

Symptomatic Nursing Management of Advanced Breast Cancer with Multiple Metastases During DS-8201 Treatment: A Case Report and Literature Review

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Abstract: To summarise the therapeutic effects of symptomatic nursing during DS-8201 (Enhertu) treatment in a patient with advanced breast cancer with metastases to the ribs, lungs and liver. The patient, diagnosed with breast cancer with multiple metastases, was admitted to the hospital on 4 January 2021, 2 months after the discovery of a right breast mass. DS-8201 was administered during this period, and nursing care was tailored to address the patient's symptoms while on the medication. Before treatment, the Hamilton Anxiety Scale score was 22, the Pittsburgh Sleep Quality Index score was 19 and the Insomnia Severity Index score was 24. After treatment, the SAS score decreased to 15, the PSQI score to 12 and the ISI score to 11, indicating improvements in sleep quality and anxiety. Re-examination showed minimal change in left breast nodules compared with previous results, with no additional metastases detected. By the follow-up in September 2023, the patient showed no signs of obvious recurrence and had not returned to the hospital for further consultation. During a telephone follow-up in October 2023, the patient reported no significant discomfort, her condition remained stable and her health indicators were well controlled while on the medication. This study details the symptoms and corresponding nursing interventions for patients with advanced breast cancer undergoing DS-8201 treatment, providing a nursing reference for future patient care.

Keywords: breast cancer, multiple metastases, Enhertu, nursing

Introduction

In the treatment of breast cancer, a variety of methods are available, including surgical treatment, endocrine therapy, targeted therapy, chemotherapy and radiotherapy, among which chemotherapy and targeted therapy are the preferred options.¹ DS-8201 (Enhertu) is a next-generation antibody-drug conjugate (ADC) composed of an anti-human epidermal growth factor receptor 2 (HER2) IgG1 monoclonal antibody, a linker and a topoisomerase I inhibitor Dxd.² It is a permeable-free drug that attacks adjacent cancer cells by selectively targeting HER2-expressing tumours, releasing a payload of topoisomerase inhibitors and causing cell death.³ However, DS-8201 is also prone to a series of adverse reactions during the treatment process. As a result, patients experience varying degrees of negative emotions due to their condition, which can affect the overall treatment outcome. In this regard, effective nursing intervention methods should be implemented to improve the overall effect of nursing interventions.⁴ In the conventional nursing intervention model, a great deal of attention is paid to responses to adverse drug reactions, but there is a lack of systematic guidance on the physical and mental state and nutrition of patients. This results in poor recovery of physical status and, consequently, less improvement in quality of life. Therefore, an alternative approach to care is needed.

Personalised nursing has become increasingly significant in the care of patients with advanced oncological diseases, as it tailors interventions to the unique physiological and psychological needs of each individual. Traditional nursing models often apply standardised care protocols, which may not fully address the complex and evolving challenges faced by patients with cancer undergoing advanced therapies.^{5,6} In contrast, personalised nursing recognises that factors such as treatment-related side effects, emotional well-being and lifestyle preferences vary widely among patients, particularly those dealing with metastatic or treatment-resistant cancers. By focusing on individualised care plans, personalised nursing aims to enhance patient outcomes, improve quality of life and support treatment adherence through strategies that address specific symptoms, anxiety, sleep disturbances and nutritional needs.^{7–10} This approach aligns well with advances in targeted cancer therapies, where precise medical interventions require equally tailored nursing support to mitigate side effects and provide holistic care. Emerging research highlights the positive impact of personalised nursing on patient satisfaction and overall recovery, reinforcing its growing importance in oncology care.

The application value of personalised nursing in patients with advanced breast cancer with multiple metastases receiving DS-8201 is analysed in this study.

Case Report

Patient Data

The patient, a 54-year-old woman, was initially diagnosed with right breast cancer in February 2016. She presented with a palpable mass in her right breast, prompting a series of diagnostic radiologic interventions to assess the extent of the disease. Mammography and breast ultrasound revealed a 3.0×5.0 cm mass with irregular borders and suspicious features. Additionally, a chest computed tomography (CT) scan and abdominal ultrasound were conducted to rule out distant metastases, both of which showed no evidence of metastasis at that time. Based on these findings, a modified radical mastectomy was chosen as the primary treatment approach.

