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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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FROM INFUSION REACTION TO IMMUNE CASCADE: A CASE OF SEQUENTIAL TAXANE AND CAPECITABINE TOXICITIES IN TRIPLE-NEGATIVE BREAST CANCER

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Abstract.

This case report describes a 61-year-old female with stage IIIc triple-negative breast cancer (TNBC) who experienced a sequence of distinct treatment-related toxicities: a hypersensitivity reaction to paclitaxel, taxane-induced pneumonitis during subsequent docetaxel therapy, and radiation recall dermatitis (RRD) triggered by capecitabine administered after the completion of radiotherapy. The pneumonitis was successfully managed with corticosteroids, and the RRD resolved with topical therapy and dose modification. This case highlights the complex interplay of immune-mediated toxicities and underscores the importance of vigilant monitoring, individualized treatment adjustments, and multidisciplinary care in patients receiving sequential taxane-based chemotherapy, radiotherapy, and fluoropyrimidines.

Key words. Triple-negative breast cancer, paclitaxel hypersensitivity, taxane-induced pneumonitis, radiation recall dermatitis, capecitabine, immune-related toxicity, desensitization protocol, multimodal treatment.

Introduction.

Taxanes are cornerstone agents in the management of TNBC, an aggressive breast cancer subtype that lacks expression of estrogen receptor (ER), progesterone receptor (PR), and HER2 [1]. However, their use may be limited by hypersensitivity reactions [2] and pulmonary toxicities, such as interstitial pneumonitis [3]. Desensitization protocols [4] may allow continuation of treatment in patients who react to Taxanes, although additional adverse events may still occur. In this report, we describe a case of a patient with early-stage TNBC who developed a hypersensitivity reaction to Paclitaxel, subsequently developed Docetaxel-induced pneumonitis, and later experienced radiation recall dermatitis (RRD) during adjuvant Capecitabine therapy.

Case Presentation.

On 21.07.2023, a 61-year-old female was diagnosed with invasive ductal carcinoma of the left breast, grade 3, ER-negative, PR-negative, HER2-equivocal (2+); CISH testing revealed no HER2 amplification. Clinical staging was cT4(mult)N3M0 (Stage IIIc) according to AJCC 8th edition (Figure 1 and Figure 2). She received neoadjuvant chemotherapy with four cycles of dose-dense Doxorubicin (60 mg/m²) and Cyclophosphamide (600 mg/m²) every two weeks from August 30 to October 16, 2023.

On October 30, 2023, during the first Paclitaxel infusion (175 mg/m²), she developed acute dyspnea, throat and chest tightness within 5 minutes. Vitals revealed SpO_2 95%, HR 130bpm, and BP 117/68mmHg. A Grade 2 hypersensitivity reaction was diagnosed. The infusion was stopped, and she was treated with dexamethasone 8mg i.v. and oxygen by nasal cannula with the flow of 3ml/min. The patient declined Paclitaxel desensitization.

After the initial paclitaxel hypersensitivity reaction, an MDT consisting of oncologists, pharmacists, allergologists and internal medicine specialist reviewed available options. Given the patient's refusal of paclitaxel rechallenge and the potential for cross-reactivity among taxanes [5], the team agreed to proceed with Docetaxel 75mg/m2 i.v. every three weeks using a desensitization protocol [4].

Between November 13 and December 25, 2023, she completed three cycles of Docetaxel. Before the fourth cycle, on January 15, 2024, she developed dyspnea on exertion; resting SpO_2 was 96% and dropped to 91% during physical activity. Chest CT revealed bilateral interstitial infiltrates (Figure 3 and Figure 4). Blood tests showed CRP 95.14 mg/L, procalcitonin 0.073 ng/mL, normal echocardiogram (EF 55%), and negative SARS-CoV-2 PCR. Grade 2 Taxane-induced pneumonitis (TIP) was diagnosed. While typical imaging features, symptoms, and inflammatory markers (elevated CRP) supported the diagnosis, it was not confirmed histopathologically or via BAL. Prednisolone 1 mg/kg daily was started [6]. After 2 weeks, respiratory symptoms resolved, and SpO_2 returned to 98%. Clinical dynamics confirmed the initial diagnosis. Tapering was initiated by reducing 5 mg every 5 days. On 12.02.2024 CT reassessment was done which showed decreased opacities in both lungs (Figure 5 and Figure 6). Steroids were discontinued after 6 weeks without recurrence. On February 26, 2024, she underwent left radical mastectomy with axillary lymph node dissection. Pathologic staging was ypT1cN0MxL1/Pn0R0; the residual tumor measured 1.4 cm.

