



## SERO-PREVALENCE OF ANTICARDIOLIPIN ANTIBODIES IN SUDANESE PATIENTS WITH DIABETES MELLITUS

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Article Received on 14/08/2017

Article Revised on 04/09/2017

Article Accepted on 24/09/2017

### ABSTRACT

**Background:** Diabetes mellitus (DM) commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels. Anticardiolipin antibodies (ACA) are a subgroup of anti-phospholipid antibodies and the IgG and IgM isotypes are the most important. **Objective:** The purpose of this study was to study Seroprevalance of IgAGM anticardiolipin among Sudanese patients with Diabetes mellitus. **Materials and Methods:** One hundred samples from Sudanese population were included in this study (50 of them were diabetic patients and other 50 as a healthy control). The Seroprevalance of IgAGM anticardiolipin was determined by ELISA method. **Results:** IgAGM anticardiolipin antibodies positive results were found in 13 (13.0%) among the cases and 5(5.0%) among control groups. There is a significant difference in the frequency of anticardiolipin antibodies between cases and controls with P.Value 0.033 and odd ratio (3.162). TWBCs were significantly higher in diabetic patients than control (P=0.000). Platelets didn't show significant difference between case and control (P=0.124). **Conclusion:** The findings concluded that Diabetes mellitus is associated with high frequency of IgAGM anticardiolipin antibodies than the controls.

**KEYWORDS:** Diabetes mellitus, anticardiolipin antibodies, Sudan.

### INTRODUCTION

Diabetes mellitus (DM) commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period, Symptoms of high blood sugar include frequent urination, increased thirst and increased hunger. If left untreated, diabetes can cause many complications, acute complications can include diabetic ketoacidosis, nonketotic hyperosmolar coma, or death. Serious long-term complications include heart disease, stroke, chronic kidney failure, foot ulcers and damage to the eyes. Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.<sup>[1]</sup>

Anticardiolipin (ACL) is the most commonly investigated APL in relation with several diseases as Renal failure, systemic thrombosis, cerebral ischemia, deep vein thrombosis, pulmonary embolism and myocardial infarction. The three most clinically significant are lupus anticoagulant, anticardiolipin antibodies and anti-B2 glycoprotein I antibodies.<sup>[2]</sup> Cardiolipin is a phospholipid found in inner mitochondrial membrane primarily, but it is also a minor constituent of mammalian membranes in general.

Anticardiolipin antibodies (ACL) are most frequently determined antiphospholipid antibodies.<sup>[3]</sup> Within normal population, the frequency of ACL ranges between 1% in normal pregnancies and 5.6%, in blood donors.<sup>[4]</sup> Increased levels of ACL were found in acute infections (up to 32%), in renal failure (4% - 25%), in medication-induced lupus (47%) and also in elder people without any characteristic symptoms (51%).<sup>[5]</sup> Anticardiolipin antibodies (ACA) are a subgroup of anti-phospholipid antibodies and the IgG and IgM isotypes are the most important.<sup>[6]</sup> Different abnormalities in diabetes mellitus (DM) configure a hypercoagulable state.<sup>[7]</sup> Previous data reflect controversy about an increased prevalence of antiphospholipid antibodies in types 1 and 2 diabetic patients and the possible implications are little known.<sup>[8]</sup>

### MATERIALS AND METHODS

This study is a case-control study, conducted in Khartoum, Sudan. One hundred samples from Sudanese population were included in this study (50 of them were diabetic patients and other 50 as a control) all of them were evaluated to determine anticardiolipin antibodies. Blood samples were collected from all subjects in EDTA containers. TWBCs and platelets were performed using Sysmex kx21-N Analyzer. IgA,G,M anticardiolipin was

assayed using in vitro ELISA kit, which is designed for the accurate quantitative measurement of IgAGM class antibodies against Cardiolipin in Human serum and plasma. A 96-well plate was pre-coated with Cardiolipin and  $\beta$ 2-Glycoprotein complex antigens to bind cognate antibodies. Samples were added to the wells and incubated. Following washing, a horseradish peroxidase (HRP) labeled anti-Human IgAGM conjugate was added to the wells, which binds to the immobilized Cardiolipin-specific antibodies. TMB is then catalyzed by the HRP to produce a blue color product that is changed to yellow after adding an acidic stop solution. The density of

yellow coloration is directly proportional to the amount of Cardiolipin igAGM sample captured in plate. The data were analyzed using SPSS21, with reference P-value .05.

