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Relationship between ABO Blood Groups and Lone Atrial Fibrillation in Iraqi Patients

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ABSTRACT

It is well-known that Atrial Fibrillation (AF) is the commonest type of cardiac arrhythmias. The risk factors for AF have been investigated for years however, lone AF is idiopathic which means that there is no definite cause or risk factors for it. It usually affects young age groups; and because all the risk factors have been overlooked, the link between ABO system and cardiac arrhythmias in general has not been investigated yet. Based on that, we decided to set this study to figure out the link between ABO blood group and lone AF. This case series study was conducted over a period of one year (September 2016 to September 2017). A consecutive non random sampling technique was adopted by pooling all the patients with AF attended the emergency department in two main teaching hospitals (Al-Yarmouk Teaching hospital and Baghdad Medical City Teaching Hospital) during the total year data collection period. A total of 100 patient (52 females and 48 males) was collected, all were diagnosed by the cardiologist to have lone AF, their ages ranged between (20-60) years. The mean age of the study group was (40.36 ± 10.90) years, means of Blood parameters were as follow: for blood group A; glucose was (5.20 ± 0.98) mmol/L, creatinine (1.15 ± 0.28) md/dl, Sodium (146.02 ± 4.47) meq/L and potassium (4.45 ± 0.41) meq /L, P value < 0.1 . For blood group B: (4.73 ± 0.82) mmol/L, (0.85 ± 0.12) md/dl, (141.33 ± 6.03) meq/L, (4.36 ± 0.52) meq/L, P < 0.2 . Blood group AB: (5.14 ± 0.96) mmol/L, (0.97 ± 0.29) mg/dl, (145.57 ± 5.34) meq/L, (4.17 ± 0.51) meq/L and P < 0.1 . Finally blood group O results: (5.2 ± 1.07) mmol/L, (0.99 ± 0.29) mg/dl, (142.52 ± 6.28) meq/L, (3.88 ± 0.70) meq/L, P < 0.1 . No statistical significance was found in any of these groups. People of blood group A are at a relatively higher risk to develop lone AF than O blood group and other non O blood groups.

Key words: Lone Atrial Fibrillation, ABO blood groups, cardiac arrhythmias.

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INTRODUCTION

The term 'solitary' or 'lone' AF was presented for the first time in 1954 by Evans and Swann to portray AF patients for whom no obvious cardiac or coronary disease could be found throughout subsequent investigations ⁽¹⁾, which means there is no clinical history or echocardiographic evidence of cardiovascular condition or intense trigger or identifiable comorbidities. In general, AF is the commonest cardiac arrhythmia that is associated with poor prognosis and high rate of morbidity and mortality due to AF related complications such as strokes and heart attacks ⁽²⁾. It was found that the annual incidence of AF has been increased dramatically in the last decade from 5.9 % to 11.0 % in males and from 3.0% to 7.2 % in females ⁽³⁾. Many studies have suggested that lone AF usually affects young age people, generally the patients are always younger than 55 years, the progresses in the knowledge of AF mechanisms and aetiologies state that lone AF has no apparent mechanistic or clinical bases and therefore should be distinguished from idiopathic AF when the patients are older than 60 years ⁽⁴⁾. However, the causes and risk factors of AF are many and are apprehensively being overlooked and these could be cardiac causes, for instance, hypertension, valvular heart disease particularly mitral valve, ischemic cardiac problems, or non-cardiac such as thyroid disease, obesity, alcohol, age and others ⁽⁵⁾, nevertheless, the link between ABO blood group and cardiac arrhythmias in general and lone AF in particular has not previously been established nor been reported in the literatures. This study was set to figure out the possible link between ABO blood group and lone AF. Based on a study conducted in Iraq in 2010 regarding ABO blood group distribution in Iraqi population (total population of 53,234 included in that study); found that blood group O is the commonest blood group, followed by A, B, and AB ⁽⁶⁾.

MATERIALS AND METHOD

This is a case series study that was conducted over a period of one year (September 2016 to September 2017). A consecutive non random sampling technique was adopted by pooling all the patients with AF that attended the emergency department in two main teaching hospitals (Al-Yarmouk Teaching hospital and Baghdad Medical City Teaching Hospital) during the total year data collection period.

A total of 100 patients (52 females and 48 males) was collected, all were diagnosed by the cardiologist to have lone AF, their ages ranged between (20-60) years.

All patients were seen by the cardiologists and AF was confirmed by electrocardiograph (ECG). Detailed clinical history and thorough physical examination was done to the patients, besides, echocardiographic (ECHO) assessment was performed to exclude structural heart abnormality.

Patients were excluded if they presented with vomiting, or have chronic hypertension, having diabetes mellitus, renal failure, thyroid disease, concomitant valvular disease.

Baseline clinical data of the involved patients include: age, systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR); all are expressed as mean \pm Standard deviation. A verbal consent was taken from the patients after explaining the purpose of the study and they were given the choice to participate or not.

Venous blood samples were taken from the patients. ABO blood grouping test was performed by classic slide method, through testing the unknown red cells against anti-A, anti-B and anti-AB using Lab Kit. However, Rh factor was not included in the study statistics or data. Biochemical parameters (Random blood glucose, Serum Creatinine, Serum Sodium and Potassium) were measured by obtaining venous blood sample from ante-cubital vein and their level in the blood was estimated by using the automated analyzer.

The statistical analyses were done by using SPSS software. The results are expressed by mean and standard deviation, t- student's test was used to measure the difference between means. The level of significance was determined using *P* value cutoff point of <0.05 .

