Prevalence of Premalignant and Malignant Changes in Hysteroscopically Removed Endometrial Polyps in Reproductive Aged Women: A 5-year Review of Cases in a Tertiary Government Hospital in the Philippines

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Objective: To determine the prevalence of premalignant and malignant changes in hysteroscopically removed endometrial polyps in reproductive aged women, and to determine clinical, ultrasonographic and hysteroscopic characteristics of such women.
Methods: This is a cross-sectional study of patients diagnosed with endometrial polyp, and underwent hysteroscopy from 2015-2019. A review of the medical records (ultrasound results, intraoperative findings and histopathology results) was done.
Results: A total of 117 patient records were included in the analysis. The median age of all patients who underwent hysteroscopy was 38 years old (age range: 19-44 years). The prevalence of endometrial hyperplasia or carcinoma in the 18-44 year old age group was 8.5% (n=10/117). Among patients with endometrial hyperplasia or carcinoma, 70% were nulligravid, 40% had anovulation disorder, and 40% had infertility. Most of the patients were overweight or obese (70%). Co-morbidities were present in only 3 cases, and diabetes mellitus (30%) was the predominant illness seen in these patients.
Conclusion: Our findings showed a higher prevalence (8.5%) of endometrial hyperplasia or carcinoma in endometrial polyps among Filipino reproductive-aged women, compared to reports in published literature. Among the different clinical characteristics, ultrasound and hysteroscopic findings, no particular factor had a significant association with endometrial hyperplasia or malignancy.

Key words: Hysteroscopy, endometrial polyp, endometrial carcinoma, endometrialhy perplasia, abnormal uterine bleeding

Introduction

Endometrial polyps (EMPs) are the most commonly encountered pathology of the uterus and majority of them are benign. However, pre-malignant or malignant changes might sometimes be seen involving EMPs. At present, there are different opinions regarding their association with concurrent or subsequent premalignant or malignant endometrial changes.

Endometrial polyps are defined as abnormal exophytic growths which protrude into the uterine cavity, and contain varying amounts of glands, stroma and blood vessels. They vary in size from subcentimeter masses, to as large as occupying the entire uterine cavity. Polyps may be pedunculated or sessile, smooth and spherical in gross appearance.[1]

The exact prevalence of EMPs is not known.[2] However, with the widespread use of transvaginal ultrasound, saline infusion sonohysterogram and hysteroscopy for the assessment of abnormal bleeding, the diagnosis of endometrial polyps has increased over the past years. A large epidemiological study of EMPs representing women of a wide age

range and socioeconomic group range estimated the prevalence to be 7.8-34.9%.[2] It is the most common cause of abnormal uterine bleeding and is implicated in 50% of cases3 and in 35%4 of women with infertility. These polyps may be seen in both reproductive age and postmenopausal women and present as heavy menstrual bleeding, intermenstrual spotting, postmenopausal bleeding and infertility. On the other hand, 82% of women with histologically confirmed endometrial polyps are asymptomatic.[2]

The following are the known risk factors for the formation of EMPs: advancing age, obesity, tamoxifen use and the administration of hormonal replacement therapy, with age as the most consistent risk factor in several publications.[5] These conditions are associated with elevated endogenous and exogenous estrogens which play a role in the pathogenesis of EMPs. Although not yet fully understood, the most widely accepted theory on the development of polyps is the excess estrogen activity and hypersensitivity in some areas of the endometrium. Furthermore, a localized increase in B-cell lymphoma-2 (Bcl-2), an inhibitor of apoptosis, was seen in EMPs. This may explain why EMPs do not undergo the normal cyclic apoptosis during menstruation and hence are not shed.[6]

Although rare, there have been several reports of atypical endometrial hyperplasia and endometrial carcinoma arising from EMPs. A recent meta-analysis concluded that 3% of malignant conditions were seen in patients with a diagnosis of EMPs. The risk of malignancy increased to about 5% in those with symptomatic vaginal bleeding and to about 5% for postmenopausal women.[7]

Management of EMPs is largely dependent on the patient's age, risk of malignancy, symptoms and fertility issues. Small, asymptomatic polyps may be just observed and managed expectantly. On the other hand, polyps in infertile women do not regress spontaneously and resection is usually necessary. Hysteroscopic guided polypectomy is considered the gold standard for EMP diagnosis with direct visualization and simultaneous treatment.[8] Further, the base of the polyp where the malignant cells can be found may be missed by blind techniques. A preliminary study in Italy with 23 participants described successful conservative management of patients desiring to preserve fertility with endometrial hyperplasia and carcinoma.[9] Hysteroscopic resection of the masses was done followed by high dose oral progestins or insertion of levonorgestrel releasing intrauterine device. This approach resulted to a 52.2% remission rate after 3 months of treatment and a 21.1% live birth rate.

