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Case Report

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Therapeutic benefit of Ribociclib treatment for metastatic breast carcinoma – case presentation

Maria **Militaru**[1], Maria **Neag**[1], Andrea Otilia **Onisim**[2], Florentina Claudia **Militaru**[1,2]*

[1] Toxicology and Clinical Pharmacology Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania
[2] Medisprof Cancer Center, Cluj-Napoca, Romania

*** Correspondence to:** Florentina Claudia Militaru, Pharmacology, Toxicology and Clinical Pharmacology Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania. E-mail: claudiamilitaru@yahoo.com

Abstract

Metastatic breast cancer is generally not curable with current treatments, though it is often treatable as a chronic disease. Currently, cyclin-dependent kinase 4/6 (CDK4/6) —palbociclib, ribociclib, and abemaciclib—play an important role in the treatment of advanced breast cancer. The purpose of this clinical case presentation is to demonstrate the therapeutic benefit of ribociclib therapy in a patient with *de novo* metastatic breast carcinoma.

Keywords: breast carcinoma, Ribociclib, pharmacology, CDK inhibitors.

Introduction

Metastatic breast cancer is an incurable disease, with most patients having hormone-receptor–positive (HR+) and human epidermal growth factor receptor 2–negative (HER2–) tumors [1, 2]. The goal of treatment is to slow disease progression using drugs that can prolong progression-free survival and overall survival, with a good safety profile and easy for patients to use [3]. Until recently, patients with HR+, HER2– breast cancer were treated with single-agent endocrine therapy, but resistance to endocrine therapy develops, leading to the need for cytotoxic chemotherapy [4–6].

Recently, a new class of drugs, cyclin-dependent kinase (CDK) 4/6 inhibitors, has been introduced as a treatment option for patients with advanced HR+, HER2– breast cancer, either as first-line therapy in combination with an aromatase inhibitor or as second-line therapy in combination with fulvestrant [7–12]. The CDK-RB1-E2F pathway targeted by CDK4/6 inhibitors is essential for cell-cycle progression and is altered in most cancers [13–16].

Currently, CDK4/6 inhibitors—palbociclib, ribociclib, and abemaciclib—play an important role in treating advanced breast cancer. The pharmacokinetics, pharmacodynamics, and efficacy of the three CDK4/6 inhibitors appear comparable. However, there are interesting differences, such as the ability to cross the blood–brain barrier, their side-effect profiles, and dosing schedules. These differences among the three CDK4/6 inhibitors may be used to optimize treatment selection for each patient [1].

The purpose of this clinical case presentation is to demonstrate the therapeutic benefit of ribociclib therapy in a patient with *de novo* metastatic breast carcinoma.

Case presentation

A 51-year-old female patient was diagnosed in January 2024 through mammography and ultrasound with diffuse, suspicious echogenicity changes in the central and upper quadrants of the left breast, with multiple bilateral axillary secondary lymphadenopathies, BI-RADS 5. A breast

