Gynaecology & Obstetrics Case report
ISSN: 2471-8165

Open Access Commentary

# The Differential Response to Neoadjuvant Chemoimmunotherapy in Triple-Negative Breast Cancer Is Associated with Immunologic Factors

**Robert Van***

*Department of Obstetrics & Gynecology, Duke University Medical Center, Duke Cancer Institute, Division of Gynecologic Oncology, Durham, NC 27710, USA*

## INTRODUCTION

Triple-negative Breast Cancer is an aggressive subtype of breast cancer characterized by the absence of estrogen receptor, Progesterone Receptor (PR), and HER2/neu expression. This subtype accounts for approximately 15-20% of all breast cancers and is associated with a poorer prognosis and higher rates of recurrence compared to other breast cancer subtypes. The lack of targeted therapies for TNBC makes it challenging to treat, and conventional chemotherapy remains the cornerstone of treatment. Recent advances have introduced chemoimmunotherapy as a promising approach for TNBC. The combination of chemotherapy and Immune Checkpoint Inhibitors aims to enhance anti-tumor immune responses. However, responses to neoadjuvant chemoimmunotherapy in TNBC patients are variable, with some patients achieving complete pathological responses while others exhibit resistance. This differential response is believed to be associated with various immunologic factors. Understanding these factors is crucial for optimizing treatment strategies and improving outcomes for TNBC patients [1].

## DESCRIPTION

The tumor microenvironment in TNBC is highly immunogenic, characterized by a high mutational burden and the presence of tumor-infiltrating lymphocytes. TILs are a heterogeneous population of immune cells that infiltrate the tumor. They consist of cytotoxic T cells, helper T cells, regulatory T cells, and other immune cells. High levels of TILs have been associated with better prognosis and increased response to chemotherapy and immunotherapy in TNBC. CTLs play a critical role in anti-tumor immunity by recognizing and killing cancer cells. The presence of high CD8+ CTL density in tumors correlates with improved clinical outcomes. Tregs suppress immune responses and promote tumor tolerance. An increased Treg-to-CTL ratio is often associated with poor response to treatment. Immune checkpoint molecules, such as PD-1/PD-L1 and CTLA-4, regulate immune responses by preventing overactivation of the immune system. Cancer cells exploit these checkpoints to evade immune detection. PD-L1 expression on tumor cells interacts with PD-1 on T cells, leading to T cell exhaustion and reduced anti-tumor activity. High PD-L1 expression in TNBC has been linked to better response to ICIs. Blocking CTLA-4 can enhance T cell activation and anti-tumor responses. TMB refers to the number of mutations within a tumor's genome. High TMB increases the likelihood of neoantigen formation, which can be recognized by the immune system, potentially enhancing the response to immunotherapy [2,3]. Cytokines such as IFN-γ and TNF-α promote anti-tumor immunity by activating CTLs and enhancing antigen presentation. Cytokines such as IL-10 and TGF-β suppress immune responses and promote tumor progression. The differential response to neoadjuvant chemoimmunotherapy in TNBC is influenced by the interplay of the aforementioned immunologic factors. The balance between immune activation and inhibition in the TME determines the efficacy of chemoimmunotherapy. High levels of TILs, particularly CTLs, and favorable cytokine profiles promote immune activation and enhance the response to treatment. Conversely, the presence of Tregs and immunosuppressive cytokines can inhibit anti-tumor immunity and reduce treatment efficacy. Effective tumor antigen presentation is crucial for the activation of anti-tumor immune responses. Chemotherapy can induce immunogenic cell death, releasing tumor antigens and promoting their presentation by dendritic cells. This process enhances T cell priming and activation, which can be further augmented by ICIs. Tumors with defects in antigen presentation machinery,

| | | | |
|---|---|---|---|
| **Received:** | 02-March-24 | **Manuscript No:** | ipgocr-24-19968 |
| **Editor assigned:** | 04-March-24 | **PreQC No:** | ipgocr-24-19968 (PQ) |
| **Reviewed:** | 16-March-24 | **QC No:** | ipgocr-24-19968 (Q) |
| **Revised:** | 22-March-24 | **Manuscript No:** | ipgocr-24-19968 (R) |
| **Published:** | 29-March-24 | **DOI:** | 10.36648/2471-8165.10.02.17 |

**Corresponding author:** Robert Van, Department of Obstetrics & Gynecology, Duke University Medical Center, Duke Cancer Institute, Division of Gynecologic Oncology, Durham, NC 27710, USA; E-mail: vanr@gmail.com

**Citation:** Van R (2024) The Differential Response to Neoadjuvant Chemoimmunotherapy in Triple-Negative Breast Cancer Is Associated with Immunologic Factors. Gynecol Obstet Case Rep. Vol.10 No.2:17.

such as downregulation of MHC class I molecules, may exhibit resistance to chemoimmunotherapy. Chemotherapy can modulate the TME by depleting immunosuppressive cells, such as myeloid-derived suppressor cells and Tregs, and enhancing the infiltration and activity of CTLs. The extent of TME modulation by chemotherapy varies among patients, contributing to differential responses to treatment [4,5] .

## CONCLUSION

The differential response to neoadjuvant chemoimmunotherapy in TNBC is intricately linked to various immunologic factors within the TME. Understanding these factors is crucial for developing predictive biomarkers, optimizing treatment strategies, and improving patient outcomes. Future research should focus on elucidating the complex interactions between the immune system and tumor cells, identifying novel therapeutic targets, and implementing personalized medicine approaches to enhance the efficacy of chemoimmunotherapy in TNBC. By harnessing the power of the immune system, we can move closer to achieving durable remissions and improved survival for patients with this challenging breast cancer subtype.

## ACKNOWLEDGEMENT

None.

## CONFLICT OF INTEREST

The author has no conflicts of interest to declare.

## REFERENCES

1. Du CZ, Li J, Cai Y, Sun YS, Xue WC, et al. (2011) Effect of multidisciplinary team treatment on outcomes of patients with gastrointestinal malignancy. World J Gastroenterol 17(15):2013.
2. Chan KK (1999) Does the surgeon matter in the management of ovarian cancer?. Br J Cancer 80(10):1492.
3. Brookfield KF, Cheung MC, Yang R, Byrne MM, Koniaris LG (2009) Will patients benefit from regionalization of gynecologic cancer care?. PLoS One 4(1):40-49.
4. Stockton D, Davies T (2000) Multiple cancer site comparison of adjusted survival by hospital of treatment: An east anglian study. Br J Cancer 82(1):208-212.
5. Vernooij F, Heintz P, Witteveen E, vander GY (2007) The outcomes of ovarian cancer treatment are better when provided by gynecologic oncologists and in specialized hospitals: A systematic review. Gynecol Oncol 105(3):801-812.