Pathology following the mastectomy confirmed invasive ductal carcinoma, grade 2, with sentinel lymph node metastasis (3 out of 5 nodes), oestrogen receptor (ER) (+++, 80%), progesterone receptor (PR) (+++, 80%), HER2 (2+) and a Ki-67 index of 50%. (Figure 1)

Post-surgery, the patient received seven cycles of adjuvant chemotherapy with the AC3-T4 regimen (epirubicin, cyclophosphamide and docetaxel). However, due to palpitations, she discontinued the fourth cycle of AC. No radiotherapy was administered, and she began endocrine therapy with tamoxifen, which was later switched to letrozole in January 2021 due to disease progression.

In January 2021, 5 years after her initial treatment, follow-up imaging revealed multiple metastases, including rib, lung and liver metastases. Diagnostic reports indicated an abdominal ultrasound showing hypoechoic liver lesions,

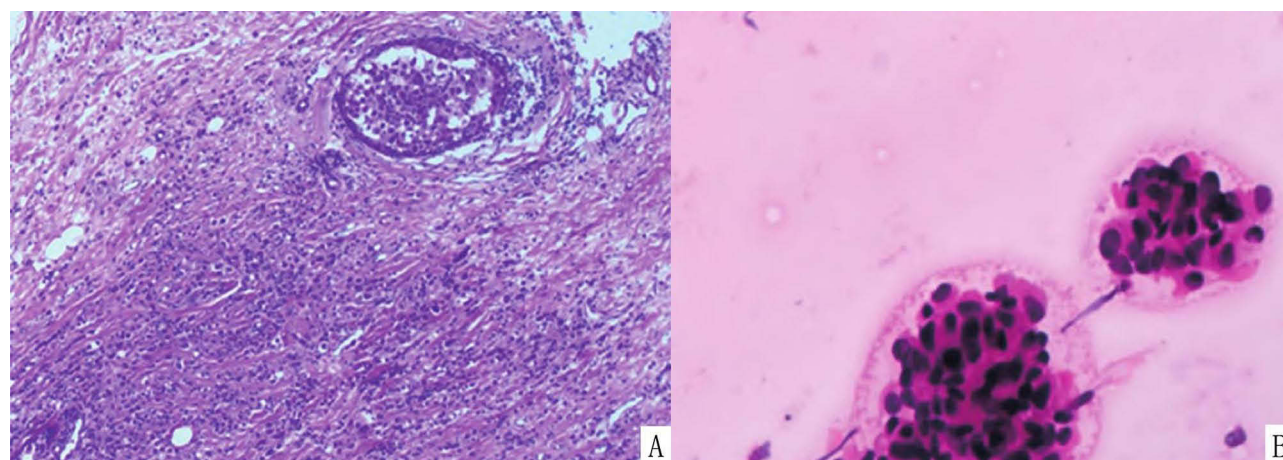


Figure 1 Pathological Section of Breast Cancer Tissue. (A) Postoperative pathology of the right breast, showing invasive ductal carcinoma (Hematoxylin and Eosin stain, ×100), grade 2, with malignant cell clusters. (B) Puncture smear of the right breast lymph node (Hematoxylin and Eosin stain, ×200), revealing metastatic involvement. These images confirm the initial diagnosis, which informed the subsequent treatment approach and nursing care strategies.

a chest CT scan revealing right rib destruction and a lung CT scan with multiple nodules. Pathology from a chest wall biopsy confirmed HER2-positive metastatic disease, leading to the initiation of treatment with DS-8201 (trastuzumab deruxtecan) alongside personalised nursing interventions to manage symptoms.

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Electric Power Hospital. Written informed consent was obtained from the patient before the initiation of this study, permitting the use of her medical information and case details for publication. This consent process was conducted in accordance with institutional guidelines and ethical standards.

Examination Data After Recurrence

The patient returned to the hospital for examination 5 years later and was found to have multiple metastases, including rib, lung and liver metastases.

