original article

Validity of pipelle endometrial sampling in patients with abnormal uterine bleeding

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Ann Saudi Med 2008; 28(3): 188-191

BACKGROUND AND OBJECTIVES: We compared endometrial sampling by pipelle endometrial curette with conventional dilatation and curettage (D&C) in patients with abnormal uterine bleeding.

METHODS: Endometrial sampling with pipelle curette was performed on 100 patients followed by formal D&C. Samples were labeled as A and B, respectively, and sent to a histopathologist who was blinded as to the method of sampling. The histopathology reports of both samples were compared, taking D&C as the gold standard.

RESULTS: An adequate sample was obtained in 98% of cases by pipelle and in 100% of cases by D&C. Pipelle had a sensitivity, specificity, positive predictive value and negative predictive value of 100% for diagnosing endometrial carcinoma, hyperplasia and secretory endometrium. Pipelle also had high diagnostic sensitivity, specificity and negative predictive value (100%, 98% and 100%, respectively) for hyperplasia with atypia, and low sensitivity (57%) and positive predictive value (57%), but high specificity (97%) and negative predictive value (97%) for endometritis. Similarly, for proliferative endometrium, the pipelle technique had values of 94% and 93% for sensitivity and specificity, respectively. Both samples labeled as inadequate for histology by pipelle were polyps on the D&C report. Difficult endotracheal intubation was encountered in two cases of D&C. No other complications of the procedure were observed.

CONCLUSION: The pipelle is a safe device for getting an adequate endometrial sample for histology, with a high sensitivity and specificity for detection of hyperplasia and malignancy.

Endometrial sampling for histopathology is important in the assessment of abnormal uterine bleeding, which is a major problem, accounting for 33% of outpatient gynecological referrals, including 69% of referrals in peri- and postmenopausal women.[1] Ten percent are found to have endometrial carcinoma on histopathology.[2] Dilatation and curettage (D&C) is the gold standard for endometrial sampling, but in 60% of cases less than half of the uterine cavity is curetted, with the added risk of general anesthesia, infection and perforation.[3,4] This has led to the advent of new and simple methods for endometrial sampling. Various devices are on the market nowadays, including the pipelle curette (Endocurrette, Midvale, Utah, USA). The safety and acceptability of this device has been reported in various studies and after successful use in tertiary care practice, it has been introduced into primary care.[5] The pipelle device can be used on an outpatient basis and is cost effective compared with D&C. However, there are still concerns regarding the adequacy of the sample obtained, nonsampling of focal intrauterine lesions and the accuracy of the histopathology report of the tissue sampled. D&C is more commonly used for endometrial sampling, even at the tertiary care level. This study was conducted to establish the validity of pipelle and adequacy of the endometrium sampled by pipelle for histopathology.

MATERIAL AND METHODS

One hundred patients 35 years of age and older who presented with abnormal uterine bleeding were enrolled in this study after providing informed consent to participation. The hospital ethical committee provided formal approval for conducting this study. Patients with lower genital tract infections, known cervical stenosis, and central endometrial thickness of <4 mm were excluded from the study. A consecutive sampling technique was used for eligible women. A detailed clinical assessment of patients performed in the outpatient department included a history, examination, and base-

line investigations, including pelvic ultrasound. The diagnostic intervention was endometrial sampling by the pipelle device and the diagnostic reference standard was endometrial sampling by D&C. Both procedures were performed in the operating theatre at the same time. First, the pipelle was introduced without performing cervical dilatation and then withdrawn outside with a rotatory movement to get the sample, which was labeled as A. The pipelle procedure was followed by the standard D&C procedure and that sample was labeled as B. Both samples were sent to a pathologist, who was blinded as to the method of sample collection, for histopathology assessment. The histopathology report of the pipelle sample was compared with that of the D&C sample, and the D&C report was used as the gold standard. Histopathology reports were categorized as proliferative, secretory, hyperplasia (simple or cystic), hyperplasia with atypia or complex hyperplasia and carcinoma.

The primary outcome measure was the validity of the pipelle technique for determining the histopathology of the endometrium in women who presented with abnormal uterine bleeding, especially for ruling out endometrial carcinoma. The secondary outcome measure was the adequacy of the tissue for histopathology, associated complications of the procedure and its failure rate. The sample was labeled as inadequate by the histopathologist when no endometrial tissue was present in the specimen sent. Failure of the procedure was inability to introduce the pipelle without cervical dilatation in three attempts. A database was made in SPSS version 10. Descriptive statistics were used for demographic features. Frequencies and percentages were used in describing results. A 2×2 table was used for calculating sensitivity, specificity, positive predictive value and negative predictive value of the pipelle versus D&C, the gold standard.

RESULTS

The mean (±SD) age of the study group was 45.4±7.2 years while the mean age of menarche was 13.3±1.1 years. The mode for parity was 6. Mean central endometrial thickness was 10.3±4.9 mm. The most common presenting complaint was menorrhagia (n=45) followed by polymenorrhagia (n=30), irregular bleeding (n=14) and postmenopausal bleeding (n=11). Tissue obtained for histopathology was 100% adequate when the procedure was D&C while it was adequate in 98% of cases by pipelle. Two cases were reported as inadequate for histopathological reporting, and both were polyps on the histopathology report by D&C. The histopathology results obtained by D&C and pipelle are shown in Table 1. Sensitivity, specificity, positive predictive value and negative predictive value for pipelle was calculated for all diagnosesof the histopathology results, after excluding the two inadequate samples, since there was no match available against the D&C report. The pipelle device was found to have a sensitivity, specificity, positive predictive value and negative predictive value of 100% for diagnosing endometrial carcinoma, endometrial hyperplasia and secretory endometrium (Table 2). Values for other diagnoses are shown in Table 2. Difficult endotracheal intubation was encountered in two cases while giving general anesthesia. No case of uterine perforation or any other postoperative complication was recorded.

