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ORIGINAL ARTICLE

Use of Hysteroscopy in Abnormal Uterine Bleeding: An Edge Over Histopathological Examination

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Abstract

Purpose of the Study To assess the efficacy of hysteroscopy in diagnosis of AUB.

Method A total of 56 women in reproductive and perimenopausal age group (20–50 years) with complaints of abnormal uterine bleeding were enrolled in the study. All the patients underwent hysteroscopic examination followed by biopsy/histopathological evaluation. Hysteroscopic findings were compared against histopathological findings. Sensitivity, specificity, PPV, NPV and accuracy of hysteroscopy were calculated.

Results Mean age of patients was 36.4 ± 7.6. Majority (60.7%) presented within 6 months of complaints. Clinically, 66.1% were diagnosed as menorrhagia, 30.4% polymenorrhoea and 3.6% intermenstrual bleeding. Hysteroscopically 53.6% presented with abnormal pathology, it diagnosed polyps in 16.1%, calcification in 12.5%, submucous fibroma in 10.7%, necrotic mass in 7.1%, adhesion and forgotten IUCD in 5.4% cases each. However, on histopathology, 33 (58.9%) cases had normal/proliferative/atrophic endometrium, 12 (21.4%) had hyperplasia, 7 (12.5%) had calcified endometrium, and 12 (21.4%) had polyp. No significant difference between two modalities was observed with respect to number of normal/

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proliferative/atrophic endometrium ($p = 0.185$). Histopathology diagnosed hyperplasia in significantly higher proportion of patients as compared to hysteroscopy ($p = 0.042$). Hysteroscopy diagnosed significantly higher proportion of patients with submucous myoma ($p = 0.012$) and necrotic mass ($p = 0.042$). Statistically, no significant difference between two modalities was observed with respect to other pathologies ($p > 0.05$). Overall agreement between two modalities was 62.5%. For pathological abnormalities in general, hysteroscopy had sensitivity, specificity, PPV, NPV and accuracy values of 78.3, 63.6, 60, 80.8 and 69.6%, respectively.

Conclusion Hysteroscopy provided additional information for some of the pathologies, otherwise remaining undiagnosed by HPE.

Keywords Abnormal uterine bleeding · Hysteroscopy · Abnormal pathology · Submucous fibroma

Introduction

Abnormal uterine bleeding is a common problem mainly encountered in peri-menopausal and post-menopausal women. It attributes as a cause for 25% of total gynaecological surgeries performed by a gynaecologist. Although abnormal uterine bleeding is an outcome which has several aetiological reasons, FIGO has classified it into 9 main categories, which are arranged according to the acronym PALM-COEIN (pronounced "pahm-koin"): polyp; adenomyosis; leiomyoma; malignancy and hyperplasia; coagulopathy; ovulatory dysfunction; endometrial; iatrogenic; and not yet classified. In general, the components of the PALM group are discrete (structural) entities that can be measured visually with imaging techniques and/or histopathology, whereas the COEIN group is related to entities that are not defined by imaging or histopathology (non-structural) [1]. Abnormal uterine bleeding has a negative impact on quality of life and in turn affects the efficiency of the women [2]. It accounts for nearly 11% of total hysterectomies.

Management of AUB can be complex without a proper diagnosis. Physicians are often unable to identify the cause of abnormal bleeding after a thorough history and physical examination. Dilatation and curettage is one of the commonest investigations employed in the evaluation of the causes of abnormal uterine bleeding. However, being an invasive procedure, the discomfort caused to the patient and the numerous costs involved place a burden on its use as a screening tool. Moreover, D & C can have a diagnostic error ranging from 10 to 25%.

Other diagnostic techniques such as transvaginal sonography (TVS), despite being non-invasive, remains only a preliminary assessment tool that needs to be further confirmed with use of more precise techniques [3–5].

Hysteroscopy, on the other hand, unlike dilatation and curettage is not a blind procedure and can be used as an office procedure. Hysteroscopic evaluation permits the direct visualization and assessment of the endocervical and uterine cavities, hence proving a reliable method of diagnosing intrauterine abnormalities [6].Use of hysteroscopy in abnormal uterine bleeding is almost replacing blind curettage, as it "sees" and "decides" the cause. This is because the uterine cavity can be observed and the area in question can be curetted. In fact, it is an eye in the uterus.

