ISSN: 2755-0176

Journal of Cancer Research Reviews & Reports

SCIENTIFIC Research and Community

Review Article

Open Access

Hodgkin Lymphoma in Young Adults: Diagnosis and Treatment - A Brief Review

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ABSTRACT

Hodgkin lymphoma is one of the most prevalent hematologic malignancies in young adults, accounting for approximately 10–15% of cases in this age group. Clinically and epidemiologically, diagnosis is based on peripheral or mediastinal lymphadenopathy, with "B symptoms" present in about 30% of patients. Histological confirmation, via excisional biopsy, reveals Reed–Sternberg cells within a characteristic inflammatory stroma. Staging is performed with PET/CT according to the modified Ann Arbor system, guiding therapeutic decisions. The ABVD protocol (doxorubicin, bleomycin, vinblastine, and dacarbazine) remains the gold standard, yielding five year overall survival rates exceeding 85% in early stages. In high risk or refractory cases, intensified regimens such as escalated BEACOPP, as well as targeted therapies (including brentuximab vedotin and PD 1 checkpoint inhibitors nivolumab, pembrolizumab), have shown promising efficacy. Response assessment by PET allows treatment adaptation, reducing late toxicities such as cardiotoxicity, infertility, and secondary malignancies. In this review, we synthesize diagnostic and therapeutic advances and future perspectives to optimize the balance between efficacy and safety in young adults.

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Received: May 24, 2025; **Accepted:** May 26, 2025; **Published:** June 05, 2025

Keywords: Hodgkin Lymphoma, Young Adults, Diagnosis, Treatment, PET/CT

Introduction

Hodgkin lymphoma, first described in the nineteenth century, is characterized by the proliferation of Reed–Sternberg cells within a heterogeneous cellular microenvironment that contributes to its pathogenesis [1]. The disease exhibits a bimodal incidence pattern, peaking in young adults aged 15-30 years and again in individuals over 55 years, and carries a high morbidity and mortality rate if not appropriately diagnosed and treated. Among the classical subtypes, nodular sclerosis, mixed cellularity, lymphocyte rich, and lymphocyte depleted each bear distinct prognostic implications [2]. Epstein-Barr virus (EBV) infection is associated particularly with the mixed cellularity variant, especially in regions of lower socioeconomic development, suggesting a co oncogenic role [3].

The International Prognostic Score (IPS) for advanced disease incorporating clinical and laboratory parameters is widely used for risk stratification and guides the intensity of therapeutic approaches [4]. The ABVD regimen is well established for both early and advanced stages, affording cure rates over 80% at five years. Intensified regimens, such as escalated BEACOPP, offer benefit in high risk patients but are associated with increased hematologic and non hematologic toxicities [5]. Diagnosis and staging rely on excisional biopsy and PET/CT, the latter being essential for early functional response assessment and radiotherapy planning [6]. Current challenges include minimizing long term sequelae cardiotoxicity and infertility among them as well as controlling disease relapse. Recently, targeted therapies, notably brentuximab vedotin and checkpoint inhibitors, have been integrated into frontline and refractory treatment protocols, improving outcomes [7,8].

Objectives

This review aims to present the current diagnostic and therapeutic landscape, discussing strategies to prevent toxicities and future perspectives for individualized management in young adults with Hodgkin lymphoma.

Materials and Methods

A literature review was conducted using the PubMed, SciELO, Google Scholar, and ScienceDirect databases.

Discussion

The adoption of advanced imaging technologies, such as FDG PET/CT, has revolutionized staging and response evaluation in Hodgkin lymphoma. Studies indicate that early response assessment by the Deauville five point scale permits treatment individualization reducing chemotherapy and radiotherapy cycles in patients with early complete metabolic response without compromising progression free survival [9]. Conversely, PET positivity after two to four ABVD cycles may warrant escalation to BEACOPP, underscoring the need for an adaptive strategy [5]. Long term complications including cardiomyopathy, infertility, pulmonary dysfunction, and secondary neoplasms contribute significantly to morbidity in long term survivors, particularly in young populations. De escalation protocols, such as reducing bleomycin cycles or omitting radiotherapy in patients achieving complete metabolic response, are being tested to mitigate these sequelae [6]. Targeted therapies especially frontline combinations including brentuximab vedotin have demonstrated higher remission rates compared to traditional ABVD but carry high costs and require vigilant monitoring for neuropathic adverse effects [10]. Incorporation of checkpoint inhibitors (nivolumab, pembrolizumab) in relapsed or refractory settings has yielded objective response rates above 60%, opening new therapeutic avenues and potentially reducing exposure to cytotoxic regimens [8]. Future challenges include identifying prognostic and predictive biomarkers such as PD L1 expression, genomic profiling, and tumor microenvironment characterization to guide increasingly personalized therapies [11-15].

Conclusion

Early diagnosis and accurate staging based on excisional biopsy and PET/CT are fundamental for selecting the most appropriate treatment in young adults with Hodgkin lymphoma. While ABVD remains first line standard, PET adapted intensification or de escalation strategies guided by IPS prognostic factors optimize the balance between efficacy and toxicity. The integration of targeted agents, such as brentuximab vedotin, and PD 1 inhibitors expands options, especially in refractory cases. Managing late effects, including infertility and cardiotoxicity, is crucial to ensure long term quality of life. Future directions point toward precision medicine through molecular biomarkers and cellular therapies, aiming for ever more individualized and less toxic treatments. A multidisciplinary, evidence based approach will continue to drive progress in managing Hodgkin lymphoma in young adults.

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