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Role of Suction Pipelle in Diagnosis of Endometrial Lesions in Patients with Perimenopausal Bleeding

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ABSTRACT

Background: Suction pipelle helps for taking endometrial samples for detection of abnormal uterine bleeding.

Objective: To determine if suction pipelle can be used instead of traditional dilatation and curettage (D & C) for detection of endometrial lesions among perimenopausal bleeding patients.

Subjects and Methods: We conducted our cross-sectional study, at Obstetrics and Gynecology Department, Faculty of Medicine, Zagazig University Hospitals, and Matrouh Maternity Hospital on sixty patients with abnormal uterine bleeding (AUB). Two samples were taken from women complaining of perimenopausal bleeding, one by pipelle device without need to anesthesia and the other by D & C after general anesthesia, then comparing the findings of histological analysis of both, with D & C, which is the gold standard approach for endometrial sampling.

Results: When it came to detecting secretory and hormone-dependent endometrium, atypical hyperplasia and EEC grade 1 with both methods, there was a perfect match. Some cases of proliferative endometrium and simple hyperplasia were correctly diagnosed using the pipelle after D & C failed to do so (20% and 16.6% by pipelle versus 16.6% and 13.3% by D & C respectively). Endometrial polyps and disorganised proliferative hyperplasia were among the conditions that the pipelle failed to detect, and this is disappointing.

Conclusion: EEC grade 1 and simple endometrial hyperplasia, as well as secretory endometrium, hormone-dependent endometrium, and simple hyperplasia were all easily diagnosed using pipelle's high sensitivity and specificity. Endometrial polyp and disorganized endometrial hyperplasia were difficult to detect with this test because of its limited sensitivity.

Keywords: Suction pipelle, Endometrial lesions, Perimenopausal bleeding.

INTRODUCTION

Among women who see doctors for endometrial cancer screening, perimenopausal bleeding is a common complication **(1).** It is possible for a woman to have abnormal uterine bleeding even when she does not have a medical condition, pelvic pathology, or pregnancy. Endometrial stimulation by ovulatory hormones is disrupted, and this is reflected in the irregular cyclic pattern. The bleeding might be heavy or mild, long or short, frequent or sporadic, and it can be frequent or seldom **(2).**

Non-gravid women's AUB has been classified by the International Federation of Gynecology and Obstetrics (FIGO) using the PALM-COEIN classification system, which contains nine major categories: endometrial, leiomyoma, adenomyosis, polyp, hyperplasia, malignancy, ovulatory dysfunction, coagulopathy, iatrogenic, as well as others which were not yet classified **(3).**

There are many ways to examine the endometrium in women who are experiencing abnormal uterine bleeding, including ultrasound, D & C, office-based procedures such as hysteroscopy, and samplers such as the suction pipelle **(4)**.

Because endometrial carcinoma is the most common cause of perimenopause-related uterine haemorrhage, a biopsy is the best way to rule out the cancer and avoid needless, potentially dangerous, surgery **(5).**

Endometrial sampling has relied on dilatation and curettage since the 1970s. However, in 60% of cases, it may result in an endometrial curettage that is less than 50% effective, and there is also a risk of infection and peroration. Additionally, a trip to the hospital and either local or general anesthesia are required **(4).**

In contrast, pipelle is a straightforward outpatient procedure that does not necessitate hospitalization, general anaesthesia, or cervical dilation and allows for nearly painless endometrial samples **(6).**

It was the goal of this study to determine if suction pipelle can be used instead of traditional D & C for detection of endometrial lesions among perimenopausal bleeding patients.

SUBJECTS AND METHODS

At Obstetrics and Gynecology Department, Zagazig University Hospital and Matrouh Maternity Hospital, sixty patients with abnormal uterine bleeding were studied in cross-sectional trial.

Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee (ZU-IRB #8071). Every patient signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

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Inclusion criteria: Patients age group between 40 and 55 years present with perimenopausal bleeding not responding to medical therapy, and endometrial thickness is more than 12 mm**.**

Exclusion criteria: Pregnancy, patients with genital tract acute inflammation, cervical malignancy, bleeding disorder, patients on anticoagulant treatment or on hormonal replacement therapy or fibroid uterus.

