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Body mass index and abnormal uterine bleeding in premenopausal women: A correlation

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Background and Objective: The occurrence of endometrial cancer exhibits a positive correlation with body mass index (BMI), a pattern that has been noted in recent times due to the escalating prevalence of obesity among women. Although there is ample evidence demonstrating a correlation between endometrial cancer and obesity, there is a lack of awareness among the general population. An analytical case-control study was done to evaluate the correlation between body mass index (BMI) and endometrial pathology in premenopausal women with AUB

Methods: The research group for an analytical case-control study consisted of 120 women aged 40 to 55 who sought medical attention at the Department of General Surgery, Melmaruvathur Adhiparasakthi Institute of Medical Sciences, Tamil Nadu, India from November 2012 to October 2013. The menstrual cycles and endometrial patterns of these women, whose BMIs ranged from 18.5 to 24.99 and were less than 25, were analyzed using histopathology.

Results: The study cohort consisted of women aged 40 to 55, with an average age of 44.83. The average duration of the symptoms was similar in both groups. The control group had a duration of 8.52 months, whereas the patients group had a duration of 10.18 months. There was no noticeable difference in the menstrual cycles of the two groups, since they were identical. The cases group had higher average endometrial thickness, average BMI, and hyperplasia, with or without atypia, when compared to the control group. While lacking statistical significance, there was a higher incidence of atypical endometrial hyperplasia observed in women with increasing body mass index (BMI).

Keyword: Abnormal uterine bleeding, endometrial hyperplasia, endometrial thickness, body mass index

Introduction

Consistent with FIGO irregular uterine bleeding, in the absence of pregnancy, refers to the occurrence of irregular bleeding from the uterine corpus, characterized by variations in volume, regularity, frequency, or duration. Abnormal uterine bleeding is a common. During the period from menarche to menopause, it has a significant impact on the overall well-being and imposes a financial strain on 9 to 14% of women [1, 2].

Recent data indicates that 35% of adults globally, aged 20 and above, have an overweight body mass index (BMI) of 25 kg/m2, whereas 12% have an obese BMI of 30 kg/m2. The prevalence of elevated body mass index (BMI) in several Asian and African countries is presently estimated to be approximately 10% [3, 4]. The increasing incidence of obesity has been recognized worldwide in the past two decades. The prevalence of endometrial cancer has been observed to increase, as indicated by epidemiological data. Multiple systematic

evaluations have established a correlation between obesity and endometrial cancer. The recognition of obesity as a substantial risk factor for endometrial hyperplasia and cancer in young, symptomatic, premenopausal women has not been widely accepted, despite the fact that the majority of endometrial cancers primarily affect postmenopausal women [5, 6].

Recent meta-analytic studies indicate that women who are overweight or obese have a 1.43 or 3.33 times higher likelihood of developing endometrial cancer compared to women with a normal weight [7]. A more comprehensive comprehension of the fundamental risk factors for premenopausal women would lead to enhanced therapeutic pathways from primary to secondary care and more precise targeting of invasive diagnostic tests. According to current national standards, opting for biopsy simply based on age may result in overlooking several cases or delaying the diagnosis. The primary consideration when determining whether to do an endometrial biopsy and/or refer a patient for further gynecological treatment should be the body mass index. The primary aim of the present investigation is to evaluate the correlation between endometrial pathology and body mass index (BMI) in premenopausal women diagnosed with abdominal urothelial fibrosis (AUB) [8, 9].

Materials and Methods
After obtaining approval from the ethical committee of the institution and obtaining written informed consent from the women, the present study was conducted on a sample of 120 women who presented with abnormal uterine bleeding. These women sought medical attention at the Department of General Surgery, Melmaruvathur Adhiparasakthi Institute of Medical Sciences, Tamil Nadu, India, during the period from November 2012 to October 2013, which spanned a duration of 18 months [10, 11].

