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RESEARCH PAPER

Pipelle Endometrial Sampling Versus Fractional Curettage for evaluating patient of Postmenopausal Bleeding: A Comparative Study

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Abstract

Background: Postmenopausal bleeding (PMB) is a common presentation in gynecological oncology outpatient department and it is most frequent complaints of endometrial cancer.[3-5,7] In Bangladesh, about one-third of patients visiting the gynecological oncology outpatient department with the complaints of PMB. Fractional Curettage (FC), the conventional diagnostic method, presents challenges due to invasiveness and cost. Pipelle endometrial sampling (PES) is a promising alternative that is less invasive, more convenient, and better tolerated.[3] However, no study has been done in Bangladesh comparing the Pipelle endometrial sampling procedure with Fractional Curettage. This study aimed to fill this gap by comparing Pipelle endometrial sampling (PES) to FC in diagnosing PMB.

Objective: This study aimed to evaluate the diagnostic accuracy of Pipelle endometrial sampling compared to Fractional Curettage in PMB patients. Specific objectives included assessing the adequacy of sample collection for definitive endometrial disease diagnosis and comparing histopathological findings between Pipelle endometrial biopsy and Fractional Curettage materials.

Methods: An observational study involving 45 PMB patients was conducted at National Institute of Cancer Research and Hospital, Mohakhali, Dhaka from January to December 2022. Each patient underwent both PES and FC. Histopathological results were compared, and diagnostic accuracy, sensitivity, specificity, and predictive values for PES were calculated.

Results: PES demonstrated finally 43, 97.8% sample adequacy compared to FC's 44, 100%. PES detected four cases of atypical endometrial hyperplasia, one polyp, and nine endometrial carcinoma cases, while FC found three atypical endometrial hyperplasia cases, two polyps, and ten endometrial carcinoma cases. PES exhibited 100% sensitivity, specificity, PPV, 97.72% NPV, and 97.72% diagnostic accuracy for most benign conditions. For polyps, sensitivity was 50%, specificity 100%, PPV 100%, NPV 97.72%, and diagnostic accuracy 97.72%. In endometrial carcinoma cases, sensitivity reached 90%, specificity 100%, PPV 100%, NPV 97.14%, and diagnostic accuracy 97.72%. Finally we have excluded 1 sample from our study group for statistical analysis.

Conclusions: PES offers a safe, accurate, cost-effective, and well-tolerated outpatient alternative for assessing endometrial pathology in PMB patients, it also preserve stromal architecture better. Its performance is comparable to FC in most of the condition, making it a valuable resource-efficient choice, especially in limited-resource settings.

Keywords: Pipelle endometrial sampling, Fractional curettage, Postmenopausal bleeding, Endometrial cancer, Endometrial hyperplasia

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Introduction

Postmenopausal bleeding (PMB) is a common gynecological problem that affects about 10% of women over 50 years old. PMB may indicate endometrial cancer or precancerous conditions, such

as atypical endometrial hyperplasia, which require prompt diagnosis and treatment. Endometrial cancer is the sixth most common cancer in women worldwide, with an estimated 417,367 new cases and 97,370 deaths in 2020.[1] The incidence and mortality of endometrial cancer are increasing due to various risk factors, such as obesity, diabetes, hypertension, polycystic ovary syndrome (PCOS), hormone replacement therapy (HRT), and tamoxifen use.[2]

In Bangladesh, about one-third of patients visiting the gynecological oncology outpatient department at the National Institute of Cancer Research and Hospital present with complaints of PMB. PMB might be the first symptom of endometrial cancer, an accurate diagnostic workup is necessary for these women.[3–6]

The current gold standard for endometrial sampling is fractional curettage (FC), which is invasive, expensive, painful, and associated with 1-2% complications.[3,7] Therefore, there is a need for a less invasive, cheaper, and more convenient alternative to FC for endometrial sampling.

Pipelle endometrial sampling (PES) is an office procedure that uses a thin, delicate, 3mm plastic cannula. PES does not require admission and anesthesia or cervical dilatation and can be performed in an outpatient setting with minimal discomfort and complications. PES is effective, safe, and well tolerated method of endometrial sampling.[6]

Despite the potential benefits of PES, no study has been done in Bangladesh comparing the Pipelle endometrial sampling procedure with Fractional Curettage. Therefore, this study aims to fill this gap by evaluating the diagnostic accuracy of Pipelle endometrial sampling versus Fractional Curettage procedure for evaluating patients with postmenopausal bleeding. This will provide valuable insights for clinicians in Bangladesh and could potentially improve the diagnostic process for patients with PMB.