All participants were subjected to the following:

1. **A thorough review of the patient's medical history**, menstrual, obstetric and contraceptive history were taken
2. **Complete general examination.**
3. **Gynecological Examination:** Including abdomen, pelvic examination (external genitalia, vagina, cervix, bimanual examination.
4. **Transvaginal ultrasound:** Examination was performed with endovaginal transducer of 5-7.5 MHz frequency**.**
5. **Laboratory investigation including:** Full blood count, Rh grouping, fasting blood glucose, liver and kidney function tests, coagulation profile, ECG, hepatitis viruses markers, pregnancy test.
6. **Sample collection technique:**

Upon arrival in the operating room on the day of the surgery, the patient underwent a vaginal wash and speculum implantation in lithotomy position prior to anesthesia, dilatation, and sampling with a suction pipelle.

Once within the uterus, pipelle was gently guided into place. Once the piston of the sheath was submerged, the pipelle was slowly moved. Moving and rotating the pipelle in the endometrial cavity is necessary to retrieve tissue from the entire uterine wall. After that, the tissue was gathered and stored in a container A for later use.

After general anesthesia, a Sims curette number 3 or 4 was used for dilatation and curettage, and samples were collected in container B.

Pathologist assessed samples for histological assessment. Neither the patient nor the pathologist was aware of the sampling sequence or the method used. The pathology of pipelle-obtained endometrial tissue was compared to that of D & C, the gold standard procedure.

Statistical analysis

In order to analyze the data acquired, Statistical Package of Social Sciences version 20 was used to execute it on a computer (SPSS). In order to convey the findings, tables and graphs were employed. Quantitative data were presented in the form of mean, median, standard deviation, and confidence intervals. The information was presented using qualitative statistics such as frequency and percentage. The student's t test (T) was used to assess the data while dealing with quantitative independent variables. Pearson Chi-Square and Chi-Square for Linear Trend (X^2) were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

Age, BMI, duration of bleeding as well as endometrial thickness are all summarized in (Table 1).

Table (1): Characteristics of the studied group

Variables	Cases N=60	
Age (years)		
Mean ± SD	44.8 ± 10.2	
Range	40 – 55	
Parity number		
Mean ±SD	2.8 ± 4.21	
Range	0 – 5	
BMI	**No.**	**%**
Normal	18	30
Overweight	19	32.5
Obese	23	37.5
Duration of bleeding (days)		
Mean ±SD	23.8 ± 15.8	
Range	7 – 90	
Endometrial thickness (mm)		
Mean ±SD	16.2 ± 2.71	
Range	14 – 19	

Menorrhagia, poly-menorrhagia, postmenopausal bleeding, and metrorrhagia were the most frequently reported symptoms among the participants in the study, with a combined 32.5% of the participants reporting them (Table 2).

Table (2): Symptoms presented among the studied group

Symptoms	Cases (N=60)	
	N	Percent %
Menorrhagia	19	32.5
Poly-menorrhea	14	23.3
Metrorrhagia	13	20.8
Post-menopausal bleeding	14	23.3

When comparing pipelle as well as D & C, both were perfect to detect EEC grade 1, secretory endometrium, atypical hyperplasia, as well as hormone-dependent endometrium while it was over in estimating simple hyperplasia and positive endometrial cases (13.3% and 16.6b% versus 16.6% and 20% respectively) as shown in table (3).

Table (3): Comparison of results obtained by D & C and pipelle device

Symptoms	Cases N=60	
	D & C N (%)	Pipelle N (%)
Proliferative endometrium	10 (16.6)	12 (20)
Secretory endometrium	9 (15.2)	9 (15.2)
Endometrial polyp	10 (16.6)	6 (10)
Disordered proliferative endometrium	12 (20)	10 (16.6)
Hormone dependent endometrium	6 (10)	6 (10)
Simple endometrial hyperplasia	8 (13.3)	10 (16.6)
Atypical endometrial hyperplasia	2 (3.3)	2 (3.3)
EEC grade 1	2 (3.3)	2 (3.3)
Insufficient sample	1 (1.6)	3 (5.0)

A high statistically significant excellent agreement was found between both results of pipelle device and the gold standard D & C [kappa agreement test > 0.8 (P-value<0.001)] (Table 4).

Table (4): Agreement between results of D & C and that of pipelle device

	Symptoms	D & C (N=60)									
		Proliferative endometrium	Secretory endomet.	polyp	DPE	HDE	Simple hyperplasia	Atypical hyperplasia	EEC 1	Insufficient sample	Total
Pipelle	Proliferative endometrium	10	0	0	0	0	0	0	0	0	10
	Secretory endometrium	0	9	0	0	0	0	0	0	0	9
	Endometrial polyp	2	0	6	0	0	0	0	0	2	10
	Disordered proliferative endometrium	0	0	0	10	0	2	0	0	0	12
	Hormone dependent endometrium	0	0	0	0	6	0	0	0	0	6
	Simple endometrial hyperplasia	0	0	0	0	0	8	0	0	0	8
	Atypical endometrial hyperplasia	0	0	0	0	0	0	2	0	0	2
	EEC grade 1	0	0	0	0	0	0	0	2	0	2
	Insufficient sample	0	0	0		0	0	0	0	1	1
	Total	12	9	6	10	6	10	2	2	3	60
Kappa test						P –value					
0.861						<0.001 (HS)					

When it came to detect proliferative endometrium, simple and atypical hyperplasia, and EEC grade 1, the sensitivity of pipelle sampling was 100%, while it was only 89% sensitive when it came to find disordered endometrium. it was only 53.3% sensitive when it came to find polyps (Table 5).

