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Pipelle endometrial sampling versus conventional dilatation & curettage in patients with abnormal uterine bleeding

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ABSTRACT

Objective: To compare the diagnostic accuracy of Pipelle endometrial sampling with conventional dilatation & curettage in patients with abnormal uterine bleeding. **Methods:** One hundred and forty patients with abnormal uterine bleeding were included in this comparative study; endometrial sampling was done before cervical dilatation by Pipelle device followed by conventional dilatation & curettage (D&C). The histopathology report of the Pipelle sample was compared with that of the D&C sample and the D&C report was considered as the gold standard. **Results:** 100% of the samples obtained by conventional D&C, while 97.9% of the samples obtained by Pipelle device were adequate for histopathological examination. The histopathological examination of one hundred and forty (140) samples obtained by conventional D&C revealed proliferative endometrium in 37 specimens, secretory endometrium in 33 specimens, endometrial hyperplasia in 49 specimens (45 without atypia & 4 with atypia), endometritis in 8 specimens, endometrial polyps in 3 specimens and malignant endometrium in 10 specimens. In this study; the Pipelle device had 100% sensitivity, 100% specificity and 100% accuracy for diagnosing endometrial hyperplasia, endometrial carcinoma, proliferative and secretory endometrium, also, it had 88.9% sensitivity, 99.2% NPV and 99.3% accuracy for diagnosing endometritis and it had 60% sensitivity, 89.6% NPV and 98.6% accuracy for diagnosing endometrial polyps. **Conclusion:** The endometrial sampling using Pipelle is safe, accurate, cost effective outpatient procedure, avoids general anesthesia with high sensitivity and specificity for detection of endometrial hyperplasia and endometrial malignancy.

1. Introduction

Abnormal uterine bleeding is a major gynecological problem, accounting for 33% of outpatient referrals, including 69% of referrals in peri-menopausal and postmenopausal age group[1].

Evaluation of the abnormal uterine bleeding in women ≥ 40 years or menopausal women is of critical importance to confirm benign nature of the problem, and to exclude endometrial carcinoma, so that medical or conservative treatment can be offered and unnecessary radical surgery

can be avoided[2].

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 device[5,6]. The Pipelle can be used on an outpatient basis and is cost effective compared with D&C[7]. However, there are still concerns regarding the adequacy of the sample obtained, non-sampling of focal intrauterine lesions[6] so, this study was designed to compare the diagnostic accuracy of Pipelle endometrial sampling with conventional D&C in patients with abnormal uterine bleeding.

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2. Materials and methods

Over one year, patients with abnormal uterine bleeding over 40 years, presented to gynecology clinics of Ahmadi Hospital–Kuwait Oil Company (KOC), were included in this comparative study. Detailed clinical assessment of the patients was followed by transvaginal sonography and laboratory investigations (CBC, coagulation profile, prolactin, thyroid and liver function tests). Patients with local gynecological cause or possibility of pregnancy or history of contraception or endometrial thickness < 4 mm were excluded from the study.

A total of 143 patients were included in this study after informed consent and approval of the study protocol by the institute ethics committee. Patients included in this study were euthyroid with normal liver function tests, normal APTT and normal platelet count. The endometrial sampling was performed by the Pipelle device in the ward prior to premedication ordered by the anesthetist. The Pipelle (Endocurette, Midvale, Utah, USA) was introduced without performing cervical dilatation and withdrawn outside the uterus with a rotatory movement to get the sample which was labeled as sample A. The patients were then transferred to the operative theatre for D&C and the obtained sample after D&C was labeled as sample B. Both samples were sent to a pathologist, who was blinded to the methods of sampling and patients' medical history 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 considered as the gold standard.

3. Results

Failure of the procedure was inability to introduce the Pipelle without cervical dilatation in three attempts (3

patients were excluded due to failure to introduce the Pipelle through the cervix to get the endometrial sample and the samples were obtained in those patients by D&C). After exclusion of those 3 patients, 140 patients with abnormal uterine bleeding were included in this study, the mean age of the studied population was (46.3±5.6) years and mean age of menarche was (12.2±1.2) years, while the mean parity was (4.7±2.2) and mean endometrial thickness was (10.6 ± 0.8) cm (Table 1).

The presenting symptoms of the studied cases were: menorrhagia ($n=53$), polymenorrhagia ($n=37$), metrorrhagia or irregular bleeding ($n=26$) and postmenopausal bleeding ($n=24$).