Materials and Methods

This observational study was conducted at the Department of Gynecological Oncology of the National Institute of Cancer Research and Hospital, Mohakhali, Dhaka, from January 2022 to December 2022. The primary aim was to compare the diagnostic accuracy of Pipelle endometrial sampling (PES) with Fractional Curettage (FC) in patients presenting with postmenopausal bleeding (PMB).

A total of 45 PMB patients were included in this study initially. All participants were carefully selected based on specific inclusion criteria, which included age, clinical presentation, and willingness to undergo both PES and FC for diagnostic purposes. The inclusion criteria were women ≥45 years old who experienced menopause with a history of postmenopausal bleeding and endometrial thickness ≥4mm on transvaginal sonography. The exclusion criteria were endometrial thickness <4mm, bleeding diathesis, abnormal thyroid function, abnormal liver function, heart disease, abnormal paps report, invasive cervical cancer, infection, PID, and cervical stenosis.

Patient Selection: Patients presenting with PMB were assessed for eligibility by taking detail history, physical examination and investigations. Informed consent was obtained from each participant before inclusion.

Pipelle Endometrial Sampling (PES): Each participant underwent PES as an outpatient procedure. After explaining the procedure and obtaining informed consent, a sterile Pipelle device was inserted transcervically, and endometrial tissue was collected and labelled as “A”. The adequacy of the sample was assessed during the procedure.

Fractional Curettage (FC): Following PES after 7-10 days the same participants underwent FC under general anesthesia. This procedure involved collection of endocervical sample by curettage and labelled as “B” then dilatation of internal os of cervix and curettage of endometrium systematically, this sample labelled as “C”.

Histopathological Analysis: The obtained tissue samples from both PES and FC were preserved and sent for histopathological analysis. An experienced pathologist assessed and reported on the histopathological findings.

Data collected for each participant by a structured questionaire included age, important history, PES and FC histopathological result. The data were meticulously recorded and stored securely for subsequent analysis.

The collected data were subjected to statistical analysis to assess the diagnostic accuracy of PES compared to FC. The following parameters were calculated:

Sensitivity

Specificity

Positive Predictive Value (PPV)

Negative Predictive Value (NPV)

Diagnostic Accuracy

Ethical approval was obtained from the "ethical committee" of the National Institute of Cancer Research and Hospital, Mohakhali, Dhaka. All participants provided informed consent, and their confidentiality was maintained throughout the study.

Statistical analysis was performed using SPSS version 25. Descriptive statistics were used to summarize patient characteristics, while measures of diagnostic accuracy were calculated to assess the performance of PES compared to FC.

The sample size of 45 participants was determined based on a power analysis to ensure statistical significance and the ability to detect clinically relevant differences between the two sampling methods. The sample size was calculated using the formula

$$n = \frac{z^2 pq}{d^2}$$

Where z is the standard normal deviation (set at 1.96, corresponding to a 95% confidence level), p is the assumed target proportion (sensitivity set at 97%.[3]), q is 100 - p (set at 3%), and d is the allowable error (set at 5%).

This study has limitations, including the relatively small sample size and single-center. Further multicenter studies with larger cohorts could provide additional insights.

The study design, careful patient selection, ethical considerations, and rigorous data analysis provided a robust platform for comparing PES and FC in evaluating PMB. The findings contribute valuable information to the medical community, supporting using PES as an effective and cost-efficient alternative to FC in diagnosing endometrial pathology in postmenopausal bleeding patients.

Results

The mean age of the patients was 60.96 ± 6.89 years, ranging from 46 to 85 years. Most patients were from the lower middle-income class (37.77%). The mean age at menarche was 12.89 ± 0.859 years, and the mean age at menopause was 50.20 ± 4.176 years. Three patients (6.7%) had a family history of breast cancer, and eight patients (17.8%) had a personal history of breast cancer and were treated with tamoxifen therapy.