This paper thus aims to determine the prevalence of premalignant and malignant changes in hysteroscopically-removed EMPs in reproductive aged women. Moreover, the additional specific objectives of this study are to determine the age, gravidity and parity of the women with the said condition, to determine the presence of co-morbidities and co-existing conditions such as anovulation and infertility, to determine whether vaginal bleeding is present, to identify the sonographic characteristics of the pathology, and to describe the hysteroscopy findings in such cases. The findings of this study will contribute to the existing knowledge on the factors associated with the development of premalignant and malignant changes in endometrial polyps particularly in reproductive aged women. Furthermore, recognizing the clinical profile of these women will help stratify patients at risk for premalignant or malignant conditions. This would lead to earlier detection of a premalignant or malignant condition and better pre-operative planning which will allow patients to have an informed choice regarding the subsequent management of their condition.

Methods

This is a cross-sectional study performed on patients who underwent hysteroscopy from 2015-2019. Patients aged 18-44 years old, with a preoperative diagnosis of endometrial polyp as seen on ultrasound or saline infusion sonohysterogram, who underwent hysteroscopy, and had histopathology results for review were included in this study. Patients who were preoperatively diagnosed with endometrial hyperplasia or carcinoma and those whose data are missing or not available for review were excluded from this study. A review of the medical records—including ultrasound results, intraoperative findings at hysteroscopy, and histopathology results—of all eligible patients was undertaken. This protocol was evaluated and approved by the University of the Philippines Research Ethics Board (UPM-REB).

The collected information were used discretely and anonymously and were kept confidential.

Data Analysis

The description of patient characteristics, clinical profile, ultrasound and/or initial endometrial biopsy results, hysteroscopy findings and final histopathology results was presented and analyzed. SPSS for Macintosh version 24 was utilized. Quantitative data was described using mean ± standard deviation. Qualitative data was described using frequency and proportions. Continuous variables were compared between the groups using one way analysis of variance. Categorical variables were compared between the groups using Fisher's exact test. Correlation among all variables and the final biopsy results was done using binomial logistic regression. The significance was set to alpha = 0.05.

Results

A total of 117 patient records were included in the analysis of this study. The median age of all patients who underwent hysteroscopy was 38 years old (age range: 19-44 years). The prevalence of endometrial hyperplasia or carcinoma in the 18-44 year old age group was 8.5% (n=10/117). The clinical characteristics, ultrasound, hysteroscopic findings and final biopsy results of the hysteroscopy specimen of these patients are presented in Table 1.

The clinical profile of the patients with endometrial hyperplasia or carcinoma are summarized in Table 2. The median age of these patients was 34.5 years old (age range 28-44 years). Only 1 patient had endometrial hyperplasia without atypia (10%, n=1/10), while the rest were diagnosed with endometrial carcinoma (90%, n=9/10). Majority of the patients with carcinoma (80%, n=8/10) had an endometrioid type histology.

Table 1. Patient characteristics and relationship between clinical parameters and histologic results (117 cases).

		Endometrial polyp		**Endometrial carcinoma or endometrial hyperplasia**		***p value*** **Alpha = 0.005**
		n	(%)	n	(%)	
Age (median, range)		38 (19-44 years old)		34.5 (28-44 years old)		
Age Range	18-25	8	6.8%	0	0.0%	0.580
	26-35	34	29.1%	7	6.0%	
	36-44	65	55.6%	3	2.6%	
Gravidity	Nulliparous	39	33.3%	7	6.0%	0.253
	Primi/Multiparous	68	58.1%	3	2.6%	
BMI	Underweight	5	4.3%	0	0.0%	0.099
	Normal	47	40.2%	3	2.6%	
	Overweight	11	9.4%	4	3.4%	
	Obese I	30	25.6%	1	0.9%	
	Obese II	14	12.0%	2	1.7%	
Comorbidities	None	75	64.1%	6	0.0%	0.103
	Hypertension	9	7.7%	0	0.0%	
	Diabetes mellitus	7	6.0%	3	2.6%	
	Others	17	14.5%	0	0.0%	
Anovulation	No anovulation	92	78.6%	6	5.1%	0.056
	With anovulation	15	12.8%	4	3.4%	

