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The effect of suction curettage on the visualization, operative time, fluid deficit, and histopathological diagnosis among perimenopausal women with abnormal uterine bleeding and unprepared endometrium for operative hysteroscopy: A single-center randomized controlled trial

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Abstract:

INTRODUCTION: Hysteroscopy is the gold standard procedure for the evaluation and diagnosis of intrauterine pathologies. The optimal time to do hysteroscopy is during the proliferative phase. However, for women with irregular bleeding, the optimal time is unpredictable. Besides pharmacological means, mechanical endometrial preparation could be done.

OBJECTIVE: The objective of this study was to determine the effect of suction curettage on visualization, operative time, fluid deficit, and histopathologic diagnosis among perimenopausal women with abnormal uterine bleeding (AUB) and unprepared endometrium prior to operative hysteroscopy.

METHODOLOGY: Thirty-four (34) perimenopausal women admitted for AUB with unprepared endometrium for operative hysteroscopy who consented to participate were recruited and randomly divided into two groups: 18 women had suction curettage done prior to operative hysteroscopy and 16 women had operative hysteroscopy done alone. The following data were obtained for each group: (1) improvement in clarity (i.e., visualization of fundus and both tubal ostia), (2) operative time from entry to withdrawal of the resectoscope (measured in minutes), (3) fluid deficit, and (4) final histopathological diagnosis. $P < 0.05$ was considered statistically significant.

RESULTS: Women who underwent suction curettage prior to operative hysteroscopy had improved visualization (72.2%, $P < 0.001$), shorter operative time (29.06 ± 7.06 min vs. 35.5 ± 7.2 min, $P = 0.013$), no difference in fluid deficit ($P = 0.276$), and the histopathologic diagnosis ($P = 0.470$).

CONCLUSION: Suction curettage prior to operative hysteroscopy among perimenopausal women with AUB and unprepared endometrium improved visualization and shortened operative time without affecting fluid deficit and histopathologic diagnosis.

Keywords:

Histopathologic diagnosis, hysteroscopy, operating time, suction curettage, visualization

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Introduction

Hysteroscopy is considered the gold standard procedure for the diagnosis and management of intrauterine pathologies.^[1] In fact, despite the COVID-19 pandemic, hysteroscopy is still being recommended to be done in order to evaluate select cases of abnormal uterine bleeding (AUB).^[2]

The optimal time to do hysteroscopy is during the early proliferative phase, i.e., days 4–11 of the menstrual cycle.^[3,4] During the proliferative phase, the endometrium is thinner, which optimizes visualization during hysteroscopy. Therefore, hysteroscopy could be completed at a faster time potentially decreasing possible complications. However, for women with irregular heavy menstrual bleeding, the optimal time for hysteroscopy becomes unpredictable. In order to achieve the presence of a thin endometrium for those with irregular uterine bleeding, one approach is to do pharmacologic thinning of the endometrium.^[3] There are numerous pharmacologic agents that have been studied and are used in the preparation of the endometrium prior to hysteroscopy. These include gonadotropin-releasing hormone (GnRH) analogs, danazol, progestins, and even oral contraceptive pills.^[3] However, disadvantages of pharmacologic endometrial preparation include delay in surgery due to the regimen, side effects of the pharmacological agents, and cost of the medications themselves.^[5]

Another option is to do mechanical endometrial preparation through suction curettage.

Suction curettage is a procedure in which contents from the inside of the uterus are evacuated with the aid of a mechanical suction device. Suction curettage is usually performed to remove molar pregnancy, clear tissues out after a miscarriage, or to obtain a uterine tissue sample to confirm the diagnosis of gynecologic pathologies. Suction curettage is a relatively safe procedure, and complications are rare.^[6]

Cheng *et al.* and Farrow *et al.* determined that performing suction curettage in removing polyps or small submucous myomas prior to hysteroscopic resection decreased operative times.^[7,8]

Mechanical preparation of the endometrium by suction curettage can also be done immediately prior to the operative hysteroscopy. Selected premenopausal women with AUB will therefore no longer have to wait for at least 2 weeks prior to their scheduled hysteroscopy if endometrial preparation will be done pharmacologically, not to mention the cost of the medications themselves and their associated side effects.