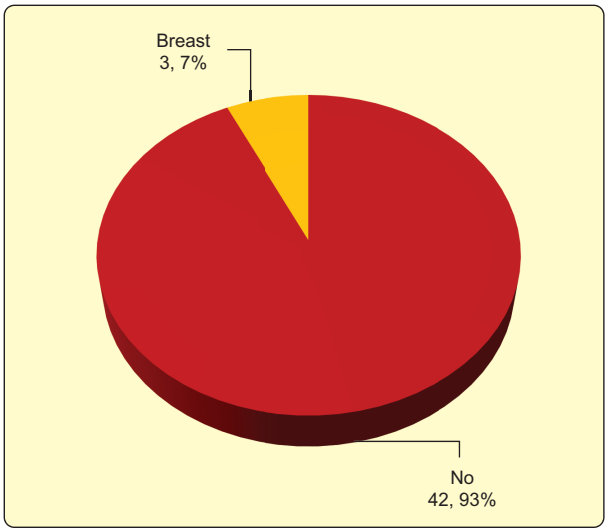

Figure 1: Distribution of respondents according to family history of breast cancer

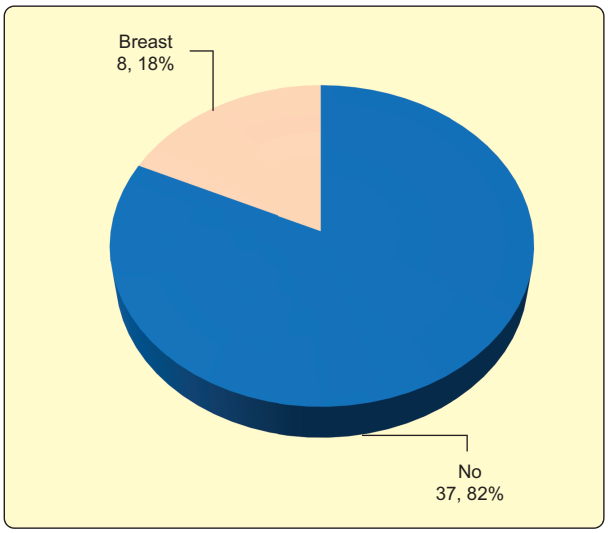

Figure-2: Distribution of respondents according to personal history of breast cancer

Twenty-one patients (46.6%) had diabetes mellitus, eighteen patients (40%) had low parity and eleven patients (24.4%) were obese.

The endometrial thickness measured by transvaginal sonography ranged from 4 to 23 mm, with a mean of 11.53 ± 5.02 mm. Most patients (35.6%) had an endometrial thickness of 4-8 mm, 22.2% were 19 mm, 22.2% were 9-13 mm, and 20% were 14-18 mm.

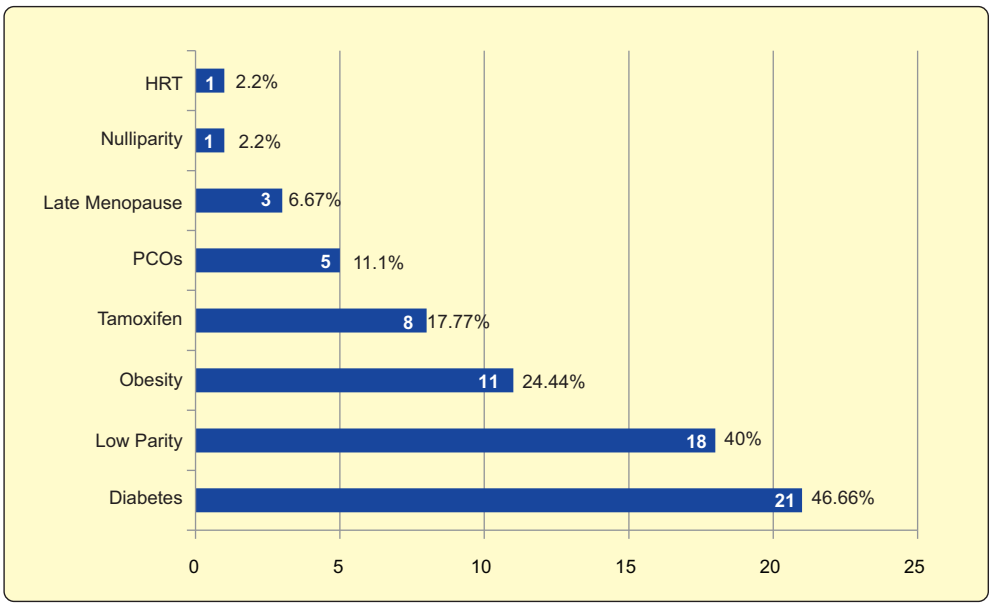

Figure 3: Distribution of respondents according to risk factor for endometrial cancer and precancer