The sample was labeled as inadequate by the histopathologist when no endometrial tissue was present in the specimen sent.

100% of the samples obtained by D&C, while 97.9% of the samples obtained by Pipelle device were adequate for histopathological examination.

The histopathological examination of 140 samples obtained by conventional D&C revealed proliferative endometrium in 37 specimens, secretory endometrium in 33 specimens, endometrial hyperplasia in 49 specimens, endometritis in 8 specimens, endometrial polyps in 3 specimens and malignant endometrium in 10 specimens (one EIN, 5 adenocarcinoma, 2 adenosquamous carcinoma, one endometrial adenosarcoma, one MMT) (Table 2).

In this study, the Pipelle device had 100% sensitivity, 100% specificity and 100% predictive values for diagnosing endometrial hyperplasia, endometrial carcinoma, proliferative and secretory endometrium, also, it had 88.9% sensitivity, 100% specificity, 100% PPV and 99.2% NPV for diagnosing endometritis, while, it had 60% sensitivity, 100% specificity, 100% PPV and 89.6% NPV for diagnosing endometrial polyps (Table 3).

In this study; the Pipelle device was 100% accurate for diagnosing endometrial hyperplasia, endometrial carcinoma,

Table 1

The characteristics of the studied population.

Variables	Mean ± SD	Range
Age (years)	46.3 ± 5.6	40–49
Age of menarche (years)	12.2 ± 1.2	12– 15
Parity	4.7 ± 2.2	1– 6
Endometrial thickness (cm)	10.6± 0.8	10–12

Table 2

The histopathological results of the specimens obtained by conventional D&C and Pipelle device.

Histopathological diagnosis	Histopathological results of the specimens obtained by conventional D&C	Histopathological results of the specimens obtained by the Pipelle device
Proliferative endometrium	37	37
Secretory endometrium	33	33
Endometrial hyperplasia without atypia	45	45
Endometrial Hyperplasia with atypia	4	4
Endometritis	8	7*
Endometrial polyp	3	1**
EIN (Endometrial intraepithelial neoplasia)	1	1
Adenocarcinoma	5	5
Adenosquamous carcinoma	2	2
Endometrial adenosarcoma	1	1
Mixed Mullerian tumor (MMT)	1	1

* One case of endometritis cannot diagnosed by Pipelle sampling, because the tissue sent was inadequate for histopathological examination

** Two cases of endometrial polyps cannot diagnosed by Pipelle sampling, because the tissue sent was inadequate for histopathological examination

Table 3

The sensitivity, specificity, predictive values and accuracy of the Pipelle device for diagnosing endometrial histology in patients with abnormal uterine bleeding

Variables	Proliferative endometrium	Secretory endometrium	Endometrial hyperplasia	Endometrial carcinoma	Endometritis	Endometrial polyps
Sensitivity= true positive/true positive + false negative × 100	100%	100%	100%	100%	8/8+1 =88.9%	3/3+2 =60%
Specificity= true negative/true negative + false positive × 100	100%	100%	100%	100%	132/132+0 =100%	137/137+0 =100%
PPV= True positive/(True positive + false positive) × 100	100%	100%	100%	100%	8/8+0 =100%	3/3+0 =100%
NPV= True negative/(True negative + false negative) × 100	100%	100%	100%	100%	132/132+1 =99.2%	137/137+2 =98.6%
Accuracy= True positive + true negative/(True positive + true negative + false positive + false negative) × 100	100%	100%	100%	100%	140/141 =99.3%	140/142 =98.6%

NPV= Negative predictive value

PPV= Positive predictive value

proliferative and secretory endometrium, also, it was 99.3% accurate for diagnosing endometritis and it was 98.6% accurate for diagnosing endometrial polyps (Table 3).

4. Discussion

Endometrial biopsy is important step in the assessment of abnormal uterine bleeding to rule out endometrial carcinoma, so that medical 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 an inpatient or outpatient basis[8,9].

D&C is an invasive inpatient procedure performed under general anesthesia. Pipelle device is used as outpatient non-invasive method gives adequate endometrial sample in 98% of cases and the probability of getting an adequate sample increases when central endometrial thickness is more than 5 mm[10,11], this why patients with endometrial thickness < 4 mm were excluded from this study, also, in this study, the samples obtained by Pipelle device were adequate for histopathological examination in 97.9%.

