ISSN: 2581 – 3633
PubMed - National Library of Medicine - ID: 101745081

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at:www.ijmacr.com

Volume – 9, Issue – 2, March - 2026, Page No.: 154 – 159

Comparison of Pipelle Endometrial Sampling and Dilatation Curettage in Abnormal Uterine Bleeding

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How to citation this article: Dr Devika Tandon, Dr Shreya, Dr Tharun KC, "Comparison of Pipelle Endometrial Sampling and Dilatation Curettage in Abnormal Uterine Bleeding", IJMACR- March - 2026, Volume – 9, Issue - 2, P. No. 154 – 159.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Abnormal Uterine Bleeding (AUB) is a leading gynecological concern, particularly in peri- and postmenopausal women, often requiring endometrial evaluation to rule out infection, hyperplasia, or malignancy. This study compares the diagnostic accuracy and adequacy of Pipelle endometrial biopsy, a simple outpatient alternative, with conventional dilatation and curettage (D&C) in assessing endometrial pathology.

Materials & methods: A comparative interventional study was conducted on 80 women aged ≥40 years with abnormal uterine bleeding (AUB) to evaluate the diagnostic efficacy of Pipelle endometrial biopsy versus dilatation and curettage (D&C). Participants underwent detailed evaluation, transvaginal sonography, and both sampling techniques, with specimens analyzed blindly by a histopathologist. Data were statistically evaluated using SPSS software, considering D&C as the diagnostic gold standard.

Results: Pipelle endometrial sampling showed strong diagnostic agreement with D&C, particularly for hyperplasia and proliferative lesions. Adequacy of Pipelle samples was high (87–92%), though slightly affected by endometrial thickness. Diagnostic accuracy and specificity remained above 80% for most lesions, establishing Pipelle as a reliable, less invasive alternative to conventional D&C.

Conclusion: Pipelle endometrial sampling is a simple, safe, and cost-effective outpatient procedure with excellent patient compliance and minimal complications compared to D&C. It provides adequate tissue with high sensitivity and specificity, making it a reliable first-line diagnostic tool for evaluating endometrial pathology in AUB.

Keywords: Abnormal Uterine Bleeding, Hyperplasia, Sagittal Plane, Sensitivity

Introduction

Abnormal uterine bleeding (AUB) is a common and clinically important gynecological condition. Its subgroup, heavy menstrual bleeding (HMB), affects approximately 14–25% of women of reproductive age and can significantly impair their physical, emotional, social, and financial quality of life.[1, 2] AUB is classified as either acute or chronic. Acute AUB refers to sudden, heavy bleeding that demands urgent medical attention to prevent excessive blood loss, and it may occur independently or alongside chronic AUB. Chronic AUB, on the other hand, is characterized by persistent menstrual irregularities lasting for six months or more. Differentiating between the two types is essential for selecting appropriate diagnostic and therapeutic approaches. Evaluation includes a thorough clinical history, physical examination, relevant laboratory investigations, and, when indicated, imaging or endometrial sampling. Management focuses on addressing the underlying cause and controlling bleeding, with treatment tailored according to the severity, etiology, and individual patient needs.[3, 4] Dilatation and curettage (D&C) remains the gold standard for endometrial sampling; however, in about 60% of cases, less than half of the uterine cavity is sampled. The procedure also carries risks related to anesthesia, infection, and uterine perforation. These limitations have prompted the development of simpler, safer alternatives such as the Pipelle device. Pipelle sampling is cost-effective, can be performed on an outpatient basis, and avoids anesthesia, though concerns remain about sample adequacy and the potential for missing focal intrauterine lesions.[5-7] Hence; the present study was undertaken for comparing the diagnostic accuracy and adequacy of Pipelle endometrial biopsy, a simple outpatient alternative, with conventional dilatation and curettage (D&C) in assessing endometrial pathology.