Table I: Comparison between sample adequacy of Pipelle endometrial sampling and Fractional Curettage (n = 44)

Pipelle	Number	Percent	Fractional Curettage	Number	Percent	
Adequate	43	97.8	Adequate	44	100	
Inadequate	01	2.2	Inadequate	0	0	p-value 0.044
Total	44	100	Total	44	100	

Fractional Curettage obtained adequate samples from all 44 patients (100%), whereas Pipelle endometrial sampling obtained adequate samples from 43 patients (97.8%). The difference in sample adequacy between the two methods was not statistically significant (p = 0.044).

Both methods detected the same number of cases for atrophy (n = 5, 11.1%), secretory phase (n = 4, 8.9%), proliferative phase (n = 2, 4.4%), and endometrial hyperplasia without atypia (n = 18, 40%). However, Pipelle endometrial sampling detected one more case of atypical endometrial hyperplasia (n = 4, 8.9%) and one less case of endometrial carcinoma (n = 9, 20%) than Fractional Curettage (n = 3, 6.7% and n = 10, 22.2%, respectively). Fractional Curettage also detected one more case of endometrial polyp (n = 2, 4.4%) than Pipelle endometrial sampling (n = 1, 2.2%).

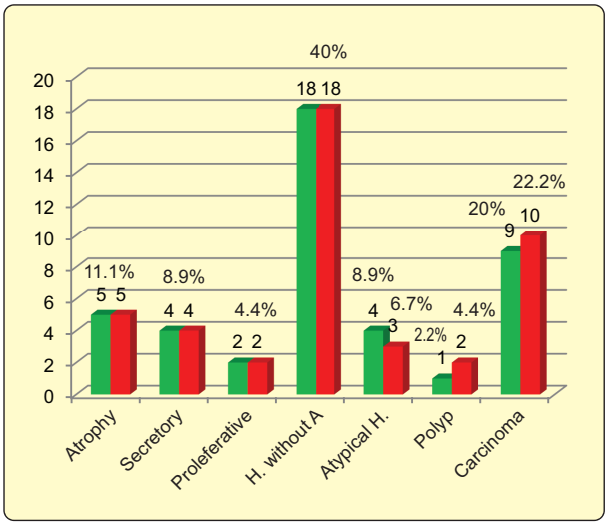

Figure 4: Comparison of Histopathology reports between Pipelle and Fractional curettage

Table II: Validity and diagnostic accuracy of Pipelle endometrial sampling for each endometrial condition

Validity of pipelle sampling '!	Sensitivity	Specificity	PPV	NPV	Diagnostic accuracy
Atrophy	100%	100%	100%	100%	100%
Secretory phase	100%	100%	100%	100%	100%
Proliferative phase	100%	100%	100%	100%	100%
EMH w/o A	100%	100%	100%	100%	100%
AEH	100%	97.56%	75%	100%	97.72%
Polyp	50%	100%	100%	97.72%	97.72%
Endometrial Carcinoma	90%	100%	100%	97.14%	97.72%
Inadequate	100%	97.67%	50%	100%	97.77%

PPV = Positive predictive value; NPV = Negative predictive value; DA = Diagnostic accuracy; EMH w/o A = Endometrial hyperplasia without atypia; AEH = Atypical endometrial hyperplasia

Pipelle endometrial sampling had a sensitivity of 100%, a specificity of 100%, a positive predictive value of 100%, a negative predictive value of 100%, and a diagnostic accuracy of 100% for most benign conditions, such as atrophy, secretory phase, proliferative phase, and endometrial hyperplasia without atypia. For atypical endometrial hyperplasia, Pipelle endometrial sampling had a sensitivity of 100%, a specificity of 97.56%, a positive predictive value of 75%, a negative predictive value of 100%, and a diagnostic accuracy of 97.72%. For endometrial polyp, Pipelle endometrial sampling had a sensitivity of 50%, a specificity of 100%, a positive predictive value of 100%, a negative predictive value of 97.72%, and a diagnostic accuracy of 97.72%. For endometrial carcinoma, Pipelle endometrial sampling had a sensitivity of 90%, a specificity of 100%, a positive predictive value of 100%, a negative predictive value of 97.14%, and a diagnostic accuracy of 97.72%.