Table (5): Reliability data of pipelle device results in comparison to D & C results

pathology	Pipelle device results (N=60			
	Sensitivity	**Specificity**	**PPV**	**NPV**
Proliferative endometrium	100%	97%	88%	100%
Secretory endometrium	100%	100%	100%	100%
Endometrial polyp	53.3%	100%	100%	91.7%
Disordered proliferative endometrium	89%	100%	100%	97.4%
Hormone dependent endometrium	100%	100%	100%	100%
Simple endometrial hyperplasia	100%	95%	75%	95%
Atypical endometrial hyperplasia	100%	100%	100%	100%
EEC grade 1	100%	100%	100%	100%

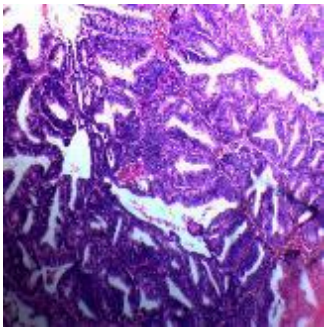

Fig. (1): Histopathological image (1): Endometrial Carcinoma, showing closely packed malignant glands lined by multiple layers of cells obtained by pipelle biopsy.

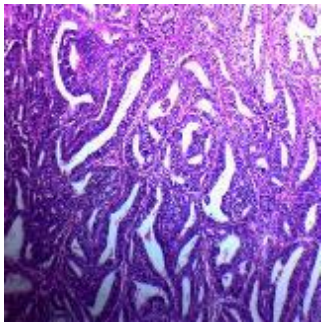

Fig. (2): Histopathological image (2): the same case by D&C biopsy showing Endometrial carcinoma

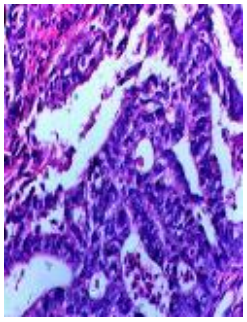

Fig. (3): Histopathological image (3): Higher magnification of previous figure

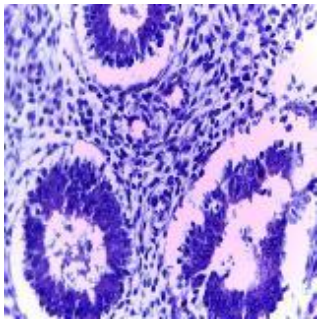

Fig. (4): Histopathological image (4): Endometrial hyperplasia with focal atypia obtained by pipelle biopsy

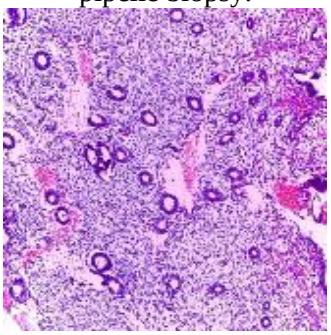

Fig. (5): Histopathological image (5): Simple endometrial Hyperplasia obtained by pipelle biopsy

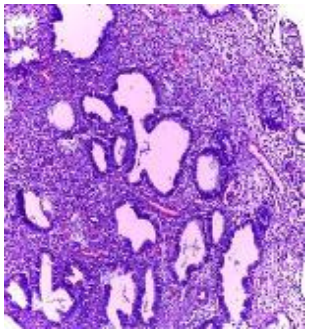

Fig. (6): Histopathological image (6): Benign endometrial hyperplasia showing increased glandular to stroma ratio by pipelle

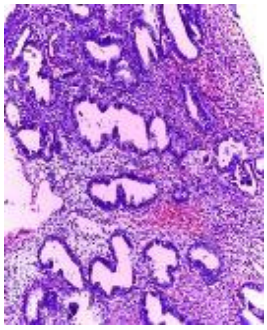

Fig. (7): Histopathological image (7): The same case obtained by D&C biopsy showing benign hyperplasia

