N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE AS A PROGNOSTIC MARKER FOR RESPONSE TO INTENSIVE CHEMOTHERAPY IN ACUTE MYELOID LEUKEMIA PATIENTS

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INTRODUCTION

Acute myeloid leukemia (AML) is a rapidly progressing myeloid neoplasm characterized by the clonal expansion of immature myeloid-derived cells, known as blasts, in the peripheral blood and bone marrow resulting in ineffective erythropoiesis and megakaryopoiesis, clinically manifested as relatively rapid bone marrow failure compared to chronic and indolent leukemias.

Several patient-related factors, including age, poor organ function and especially cardiac comorbidities are prognostic factors in patients with AML. These variables are of particular importance when exploring the ability of patients to tolerate high-dose induction chemotherapy and/or HSCT.

Anthracyclines are cytostatic antibiotics, introduced into the clinical field in the 1960. Unfortunately, anthracyclines are considered the principal culprit drugs behind chemotherapy-induced cardiotoxicity.

A robust laboratory-based biomarker assessing cardiac function and predicting tolerability of chemotherapy and general outcomes is lacking in AML. NT-ProBNP is a biomarker broadly used for the diagnosis, evaluation, and monitoring of cardiomyopathies. In addition, NT-ProBNP is also known to serve as a useful marker for early detection of asymptomatic or imminent heart failure.

AIM OF THE WORK

The aim of this Study was to:

To evaluate the prognostic value of n-terminal pro-brain natriuretic peptide as marker for response to intensive chemotherapy.

To evaluate the prognostic value of n-terminal pro-brain natriuretic peptide as an early marker for cardiac toxicity in acute myeloid leukemia patients.

PATIENTS AND METHODS

Patients

The study conducted on sixty Egyptian adult patients newly diagnosed with acute myeloid leukemia admitted to the Hematology Unit, Internal Medicine Department, Alexandria Main University Hospital from March 2023 to May 2024

Methods

All patients diagnosed as acute leukemia after performing a complete blood count, bone marrow aspiration and immnunophenotyping. N-terminal pro-brain natriuretic peptide measured by immunoassay and echocardiography done for all patients before starting chemotherapy.

RESULTS

Table 1: Relation between Mortality and different parameters (n = 60)

	Overall Survivor		U	P
	Died (n = 34)	Survived (n = 26)		
PRO – BNP				
Min. – Max.	49.0 – 2765.0	19.0 – 5016.0	280.0*	0.016*
Mean ± SD.	583.97 ± 622.63	484.88 ± 1002.96		
Median	405.50	234.50		
CRP				
Min. – Max.	12.0 – 349.0	5.30 – 384.0	310.0*	0.049*
Mean ± SD.	100.01 ± 78.11	79.55 ± 87.57		
Median	87.0	55.35		

Data are presented as mean ± SD, or median (IQR), IQR: Inter quartile range, SD: Standard deviation, U: Mann Whitney test, CRP: C-reactive protein. *: significant as P value < 0.05.

Table 2: Relation between response and different parameters (n = 60)

	Response			H	p
	Complete Response (n = 26)	Died (n = 21)	Refractory (n = 13)		
PRO – BNP					
Min.–Max.	19.0 – 5016.0	85.0 – 2267.0	49.0 – 2765.0	5.845	0.054
Mean ± SD.	484.88 ± 1002.96	505.19 ± 499.77	711.23 ± 788.29		
Median	234.50	385.0	468.0		
CRP					
Min. –Max.	5.30 – 384.0	19.50 – 349.00	12.0 – 236.0	3.882	0.144
Mean ± SD.	79.55 ± 87.59	106.88 ± 89.45	88.92 ± 56.81		
Median	55.35	87.0	87.0		

Data are presented as mean ± SD, or median (IQR), IQR: Inter quartile range, SD: Standard deviation, H: H for Kruskal Wallis test, CRP: C-reactive protein.

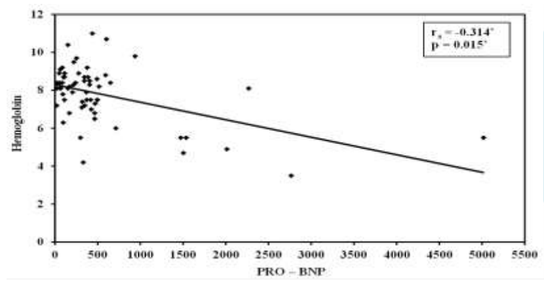

Figure 1: Correlation between hemoglobin and PRO–BNP (n=60)

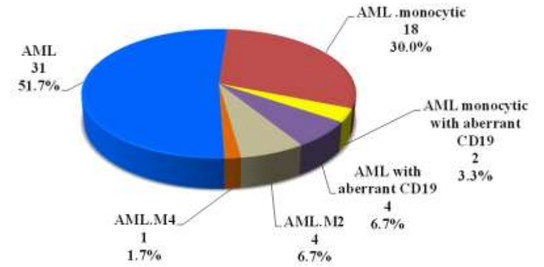

Figure 1: Distribution of the studied cases according to diagnosis (n=60)

CONCLUSION

This study highlights the potential role of NT-proBNP as a prognostic biomarker in patients with acute myeloid leukemia (AML) undergoing intensive chemotherapy.

Elevated baseline NT-proBNP levels were significantly associated with higher mortality, suggesting a potential predictive value for treatment outcomes and early cardiac toxicity.