Infertility	No infertility	87	74.4%	6	5.1%	0.211
	With infertility	20	17.1%	4	3.4%	
Bleeding pattern	No bleeding	6	5.1%	0	0.0%	0.662
	With bleeding	101	86.3%	10	8.5%	
Pad use	No pads used	7	6.0%	0	0.0%	0.642
	Soaking one pad	33	28.2%	2	1.7%	
	Soaking 2-3 pads	27	23.1%	2	1.7%	
	Soaking >3 pads	40	34.2%	6	5.1%	
UTS No of Polyps	One polyp	78	66.7%	8	6.8%	1.000
	Two polyps	22	18.8%	2	1.7%	
	Three polyps	5	4.3%	0	0.0%	
	Four polyps	2	1.7%	0	0.0%	
UTS Location	Midcorpus	68	58.6%	3	2.6%	0.099
	Fundal	18	15.5%	5	4.3%	
	Isthmic	5	4.3%	0	0.0%	
	Prolapsed	5	4.3%	0	0.0%	
	Multiple locations	11	9.5%	1	0.9%	
UTS Size (mean, SD)		2.0 (± 0.9)		2.8 (±1.6)		**0.006**
UTS Vascularity	None	51	43.6%	5	4.3%	NS
	Single feeding vessel	51	43.6%	2	1.7%	
	Scanty	3	2.6%	2	1.7%	
	Moderate	2	1.7%	1	0.9%	
UTS EMT (mean, SD)		0.7 (±0.5)		1.0 (±0.6)		
HYS No of Polyps	One polyp	54	46.2%	4	3.4%	0.683
	Two polyps	24	20.5%	3	2.6%	
	Three polyps	10	8.5%	2	1.7%	
	Four polyps	1	0.9%	0	0.0%	
	Five polyps	1	0.9%	0	0.0%	
	Multiple polyps					
HYS Size (mean, SD)		1.87 (± 1.06)		2.95 (± 1.26)		**0.003**
HYS Location	Midcorpus	61	52.1%	6	5.1%	0.482
	Fundal	16	13.7%	0	0.0%	
	Isthmic	5	4.3%	0	0.0%	
	Prolapsed	5	4.3%	0	0.0%	
	Multiple locations	20	17.1%	4	3.4%	
HYS Neoplastic Characteristics	None	107	91.5%	8	6.8%	1.000
	Atypical	0	0.0%	1	0.9%	
	Necrosis	0	0.0%	0	0	
	Friable	0	0.0%	0	0	
	Irregular shape	0	0.0%	1	0.9%	
HYS EMT	Thin	52	44.4%	5	4.3%	1.000
	Thick	55	47.0%	5	4.3%	

BMI – body mass index; UTS – ultrasound; SD – standard deviation; EMT – endometrial thickness; HYS – hysteroscopy; NS – not significant

Table 2. Clinical and histological profile of patients with endometrial hyperplasia and carcinoma associated with endometrial polyps.