RESULTS AND DISCUSSION

Table (1) demonstrates the base line clinical vital signs of the patients, it can be seen that only heart rate was on the higher side (tachycardia).

Table-1- Baseline clinical data of atrial fibrillation patients (n=100)

Parameter	Mean \pm SD
Age (years)	40.36 \pm 10.90
HR (beat/Min)	131.33 \pm 19.23
SBP (mmHg)	120.0 \pm 15.93
DBP (mmHg)	71.25 \pm 14.88

The results also show that the highest number of patients who presented with lone AF were of blood group A (58) patients whereas the lowest number were blood group B (10).

On the other hand, the biochemical analysis of the mentioned blood parameters were as follow: blood groups A, AB and O were relatively close to each other with mean \pm SD of (5.20 \pm 0.98), (5.14 \pm 0.96) and (5.2 \pm 1.07) respectively; while the lowest value seen was for patients with blood group B (4.73 \pm 0.82). The figures for serum creatinine shows that patients with blood group A have the highest values (1.15 \pm 0.28) whereas the value for the blood group O, was the second highest (0.99 \pm 0.29), blood group B came third (0.97 \pm 0.29) and blood group B (0.85 \pm 0.12) again showed the least levels, these results were illustrated in table-2.

Table-2- the studied biochemical parameter in sera of atrial fibrillation patients

Blood group	No.	Variables (mean \pm SD)			
		Blood glucose (mmol/L)	Serum Creatining (mg/dl)	S. Sodium (meq/L)	S. Potassium (meq/L)
A	58	5.20 \pm 0.98	1.15 \pm 0.28	146.02 \pm 4.47	4.45 \pm 0.41
B	10	4.73 \pm 0.82	0.85 \pm 0.12	141.33 \pm 6.03	4.36 \pm 0.52
AB	17	5.14 \pm 0.96	0.97 \pm 0.29	145.57 \pm 5.34	4.17 \pm 0.51
O	15	5.2 \pm 1.07	0.99 \pm 0.29	142.52 \pm 6.28	3.88 \pm 0.70

The upper level of serum sodium was noticed in blood group A (146.02 \pm 4.47), while low levels were seen in blood group B (141.33 \pm 6.03); levels for blood group AB and O come in between Table -2-.

The Mean \pm SD for serum potassium ranges between (4.45 \pm 0.41) and (4.17 \pm 0.51) for the three groups (A, B and AB); group A being the highest and AB the lowest, only blood group O expresses a totally different number (3.88 \pm 0.70). Interestingly, blood group A values were the uppermost among all other groups in all parameters, while blood group B was the lowest in three of them (blood glucose, serum creatinine and serum sodium). Blood group O demonstrated a significantly low levels in serum potassium.

The significance of results expressed in *P* value and listed in table -3-.

Table -3- *P* value of the blood groups for measured parameter

Blood group	Group A	Group B	Group AB	Group O
Group A		0.1	0.03	0.1
Group B	0.1		0.1	0.2
Group AB	0.03	0.1		0.1
Group O	0.1	0.2	0.1	

Many studies expressed a relation between blood groups and risk of venous thromboembolism and acute myocardial infarction in blood group O people ⁽⁷⁾. The current study shows that a similar relationship exists for lone AF arrhythmia, which means that the risk for non-O group patients is probably more than that for group O, however, the risk has not been statistically estimated but, rather, was roughly suggested from the results.

A marked increase in lone AF was seen in patients with blood group A, taking in consideration that all other blood biochemical parameters were within normal range and there was no significant evidence to illustrate a *P* value of less than 0.05.

Based on the results, the pressing question raises: “do antigens A or B have a role in the etiology of lone AF”? If so how and by which mechanism. However, no study has convincingly explained such a role, or whether A or B antigens could modify the risk of lone AF.

Although blood group O is the commonest type in Iraq ⁽⁶⁾ the results showed that blood group A tend to develop lone AF more than other types, in other word, as long as the number of blood group O is the dominant among population then it is expected that they are the ones who may develop AF more than other types but it was not, hence, it is important to think again why blood group A?

Serums electrolytes (Na⁺ and K⁺) were included as biochemical parameters to investigate if whether there is a correlation between their levels and lone AF. It is known that heart muscles depend on a certain level of sodium in the serum in order to work properly ⁽⁸⁾, therefore, it is supposed that when the circulating level of sodium changed, AV node can't act effectively and this might affect the function of AV node causing block or excitation of accessory pathway, which may cause cardiac arrhythmia including AF. The results of the current study did not show such significant changes. This would support the hypothesis that lone AF has nothing to do with blood biochemical parameters, it is supposed to happen without underlying cause, hence, blood groups are the only factor that is left uninvestigated and this what was done in this study as a start for more sophisticated researches.

Another hypothetical explanation is that immune system may play a role in terms of antigens and antibodies of the blood groups itself. Many studies support the role of the immune system (inflammatory process) in the development of hypertension whether systolic or diastolic ^(9, 10). This what rises the red flag to think about such relationship and explanation between blood group and lone AF.

Generally speaking, non-O blood groups have the higher tendency to develop lone AF, moreover, the biochemical parameters were higher despite being non-significant in comparison to that of O blood group.

CONCLUSION

In the light of the obtained results, it can be said that non O blood groups tend to develop lone AF, in particular blood group A. However, sample size must be taken into consideration. The present study adds a weigh to the argument that disease association studies with ABO blood group must henceforth be included, this may alert the physicians on the presence or the probability of developing AF later in the that specific blood group individuals'.

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