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Anthracycline-Induced the Left Ventricular Dysfunction in Acute Myeloid Leukemia: A Comprehensive Assessment

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Commentary

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DESCRIPTION

Anthracycline-Induced Left ventricular Dysfunction (A-ILD) poses a notable concern in the treatment landscape of Acute Myeloid Leukemia (AML) patients undergoing anthracycline-containing induction chemotherapy. Despite its clinical significance, a comprehensive understanding of A-ILD incidence and predictors in this patient population remains elusive. Incidence of A-ILD in AML patients recent studies have begun to unravel the prevalence of A-ILD in AML patients undergoing anthracycline-containing induction chemotherapy. One such study, conducted at the Dana-Farber Cancer Institute over the period from 2014 to 2022, examined 419 consecutive adult AML patients meeting inclusion criteria for pre- and post-chemotherapy echocardiograms and pre-treatment LVEF>50%. This study revealed that out of the cohort, 8% developed A-ILD post-induction, highlighting the notable risk associated with anthracycline exposure in this population. Notably, a subset of patients (1%) became ineligible for allogeneic stem cell transplantation due to A-ILD, underlining its clinical significance in treatment decision-making.

Predictors of A-ILD

Identifying predictors of A-ILD is crucial for risk stratification and tailored patient management. The study at the Dana-Farber Cancer Institute provided insights into potential predictors of A-ILD in AML patients. Surprisingly, baseline cardiovascular comorbidities, including hypertension, diabetes mellitus, hyperlipidemia, smoking, and coronary artery disease, did not emerge as significant predictors of post-induction A-ILD.

This finding challenges conventional assumptions regarding the role of cardiovascular risk factors in A-ILD development. However, the presence of a JAK2 mutation, identified through comprehensive next-generation sequencing, was associated with an increased risk of A-ILD in multivariable analysis. This novel finding underscores the importance of exploring molecular predictors of A-ILD beyond traditional cardiovascular risk factors.

Clinical implications and future directions

The elucidation of A-ILD incidence and predictors holds significant clinical implications for the management of AML patients undergoing anthracycline-containing induction chemotherapy. Firstly, clinicians should maintain a heightened awareness of the potential risk of A-ILD in this patient population, particularly in those harboring JAK2 mutations. Incorporating routine monitoring of cardiac function, including pre- and post-chemotherapy echocardiography, is paramount for early detection and management of A-ILD. Additionally, future research endeavors should aim to validate and expand upon the identified predictors of A-ILD, including molecular markers such as JAK2 mutations. Understanding the mechanistic underpinnings of A-ILD, particularly in the context of specific genetic mutations, may pave the way for targeted interventions aimed at mitigating A-ILD risk and improving treatment outcomes in AML patients.

Challenges and considerations

While recent studies have provided valuable insights into A-ILD in AML patients, several challenges and considerations warrant attention. Firstly, the retrospective nature of many studies limits the ability to establish causality between potential predictors and A-ILD occurrence. Prospective, longitudinal studies are needed to validate findings and elucidate temporal relationships between predictors and A-ILD development. Moreover, the complexity of A-ILD etiology, involving multifactorial interactions between anthracycline exposure, genetic predisposition, and cardiovascular health, underscores the need for a multidisciplinary approach to patient care. Collaboration between oncologists, cardiologists, and molecular biologists is essential for advancing our understanding of A-ILD and developing effective preventive strategies and treatments.

The recent research efforts have brought the incidence and predictors of anthracycline-induced left ventricular dysfunction (A-ILD) in acute myeloid leukemia (AML) patients undergoing induction chemotherapy. While challenges persist, including the need for prospective validation and mechanistic elucidation, these findings represent a significant step forward in our understanding of A-ILD in AML. By incorporating routine cardiac monitoring and exploring novel molecular predictors, clinicians and researchers can strive to mitigate A-ILD risk and improve outcomes for AML patients undergoing anthracycline containing induction chemotherapy