Examination Report

(1) Abdominal ultrasound examination: a hypoechoic lesion measuring approximately 77×25 mm was found under the capsule of hepatic segment S4, with unclear boundaries and uniform echogenicity (Figure 2A). Strip-like flow signals were detected using colour Doppler flow imaging (Figure 2B). (2) Chest CT examination: the fourth rib on the patient's right side was destroyed, with soft tissue shadow and increased metabolism. Metastatic malignancy was considered (Figure 3A). Puncture pathology of the right chest wall showed ER 90% (strong positive, 95%), PR negative, HER2 (2+) and a Ki-67 index of 60%. Pathological findings indicated that local tissue hyperplasia was active, with local cancer cells arranged in papillary patterns invading the ribs (Figure 3B). Lung CT examination showed multiple small nodules and micronodules in both lungs. Specifically, the small pure ground-glass nodules in the lingual segment of the upper lobe of the left lung were larger, with some appearing newer than before, and metastasis was considered (Figure 4A). Immunohistochemistry findings: ER (medium positive, 95%), PR (strong positive, 95%), HER2 (3+), Ki-67 index 15%, androgen receptor (strong positive, 95%), cytokeratin 5/6 (negative), p53 (negative) and epidermal growth factor receptor (negative). The pathological findings are shown in Figure 4B.

Treatment and Nursing

DS-8201 Treatment

During trastuzumab deruxtecan (DS-8201) treatment, administered intravenously, nursing interventions focused on managing potential side effects and enhancing patient comfort. The patient was monitored for adverse effects for at least 90 minutes during the first infusion and for at least 30 minutes during subsequent infusions to ensure the prompt

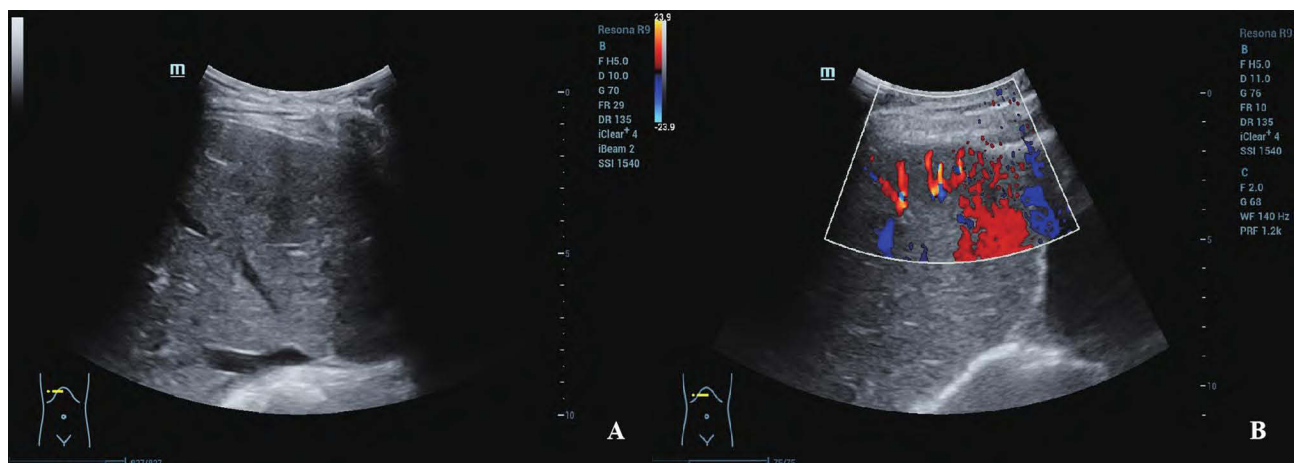


Figure 2 Abdominal Ultrasound of Liver Metastasis. (A) A 2D ultrasound image showing a hypoechoic liver lesion approximately 77 mm × 25 mm under the hepatic capsule in segment S4. (B) Color Doppler Flow Imaging (CDFI) highlighting blood flow around the lesion. This figure demonstrates the metastatic progression of the cancer, which was crucial in determining the need for Trastuzumab Deruxtecan (DS8201) treatment and symptom-focused nursing care.