Considering these advantages, the hysteroscopy seems to be a useful tool in the diagnosis of abnormal uterine bleeding. The present study tries to explore its potential as an office procedure in evaluation of abnormal uterine bleeding with histopathology as the basis for correlation.

Material and Method

The present study was conducted on 56 women attending the Gynaecology OPD/IPD of Era's Lucknow Medical College, Lucknow.

Inclusion Criteria Women in the reproductive (20–40 years) and peri-menopausal (> 40 years) age group attending the Gynaecology OPD/IPD with complaints of abnormal uterine bleeding were included.

Exclusion Criteria Pregnant women/ cases of abortion/ ectopic pregnancy, those with uterine and cervical infections and pelvic inflammatory diseases, those with STDs and vaginitis, those having lower genital tract malignancies, with post-menopausal bleeding and those having medical contraindications to any invasive procedure were excluded from the study.

The sample size was calculated as 47 by targeting an accuracy of 80% for office hysteroscopy at 90% confidence and 80% power. The study was approved by institutional ethical committee, and informed consent was obtained from all the participants.

The study population was subjected to a thorough physical examination and routine investigations (Haemoglobin, ABO & Rh, blood sugar, urine routine & microscopy) followed by hysteroscopy after obtaining post-counselling informed consent. The procedure was performed in a minor operation theatre under sedation .All the procedures and measurements were performed under the direct supervision of the supervisor of the study using a structured data collection form. Patient was taken to the procedure room and placed in the dorsal lithotomy position. After a bimanual examination, a bivalved or weighted speculum was used to bring the cervix into view. The cervix was cleaned with using of 10% povidone-iodine or

4% chlorhexidine gluconate solution. A single-toothed tenaculum was then applied to the anterior lip of the cervix. A small amount of local anaesthetic was used prior to applying the tenaculum.

Carbon dioxide was used as the distension media as this is the only gas recommended for uterine distention and is commonly used in diagnostic hysteroscopy in the office setting. Carbon dioxide is not recommended for operative hysteroscopic procedures as the possibility of gas embolism is greatly increased in cases where raw or ablated tissue provides the gas direct access to the uterine vasculature. Once equipment for distention media was activated and functional, the flow of the medium was started. The tubing was flushed with CO_2 prior to insertion into the cervix. As the hysteroscope was introduced to the external cervical os and advanced into the endocervical canal, attention was turned to the video monitor or eyepiece. The distal tip of the hysteroscope was then gently advanced through the length of the cervix, taking care to keep the endocervical canal central on the viewing field when using a 0° scope.

The first evaluation was done in panoramic view of the intrauterine cavity. Next, careful inspection of the following areas was done: lateral uterine walls, superior uterine cavity, and anterior and posterior uterine walls. Gentle movement of the hysteroscope was done during the procedure. Excessive trauma to the endometrial surface was avoided as it may cause bleeding which might obscure the view and has risk of perforation. Any pathology was inspected and documented.

Biopsy/gross specimen was obtained (as the case may be) and subjected to histopathological evaluation.

The data were analysed using Statistical Package for Social Sciences version 20.0. Chi-square test was used for comparing categorical results. For evaluation of quantitative outcomes, for ordinal parameters Mann–Whitney U test was used, whereas for continuous parameters independent samples "t" test was used. A "p" value less than 0.05 was considered to indicate statistically significant association.

Results

The age of patients ranged from 20 to 50 with a mean age of 36.4 ± 7.6. Majority of patients had a history of symptoms for < 6 months (60.7%); only 10.7% patients had symptoms for > 1 year. Clinically, majority of patients presented with menorrhagia (66.1%) followed by polymenorrhoea (30.4%) and intermenstrual bleeding (3.6%), respectively. Most of the patients had normal uterus (85.7%); in 5 (8.9%) it measured 6–8 weeks, whereas in 3 (6.3%) it measured > 8 weeks (Table 1).