The patient completed adjuvant radiotherapy (42.5 Gy in 16 fractions) by May 1, 2024 [3]. BRCA1/2 testing was considered to determine eligibility for adjuvant Olaparib; however, the patient could not afford the test. (According to the OlympiA trial, germline BRCA mutation testing is indicated in high-risk early TNBC). Dihydropyrimidine dehydrogenase (DPD) testing was done and showed no mutations, supporting the safe use of Capecitabine.

Ten days after completing radiation, the patient started Capecitabine 1000mg/m2 p.o. BID. After completing the first 14-day cycle, she developed localized erythema and desquamation confined to the radiation field within two days of treatment cessation—consistent with radiation recall dermatitis (RRD) (Figure 7). Symptoms resolved completely with topical Mometasone. Capecitabine was resumed with a 20% dose

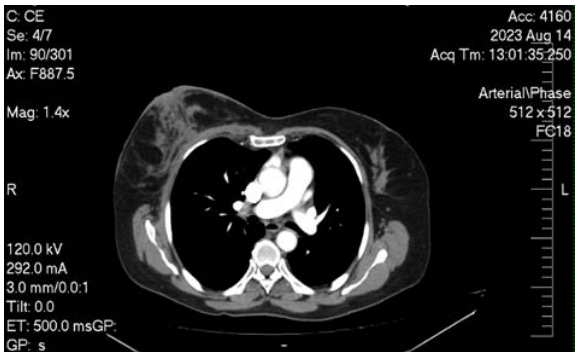


Figure 1

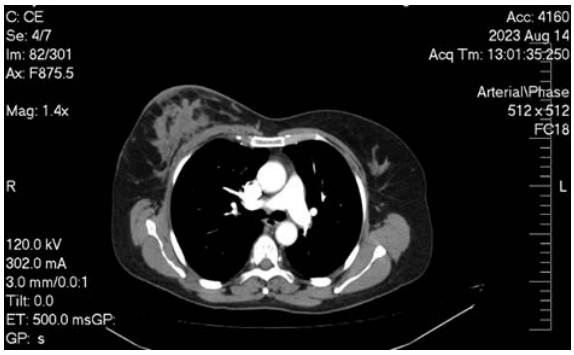


Figure 2

Figures 1,2. *Depicts invasive ductal carcinoma of the breast; cT4(mult)N3M0 - Stage IIIc.*

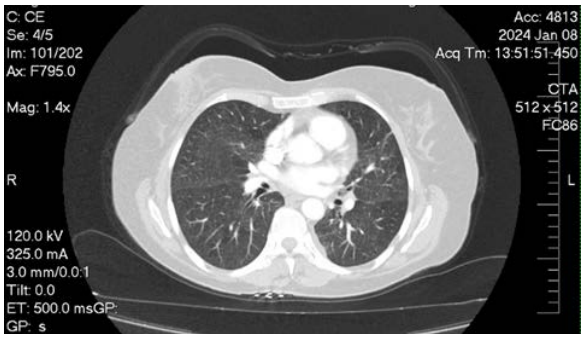


Figure 3

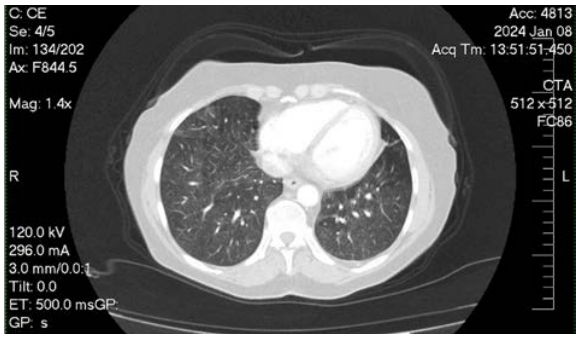
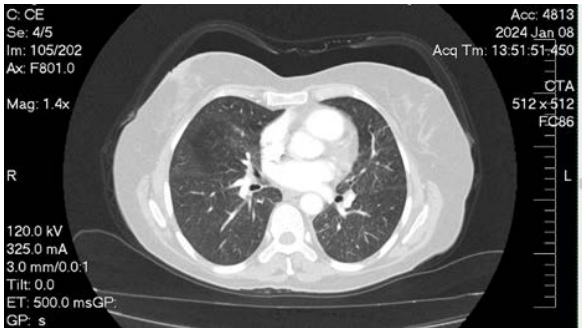


