Association Of ABO Blood Groups with Mullerian Anomalies Among Females Attending Tertiary Infertility Center, In Babylon, Middle of Iraq.

Introduction

Mullerian anomalies refer to a range of congenital malformations that affect the development of the female reproductive tract, including the uterus (1). These anomalies occur in up to 7% of the general population with a prevalence of as high as 25% in women with a history of both infertility and miscarriage (2).

The ABO blood group system is a classification system that categorizes blood based on the presence or absence of certain antigens on the surface of red blood cells. The ABO locus is located on chromosome 9 (9q34). Numerous studies have shown that different ABO blood groups may affect different cancerous and non-cancerous processes in the body (3).

Among several studies about the association of ABO blood groups with diseases, a recent 41-year retrospective study included 482,914 individuals; had demonstrated a relationship between ABO and Rhesus D groups with phenome-wide disease incidence (4). There is some research on the relationship between the ABO blood group and Mullerian anomalies, particularly in relation to the development of uterine anomalies. One study published in the journal Fertility and Sterility in 2009 found that women with type O blood were more likely to have uterine anomalies than women with other blood types (5). Another study published in the Journal of Obstetrics and Gynecology Research in 2012 found a higher incidence of Mullerian anomalies in women with blood group B compared to women with other blood types (6).

To the best of my knowledge, there is no meta-analysis that has been conducted to evaluate the association between ABO blood groups and uterine anomalies. However, there have been several systematic reviews and meta-analyses that have investigated the association between ABO blood groups and other health outcomes, such as cardiovascular disease and cancer (4, 7).

For example, a meta-analysis of 52 studies found that individuals with blood type A had a higher risk of cardiovascular disease compared to individuals with other blood types (8). Another meta-analysis of 44 studies found that individuals with blood type O had a lower risk of developing cancer compared to individuals with other blood types (9).

While these meta-analyses are not specific to uterine anomalies, they suggest that there may be important associations between ABO blood groups and various health outcomes. It is possible that future meta-analyses or large-scale studies may be able to shed more light on the association between ABO blood groups and uterine anomalies.

Despite the uncertainties surrounding the association between ABO blood groups and uterine anomalies, it is clear that uterine anomalies are a common reproductive health concern. Given the high prevalence of uterine anomalies and their potential impact on reproductive health, further research on this topic is needed to better understand the risk factors and potential interventions to prevent or manage these conditions.
On these bases, this study was attempted to highlight the association of ABO blood groups with mullerian anomalies among females attending our tertiary infertility center, in Babylon, middle of Iraq.

Materials and methods

The survey is a continuation of our previous projects that study infertility and its interventions in Iraq (10-12). This descriptive, cross-sectional study was carried out retrospectively, at the tertiary Teba infertility center, in Babylon, middle of Iraq. The series consisted of 5837 infertile women with a mean age of 36.7 ± 6.9 years who were attending our center during the period between 2012 and 2022. All were submitted to a thorough medical, gynecological, and obstetrical history, and 3D sonography were also performed for all females to reveal uterine contours, and detect any Mullerian system anomalies. Uterine anomalies when diagnosed were classified according to the "ESHRE/ESGE consensus on the classification of female genital tract congenital anomalies" (13). Blood grouping and Rh testing were performed and compared among the types of uterine anomalies.

Obstetrical, gynecological, and fertility history was meticulously recorded. Clinical examination, including 2D/3D transvaginal ultrasound, full blood count, coagulation tests, electrolytes, and beta hCG serum levels were also registered. Treatment followed the NICE criteria (14).

The following parameters were extracted from patients' files and used for statistical evaluation: patients' age, gravity, parity, types of infertility (primary or secondary), and uterine morphology. Uterus morphology (shape, position, and dimension), endometrial and adnexal characteristics were examined by an expert in sonography. The collected data was archived in Excel files and then transferred and processed statistically by SPSS software IBM-USA, compatible with Windows. Frequencies and percentages were used -to present categorical parameters. The format for continuous parameters was (Means± SD). When the variable wasn't normally distributed, the Mann-Whitney test was employed to associate the two groups. The relationship between categorical variables was determined using Fisher's Exact and Chi-Square tests. A p-value of 5% or lower was regarded as significant.