On hysteroscopy, maximum number of cases ($n = 26$; 46.4%) had no abnormal pathology (10 proliferative, 9 secretory and 7 atrophic). A total of 9 (16.1%) cases were diagnosed to have polyp, 7 (12.5%) had calcified endometrium, 6 (10.7%) had submucous myoma, 4 (7.1%) had necrotic mass, 3 (5.4%) had adhesion, and 1 (1.8%) had forgotten IUCD. However, on histopathology, 33 (58.9%) cases had normal/proliferative/atrophic endometrium, 12 (21.4%) had hyperplasia, 7 (12.5%) had calcified endometrium, and 12 (21.4%) had polyp. No significant difference between two modalities was observed with respect to number of normal/proliferative/atrophic endometrium ($p = 0.185$). Histopathology diagnosed hyperplasia in significantly higher proportion of patients as compared to hysteroscopy ($p = 0.042$). Hysteroscopy diagnosed significantly higher proportion of patients with submucous myoma ($p = 0.012$) and necrotic mass ($p = 0.042$). Statistically, no significant difference between two modalities was observed with respect to other pathologies ($p > 0.05$) (Table 2).

Between hysteroscopy and hitopathology, an agreement for diagnosis was observed at 35/56 cases (62.5%). Hysteroscopy provided additional information in 3 cases of submucous myoma, 4 cases of necrotic mass, 3 cases of adhesion and 1 case of forgotten IUCD which were described as hormonal by histopathology. Additionally, 3 cases diagnosed as hyperplasia by histopathology were also shown to have submucous fibroid by hysteroscopy and 1 case diagnosed to be polyp by hysteroscopy was diagnosed as calcified endometrium by histopathology. On the other hand, hysteroscopy missed four cases of polyps. Overall, there was 62.5% agreement between histopathology and hysteroscopy. For pathological abnormalities in general, hysteroscopy had sensitivity, specificity, PPV, NPV and accuracy values of 78.3, 63.6, 60, 80.8 and 69.6%, respectively. Hysteroscopy missed to diagnose all the 4 cases of hyperplasia. For polyps, hysteroscopy had sensitivity, specificity, PPV, NPV and accuracy values of 66.7, 100, 100, 91.7 and 94.6% whereas for calcification these values were 85.7, 100, 100, 98 and 98.2%, respectively (Table 3).

Discussion

In present study, hysteroscopy showed the absence of any abnormal pathology in almost half (46.4%) patients. Among these 10 were in proliferative phase, 9 were in secretory phase, and remaining 7 were atrophic. Thus, abnormal pathologies were diagnosed in remaining 53.6% cases. Hysteroscopically diagnosed abnormal pathology rates have been shown to vary substantially across different series. In a study, Mukhopadhyay and Ashis [7] reported it

Table 1 Patient demographic profile and other characteristics

SN	Characteristic	Statistic
1.	Mean age ± SD (range) in years	36.4 ± 7.6 (20–50)
2.	Duration of symptoms	
	< 6 months	34 (60.7%)
	6 months–1 year	16 (28.6%)
	> 1 year	6 (10.7%)
3.	Clinical presentation	
	Menorrhagia	37 (66.1%)
	Polymenorrhoea	17 (30.4%)
	Intermenstrual bleeding	2 (3.6%)
4.	Uterus size	
	Normal	48 (85.7%)
	6–8 weeks	5 (8.9%)
	> 8 weeks	3 (6.3%)

to be 32.6%. Similar to present study, Katke and Zakariya [8] reported pathological abnormalities in 51.6% of their patients, whereas Guin et al. [9] reported them in 56% of their patients. However, the differences in prevalence of hysteroscopically diagnosed pathologies might be incidental and might vary from series to series.

In present study, abnormalities were diagnosed in 53.6% cases. Additionally finding endometrial calcification was also seen in 12.5% cases, thus in effect reducing the abnormal pathology rate to 40.9% only. Among different abnormal pathologies diagnosed by hysteroscopy, 6/18 previous studies (33.3%) reported polyps to be the diagnosis while 9/18 (50%) reported hyperplasia to be the most common abnormal pathologies. In present study, endometrial polyps were the most common abnormal pathologies (16.1%) followed by submucous fibroma (10.7%), necrotic mass (7.1%), adhesions (5.4%) and forgotten IUCD (1.8%), respectively. Although in present study, no case of endometrial carcinoma was diagnosed, a sizeable number of cases (7.1%) were diagnosed to have necrotic mass reflective of a progression towards malignancy [10]. These findings are in accordance with the observations of a number of other studies that did not report a single case of endometrial carcinoma in their series. Endometrial cancer is a rare finding in AUB cases with only few studies reporting its prevalence in the range of 1.7–4.1% [11, 12].

