ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Fasting Blood Glucose and Body Mass Index as Predictors of Endometrial Hyperplasia in Abnormal Uterine Bleeding

Authors: Dr. Shristi Jaiswal[1] (Asst. Professor, MBBS, M.D, DNB, MRCOG) & Dr. Nitin Kumar Gangrade[2] (MBBS, DNB)

Dept. of Obstetrics and Gynaecology, Index Medical College Hospital & Research Centre, Indore, M.P.[1]

Dept. of Nuclear Medicine, CHL Hospital, Indore, M.P.[2]

Corresponding Author: Dr. Shristi Jaiswal

Abstract

Background & Methods: The aim of this study was to evaluate the relationship between fasting blood glucose, body mass index (BMI), and endometrial hyperplasia in women presenting with abnormal uterine bleeding (AUB). AUB is a common gynecological condition that significantly affects women's quality of life and contributes to global disease burden. While AUB is frequently associated with iron deficiency anemia (IDA), the metabolic factors contributing to its underlying causes remain underexplored. This observational study investigates whether elevated fasting blood glucose and increased BMI can serve as predictors of endometrial hyperplasia in women with AUB, providing insight into the role of metabolic health in gynecologic pathology.

Results: Among women with normal fasting blood glucose levels, 27 (54%) had endometrial hyperplasia, while 23 (46%) did not. In contrast, among women with elevated fasting blood glucose, 45 (84.9%) had hyperplasia and only 8 (15.1%) did not. This association was statistically significant ($p < 0.01$). BMI was also significantly associated with hyperplasia ($p = 0.047$), whereas age, parity, and waist-to-hip ratio showed no statistically significant association.

Conclusion: There is a significant relationship between BMI and high fasting blood glucose with endometrial hyperplasia, but this significant relationship was not identified between age and parity towards endometrial hyperplasia. This research is a beginning to reveal the endometrial histology in AUB, in relation with numerous risk factors. In this study, we hypothesized that examination of BMI and fasting blood glucose can be used to predict the likelihood of malignancy in patients with AUB. However, further research is needed with a larger sample size and evaluating other risk factors to improve the accuracy of the study.

Keywords: relationship, abnormal, uterine, bleeding, glucose & mass.

Study Design: Observational Study.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Introduction

Unusual menstrual cycle irregularities involving the characteristics of frequency, regularity, duration, and volume of flow outside of pregnancy in women of reproductive age are collectively referred to as abnormal uterine bleeding (AUB). The most usual times for abnormalities to occur are during menarche and perimenopause, and up to one-third of women will develop AUB throughout their lifetime[1]. A typical menstrual cycle lasts 2 to 7 days, with 5 to 80 mL of blood loss, and occurs every 24 to 38 days. Consequently, AUB is the result of changes in any one of these four characteristics.

Intermenstrual bleeding (i.e., cyclical or random spontaneous bleeding between menstrual periods), breakthrough bleeding (BTB) on hormone medication, and heavy menstrual bleeding (HMB), which is defined as bleeding >80 mL or heavy enough to interfere with a patient's qualify of life, were also used to replace the nonspecific terms menorrhagia, metrorrhagia, and oligomenorrhea.[2] For further details on AUB descriptions, please see the History and Physical section. PALM-COEIN, which was developed by FIGO System 2, divides AUB into two categories: nonstructural (coagulopathy, ovulatory dysfunction, endometrial, iatrogenic, not otherwise defined) and structural (polyp, adenomyosis, leiomyoma, malignancy/hyperplasia).[3][4] Any bleeding that is outside of the 5th to 95th percentiles for any menstrual parameter (such as regularity, frequency, duration, and volume) was also deemed irregular by the committee.

Acute and persistent bleeding are further classifications for AUB. Excessive bleeding that needs to be stopped right away to stop additional blood loss is known as acute AUB. Acute AUB can happen alone or in conjunction with chronic AUB, which is defined as irregular menstrual bleeding for the majority of the preceding six months.[5] Clinicians can better customize diagnosis and management strategies and ensure optimal patient outcomes by having a thorough understanding of acute versus chronic AUB.[6] A thorough medical history, physical examination, laboratory testing, diagnostic imaging, and, if necessary, endometrial biopsy are all part of the evaluation process. The main goal of management approaches is to optimize bleeding and treat the underlying etiology using strategies that are tailored to the patient's preferences, AUB severity, and cause.