Due to the study's retrospective nature, it was not necessary to include patients' consignments in this study from an ethical perspective. The study was ratified by the institutional ethical review committee as well as Faculty of Pharmacy/University of Babylon

Results

Mean age of patients attending the center was (35.81 ± 7.06) years with older patient was 69 years and younger patient was 14 years. In 2609 (44.7%) of all included infertile females had uterine anomalies, of them 1394 (53.4%) revealed acquired anomalies and 1215 (46.6%) revealed a congenital type.

The commonest acquired uterine anomaly among the enrolled infertile females was uterine polyps, which was observed among 1131 (81.5%), while the commonest congenital anomaly was the septate uterus, which was observed among 1090 (89.8%).

The most predominant blood group was O⁺, which was detected in 2080 (35.6%). The next predominant blood group was B⁺ and A⁺, which were detected in (25.8% and 25.3%), respectively, Table 1.

Table 1: The basic demographic features of the studied infertile females (N=5837)

Variables		N (%)
Ages/year	Mean±SD	35.81 ± 7.06
	< 20	25 (0.4%)
	20-30	1136 (19.5%)
	30-40	2853 (48.9%)
	40-50	1707 (29.2%)
	≥ 50	2853 (48.9%)
Uterine anomalies	Present	2609 (44.7%)
	Absent	3228 (55.3%)
Acquired	Total	1394 (53.4%)
	Uterine polyps	1131 (81.5%)
	Intrauterine adhesions	118 (8.5%)
	Uterine fibroids	118 (8.0%)
	NICH	111 (1.9%)
	Foreign body	27 (0.1%)
	Unknown	6 (0.4%)
Congenital	Total	1215 (46.6%)
	Uni-cornuate uterus	27 (2.2%)
	Bi-cornuate uterus	14 (1.2%)
	T-shape	82 (6.8%)
	Septum	1090 (89.8%)
Blood groups	O+	2080 (35.6%)
	O-	0
	B+	1506 (25.8%)
	B-	127 (2.2%)
	A+	1477 (25.3%)
	A-	155 (2.7%)
	AB+	450 (7.7%)

	AB-	42 (0.7%)

Discussion

We found blood group B to be positively associated with 'ectopic pregnancy', 'excessive vomiting in pregnancy, and 'abnormality of organs and soft tissues of pelvis complicating pregnancy' indicating that blood group B mothers may be more likely to experience pregnancy complications. Further, we found positive associations of blood group A with both 'mucous polyp of cervix', and blood group AB with 'cervicitis and endocervicitis'. Taken together these findings may indicate that the ABO blood groups are associated with diseases of the female reproductive system. However, the study design does not allow for any causal interpretation (15).

The blood groups may reflect their corresponding genetic markers; thus, our findings may indicate an association between disease and the ABO locus on chromosome 9 and the RH locus on chromosome 1, respectively. Alternatively, the associations may indicate that the blood groups are involved in disease mechanisms at the molecular level mediated either through the blood group antigens or by the blood group reactive antibodies. However, our findings have a compromised causal interpretation given the retrospective inclusion of individuals (and person-time) after an in-hospital blood group test (15).

Thus author is now convinced that, whether the statistical associations are valid or not, there is increasing evidence that some blood groups may play a biological role (7).

Many of these early statistical associations now have some associated scientific findings suggesting a rationale for the statistical associations. Some authors have suggested that the ABO blood group antigens should be termed ABH histo-blood group antigens to emphasize that they are primarily tissue antigens.45 (7)

No longer can we accept the notion that a molecule expressed on the surface of RBCs is unlikely to have important biologic activity, and research in this area must therefore be encouraged.105 (7)

Please note that these studies may have limitations and further research may be required to establish the relationship between ABO blood group and Mullerian anomalies.

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