Comparison of the histopathological diagnoses of preoperative dilatation and curettage and Pipelle biopsy

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Summary

Purpose: To evaluate the accuracy of dilatation and curettage (D&C) and Pipelle biopsy for the diagnosis of endometrial pathologies and determine whether the amount of endometrial tissue obtained using these techniques is sufficient for further histopathology of hysterectomy specimens. *Materials and Methods:* Patients undergoing hysterectomy for various indications were evaluated via Pipelle endometrial biopsy or D&C from 2009–2011. A total of 267 women were included with 78 women enrolled in the Pipelle group and 189 in the D&C group. Uterine findings were grouped as normal, hyperplasia, focal lesion, atypia, and atrophy. Histological sections from the Pipelle biopsy or D&C specimens were compared to each other and hysterectomy specimens. *Results:* The concordance rate between Pipelle biopsy and hysterectomy was 62% and between D&C and hysterectomy was 67%. The sensitivity of Pipelle biopsy and D&C for detecting hyperplasia was 41.7% and 45%, respectively, and for detecting atypia was 71.4% for both techniques. The sensitivity of detecting atrophic endometrial tissue was significantly higher in the D&C group at 80% compared to 37.5% in the Pipelle biopsy group ($p = 0.030$). All other parameters were similar in both groups. *Conclusion:* Pipelle biopsy and D&C were equally successful for diagnosing endometrial pathologies. Neither Pipelle biopsy nor D&C was adequate for detecting focal endometrial pathologies and endometrial hyperplasia. In contrast, both techniques were sufficient for the diagnosis of atypia. The Pipelle biopsy technique is a reasonable pre-hysterectomy procedure that is more economical, less invasive, and can easily be performed in multiple clinics.

Key words: Pipelle biopsy; Dilatation and curettage; Endometrial pathologies.

Introduction

Gynecologists routinely sample the endometrium before a hysterectomy to detect unsuspected or asymptomatic endometrial pathologies as part of the preoperative workup regardless of the indication for hysterectomy [1]. Several endometrial sampling techniques are used to diagnose endometrial abnormalities for patients with or without abnormal uterine bleeding, including dilatation and curettage (D&C), aspiration techniques (Pipelle biopsy), and hysteroscopy [2].

D&C is the method of choice for obtaining an endometrial sample [3]. However, patients must undergo general anesthesia and are at risk for complications such as infections, bleeding, and uterine perforation, which collectively cause physicians to question the suitability of the procedure [4. 5]. In contrast, hysteroscopy is an effective procedure, although more expensive than D&C. Hysteroscopy also requires general anesthesia with similar complications to D&C. Thus, there is a need for an accurate, less invasive, more economical, and easily applicable method for early histological diagnosis of premalignant and malignant pathologies. Pipelle is a flexible polypropylene endometrial biopsy cannula that does not require a syringe or pump. A Pipelle biopsy can be performed during an office visit without general anesthesia or cervical dilatation and is less invasive [6].

This study examined the accuracy of D&C and Pipelle biopsy in pre-hysterectomy endometrial sampling for the diagnosis of endometrial pathologies and determined whether the amount of endometrial tissue obtained with the techniques is sufficient for further histopathology of hysterectomy specimens.

Materials and Methods

The authors retrospectively analyzed the charts of all patients who underwent a hysterectomy for various indications at the Departments of Gynecology and Obstetrics, Istanbul Teaching Hospital and Şişli Etfal Teaching Hospital from 2009 to 2011. Patients were excluded from the study if their medical records were incomplete or if the endometrium was sampled more than 30 days before hysterectomy. A total of 267 patients were enrolled with these criteria. This study was approved by the local ethics committee and informed consent of all of the patients was obtained before the procedure by informing patients about the implementation details of the diagnostic methods to be used and possible complications before the procedures.

Detailed gynecological histories of all of the cases were collected, and following physical and gynecological examinations, blood was collected for laboratory tests. β-human chorionic gonadotropin was measured to rule out pregnancy in patients that had not entered menopause. Transvaginal ultrasound examination prior to endometrial biopsy was performed in all patients using an ultrasound eight-MHz transvaginal probe. Endometrial thick-

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Table 1. — *Demographic characteristics of patients.*

