Why you should read this article:

- To refresh your knowledge on nail changes occurring as a side effect of cancer treatments
- To recognise the burden of treatment-related nail toxicities in terms of patients' quality of life
- To find out about nursing interventions for preventing and managing treatment-related nail toxicities

Nail toxicities associated with systemic anticancer therapy

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Abstract

Nail toxicities are a common but often overlooked side effect of systemic anticancer therapy (SACT) and can have significant adverse effects on patients' quality of life and emotional well-being. This article explores the literature on nail toxicities associated with different types of SACT. It details the results of a large-scale UK patient survey (n=1,352) aimed at assessing patients' awareness of nail damage as a side effect of SACT and of the information and support they receive regarding nail health. The results suggest there is a substantial gap between the high incidence of nail toxicities and patients' awareness of them; that patients are often unprepared for this side effect of SACT; and that they lack access to adequate evidence-based preventive and supportive interventions. The article outlines evidence-based strategies that cancer nurses can use to support the prevention, assessment and treatment of nail toxicities in patients receiving SACT.

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Keywords

adverse reactions, cancer treatments, medicines, nursing care, patient education, patient experience, pharmacology, signs and symptoms, symptom management

SYSTEMIC ANTICANCER therapy (SACT) has transformed patient outcomes, but the benefits are often accompanied by a wide range of side effects that can significantly affect patients' quality of life and emotional well-being. While some side effects of SACT, such as hair loss and nausea, are widely recognised and managed, others remain underappreciated and undertreated. Nail toxicities fall into the latter category, and are a common, often distressing and functionally impairing side effect that is frequently overlooked in routine clinical practice (Emvalomati et al 2023). Nail damage associated with SACT can cause significant pain, increase the risk of infection and interfere with daily activities such as getting dressed, typing or walking (Robert et al 2015). For patients already navigating the physical and emotional challenges of a cancer diagnosis, this visible and often painful reminder of their treatment can take a heavy toll.

Nails, similarly to the skin and hair roots, are composed of rapidly dividing cells, making them particularly vulnerable to the cytotoxic and antiproliferative effects of many cancer treatments. As a result, a high proportion of patients undergoing chemotherapy, targeted therapy, immunotherapy and/or hormonal therapy experience some form of nail changes, ranging from discolouration and pitting or flaking to severe pain, inflammation, infection and nail loss (Emvalomati et al 2023).

This article provides an overview of the evidence on nail toxicities associated with different cancer treatment modalities and presents results from a large-scale UK patient survey that aimed to quantify the extent of the issue from the patient and carer perspective. The article also outlines evidence-based

management strategies for cancer nurses with regard to the prevention, assessment and treatment of nail toxicities.

Nail toxicities associated with cancer treatments

The high incidence of nail toxicities is well-documented across a range of SACT agents. The underlying mechanisms vary depending on the class of drug, but the common thread is the disruption of the normal, rapid cell division that characterises healthy nail growth. The brief examination of the literature below highlights the pervasive nature of SACT-related nail toxicities. The incidence rates reported underscore the importance of recognising and managing this common but often neglected side effect of cancer treatments.

Chemotherapy

Cytotoxic agents used in chemotherapy, which target all rapidly dividing cells, are a major cause of nail damage. The nail matrix, with its high rate of proliferation, is particularly susceptible to the effects of these medicines. The result is a wide spectrum of nail changes, with incidence rates varying depending on the specific agent and drug regimen used.

Taxanes such as docetaxel and paclitaxel are associated with a high incidence of nail toxicities (Scotté et al 2005, Sibaud et al 2016, Emvalomati et al 2023). Taxane-induced nail damage is often severe and can include onycholysis (nail separation), subungual haemorrhage and significant pain (Sibaud et al 2016).

Anthracyclines, for example doxorubicin hydrochloride and epirubicin hydrochloride, are also frequently implicated in nail changes, with one study reporting nail colour changes in 60.7% of patients receiving these drugs (Choulli et al 2024). Common manifestations include melanonychia (dark pigmentation of the nail) and Beau's lines (transverse grooves in the nail plate) (Robert et al 2015).

