

STUDY OF BSG (BASIGIN, CD147) GENE EXPRESSION IN EGYPTIAN PATIENTS WITH ACUTE MYELOID LEUKEMIA

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Introduction

Acute Myeloid leukemia (AML) is a clonal proliferation of myeloid blasts in the peripheral blood, bone marrow, or other tissues. Molecular markers have made a breakthrough in AML after proving to be important in disease pathogenesis and as therapeutic targets. Basigin (BSG, CD147), also named as extracellular MMP inducer (EMMPRIN), is a widely distributed cell surface glycoprotein that belongs to the immunoglobulin superfamily. BSG expression is elevated in many cancers and is known to promote tumor invasiveness and metastasis, through interaction with various proteins. It has been explored as a potential biomarker for cancer diagnosis and prognosis, as well as a therapeutic target. Recent studies have shown growing interest in the CD147 molecule in some hematological malignancies and highlighted its significant role in the pathogenesis. However, minimal studies have been conducted to evaluate the role of BSG gene expression in adult AML.

Aim of the work

The aim of the present study was to assess the impact of BSG gene expression on the susceptibility and clinical outcome among Egyptian patients with acute myeloid leukemia.

Subjects and Methods

SUBJECTS: This study was conducted on 50 newly diagnosed adult AML patients of both sexes admitted to Alexandria Main University Hospital and 50 individuals of matching age and sex as a control group, that were clinically and laboratory free from hematological malignancies.

METHODS: All subjects underwent full history taking, thorough clinical examination and lab investigations including CBC, bone marrow aspiration, immunophenotyping for establishing diagnosis of the cases and karyotyping for the cases whenever possible. Bone marrow aspirate samples were obtained. Total RNA was extracted using the QIAamp RNA blood mini kit (QIAGEN, Germany) and cDNA reverse transcription was carried out using the RevertAid first strand cDNA synthesis kit (Thermo Fisher Scientific, USA). Relative quantification of BSG expression levels was performed by TaqMan Universal Master Mix II (Applied Biosystems, USA) using the Rotor-Q 3000

RT-PCR system (QIAGEN, Germany) according to the manufacturer's instructions. A normalizer target (Beta Actin as housekeeping gene for RNA) was included in the assay and the relative gene expression was done using the comparative Ct method. Patients were followed up for a period of one year, from the time of diagnosis till the end of the study, to assess response to treatment and overall survival.

Results

- BSG was significantly over expressed in AML patients relative to the control group. ($p < 0.001$)
- Kaplan-Meier survival analysis showed that the OS tends to be shorter in AML patients with high BSG expression levels than those with low levels of expression, yet with no statistical significance ($p = 0.272$)
- There was no statistically significant difference found between BSG expression level and the incidence of relapse in AML patients. ($p = 1.000$)

Table 1: Comparison between the two studied groups according to BSG gene expression ($2^{-\Delta\Delta C_t}$)

	Cases (n = 50)	Control (n = 50)	U	p
BSG gene expression ($2^{-\Delta\Delta C_t}$)				
Min – Max.	0.21 – 21.56	0.20 – 4.89		
Mean \pm SD.	5.63 \pm 6.61	1.36 \pm 1.08	624.00*	<0.001*
Median (IQR)	2.306 (1.35 – 10.13)	0.877 (0.60 – 1.83)		

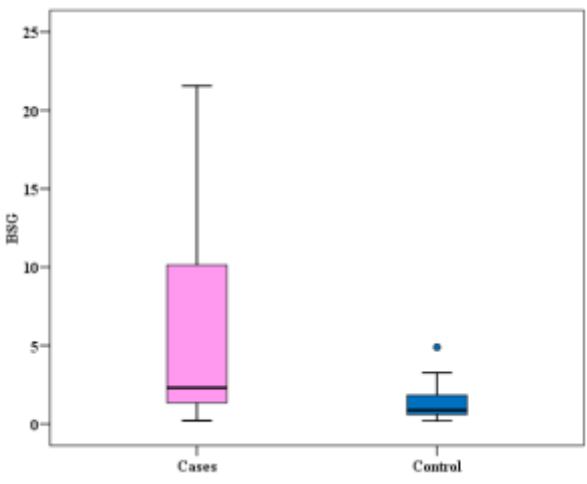


Figure 1: Box plot showing BSG gene expression in both AML patients and control groups.

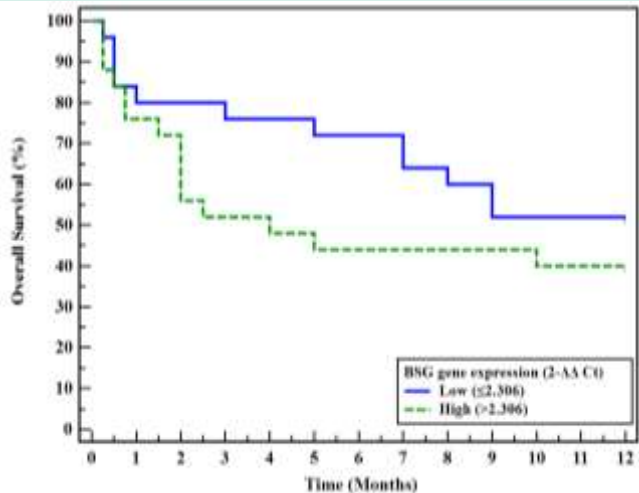


Figure 2: Kaplan-Meier survival curve for Overall Survival with BSG gene expression ($2^{-\Delta\Delta C_t}$)

Table 2: Relation between BSG gene expression ($2^{-\Delta\Delta C_t}$) and the clinical outcome in AML cases (n = 50)

	BSG gene expression				χ^2	P
	Low (≤ 2.306) (n = 25)		High (> 2.306) (n = 25)			
	No.	%	No.	%		
Response						
CR	14	56.0	12	48.0	0.321	0.571
Non CR:	11	44.0	13	52.0		
PR	3	27.3	2	15.4	0.511	^{FE} p=0.630
Failure of treatment	8	72.7	11	84.6		
Relapsed						
No	24	96.0	25	100.0	1.020	^{FE} p=1.000
Relapsed	1	4.0	0	.0		

Table 3: Kaplan-Meier survival curve for Overall Survival with BSG gene expression

	Total No.	No. of Events	Mean	Median	% End of study	Log rank	
						χ^2	P
BSG gene expression ($2^{-\Delta\Delta C_t}$)							
Low (≤ 2.306)	25	12	8.27	–	52.0	1.208	0.272
High (> 2.306)	25	15	6.15	4.0	40.0		

Conclusion

- BSG gene expression was significantly higher in newly diagnosed adult AML patients in comparison with the control group.
- No significant correlation was found between BSG gene expression and the clinical outcome in AML patients.
- BSG gene has no statistically significant association with other prognostic factors of AML.



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