A STUDY OF SERUM MICRORNA-155: A POTENTIAL NOVEL BIOMARKER FOR CARDIOVASCULAR COMPLICATIONS IN EGYPTIAN PATIENTS WITH END-STAGE RENAL DISEASE

Ayman Abdo Barghash , Ahmed Nagdy Abdelaal, Yasmine Salah Naga*, Yasmine Mahmoud Nabil Kamel, Hadeer Mahmoud Awad Hendy

Department of Medical Biochemistry, Department of Internal Medicine*, Faculty of Medicine, Alexandria University

Introduction

End stage renal disease (ESRD) is a chronic kidney disease (CKD) characterized by a decreased glomerular filtration rate (GFR) of less than 15 mL/min. Hypertension and diabetes mellitus are the leading causes of ESRD in Egypt. Cardiovascular disease (CVD) is present in > 50% of patients undergoing dialysis and the relative risk of death due to CVD in haemodialysis (HD) patients is 20 times higher than in the general population. All of the available diagnostic tools for atherosclerotic CVD are less reliable in CKD patients in comparison with those without. Consequently, there is a crucial need for specific CVD markers for all CKD patients. MicroRNAs (MiRs), which are defined as small non-coding RNA fragments with an average length of 19-25 nucleotides, are promising diagnostic tools in this field. The multifunctional miR-155 is involved in multiple physiological processes and its dysregulation is associated with several pathologies including CKD and CVDs.

Aim of the work

The current study aimed to study the level of miR-155 in the peripheral blood of ESRD Egyptian patients as a potential biomarker for adverse CV outcomes in these patients.

Patients and Methods

45 male subjects were included in this study and were divided into 3 groups:
Group I**:** 15 ESRD male patients on maintenance HD and suffering from CV complications.
Group II: 15 ESRD male patients on maintenance HD without any CV complication.
Group III**:** 15 age-matched healthy male volunteers without any history of renal or CV disease as a control group.
Subjects suffering from malignancy, autoimmune disease, or active liver disease were excluded.

All subjects were subjected to full history taking, Body mass index (BMI) measurement, and thorough clinical examination. A peripheral blood sample was withdrawn from every subject in this study and the collected samples were handled and prepared for the determination of haemoglobin concentration, serum calcium, phosphorus, c-reactive protein (CRP), urea, and creatinine (by standard methods) as well as the measurement of miR-155 in the peripheral blood leukocytes by real-time quantitative reverse transcription polymerase chain reaction (RT-qPCR) technique.

Results

Table (1): Comparison between the three studied groups according to peripheral blood miR-155 relative expression and serum CRP.

	Group I (n = 15)	Group II (n = 15)	Control (n = 15)	P
1. miR-155				
Min. – Max.	0.12 – 281.3	0.23 – 114.2	0.12 – 3.86	<0.001**
Median	40.38	4.19	1.09	
IQR	31.72	26.98	0.92	
Significance	p_1=0.035*, p_2<0.001**, p_3=0.018*			
2. CRP (mg/L)				
Min. – Max.	3.20 – 16.90	2.40 – 12.90	1.60 – 5.60	<0.001**
Mean ± SD	10.70 ± 3.96	7.37 ± 3.04	3.52 ± 1.38	
Significance	p1=0.011*,	p2<0.001**,	p3=0.003*	

Min, minimum; Max, maximum; IQR, interquartile range, CRP; c-reactive protein; SD, standard deviation.
P, probability value for comparing between the studied groups.
p_1, p-value for comparing group I and group II.
p_2, p-value for comparing group I and the control group.
p_3, p-value for comparing group II and the control group.
*, Statistically significant at $p \leq 0.05$.
**, Statistically significant at p<0.001.

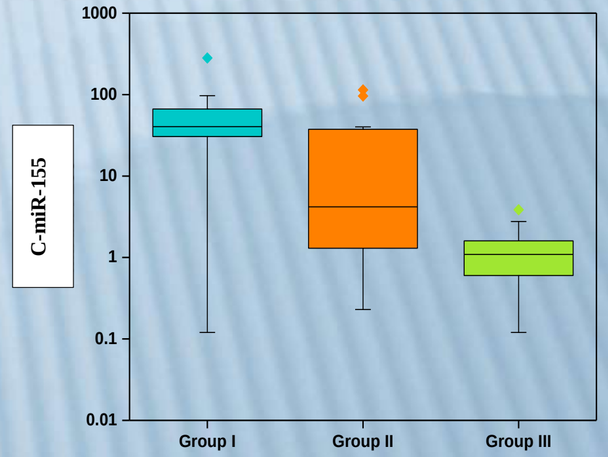

Fig (1): Box plot demonstrating peripheral blood miR-155 relative expression level in the 3 studied groups.

Conclusion

The increased miR-155 level in the peripheral blood of ESRD patients on maintenance HD in this study is a promising non-invasive biomarker for the adverse CV outcomes in these patients.
The increased serum CRP level in this study was associated with adverse CV outcomes in ESRD patients on maintenance HD.