Materials & Methods

A hospital-based interventional comparative study was conducted on 80 women aged 40 years and above presenting with abnormal uterine bleeding (AUB) in the Department of Obstetrics and Gynecology, following ethical clearance and informed consent. The study population included reproductive, perimenopausal, and postmenopausal women, while patients with pregnancy, genital infections, pelvic inflammatory disease, bleeding disorders, cervical malignancy, hormone therapy, or adnexal pathology were excluded. All participants underwent detailed history-taking, clinical examination, baseline investigations, and transvaginal sonography (TVS) using a 5.0–7.5 MHz transducer to measure endometrial thickness in the sagittal plane. Endometrial tissue sampling was performed using two techniques for diagnostic comparison—Pipelle endometrial sampling in the outpatient setting and dilatation and curettage (D&C) under anesthesia. The Pipelle device, a flexible suction cannula with an inner piston, was introduced into the uterine cavity, and negative pressure was created to aspirate endometrial tissue. Subsequently, patients underwent D&C, wherein after gradual cervical dilatation with Hegar's dilators, a sharp curette was used to obtain systematic and complete endometrial scrapings. Both tissue samples were sent for histopathological evaluation, with the pathologist blinded to the sampling technique to prevent observer bias. The diagnostic performance of Pipelle sampling was compared with conventional D&C histopathology reports, which served as the reference standard. Data were analyzed using SPSS software.

Results

Comparison between Pipelle endometrial sampling and dilatation and curettage (D&C) revealed comparable diagnostic yields across various histopathological categories. The most frequent finding was simple hyperplasia without atypia (46.25% in Pipelle and 47.5% in D&C), followed by disordered proliferative endometrium (25% and 20%, respectively). Proliferative endometrium was identified in 10% of cases in both methods, while Pipelle detected fewer endometrial polyps (3.75%) compared to D&C (10%). Minor variations were noted in cases of hormonal effect, endometrial carcinoma, and others, with overall close concordance between both techniques, demonstrating Pipelle's reliability as a minimally invasive alternative to D&C.

Assessment of sampling adequacy in relation to endometrial thickness (ET) showed that Pipelle provided adequate samples in 92.3% of women with normal ET and 73.33% with abnormal ET, the difference being statistically significant (p = 0.000). D&C yielded adequate tissue in 90.77% and 80% of respective groups, which was not statistically significant (p = 0.585). These results indicate that Pipelle achieves high adequacy rates comparable to D&C, though endometrial thickness influences sample sufficiency. Diagnostic performance analysis demonstrated that Pipelle sampling achieved high sensitivity, specificity, and accuracy for most endometrial pathologies. Sensitivity and specificity were highest (100%) for proliferative endometrium, hormonal effect, and endometrial carcinoma. The lowest sensitivity (20.3%) was observed for miscellaneous findings, though specificity remained high (98.1%). Overall diagnostic accuracy exceeded 80% across all categories, confirming Pipelle's effectiveness in detecting common endometrial abnormalities.

Table 1: Comparison of Pipelle HPE and D&C HPE

Findings	Pipelle HPE		D&C HPE	
	N	%	N	%
Nil	5	6.25	5	6.25
Simple hyperplasia without atypia	37	46.25	38	47.5
Disordered proliferative endometrium	20	25	16	20
Proliferative endometrium	8	10	8	10
Endometrial polyp	3	3.75	8	10
Hormone effect	3	3.75	1	1.25
Endometrial carcinoma (CA)	2	2.5	1	1.25
Others	2	2.5	3	3.75

Table 2: Adequacy in Pipelle/D&C Distribution in Relation to Endometrial Thickness (ET)

Adequacy		TVS ET Normal (n=65)	TVS ET Abnormal (n=15)	Total (n=80)	P value
Adequacy in Pipelle	Adequate	60 (92.3%)	11 (73.33%)	71	0.000*
	Scanty	5 (7.7%)	3 (20%)	8	
	Not obtained	0 (0%)	1 (6.67%)	1	

