

# Accuracy of hysteroscopy in diagnosing different conditions in abnormal uterine bleeding

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## Abstract

**Background:** Abnormal uterine bleeding (AUB) is a common reason for women of all ages to consult their gynaecologist. It includes organic and non-organic causes of uterine bleeding. When AUB is not associated with an organic cause it is referred to as dysfunctional uterine bleeding (DUB). The diagnosis of DUB can be made only when histopathological examination of endometrium excludes an organic lesion. Hysteroscopy allows direct visualization and sampling of the uterine cavity and has an established diagnostic value for many uterine conditions. **Aims and Objectives:** To find out the accuracy of hysteroscopy in diagnosing different conditions causing abnormal uterine bleeding (AUB) and to correlate hysteroscopic findings with histopathologic findings. **Materials and Methods:** A prospective study was carried out in the Department of Obstetrics and Gynaecology at Father Muller Medical College, Mangalore between January 2014 to May 2015. Two hundred and sixty nine cases were selected for this study from patients of age group 25 and above, who were admitted with the history of abnormal uterine bleeding. Hysteroscopic examination was done in all patients post-menstrually, following which patients underwent dilatation and curettage and endometrium was sent for histopathologic examination. The correlation between hysteroscopic findings and histopathologic examination was tabulated. **Results:** Out of 269 cases, 118 cases of hyperplasia, 69 cases of normal endometrium, 42 cases of atrophic endometrium, 34 cases of endometrial polyp, 3 cases of endometrial carcinoma and 3 cases of submucous fibroid were suspected on hysteroscopy, but histopathological examination of the 269 samples showed 48 cases as hyperplasia, 164 of normal endometrium, 14 cases of atrophic endometrium, 22 cases of endometrial polyp, 7 cases of endometrial carcinoma and 7 cases of fibroid polyp and 4 cases of inadequate sample and 3 cases of normal endometrium with focal endometrial hyperplasia. **Conclusions:** Hysteroscopy is an accurate diagnostic modality in diagnosing intrauterine lesions like endometrial polyp and submucous fibroid. In fact, it was also found to be highly specific in conditions like endometrial cancer, polyp, atrophic and normal endometrium.

**Keywords:** hysteroscopy, histopathology, abnormal uterine bleeding, dilatation and curettage.

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## INTRODUCTION

Normal menstruation is defined as the bleeding from secretory endometrium- associated with ovulatory cycle- not more than a length of 5 days. Any bleeding not fulfilling these criteria is referred to as abnormal uterine bleeding (AUB). Abnormal uterine bleeding (AUB) is a

common reason for women of all ages to consult their gynaecologist. It includes organic and non-organic causes of uterine bleeding. When AUB is not associated with an organic cause it is referred to as dysfunctional uterine bleeding (DUB).<sup>1</sup> The diagnosis of DUB can be made only when histopathological examination of endometrium excludes an organic lesion.<sup>2,3</sup> Abnormal uterine bleeding includes both dysfunctional uterine bleeding and bleeding from structural causes. DUB can also be anovulatory, which is characterized by unpredictable irregular bleeding, or even ovulatory, which is characterized by regular but heavy periods (i.e., menorrhagia).<sup>4</sup> FIGO Classification for AUB- "PALM-COEIN" The PALM side of the classification refers to structural causes that could be evaluated and diagnosed on imaging and/or biopsy. The COEIN side allows consideration of underlying medical disturbances that could result in AUB.<sup>5</sup>

Structural causes (PALM)	Non-Structural causes(COIN)
Polyps	Coagulopathy
Adenomyosis	Ovulatory dysfunction
Leiomyomas	Endometrial (primary disorder of mechanisms regulating local endometrial "hemostasis")
Submucous and others	Iatrogenic
Malignancy and hyperplasia	Not yet specified

### Medications that can cause abnormal uterine bleeding

1. Anticoagulants
2. Antidepressants (selective serotonin reuptake inhibitors and tricyclics)
3. Hormonal contraceptives
4. Tamoxifen
5. Antipsychotics (first generation and risperidone)
6. Corticosteroids.