Figure 4

Figures 3,4. *Depicts TIP (Taxane-induced pneumonitis).*



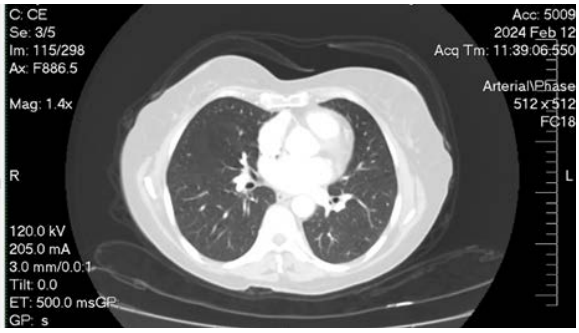
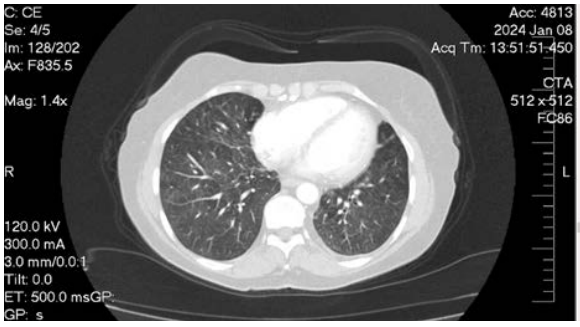


Figure 5. *Comparison between start of TIP (Taxane-induced pneumonitis and result of 5 weeks of steroidotherapy).*



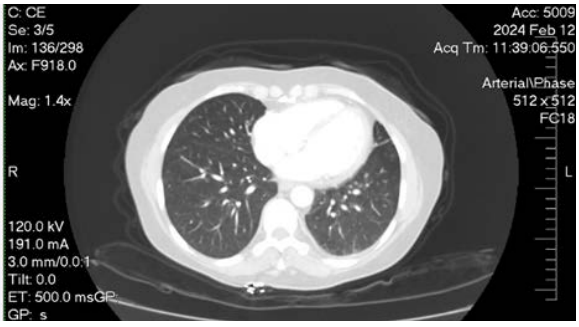


Figure 6. *Comparison between start of TIP (Taxane-induced pneumonitis and result of 5 weeks of steroidotherapy).*

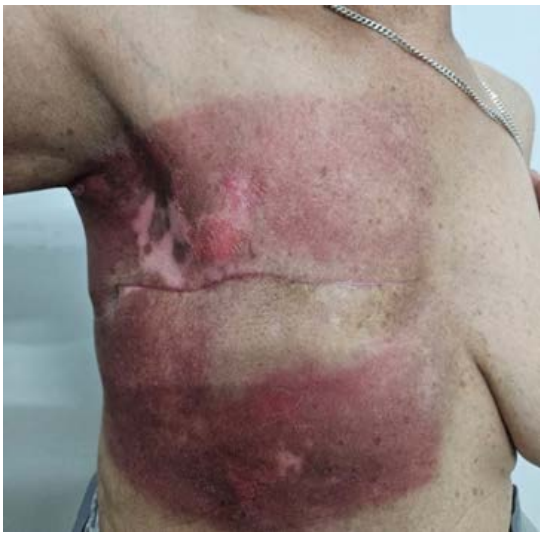


Figure 7. *RRD – Radiation Recall Reaction.*

reduction for two cycles due to concern for recurrence [7]. As no further RRD was observed, full dosing was reinstated for the final three cycles. The patient completed all six cycles of Capecitabine without additional toxicity.

Patient is now on follow-up period. She visits clinic once every 3 months for physical examination and consultation. She undergoes annual contralateral breast US and mammography, and because of the aggressive nature of her disease, she has CT scan once every 3-6 months. Last CT assessment was done on 05.05.2025, which shows no recurrence of the disease.

Discussion.

The case is further distinguished by the sequential emergence of three distinct immune-mediated toxicities: (1) paclitaxel hypersensitivity, (2) suspected docetaxel-induced pneumonitis, and (3) capecitabine-triggered radiation recall dermatitis (RRD). To our knowledge, the collective appearance of all three events in a single patient undergoing standard therapy for TNBC is unprecedented.