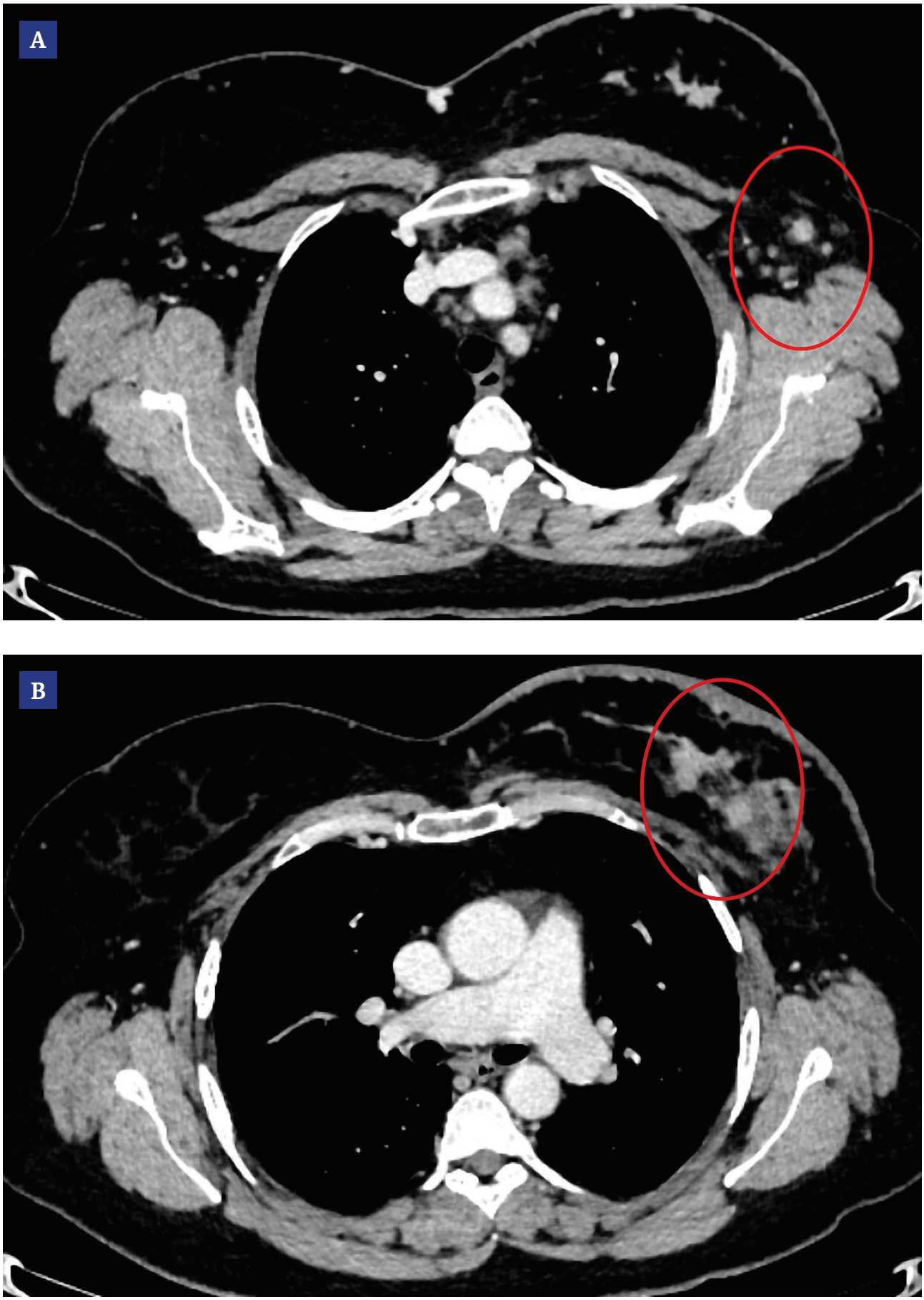

Figure 1. Contrast-enhanced computed tomography (CT) images of the chest obtained during the initial staging work-up. Red circles indicate secondary lymphadenopathy in the left axillary (A) and tumor in the left breast (B). February 2024.

biopsy was performed, with a histopathological result of invasive micropapillary breast carcinoma, Nottingham grade II, estrogen receptors (ER) 90%; progesterone receptors (PR) 70%; Ki-67 = 20%; HER2 = 1+ (negative). The histopathological result from the axillary lymphadenopathy revealed a lymph-node metastasis of micropapillary breast carcinoma.

At the initial evaluation, the clinical assessment established a good performance status (ECOG = 1). Clinical examination revealed a left retroareolar breast tumor of approximately 2.5 cm with cutaneous infiltration and left axillary lymphadenopathy.

Biological tests, including complete blood count and biochemical analyses, showed no pathological changes, and the tumor marker CA 15-3 was within normal limits.