### Three modes of Evaluation of the endometrium which includes

1. Imaging of endometrial patterns by transvaginal ultrasound, hysterosonography (SHG) and to some extent a magnetic resonance imaging (MRI)
2. Visual assessment by Hysteroscopy and
3. Cellular assessment by microscopic evaluation of endometrial samples

Since the last decades, several methods include transvaginal ultrasonography (TVU), saline infusion sonography and hysteroscopy, have been developed to assess uterine cavity, with their own advantages and disadvantages. Although TVU is a simple examination allowing clear visualization of most uterine conditions,<sup>6</sup> several concerns have been raised regarding its accuracy<sup>7-9</sup>. Hysteroscopy allows direct visualization and sampling of the uterine cavity and has an established diagnostic value for many uterine conditions.<sup>10-18</sup> Studies from Dreisler E, *et al.* showed that the hysteroscopy is not as cost-effective and convenient when compared to ultrasonographic imaging modalities, with relatively less patient discomfort and do not necessitate anesthesia<sup>19</sup>. The present era using more of a Dilatation and curettage alone than other mode of visualising intrauterine conditions associated with abnormal uterine bleeding as it is less time consuming and easily done. But the chances of missing the lesion using such blind techniques alone will not help in taking proper biopsy of the exact lesion and proper idea of uterine pathology. Therefore the procedure will be done under hysteroscopic guidance to look for exact pathology of uterus responsible for AUB, hence this study is being conducted in order to assess how effective is the diagnostic hysteroscopy in diagnosing

different uterine conditions causing abnormal uterine bleeding.

### AIMS AND OBJECTIVE OF THE STUDY

To find how accurate the diagnostic hysteroscopy in diagnosing different is uterine conditions responsible for abnormal uterine bleeding and to correlate the hysteroscopic findings with histopathological examination.

### MATERIALS AND METHODS

1. Source of data-patients admitted in FMMCH with abnormal uterine bleeding.
2. Sample size-maximum available patients in a period of 1 ½ year.
3. Study design-Prospective type of study.

It is a prospective type of study on 269 patient with age group 25-70yrs, who have attended the department of OBG at Father Muller Medical College, Mangalore in the last 1 1/2 years with complaints of abnormal uterine bleeding. All patients presented with AUB were admitted into the hospital. After thorough history and clinical examination patients were subjected to ultrasonological examination. On the next available OT, patients had diagnostic hysteroscopy followed by endometrial curettage. Hysteroscopy findings were noted at the time of the examination and documented. histopathological reports were collected from the pathological department and the results were analysed.

### Exclusion Criteria

1. Age below 25yrs and above 70yrs
2. Patients with cancer cervix, vaginal and vulval cancer,
3. Pregnant women,
4. Patients on Anticoagulants, Antidepressants, Hormonal contraceptives, Antipsychotics, Corticosteroids were excluded.

Records of hysteroscopy findings were classified as normal, hyperplasia, atrophy, polyp, fibroid, cancer. Histopathological diagnosis was taken as gold standard to determine accuracy of hysteroscopy findings for diagnosing endometrial abnormalities. The data was analysed using SPSS software with respect to sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV).

### RESULTS

In the study, the patient's age varied between 25 to 70 years. Abnormal uterine bleeding was most prevalent among women of two age groups, 41-50years (42%) and 31-40years (29%). The commonest affected patients were para 3 or more (33%) and least affected were para 1 (10%). 51.3% of the cases belonged to Middle