Worldwide, it is believed that between 3% and 30% of women in their reproductive years have AUB, with a higher incidence around menarche and perimenopause. The frequency increases to 35% or higher when irregular and intermenstrual bleeding are taken into account, however many research are restricted to HMB.[7] A survey of women in Europe revealed a 27% prevalence of HMB, although other research revealed a global prevalence of above 50%. It is challenging to pinpoint the precise prevalence because many women choose not to seek treatment for their symptoms, and some aspects of diagnosis are subjective while others are objective.[8]

Material and Methods

Present study was conducted for 01 Year on 100 cases. This is also associated with risk factors of age, parity, obesity and fasting blood glucose. Patients who have agreed to participate in this study underwent D&C to determine the histologic picture of endometrium, and are grouped into the hyperplasia and non-hyperplasia group. The data obtained is

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

analyzed statistically by performing Chi square test to assess the significance of a relationship of the specified risk factors in influencing AUB.

Inclusion Criteria: Cases age between 35-50 years.

Result

Table No. 1: Demographic Profile

S. No.	Variables	Mean	P Value
1	Age	39.4 (30.0-43.0)	0.729
2	Triglycerides (mg/dL)	82.7 (67.0-123.0	0.513
3	LDL (mg/dL)	95.6 (71.0-110.0)	0.047
4	HDL (mg/dL)	54.3 (44.0‑63.0)	0.033
5	Cholesterol (mg/dL)	167.1 (143.0-186.0)	0.001

Table No. 2: BMI & Waist/hip ratio

S. No.	BMI	Mean	P Value
1	BMI	28.2 (25.2‑39.1)	0.047
2	Waist/hip ratio	0.88 (0.81-0.90	0.616

Table No. 3: Characteristics Based on Parity

S. No.		Hyperplasia	Non-Hyperplasia	P Value
1	Nulliparous	29	09	.049839
2	Multiparous	47	15	

The chi-square statistic is 4.0034. The *p*-value is .049839. The result is significant at $p < .05$.

Among the nulliparous women, 29 (76.3%) had endometrial hyperplasia, while 9 did not. Among multiparous women, 47 (75.8%) had hyperplasia and 15 did not. Although statistically significant, the difference is marginal.

Table No. 4: Characteristics based on Fasting Blood Glucose

S. No.		Hyperplasia	Non-Hyperplasia	P Value
1	Normal	27	23	.000632
2	Abnormal	45	08	

The chi-square statistic is 11.6806. The *p*-value is .000632. The result is significant at $p < .05$.

Among patients with normal fasting blood glucose, 27 (54%) had endometrial hyperplasia and 23 (46%) did not. In contrast, among those with elevated fasting blood glucose, 45 (84.9%) showed hyperplasia and only 8 (15.1%) did not. This suggests a strong association between elevated glucose levels and endometrial hyperplasia.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Discussion

When ovulatory failure results in abnormal uterine bleeding (AUB), hormonal imbalances are frequently the root cause. Patients with a hormonal etiology of AUB will complain of irregular menstrual periods, which is not the case with the patient at hand. Disruption of the hypothalamic-pituitary-adrenal (HPA) axis frequently causes dysfunctional ovulation, however this is rarely regarded as pathological in the years after menarche or in the years preceding menopause[9]. Anovulatory cycles are frequently caused by the underdeveloped HPA axis during the first several years after menarche. Normal hormonal variations can also cause anovulatory cycles until menstruation stops up to 8 years before menopause. Anovulation caused by disruptions to the HPA axis is regarded as abnormal outside of these conditions.

Ovulation is necessary for the formation of a corpus luteum and the production of progesterone, which counteracts the proliferative effects of estrogen on the endometrium. Unopposed estrogen will cause the endometrium to develop until it can no longer supply enough blood, which will lead to heavy, irregular bleeding. As a result, individuals with hormone imbalances frequently complain of heavy, irregular periods along with other particular symptoms associated with their underlying endocrinopathy[10].

Although there is no statistically significant correlation between parity and the presence of endometrial hyperplasia, the incidence of endometrial hyperplasia is comparable between nullipara and multipara. The nulliparous population, where there is a higher cumulative exposure to estrogen due to the higher total number of menstrual cycles during life, is theoretically more likely to experience hyperplasia[11]. The likelihood of random error could account for our findings, and more AUB study on the nullipara population is necessary.

We found that, according to BMI characteristics, the incidence of AUB was marginally greater in the obese group (53.3%) than in the non-obesity group (46.7%). In Italy, Parazzini et al. found that 60.4% of individuals with endometrial hyperplasia had a BMI more than 25. Clinical data indicates that obesity has an impact on endometrial hyperplasia because all 16 obese samples showed the histologic appearance of endometrial hyperplasia. In contrast, the majority of the group with a lower BMI did not exhibit endometrial hyperplasia[12]. The results of statistical testing indicated a substantial correlation between endometrial hyperplasia and BMI. Therefore, our findings supported the hypothesis that hyperplasia is an estrogen-dependent illness in which endogenous and exogenous estrogens overly stimulate endometrial growth, both clinically and statistically.