For premenopausal women with AUB, performing hysteroscopy with an unprepared endometrium can result in poor visualization.^[9] Poor visualization has been credited as the cause of majority of all failures of hysteroscopic assessment.^[10] This in turn results in an inconclusive histopathological diagnosis. An inconclusive or equivocal histopathological diagnosis was defined by Sheiman *et al.* (1998) as final pathology findings which are either suggestive of but not definitive for a specific malignancy, nondiagnostic (insufficient material or hypocellularity or atypical cells identified but no definite malignancy), or negative for malignancy (inflammatory or normal cells). They often stem from obtained specimens which are often too small or not well representative of the entire lesions or rich in necrosis or bloody samples.^[11,12] Equivocal histopathology might lead to either a repeat biopsy which could further cause a delay in definitive treatment or at the other end of the spectrum, overtreatment.

This study will explore the effect of suction curettage on the visualization, operative time, fluid deficit, and histopathological results among perimenopausal women with AUB and unprepared endometrium for operative hysteroscopy.

Methodology

A randomized control trial was done which was composed of perimenopausal women with AUB admitted to a tertiary hospital between October and December 2022. These women were diagnosed to have either a combination of a thickened endometrium on transvaginal ultrasound (>0.5 cm endometrial thickness), endometrial polyp, or submucous myoma. Menopausal women, pregnant women, women with prolapsed submucous myoma or prolapsed polyp, endometrial or cervical malignancy diagnosed preoperatively, or those with nonstructural causes of AUB (coagulopathy, endometrial causes, iatrogenic, or those not yet classified), or women who were given any hormonal treatment such as GnRH analogs, danazol, progestins, oral contraceptives, or those who took “herbal” medications within the last 4 weeks prior to scheduled hysteroscopy are excluded.

A minimum of 30 premenopausal women, which was based on a study by Cheng *et al.*,^[7] were included. Consent for participation in the study as well as consent for the procedure was obtained after risk stratification.

Hysteroscopy was performed under spinal anesthesia. Diagnostic hysteroscopy was done using a 3 mm scope with a 30-degree forward-oblique view and an outer diameter of 5 mm. Isotonic saline 0.9% NaCl solution

was used as a distending medium with the intrauterine pressure maintained below the mean arterial pressure.

If upon diagnostic hysteroscopy, there was adequate visualization as demonstrated by the presence of a thin endometrium and both the fundus and the bilateral ostia were seen, the patient was withdrawn from the study, but the planned operative hysteroscopy was still done.

If upon diagnostic hysteroscopy, there was inadequate visualization brought about by the thickened endometrium and blood clots and there was difficulty in visualizing both the fundus and bilateral ostia, the patient was randomized and assigned either to the suction group or control (nonsuction) group.

For the control group, operative hysteroscopy proceeded immediately after diagnostic hysteroscopy with no suction curettage done prior.

For the suction group, suction curettage was done prior to operative hysteroscopy. Suction curettage was carried out using a Yankauer suction cannula with a suction level of 100–150 mmHg. A 6–7 mm Yankauer suction cannula was inserted into the uterine cavity up to the level of the uterine fundus as determined by diagnostic hysteroscopy, vacuum was then applied, and the cannula was gradually withdrawn. Then, operative hysteroscopy with transcervical resection of the endometrium or transcervical resection of the polyp or transcervical resection of the myoma was carried out after the suction curettage was performed.