socioeconomic strata, 22.3% to high socioeconomic strata and 27.4% of the cases belonged to poor socioeconomic status. 70.63% of the population was from rural areas of different parts of Karnataka and remaining 29.36% from urban centres. 60 women (22.3%) patients were postmenopausal, 120(44.6%) women were perimenopausal and the remaining 89(33.08%) patients were young. 8(2.98%) patients had Modified Radical Mastectomy for Ca. Breast and was on Tamoxifen therapy and ultrasonography showing endometrial hyperplasia and remaining 261(97.02%) actually presented with AUB. 9(18.2%) of the patients were hypertensive, 9(3.3%) were diabetic and 7(2.6%) of the patients were having both Hypertension and Diabetes. In the present study majority of the patients presented with Menorrhagia 121(45%) followed by Postmenopausal bleeding 60(22.30%), Polymenorrhoea 31(12%), Polymenorrhagia 18(7%), Continuous bleeding 9(3.35%), Metrorrhagia 7(2.6%), Irregular cycles 7(2.6%), Dysmenorrhoea 6(2%), Dysmenorrhoea+Menorrhagia 4(1.50%), Polymenorrhoea+ Dysmenorrhoea, Polymenorrhoea+Metrorrhagia and Primary infertility contributes to 2(0.74%) each. All hysteroscopy were done in operation theatre under general anesthesia. Normal saline was used as the distending medium for diagnostic hysteroscopy. For all patients, following endometrial curettage the specimen was sent for histopathological examination. The hysteroscopy findings were tabulated as hyperplasia, normal, atrophy, polyp, cancer and submucous fibroid. 118 cases of hyperplasia were suspected on hysteroscopy, but 48 cases were diagnosed as hyperplasia on histopathology. Out of 48 cases of hyperplasia on histopathology, 35 cases were simple hyperplasia without atypia, 4 cases were simple hyperplasia with atypia, 3 cases of complex hyperplasia without atypia and 6 cases of complex hyperplasia with atypia. Hysteroscopy reported as normal in 69 cases, whereas histopathology diagnosed 164 were actually having normal endometrium. Out of 42 cases which were diagnosed as atrophy on hysteroscopy, 14 were confirmed as atrophic on histopathological examination (HPE) and 4 were insufficient endometrium obtained again probably due to atrophic endometrium. Out of 34 cases which were diagnosed as endometrial polyp on hysteroscopy, 22 were confirmed as endometrial polyp on histopathological examination. Hysteroscopy reported as endometrial carcinoma in 3 cases, whereas histopathology diagnosed 7 were actually having endometrial carcinoma. Hysteroscopy reported as submucous fibroid in 3 cases, whereas histopathology diagnosed 7 cases of fibroid polyp. The correlation between hysteroscopy findings and histopathological examination of endometrial curetting were studied. Of

those 118 patients with hyperplasia on hysteroscopy, 65(55.08%) patients had normal endometrium, 43(36.4%) patients had hyperplasia and 4(3.39%) patients had cancer, 2(1.7%) patients had endometrial polyp, 2(1.7%) with Normal endometrium with Focal hyperplasia, 1(0.85%) Atrophic endometrium, 1(0.85%) of Fibroid polyp. Of those 69 patients with normal on hysteroscopy, 64(92.7%) patients had normal endometrium, 2(2.9%) patients had hyperplasia, 2(2.9%) patients had endometrial polyp, 1(1.49%) with Atrophic endometrium. Of those 42 patients with Atrophic endometrium on hysteroscopy, 24(57.14%) patients had normal endometrium, 12(28.57%) patients actually had atrophic endometrium, 4(9.52%) were inadequate for histopathological examination and 2(4.76%) patients had hyperplasia. Of those 34 patients with Endometrial polyp on hysteroscopy, 18(52.94%) patients actually had endometrial polyp, 9(26.47%) normal endometrium, 6(17.64%) patients had fibroid polyp, 1(2.94%) patient had endometrial hyperplasia. 3 patients were diagnosed as endometrial cancer on hysteroscopy found to be true on histopathology. 3 patients were diagnosed to have submucous fibroid on hysteroscopy found to be normal on histopathology in 2(66.7%) patients and 1(33.3%) with normal endometrium with focal hyperplasia. Hysteroscopy was highly specific in diagnosing cancer but sensitivity was low. The sensitivity of hysteroscopy in diagnosing cancer was 42.85%, specificity was 100%, positive predictive value (PPV) being 100% and negative predictive value (NPV) was 98.49%. Hysteroscopy was found to have high specificity in diagnosing normal endometrium (95.23%), atrophy (88.23%), polyp (93.52%) and submucous fibroid (98.85%). It was found to have low specificity in diagnosing hyperplasia (66.21%). The sensitivity of hysteroscopy in detecting normal endometrium and cancer were 39.02% and 42.85% respectively which is low. The sensitivity in diagnosing polyp was found to be 81.81% and hyperplasia was 89.25%. Overall, hysteroscopy was highly sensitive in detecting hyperplasia (89.25%) and specific in detecting endometrial cancer (100%).

