



# Pathological complete response in breast cancer: A case series

Elakiya\*

Physician Assistant, Medical oncology department, Kauvery Cancer Unit, Trichy, Tamil Nadu

\*Correspondence

## Abstract

**Background:** Pathological Complete Response (pCR) is an important prognostic indicator in oncology, particularly in breast cancer patients receiving neoadjuvant chemotherapy. It is defined as the absence of invasive cancer in the surgical specimen following systemic therapy. Achieving pCR is associated with improved overall survival and disease-free survival. This article presents a case series of patients with breast cancer who achieved pathological complete response following neoadjuvant chemotherapy and subsequent surgical management. They highlight the importance of systemic therapy in achieving tumor regression and improving treatment outcomes.

**Key words:** Pathological Complete Response (pCR); Breast cancer; Neoadjuvant chemotherapy

## 1. Introduction

Neoadjuvant chemotherapy has become an important component in the management of locally advanced breast cancer. One of the most significant outcomes following neoadjuvant therapy is pathological complete response (pCR). The complete pathological response refers to the absence of residual invasive tumor cells in the breast and lymph nodes upon microscopic examination of the surgical specimen after neoadjuvant therapy. Achieving pCR is considered a strong predictor of favorable prognosis and improved survival outcomes in several cancers.

## 2. Significance of Pathological Complete Response

PCR plays an important role in predicting treatment outcomes and guiding further therapy.

It helps in:

- Predicting improved overall survival
- Predicting disease-free survival
- Assessing chemosensitivity of the tumor

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- Guiding treatment escalation in non-responders
- Patients who fail to achieve pCR may require additional or intensified therapy.

### 3. Cancers where pCR is clinically relevant

Complete Pathological Responding is considered an important prognostic indicator in several malignancies, including:

- Breast cancer
- Esophageal cancer
- Gastric cancer
- Rectal cancer
- Ovarian cancer
- Bladder cancer
- Lung cancer

Among these, breast cancer shows the most clinical utility for pCR assessment.

#### Breast cancer subtypes

Breast cancer can be classified into different molecular subtypes based on receptor status.

#### Hormone Receptor Positive (HR+)

These tumors express estrogen receptors or progesterone receptors and usually respond to hormonal therapy.

#### HER2 Positive

These cancers overexpress the HER2 receptor and are treated with targeted therapies such as trastuzumab and pertuzumab.

#### Triple Negative Breast Cancer (TNBC)

Triple negative breast cancer lacks estrogen receptors, progesterone receptors, and HER2 receptors. These tumors are generally more aggressive but may respond well to chemotherapy.

### 4. Case Series

**4.1. Case 1:** A 32-year-old female presented with a lump in the right breast for eight months.

#### Clinical findings

Clinical staging was T4N3M0.

- Tumor subtype
- ER negative
- PR negative
- HER2 negative

This was classified as Triple Negative Breast cancer.

#### **Treatment**

The patient received neoadjuvant chemotherapy consisting of:

- Paclitaxel
- Carboplatin
- Pembrolizumab

This was followed by additional cycles of: Adriamycin, Cyclophosphamide, Pembrolizumab

**Surgery:** The patient underwent Modified Radical Mastectomy (MRM).

**Histopathology:** Postoperative histopathological examination showed ypT0N0, indicating pathological complete response.

**Follow-Up:** The patient completed adjuvant radiotherapy and is currently on maintenance Pembrolizumab for one year.

**4.2. Case 2:** A 49-year-old female presented with a lump in the right breast for one month.

#### **Clinical findings**

Clinical stage was T3N2M0.

- Tumor subtype
- ER negative
- PR negative
- HER2 positive

#### **Treatment**

The patient received six cycles of neoadjuvant chemotherapy including:

- Docetaxel
- Carboplatin
- Trastuzumab

- Pertuzumab

**Surgery:** She subsequently underwent Modified Radical Mastectomy.

**Histopathology:** Postoperative histopathology showed ypT0N0, confirming pathological complete response.

**Follow-Up:** The patient completed adjuvant radiotherapy and is currently receiving maintenance therapy with Trastuzumab and Pertuzumab.

**4.3. Case 3:** A 44-year-old female presented with a right breast lump for two months.

#### **Clinical findings**

Clinical staging was T2N1M0

- Tumor subtype
- ER positive
- PR negative
- HER2 negative

#### **Treatment**

The patient received neoadjuvant chemotherapy consisting of:

- Adriamycin
- Cyclophosphamide
- Paclitaxel

**Surgery:** She underwent Modified Radical Mastectomy.

**Histopathology:** Postoperative histopathology revealed ypT0N0, indicating pathological complete response.

**Follow-Up:** The patient completed adjuvant radiotherapy and is currently on hormonal therapy.

**Imaging assessment:** PET-CT scans were used to evaluate tumor response before and after treatment. Post-treatment imaging showed significant tumor regression in all three cases.

### **5. Discussion**

Pathological complete response is an important surrogate marker for long-term outcomes in breast cancer. Studies have shown that patients who achieve pCR after neoadjuvant therapy have significantly improved survival compared with those who have residual disease. The likelihood of achieving pCR varies among breast cancer subtypes. Higher pCR rates are observed in HER2-positive and triple-negative breast cancers, particularly when targeted therapies and immunotherapy are used. Neoadjuvant therapy

also allows early assessment of tumor response, enabling clinicians to modify treatment strategies in patients who do not achieve adequate response.

## 6. Conclusion

Pathological complete response is a valuable prognostic indicator in breast cancer management. The case series demonstrates that neoadjuvant chemotherapy combined with targeted therapy or immunotherapy can achieve complete tumor regression in selected patients. Early evaluation and multidisciplinary treatment planning are essential to improve outcomes in breast cancer patients.

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