As part of the staging work-up, a contrast-enhanced CT scan of the chest, abdomen, and pelvis was performed, with the following results: enhancing tumor foci in the left breast; secondary lymphadenopathy in the left axillary, supraclavicular, superior mediastinal, and left internal mammary regions; slight osteodense inhomogeneities at sacral and left iliac levels, most likely nonspecific (Figures 1AB, 2AB).

Given the uncertain imaging appearance at the bone level, a PET-CT examination was also performed. The results showed increased FDG uptake, corresponding to tissue densifications located intraglandularly and subcutaneously/cutaneously in the left mammary gland, an imaging aspect compatible with a malignant substrate/primary lesion; metabolic hyperactivity at lymph node and bone levels, most likely in the same oncologic context/secondary determinations; focal metabolic hyperactivity in the right triceps muscle, suspected from an oncologic standpoint (Figure 3AB).

Following the clinical, pathological, and imaging evaluation, the diagnosis of invasive micropapillary breast carcinoma, Nottingham grade II, of the left breast, ER = 90%; PR = 70%; Ki-67 = 20%;

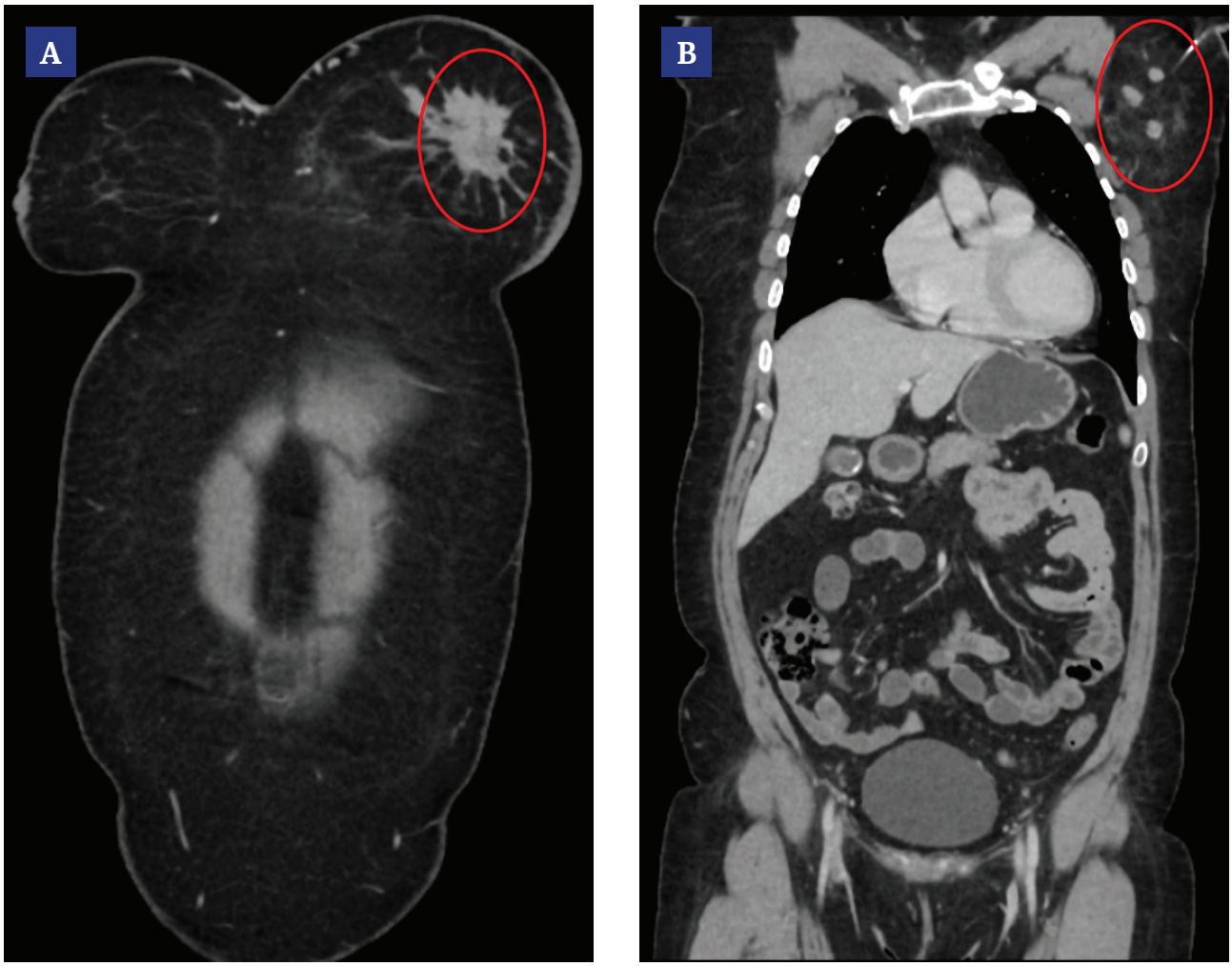

Figure 2. Longitudinal section. Contrast-enhanced computed tomography (CT) images of the chest obtained during the initial staging work-up. Red circles indicate tumor in the left breast (A) and secondary lymphadenopathy in the left axillary (B). February 2024.