In order to estimate the sample size for the current case-control study, the odds ratio for developing endometrial cancer in overweight premenopausal women compared to normal weight was computed as 3.5. According to the data provided, the rate of sickness exposure is 70% among individuals classified as overweight and 40% among those classified as normal weight. Based on the assumption of two-tailed hypotheses, the estimated minimum sample size for each group is 42 instances, with a 30% effect size at a significance level of 5%. Consequently, a minimal total sample size of 84 cases was selected for the investigation [12, 13].

Inclusion criteria
1. Female participants who shown a willingness to provide written informed permission.
2. All women between the ages of 40 and 55 with a body mass index ranging from 18.5 to 24.99 and above who are seeking medical attention at the Gynaecology OPD due to irregular uterine bleeding.

Exclusion criteria
1. Cervical, uterine, and ovarian cancer that is now present.
2. Peripheral inflammatory disease (PID)
3. Women in the premenopausal stage who experience coagulation issues.
4. The condition of being pregnant
5. Women who have thyroid issues, liver disorders, or have chronic renal disease

Methodology
The control and study groups consist of premenopausal women with AUB and BMI ranging from 18.5 to 24.99 and 25, respectivel. The inclusion and exclusion criteria determine which women are included and excluded from the study. In the outpatient department, a comprehensive clinical assessment was conducted for each female patient, encompassing a history interview, physical examination, and baseline tests such as a complete hemogram, left ventricular tachycardia (LFT), right ventricular tachycardia (RFT), coagulation profile, and pelvic ultrasound. The obtained outcomes were recorded in a pre-established proforma. Height and weight measurements were conducted on all female participants, and subsequently, BMI calculations were performed [14, 15].
The Body Mass Index (BMI) is a commonly employed metric for classifying individuals into

three categories based on their weight relative to height: underweight, overweight, or obese. The formula is calculated as kg/m2, which is the ratio of weight in kilograms to height in meters squared. The Body Mass Index (BMI) is calculated utilizing the Quetelet index, which considers both height and weight [16, 17]. The height of each participant was determined by ensuring they maintained an upright posture, without shoes, on the foundation of the traditional stadiometer. A plate was securely attached to the vertical, two-meter wooden scale. Subsequently, the patients were directed to assume an upright position without assistance, with their arms positioned alongside them and their heads in a secure posture. The height at the vertex of the skull was measured in centimeters, to the closest millimeter, using a horizontal, thin plate. The measurement of weight is conducted utilizing a weighing machine with a range of 0 to 125 kg (KRUFS), while the measurement of height is performed using a stadiometer (8, 19). After performing endometrial biopsies on these ladies, the histopathology report analyzed the endometrial pattern. The diagnostic intervention for both groups was the use of endometrial samples obtained from D and C or Pipelle. The cervix was initially dilated using Hegar dilators as the first stage in a D&C procedure. Subsequently, a curette, a metallic rod featuring a handle at one extremity and a pointed loop at the opposite end, was introduced into the uterus via the dilated cervix. The tissue labeled as sample A in the study group was carefully removed from the uterine lining using a curette. Women who have a normal body mass index (BMI) will be subjected to same treatment and assigned to Sample B. The Pipelle is a pliable plastic tube with a lateral opening at the end. The suction was achieved by retracting a smaller tube, known as the internal piston, within the Pipelle. The pipelle was rotated

and shifted from the fundus to the internal os in order to collect minuscule fragments of endometrial tissue [20]. The blinded pathologist was provided with both samples for the purpose of histopathology examination. The histological report of D&C in women with BMIs ranging from 18.5 to 24.99 and 25 assessed the endometrial pattern [21, 22]. The analysis of the results involved the utilization of independent t-tests and chi-square/Fischer Exact tests. The continuous factors considered were age, length of symptoms, and endometrial thickness, while the categorical variables included parity, monthly pattern, and USG and histo pathological investigations. A P value below 0.05 is considered statistically significant. The primary finding of the study involved a comparison between the menstrual patterns and histological data pertaining to the endometrial patterns of women in both groups. The study examined secondary outcomes such as average age, duration of AUB, and association with comorbidities [23, 24].

