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Case reports

Successful Desensitization in Recurrent Paclitaxel Hypersensitivity: A Breast Cancer Case Report

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Background

Paclitaxel is a cornerstone in breast cancer treatment, but hypersensitivity reactions (HSRs) remain a frequent clinical challenge, usually related to the Cremophor EL solvent rather than IgE-mediated allergy. Although premedication decreases their incidence, breakthrough reactions may still compromise therapy.

Case Report:

We present the case of a 41-year-old woman with locally advanced breast carcinoma who developed acute erythematous and pruritic lesions during her first paclitaxel infusion. Despite intensified premedication and prolonged infusion, a second attempt triggered recurrent cutaneous reactions. Skin tests were negative, and the patient was referred to allergology. A standardized multi-step desensitization protocol was initiated under strict monitoring, which enabled successful reintroduction of paclitaxel. The patient completed all planned cycles without further hypersensitivity.

Conclusion

This case highlights that desensitization remains a safe and effective strategy to overcome recurrent paclitaxel hypersensitivity, allowing continuation of optimal taxane-based therapy in the neoadjuvant setting.

INTRODUCTION

Hypersensitivity reactions (HSRs) to taxanes, particularly paclitaxel, are well-recognized complications in oncology practice, with an incidence reported in up to 30% of patients and severe reactions in 2–5%.[1] Unlike classical IgE-mediated allergies, paclitaxel HSRs are often triggered by the Cremophor EL solvent, leading to complement activation and mast cell degranulation.[2] Clinically, they occur within minutes of infusion and present as cutaneous eruptions, flushing, dyspnea, or hypotension.

Preventive premedication with corticosteroids and antihistamines has significantly reduced the frequency of these events. However, breakthrough reactions may still occur and create a therapeutic dilemma, particularly in breast cancer where taxanes are essential for optimal outcomes.[3]

Desensitization protocols, involving stepwise administration of escalating drug doses, have proven effective in inducing temporary tolerance and enabling safe drug delivery.[4] Here, we report a case of recurrent paclitaxel hypersensitivity successfully managed with desensitization, allowing continuation of standard neoadjuvant therapy.

CASE REPORT

A 41-year-old woman, with no relevant medical history, was diagnosed with locally advanced breast carcinoma and initiated on neoadjuvant chemotherapy. The initial regimen consisted of four cycles of epirubicin and cyclophosphamide (EC), which were well tolerated without adverse events.

She was subsequently switched to paclitaxel. Within minutes of the first infusion, the patient developed acute erythematous and pruritic lesions involving both palms and forearms, consistent with an immediate hypersensitivity reaction. The infusion was immediately discontinued, and she received intravenous corticosteroids and antihistamines, with rapid resolution of symptoms. Clinical documentation at this time demonstrated palmar erythema (Figure 1A), erythematous plaques on the chest and abdomen (Figure 1B), patches on the back (Figure 1C), and multiple lesions on the lateral trunk (Figure 1D).

Given the therapeutic importance of taxanes in the neoadjuvant setting, a second attempt was made with prolonged infusion over six hours and reinforced monitoring. Despite these precautions, the patient again developed erythematous cutaneous lesions on the chest, back, and trunk, without respiratory or cardiovascular compromise.

