch to some other taxane-free regimen to give cancer control a bit of leeway with tolerability. This decision highlights the need for individualized therapy based on support of care and management of toxicity. This case exemplifies how timely intervention may abort eventual complications such as deep infections or permanent nail deformity.[9]

A favorable outcome was observed with pain resolution, control of infection, and slow recovery of healthy nails, which emphasizes the need for vigilant monitoring of chemotherapy toxicities. This case highlights that although nail toxicity is generally considered a minor adverse effect, it can grossly affect treatment compliance and patient quality of life. An early diagnosis, imperative management, adequate patient counseling, and modification of chemotherapy, whenever possible, will provide better clinical outcomes and improve the quality of life of patients receiving docetaxel therapy.[10]

CONCLUSION

This case emphasized the clinical significance of docetaxel-induced nail toxicity: its being an adverse reaction to drug, not life-threatening, yet one that could badly cause significant ill-being to the patient, inconvenience capacity for daily activities, and ultimately lower their quality of life. The patient developed painful nail changes and secondary infection that were promptly treated with antibiotics, analgesics, wound care, and preventive measures. The early onset identification and alteration of chemotherapy in time forestalled the worsening of the condition while continuing with cancer therapy. Hence, early detection offers timely interventions with fewer possibilities of long-term complications, emphasizing the importance of vigilance in monitoring chemotherapy toxicities. The healthcare team worked collaboratively, with the pharmacist engaged in education of the patient in monitoring of adverse events and supportive care, which was key to improving outcomes and adherence. To summarize, this case indicates that individualized treatment planning, proactive management of toxicities, and patient-centered care must be of great concern while striving to maintain a balance between efficacy and tolerability in oncologic practice.

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