Case Report

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Beau's Lines Resulting from Taxane Chemotherapy

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Abstract:

Nail abnormalities are frequently found in oncologic patients who have undergone chemotherapy. Although these changes do not require treatment, they could influence the treatment plan and the patient's quality of life. Some nail disorders lead to severe complications. Herein, the author reports on a patient with advanced breast cancer who received multiple kinds and cycles of chemotherapy. She developed multiple, parallel, transverse grooves, compatible with Beau's lines, on the nail plate of all her fingernails and toenails. This report aims to further the knowledge of medical students, physicians, and healthcare providers regarding the nails of patients who receive chemotherapy.

Keywords: adverse drug reaction, Beau's lines, chemotherapy, nails, taxane

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Introduction

Nails, a special skin appendage, consist of complex structures, including the nail matrix, the nail bed, the proximal nail fold, the hyponychium, and a hard keratin product, the nail plate. Nails have multiple functions, for example, supporting the ability to pick up small objects, protecting the distal fingers and toes, providing information about personal health and specific exposures, and influencing mental status.[1] Fingernail growth rate is 3–3.5 mm/month in adults, and grow two times faster than toenails, approximately 1–1.5 mm/month.[1,2] The growth rate can be altered by some physiological or pathological factors and medications.[2,3]

Nail abnormalities can be classified by the primary site of the structural damage, including the nail matrix (Beau's line, onychomadesis, pitting, true leukonychia, koilonychia), nail bed (onycholysis, apparent leukonychia, splinter hemorrhages), and nail fold (paronychia, pyogenic granuloma).[1] Chemotherapy, particularly the taxane regimen, can temporarily arrest nail matrix proliferation, causing nail plate abnormalities. It can also induce inflammation and pigmentation of the nail apparatus. This article reports on Beau's lines, an interesting nail abnormality resulting from taxanes chemotherapy, which correlates with the cycles of chemotherapy and the nail growth rate.

Case report

A 42-year-old woman presented with nail changes for a year. Fifteen months earlier, she was diagnosed with breast cancer, which metastasized to the liver, lungs, and pleura. The tumors were positive for estrogen and progesterone receptor, but negative for human epidermal growth factor receptor 2. She had received 4 courses of a combination of doxorubicin and cyclophosphamide, and then switched to paclitaxel 175 mg/mm^2 for 7 sessions, but her disease sustained only a partial response. Her most recent chemotherapy regimen was 100 mg/mm^2 of docetaxel every 4 weeks/cycle for 5 cycles. She noticed the first nail changes occurring a month after receiving the first cycle of docetaxel.

Physical examination showed multiple, parallel, constant transverse grooves on the nail plate of all her fingernails (Figure 1) and toenails (Figure 2), compatible with Beau's lines, which correlated with the timing of her taxane chemotherapy cycles. She had no history of onychomadesis. Her nails also showed melanonychia and distal onycholysis.

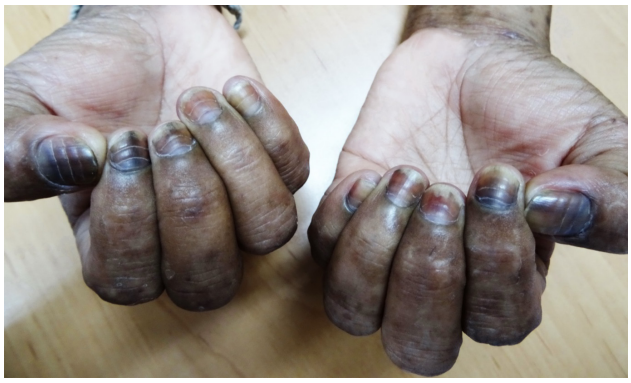

Figure 1 Multiple parallel Beau's lines, melanonychia, and distal onycholysis of all fingernails