The continuous variables of age, duration, and endometrial thickness were measured and presented as the mean (standard deviation), median, and interquartile range (IQR). The frequencies and percentages of menstrual cycle, parity, and other category parameters were aggregated. The distribution of continuous variables (age, duration, and endometrial thickness) between cases and controls was analyzed using an independent t-test. A comparison was made between cases and controls using chi square/Fischer Exact text to determine the proportion of categorical variables (parity, menstrual pattern, USG, and histological features) that exhibited differences. A P value below 0.05 is deemed statistically significant [25, 26].

Results

Table 1: Comparison of age among both the groups

Group	(n=)	Mean	SD	P25	Median	P75	Minimum	Maximum	P value
Control	60	45.14	2.76	42.75	44	47	40	50	
Case	60	44.52	3.3	42	44.5	47.25	40	50	0.3
Total	120	44.83	3.05	42	46	47	40	50	

Ultrasonographic Findings

Table 2: Comparison of USG correlation among cases and controls

USG (uterus)	Control	%	Case	%	Total	%	P value
Normal	39	68.0	38	57.0	72	62.0	
Bulky	21	32.0	22	43.0	48	38.0	0.22
Total	60	100.0	50	100.0	120		

Table 3: Comparison of endometrial thickness in USG among cases and controls

Group	(n=)	Mean	SD	P25	Median	P75	Minimum	Maximum	P value
Control	60	15.8	3.36	12	16	21	8	24	
Case	60	17.06	3.94	14	16.75	20	10	27	0.09
Total	120	13.43	3.70	14.00	16.00	19.00	8	27	

Type of Procedure Performed

Table 4: Comparison of type of procedure performed among cases and controls

Procedure	Control	%	Case	%	Total	%	P value
D&C	58	98.0	50	100.0	118	99.0	
Endometrial Pipeling	2	2.0	0	0.0	2	1.0	0.32
Total	50	100.0	50	100.0	100		

Discussion

The present investigation involved the division of 120 premenopausal women diagnosed with AUB, aged between 40 and 55, into two distinct groups according to their body mass indices. The women belonging to the control and cases groups exhibited body mass index (BMI) values ranging from 18.5 to 24.99 and below 25, respectively. Additionally, the ladies underwent an assessment to discover the specific monthly irregularities they experienced, as well as any uterine or adnexal diseases they may have had. The thickness of their endometrium was measured using sonography, and any associated comorbidities were also investigated. After performing endometrial biopsies on these ladies, the histopathology report analyzed the endometrial pattern. The primary finding of the study was the comparison of menstrual patterns and histopathological reports among the women in both groups. The study also examined the duration of AUB, associated comorbidities, and average age. The demographic features of the two groups were found to be similar in terms of age. The average age of women in the control group (with a normal BMI) was 45.14 years, while in the cases group it was 44.52 years. The mean symptom length of the control group was 8.52 months, while the cases group had a mean symptom duration of 10.18 months.

Conclusion

Obesity is reported to be increasing worldwide. The current study found that an elevated BMI is a notable and separate risk factor for the occurrence of endometrial hyperplasia with atypia, which is a precursor to endometrial cancer, in premenopausal women with AUB. Age, symptom duration, and duration of menopause were considered important criteria in determining the appropriate evaluation of the endometrium in premenopausal and post-menopausal women. However, these characteristics led to a delay in detecting endometrial cancer in these individuals. BMI should be the primary criterion for premenopausal women receiving endometrial examination to diagnose and prevent endometrial hyperplasia or cancer at an early stage. The existing body of literature has emphasized the association between obesity and the development of endometrial cancer, breast cancer, and colon cancer. It is imperative to promote awareness

about the perils of cancer, which can be prevented by maintaining a healthy body mass index.

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