British Journal of Medicine & Medical Research
3(4): 2017-2021, 2013

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Association between ABO Blood Type and Cervical Dysplasia/Carcinoma in Jamaican Women

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Authors' contributions

This work was carried out in collaboration between all authors. All the authors participated in the conception and design, analysis and interpretation of data, drafting the article and final approval of the version to be published.

Short Communication

Received 28th March 2013
Accepted 13th June 2013
Published 28th June 2013

ABSTRACT

Cervical cancer is one of the leading causes of death from cancer among women worldwide and is the most common female cancer in developing countries. In Jamaica, at 27.5 per 100, 000 it is second only to breast cancer as a cause of cancer death in women. Several studies have suggested an association between blood type A and cervical dysplasia/cancer. The aim of this study was to determine whether presence of cervical dysplasia/cancer is associated with blood type A in Jamaican women. Blood was collected from 319 women, 234 cases (abnormal Pap smears) and 85 controls (normal Pap smears). Blood type was determined by the determination of isoagglutinins (anti-A and anti-B). The frequency of types A, B, AB and O in the controls and cases was similar to the Jamaican population. There was a slightly association between blood group O and cervical dysplasia/ carcinoma in Jamaican women when compared with others blood groups. Cervical dysplasia/ carcinoma was strongly associated to the number of sexual partners, number of biological fathers, number of children and the use of hormonal

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contraceptive.

Keywords: Cervical cancer; cervical dysplasia; Jamaica; ABO blood types.

1. INTRODUCTION

Cervical cancer is common in Jamaica at 27.5 per 100,000 and is the second cause of death from cancer in Jamaican women [1]. Several studies have shown an association between ABO blood types and certain cancers [2-4]. They found that among the gynaecological tumors, group A blood type was associated with ovarian, endometrial and cervical cancers and with poor prognosis for ovarian and endometrial cancers. ABO type antigens are expressed at low levels in normal cervical tissue but are expressed at higher frequency in cervical carcinoma tissues [5]. Cui and collaborators reported the presence of an A-like antigen (MRG-1) in cervical tissues and suggested that persons lacking anti-A antibodies are more susceptible to tumours since they do not have antibodies, which can destroy tumour cells. This study was carried out to determine whether there is association between ABO blood types and cervical dysplasia/carcinoma in Jamaican women.

2. MATERIALS AND METHODS

Women who participated in this case-control study were recruited from the Gynaecology and Colposcopy clinics, at the University Hospital of the West Indies in 2003. All the women gave written, informed consent and donated 10 ml of blood for the study. They were interviewed privately on their lifestyle practices and use of hormonal contraceptive. Blood specimens were collected from 85 controls (women with normal pap smears) and 53 cases of women with cervical dysplasia and cervical carcinoma, and cases of women with only dysplasia that were CIN I=71, CIN II=59 and CIN III=51 (women with abnormal pap smears) and stored at –20ºC before they were investigated. The mean age ± SD of women with cervical dysplasia was 39.1 ±SD 11.8 years and the mean age of the control women was 38.1 ± SD 10 years. All women with abnormal pap smears (100%) were human papillomavirus positive by serological and histological analysis. We will describe the number of cases of the women who had multiple sexual partners, several numbers of pregnancies and use of hormonal contraceptive. The data generated were analyzed using X^2Test using the SPSS version 18.

3. RESULTS AND DISCUSSION

In this study the frequency of the blood groups among cases and controls was similar to that calculated from the National Health Public Laboratory, indicating that the sample was representative of the population, which is predominantly of African origin. These frequencies were similar to those described for American blacks [6]. It was of interest to note that the frequency of type A blood group was approximately half of that described in European origin population [7].

The blood groups O and A were the most frequently occurring ABO blood groups in cases and controls (54.2%, 26.1%; X^2 = 0.019, p=0.99). There were no significant differences in the distribution of the blood groups in cervical dysplasia and healthy control subjects. The analysis of the blood groups in different stages of cervical dysplasia and healthy controls showed no statistically significant association (X^2(df)=6.5; p=0.89).

Specific red blood cell antigens have been associated with infection, immune response and disease condition, especially cancers. D'Adamo reported that cancers in general tend to be associated with blood group A and slightly less strongly with blood group B. In contrast, individuals with blood group O appear to be more resistant to the development of cancers [8].