Other cytotoxic agents associated with nail toxicities, albeit often at lower rates than taxanes and anthracyclines, include (Mittal et al 2022):

- Capecitabine – which can cause onycholysis, onychomadesis (spontaneous separation and shedding of a nail from its root), paronychia (nail inflammation resulting from trauma, irritation or infection) and pyogenic granuloma (non-cancerous vascular growth).
- 5-fluorouracil – which can cause onycholysis, nail plate dystrophy, onychomadesis, transverse bands, hyperpigmentation and paronychial pain and inflammation.
- Etoposide – which can cause nail bed pigmentation, Beau's lines and onycholysis.

Many cytotoxic agents are used in combination, which can have a compounding effect.

Targeted therapies

Targeted therapies, which are designed to interfere with specific molecular pathways involved in cancer growth, have distinct patterns of nail toxicity. While more precise in terms of targeting the cancer than traditional chemotherapy, the agents used in targeted therapies can have significant on-target, off-tumour effects on the skin and nails. Examples of such agents include:

- Epidermal growth factor receptor (EGFR) inhibitors – commonly used to treat lung, colorectal and head and neck cancers, and well-known for causing skin and nail toxicities. Paronychia is a particularly common and often painful side effect of EGFR inhibitors, affecting a substantial number of patients (Fox 2007).
- Tyrosine kinase inhibitors (TKIs) – used to treat a range of cancers, and have been associated with high rates of nail toxicities (Emvalomati et al 2023). The specific manifestations can vary widely depending on the TKI and the pathways it targets, but include paronychia, onycholysis, subungual haemorrhage and nail discolouration.
- Vascular endothelial growth factor (VEGF) inhibitors – work by inhibiting the formation of new blood vessels and can lead to vascular fragility in the nail bed. Around 70% of patients receiving sorafenib, and 25% of those receiving sunitinib, have been reported to develop subungual splinter haemorrhages within the first two months of therapy (Emvalomati et al 2023).

Hormonal therapies

Hormonal therapies, while generally associated with a lower risk of severe side effects than chemotherapy and targeted therapies, can cause nail changes, although their incidence has not been consistently established in the literature (Lacouture and Sibaud 2018). These nail changes, which are often subtle and slow to develop, can include increased brittleness, dryness and blemishes such as small indentations or a horizontal or vertical line (Breastcancer.org 2025) and should not be underestimated in terms of the effects on patients' emotional well-being.

Key points

- Nails are composed of rapidly dividing cells, so they are vulnerable to the cytotoxic and antiproliferative effects of many cancer treatments
- The high incidence of nail toxicities is well-documented across a range of systemic anticancer therapy (SACT) agents
- SACT-related nail changes include nail separation, shedding, haemorrhage, discolouration and inflammation
- In a large-scale UK survey, patients who had undergone SACT reported a lack of information and support from healthcare professionals regarding nail health, despite experiencing nail toxicities causing significant physical and emotional distress
- Cancer nurses have an important role in the prevention and management of nail toxicities including routine nail assessments, patient education, supportive care and advocacy

Emerging therapies

As the landscape of cancer treatments continues to evolve, new drugs are emerging, each with its own distinct side effect profile. While data on nail toxicities associated with newer agents such as those used in immunotherapies – including in chimeric antigen receptor (CAR) T-cell therapy – remain limited, early reports suggest that nail toxicities are a significant concern. Immunotherapies, which work by harnessing the body's own immune system, can cause a range of immune-related side effects. While less well-documented than other side effects, there is growing evidence of immunotherapy-induced nail changes, including autoimmune-like phenomena and chronic inflammation (Axler et al 2025).

CAR T-cell therapy and bispecific antibody therapy are cutting-edge therapies that have shown remarkable efficacy in some cancers but can cause significant toxicities. Nail-related adverse events were reported in 53-55% of patients in the MonumenTAL-1 study, which investigated the safety and activity of the bispecific antibody talquetamab in patients with relapsed or refractory multiple myeloma (Chari et al 2025). These nail-related adverse events were predominantly grade 1 (mild) or grade 2 (moderate), as per the Common Terminology Criteria for Adverse Events (CTCAE) (US Department of Health and Human Services 2017) (Chari et al 2025). Talquetamab is designed to target the GPRC5D receptor found in myeloma cells, but that receptor is also found in healthy tissue in the nail matrix, so talquetamab can have on-target, off-tumour effects – which occur when an anticancer agent hits its intended target but in non-malignant tissues.