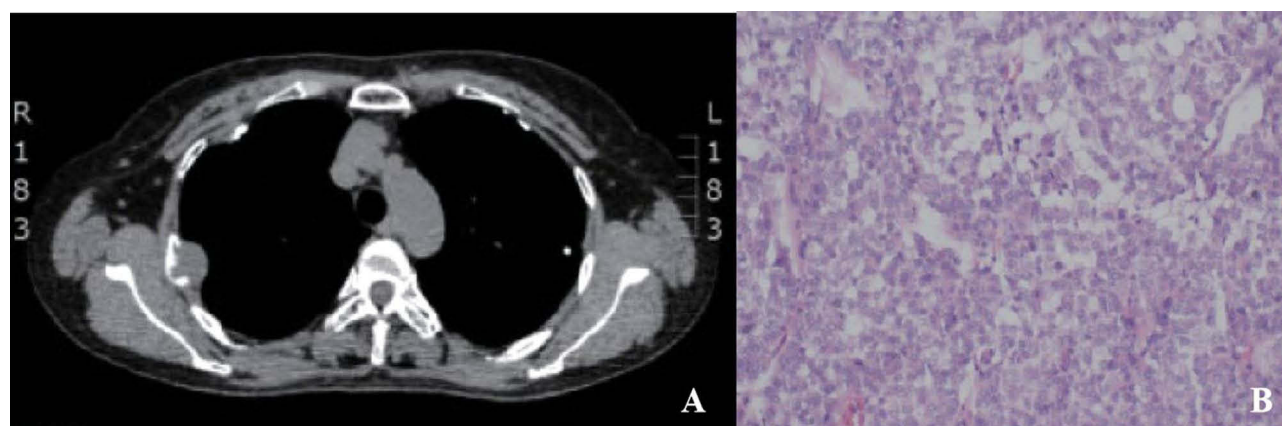


Figure 3 CT Imaging of Rib Metastasis. **(A)** Chest CT cross-section showing destruction of the fourth rib with a soft tissue shadow, indicating metastatic malignancy. **(B)** Pathological section confirming rib invasion by cancer cells. These images underscore the extent of metastasis, necessitating vigilant symptom management through personalized nursing interventions.

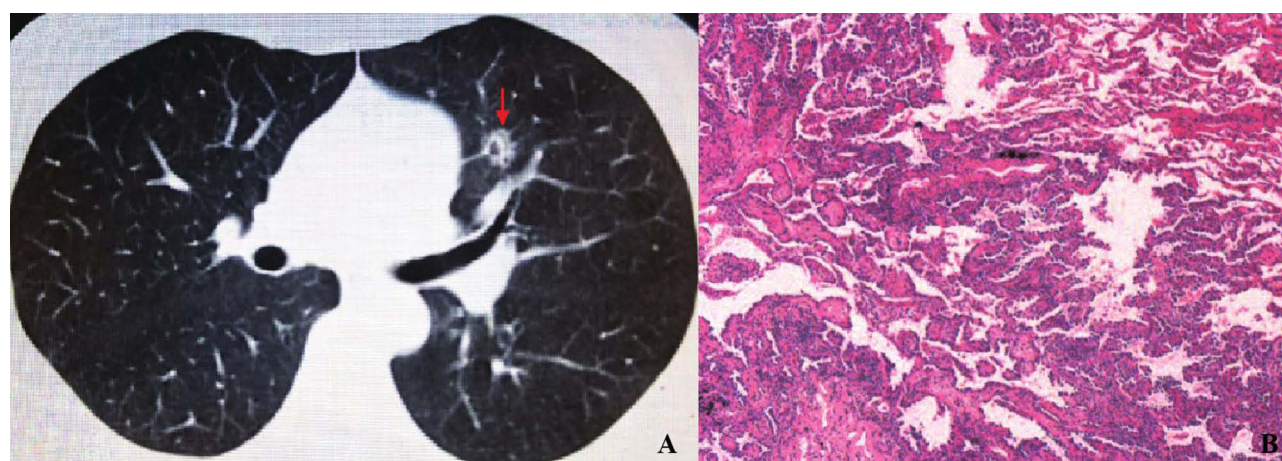


Figure 4 Lung CT of Metastatic Nodules. **(A)** Lung CT displaying multiple small nodules in both lungs, with enlargement in the lingual segment of the upper left lobe. The red arrow indicates the primary metastatic nodule in the upper lobe of the left lung, which was found to be slightly enlarged compared to previous imaging, suggesting disease progression. **(B)** Pathological section showing cancer cell invasion in lung tissue. This figure relates to the nursing care plan by highlighting the patient's respiratory health needs, a consideration during symptom management with DS8201 treatment.

identification and management of any reactions. Symptom control measures included pre-medication with anti-nausea agents and regular assessment of the patient's physical and emotional well-being. The nursing staff also provided continuous support through psychological counselling, sleep environment adjustments and relaxation techniques to alleviate anxiety and improve sleep quality throughout the treatment process.