									Ultrasound Findings					Hysteroscopy Findings					
Case	Age	GP	BMI	Co-morbidities	Anovulatory?	Infertile? (Years infertile)	With bleeding?	PPD	No of polyps	Size (cm)	Location	Vascularity	EMT (cm)	No of polyps	Size (cm)	Location	Neoplastic characteristics	EMT	Biopsy Result
1	31	G1P1 (1001)	Overweight	None	N	N	Yes	2	1	3.4	Fundal	None	0.6	2	3	Midcorpus	Irregularly shaped	Thickened	Endometrial carcinoma, endometrioid type, FIGO I
2	31	G0	Normal	None	N	N	Yes	6	1	2.7	Fundal	NA	2	Multiple	4	Midcorpus	None	Thickened	Endometrioid adenocarcinoma, FIGO grade II
3	35	G0	Obese II	DM Type 2	Y	Y (13 years)	Yes	8	1	3.6	Fundal	Scant	0.7	3	2	Fundal, midcorpus	None	Thickened	Endometrial adenocarcinoma, endometrioid type arising in a hyperplastic polyp, FIGO I
4	40	G1P1 (1001)	Overweight	None	N	Y (12 years)	Yes	1	2	1.6	Midcorpus	None	0.4	3	2	Isthmic, midcorpus	None	Thickened	Endometrial adenocarcinoma, endometrioid type, FIGO grade I
5	40	G0	Normal	Asthma	N	N	Yes	4	2	2.3	Fundal, midcorpus	None	1.5	2	3	Isthmic, fundal	Atypical vascularity	Thin	Endometrial adenocarcinoma, endometrioid type, FIGO grade II
6	44	G0	Normal	None	Y	Y (19 years)	Yes	4	1	6.8	NA	Scant	NA	2	6	Midcorpus	None	Thin	Focal adenocarcinoma, endometrioid type, arising from an endometrial polyp, FIGO I
7	35	G0	Overweight	DM Type 2	N	Y (11 years)	Yes	12	1	1.5	Fundal	Single feeding vessel	NA	1	3	Midcorpus	None	Thin	Endometrial adenocarcinoma, endometrioid type, FIGO grade I in a background of atypical hyperplasia
8	34	G0	Obese II	DM Type 2	Y	N	Yes	4	1	2.5	Midcorpus	Moderate	1.2	1	2	Midcorpus	None	Thin	Endometrial adenocarcinoma, endometrioid type, FIGO grade I
9	28	G0	Obese I	None	Y	N	Yes	2	1	2.1.	Midcorpus	NA	0.4	1	2.5	Midcorpus	None	Thickened	Well differentiated villoglandular endometrioid adenocarcinoma
10	30	G2P2 (2002)	Overweight	None	N	N	Yes	1	1	1.7	Fundal	Single feeding vessel	0.8	1	2	Fundal, midcorpus	None	Thin	Endometrial polyp with focus of endometrial hyperplasia without atypia

In this subgroup (n=10), 70% of the women were nulligravid. Anovulation was present in 40%, and infertility was likewise present in 40% of cases. Most of the patients were overweight or obese (70%). Co-morbidities were present in only 3 cases, and diabetes mellitus (30%) was the predominant illness seen in these patients. Notably, all patients complained of vaginal bleeding with an average use of 4.4 pads per day. On ultrasound, 80% of these women had a finding of a single polyp. Mean size measurement of the mass on ultrasound was 2.8 ± 1.6 cm while the mean endometrial thickness was 1.0 ± 0.6 cm. Most common location of the mass was on the fundus (50%). Moderate vascularity on power doppler of the mass was seen in only 1 patient. Hysteroscopic findings revealed that 60% of patients had more than one polyp and 1 patient was described to have "multiple" polyps. Mean size measurement on hysteroscopy was 2.95 ± 1.26 cm, with 60% of lesions found at the midcorpus. There was equivalent prevalence for thin and thickened endometrium. Neoplastic characteristics were apparent in only 2 patients.

Using one-way ANOVA, there was a significant difference between the EM polyp and the EM carcinoma group in terms of mean size measurements in ultrasound ($F(1,100) = 7.757$, $p = 0.006$) and hysteroscopy ($F(1,100) = 9.225$, $p = 0.003$). There were no significant differences in terms of age groups ($p = 0.580$), pad use ($p = 0.163$), and endometrial thickness in ultrasound ($p = 0.229$).

Using Fisher exact test for categorical variables, there was no significant association between comorbidities and final biopsy results (Fisher's exact = 5.323, $p = 0.103$). Post hoc analysis for ultrasound vasculature patterns show no significant differences between individual patterns. There were no significant differences in terms of age groups ($p = 0.079$), parity ($p = 0.253$), BMI ($p = 0.099$), comorbidities ($p = 0.729$), anovulation status ($p = 0.056$), infertility ($p = 0.211$), pad use ($p = 0.642$), number of polyps (on ultrasound: $p = 1.000$; on hysteroscopy, $p = 0.683$), location (on ultrasound, $p = 0.099$; on hysteroscopy, $p = 0.482$), and endometrial thickness on hysteroscopy ($p = 1.000$) (Table 2).