Table 1

Parameters	Group	Numbers	%
Age (yrs)	<30	9	3%
	31-40	79	29%
	41-50	112	42%
	51-60	57	21%
	>60	12	5%
	Total	269	100%
Parity	Nulliparous	12	4.46%
	Multiparous	200	74.35%
Socioeconomic status	High	60	22.30 %
	Middle	138	51.30%

	Low	71	27.40%
Locality of the population	Rural	190	70.63%
	Urban	79	29.36%
State of the patients	Postmenopausal	60	22.3%
	Perimenopausal	120	44.6%
	Young	89	33.08%
H/o Cancer	Present	8	2.98%
	Absent	261	97.02%
Associated co morbidities	Hypertension	49	18.2%
	Diabetes	9	3.3%
	HTN+ Diabetes	7	2.6%

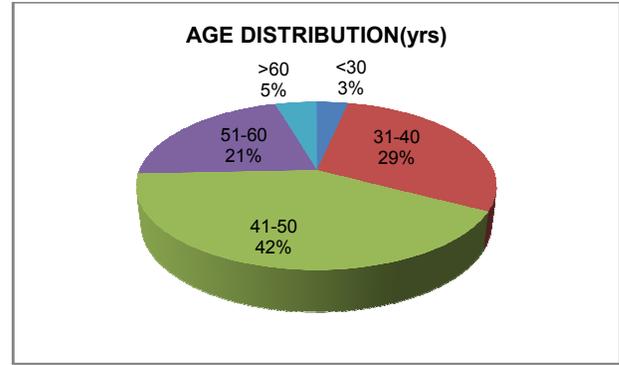


Figure 1: Age Distribution(yrs)

Age Group	Frequency	Percentage
<30	9	3%
31-40	79	29%
41-50	112	42%
51-60	57	21%
>60	12	5%
<b>Total</b>	<b>269</b>	<b>100%</b>

Symptoms	Frequency	Percentage
Menorrhagia	121	45%
Polymenorrhoea	31	12%
Polymenorrhagia	18	7%
Dysmenorrhoea	6	2%
Dysmenorrhagia	4	1.50%
Metrorrhagia	7	2.60%
Polymenorrhoea+Dysmenorrhoea	2	0.74%
Polymenorrhoea+Metrorrhagia	2	0.74%
Continuous Bleeding	9	3.35%
Irregular Cycles	7	2.60%
Primary Infertility	2	0.74%
Postmenopausal Bleeding	60	22.30%
<b>Total</b>	<b>269</b>	<b>100%</b>

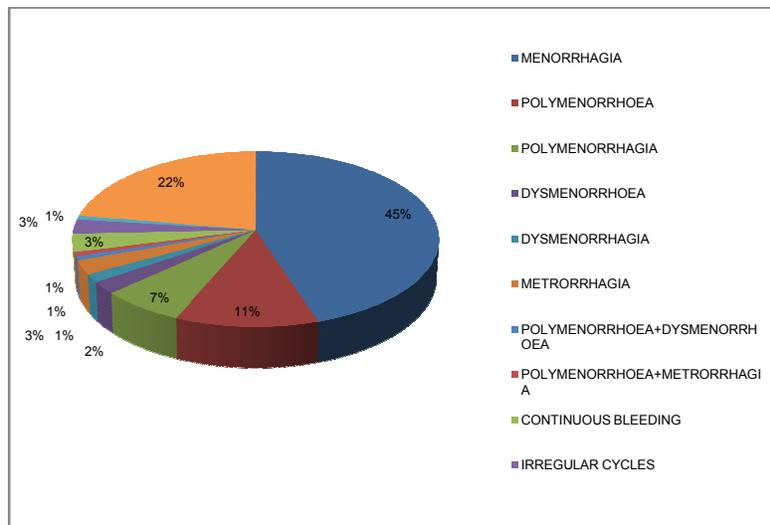


Figure 2: Symptomwise distribution of patients

Hysteroscopic Findings	Frequency	Percentage
Hyperplastic Endometrium	118	44%
Normal Endometrium	69	27%
Atrophic Endometrium	42	15%
Endometrial Polyp	34	12%
Endometrial Carcinoma	3	1%
Submucous Fibroid	3	1%
<b>Total</b>	<b>269</b>	<b>100%</b>