Patient survey

To quantify the gap between clinical evidence and patient experience, a UK survey of patients who had undergone SACT or their families or carers was conducted in June 2025 by Yolo Communications (an international market research and social media insight agency based in London). The survey was commissioned and funded by HZeal Ltd, the exclusive global distributor of a nail balm developed by a UK oncologist and designed to help protect and support nail health during chemotherapy. With an increasing number of new SACT agents being approved and used in clinical practice, each with a distinct side effect profile, it was considered timely to evaluate patients' awareness and experiences of associated toxicities, particularly nail damage.

Survey sampling, design and data analysis

Random sampling was used to recruit respondents from Yolo Communications' representative online partner panels (that is, curated, pre-recruited groups of individuals who have agreed to participate in surveys, market research studies or product tests). Potential respondents were identified through their registered profile details and screened for eligibility; eligibility criteria were patients with a cancer diagnosis who had received SACT within the past three years, or close family members or carers of such patients. Eligible panellists were sent an email invitation to participate; these invitations are sent on a random basis within the eligible target groups for the research.

The online survey consisted of nine core questions (excluding screener questions and demographics). Multiple-choice ('select all that apply') and Likert scale ('strongly agree', 'agree', 'neither agree nor disagree', 'disagree', 'strongly disagree') questions were used to quantify respondents' experiences, and open questions were used to gather qualitative insights.

Data analysis was descriptive and no inferential statistical tests were performed; therefore, the term 'significant' in relation to survey results refers to clinical or substantial importance, not statistical significance.

Ethical considerations

The survey was conducted to assess patients' awareness and experiences of nail toxicities and did not require formal ethical approval. The survey was conducted in accordance with the Market Research Society (2023) code of conduct and the International Chamber of Commerce/ESOMAR (2016) international code on market, opinion and social research and data analytics.

All respondents were part of an 'opt-in' panel and had therefore previously agreed to participate in surveys and provide honest opinions for market research studies. The invitations to panellists for any survey undertaken by Yolo Communications reiterate the terms and conditions of the research, including the potential uses by the researchers of the information provided, and panellists are reminded that their personal identity and other personally identifiable details will be protected. Consent is therefore obtained through the established double opt-in panel registration process and reiterated at the point of survey invitation.

Yolo Communications is registered with the Information Commissioner's Office

and is fully compliant with the UK Data Protection Act 2018. Panel members who participate in surveys receive nominal 'reward points' (redeemable for money or charitable donations).

Results

A total of 1,690 individuals responded to the invitation to participate, of whom 338 did not meet the eligibility criteria and were therefore removed from the sample. This resulted in 1,352 completed surveys (completion rate: 80%).

The results revealed substantial disparities in awareness of, communication about and support regarding nail damage. There was a significant disparity in patient awareness regarding common side effects of SACT. While 81% (*n*=1,100) of respondents correctly identified hair loss as a potential consequence of SACT, only 41% (*n*=559) were aware that nail damage could occur. This awareness gap appeared to be compounded by a lack of proactive communication from healthcare professionals. Half of all survey respondents (50%, *n*=679) recalled being warned about the risk of hair loss, but only 18% (*n*=245) said they had been informed about potential nail damage.

The disparities extended to the provision of supportive interventions. Even when nail damage occurred, it appeared that support was limited. While 27% (*n*=363) of respondents were offered interventions to mitigate hair loss, such as scalp cooling, only 11% (*n*=151) received guidance or products to prevent or manage nail damage. Only 21% (*n*=280) of respondents received advice on nail care before their treatment started, and only 14% (*n*=191) were provided with guidance after nail damage had manifested. Around 71% (*n*=959) of responding patients had received no advice or support for their nail health at any point during their treatment journey.

The consequences of this gap in care were substantial. For many patients, nail damage was not a minor inconvenience but a source of significant physical and emotional distress. Around 37% (*n*=506) of respondents reported that nail damage interfered with their daily tasks, for example typing, buttoning clothes, walking or sleeping; 23% (*n*=311) experienced emotional distress because of the changes to their nails; 12% (*n*=163) required a prescription for painkillers to manage nail-related pain; 10% (*n*=137) were prescribed antibiotics to treat secondary nail infections; and 7% (*n*=88) had an adjustment to their SACT regimen due to the severity of their nail toxicities.