	Pipelle group (n = 78)	D&C group (n = 189)	*p* value	OR (95% CI)
Age ± SD (year)	49.8 ± 6.1	48.2 ± 6.5	0.066	—-
Menopausal status				
Premenopausal, n (%)	48 (61.5)	103 (54.5)	0.291	1.3 (0.7–2.2)
Postmenopausal, n (%)	30 (38.5)	86 (45.5)		
Endometrial thickness				
≥ 10 mm, n (%)	33 (42.3)	90 (47.6)	0.428	0.8 (0.4–1.3)
< 10 mm, n (%)	45 (57.7)	99 (52.4)		
Type of hysterectomy				
Abdominal, n (%)	63 (80.8)	154 (81.5)	0.892	0.9 (0.4–1.8)
Vaginal, n (%)	15 (19.2)	35 (18.5)		
Gravidity ± SD	4.7 ± 2.4	4.5 ± 2.4	0.550	
Tobacco use, n (%)	11 (14.4)	28 (14.8)	0.881	0.9 (0.4–2.0)

CI: confidence interval; D&C: dilatation and curettage; OR: odds ratio; SD: standard deviation.

Table 2. — *Clinical outcomes of patients who underwent Pipelle biopsy and hysterectomy (n = 78).*

	Hysterectomy					
	Normal (43)	Hyperplasia (12)	Focal lesion (8)	Atypia (7)	Atrophy (8)	Insufficient (0)
Pipelle						
Normal (48)	32	6	5	1	4	0
Hyperplasia (6)	1	5	0	0	0	0
Focal lesion (6)	2	0	3	1	0	0
Atypia (5)	0	0	0	5	0	0
Atrophy (9)	6	0	0	0	3	0
Insufficient (4)	2	1	0	0	1	0

Data are expressed as the number of patients (n) in each category.

ness was measured in the sagittal plane. The authors chose a cut-off level of ten mm because they defined the top ten mm as thick endometrium.

To perform a D&C, the patient was placed on the table in the lithotomy position and general anesthesia administered as necessary. After a careful pelvic examination to locate the position of the uterine body, the vagina, and perineum were cleaned. The cervix was dilated with small Hegar dilators as a preliminary step to curettage of the uterine cavity.

The authors implemented the Pipelle device in the dorsal lithotomy position. If necessary, the cervix was held with tenaculum forceps during Pipelle insertion into the cervical canal. After reaching the fundus, the pistol was pulled back to provide negative pressure and endometrial tissue was aspirated. The procedure was attempted twice and samples were preserved in formalin.

All samples were evaluated in the pathology department of two institutions (Istanbul Teaching Hospital and Şişli Etfal Teaching Hospital pathology department). Histopathological findings were categorized into six groups: normal, hyperplasia, focal lesions, atypia, atrophy, and insufficient material. Proliferative and secretory endometrium were included in the normal group; polyps and submucous myomas were included in focal lesion group; simple and complex hyperplasia without atypia were included in hyperplasia group; atypical hyperplasia and carcinoma were included in the atypia group; and atrophic endometrium was included in the atrophy group. The pre- and postoperative histopathological findings were evaluated for each case and the histopathological diagnosis of the endometrial sample was compared to the endometrial diagnosis for the hysterectomy specimen. The sensitivity and specificity of Pipelle and D&C were calculated by comparison with the final pathological diagnosis.

SPSS 17 for Windows was used for statistical analysis. The data are presented as means ± standard deviation (SD) or percentage according to the variables. Chi-squared tests were used to analyze categorical variables; the Student's *t*-test and Mann–Whitney *U*-test were used for continuous variables. Relative risk (RR) with a 95% confidence interval (CI) was calculated. Statistical significance was considered to be at $p < 0.05$.

Results

A total of 267 women were included in the study, with 78 in the Pipelle group and 189 in the D&C group. Maternal demographic characteristics are shown in Table 1. No differences were observed between the Pipelle group and the D&C group regarding mean maternal age (49.8 ± 6.1 vs. 48.2 ± 6.5 years) or gravidity (4.7 ± 2.4 vs. 4.5 ± 2.4). Furthermore, the rate of premenstrual status (61.5% vs. 54.5%), endometrial thickness measures (42.3% vs. 47.6%), and the patients who subsequently underwent abdominal hysterectomy (80.8% vs. 81.5%) were similar between groups.