Excluding cases with no uterine EM thickness measurements, none of the variables were correlated with the final biopsy results using binomial logistic regression.

Discussion

In the past 10 years, a significant increase in the incidence of endometrial cancer in young women has been observed due to the earlier onset of obesity and hyperinsulinemia.[10] Several papers have described the risk factors for premalignant and malignant changes in endometrial polyps, however, majority of the cases that have been described were focused on postmenopausal women.[7,11,12] To date, to the best of the authors' knowledge, there are only two similar studies in the literature among women in the same age range, with both studies limited to patients with infertility.[13,14] Although infertility has been well established as a risk factor for endometrial carcinoma, other factors may be implicated in the development of malignancy, underlying the importance of including women with different profiles in the study.

Clinical Characteristics

Notable in the authors' findings is the 8.5% prevalence of endometrial hyperplasia or malignancy in reproductive aged women with endometrial polyp/s. This rate is significantly higher compared to similar studies (0.97% and 1.88%)[13,14] and could be due to the smaller sample size of patients in their study.

The following are the known risk factors for the development of atypical histology in EMPs: nulliparity, anovulation from polycystic ovarian syndrome, infertility, obesity, diabetes mellitus, hypertension, tamoxifen therapy and genetic risk factors such as Lynch syndrome.[11]

In the present study, nulliparity was observed in seven out of ten patients in whom endometrial hyperplasia/carcinoma was detected after hysteroscopy. The mechanism by which nulliparity poses an increased risk for developing carcinoma is not yet elucidated, but several hypotheses have been suggested[15]: 1) the elevated progesterone levels during pregnancy may inhibit elevated endogenous estrogen in the endometrium; 2) the postpartum involution of the uterus may facilitate the shedding of pre-cancerous or cancerous cells in the endometrial lining; and 3) anovulatory disorders that cause infertility such as polycystic ovarian syndrome may also contribute to the increased risk of carcinoma among nulliparous patients. Current study showed

that 40% of women who had hyperplasia or carcinoma were infertile; likewise, 40% of these women had anovulatory disorders.

Data from a meta-analysis on risk factors associated with malignancy on hysteroscopically removed polyps showed that obese patients had a higher chance of developing premalignant and malignant endometrial lesions compared to non- obese patients.[16] In addition, findings from a retrospective review published in 2014 showed that obesity is associated with earlier age at diagnosis of endometrioid-type endometrial cancers.[17] This is compatible with current study data, which showed that majority (70%) of patients in this cohort were overweight or obese, with 80% of the patients having an endometrioid-type histology.

Endogenous estrogen is increased in obese women by several mechanisms. There is increased rate of peripheral conversion of estrogen precursors to active estrogen, increased hydroxylation of estrone, and decreased levels of sex hormone binding globulin which result to higher serum levels of free estrogen.[10,14,17] The elevated level of endogenous estrogens in obese women increases the exposure of the endometrium to estrogen, possibly leading to premalignant/malignant changes in the endometrium. Moreover, the insulin resistance and hyperinsulinemia associated with obesity may also be linked with a higher risk of endometrial carcinoma. Although the direct mitogenic effects of insulin on malignant changes of the endometrium is yet to be established, in vitro studies have shown that increased expression of insulin receptor alpha is associated with the development of endometrial cancer cells.[10,14]

As previously stated, diabetes mellitus and hypertension are known risk factors for the development of endometrial hyperplasia or carcinoma in endometrial polyps. This may be related to the fact that obese patients are at a higher risk to develop diabetes and hypertension. In the current study, 30% of patients in the hyperplasia and malignancy group had Type 2 diabetes mellitus. No cases of hypertension were noted. This may be because the incidence of both diseases increase with increasing age, and this cohort only included women in the younger age group.

Another risk factor for the development of endometrial carcinoma in younger patients is the genetic susceptibility to Lynch syndrome or hereditary nonpolyposis colorectal cancer syndrome. Unfortunately, the authors were not able to evaluate the family history of the patients due to lack of data in the records.

