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# Pegylated liposomal doxorubicin in recurrent ovarian cancer – a case report and literature review

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## Abstract

***Background.*** Ovarian cancer remains one of the leading causes of death among gynecological malignancies worldwide. Due to nonspecific symptoms and the lack of effective screening methods, the disease is frequently diagnosed at an advanced stage. Despite advances in surgical and systemic treatment, disease recurrence remains common, creating a need for effective and well-tolerated therapeutic options. ***Materials and methods.*** A 72-year-old woman with FIGO stage IIIC ovarian cancer, type 2 diabetes mellitus, and arterial hypertension developed disease recurrence following first-line treatment consisting of surgery and platinum-based chemotherapy. Before treatment initiation, cardiological assessment, including echocardiography, revealed no contraindications to anthracycline therapy. Due to disease recurrence, comorbidities, and reduced tolerance to previous treatment, pegylated liposomal doxorubicin was selected as second-line therapy. ***Results.*** Treatment resulted in disease stabilization and was well tolerated. ***Conclusion.*** Pegylated liposomal doxorubicin represents a valuable therapeutic option in recurrent ovarian cancer, particularly in elderly patients and those with comorbidities. Careful patient selection and cardiovascular monitoring may help maintain treatment safety and tolerability. *(Farm Współ 2026; 19: 158-161) doi: 10.53139/FW.20261917*

*Keywords: ovarian cancer, liposomal doxorubicin, drug delivery systems*

## Introduction

Ovarian cancer remains one of the most lethal gynecological malignancies worldwide. It is frequently diagnosed at an advanced stage due to the lack of effective screening methods and nonspecific early symptoms. Consequently, the prognosis remains poor despite ongoing advances in systemic treatment [1].

Despite advances in surgery and systemic treatment, ovarian cancer is characterized by a high recurrence rate. Up to 70% of patients with stage III–IV disease experience relapse within three years after completion of first-line therapy, making the management of recurrent disease a major therapeutic challenge [1]. Standard first-line treatment of advanced ovarian cancer consists of cytoreductive surgery followed by platinum-based chemotherapy, most commonly carboplatin combined with paclitaxel. Despite initial treatment success, disease recurrence remains common. The selection of subsequent treatment lines may be particularly challenging in elderly patients and those with multiple comorbidities, in whom cumulative toxicity and reduced treatment tolerance often limit available therapeutic options [1,2].

Although conventional chemotherapy remains an essential component of ovarian cancer treatment, its clinical use is frequently limited by treatment-related toxicity and unfavorable pharmacokinetic properties of cytotoxic agents, particularly anthracyclines such as doxorubicin. Advances in nanotechnology have enabled the development of liposomal drug delivery systems designed to improve the safety and pharmacokinetic profile of anticancer therapy. Pegylated liposomal doxorubicin (PLD) has become one of the most clinically established nanotechnology-based formulations in oncology due to its reduced cardiotoxicity and favorable efficacy in recurrent ovarian cancer, especially in elderly patients and patients with comorbidities [3].

## Case report

A 72-year-old woman was admitted to the Emergency Department in January 2019 due to progressive postprandial abdominal distension and increasing abdominal circumference. Her medical history was significant for type 2 diabetes mellitus treated with oral hypoglycemic agents and arterial hyperten-

sion. Imaging studies revealed a multilocular tumor of the right ovary. Based on computed tomography findings and elevated CA125 and HE4 levels, advanced ovarian cancer (FIGO stage IIIC) was diagnosed. Histopathological examination confirmed epithelial ovarian carcinoma, most likely of the high-grade serous subtype. The stage IIIC classification was established based on the presence of peritoneal dissemination. The patient underwent surgical treatment followed by six cycles of first-line chemotherapy consisting of paclitaxel and carboplatin. During follow-up, disease recurrence was observed, requiring further systemic treatment.

At the time of recurrence, the patient remained in moderate general condition (ECOG performance status 2). Due to the presence of cardiovascular risk factors, including arterial hypertension and type 2 diabetes mellitus treated with oral hypoglycemic agents, a cardiological evaluation including echocardiography was performed before treatment initiation. No significant impairment of left ventricular systolic function was observed, and the findings revealed no contraindications to anthracycline therapy. During qualification for further treatment, the patient's age, comorbidities, and reduced tolerance to prior chemotherapy were considered. To balance treatment efficacy with the risk of adverse effects, pegylated liposomal doxorubicin was selected as second-line therapy. Considering the patient's age, comorbidities, and reduced tolerance to previous chemotherapy, a less intensive treatment strategy was considered more appropriate than re-administration of standard platinum-based combination chemotherapy. This decision was supported by its favorable safety profile and lower cardiotoxic potential compared with conventional anthracyclines.

Following treatment initiation, disease stabilization was confirmed by imaging studies and tumor marker assessment. During subsequent follow-up visits, no clear evidence of disease progression was observed, allowing continuation of systemic therapy. The treatment was well-tolerated and did not require premature discontinuation.

No clinically significant cardiotoxicity was observed. The most common adverse effects included mild fatigue and low-grade palmar-plantar erythrodysesthesia, which did not require treatment modification.

The absence of significant cardiovascular complications was particularly important given the patient's age and pre-existing cardiovascular risk factors. Overall, the applied therapy enabled continuation of systemic treatment while maintaining acceptable tolerability and quality of life.