The authors compared the results of Pipelle endometrial sampling and the endometrial histopathology obtained from hysterectomy in 78 cases (Table 2). The highest histopathological compliance between Pipelle and hysterectomy was seen in patients with normal endometrial tissue and atypia. Among 49 patients with normal endometrial

Table 3. — *Clinical outcomes of patients who underwent D&C and hysterectomy (n = 189).*

	Hysterectomy					
	Normal (111)	Hyperplasia (20)	Focal lesion (24)	Atypia (14)	Atrophy (20)	Insufficient (0)
D&C						
Normal (105)	80	10	10	2	3	0
Hyperplasia (14)	4	9	1	0	0	0
Focal lesion (26)	10	0	13	2	1	0
Atypia (10)	0	0	0	10	0	0
Atrophy (27)	10	1	0	0	16	0
Insufficient (7)	7	0	0	0	0	0

Data are expressed as the number of patients (n) in each category. D&C: dilatation and curettage

Table 4. — *Comparison of sensitivity and specificity between groups*

	Pipelle group (n = 78)	D&C group (n = 189)	*p* value	OR (95% CI)
Sensitivity				
Normal tissue (%)	32/43 (74.4)	79/111 (71.2)	0.687	1.0 (0.8–1.2)
Hyperplasia (%)	5/12 (41.7)	9/20 (45.0)	0.854	0.9 (0.4–2.1)
Focal lesion (%)	3/8 (37.5)	13/24 (35.1)	0.899	1.1 (0.2–5.3)
Atypia (%)	5/7 (71.4)	10/14 (71.4)	——	1.0 (0.5–1.7)
Atrophia (%)	3/8 (37.5)	16/20 (80.0)	0.030*	0.4 (0.1–1.1)
Specificity				
Normal tissue (%)	18/35 (51.4)	53/78 (67.9)	0.093	0.7 (0.5–1.0)
Hyperplasia (%)	65/66 (98.0)	164/169 (97.0)	0.528	1.0 (0.9–1.1)
Focal lesion (%)	67/70 (95.7)	152/165 (92.1)	0.317	1.0 (0.9–1.1)
Atypia (%)	71/71 (100)	165/165 (100)	—-	—-
Atrophia (%)	64/70 (91.4)	158/169 (93.5)	0.572	0.9 (0.9–1.0)
Insufficient tissue, n (%)	4 (5.1)	7 (3.7)	0.594	1.3 (0.4–4.5)

CI: confidence interval; D&C: dilatation and curettage; OR: odds ratio; SD: standard deviation. *statistically significant.

tissue obtained by Pipelle sampling, six of 49 lesions (12%) were diagnosed as hyperplasia based on the final pathology results obtained by hysterectomy. Furthermore, five of 49 lesions (10%) were diagnosed as focal lesions with the final pathology results. Two normal endometrial tissues obtained from Pipelle biopsy were upgraded to atypia upon final histopathological analysis.

D&C histopathology findings were compared to those of the subsequent hysterectomy specimen in 189 cases (Table 3). The highest histopathological compliance rate between D&C and hysterectomy was seen in patients with normal, atypia, and atrophy endometrial tissue. In contrast, the lowest histopathological compliance rate between D&C and hysterectomy was seen in patients with hyperplasia, which was similar to the Pipelle group. All insufficient tissue samples (7/7) obtained from D&C were upgraded to normal endometrial tissue upon final histopathology.

The authors also compared the sensitivity and specificity to the two different techniques (Table 4). The sensitivity was similar between the groups for detection of normal endometrial tissue, 74.4% vs. 71.2% ($p = 0.687$); hyperplasia, 41.7% vs. 45.0% ($p = 0.854$); and focal lesions, 37.5% vs. 35.1% ($p = 0.899$). Furthermore, the rate of atypia was the same between the groups (71.4% vs. 71.4%). Only the sensitivity of detecting atrophic endometrial tissue was significantly different with 37.5% in the Pipelle group vs. 80.0% in the D&C group ($p = 0.030$). The highest sensitivity was normal endometrial tissue at 74.4% for the Pipelle group and atrophy at 80.0% for the D&C group. The specificities of histopathological findings were high in both groups; only normal endometrial tissue specificity was lower than 90% in both groups, with 51.4% in the Pipelle group vs. 62.7% in the D&C group ($p = 0.257$). The rate of insufficient tissue sampling was also similar between the groups with 5.1% in the Pipelle group vs. 3.7% in the D&C group ($p = 0.594$). The four cases of insufficient tissue obtained in the Pipelle group were from patients with an endometrial thickness < ten mm.

Discussion

Endometrial sampling is a frequently performed gynecological procedure that is an important step during the pre-hysterectomy workup. Various methods of endometrial sampling are used in practice; D&C is accepted as the traditional method but a Pipelle biopsy is a minimally invasive, more economical, and less time-consuming outpatient procedure. The authors evaluated the accuracy of Pipelle biopsy and D&C for the diagnosis of endometrial

pathologies and determined whether the amount of tissue obtained is sufficient for further histopathological analysis. The results demonstrated that both techniques resulted in an equally accurate diagnosis of endometrial pathologies.