Nursing Measures

(1) Psychological nursing: by establishing a nurse–patient communication group, patients communicated with each other about their conditions. In this way, they encouraged each other, worked together to overcome the fear of the unknown and improved their self-confidence to overcome the disease. (2) Sleep- and rest-friendly environment: a. the sleeping environment was kept quiet, and loud noises were avoided; b. doors and windows were closed, curtains were drawn when the patient was at rest and wall lights were used at night; c. appropriate temperature and humidity were maintained in the ward, and the bed units were kept clean and tidy. (3) Sleep nursing: a. efforts were made to ensure that the patient slept as they would at home; b. nursing activities were arranged in a planned manner to minimise disruption to the patient's sleep; c. sleep-promoting measures and analgesic measures were provided, comfortable sleeping positions were guided, the patient was instructed to breathe slowly and deeply using relaxation techniques and full-body muscle relaxation therapy

was performed. (4) Cognitive therapy: reasonable sleep expectations were maintained, falling asleep naturally was encouraged, excessive subjective intention to fall asleep was avoided and sleep was treated with ease.

Evaluation Indicators

The Hamilton Self-Rating Anxiety Scale (SAS) was used to evaluate the psychological status of the patient. The Pittsburgh Sleep Quality Index (PSQI) and the Insomnia Severity Index (ISI) were employed to assess the patient's sleep status. Additionally, side effects during medication were evaluated. Medication evaluation: DS-8201 can cause toxic and side effects, including interstitial lung disease, bone marrow suppression, decreased cardiac function, nausea, vomiting, constipation, diarrhoea, indigestion and fatigue. While on the medication, the patient developed symptoms of nausea and vomiting. She was prophylactically treated with oral aprepitant, intravenous injection of 5 mg tropisetron and intramuscular injection of diphenhydramine. Subsequently, the vomiting was well controlled.

Efficacy Evaluation

Before treatment, the patient had a SAS score of 22, indicating significant symptoms of anxiety that needed to be addressed and that affected her life and activities. After multiple cycles of treatment, the patient's examination reports and indicators improved. Her SAS score also dropped to 15 points, indicating continued anxiety and affirmations that did not interfere with her life and activities. Before treatment, the patient's PSQI score was 19 points, and after treatment, it was 12 points. Furthermore, the ISI score, which was 24 before treatment, dropped to 11 after treatment, indicating that her sleep quality had improved. The patient underwent re-examination on 9 August 2022, and the results showed that the left breast nodule had not changed much from the previous examination results, and no metastasis to other parts was found. The patient was followed up until September 2023, and no obvious recurrence was found; she did not return to the hospital for follow-up treatment after that. In October 2023, the patient was followed up by phone. She had no obvious discomfort, and her condition was stable. After active intervention, the patient's various indicators during the medication period were well controlled. Ethical approval for this case report was granted by the (Institution Name) Ethics Committee (Approval No: 2023–4567), and written informed consent was obtained from the patient in accordance with institutional and ethical guidelines.

Discussion

In this case study, personalised nursing interventions focused on psychological support, sleep management and symptom control were integral to enhancing the patient's quality of life during trastuzumab deruxtecan (DS-8201) treatment. Psychological counselling provided a supportive outlet, reducing the patient's anxiety, as evidenced by a decrease in the SAS score from 22 to 15, showing a clear benefit of emotional support on mental well-being. Additionally, structured sleep management, including creating a quiet environment and utilising relaxation techniques, led to significant improvements in sleep quality, as indicated by reductions in the PSQI and ISI scores. Finally, proactive symptom monitoring allowed for timely intervention, particularly with anti-nausea support and extended monitoring during infusions, which effectively minimised treatment-related side effects such as nausea and fatigue. Together, these nursing applications demonstrated a meaningful impact on the patient's comfort and symptom control, underscoring the value of targeted nursing care in advanced oncologic treatment.