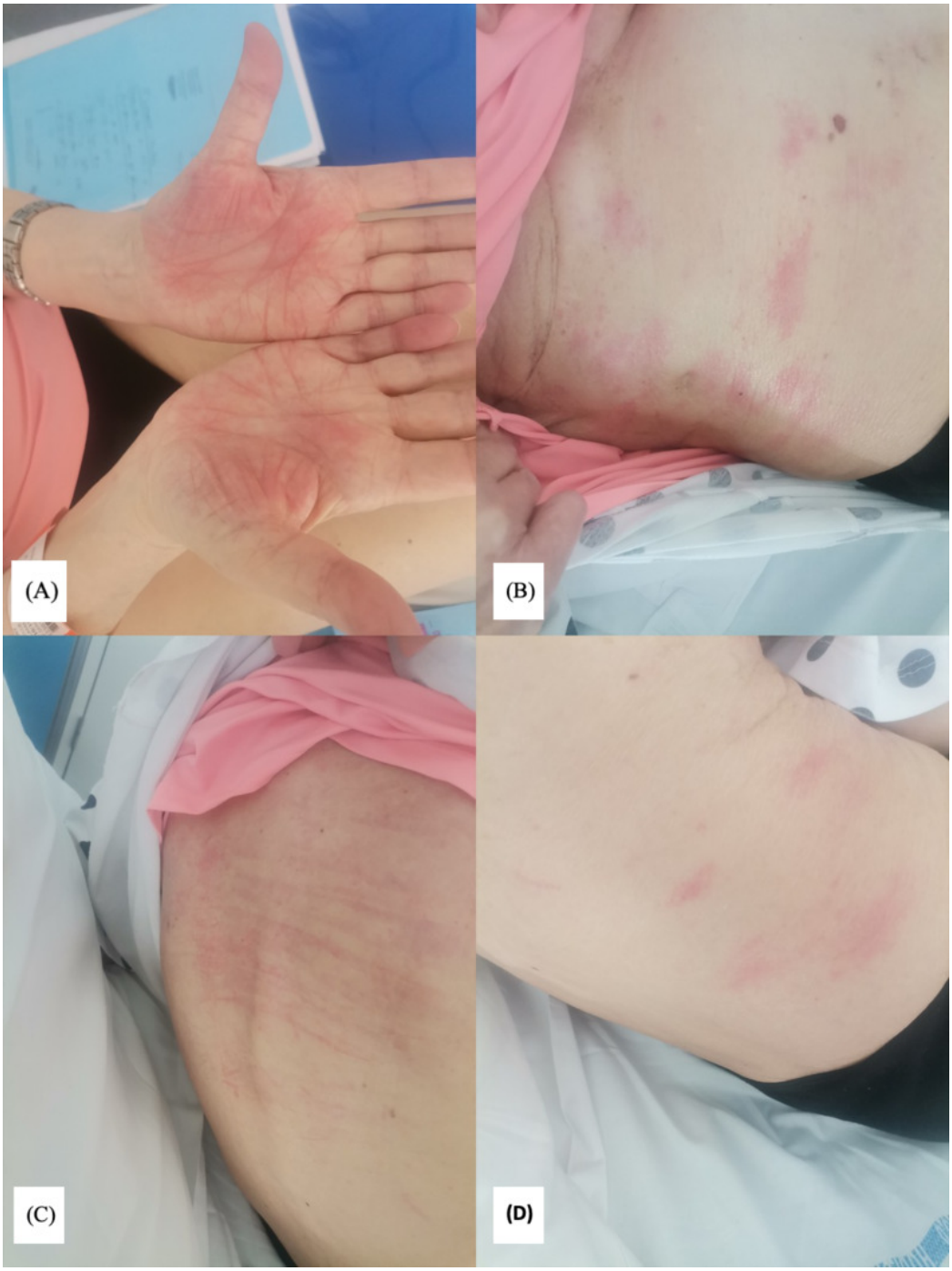

Figure 1. Clinical manifestations of paclitaxel hypersensitivity reaction.

(A) Palmar erythema during infusion.
(B) Erythematous plaques on the chest and abdomen.
(C) Erythematous patches on the back.
(D) Multiple erythematous lesions on the lateral trunk.

She was referred to the allergology service for further evaluation. Skin prick and intradermal testing for paclitaxel were negative. However, due to the reproducibility of symptoms and the clinical need to maintain taxane-based therapy, a standardized multi-step rapid desensitization protocol was initiated under strict monitoring. The protocol consisted of a single infusion bag of paclitaxel (140 mg in 500 mL of 5% glucose) administered through seven sequential steps with progressive dose escalation, for a total duration of 234 minutes (≈ 3.9 hours) (Table 1).

Before initiating the procedure, the patient underwent careful psychological preparation. She was informed in detail about the rationale, potential risks, and expected course of the desensitization protocol. The oncology and allergy teams reassured her regarding the continuous monitoring, the presence of emergency equipment and medications, and the multidisciplinary support available throughout the infusion. An experienced nurse remained at the patient's side for the entire duration of the infusion, while the oncologist performed regular checks to ensure the pa-

Table 1. Rapid desensitization protocol for paclitaxel.

Step	Infusion rate (mL/h)	Duration (min)	Dose delivered (mg)	Cumulative dose (mg)
1	**1**	**15**	**0.07**	**0.07**
2	**2**	**15**	**0.14**	**0.21**
3	**4**	**15**	**0.28**	**0.49**
4	**10**	**15**	**0.70**	**1.19**
5	**20**	**15**	**1.40**	**2.59**
6	**40**	**15**	**2.80**	**5.39**
7	**200**	**144.2**	**134.61**	**140**

The protocol consisted of seven sequential infusion steps with progressive dose escalation. A total dose of 140 mg of paclitaxel was administered over 234 minutes (≈ 3.9 hours) using glucose 5% as solvent. The patient tolerated the procedure without recurrence of hypersensitivity.

tient's safety and well-being. This close supervision helped reduce her anxiety and allowed her to proceed with confidence. Written informed consent was obtained prior to starting the protocol.