The results highlight that nail damage is a serious medical issue with tangible consequences for patients' well-being and treatment outcomes. The significant rates of pain, infection and functional impairment are in clear contrast with the low levels of awareness and support regarding nail toxicities. These toxicities can consume significant healthcare resources through the costs of prescription medicines, such as analgesia and antibiotics, healthcare professionals' time, specialist dermatology referrals and procedures for nail debridement or regrowth support (Belzer et al 2024).

The survey also revealed a significant lack of knowledge among patients and carers regarding available management options. When asked about potential interventions to protect their nails, 44% (*n*=590) of respondents did not know of any. While 32% (*n*=431) were aware of nail moisturisers, only 18% (*n*=240) had heard of a specific product (which was named in the survey), a natural nail balm that has been clinically validated to protect the nails during chemotherapy (Thomas et al 2018). This highlights a clear need for improved patient education and access to evidence-based supportive care.

Limitations

Several limitations should be considered when interpreting the survey results. The use of an online survey platform means that individuals without internet access or with low digital literacy may have been excluded, potentially introducing selection bias. The data collected were based on self-report and there may have been a recall bias, as respondents were asked about their experiences within the past three years. The inclusion of carers' perspectives, while valuable, may not accurately reflect the patients' experiences. Finally, as it was a UK-based survey, the results may not be generalisable to other healthcare systems with different models of cancer care.

Management of nail toxicities

Given the high incidence of nail toxicities and their significant adverse effects on patients' well-being and quality of life, as demonstrated in the literature and in the survey results, there is a pressing need for cancer nurses to take a proactive, systematic approach to the prevention, assessment and treatment of SACT-related nail toxicities. The goal is twofold: to prevent or minimise

the severity of nail changes and their effects on patients' quality of life, and to effectively treat symptoms when they arise.

Prevention

As the survey results highlight, patient education is a critical but often overlooked component of preventive care with regard to nail toxicities. Before starting SACT, all patients should be informed of the potential for nail changes and provided with clear, practical advice on how to protect their nails. This should include guidance on gentle nail care, avoidance of trauma and the use of appropriate products (Macmillan Cancer Support 2025). Patients should be advised to keep their nails short and filed smooth to prevent catching and trauma; moisturise their hands and nails regularly with a thick, emollient cream; avoid harsh soaps and detergents; and wear gloves for wet work and gardening. In addition, they should be advised to avoid manicures, pedicures and the application of artificial nails, and refrain from using nail varnishes and nail varnish removers during their cancer treatment (Cancer Research UK 2023, Emvalomati et al 2023, Macmillan Cancer Support 2025).

For patients receiving taxane-based chemotherapy, the use of cooling devices for hands and feet during administration of the intravenous infusion can be used as a prophylactic measure against peripheral neuropathy and nail toxicities. The intense cold produced by a cooling device causes vasoconstriction in the hands and feet, which is thought to reduce the delivery of the cytotoxic agent to the nail matrix and nail beds. A number of studies have demonstrated the use of this approach – see for example Can et al (2012) or McCarthy et al (2014). However, this modality only offers potential benefit during the intravenous administration of cytotoxic agents, not when using targeted therapies, immunotherapies or hormonal therapies (Huang et al 2019).

The use of a nail balm containing a blend of natural waxes and botanical oils has been shown to be effective in protecting the nails during chemotherapy. A double-blind randomised controlled trial involving 60 patients found that the natural balm reduced the incidence and severity of chemotherapy-induced nail damage and improved nail-related quality of life in the intervention group compared with the placebo group (Thomas et al 2018). Patients using such products should do so regularly, starting before treatment and continuing throughout and afterwards to reduce the risk of late-onset adverse effects (Thomas et al 2018).

Assessment

Regular assessment and monitoring are central to the early detection and effective management of nail toxicities. Cancer nurses are ideally placed to undertake these activities by incorporating a brief nail examination into their routine patient assessments. The CTCAE provides a standardised framework for grading the severity of nail changes (US Department of Health and Human Services 2017). This can be a useful tool in clinical practice; for example, grade 1 nail changes (discolouration, ridging or pitting) may require monitoring and supportive measures, while grade 2 changes (partial or complete nail loss, pain interfering with activities of daily living) may warrant referral to a specialist.