For both the groups, the following data were collected:

1. Operative time: Described as the time the operative hysteroscopy started (insertion of the operative hysteroscope) until its end (removal of the operative hysteroscope), measured in minutes
2. Amount of fluid absorbed or fluid deficit: The difference between the volume of fluid infused and the measured volume recovered, measured in milliliters
3. Improvement of visualization: If the fundus and both ostia are seen or not seen after performing suction curettage. This was measured using a Likert scale (0 = fundus and bilateral ostium not seen; 1 = fundus and bilateral ostium seen) as determined by the surgeon.

For the suction group, additional data of uterine volume as determined by preoperative ultrasound, measured in cubic centimeters, were also obtained.

All the procedures were done by a minimally invasive gynecologic surgery fellow-in-training accompanied by the attending consultant. All specimens obtained by hysteroscopy and suction curettage were sent for histopathological analysis by the primary investigator as

standard protocol for both the groups. Histopathological results were obtained for both suction and control groups upon follow-up of the patient at the outpatient clinics 1–2 weeks postoperative. Thereafter, the patients were treated per the latest clinical guidelines.

Results

A total of 34 perimenopausal women with AUB with unprepared endometrium were included in this study: 18 had suction curettage prior to hysteroscopy (suction group) and 16 did not undergo suction curettage prior to hysteroscopy (control group). The mean age in years was 44.15 ± 3.01 . The two patient groups were comparable in their mean age in years (43.56 ± 3.09 vs. 44.81 ± 2.86 , respectively) and the number of obese patients (6 vs. 4, respectively) ($n = 10$). The majority of the patients were multigravid (61.76%), and half were multiparous (50%). None of the patients had previous uterine surgeries. The main indication for hysteroscopy was polyp for the suction group and thickened endometrium for the control group, but there was no significant difference in the distribution of the indications. The median uterine volume was higher for the suction group, but this was not found to be statistically different between the two groups [Table 1].

As to outcomes [Table 2], the suction group had a shorter operative time with a mean of 29.06 ± 7.06 min (vs. 35.5 ± 7.2 min, $P = 0.013$). There was a reduction of 5–6 min in the time of operative hysteroscopy. There was improved visualization of the fundus and bilateral ostia in the suction group by 72% ($P < 0.001$). There is no statistical difference between the two groups in terms of fluid deficit or amount of fluid absorbed.

On the average, the median uterine volume of those in the suction group where there is improvement of visualization was smaller than those with no improvement in visualization (672 vs. 2184). However, this was not statistically significant whether through comparing ranks ($P = 0.182$) or through odds ratios ($P = 0.188$) [Table 3].

For the histopathology results, the suction group has a lesser frequency of equivocal histopathology results compared to the frequency of equivocal histopathology results in the nonsuction/control group (0% vs. 6.252%, respectively). However, there was no significant difference between the two groups [Table 4].

Discussion

In this randomized control trial, it has been shown that performing suction curettage prior to operative hysteroscopy in premenopausal women with unprepared endometrium can provide better visualization resulting

Table 1: Demographic and clinical profile of premenopausal women who underwent hysteroscopy with an unprepared endometrium

	Frequency (%)			P
	Total sample (n=34)	Suction (n=18)	No suction (n=16)	
Age (years), mean±SD	44.15±3.01	43.56±3.09	44.81±2.86	0.229*
Obesity	10 (29.41)	6 (33.33)	4 (25)	0.715‡
Gravidity				
Nulligravid	4 (11.76)	2 (11.11)	2 (12.50)	0.879‡
Primigravid	9 (26.47)	4 (22.22)	5 (31.25)	
Multigravid	21 (61.76)	12 (66.67)	9 (56.25)	
Parity				
Nulliparous	9 (26.47)	5 (27.78)	4 (25)	>0.999‡
Primiparous	8 (23.53)	4 (22.22)	4 (25)	
Multiparous	17 (50)	9 (50)	8 (50)	
Number of previous uterine surgery, median (range)				
Cesarean section	0 (0–2)	0 (0–2)	0 (0–2)	0.579§
Myomectomy	0	0	0	-
Indications for hysteroscopy				
Leiomyoma	4 (11.76)	2 (11.11)	2 (12.5)	0.935‡
Endometrial polyp	15 (44.11)	8 (44.44)	7 (43.75)	
Thickened endometrium	15 (44.11)	7 (38.89)	8 (50)	
Uterine volume, median (range)	619.50 (180–3584)	768 (210–3024)	526.50 (180–3584)	0.952§