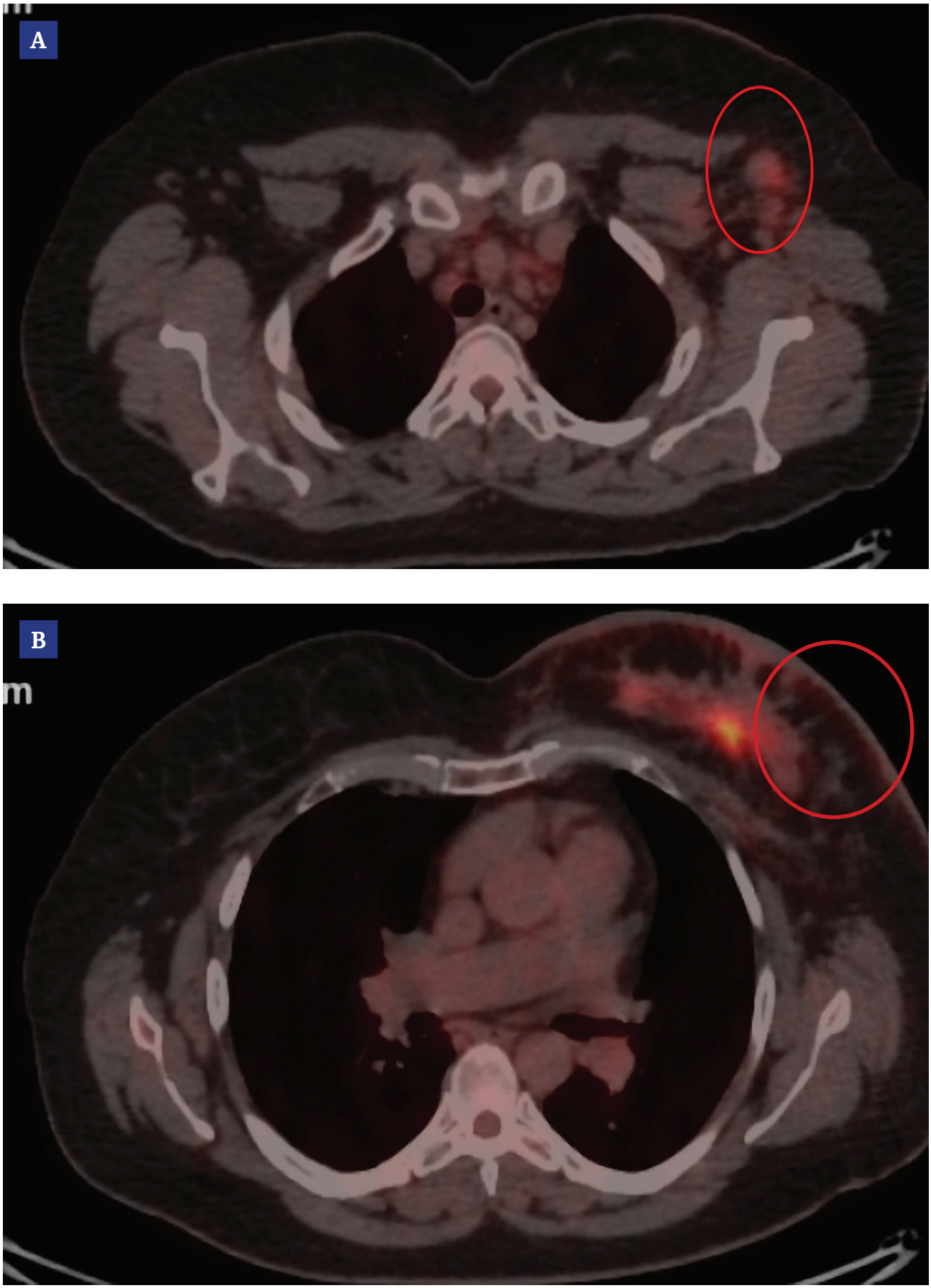

Figure 3. Fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) images obtained at baseline (February 2024). Red circles indicate metabolic hyperactivity at lymph node (A) and increased FDG uptake, corresponding to tissue densifications located intraglandularly and subcutaneously/cutaneously in the left mammary gland (B).