Discussion

The main objective of this study was to compare the diagnostic accuracy and validity of Pipelle endometrial sampling versus Fractional Curettage for evaluating postmenopausal bleeding. Postmenopausal bleeding is a common gynecological problem that requires prompt investigation to rule out endometrial cancer and its precursors. Fractional Curettage is considered the gold standard for endometrial sampling, but it is an invasive, expensive, and painful procedure that requires anesthesia and hospitalization.[3] Pipelle endometrial sampling is a simple, cheap, and well-tolerated outpatient procedure that does not require anesthesia or cervical dilation.[3]

The results of this study showed that Pipelle endometrial sampling had a high sample adequacy (97.8%) and a high diagnostic accuracy (97.72%) for most endometrial conditions, comparable to Fractional Curettage (100% and 100%, respectively). Both methods detected the same number of cases of atrophy, secretory phase, proliferative phase, and endometrial hyperplasia without atypia. However, Pipelle endometrial sampling missed one case of endometrial carcinoma and one case of endometrial polyp that detected by Fractional Curettage. The sensitivity of PES for endometrial carcinoma was 90%, Specificity 100%, Diagnostic accuracy 97.72%. Another study was done by Ibrahim A Abdelazim et at al Sensitivity, Specificity, Diagnostic accuracy of Pipelle procedure to detct endometrial hyperplasia, carcinoma 100%.[5] Some other studies showed sensitivity and diagnostic accuracy of endometrial carcinoma 96-100%.

The sensitivity of Pipelle endometrial sampling for endometrial polyp was 50%, which is consistent with the reported sensitivity of 40-60% in previous studies. The lower sensitivity of Pipelle endometrial sampling for these focal lesions may be due to the small diameter of the cannula (3 mm) and the random sampling technique that may miss the affected areas. Therefore, Pipelle endometrial sampling may not be sufficient for diagnosing endometrial polyps.

This study also showed that Pipelle endometrial sampling caused less pain and bleeding than Fractional Curettage. Only 4.4% of the patients who underwent Pipelle endometrial sampling experienced bleeding, and 6.7% experienced pain, whereas 6.7% of the patients who underwent Fractional Curettage experienced bleeding, 40% experienced pain, and 22.2% experienced both pain and bleeding. These findings agree with previous studies that reported fewer

complications and better patient tolerance with Pipelle endometrial sampling than Fractional Curettage.

The strengths of this study include, the prospective design, the use of Fractional Curettage as the gold standard. The limitations of this study include small study population, the single-center setting, and the exclusion of patients with endometrial thickness <4 mm on transvaginal sonography.

In conclusion, this study demonstrated that Pipelle endometrial sampling is a valid, accurate, cost-effective, and well-tolerated outpatient procedure for evaluating postmenopausal bleeding. It has a high diagnostic accuracy for most benign, premalignant, and malignant endometrial conditions, comparable to Fractional Curettage. However, some cases of endometrial polyps and submucous myomas may be missed, which require further evaluation by other methods such as hysteroscopy. Therefore, Pipelle endometrial sampling can be used as a first-line method for endometrial biopsy in patients with postmenopausal bleeding.

Conclusion

This study compared the diagnostic accuracy and validity of Pipelle endometrial sampling versus Fractional Curettage for evaluating postmenopausal bleeding. The results showed that Pipelle endometrial sampling had a high sample adequacy and diagnostic accuracy for most of the benign endometrial conditions, comparable to Fractional Curettage. However, Pipelle endometrial sampling detected fewer endometrial polyps and endometrial carcinoma cases than Fractional Curettage. Despite this, Pipelle endometrial sampling caused less pain and bleeding than Fractional Curettage. Therefore, Pipelle endometrial sampling can be used as a first-line method for endometrial biopsy in patients with postmenopausal bleeding. Still, when indicated, it should be combined with other modalities, such as Fractional curettage or hysteroscopy (If there is atypical endometrial hyperplasia or symptomatic patient having negative biopsy report by pipelle). Further studies with larger sample sizes, inclusion of multiple centre and more extended follow-up periods are needed to confirm this study's findings and assess the cost-effectiveness and patient satisfaction of Pipelle endometrial sampling versus Fractional Curettage.

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