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The Association Between ABO Blood Groups and Adenomyosis

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ABSTRACT

Background: Several studies have investigated the relationships between female reproductive diseases and ABO blood groups. However, evidence regarding the potential association between ABO blood groups and adenomyosis remains limited. The aim of the study, thus, was to investigate the association between ABO blood groups and the risk of developing adenomyosis in women.

Methods: An analytical cross-sectional study on adenomyosis and ABO blood groups was conducted at the department of obstetrics and gynecology, Tribhuvan University Teaching Hospital, Maharajgunj, among women undergoing hysterectomy. The study was carried out between 13th April 2016 and 14th July 2017, involving women who provided informed consent and agreed to participate in this study. Following the surgery and histopathology report, the patients were categorized into the adenomyosis and non-adenomyosis groups. The data was tabulated and analyzed using using Statistical Package for Social Sciences (SPSS) for windows, version 29.

Results: A total of 249 women with recorded ABO groups, and who consented to participate, were included in this study. Of these, 85 cases (34%) were histologically confirmed to have adenomyosis. The most frequent ABO blood group was B (43%), while the least frequent was AB (6%). Women with blood group B had a significantly increased risk of developing adenomyosis, with an odds ratio of 2.3 (95% CI: 1.22-4.43, *P* value = 0.01). Conversely, blood group A was associated with a significantly reduced risk of adenomyosis, with an odds ratio of 0.41 (95% CI: 0.19-0.89, *P* value= 0.03).

Conclusions: This study demonstrated that women with blood group B have a 2.3-fold higher risk of developing adenomyosis, whereas those with blood group A may have a protective effect. Multicenter studies with larger sample sizes and diverse demographic groups are needed to substantiate these findings.

Key Words: Adenomyosis; ABO blood group; risk factors.

INTRODUCTION

Adenomyosis, defined by as the infiltration of endometrial glands and stroma into myometrium, can significantly influence women's quality of life.[1] Estimated prevalence rate of adenomyosis in hysterectomy specimens varies widely, ranging from 5% to 70%.[2] The prevalence of adenomyosis is found to be 23.5% in the Indian population,[3] while 71% in Pakistani women.[4] In Nepal, the prevalence of adenomyosis varied widely from 23.4% to 43.1% in hysterectomy specimens, of which most of them were middle-aged women.[5-7] Adenomyosis has been reported most commonly among the 41-50 years of age group elsewhere.[5,8]

Several studies have shown a relationship between ABO blood groups and female reproductive diseases.[9-11] However, to date, no studies have investigated the possible link between ABO blood groups and adenomyosis in Nepal. The present study, therefore, aims to determine the association between ABO blood groups and adenomyosis in women.

METHODS

An analytical cross-sectional study was conducted at the Department of Obstetrics and Gynecology of Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu, from 13th April 2016 to 14th July, 2017. Women undergoing hysterectomy, who provided informed consent, and agreed to participate, were included in this study. Hysterectomy cases associated with malignancy, and

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those who refused to participate, were excluded from this study. Following the histopathological assessments after surgery, patients diagnosed with adenomyosis were classified into the "adenomyosis group", while those without adenomyosis were designated as the "non-adenomyosis" group for analysis. Patients with recorded blood groups were included in this study, Sample size was calculated using formula: $n= [Z_{\alpha}\sqrt{p\ (1-p)\ (1+c)/c} + Z_{\beta}\sqrt{p2(1-p2)\ +p1(1-p1)/c}]^2/(p2-p1)^2$, $Z_{\alpha=}$ 1.96 at 95% confidence interval, $Z_{\beta=}$ 0.84 at 80% power, P1 = 0.34 in study group, P2= 0.55 in other group, P= (p1+p2)/2. The minimum required sample size for the adenomyosis group was 70. The final sample size was 85 for the adenomyosis group, and 170 for the non-adenomyosis group. The prevalence used for the sample size calculation was derived from the study by Shrestha A.[5] Data were coded and entered into an excel database (Microsoft, Redmond, Washington, USA). Statistical analysis was carried out by using the Statistical Package for the social Sciences (SPSS) for windows, version 29 (SPSS Inc., Chicago, IL, USA). Odd ratios (OR) were calculated with 95% confidence interval (CI), and *P* value equal or < 0.05 was considered statistically significant. Ethical approval for this study was obtained from the institutional review committee (Ref: IRC- 338/6-11-E-072-73), Institute of Medicine, Tribhuvan University, Kathmandu, Nepal.

RESULTS

A total of 249 patients with recorded ABO blood groups were included in this study. Of these, 85 cases (34%) were histologically confirmed to have adenomyosis, while 164 (66%) were in the non-adenomyosis group. Blood groups B, O and A were found higher among women with adenomyosis aged between 41 and 50 years, while blood group AB was more common in the age group of 51 to 60 years, as illustrated in figure 1.

