

Short communication

Association of ABO blood group in Iraqis with hypercholesterolaemia, hypertension and diabetes mellitus

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ترابط زمرة الدم ABO مع فرط كوليسترول الدم وارتفاع ضغط الدم والسكري لدى العراقيين ولاء إسماعيل جاسم

الخلاصة: ثمة بيّنات قوية تدلُّ على الترابط بين زمرة (فصيلة) الدم ABO وبين بعض الأمراض. وقد أجرت الباحثة هذه الدراسة في بغداد، العراق، لتحري إمكانية ترافق السكري وفرط كوليسترول الدم وارتفاع ضغط الدم مع نمط الزمرة الدموية ABO. وقد استمدت الباحثة المعطيات من 920 مريضاً بالسكري وفرط كوليسترول الدم وارتفاع ضغط الدم ممن يراجعون المستشفيات والعيادات والمختبرات في بغداد، إلى جانب 200 شخصاً من الشواهد الأصحاء. واتضح للباحثة، بتحليل المعطيات على أساس الزمرة الدموية، أن مستويات الكوليسترول الكلي والسكر والضغط الانقباضي والانقباضي والانساطي جميعها هي أعلى بمقدار يُعتدُّ به لدى الذكور والإناث المرضى من ذوي الزمرة الدموية O مما هو عليه لدى ذوي بقية الزمر الدموية، مع نقص الميل لدى ذوي الزمرة الدموية A ثم B ثم AB. وقد لوحظت ميول مشابهة في ذوي الزمر الدموية لدى الشواهد الأصحاء، رغم أن الاختلافات كانت أقل وضوحاً.

ABSTRACT There is strong evidence to suggest that there is an association between ABO blood group and certain diseases. This study in Baghdad, Iraq investigated the possible association of diabetes mellitus, hypercholesterolaemia and hypertension with ABO type. The data were derived from 920 patients with diabetes mellitus, hypertension and hypercholesterolaemia attending hospitals, clinics and laboratories in Baghdad, and 200 healthy control individuals. Analysing the data by blood group showed that the levels of total cholesterol, glucose and systolic/diastolic blood pressure were all significantly higher in male and female patients in blood group O than other groups, with a decreasing trend from group A to B then AB. Similar trends by blood group were seen for the healthy controls although the differences were less marked.

Association entre les groupes sanguins ABO et l'hypercholestérolémie, l'hypertension et le diabète chez les Iraquiens

RÉSUMÉ De solides données suggèrent qu'il existe une association entre les groupes sanguins ABO et certaines maladies. La présente étude menée à Bagdad (Iraq) a examiné l'association possible entre le diabète, l'hypercholestérolémie, l'hypertension et les groupes sanguins ABO. Les données ont été recueillies à partir des dossiers de 920 patients atteints de diabète, d'hypertension et d'hypercholestérolémie en consultation dans des hôpitaux, des cliniques et des laboratoires d'analyses de Bagdad, et de 200 témoins en bonne santé. L'analyse des données par groupe sanguin a révélé que les taux de cholestérol total et de glycémie et la mesure de la tension artérielle systolique/diastolique étaient tous nettement supérieurs chez les patients des deux sexes du groupe O, avec une tendance décroissante chez le groupe A, puis B, puis AB. Des tendances similaires par groupe sanguin ont été observées chez les témoins en bonne santé, mais les différences étaient moins marquées.

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Introduction

There is strong evidence in the literature to suggest there is an association between ABO blood group and certain diseases [1,2]. The AB antigen appears to have evolutionary significance because the frequencies of different ABO blood group types vary across different populations, suggesting that a particular blood type confers a selection advantage (e.g. resistance against an infectious disease) [3,4]. Numerous associations have been reported between particular ABO phenotypes and an increased susceptibility to disease [5]. For example, the ABO phenotype has been linked with stomach ulcers, which are more common in group O individuals and gastric cancer, which is more common in group A individuals [6–8].

A clear correlation has been established between ABO phenotype and the level of 2 proteins involved in blood clotting, von Willebrand factor and factor VIII [9]. However, the literature shows conflicting evidence regarding the role of blood group in diabetes mellitus [10,11]. The aim of this study therefore was to investigate the possible association of diabetes mellitus, hypercholesterolaemia and hypertension with ABO blood group.

Methods

The data were derived from 920 patients (488 males and 432 females) with diabetes mellitus, hypertension and hypercholesterolaemia, attending different hospitals, clinics and laboratories in Baghdad, Iraq. Their ages ranged from 25–55 years. Another group of 200 individuals (117 males and 83 females) were included as a healthy control group.

Blood samples were taken from all patients and controls after an overnight fast and were examined for ABO blood group by slide agglutination and for plasma glucose and total cholesterol

by enzymatic colorimetric methods. Their diastolic and systolic blood pressures were measured using a sphygmomanometer and stethoscope. Blood pressure measurements were done by physicians with all patients in a resting state.

The data were described with frequencies, mean and standard deviation (SD). Differences between groups were analysed using analysis of variance.

Results

Tables 1 shows that there was no significant difference in mean age between the patient and control groups or between the patients in different blood groups. Table 2 confirms that for males in all blood groups the mean levels of total cholesterol, glucose and systolic/diastolic blood pressure were significantly higher in patients with diabetes mellitus, hypercholesterolaemia and hypertension than in the healthy control group ($P < 0.01$). The same pattern was seen for females (Table 3). There was no significant difference between males and females in mean levels of total cholesterol, glucose or systolic/diastolic blood pressure in either patient or control groups ($P > 0.05$).