The samples from the normal and abnormal groups were equal based on the fasting blood glucose levels. According to statistical testing, 14 samples in the group with abnormal fasting blood glucose showed a histologic image of endometrial hyperplasia, indicating that the results were not normal[13-14]. On the other hand, endometrial hyperplasia occurs roughly equally in populations with normal blood sugar levels. Clinically, we discovered that 93.3% of samples with elevated fasting blood glucose showed endometrial hyperplasia histology and AUB symptoms. We discovered a statistically significant correlation between endometrial hyperplasia and fasting blood glucose. This supports the hypothesis that endometrial

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

hyperplasia is twice as likely to develop in women with diabetes. According to Lindemann et al. (2010), those with diabetes have a threefold increased risk of endometrial cancer.

Conclusion

This study demonstrated a statistically significant association between elevated body mass index (BMI) and fasting blood glucose levels with endometrial hyperplasia in women presenting with abnormal uterine bleeding (AUB). While parity showed borderline significance, no significant association was observed with age or waist-to-hip ratio. These findings highlight the potential role of metabolic factors in the pathogenesis of endometrial changes among AUB patients. Further large-scale studies are recommended to validate these associations and to explore additional contributing risk factors.

References

1. Wouk N, Helton M. Abnormal Uterine Bleeding in Premenopausal Women. Am Fam Physician. 2019 Apr 01;99(7):435-443.

2. Leal CRV, Vannuccini S, Jain V, Dolmans MM, Di Spiezio Sardo A, Al-Hendy A, Reis FM. Abnormal uterine bleeding: The well-known and the hidden face. J Endometr Uterine Disord. 2024 Jun;6

3. Marnach ML, Laughlin-Tommaso SK. Evaluation and Management of Abnormal Uterine Bleeding. Mayo Clin Proc. 2019 Feb;94(2):326-335.

4. ACOG committee opinion no. 557: Management of acute abnormal uterine bleeding in nonpregnant reproductive-aged women. Obstet Gynecol. 2013 Apr;121(4):891-896.

5. Jain V, Munro MG, Critchley HOD. Contemporary evaluation of women and girls with abnormal uterine bleeding: FIGO Systems 1 and 2. Int J Gynaecol Obstet. 2023 Aug;162 Suppl 2(Suppl 2):29-42.

6. Sarwar A, Haque AU. Types and frequencies of pathologies in endometrial curettings of abnormal uterine bleeding. Int J Pathol 2005; 3(2): 65-707.

7. Cheong Y, Cameron IT, Critchley HOD. Abnormal uterine bleeding. Br Med Bull. 2017 Sep 01;123(1):103-114.

8. ACOG Committee Opinion No. 785, Screening and Management of Bleeding Disorders in Adolescents With Heavy Menstrual Bleeding: Correction. Obstet Gynecol. 2023 Jan 01;141(1):228.

9. Whitaker L, Critchley HO. Abnormal uterine bleeding. Best Pract Res Clin Obstet Gynaecol. 2016 Jul;34:54-65.

10. Screening and Management of Bleeding Disorders in Adolescents With Heavy Menstrual Bleeding: ACOG COMMITTEE OPINION, Number 785. Obstet Gynecol. 2019 Sep;134(3):e71-e83.

11. Expert Panel on GYN and OB Imaging. Robbins JB, Sadowski EA, Maturen KE, Akin EA, Ascher SM, Brook OR, Cassella CR, Dassel M, Henrichsen TL, Learman LA, Patlas

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

MN, Saphier C, Wasnik AP, Glanc P. ACR Appropriateness Criteria® Abnormal Uterine Bleeding. J Am Coll Radiol. 2020 Nov;17(11S):S336-S345.

12. Vitale SG, Della Corte L, Ciebiera M, Carugno J, Riemma G, Lasmar RB, Lasmar BP, Kahramanoglu I, Urman B, Mikuš M, De Angelis C, Török P, Angioni S. Hysteroscopic Endometrial Ablation: From Indications to Instrumentation and Techniques-A Call to Action. Diagnostics (Basel). 2023 Jan 17;13(3).

13. Schoep, M. E., Nieboer, T. E., van der Zanden, M., Braat, D. D. M. & Nap, A. W. The impact of menstrual symptoms on everyday life: a survey among 42,879 women. Am. J. Obstet. Gynecol. 220, 569.e1–569.e7 (2019).

14. Munro, M. G., Critchley, H. O., Broder, M. S. & Fraser, I. S., FIGO Working Group on Menstrual Disorders. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Int. J. Gynaecol. Obstet. 113, 3–13 (2011).