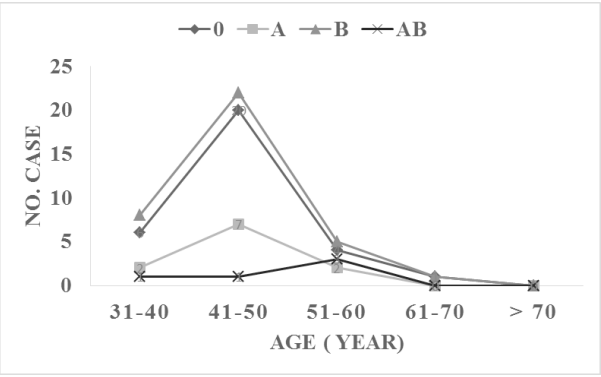

Figure 1. Age distribution of ABO blood groups in women with adenomyosis.

As shown in fig 2, among women with adenomyosis, the most frequent blood group was B (43%), followed by O (37%) and A (13%), respectively. The AB blood group was the least common (6%) in women with adenomyosis.

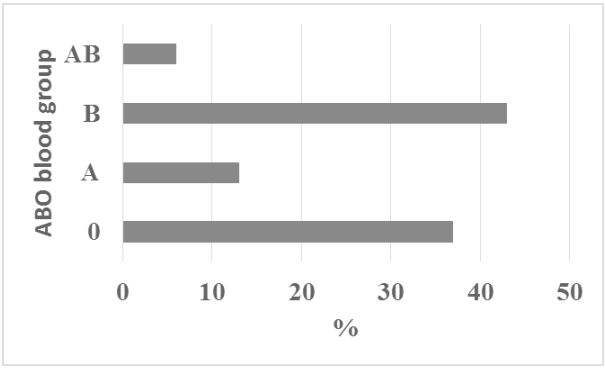

Figure 2. Distribution of ABO blood groups among women with adenomyosis.

Women with blood group B had a risk of having adenomyosis, with an odd ratio (OR) of 2.32 (95% CI=1.22-4.43; *P* value =0.01), as shown in Table 1, and this finding was statistically significant. In contrast, blood group A was associated with a significantly reduced risk of adenomyosis, with an OR of 0.41 (95%CI=0.19-0.89, *P* value=0.02). No statistically significant association was found for blood group AB (OR 0.71, 95% CI=0.24-2.16, *P* value=0.79).

Table 1. Association between ABO blood groups and adenomyosis.

Blood group	Adenomyosis group	Non-adenomyosis group	Odds Ratio (OR)	95% CI (Lower-Upper)	*p*-value
A	11	54	0.41	0.19-0.89	0.02
B	36	31	2.32	1.22-4.43	0.01
AB	5	14	0.71	0.24-2.16	0.79
O	31	62	1.00 (Reference)	-	-

DISCUSSION

The prevalence rate of adenomyosis has been reported to be as high as 61.5 percent.[1] Although, the definitive cause of adenomyosis is yet to be fully understood, several factors have been shown to be associated with the condition, including increased age, multiparity, a history of abortions, uterine dilatation and curettage (D&C), previous uterine surgeries and irregular menstrual cycles.[1,2,7] Nonetheless, the relationship between ABO blood groups and adenomyosis remains

poorly understood. The present study, thus, was carried out to determine the association between ABO blood groups and adenomyosis in women, who visited the department of obstetrics and gynecology, Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu, from 13th April 2016 to 14th July, 2017. To the best of our knowledge, this is the first study to investigate the possible association between ABO blood groups and adenomyosis at a tertiary hospital in Nepal.

In this study, the majority of women with blood groups B, O and A (93%) were found to have diagnosed with adenomyosis by the time they reached the age 41. In contrast, women with blood group AB were more often diagnosed with the condition after the age of 51. It shows that women with blood group AB may likely to develop adenomyosis at a later age than those with other blood groups (B, O and A). Unfortunately, research on the relationship between age groups, ABO blood groups and adenomyosis remains scarce. Thus, while this result may be noteworthy, additional and extensive research is needed to support this result.

ABO blood groups have been associated with an increased susceptibility to a wide range of both infectious and non-infectious diseases.[12] However, the exact mechanism that would explain the associations between blood group antigens and disease have not yet known. Our study showed the blood group B (43%) was most predominant in women with adenomyosis, while blood group AB (6%) was least predominant. Although several gynecological conditions and their association with ABO blood groups have been examined, the underlying mechanism for the association between blood group B with adenomyosis, as demonstrated in our study, requires further investigation.

Among the various factors, ABO blood groups were found to be associated with a range of gynecological conditions in various studies.[10,13] For example, a study conducted in the USA showed women with endometriosis have a 2.9-fold increased risk in the A blood group distribution.[9] Another study conducted in France found that Rh-negative women were twice as likely to develop endometriosis compared to Rh-positive women.[14] In contrast to these studies, a study carried out among Iranian women showed no statistically significant association between ABO blood groups and endometriosis, although blood group O appeared to have a lower risk of developing endometriosis compared to those with other blood groups.[10] In fact, studies have demonstrated varying results regarding the relationship between ABO blood groups and endometriosis. Such contradictory observations may be attributed to genetic and molecular variations within ABO blood groups across different populations, varing by ethnicity and geography.[15] Some study indicates that up to 91.1% of women with endometriosis may have adenomyosis.[16] However, little is known about the relationship between ABO blood groups and adenomyosis. In this study, women with blood group B have a 2.3-fold higher risk of developing adenomyosis compared to other groups, whereas those with blood group A significantly reduced risk of developing adenomyosis. No statistically significant association was found for blood group AB in this study. Although, this study found a significant risk of having adenomyosis in women with blood group B, there is a necessity to conduct multicenter studies with larger sample sizes and diverse demographic groups to better comprehend the association between ABO blood groups and adenomyosis. Nevertheless, this study clearly showed the increased risk of developing adenomyosis in women with blood group B.