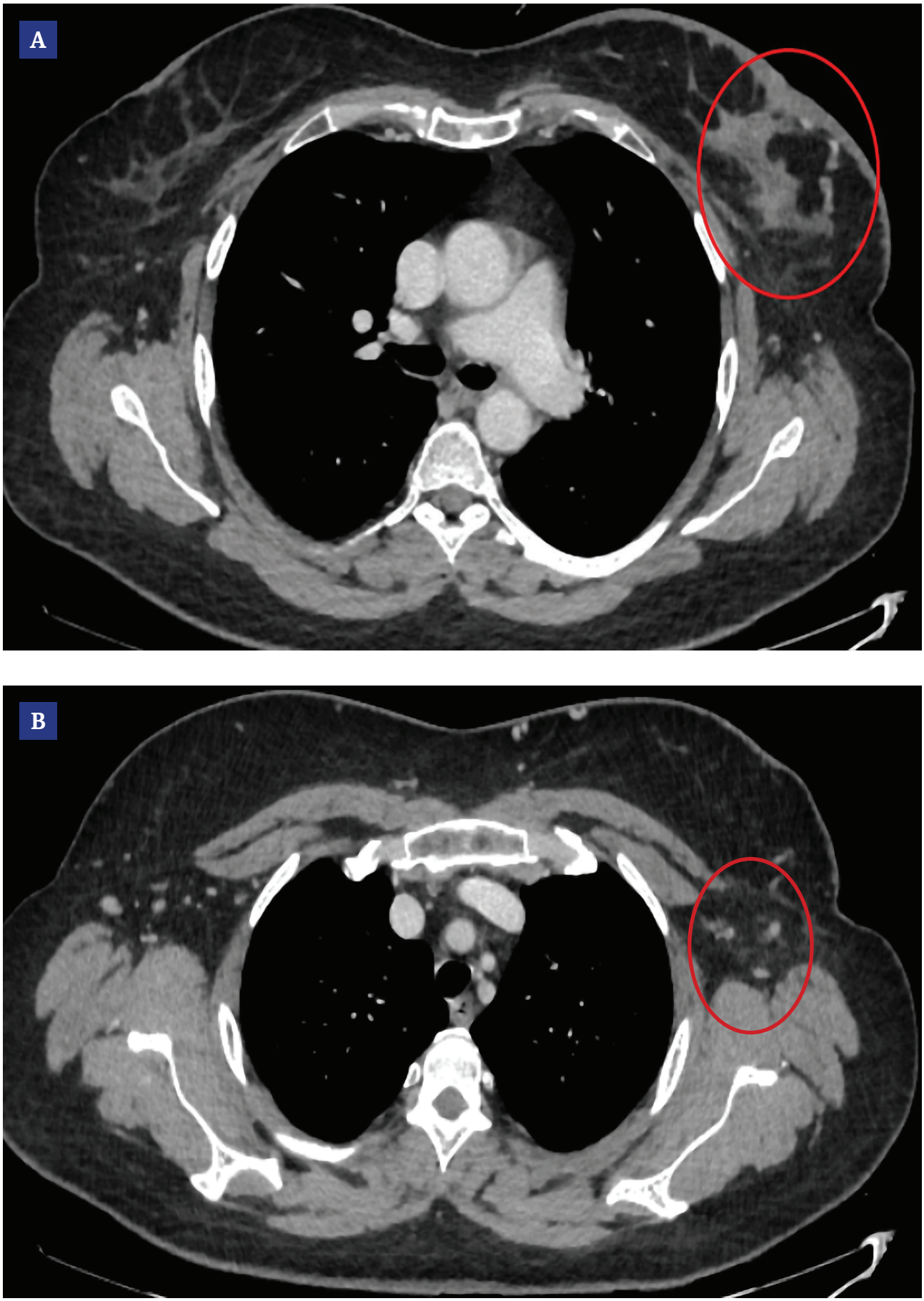

Figure 4. Contrast-enhanced computed tomography (CT) images of the chest at first response assessment (June 2024). Red circles highlight left breast tumor foci with significant global regression (A) and secondary left axillary lymphadenopathy with significant regression (B).

HER2 = 1+ (negative), cT4N1M1 (bone lesions and possible right triceps muscle involvement), stage IV was established. Metastatic disease was not histopathologically confirmed by biopsy, the stage was established solely on imaging findings. First-line treatment was initiated in March 2024 with ribociclib 600 mg once daily for 21 days followed by 7 days off per 28-day cycle + letrozole 2.5 mg orally daily + denosumab 120 mg subcutaneously every 28 days.

In June 2024, the first assessment of treatment response was performed. Clinically, the patient maintained a good performance status (ECOG = 0), and the physical examination showed a reduction in the size of the left breast tumor and left axillary lymphadenopathy. The treatment was well tolerated, with no adverse effects reported.

Repeat contrast-enhanced CT scan of the chest–abdomen–pelvis showed left breast tumor foci with significant global regression; secondary left axillary, supraclavicular, superior mediastinal, and left internal mammary lymphadenopathy with significant regression; bone metastases showing important remineralization (Figure 4AB).

As a result of the clinical and imaging evaluation, the response was interpreted as a partial response to treatment, and it was decided to continue therapy with ribociclib 600 mg once daily for 21 days followed by 7 days off per 28-day cycle + letrozole 2.5 mg orally daily + denosumab 120 mg subcutaneously every 28 days.

The most recent reassessment performed in November 2025 showed maintained performance status (ECOG = 0), with clinical and imaging findings consistent with a continued partial response. The patient continues treatment at the same doses, as she has not experienced significant toxicities.

Discussion

Particularities of the case: the patient presented with metastatic disease at the initial diagnosis; the response to therapy with ribociclib + letrozole was rapid and favorable, consistent with data from the literature [8], achieving prolonged progression-free survival, which is currently 21 months.

The treatment was well tolerated, and the patient maintained a good quality of life.

Conclusion

This case presentation illustrates a favorable evolution under treatment with ribociclib and letrozole in a patient with metastatic breast carcinoma. The patient benefited from treatment with ribociclib, belonging to a new class of drugs—cyclin-dependent kinase (CDK) 4/6 inhibitors—which enabled this favorable disease course.

Acknowledgements

Conflict of interest

The authors declare no conflict of interest.

Informed consent

Written informed consent was obtained from the participant.

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