Following desensitization, paclitaxel was successfully reintroduced, and the patient subsequently completed all planned cycles without recurrence of hypersensitivity.

DISCUSSION

Paclitaxel-induced hypersensitivity reactions (HSRs) are a frequent concern in oncology, typically occurring during the first or second infusion and manifesting as skin eruptions, flushing, dyspnea, or hypotension.[1,2] Their pathophysiology is usually non–IgE mediated, most often related to the Cremophor EL solvent, which triggers complement activation and mast cell degranulation.[2]

In our patient, the reaction developed within minutes of the first infusion and recurred despite prolonged administration and reinforced premedication. Negative allergological tests were consistent with the literature, as standard skin testing has limited sensitivity for non–IgE-mediated reactions.[3]

Desensitization remains the cornerstone strategy when continuation of taxane therapy is required. Multi-step protocols, such as those developed by Castells et al., have demonstrated >90% success rates, allowing safe reintroduction of chemotherapy.[4] Our case aligns with these findings, as paclitaxel was successfully reintroduced through desensitization without recurrence of HSRs.

Regarding alternatives, docetaxel is not always a reliable option, as cross-reactivity between paclitaxel and docetaxel has been reported, with a significant proportion of patients experiencing recurrent hypersensitivity.[5] Nab-paclitaxel, a Cremophor-free formulation, has demonstrated excellent tolerance in patients with prior paclitaxel reactions. However, its use in the neoadjuvant setting is not validated in current guidelines, and its availability and cost limit its applicability in many centers.[6]

Recent ESMO guidelines (2024) emphasize rapid recognition, standardized management protocols, and multidisciplinary collaboration involving oncologists, allergologists, pharmacists, and nurses.[7] Predictive models such as the Pac-HSR score (2024) also provide new perspectives for identifying patients at higher risk.[8]

Importantly, desensitization protocols are not yet routinely available in Morocco, where oncologists often face the need to discontinue paclitaxel after severe reactions. This experience, conducted in collaboration with the team in Épinal, France, highlights the value of international partnerships and underlines the need to develop similar strategies in resource-limited settings.

This case reinforces three key messages:

1. Paclitaxel hypersensitivity may occur even in young, otherwise healthy patients.
2. Desensitization protocols are safe and effective, preserving access to essential therapies.
3. Expanding access to such protocols in countries like Morocco is crucial to ensure equity in cancer care.

Desensitization acts by inducing a temporary state of tolerance, achieved through the controlled administration of increasing doses of the culprit drug. At the cellular level, gradual exposure prevents massive mast cell and basophil degranulation, favoring subthreshold activation and depletion of preformed mediators.[9] This process allows safe delivery of the full therapeutic dose, but tolerance is transient and must be re-induced with each cycle.

Beyond its immunological basis, desensitization also represents a significant psychological challenge for patients. Qualitative studies have reported heightened anxiety prior to the procedure, often related to fear of recurrent severe reactions.[10] Continuous communication, reassurance, and the presence of a multidisciplinary team (oncologists, allergologists, nurses, and psychologists) are key to improving patient confidence and adherence. In our case, careful counseling and informed consent were crucial in preparing the patient for this approach.

Several clinical series have highlighted the efficacy of paclitaxel desensitization. For instance, Sloane et al. reported a large cohort of patients undergoing rapid desensitization, with a high completion rate and minimal breakthrough reactions.[11] Similarly, Lee et al. described a multi-institutional experience confirming that over 90% of patients were able to receive their planned chemotherapy without recurrence of hypersensitivity.[12] These findings reinforce our observation and emphasize the importance of

structured protocols to preserve access to taxane-based therapy.

CONCLUSION

Paclitaxel-induced hypersensitivity remains a significant barrier to optimal breast cancer management. This case demonstrates that a standardized desensitization protocol can provide a safe and effective strategy, enabling continuation of taxane-based therapy in the neoadjuvant setting. Beyond individual patient benefit, this experience highlights the need to expand access to desensitization protocols in Morocco and other resource-limited countries, where such strategies are not yet routinely implemented.

PATIENT CONSENT

Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical images.

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