In this case, the SAS, the PSQI and the ISI were used to evaluate the patient's psychological and sleep-related outcomes during treatment with trastuzumab deruxtecan (DS-8201). Initially, the patient presented with a SAS score of 22, indicating moderate anxiety levels impacting her daily life. Following consistent psychological support and counselling, her anxiety levels decreased, reflected by a reduced SAS score of 15, highlighting the effectiveness of tailored nursing interventions in alleviating treatment-related anxiety.

Sleep quality was also a central focus, as poor sleep is common in patients with advanced cancer and can significantly affect quality of life. Initially, the patient's PSQI score was 19, and her ISI score was 24, both indicating severe sleep disturbance and insomnia. After implementing sleep management techniques, including environmental adjustments and guided relaxation, her PSQI score improved to 12, and her ISI score dropped to 11, suggesting that these interventions had a substantial positive impact on her sleep quality. These findings underscore the value of targeted nursing

interventions in addressing the unique challenges of advanced oncology care, ultimately enhancing the patient's comfort and well-being.

Studies have shown that patients with breast cancer experience poor sleep quality during chemotherapy,¹¹ and approximately 65% of them have sleep disorders during that period.¹² As a pretreatment for breast cancer chemotherapy, oral high-dose dexamethasone can reduce or eliminate the adverse reactions caused by taxanes. However, excessive dosage can give rise to sleep disorders.¹³ For patients with breast cancer who develop regional lymph node metastasis, additional treatments and surgeries, such as neoadjuvant chemotherapy, lymph node surgery, endocrine therapy and radiotherapy, are usually necessary.¹⁴ However, these procedures tend to place patients under heavier treatment side effects, as well as psychological and economic burdens, leading to a higher probability of sleep disorders. Patients who use targeted drugs have a higher probability of developing severe sleep disorders, which is 2.135 times higher than those who do not use targeted drugs.¹⁵

DS-8201, as a novel HER2-targeting ADC, consists of a humanised anti-HER2 antibody, a cleaved peptide linker and a novel topoisomerase I inhibitor. Specifically, the anti-HER2 antibody is a human monoclonal IgG1 with the same amino acid sequence as trastuzumab.¹⁶ The topoisomerase I inhibitor exerts cytotoxic activity by interfering with DNA replication and transcription through the trapped topoisomerase I cleavage complex.¹⁷ Given its highly membrane-permeable payload, DS-8201 has bystander-killing effects that can be observed in cells adjacent to HER2-positive cells with minimal systemic toxicity.¹⁸ Currently, DS-8201 is rarely reported in breast cancer with multiple metastases. Patients undergoing chemotherapy not only endure the toxic side effects caused by drug stimulation and cancer pain but also have to bear high treatment costs. At the same time, they are also subject to emotional, social, spiritual and other pressures, which can lead to negative emotions and result in a low expected quality of life. In this study, DS-8201 was used in combination with symptomatic nursing to treat a patient with advanced breast cancer with rib, lung and liver metastasis. The results revealed that the patient's anxiety score decreased after treatment. Throughout her treatment with trastuzumab deruxtecan (DS-8201), the patient experienced several notable symptoms, primarily anxiety, sleep disturbances and nausea, which were addressed through individualised nursing interventions. Psychological distress was initially significant, with a SAS score of 22, reflecting moderate anxiety. The nursing team provided consistent psychological support through regular communication, addressing the patient's concerns and offering coping strategies. This intervention reduced the patient's anxiety, as evidenced by the post-treatment SAS score of 15. Additionally, sleep disturbances were a central issue, with initial PSQI and ISI scores of 19 and 24, respectively, indicating severe sleep disruption. By optimising the rest environment, implementing relaxation techniques and minimising nighttime disruptions, the nursing team successfully reduced the patient's PSQI to 12 and ISI to 11, significantly improving her sleep quality. During a telephone follow-up, the patient had no obvious discomfort, and her condition was stable. However, since only one patient was included in this study, more samples need to be included in future studies to verify the above conclusions from multiple perspectives. Data collection during the COVID-19 pandemic posed unique challenges, necessitating remote follow-up assessments to ensure patient safety. The use of phone interviews to complete the SAS, the PSQI and the ISI evaluations was carefully considered. Phone-based assessments have been validated in prior studies as reliable when conducted by trained professionals using standardised guidelines, ensuring that patients understood and accurately responded to each item. Additionally, the patient had been familiarised with the scales in previous in-person assessments, which supported consistent scoring during remote follow-ups. While recognising the inherent limitations of phone assessments, we believed the approach provided a trustworthy and practical method for monitoring the patient's progress during a period of restricted access.