The presence of symptomatic abnormal uterine bleeding is another known risk for malignancy in endometrial polyps[2,7,11,12] and this observation is confirmed in the current study. All patients who developed hyperplasia or malignancy reported vaginal bleeding. Moreover, majority of these patients (60%) reported heavy bleeding of more than 3 pads per day.

Ultrasound Findings

Aside from the clinical characteristics, other points of interest among patients with malignancy in endometrial polyp are the morphological findings on ultrasound. A retrospective study by Costa-Paiva in 2011 demonstrated that polyps larger than 1.5 cm had a higher prevalence for malignancy (5.06%) compared to polyps with a smaller diameter (2.09%); but this finding was only a statistical trend and was not significant.[18] A higher, statistically significant cut-off size of 2.2 cm was more recently demonstrated by an Italian group in 2019.[12] Conversely, a systematic review and meta-analysis done by Sasaki, et al. in 2019 concluded that polyp size was not associated with endometrial hyperplasia or carcinoma.[16] This finding could be explained by the different measurement units used in the selected studies—millimeters, centimeters, or volume—which precluded the analysis of this association. It was not clear in the studies by Costa-Paiva, the Italian group, and Sasaki whether the measurement of the size of the mass was made by ultrasound or during hysteroscopy. Current data was similar to the Italian study. The mean size measurement of the mass was significantly bigger for those patients who had endometrial hyperplasia or carcinoma versus the endometrial polyp group, in both ultrasonography (2.8 ± 1.6 cm vs 2.0 ± 0.1 cm, $p = 0.006$) and hysteroscopy (2.95 ± 1.26 cm vs 1.87 ± 1.06 cm, $p = 0.003$). However, when other variables are taken into account using logistic regression, this finding was not statistically significant.

Several ultrasound characteristics of endometrial malignancy as defined by the International

Endometrial Tumor Analysis (IETA) nomenclature were determined in a large, prospective, multicenter study.[19] High-risk tumors were found to be larger, had non-uniform echogenicity, had multiple, multifocal vessel pattern, had moderate or high color score, and were less likely to have regular endometrial-myometrial junction. Again, their observation that tumor size is a strong predictor for malignancy is congruent with the findings of the current study. Only one malignancy patient (10%) had moderate vascularity of the mass on ultrasound (Figure 1), while the majority did not have any abnormal vascularity (30%). Fifty percent of the patients had a fundal location of the mass. Other ultrasound parameters, on the other hand, were lacking in the records of patients in the current study, hence a comparison cannot be made.

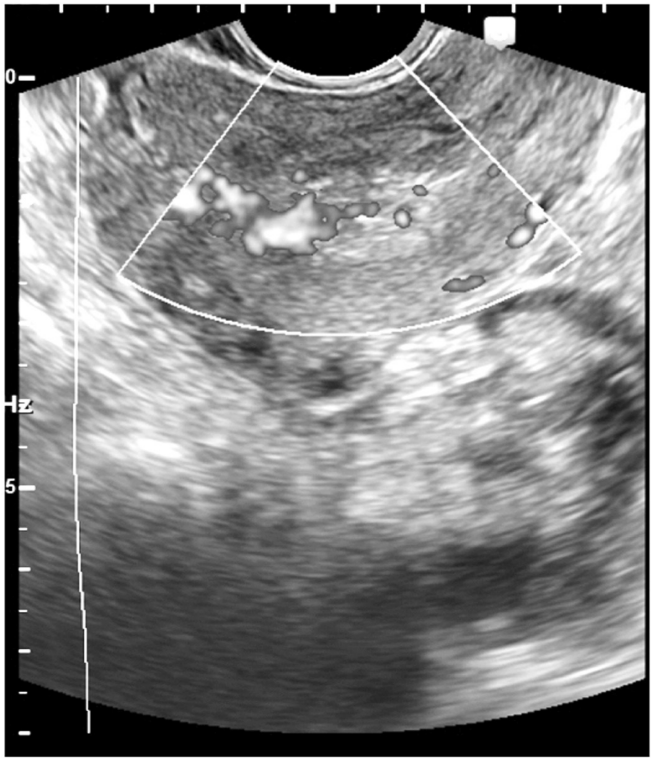

Figure 1. Case 8. Moderate vascularity of the mass on power doppler.

