Updates in Immunotherapy for Cancer Treatment in General Internal Medicine.

Christian Jorge*

Department of Medicine Columbia University of New York, United States

Introduction

Immunotherapy has rapidly evolved as a cornerstone of cancer treatment, offering substantial promise for patients with a variety of malignancies. It utilizes the body's immune system to target and destroy cancer cells more effectively, often providing long-term benefits, especially for patients with advanced or metastatic cancers. In the context of General Internal Medicine, clinicians are increasingly engaged in the administration, monitoring, and management of these therapies, which requires understanding both their potential benefits and associated risks [1].

Immune Checkpoint Inhibitors (ICIs)

The advent of immune checkpoint inhibitors has been one of the most revolutionary breakthroughs in cancer therapy. These drugs, such as pembrolizumab (anti-PD-1), nivolumab (anti-PD-1), and ipilimumab (anti-CTLA-4), work by blocking immune checkpoints that cancers exploit to avoid immune detection. The PD-1/PD-L1 and CTLA-4 pathways, which normally suppress immune responses, are effectively "unlocked" by ICIs, allowing the immune system to recognize and attack tumor cells [2].

ICIs have transformed the treatment landscape for several cancers, including non-small cell lung cancer (NSCLC), melanoma, renal cell carcinoma, and urothelial carcinoma. Combination therapies, such as nivolumab with ipilimumab, have demonstrated enhanced efficacy, particularly in melanoma and NSCLC, providing patients with durable responses. However, these therapies are not without their challenges, as they can lead to immune-related adverse events (irAEs), including colitis, hepatitis, pneumonitis, and endocrinopathies [3]. The management of these irAEs often involves immunosuppressive agents, which require careful monitoring, underscoring the importance of an interdisciplinary approach in General Internal Medicine.

Monoclonal antibodies and targeted therapies

Monoclonal antibodies (mAbs) have been pivotal in the targeted treatment of various cancers. Trastuzumab, a monoclonal antibody targeting HER2 in breast cancer, and rituximab, used for treating non-Hodgkin lymphoma, are among the well-established treatments. These therapies work by directly targeting cancer cell receptors, blocking tumor growth, and enhancing immune system activity. In addition, bispecific antibodies, which engage both T-cells and tumor cells, are an exciting area of research, offering new potential for cancers that have been less responsive to traditional therapies [4,5].

Targeted therapies, such as tyrosine kinase inhibitors (TKIs) for chronic myelogenous leukemia (CML) and epidermal growth factor receptor (EGFR) inhibitors for NSCLC, have also become integral in cancer treatment. By targeting specific molecular mutations, these therapies provide more personalized, effective treatment options with reduced off-target effects, though they are not entirely free from side effects [6].

Cancer vaccines

Cancer vaccines, although still in developmental stages, hold significant promise in immunotherapy. Therapeutic vaccines, such as the recently FDA-approved personalized cancer vaccines, work by stimulating the immune system to recognize and destroy cancer cells based on specific tumor-associated antigens. Additionally, preventive vaccines like the HPV vaccine have significantly reduced the incidence of cervical cancer. Research into cancer vaccines continues to expand, offering hope for more targeted and less toxic treatment options [7].

Adoptive cell therapy

Chimeric Antigen Receptor T-cell (CAR-T) therapy represents one of the most exciting innovations in cancer immunotherapy. CAR-T involves modifying a patient's T-cells to enhance their ability to target and kill cancer cells. This has shown remarkable success, particularly in hematologic malignancies like acute lymphoblastic leukemia (ALL) and large B-cell lymphoma. However, the therapy is not without challenges, including cytokine release syndrome (CRS) and neurotoxicity, which require close monitoring and management in specialized centers [8,9].

Emerging challenges and future directions

While the advancements in immunotherapy are promising, they are accompanied by significant challenges, particularly the management of immune-related adverse events (irAEs), which can range from mild to life-threatening. The growing recognition of biomarkers such as PD-L1 expression and tumor mutational burden (TMB) is expected to help identify which

***Correspondence to**: Christian Jorge, Department of Medicine Columbia University of New York, United States. E-mail: christianjorge@hotmail.com

Received: 02-Jan-2025, Manuscript No. AAAGIM-25-162824; ***Editor assigned:*** 03-01-2025, PreQC No. AAAGIM-25-162824(PQ); ***Reviewed:*** 17-Jan-2025, QC No. AAAGIM-25-162824; ***Revised:*** 24-Jan-2025, Manuscript No. AAAGIM-25-162824(R); ***Published:*** 28-Jan-2025, DOI: 10.35841/aaagim.9.1.271

Citation: *Jorge C. Updates in Immunotherapy for Cancer Treatment in General Internal Medicine. Arch Gen Intern Med. 2025;9(1):271*

patients will benefit most from specific immunotherapies. Additionally, next-generation therapies, including bispecific antibodies, immune cytokine therapy, and oncolytic virus therapy, are under investigation and could further expand treatment options [10].

Conclusion

Immunotherapy has revolutionized cancer treatment, offering significant therapeutic potential across various malignancies. The increasing integration of these therapies into clinical practice, coupled with their ability to produce long-lasting responses, has transformed outcomes for patients with advanced cancers. However, the need for careful monitoring and management of immune-related side effects remains crucial. As immunotherapy continues to evolve, it will become an increasingly important component of cancer care, requiring General Internal Medicine practitioners to stay informed about the latest developments and incorporate them into multidisciplinary patient management strategies.

References

1. Borghaei H, Smith MR, Campbell KS. Immunotherapy of cancer. Eur J Pharmacol. 2009;625(1-3):41-54.
2. Zaidi N, Jaffee EM. Immunotherapy transforms cancer treatment. J Clin Invest. 2019;129(1):46-47.
3. Rescigno M, Avogadri F, Curigliano G. Challenges and prospects of immunotherapy as cancer treatment. Biochim Biophys Acta. 2007;1776(1):108-123.
4. Gulley JL, Madan RA, Pachynski R, et al. Role of antigen spread and distinctive characteristics of immunotherapy in cancer treatment. J Natl Cancer Inst. 2017;109(4):djw261.
5. Yang L, Ning Q, Tang SS. Recent advances and next breakthrough in immunotherapy for cancer treatment. J Immunol Res. 2022;2022(1):8052212.
6. Borgers JS, Heimovaara JH, Cardonick E, et al. Immunotherapy for cancer treatment during pregnancy. Lancet Oncol. 2021;22(12):e550-e561.
7. Sahu M, Suryawanshi H. Immunotherapy: The future of cancer treatment. J Oral Maxillofac Pathol. 2021;25(2):371.
8. Mishra AK, Ali A, Dutta S, et al. Emerging trends in immunotherapy for cancer. Diseases. 2022;10(3):60.
9. Klabunde CN, Ambs A, Keating NL, et al. The role of primary care physicians in cancer care. J Gen Intern Med. 2009;24:1029-1036.
10. Rosenberg SA. Progress in the development of immunotherapy for the treatment of patients with cancer. J Intern Med. 2001;250(6):462-475.

Citation: *Jorge C. Updates in Immunotherapy for Cancer Treatment in General Internal Medicine. Arch Gen Intern Med. 2025;9(1):271*