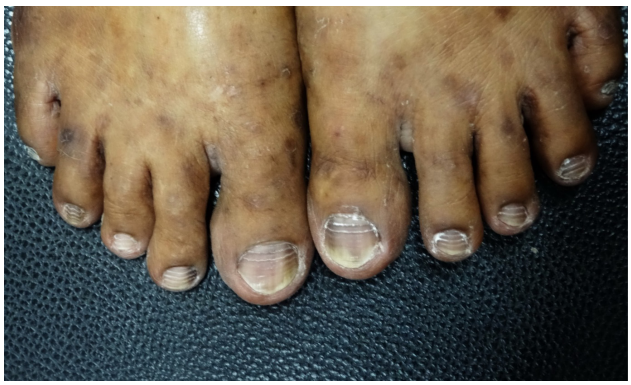

Figure 2 Multiple parallel Beau's lines, melanonychia, and distal onycholysis of all toenails

Discussion

Beau's lines, first described by French physician Dr. Joseph Honoré Simon Beau in 1846, are transverse depressions of the nail plate resulting from a temporary arrest of mitotic activity of the proximal nail matrix.[4] This transverse line is a distal migration following the nail growth rate. The multiple parallel lines, as shown in this case, indicate repeated normal damage from the constant course of chemotherapy. The other conditions causing multiple Beau's lines are systemic, including viral infection, especially hand-foot-and-mouth disease, high fever, and localized Beau's lines caused by trauma, infections, or inflammation of the nails, e.g., manicures, chronic paronychia, and eczema.[1,5,6] Severe damage can produce a complete interruption of proximal and distal nail matrix activity, which causes a complete detachment of the distal nail plate from the proximal nail fold, and is called onychomadesis or defluvium unguium.[5]

Taxanes (e.g., paclitaxel, docetaxel) are potent cytotoxic chemotherapy agents used in the treatment of many kinds of solid neoplasms, including breast, lung, gastric, ovary, prostate, and head and neck cancers.[7] The all-grade incidence of nail changes with paclitaxel treatment is reported to be approximately 43.7%.[8] These nail adverse reactions can be hyperpigmentation, melanonychia, splinter hemorrhages, onycholysis, photo-onycholysis, Meuhrcke's nails, acute paronychia, pyogenic granuloma, Beau's lines, and onychomadesis.[1,7,8] The patient in this report had melanonychia, distal onycholysis, and Beau's lines after treatment with paclitaxel and docetaxel.

Nail changes can commonly occur due to various medications other than taxanes (Table 1). Medications frequently reported with melanonychia are hydroxyurea, zidovudine, and psoralen.[1,9,10] For onycholysis, other medications are tetracyclines, psoralen, and nonsteroidal anti-inflammatory drugs.[1] Retinoids, indinavir, methotrexate, capecitabine, sirolimus, and epidermal growth factor receptor inhibitors reported paronychia and pyogenic granuloma.[1,11] However, another cause of nail changes, including infections and cutaneous metastasis, should be considered in patients who have advanced cancer with immunocompromised status.[12]

Table 1 Drug-induced nail abnormalities[1,7-11]

Nail changes	Affected anatomy	Common medications
Beau's lines, onychomadesis	Nail matrix	Taxanes
Melanonychia	Nail matrix	Taxanes, hydroxyurea, fluorouracil, zidovudine, psoralen
True leukonychia (e.g. Mee's lines)	Nail matrix	Doxorubicin, vincristine, fluorouracil, methotrexate, cyclophosphamide
Apparent leukonychia (e.g. Muehrcke's lines)	Nail bed	Taxanes
Onycholysis	Nail bed	Taxanes, hydroxyurea, capecitabine, cyclophosphamide, doxorubicin, fluorouracil, tetracyclines, psoralen, nonsteroidal anti-inflammatory drugs
Paronychia and periungual pyogenic granuloma	Nail fold	Taxanes, methotrexate, capecitabine, sirolimus, epidermal growth factor receptor inhibitors, retinoids, indinavir

There is a lack of guidelines and effective treatment interventions for nail abnormalities associated with chemotherapy.[8] Most nail changes are asymptomatic and do not require treatment. Local wound care and topical antibiotics and corticosteroids should be adjusted in patients with symptoms. In severe reactions, a reduced dose of chemotherapy might help prevent events afterward.

Conclusion

Nail changes resulting from chemotherapeutic agents are common. Patients should get information before treatment plans, and physicians should also evaluate adverse reactions. When patients experience nail abnormalities, they should receive an appropriate intervention.

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