The presented case confirms the clinical usefulness of pegylated liposomal doxorubicin in elderly patients with recurrent ovarian cancer and multiple comorbidities, in whom treatment efficacy must be balanced against the risk of therapy-related toxicity.

## Discussion

Pegylated liposomal doxorubicin differs from conventional doxorubicin mainly in its pharmacokinetic properties and toxicity profile. The reduced cardiotoxicity of PLD is associated with liposomal encapsulation and the enhanced permeability and retention (EPR) effect, which promotes preferential accumulation of the drug within tumor tissue while limiting exposure of healthy tissues, particularly the myocardium. Comorbidities and an increased risk of treatment-related toxicity often complicate treatment planning in elderly patients with ovarian cancer. Therefore, the selection of systemic therapy should balance antitumor efficacy with treatment tolerability and the patient's overall clinical condition. In such cases, treatment strategies with a more favorable safety profile may be particularly valuable [1,2].

Liposomal encapsulation limits drug distribution to healthy tissues, especially the myocardium, thereby significantly reducing the risk of cardiotoxicity [4,5]. However, recent studies indicate that despite its favorable safety profile, pegylated liposomal doxorubicin may still be associated with cardiovascular toxicity, particularly when combined with bevacizumab. Hoeger and colleagues demonstrated a higher risk of heart failure, cardiomyopathy, hypertension, and venous thromboembolism in patients receiving combination therapy compared with pegylated liposomal doxorubicin alone [6].

Current clinical guidelines emphasize that treatment decisions in recurrent ovarian cancer should be individualized and based on previous therapies, expected efficacy, toxicity profile, and patient-related factors. In the presented case, these considerations supported the use of pegylated liposomal doxorubicin as an appropriate therapeutic option [1,2].

Apart from reduced cardiotoxicity, this formulation is associated with a different spectrum of adverse effects. The most commonly observed include palmar-

-plantar erythrodysesthesia and mucositis. Although these adverse reactions may affect patient comfort, they are generally less severe and more manageable compared to cardiotoxic complications observed with conventional doxorubicin [4]. The authors also emphasized the importance of cardiovascular monitoring in patients receiving PLD-based combination regimens, particularly in those with pre-existing cardiovascular risk factors or comorbidities [6].

Current ESMO guidelines indicate that platinum-based doublets remain the preferred treatment strategy in recurrent ovarian cancer whenever platinum rechallenge is feasible. Among the available combinations, carboplatin and pegylated liposomal doxorubicin are preferred because of their favorable safety profile [1].

In the treatment of ovarian cancer, pegylated liposomal doxorubicin is used mainly in patients with recurrent disease, especially in platinum-resistant cases [7,8]. Current clinical guidelines emphasize that treatment decisions in recurrent ovarian cancer should be individualized and based on previous therapies, expected efficacy, toxicity profile, performance status, and patient-related factors, including age and comorbidities [1,2]. Its favorable safety profile makes it a valuable therapeutic option in elderly patients and those with comorbidities, where maintaining treatment tolerability is essential. At the same time, the increasing use of PLD in combination with targeted therapies, such as bevacizumab, requires careful assessment of the potential cardiovascular risks associated with these treatment strategies [2,6].

The presented case confirms the clinical usefulness of this therapeutic approach. The introduction of pegylated liposomal doxorubicin enabled continuation of systemic therapy in a patient with reduced tolerance to standard chemotherapy, resulting in disease stabilization and acceptable tolerability. This case highlights the importance of individualized treatment planning and interdisciplinary management in patients receiving oncological therapies associated with potential cardiovascular toxicity.

Despite the advantages associated with nanotechnology-based drug delivery systems, their application in routine clinical practice remains limited. Factors such as treatment cost, availability, and variability in patient response continue to influence therapeutic decisions [9,10]. Furthermore, although nanotechnology-based formulations such as PLD reduce the risk of toxicity to healthy tissues, they do not completely eliminate the risk of cardiovascular adverse events, underscoring the need for further studies evaluating their long-term safety in routine clinical practice [6].

## Conclusion

The development of nanotechnology has significantly expanded therapeutic possibilities in oncology by introducing advanced drug formulations with modified pharmacokinetic properties and improved safety profiles [9,10]. Liposomal doxorubicin represents an effective application of nanocarriers in oncological pharmacotherapy, enabling selective drug delivery to tumor tissues and reduction of toxicity toward healthy organs [4]. However, recent evidence indicates that pegylated liposomal doxorubicin, particularly when combined with bevacizumab, may still be associated with an increased risk of cardiovascular complications, despite its reduced cardiotoxicity compared with conventional doxorubicin [6].

Its favorable safety profile makes it a valuable therapeutic option in elderly patients and those with comorbidities, where maintaining treatment tolerability is essential. At the same time, the increasing use of PLD in combination with targeted therapies such as bevacizumab requires careful assessment of the potential cardiovascular risk associated with such treatment strategies.

The presented case confirms the clinical usefulness of PLD in achieving disease stabilization while maintaining an acceptable safety profile [3,5]. Furthermore, the growing use of PLD in combination with targeted therapies underscores the importance of careful cardiovascular monitoring and interdisciplinary cooperation between oncologists, clinical pharmacists, and cardiologists to optimize treatment outcomes and patient safety [6].

Conflict of interest
None

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