While each individual event is known in the literature, their sequence in a single patient is exceedingly rare. Hypersensitivity to paclitaxel, especially those reactions driven by solvent excipients like Cremophor EL, occur in 2–10% of patients [8-10]. Docetaxel pneumonitis has been reported in <2% of breast cancer patients and is often idiosyncratic in nature [11-13]. RRD due to capecitabine is also rare, with reported incidence ranging from 1–6% depending on drug class and timing relative to radiotherapy [14,15]. In our patient, capecitabine was initiated 10 days after radiotherapy—a high-risk interval—and RRD was confined to the irradiated field. The dermatitis was classified as Grade 1 per NCI-CTCAE v5.0, resolving fully with topical corticosteroids. It was clinically and anatomically consistent with prior radiotherapy borders [16,17].

The temporal proximity between the initial hypersensitivity reaction and the subsequent development of TIP raises the hypothesis of a shared or "primed" immune susceptibility [11]. Rather than viewing these events as isolated adverse effects, this sequence may reflect a broader immune dysregulation triggered by repeated exposures to immunogenic agents. Such evolving immune vulnerability may predispose certain patients to a cascade of inflammatory complications, particularly in the setting of intensive multimodal therapy.

Radiation recall dermatitis, as seen here during adjuvant capecitabine, is another idiosyncratic reaction that reactivates inflammatory pathways in previously irradiated tissue. Incidence rates vary but are estimated between 1–10% for fluoropyrimidines [14]. Proposed mechanisms include upregulation of pro-inflammatory cytokines such as IL-1, IL-6, and TNF-α [15], and localized hypersensitivity. Most cases resolve with drug interruption and symptomatic management. Notably, capecitabine was initiated 10 days post-radiotherapy, within a timeframe previously reported to pose a higher RRD risk [18]. The fact that this third immune-related event occurred in the same patient further supports the notion of an evolving immune terrain sensitized by prior treatments.

Comparative literature on multiple immune-mediated toxicities reveals that such patterns are mostly described in the context of immune checkpoint inhibitors (ICIs), where colitis, hepatitis, and pneumonitis may co-occur as immune-related adverse events (irAEs). In contrast, sequential immune toxicities during cytotoxic chemotherapy are far less common. Case reports exist describing capecitabine-induced RRD and paclitaxel-associated recall pneumonitis individually, but no published literature to date describes the combined sequence of paclitaxel hypersensitivity, TIP, and RRD. Radiation recall involving more than one tissue type (e.g., skin and lungs) has been reported with taxanes or gemcitabine, but again, typically as isolated phenomena. Our case therefore provides a novel contribution to the literature, supporting the notion that some patients may have an intrinsic or treatment-induced susceptibility to immune-mediated complications across multiple treatment phases.

These observations raise the hypothesis that early immune activation (e.g., paclitaxel hypersensitivity) may serve as a priming event, sensitizing the immune system and predisposing the patient to further immune complications. This evolving immune susceptibility could be mediated by Th1/Th17-driven inflammation, cytokine upregulation (e.g., IL-6, TNF-α), and memory T-cell responses. While speculative, this concept parallels emerging evidence in immunotherapy literature where early irAEs correlate with subsequent toxicity patterns—and, in some studies, even improved outcomes. Whether chemotherapy- and radiotherapy-associated immune toxicities might carry similar prognostic or immunologic significance remains unknown and warrants future investigation.

This case underscores the importance of multidisciplinary coordination, proactive toxicity monitoring, and the flexibility to adjust therapy while maintaining curative intent in early-stage TNBC. Understanding patterns of immune reactivity may ultimately help clinicians anticipate and mitigate such complications more effectively.

Conclusion.

This case illustrates how sequential toxicities—beginning with a paclitaxel hypersensitivity reaction, followed by suspected docetaxel-induced pneumonitis and capecitabine-triggered radiation recall dermatitis—may reflect an evolving immune vulnerability rather than isolated treatment-related

complications. Such a sequence is exceedingly rare in the literature and underscores the potential for certain patients to develop a pattern of heightened immune reactivity during multimodal cancer therapy.

At each clinical juncture, multidisciplinary team (MDT) discussions guided diagnostic evaluation and therapeutic decision-making. This collaborative approach was essential in managing uncertainty, excluding infectious causes, and adapting treatment—ultimately allowing the patient to complete curative-intent therapy without compromising outcomes.

Future studies should explore whether early hypersensitivity events might predict susceptibility to further immune-mediated toxicities, especially in the context of sequential chemotherapy and radiotherapy. Moreover, it remains an open and intriguing question whether such immune-related adverse events carry prognostic implications—potentially influencing progression-free or overall survival in early-stage breast cancer. While current evidence is limited, this case highlights the need to better understand the broader clinical impact of immune toxicities and affirms the critical role of adaptive, multidisciplinary care in optimizing treatment success.

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