Fothergill *et al.* [7] was the first to compare the diagnostic accuracy of Pipelle biopsy and D&C and found 84% concordance between the two methods for 187 cases. Goldschmit *et al.* [8] performed Pipelle endometrial biopsy prior to D&C in 176 consecutive patients and reported that Pipelle biopsy resulted in a 39% rate of false-negative results for endometrial polyps and hyperplasia in premenopausal patients. The authors suggested that the low sensitivity of Pipelle sampling may be correlated with the focal location of hyperplasia. In the present study, a lower sensitivity rate was seen in focal lesions and hyperplasia in both the Pipelle and D&C groups, confirming the findings of Goldschmit *et al.* [8]. Thus, hysteroscopy would be superior to Pipelle sampling and D&C for detecting hyperplasia in high-risk patients, such as diabetics, the obese, and low parity-postmenopausal women, because the entire uterine cavity can be observed and the area in question curreted [9, 10].

The authors performed a Pipelle biopsy prior to hysterectomy in 78 patients to evaluate the diagnostic accuracy of Pipelle for endometrial pathology. The histopathologic results on the specimen were 62% (48/78) concordant with the Pipelle biopsy. Remarkably, hyperplasia, atrophy, and focal lesion sensitivity were very low but specificity was very high. However, the sensitivity for atypia was reasonable with only two cases missed by Pipelle biopsy, which is an important indicator because atypia is a life-threatening pathology. In 2000, Dijkhuizen *et al.* [11] published a meta-analysis that reported 25–100% sensitivity and 93–100% specificity of Pipelle biopsy for endometrial carcinoma. They concluded that endometrial biopsy with the Pipelle is superior to other endometrial techniques for detecting endometrial carcinoma and atypical hyperplasia. In contrast, the present authors found that Pipelle was not superior to traditional techniques. In another study, one in three cases of adenocarcinoma of the endometrium could not be detected by Pipelle [12], which was similar to the present results that two in seven cases of atypia of the endometrium could not be detected by Pipelle. Guido *et al.* [13] performed Pipelle biopsy prior to hysterectomy in 65 cases diagnosed previously as endometrial carcinoma. Malignancy was detected in 54 patients, a sensitivity of 83 ± 5%. Of the 11 patients with false-negative results, five had tumors present in only an endometrial polyp, and three had disease localized to <5% of the surface area of the endometrium. The authors concluded that the Pipelle endometrial suction curette is an effective device for evaluating patients at risk of endometrial cancer; however, tumors localized to a polyp or small area of endometrium may go undetected. In the present study, the rate of atypia sensitivity was high at 71.4%, but a lower sensitivity rate was seen in focal lesions at 37.5%, similar to that reported by Guido *et al.* [13].

The present authors found a concordance rate of 67% (128/189) between D&C and hysterectomy, higher than that between Pipelle biopsy and hysterectomy. Epstein *et al.* [14] reported that D&C missed 58% (25/43) of polyps, 50% (5/10) of hyperplasias, 60% (3/5) of complex atypical hyperplasias, and 11% (2/19) of endometrial cancers. Here, the present authors report similar results in that D&C failed to diagnose focal lesions in 11/24 cases and hyperplasia in 11/20 cases. Bettocchi *et al.* [15] confirmed the inadequacy of D&C as a diagnostic tool for all uterine disorders because major intrauterine diseases (myomas, polyps, and hyperplasia) were missed in 62.5% of patients. The limited value of D&C for the diagnosis of endometrial polyps and submucous myomas has been reported [15, 16], which supports the present results.

Another important issue is the power of obtaining sufficient material for endometrial sampling techniques. The insufficient sampling rate of Pipelle biopsy and D&C was 5% and 4%, respectively. Thus, the sampling rate of the two techniques is acceptable. The rate of insufficient tissue for Pipelle biopsy in the present study was consistent with the 8% failure rate reported by Clark *et al.* [17]. In addition, the rate of insufficient tissue from D&C in the present study was much lower than previous reports of 22.6% by Barut *et al.* [18].

The present authors also compared the sensitivity and specificity of the two different techniques and found that only the sensitivity rate of atrophic endometrial tissue was statistically higher in the D&C group. They attributed this to atrophic endometrial tissue not being aspirated with negative pressure.

In conclusion, Pipelle biopsy and D&C had an approximately equal success rate for the diagnosis of endometrial pathologies. Neither Pipelle biopsy nor D&C was an adequate method for diagnosis of focal endometrial pathologies and endometrial hyperplasias. In contrast, both methods seem sufficient for diagnosing atypia. The Pipelle biopsy technique is a reasonable pre-hysterectomy procedure that is more economical, less invasive, and can be easily performed in multiple clinics.

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