CONCLUSIONS

This study demonstrated that women with blood group B have a 2.3-fold higher risk of developing adenomyosis, whereas those with blood group A may have a protective effect. Multi center studies with larger sample sizes, and diverse demographic groups are needed to corroborate the findings of this study.

CONFLICTS OF INTERST

The authors declare no conflicts of interest.

REFERENCES

1. Upson K, Missmer SA. Epidemiology of Adenomyosis. Semin Reprod Med. 2020 May;38(2-03):89-107. [PMC7927213]

2. Parazzini F, Vercellini P, Chatenoud L, Oldani S, Crosignani PG. Risk factors for adenomyosis. Hum Reprod. 1997;12(6):1275-9.[Article]

3. Arunachalam B, Manivasakan J. A Clinico-Pathological Study of Adenomyosis. J Clin Diagnostic Res. 2012;6(3):428-30.[Article]

4. Shaikh H, Khan KS. Adenomyosis in Pakistani Women: Four Year Experience at the Aga Khan University Medical Centre, Karachi. J Clin Pathol. 1990;43(10):817-9.[Article]

5. Shrestha A. Risk factors for adenomyosis. J Nepal Health Res Counc. 2012 Sep;10 (22):229-33. [PubMed]

6. Shrestha A, Shrestha R, Lb S, Pandit U. Adenomyosis at Hysterectomy : Prevalence , Patient Characteristics , Clinical Profile and Histopatholgical Findings. Kathmandu Univ Med J. 2012;10 (1):1-4.[PubMed]

7. Pun S. Induced Abortion: A Risk Factor Adenomyosis. J Nepal Health Res Counc. 2022 Oct-Dec;20 (57):913-5.[Article]

8. T. Bergholt, L. Eriksen, N. Berendt, M. Jacobsen, J.B. Hertz, Prevalence and risk factors of adenomyosis at hysterectomy, Human Reproduction, Volume 16, Issue 11, November 2001, 2418–21,doi: https://doi.org/10.1093/humrep/16.11.2418

9. Matalliotakis I, Cakmak H, Goumenou A, Sifakis S, Ziogos E, Arici A. ABO and Rh blood groups distribution in patients with endometriosis. Arch Gynecol Obstet. 2009 Dec;280 (6):917-9. doi: 10.1007/s00404-009-1031-2. Epub 2009 Mar 20. [PubMed]

10. Malekzadeh F, Moini A, Amirchaghmaghi E, Daliri L, Akhoond MR, Talebi M, et al. The Association between ABO and Rh Blood Groups and Risk of Endometriosis in Iranian Women. Int J Fertil Steril. 2018;12(3):213-17.[Article]

11. Alhammadi MH, Alsaif AA, Alghamdi DA. Distribution of ABO and Rh Blood Groups in Patients With Endometriosis at King Abdulaziz University Hospital: A Case-Control Study. Cureus. 2023 Dec 29;15(12):e51268.[Article]

12. Than NG, Romero R, Meiri H, Erez O, Xu Y, Tarquini F, et al. PP13, maternal ABO blood groups and the risk assessment of pregnancy complications. PLoS One. 2011 Jul 25;6(7):e21564. [DOI] [PMC free article] [PubMed] [Google Scholar][Ref list]

13. Gates MA, Wolpin BM, Cramer DW, Hankinson SE, Tworoger SS. ABO blood group and incidence of epithelial ovarian cancer. Int J Cancer. 2011 Jan 15;128(2):482-6. doi: 10.1002/ijc.25339. Epub 2010 Mar 22.[Article]

14. Borghese B, Chartier M, Souza C, Santulli P, Lafay-Pillet MC, de Ziegler D, et al. ABO and Rhesus blood groups and risk of endometriosis in a French Caucasian population of 633 patients living in the same geographic area. Biomed Res Int. 2014;2014:618964.[PubMed]

15. Anstee DJ. The relationship between blood groups and disease. *Blood*. 2010;115(23):4635–43.[Article]

16. Leyendecker G, Bilgicyildirim A, Inacker M, Stalf T, Huppert P, Mall G, et al. Adenomyosis and endometriosis. Re-visiting their association and further insights into the mechanisms of auto-traumatisation. An MRI study. Archives of gynecology and obstetrics. 2015 Apr;291:917-32. doi: https://doi.org/10.1007/s00404-014-3437-8