Treatment

If nail toxicities occur, cancer nurses can employ a range of interventions to manage the associated symptoms and prevent complications such as pain or infection (Fox 2007, Robert et al 2015, Mittal et al 2022, Emvalomati et al 2023).

- For patients experiencing mild or moderate pain associated with nail changes, simple analgesics such as paracetamol or non-steroidal anti-inflammatory drugs can be effective. For more severe pain, a referral to a pain management specialist may be necessary.
- Paronychia and other infections are common SACT-related nail toxicities. They should be treated promptly with topical or oral antibiotics, depending on the severity of the infection. Patients should be advised to keep the affected area clean and dry and to avoid any trauma.
- When onycholysis occurs, the separated portion of the nail should be trimmed back to prevent it from catching and causing trauma. The underlying nail bed should be kept clean and dry to prevent secondary infection.
- For patients with severe or persistent nail toxicities, a referral to a dermatologist or a specialist podiatrist may be appropriate. These specialists can provide expert advice on diagnosis and management and may recommend additional treatment options such as debridement and regrowth strategies.

Implications for cancer nursing practice

There is an opportunity to move from a reactive approach to nail toxicities towards a proactive preventive model of care. Cancer nurses, who are at the forefront of patient care, are uniquely positioned to lead this change. Key nursing interventions for preventing and managing nail toxicities are summarised in Box 1 and detailed in the following subsections.

Nail assessments

Incorporating a visual assessment of the nails into routine patient consultations can facilitate early detection of nail changes and timely initiation of management strategies (Parreira et al 2024). The use of a standardised grading tool, such as the CTCAE (US Department of Health and Human Services 2017), can help to ensure consistency in assessment and documentation, which is crucial to enable patients to manage SACT-related symptoms at home (Coolbrandt et al 2018). There is an opportunity for nurses to develop and validate more effective nail assessment and management tools for integration into established side effect assessment tools and electronic systems used in clinical care.

Patient education

Nurse-led educational interventions have been shown to be effective in improving the management of cancer-related symptoms (Kelly et al 2022). Cancer nurses have a pivotal role in ensuring that all patients are informed about the risk of nail toxicities before starting treatment. This should become a standard component of pre-treatment education alongside information about other common side effects of SACT.

Providing clear, practical advice on preventive strategies for nail health, and reinforcing this information throughout the treatment pathway, can empower patients to take an active role in their care. This information should clarify common side effects and detail preventive measures that can be taken to reduce the incidence and severity of nail damage.

Box 1. Key nursing interventions for preventing and managing nail toxicities

Immediate actions (for individual nurses):

- Integrate a visual nail assessment into routine patient consultations
- Ask patients about their nail health; ask them to describe any nail changes they have noticed since starting their cancer treatment; ask them about the effects of any nail changes on their quality of life and well-being
- Provide patients with information on simple, evidence-based preventive and/or supportive measures

Future actions (with organisational support):

- Advocate for and contribute to the development of standardised protocols for the assessment and management of nail toxicities
- Secure resources for preventive and/or supportive measures
- Promote multidisciplinary collaboration by facilitating referrals to dermatologists, podiatrists and other specialists as needed

Supportive care and signposting

Nurses can raise awareness of supportive care interventions to prevent and manage nail toxicities. This may include advising patients on the use of hand and feet cooling devices, if available; recommending appropriate nail care products; and providing guidance on gentle nail care techniques. Where appropriate, signposting patients to dermatologists or podiatrists can ensure patients receive specialist care when it is needed.

Advocacy and research

Nurses have a vital role in advocating for greater recognition of nail toxicities and promoting research in this area. By documenting the incidence of nail changes and their effects on patients, and by participating in research studies, nurses can help to build the evidence base for effective nail toxicity prevention and management strategies. This advocacy role is central to promoting patient self-management and ensuring a unified approach to treatment (Alsbrook et al 2022, Naito 2023).

Conclusion

Nail toxicities are common, distressing and often painful side effects of SACT. The results of a UK patient survey demonstrate a substantial gap between a high incidence of nail toxicities with significant adverse effects on patients' quality of life on the one hand, and low levels of awareness and support regarding nail toxicities on the other. Cancer nurses are ideally placed to address this gap. By incorporating routine nail assessments, proactive educational interventions and evidence-based management strategies into their practice, nurses can help to improve patients' experiences and reduce the burden of these challenging side effects.

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