*Independent t-test, §Mann–Whitney U-test, ‡Fisher's exact test. SD: Standard deviation

Table 2: Comparison between the improvement of visualization, operative time, and fluid deficit between the suction group and nonsuction group

	Overall	Suction (n=18)	No suction (n=16)	P	Percentage difference (%)
Improved visualization, frequency (%)	13 (38.24)	13 (72.22)	0	<0.001†	-
Operative time (min), mean±SD	32.09±7.74	29.06±7.06	35.50±7.20	0.013*	18.14
Fluid deficit/amount of fluid absorbed (mL), median (range)	100 (0–300)	100 (0–300)	100 (100–300)	0.276§	15.13

*Independent t-test, §Mann–Whitney U-test, †Chi-square test. Percentage difference formula: $100 \times ((\text{suction mean} - \text{no suction mean}) / \text{no suction mean})$
SD: Standard deviation

Table 3: Uterine volume as a factor for the improvement in visualization in those that underwent suction curettage prior to hysteroscopy

	Overall (n=18)	With improved visualization (n=13)	Without improved visualization (n=5)	P	Crude OR (95% CI)	P
Uterine volume, median (range)	786 (210–3024)	672 (210–2366)	2184 (294–3024)	0.182§	0.9992 (0.9980–1.0003)	0.188*

*Binary logistic regression, §Mann–Whitney U-test. Successful curettage based on improvement of visualization (with the fundus and bilateral ostia seen after curettage was done). OR: Odds ratio, CI: Confidence interval

Table 4: Histopathological results between the suction and nonsuction groups

Histopathological diagnosis	Frequency (%)			P
	Total sample (n=34)	Suction (n=18)	No suction (n=16)	
Definite	33 (97.1)	18 (100)	15 (93.75)	0.4706‡
Equivocal	1 (2.9)	0	1 (6.25)	

Statistical tests used: ‡Fisher's exact test

in a shorter duration of surgery. Additionally, with better visualization, it can also enhance specimen acquisition for histopathologic studies.

Clear vision during hysteroscopy increases the probability of locating lesions and is crucial for favorable outcomes. Suction curettage removes intrauterine blood clots and denudes the endometrium, stripping the functional

layers and leaving the basalis layer which aids in the operative hysteroscopy.^[13] This has been supported by Sayyah-Melli *et al.* (2022) which found that removing intrauterine contents using suction, even with concurrent active bleeding, can be done to better view the inner uterine wall.^[14]

One might assume that a reduction of 5–6 min in the duration of surgery may not be clinically significant. However, this still represents a reduction of 18% in total operative hysteroscopy time.

Although this study found no significant difference in the fluid deficit between the two groups, it is known that fluid deficit during hysteroscopic procedures is directly correlated with operating time.^[15] Longer procedures

generally lead to greater fluid deficits, highlighting the importance of minimizing operating time to reduce this risk.

In the suction group, it was observed that majority of patients with improved visualization brought about by suction curettage had a smaller mean uterine volume of 672 g. Conversely, patients who did not show improved visualization despite undergoing suction curettage had a larger mean uterine volume of 2184 g. A larger uterus can affect the efficiency of suction curettage, as the suction cannula must traverse a greater distance. Additionally, an enlarged uterine cavity often contains more blood clots, making the procedure more challenging. The pathologies which make the uterus enlarged could also distort the uterine cavity which could pose difficulty in performing suction curettage prior to hysteroscopy. A positive trend toward improvement of visualization for those with smaller uterine size was seen in our study; however, no statistical significance exists between them.