Analysing the data by blood group showed that the levels of all parameters were significantly higher in patients in blood group O than other groups, with a decreasing trend from group A to B to AB ($P < 0.01$). For example, in male

patients, the mean total cholesterol was 330 (SD 10) mg/dL in patients in group O, 320 (SD 11) mg/dL in group A, 300 (SD 10) mg/dL in group B and 255 (SD 7) mg/dL in group AB (Table 2). Mean glucose levels were 240 (SD 11) mg/dL in group O, 229 (SD 10) mg/dL in group A, 204 (SD 10) mg/dL in group B and 179 (SD 10) mg/dL in group AB. The same trend was seen in the mean levels of diastolic blood pressure [decreasing from 164 (SD 12) mmHg in group O to 140 (SD 11) mmHg in group AB] and systolic blood pressure [decreasing from 103 (SD 12) mmHg in group O to 91 (SD 11) mmHg in group AB]. Similar differences by blood group were seen for the male healthy controls (Table 2).

The same patterns of differences by blood group were seen for total cholesterol, glucose and systolic/diastolic blood pressure in female patients and healthy controls (Table 3).

Discussion

The data showed that people with blood group O had higher levels of total cholesterol, glucose and diastolic/systolic blood pressure, followed by group A, B then AB. The differences were more marked in patients with diabetes mellitus, hypercholesterolaemia and hypertension than in the healthy control group. Individuals with group AB who have both A and B antigens were more healthy than other groups.

Table 1 Mean age of the study patients with diabetes mellitus, hypercholesterolaemia and hypertension and healthy controls by ABO blood group

Blood group	Patients		Controls	
	No.	Mean (SD) age (years)	No.	Mean (SD) age (years)
O	401	38.2 (13)	90	37.0 (12)
A	331	36.8 (17)	70	38.0 (13)
B	150	37.2 (14)	30	38.0 (12)
AB	38	37.9 (12)	10	37.4 (11)

SD = standard deviation.

Table 2 Mean levels of total cholesterol, glucose and systolic/diastolic blood pressure in male patients and healthy controls by ABO blood group

Blood group	No.	Total cholesterol (mg/dL)	Glucose (mg/dL)	Blood pressure (mmHg)	
		Mean (SD)	Mean (SD)	Systolic Mean (SD)	Diastolic Mean (SD)
Patients					
Group O	211	330 (10)	240 (11)	164 (12)	103 (12)
Group A	171	320 (11)	229 (10)	153 (11)	101 (11)
Group B	85	300 (10)	204 (10)	148 (12)	95 (11)
Group AB	21	255 (7)	179 (10)	140 (11)	91 (11)
Controls					
Group O	55	188 (4)	106 (2)	123 (20)	83 (14)
Group A	40	185 (3)	100 (1)	123 (20)	82 (14)
Group B	17	172 (2)	96 (2)	121 (40)	82 (12)
Group AB	5	160 (3)	95 (1)	120 (30)	80 (11)

SD = standard deviation.

Table 3 Mean levels of total cholesterol, glucose and systolic/diastolic blood pressure in female patients and healthy controls by ABO blood group

Blood group	No.	Total cholesterol (mg/dL)	Glucose (mg/dL)	Blood pressure (mmHg)	
		Mean (SD)	Mean (SD)	Systolic Mean (SD)	Diastolic Mean (SD)
Patients					
Group O	190	329 (10)	238 (10)	163 (12)	102 (11)
Group A	160	319 (10)	225 (8)	152 (12)	101 (11)
Group B	65	300 (10)	200 (6)	148 (13)	94 (11)
Group AB	17	251 (10)	177 (4)	137 (11)	90 (11)
Controls					
Group O	35	186 (4)	100 (2)	122 (30)	83 (13)
Group A	30	180 (2)	98 (2)	121 (20)	82 (12)
Group B	13	170 (1)	95 (1)	120 (10)	81 (11)
Group AB	5	158 (2)	90 (1)	118 (20)	80 (11)

SD = standard deviation.

The susceptibility to a number of diseases has been linked with ABO phenotype [4], but such correlations remain controversial [5,6]. Individuals with blood group O have about 25% less factor VIII and von Willebrand factor in their plasma [9]. It is well established that low levels of these factors, which are proteins involved in blood clotting, are a cause of excess bleeding and therefore may also increase the risk of both arterial (ischaemic heart disease) and venous (thromboembolic disease) problems [12,13]. Both also have a relationship with hypercholesterolaemia, which in turn has a relationship with diabetes mellitus and hypertension [14–16]. This may explain why blood group O individuals are more affected by these conditions than other blood groups.

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International conference on healthy lifestyles and noncommunicable diseases in the Arab World and Middle East, 10-12 September 2012

The Ministry of Health of Saudi Arabia, in collaboration with the WHO Regional Office for the Eastern Mediterranean, is organizing an international conference focusing on the implementation of the UN Political Declaration on Noncommunicable Diseases in the Region. Representatives from ministries of health, foreign affairs and planning, the League of Arab States, United Nations funding agencies, programmes and agencies, international financial institutions, development banks and other key international organizations are expected to attend.

The aims of the conference are to:

- review and adopt a set of monitoring indicators for noncommunicable disease surveillance systems;
- share strategies, tools and cost-effective interventions that countries in the Region may have implemented in relation to surveillance, prevention and improved health care for noncommunicable diseases;
- articulate a road map for capacity-building for the Region based on a review of current regional and national capacities;
- discuss and adopt a research agenda concerning noncommunicable disease priority areas in the Region.

Further information is available at: <http://www.emro.who.int/noncommunicable-diseases/ncd-infocus/riyadh-conference-september-2012.html>