In present study, on histopathology, 33 (58.9%) cases were shown to have normal/proliferative/atrophic endometrium, 12 (21.4%) had hyperplasia, 7 (12.5%) had calcified endometrium, and 12 (21.4%) had polyp. Similar to present study, Patil et al. [13] also showed the absence of abnormal pathologies in 67% of their patients. In their study, they reported hyperplasia with and without atypia (16%), complex hyperplasia with and without atypia (4%), endometrial/fibroid polyps (6%) and endometrial cancer (2%) as the major pathologies involved. Valson et al. [14] in their study also reported normal/atrophic findings in 72% of their patients of AUB and reported simple hyperplasia with/without atypia (12%), polyp (8%), submucous myoma (2%) and endometrial cancer (2%) as the major abnormal pathologies involved. In contrast, Katke and Zawariya [8] found abnormal pathologies in only 5/66 (7.6%) of their patients—4 having simple hyperplasia with/without atypia and 1 (1.5%) showing abnormal shedding. A low prevalence of histopathological abnormalities was also reported by Sunitha and Somlatha [15] who reported 68% of their cases to have a normal/atrophic endometrium and found endometrial hyperplasia as the most common abnormal pathology involved (20%) and did not find any case of endometrial cancer. Dinić et al. [16] also found abnormal pathologies in majority of their cases (50.63%) and found endometrial polyp (21.8%), cervical polyp

Table 2 Comparison of hysteroscopic and histopathological abnormalities

SN	Finding	Hysteroscopy	Histopathology	Significance
1.	Hormonal	26	33	$\chi^2 = 1.755$; $p = 0.185$
	Proliferative	10	14	$\chi^2 = 0.848$; $p = 0.357$
	Secretory	9	10	$\chi^2 = 0.063$; $p = 0.801$
	Atrophic	7	9	$\chi^2 = 0.292$; $p = 0.589$
2.	Hyperplasia	0	4	$\chi^2 = 4.148$; $p = 0.042$
3.	Polyp	9	12	$\chi^2 = 0.527$; $p = 0.468$
	Endometrial	2	2	$\chi^2 = 0$; $p = 1$
	Cervical	7	10	$\chi^2 = 0.624$; $p = 0.430$
4.	Submucous myoma	6	0	$\chi^2 = 6.340$; $p = 0.012$
5.	Calcified	7	7	$\chi^2 = 0$; $p = 1$
6.	Forgotten IUCD	1	0	$\chi^2 = 1.009$; $p = 0.315$
8.	Adhesion	3	0	$\chi^2 = 3.083$; $p = 0.079$
9.	Necrotic mass	4	0	$\chi^2 = 4.148$; $p = 0.042$

Table 3 Cross-tabulation showing agreement between hysteroscopy and histopathology for different diagnoses and evaluation of diagnostic efficacy of hysteroscopy against histopathology for different AUB pathologies

Hysteroscopic diagnosis		Histopathological diagnosis				Total
		Hormonal	Endometrial hyperplasia	Polyp	Calcified endometrium	
(a) Agreement						
1	Hormonal	21	1	4	0	26
2	Polyp	0	0	8	1	9
3	Submucous myoma	3	3	0	0	6
4	Calcified endometrium	1	0	0	6	7
5	Forgotten IUCD	1	0	0	0	1
6	Adhesion	3	0	0	0	3
7	Necrotic mass	4	0	0	0	4
Total		33	4	12	7	56
Total agreement = 35/56 = 62.5%						

(b) Evaluation of diagnostic efficacy of hysteroscopy for different AUB pathologies

S. No.	Finding	TP	FP	FN	TN	Sens	Spec	PPV	NPV	Accuracy
1.	Pathological abnormalities ($n = 23$)	18	12	5	21	78.3	63.6	60	80.8	69.6
2.	Hyperplasia ($n = 4$)	0	0	4	52	0	100	–	92.9	–
3.	Polyps ($n = 12$)	8	0	4	44	66.7	100	100	91.7	92.9
4.	Calcification ($n = 7$)	6	0	1	49	85.7	100	100	98.0	98.2

(13.2%) and hyperplasia (6.83%) as the major abnormal pathologies and endometrial cancer in 1.28% of their cases. The findings of present study are thus more proximal to the results of Patil et al. [13] and Sunitha and Somlatha [15] who reported abnormal pathologies in less than half of patients in their series.