Hysteroscopic Findings

Hysteroscopy allows the surgeon visualization of the endometrium and a targeted and complete resection of the endometrial mass/es. When done by an experienced surgeon, hysteroscopy has a 94.2% sensitivity, 88.8% specificity, 96.3% negative predictive value and 83.1% positive predictive value in predicting normal or abnormal histopathology of the endometrium.[20] In the same study, features of endometrial hyperplasia and carcinoma were also described. The following were the features of endometrial hyperplasia: "thickened endometrium with rough and uneven surface, sometimes showing smooth polypoid projections; irregularly spaced endometrial glands with or without thickening of gland openings; glandular cystic changes in a thick endometrium; highly vascular and easily bleeding mucosa with an irregular course and abnormal arrangement of endometrial vessels with respect to the delicate network of normal endometrium". On the other hand, endometrial carcinoma had the following features: "exophytic growth displaying nodular, polypoid, papillomatous or mixed features filling the uterine cavity; rough, uneven, and friable mucosal covering, necrosis and ulceration, and superficial atypical and engorged vessels with marked varicosities". Likewise, recent studies on a similar cohort of patients demonstrated the association of the appearance of diffuse polypoid endometrium with endometrial hyperplasia or carcinoma.[13,14]

In the current study, majority (80%) of the patients in the hyperplasia or malignancy group did not have neoplastic features on hysteroscopy, and only one patient (10%) was characterized to have "multiple" polyps. The two patients who had neoplastic features had the following hysteroscopic findings: irregularly shaped mass (10%) and atypical vascularity (10%) (Figure 2). The endometrium was either thin or thickened during hysteroscopy (50% each). The size of the mass and its association with hyperplasia or malignancy were already discussed in the previous section. Most of the masses (60%) were located on the uterine midcorpus. The inconsistency of the current study data with the literature is likely due to the inexperience of the surgeons in correctly and thoroughly identifying neoplastic characteristics during hysteroscopy.

Conclusion

In conclusion, the authors saw a higher prevalence of endometrial hyperplasia or carcinoma in endometrial polyps among women in the

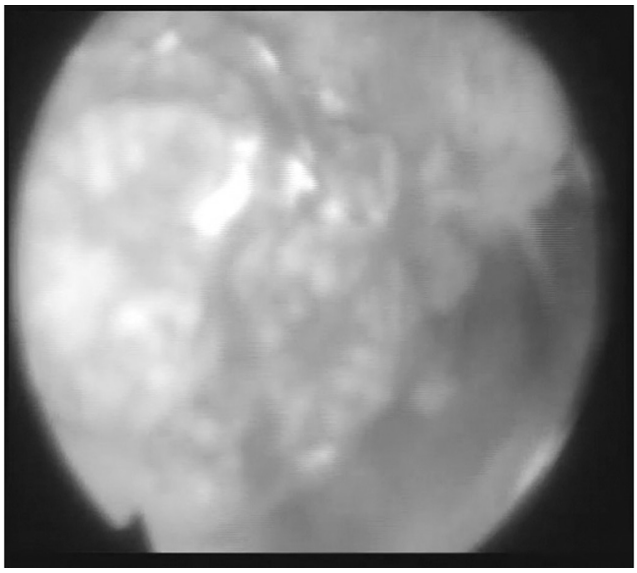

Figure 2. Case 5. Atypical superficial vascularity of the endometrial mass.

reproductive age group compared to available literature. Considering this remarkable finding, it would be helpful to identify reliable risk factors especially in younger women in whom conservative management may be necessary. Among the different clinical characteristics, ultrasound and hysteroscopic findings, no particular factor had a significant association with endometrial hyperplasia or malignancy. Nevertheless, the data presented in this study could be used to inform patients with modifiable risk factors such as obesity—that they could have an overall increased lifetime risk of developing endometrial cancer, and that it may occur at a younger age. Moreover, the option of fertility-sparing procedures or treatment for endometrial cancer should be considered in reproductive aged women.

Limitations and Recommendations

The final results should be interpreted with caution because of the small sample size, the incompleteness of some data, and the retrospective design. All of the data were collected from medical charts which may have inconsistent information. The ultrasound and hysteroscopic procedures were performed by fellows in training most of the time, hence the findings may not be 100% accurate or correct. Therefore, it is important to have additional well- designed, prospective, large-scale studies in the future.

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