As for the histopathology diagnosis, a singular equivocal histopathological result (glandular stromal breakdown) was seen in the nonsuction group.

Results have shown that suction curettage caused an improvement in visualization prior to operative hysteroscopy in premenopausal women with unprepared endometrium. This improvement of visualization has improved specimen retrieval which reduces the incidence of obtaining inadequate specimen volume and then consequently an inconclusive histopathologic diagnosis.

Sakhdari *et al.* showed that an adequate sample from the endometrium should be at least the presence of one intact endometrial tissue fragment containing both glands and stroma for premenopausal women.^[16] In the uterine cavity filled with blood clots, obtaining the minimum required specimen size could prove to be difficult.

Suction curettage enhances histological diagnosis, by effectively removing intrauterine blood clots and denuding the endometrium, which can then be submitted for histopathological evaluation. It has also proven useful in removing small polyps and myomas, as demonstrated by Cheng *et al.*,^[7] allowing histopathological studies.^[7] Suction curettage can retrieve tissue from the entire uterine cavity, not just from the visible pathology, ensuring that hyperplasia, which may not be immediately apparent, is not missed.^[17]

However, in this study, no significant association was established between performing suction curettage and the decreased incidence of obtaining an inconclusive histopathologic diagnosis in the suction group.

During the hysteroscopic procedure for the nonsuction group, difficulty of visualization was encountered. The utilization of hysteroscopy in the nonsuction group was able to overcome this and was evident with only one who presented with an equivocal histopathology result. An adequate specimen can be obtained even if no suction curettage was done prior to hysteroscopy for the nonsuction group. However, a longer operative time is needed in order to attain the necessary specimen for a more definitive histopathological result.

Other claimed advantages of performing suction curettage prior to hysteroscopy as a means of endometrial preparation include decreased cost since less medications will be used, if used at all, to prepare the endometrium. There is also less risk for ensuing complications brought about by the medications used to prepare the endometrium. It is easier to schedule the procedure, at any stage of the cycle, not just at the proliferative phase.^[14]

In our setting, suction curettage as a means of endometrial preparation prior to hysteroscopy has been useful during the COVID-19 pandemic. This approach was particularly useful for patients with AUB who were admitted for anemia correction and required endometrial evaluation by hysteroscopy. Instead of discharging patients for pharmacologic endometrial preparation or extending their stay in the hospital for at least 2 weeks for pharmacologic endometrial preparation, mechanical endometrial preparation via suction curettage can be done to facilitate scheduling of the surgery. These patients are now being diagnosed and treated in just one hospital admission instead of multiple admissions if pharmacological endometrial preparation was to be used.

Although suction curettage is associated with uterine perforation by as much as 2%,^[18] this complication was not seen in our study.

Conclusion

This study showed that suction curettage prior to performing operative hysteroscopy in premenopausal women with unprepared endometrium could improve visualization, shorten operative time, and may aid on the acquisition of specimens for histopathology. Uterine volume does not have a positive effect in the improvement of visualization brought about by suction curettage.

Suction curettage is efficient and practical since it can be done immediately prior to the hysteroscopy. This mechanical means of preparing the endometrium eliminates the disadvantages of pharmacologic endometrial preparation which includes the delay

in surgery due to the regimen, the side effects of the pharmacological agents, and the cost of the medications.

Authorship contributions

Dr. Andy Teodoro K Paningbatan - Andy Teodoro K Paningbatan, MD: involved in conceptualization, methodology, validation, formal analysis, resources, data curation, writing original draft, writing review and editing, visualization, supervision, and funding acquisition.

Dr. Zoraida R. Umipig-Guevara - Zoraida R. Umipig-Guevara, MD: involved in conceptualization, validation, writing review and editing, and supervision.

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Conflicts of interest

There are no conflicts of interest.

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