Personalised nursing has become increasingly relevant in oncology, particularly in improving comfort and quality of life for patients undergoing advanced therapies. Studies show that individualised nursing care effectively reduces treatment-related discomfort, enhances psychological well-being and improves adherence to therapy. For instance, So et al found that targeted nursing interventions, such as psychological support and symptom-focused strategies, significantly improved anxiety and sleep quality in patients with advanced breast cancer.¹⁹ Similarly, Rathert et al reported that patient-centred care models in oncology enhanced comfort by addressing specific needs, such as pain and sleep disturbances, contributing to better overall outcomes.²⁰

In patients on trastuzumab deruxtecan (DS-8201), nursing interventions are particularly critical given the drug's side effects. Rugo et al highlighted that proactive nursing care during DS-8201 therapy minimised discomfort and strengthened treatment adherence.²¹ This case report builds on such findings, demonstrating how personalised nursing mitigated DS-8201 side effects, emphasising the integral role of holistic care.

This case report offers valuable insights into the application of personalised nursing care for a patient undergoing trastuzumab deruxtecan (DS-8201) treatment for advanced breast cancer with multiple metastases. A primary strength of the study is its focus on individualised nursing interventions, addressing not only the physical side effects of the treatment but also psychological and sleep-related challenges. This patient-centred approach highlights the importance of comprehensive nursing care in enhancing the quality of life for patients with oncological diseases, providing a practical model that may be applicable in similar clinical settings.

However, this study also has limitations. As a single-case report, its findings cannot be generalised across a larger population without further research. Additionally, due to pandemic-related restrictions, some follow-up data were collected remotely, which may limit the precision of certain assessments. Future studies with larger sample sizes and in-person evaluations could strengthen the evidence for personalised nursing interventions in oncology care.

In this case, personalised nursing interventions significantly improved the patient's quality of life during trastuzumab deruxtecan (DS-8201) treatment for metastatic breast cancer. By providing targeted psychological support, the nursing team effectively reduced the patient's anxiety, as reflected in the improved SAS scores. Additionally, sleep-focused interventions, such as creating a restful environment and incorporating relaxation techniques, led to measurable improvements in sleep quality, as shown in the reduced PSQI and ISI scores. Symptom management strategies, including proactive anti-nausea measures and careful monitoring during infusions, helped minimise side effects and maintain patient comfort. This case demonstrates the critical role of personalised nursing care in managing the complex needs of patients with advanced oncological diseases, suggesting a model that could enhance patient-centred outcomes in similar contexts.

This case report highlights the potential benefits of personalized nursing interventions in managing side effects and improving the quality of life for patients undergoing Trastuzumab Deruxtecan (DS8201) treatment. However, further research is needed to confirm these findings across a larger, more diverse patient population. Future studies should include multi-institutional collaborations with extended follow-up periods to assess the long-term impact of personalized nursing on patient outcomes. By involving a broader cohort, these studies could provide more robust data, helping to develop standardized, evidence-based nursing protocols for oncology patients receiving DS8201. Additionally, future research could explore specific nursing strategies tailored to address common side effects of DS8201 treatment, such as fatigue, nausea, and psychological distress, to refine best practices in oncology nursing. This expanded research focus will be essential in validating and advancing the role of personalized nursing care in complex oncologic treatments.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Electric Power Hospital. Written informed consent was obtained from the patient before the initiation of this study.

Consent for Publication

Informed consent for the publication of the case report was obtained from the patient in written form.

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Disclosure

All of the authors had no any personal, financial, commercial, or academic conflicts of interest to report for this work.

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