As far as detection rate of different abnormal pathologies was concerned, the present study did not show a significant difference between hysteroscopic and histopathological findings for almost all the hysteroscopic findings except for detection rate of hyperplasia, submucous myoma and necrotic mass. In present study, hysteroscopy had a significantly lower detection rate for hyperplasia (0%) as compared to histopathology (7.1%); in contrast, hysteroscopy showed a significantly higher detection rate for submucous myoma and necrotic masses (10.7 and 7.1%, respectively) as compared to histopathology (0% for both) as blind D and C may miss both these findings.

In present study, as far as abnormal pathology was concerned, hysteroscopy was found to be 78.3% sensitive and 63.6% specific. Contrary to findings in present study, Chaudhari and Sathe [17] in their study reported a very high sensitivity and specificity of hysteroscopy for detection of abnormalities (98.3 and 80.5%, respectively). In yet another study, Nandan et al. [11] found hysteroscopy to be highly sensitive 92.2% but poorly specific 21.2% in detection of abnormal pathologies when compared to histopathology.

Considering the fact that there is a considerable difference in nature of different abnormal pathologies, most of the workers have concentrated on evaluating the sensitivity and specificity of hysteroscopy for different abnormal pathologies on histopathology. In present study, we also made an attempt to evaluate the diagnostic efficacy of hysteroscopy for different abnormal pathologies separately. In present study for hyperplasia, hysteroscopy lacked the sensitivity and failed to diagnose any of the cases. In contrast, in the literature the sensitivity for detection of hyperplasia varies from 50 [17] to 100% and specificity ranges from 48.4 to 98% [15] amidst varying prevalence scenarios (6.7–61.7% [16]). Hysteroscopy is highly specific for hyperplasia; in present study, the specificity rate was 100%; in the literature too, most of the studies have reported specificity rates > 90% for hyperplasia [13].

In present study, hysteroscopy showed a sensitivity and specificity of 66.7 and 100% respective for detection of polyp (2 endometrial + 10 cervical). In contrast, contemporary studies have shown the sensitivity of hysteroscopy to the range from 83.3 to 100% [13]. Compared to this, the present study had a sensitivity of 66.7% only. One of the reasons for this was that while in other studies only endometrial polyp was diagnosed in present study we also included cervical polyps for evaluation of sensitivity of

hysteroscopy. Hysteroscopy is less commonly used for evaluation of cervical pathologies; however, in recent reports, it has shown to be useful in evaluation of cervical polyps too. Although in present study we found it useful in evaluation of cervical polyps, its sensitivity was doubtful. As far as specificity of hysteroscopy is concerned, the findings in present study matched with the observations in other studies too.

In present study, hysteroscopy was found to be highly sensitive as well as specific for diagnosis of endometrial calcification (85.7% sensitive, 100% specific). Hysteroscopy is considered to be one of the most reliable techniques for detection of endometrial calcification [18] and findings of present study confirmed this observation. The high prevalence of endometrial calcification in present study might be due to a sizeable number of women in reproductive age group.

One of the limitations of present study was its sample size. Owing to small sample size, the sensitivity and specificity of hysteroscopy were affected adversely; however, the study was able to explain the usefulness of hysteroscopy in evaluation of gross structural and anatomical pathologies responsible for AUB. Another limitation was the absence of any malignant lesion and hence our inability to evaluate the efficacy of hysteroscopy for this specific and most important diagnosis. Further studies on larger sample size are recommended.

Conclusion

The findings of the study suggested that hysteroscopy was quite useful in diagnostic workup of abnormal uterine bleeding. Although it had an agreement with histopathology to the extent of 62.5% only, it provided additional information for pathologies that remained undiagnosed on histopathology, viz. submucous fibroid, adhesion and necrotic mass (although the reason for missing these findings may have been blind dilatation and curettage). Keeping in view the additional information provided by hysteroscopy, it is essential that it should be made essential part of diagnostic workup of cases of abnormal uterine bleeding.

Compliance with Ethical Standards

Conflict of interest Dr. Nidhi Yadav, Dr. Parul Sinha, Dr. Uma Gupta declare that they have no conflict of interest.

Informed Consent All procedures followed were in accordance with the ethical standards of the institutional ethical committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

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