Adequacy in D&C	Adequate	59 (90.77%)	12 (80%)	71	0.585
	Scanty	5 (7.69%)	2 (13.33%)	7	
	Not obtained	1 (1.54%)	1 (6.67%)	2	

*: Significant

Table 3: Sensitivity and specificity

Findings	Sensitivity (%)	Specificity (%)	Accuracy (%)
Simple hyperplasia without atypia	84.2	88.5	85.2
Disordered proliferative endometrium	60.3	88.1	83.7
Proliferative endometrium	100	98.7	98.6
Endometrial polyp	45.9	95.5	92.3
Hormone effect	100	100	100
Endometrial carcinoma (CA)	100	100	100
Others	20.3	98.1	

Discussion

In the present study, comparison of Pipelle endometrial sampling and dilatation & curettage (D&C) showed similar diagnostic accuracy across most histopathological findings. The most frequent lesion was simple hyperplasia without atypia (46.25% in Pipelle vs. 47.5% in D&C), followed by disordered proliferative endometrium (25% vs. 20%). Both methods identified 10% proliferative endometrium, though Pipelle detected fewer polyps (3.75% vs. 10%). Pipelle achieved adequate sampling in 92.3% of women with normal and 73.3% with abnormal endometrial thickness, comparable to D&C. The diagnostic accuracy of Pipelle endometrial sampling with conventional dilatation and curettage (D&C) in 140 women with AUB was assessed a previous study conducted by Abdelazim IA et al. Endometrial tissue was first obtained using the Pipelle device, followed by D&C, which served as the gold standard. Adequate samples were obtained in 97.9% of Pipelle cases and 100% of D&C cases. Pipelle sampling showed 100% sensitivity, specificity, and accuracy for diagnosing endometrial hyperplasia, carcinoma, and normal endometrial phases. It demonstrated 88.9% sensitivity for endometritis and 60% for polyps. The study concluded that Pipelle endometrial sampling is a reliable, safe, and cost-effective outpatient alternative to D&C, offering high diagnostic accuracy without the need for anesthesia.[13]

In the present study, diagnostic performance was high, with 100% sensitivity and specificity for proliferative endometrium, hormonal effects, and malignancy, and overall accuracy exceeding 80%, confirming Pipelle's reliability as a minimally invasive alternative to D&C. Fakhar et al, in a previous study, compared Pipelle endometrial sampling with conventional dilatation and curettage (D&C) in 100 women presenting with abnormal uterine bleeding. Pipelle showed 100% sensitivity, specificity, and predictive values for diagnosing endometrial carcinoma, hyperplasia, and secretory endometrium. It also demonstrated high accuracy for hyperplasia with atypia and proliferative endometrium, though lower sensitivity (57%) for endometritis. The study concluded that Pipelle is a safe, reliable, and less invasive alternative to D&C, offering

excellent diagnostic accuracy for endometrial pathology.[14] In another previous study conducted by Sanam et al, authors compared Pipelle endometrial biopsy with diagnostic curettage in 130 women over 35 years with abnormal uterine bleeding. Both methods showed 88% agreement in sampling adequacy and 94% concordance in histopathology, with Pipelle demonstrating over 97% diagnostic accuracy and a failure rate below 5%. Sensitivity and specificity were high for most endometrial patterns and malignancy but lower for atrophic endometrium. Pipelle was faster, less expensive, and required no anesthesia, making it an effective alternative to conventional curettage.[15] Pipelle endometrial sampling is a safe and reliable alternative to conventional dilatation and curettage (D&C). It is a simple, accurate, and cost-effective outpatient procedure that eliminates the need for general anesthesia while maintaining high sensitivity and specificity for diagnosing endometrial hyperplasia and carcinoma.[10, 11]

Conclusion

Pipelle endometrial sampling is a simple, safe, and cost-effective outpatient procedure with excellent patient compliance and minimal complications compared to D&C. It provides adequate tissue with high sensitivity and specificity, making it a reliable first-line diagnostic tool for evaluating endometrial pathology in AUB.

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