DISCUSSION

The main reason for performing endometrial biopsy in women with abnormal uterine bleeding is to confirm the benign nature of the problem, by ruling out endometrial carcinoma, so that medical treatment or conservative surgery can be offered and unnecessary radical surgery can be avoided.

Various methods of endometrial sampling are used in practice, including invasive and non-invasive, on either an inpatient or outpatient basis. Ultrasonographic measurement of central endometrial thickness (double layer) is one of the commonly used non-invasive methods. Ultrasonography avoids 40% of histological assessment of the endometrium, although the cut-off limit for endometrial thickness is still debated.[6] However, a thin and regular endometrium is reliable for exclusion of endometrial carcinoma.[7] D&C is an invasive inpatient procedure performed under general anesthesia. Outpatient invasive methods include hysteroscopic

Table 1. Histopathology results for dilatation and curretage (D&C) versus the pipelle device.

Endometrial histopathology report	Endometrial histopathology on pipelle	Endometrial histopathology on D&C
Secretory	14	14
Proliferative	54	54
Hyperplasia	11	11
Hyperplasia with atypia	10	8
Endometritis	7	7
Carcinoma	2	2
Polyp	-	4
Inadequate	2	-
Total	**100**	**100**

Table 2. Validity of pipelle for endometrial histopathology.

Endometrial Histopathology	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Carcinoma	100	100	100	100
Endometrial hyperplasia	100	100	100	100
Secretory endometrium	100	100	100	100
Hyperplasia with atypia	100	98	80	100
Proliferative endometrium	94	93	94	93
Endometritis	57	97	57	97

directed biopsy or endometrial biopsy with various endometrial samplers, including the pipelle device. We found that the pipelle is a user-friendly and patient-friendly device. In 98% of cases the sample was adequate. Inadequate sampling has been reported in 11% of cases in other studies.[8] For the purpose of maintaining synchronicity in the timing of the sample, the pipelle method was performed at the time of the D&C, but otherwise it is an outpatient procedure that can be performed without anesthesia, analgesia, or premedication in the same setting and at the same time as a pelvic examination. There is no need for cervical dilatation. We set a cut-off limit for a central endometrial thickness of ≥4 mm as there is only a 27% probability of getting an adequate sample when central endometrial thickness is <5 mm.[9] In this study, the pipelle was found to have a sensitivity, specificity, positive predictive and negative predictive value of 100% for endometrial carcinoma, hyperplasia and secretory endometrium. Other studies have also shown that pipelle and D&C produced the same results in detection of endometrial pathology.[10-12] The pipelle had a sensitivity and specificity of 100% for postmenopausal bleeding and a positive predictive value of 100% for detection of malignancy.[13,14] Both cases of endometrial carcinoma diagnosed by pipelle in our study were confirmed by D&C and both were in postmenopausal women. Sarwar and Haque in their study have also quoted a 2% detection rate for endometrial carcinoma.[15] In that study, the pipelle device had 100% sensitivity, 98% specificity and 100% negative predictive value for detection of hyperplasia with atypia. Mechado et al found 96.9% accuracy for detection of endometrial carcinoma and atypical hyperplasia.[16] The pipelle has been declared the best device compared to other endometrial sampling techniques for detection of endometrial carcinoma and atypical hyperplasia.[17] However, accuracy is high when an adequate endometrial sample is obtained, as cases of endometrial carcinoma were subsequently detected on inadequate specimens of pipelle.[18] Thus, further evaluation of cases is required where symptoms persist despite a negative biopsy or when other risk factors for endometrial carcinoma are present.[19,20] In this study, both cases reported as inadequate on pipelle were benign polyps on the D&C report and no case of endometrial carcinoma was missed. A high negative predictive value (98.7%) for an inadequate specimen has been reported[21] and the most common histological diagnosis missed with an inadequate sample was endometrial polyp.[22] Our study has shown a low sensitivity (57%) but high specificity (97%) for pipelle in diagnosing endometritis. Similarly, a diagnosis of proliferative endometrium by pipelle has 94% sensitivity and 93% specificity. However, atypical hyperplasia has a sensitivity and specificity of 100% and 98%, respectively. This leads to the conclusion that the pipelle is a good device for diagnosing malignant disease and hyperplasia, both with and without atypia, as compared to benign disease, which was also reported in a study by Clark and colleagues. However, a major limitation of the study was the use of a single pathologist in the evaluation of both samples. If our results are confirmed in a larger study involving at least two independent pathologists, then pipelle sampling could conclusively be considered an alternative to the standard D&C. Difficult endotracheal intubation was encountered in two cases.

We had no procedure failure or operative complication (pre- or postoperative). The cost per case was £39.46 for dilatation and curettage as compared to £4.74 for the pipelle. The cost included the procedure, anesthesia, surgery and inpatient charges. Thus, in view of our results and the reported high sensitivity and specificity of pipelle,[23-25] it is suggested that this device should replace the traditional method of endometrial sampling by D&C as it is an outpatient procedure, avoids general anesthesia along with its associated complications, does not require operating theater space or staff, is less painful, more cost effective and above all

produces an adequate sample with reliable histopathology results when compared with D&C. The pipelle is a safe and cost-effective device for getting an adequate endometrial sample for histology, with a high sensitivity and specificity for detection of hyperplasia and malignancy.

Acknowledgments

We acknowledge the support of Dr. M. Amin, Dean of Shifa College of Medicine in conducting this study by providing complete budget and efforts of Dr. Faisal Rahim incharge SCILS lab and Mr. Sabir Tabassum, computer data analyst, Shifa College of Medicine.

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