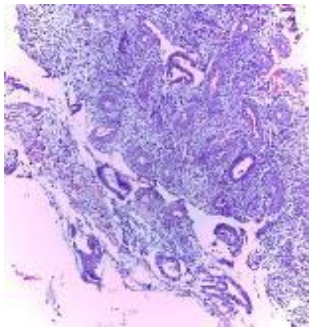

Fig. (8): Histopathological image (8): Endometrial Polyp obtained by pipelle biopsy

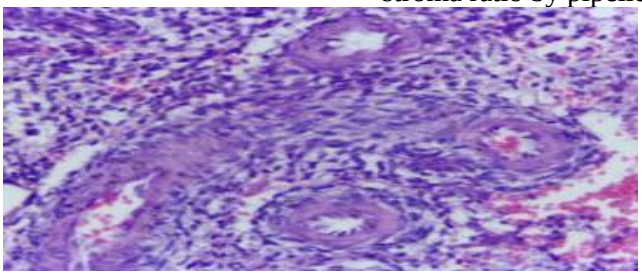

Fig. (9): Histopathological image (9): Higher magnification of previous figure showing hyperplastic glands in a fibrous stroma and thick walled blood vessels

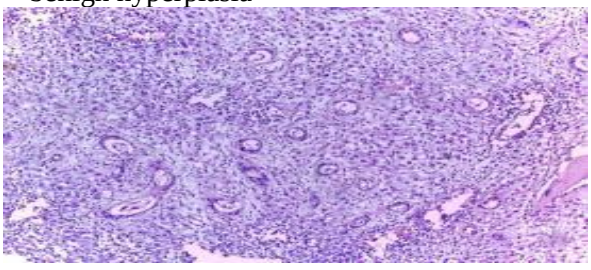

Fig. (10): Histopathological image (10): Showing atrophic endometrium obtained by pipelle biopsy

DISCUSSION

Women's reproductive, perimenopausal, and postmenopausal years are all affected by the AUB. Pre- and postmenopausal women should have their AUB thoroughly evaluated to rule out atypical endometrial hyperplasia and cancer as potential causes [5]. Endometrial tissue histopathology is still the gold standard for diagnosing AUB. A variety of invasive and non-invasive methods, including the pipelle technique, D & C, and hysteroscopic guided biopsy, are now being used to collect endometrial samples [7]. Endometrial hyperplasia can be diagnosed using the pipelle method, although previous investigations highlighted questions about the quality of the endometrial samples used and the accuracy of the test [8].

Therefore, we undertook a study to compare pipelle sampling to the gold standard approach, D & C, in the diagnosis of endometrial diseases in women with perimenopausal bleeding.

Regarding the clinical features of the study population, the ages of the studied group ranged from 40 up to 55 years with a mean of 44.8 years, parity of the studied group ranged from 0 to 5 times with a mean of 2.8, and according to BMI, 30% were normal, 37.5% of them were obese and 32.5% were overweight, from that it seems that most of patients were obese. This agrees with **Chandrakumari *et al.*** [6] as they showed that the mean age was 44.6 years. Also, the results are similar to **Rauf *et al.*** [9] as the mean age of the patients was 46.3 ± 4.45 years.

We found that 73.3% of the women we evaluated were in the pre-menopausal stage, whereas the remaining cases were post-menopausal. It is somewhat in line with the **Chandrakumari *et al.*** [6] study, which found that 62.3% of women were in pre-menopause.

Regarding complain, 32.5% of the women investigated had menorrhagia, 23.3% had poly-menorrhagia, 23.3% had postmenopausal bleeding, and 20.8% had metrorrhagia, according to the study. Patients included in **Chandrakumari *et al.*** [6] study had slightly different percentages of the common presentation. Because menorrhagia was the most common complaint, we observed that metrorrhagia, polycystic ovarian syndrome (PCOS), and postmenopausal haemorrhage were the next most common complaints in 48 (22.86 %) of the cases studied.

Regarding sufficiency of obtained sample: Sample sufficiency for histopathology was 97% for D & C and 90% for pipelle sampling in our investigation, with only one insufficient sample in each method. It nearly agrees with **Chandrakumari *et al.*** [6] study as pipelle sample had sufficiency rate of 95.2% while all D & C samples were adequate for histopathological examination, 100% sufficiency rate. According to **Alliratnam *et al.*** [10] D & C had a sample sufficiency rate of 96% while Pipelle had a rate of 93%. At **Moradan *et al.*** [4] study 84.6% of samples acquired by Pipelle and 90% of samples obtained by D & C were satisfactory. Sample sufficiency was 100 percent for D & C against 97.9 percent for pipelle in **Abdelazim *et al.*** [11] study, which found similar results.