Marinaccio et al. [4] found that among the gynaecological tumours ovarian, endometrial and cervical cancer was associated with blood group A and with poor prognosis for ovarian and endometrial cancer . The ABO blood group antigens are expressed at low levels in normal cervical carcinoma tissues [5]. They reported the presence of an A-like antigen (MRG-1) in cervical tissues and suggested that persons with blood group A and AB, thereby lacking anti-A antibodies are more susceptible to tumours.

Blood group ABH expression on cervical cancer cells has been linked with improved prognosis and shown to be a predictor of patient survival [9-10]. The expression of ABH antigens on pre-malignant and malignant cervical lesions have also been investigated as possible diagnostic and classification tools in cervical neoplasia [11]. The study did not confirm claims that blood group A are associated with cervical cancer. Analysis of the different stages of cervical dysplasia and healthy controls showed no statistically significant association.

Table 1. Frequency (%) of ABO blood group in controls and each disease status*

Blood type	Controls	CIN I	CIN II	CIN III	Cancer
A	22 (25.9)	19 (26.8)	19 (32.2)	9 (17.6)	15 (28.3)
B	15 (17.6)	10 (14.6)	9 (15.3)	10 (19.6)	11 (20.8)
AB	2 (2.4)	2 (2.8)	0 (0.0)	1 (2.6)	2 (3.8)
O	46 (54.1)	40 (56.3)	31 (52.5)	31 (60.8)	25 (47.2)

From Table 1 frequency distribution shows no statistically significant difference among the groups; X^2(df)=6.5; p=0.89

Additionally, there was no statistically significant association when cases were categorized by the Bethesda system of low risk and high risk disease (X^2=0.834, p=0.839). Reports of Pap smear history prior to diagnosis showed a statistically significant difference in cases compared to healthy controls subjects (66% vs. 96%, (X^2=17.3, p=0.0001). A limitation is notably that this study had a much smaller sample size than prior studies cited.

Bazuaye et al. [1] reported that sexual lifestyle factors by stage of disease and compares them to those in healthy controls. The mean number of children (2.4 ± 1.9 to 4.0 ±2.8), mean number of biological father (1.4 +/-1.0 to 1.9+/- 2.8) and number of sexual partners (3.9 ± 2.3 to 5.3 ± 4.6) were significant higher with progression of the disease. There was a significant lineal trend for number of children and biological father (p=0.001). This study revealed that socio-economic status, alcohol consumption and parity were statistically significantly associated with the development of cervical dysplasia/cancer compared to healthy controls (p=0.020, 0.019 and 0.008 respectively). Zero parity was found to be a protective factor in controls compared to cases (p=0.001). Severity of the disease was associated with number of sexual partners and HIV infection. It was also reported in multivariate analysis with age as a co-variate, use of hormonal contraceptive was associated both with the disease and the severity of the disease (OR 2.04, CI 1.18, 3.50; P=0.010 and 2.21, CI 1.07, 4.57; p=0.033) respectively. Association between ABO groups and cervical dysplasia/ carcinoma in Jamaica

appears to be slightly associated with blood group O that has the highest frequency in comparison to blood groups A, B or AB. The Jamaican population is mostly African that is not in concordance with other racial populations such as Caucasian, where it is reported that blood group A is associated with tumours [1]. Another aspect is that dysplasia/ cervical cancer more important than been associated with blood groups is its strong association with lifestyle factors, including number of sexual partners, number of children and use of hormonal contraceptives.

4. CONCLUSION

There was a slightly association between blood group O and cervical dysplasia/ carcinoma in Jamaican women when compared with others blood groups. Cervical dysplasia/ carcinoma was strongly associated to the number of sexual partners, number of biological fathers, number of children and the use of hormonal contraceptive.

CONSENT

The patients gave their informed consent for this study to be published.

ETHICAL APPROVAL

It was granted by the Ethical Committee of the University of the West Indies, Mona campus, Jamaica.

ACKNOWLEDGEMENTS

Blood Transfusion Service of Jamaica and Ministry of Health for its contribution in the provision of information and technical assistance. Third World Organization for Women in Science (TWOWS) and School of Graduate Studies and Research, University of the West Indies, Mona Campus for funding.

COMPETING INTERESTS

Authors have declared no competing interests exist.

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The peer review history for this paper can be accessed here:
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