Pipelle sampling can be performed without anesthesia or analgesia during routine pelvic examination, in this study; the Pipelle sampling was done in the ward, followed by general anesthesia and D&C to maintain synchronization during sampling, which is needed during this comparative study.

Many authors concluded that the Pipelle is an accurate and acceptable outpatient sampling technique when compared with D&C[12–14]. In this study; the Pipelle device had 100% sensitivity, 100% specificity and 100% predictive values, also it was 100% accurate for diagnosing endometrial hyperplasia (with or without atypia) and endometrial carcinoma.

A systematic quantitative review of published medical literature to determine the accuracy of outpatient endometrial biopsy in diagnosing endometrial hyperplasia in women with abnormal uterine bleeding was carried by Clark and colleagues. Although, Clark and colleagues concluded that outpatient endometrial biopsy has modest accuracy

in diagnosing endometrial hyperplasia and additional endometrial assessment should be undertaken, especially if symptoms persist or intrauterine structural abnormalities are suspected, Sarwar et al, concluded that the Pipelle had a 100% sensitivity, 98% specificity, and 100% NPV for detection of endometrial hyperplasia and atypia in women with postmenopausal bleeding[15,16].

Mechado and colleagues reviewed 1 535 reports of endometrial biopsies taken from outpatients using the Cornier Pipelle, in pre- and postmenopausal patients with abnormal vaginal bleeding, to establish the accuracy of endometrial biopsy with the Cornier Pipelle in the diagnosis of endometrial cancer and atypical endometrial hyperplasia. The Cornier Pipelle was 84.2% sensitive, 99.1% specific, 96.9% accurate, with 94.1% PPV and 93.7% NPV for detection of endometrial carcinoma and atypical hyperplasia, and they concluded that endometrial biopsy taken with the Cornier Pipelle is an accurate method for diagnosis of endometrial cancer and its precursor atypical hyperplasia[17].

Three hundred sixty endometrial cancer patients had preoperative endometrial sampling to evaluate the ability of preoperative endometrial sampling to accurately diagnose high-grade endometrial tumors were included in Gloria et al study. Gloria et al, concluded that Pipelle endometrial sampling was 93.8% sensitive for diagnosing low-grade endometrial cancer and it was 99.2% sensitive for diagnosing high-grade endometrial cancer, also, they concluded that the endometrial sampling with Pipelle is sensitive and accurate for the diagnosis of high-grade endometrial tumors[18].

A meta-analysis to assess the accuracy of endometrial sampling devices in detection of endometrial carcinoma and atypical hyperplasia was done by Dijkhuijen and colleagues. They concluded that the endometrial biopsy with the Pipelle is superior to other endometrial techniques in detection of endometrial carcinoma and atypical hyperplasia in pre- and postmenopausal women[19].

In this study; the Pipelle had 88.9% sensitivity, 99.2% NPV and it was 99.3% accurate for diagnosing endometritis, also, it had 60% sensitivity, 89.6% NPV and it was 98.6% accurate for diagnosing endometrial polyps, because the

accuracy is high when an adequate endometrial sample is obtained and in this study, 3 specimens were reported as inadequate for histopathological evaluation (two of them were diagnosed as endometrial polyps and the other one was diagnosed as endometritis by conventional D&C).

In this study, in spite of the low sensitivity of the Pipelle device for diagnosing endometritis and endometrial polyps (88.9% & 60%; respectively), it had a high negative predictive values (99.2% & 89.6%; respectively) and high accuracy (99.3% & 98.6%; respectively), also, Kuruvilla and colleagues, found that the most common histological diagnosis missed with an inadequate endometrial sample was endometrial polyp^[20].

Three patients were excluded from this study due to failure to introduce the Pipelle through the cervix to get the endometrial sample (procedure failure), and the samples were obtained in those patients by D&C. No intra-operative or postoperative complications were recorded in this study, this leads to the conclusion that the endometrial sampling using Pipelle could replace the conventional D&C method of endometrial sampling, because, it is safe, accurate, cost effective outpatient procedure, avoids general anesthesia with high sensitivity and specificity for detection of endometrial hyperplasia and endometrial carcinoma^[6,21].

Conflict of interest statement

No actual or potential conflict of interest in relation to this article exists.

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