This study was approved by ethical committee of ministry of health, and informed consent was obtained from each participant before sample collection.

## RESULTS

Descriptive statistics of quantitative variable (mean $\pm$ SD) showed that the mean age among patients was (54.86 $\pm$ 12.12) (Table1).

**Table (1) shows statistics of age IT among case and control groups.**

	N	Mean $\pm$ Std. Deviation	Minimum- Maximum
Case	50	54.86 $\pm$ 12.12	33.00-80.00
Control	50	42.34 $\pm$ 15.12	18.00-80.00

TWBCs in case and control were (9.838 $\pm$ 4.6680) and 6.210 $\pm$ 1.2369, respectively. TWBCs were significantly higher in diabetic patients than control (P=0.000).

Platelets didn't show significant difference between case and control (P=0.124). (Table2).

**Table (2) shows statistics and mean differences of TWBCs and PLT among case and control groups.**

		N	Mean $\pm$ Std. Deviation	Minimum- Maximum	P value
TWBCs	Case	50	9.838 $\pm$ 4.6680	3.3-23.2	0.000
	Control	50	6.210 $\pm$ 1.2369	3.5-8.9	
PLT	Case	50	294.74 $\pm$ 153.508	66-886	0.124
	Control	50	258.76 $\pm$ 57.401	160-402	

**Table (3) shows the comparison of the frequency of IgAGM anticardiolipin antibodies among cases and controls.**

		IgAGM		Total	P value	Odd ratio
		Positive	Negative			
Study groups	Case	13( 13.0%)	37(37.0 %)	50(50.0 %)	0.033	3.162
	Control	5( 5.0%)	45(45.0 %)	50(50.0 %)		
Total		18(18.0%)	82(82.0 %)	100(100.0 %)		

IgAGM anticardiolipin antibodies was detected in (13.0) of cases and in 5(5.0%) of the control group. There is a significant difference in the frequency of anticardiolipin antibodies between cases and controls with (P.Value 0.033), (odd ratio 3.162). (Table3).

## DISCUSSION

Diabetes mellitus is associated with oxidative and carbonyl stress, micro-inflammation and other mechanisms, which may contribute to diabetic complications, accelerated atherosclerosis, higher rate of infectious complications and to the increased morbidity and mortality of diabetic patients. The aim of the present study was to assess serum levels of anticardiolipin antibodies in patients with diabetes mellitus.

IgAGM anticardiolipin antibodies were detected in (13.0) of cases and in 5(5.0%) of the control group. Diabetes mellitus is associated with high frequency of IgAGM anticardiolipin antibodies than the controls. A study done by Galtier-Dereure F et al<sup>[9]</sup> agrees with our results in that there is a significant difference in anticardiolipin antibodies between diabetic and healthy

participants. Another study by Maha Shahin et al<sup>[10]</sup> gone in the same line with our findings, they found that among the 34 patients, 6 (17.7%) of diabetics were positive for anticardiolipin antibodies.

Our study has several limitations, such as the low number of study subjects, and that we were not able to analyze other antiphospholipid antibodies (lupus anticoagulant and anti-beta-2 glycoprotein I antibodies).

## CONCLUSION

The findings concluded that diabetes mellitus is associated with high frequency of IgAGM anticardiolipin antibodies than the controls.

## ACKNOWLEDGEMENTS

Special thanks to the Staff of Hematology Department, Faculty of Medical Laboratory sciences, Alneelain University.

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