Regarding histopathological examination by D & C and pipelle, when comparing pipelle as well as D & C, both were perfect to detect EEC grade 1, secretory endometrium, atypical hyperplasia, as well as hormone-dependent endometrium while it was over in estimating simple hyperplasia and positive endometrial cases (13.3% and 16.6b% versus 16.6% and 20% respectively). This is in accordance with **Chandrakumari *et al.*** [6] study where histopathological examination of endometrial samplings by D & C revealed that the 2 methods agreed in the diagnosis of cases of secretory endometrium, while there was over estimation of diagnosis of simple endometrial hyperplasia and atypical endometrial hyperplasia by pipelle device (40.5% and 3.3% versus 36.7% and 2.9% respectively by D & C), also there were some missed cases of proliferative endometrium, disordered proliferative endometrium, hormone-dependent endometrium and endometrial adenocarcinoma by pipelle device (16.2%, 14.3%, 2.3% and 3.3% versus 17.6%, 17.6%, 3.8% and 4.3% respectively by D & C). Endometrial sampling results of **Alliratnam *et al.*** [10] are also similar to our findings**.** In all cases of secretory endometrium and adenocarcinoma, histopathological investigation found that both approaches agreed. The pipelle device was overestimated in its ability to detect proliferative endometrium. No endometrial polyps were discovered by pipelle through the investigation, and proliferative endometrium was the most common cause of peri-menopausal bleeding, hence pipelle missed only one case of endometrial problem [11]. **Demirkiran *et al.*** [12] in their study of 478 patients disagrees with our findings. D & C biopsy histopathology revealed normal endometrium in 330 cases (69%), hyperplasia in 21 cases (4.4%), hyperplasia with atypia in 20 cases (4.2%), localised lesions in 89 cases (18.6%), atrophy in 9 instances (1.9%) and an insufficiency of endometrial in 9 instances in the examinations (1.9%). As a result of pipelle method, normal endometrium was found in 356 cases (74.5%), hyperplasia was found in 22 cases, hyperplasia with atypicality in 18 cases (3.8%), localised lesions were found in 59 cases (12.3%), atrophy in 7 cases (1.5%) and insufficient in 16 cases (3.3%)**.**

According to our study, pipelle sampling's sensitivity was 100 percent in detecting proliferative, secretory, hormonal-dependent endometrium, simple and atypical hyperplasia and EEC grade 1, whereas it was 89% in detecting disordered endometrium and 53.3% in just detecting polyps. The results of our study are in accordance with **Chandrakumari *et al.*** [6] where pipelle sampling method had 100% sensitivity in diagnosis of endometrial hyperplasia and atypical

endometrial hyperplasia, while it was 91.9% in diagnosis of proliferative endometrium, 96% in secretory endometrium and 81.1% in disordered proliferative. According to this study, the pipelle method exhibited a high sensitivity and negative predictive value in the diagnosis of abnormal endometrium because of the strong association between the two approaches. The study by **Alliratnam and colleagues** [(10)] supports our findings that pipelle has sensitivity of 100% in diagnosing proliferative, secretory, and adenomatous endometrium, while it had 90% sensitivity in diagnosing disordered proliferative endometrium and only 16% for endometrial polyps. This study showed that pipelle has 100% sensitivity in diagnosing these conditions. In **Moradan *et al.*** [(4)] study, pipelle was found to be sensitive to proliferative endometrial (94.4%), secretory endometrium (86.8%), endometrial cancer (100%), atrophic endometrium, and simple endometrial hyperplasia without atypia each account for 92.3% of all cases (50%). **Demirkiran *et al.*** [(12)] found that pipelle biopsy was more sensitive than our study in the detection of endometrial hyperplasia. Our findings disagree with them where there are discrepancies because different age groups have been considered as inclusion criteria in this and other studies. Also, a bigger sample size and the use of different equipment could be to blame.

CONCLUSION

When compared to D & C, pipelle suction was less invasive, less painful, and more cost-effective outpatient technique that provides comparable histopathological samples and results without the use of general anesthesia or any of its associated risks. EEC grade 1 and simple endometrial hyperplasia, as well as secretory endometrium, hormone-dependent endometrium, and simple hyperplasia, were all easily diagnosed using pipelle's high sensitivity and specificity. Endometrial polyp and disorganized endometrial hyperplasia are difficult to detect with this test because of its limited sensitivity.

To collect an endometrial sample from women experiencing perimenopausal uterine haemorrhage, a simple technique called pipelle suction can be utilized as a screening procedure.

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Author contribution: Authors contributed equally in the study.

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