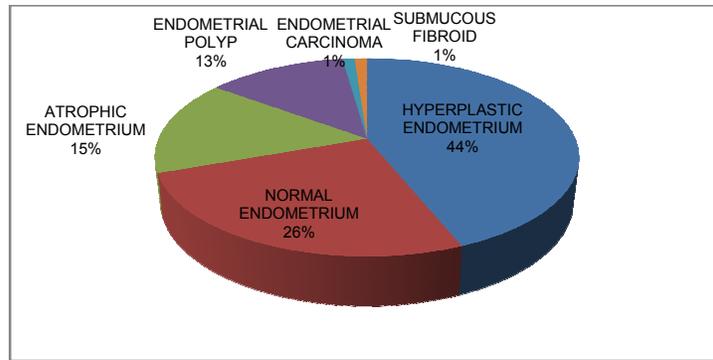


Figure 3: Hysteroscopic Findings

Table 5

Histopathological Findings	Frequency	Percentage
Hyperplastic Endometrium	48	17.80%
Normal Endometrium	164	60.90%
Atrophic Endometrium	14	5.20%
Endometrial Polyp	22	8.10%
Endometrial Carcinoma	7	2.60%
Fibroid Polyp	7	2.60%
Normal Endometrium With Focal Endometrial Hyperplasia	3	1.10%
Inadequate Sample	4	1.40%
<b>Total</b>	<b>269</b>	<b>100%</b>

Table 6

Hysteroscopy	Histopathology								Total
	Normal	Hyperplastic	Atrophic	Endometrial Polyp	Endometrial Cancer	Fibroid Polyp	Normal Endo+Focal Hyp.	Inadequate Sample	
Hyperplastic	65	43	1	2	4	1	2	0	118
Normal	64	2	1	2	0	0	0	0	69
Atrophic	24	2	12	0	0	0	0	4	42
Endometrial Polyp	9	1	0	18	0	6	0	0	34
Endometrial Cancer	0	0	0	0	3	0	0	0	3
Submucous Fibroid	2	0	0	0	0	0	1	0	3
<b>Total</b>	<b>164</b>	<b>48</b>	<b>14</b>	<b>22</b>	<b>7</b>	<b>7</b>	<b>3</b>	<b>4</b>	<b>269</b>

Table 7:

Parameter	Sensitivity (%)	Specificity (%)	Ppv (%)	Npv (%)
Hyperplastic	89.25%	66.21%	36.44%	96.68%
Normal	39.02%	95.23%	92.75%	50%
Atrophic	85.71%	88.23%	28.57%	99.11%
Endometrial Polyp	81.81%	93.52%	52.94%	98.29%
Endometrial Cancer	42.85%	100%	100%	98.49%
Submucous Fibroid	0.0%	98.85%	0.0%	97.36%

**DISCUSSION**

The most common problem in gynaecological practice is abnormal uterine bleeding. It contributes to about 30-40% of all gynecological problems.<sup>20</sup> In this prospective study,

269 women between 25 and 70 years of age who presented with complaints of abnormal uterine bleeding. They underwent two sets of investigations to reach a conclusion – diagnostic hysteroscopy and endometrial histopathology report. In our study, 22.30% patients had

postmenopausal bleeding and the rest had other menstrual abnormalities as an indication for hysteroscopy. Among which, menorrhagia (45%) being the commonest complaint which was found similar to study done in Bahrain<sup>23</sup> where menorrhagia was seen in 62% patients and postmenopausal bleeding in 22.30%. Abnormal uterine bleeding was most prevalent among women of two age groups, 41-50 years (42%) and 31-40 years (29%). Patients with hyperplastic endometrium, the endometrium appeared to be thickened, edematous and undulating. There were 118 patients with this hysteroscopic finding. This finding was consistent with histopathology of the endometrium in 43 cases and differed in rest. The sensitivity, specificity, positive predictive and negative predictive value of hysteroscopy for hyperplasia were 89.25%, 66.21%, 36.44%, 96.68%, respectively. Loverro *et al.*<sup>21</sup> stated the sensitivity, specificity, positive predictive value and negative predictive value as 98, 95, 63 and 99% respectively, for endometrial hyperplasia. The positive predictive value was 71.4% and negative predictive value was 95.4% as stated by studies of Arslan *et al.*<sup>22</sup>. Patients with normal endometrium. The normal uterine cavity has smooth walls and is free of fibroids, scar tissue, congenital malformation or polyps and *Openings to the fallopian tubes appear normal*. Of those 69 patients with normal on hysteroscopy, 64 (92.7%) patients had normal endometrium, 2 had hyperplastic endometrium, 1 had atrophic endometrium and 2 endometrial polyp. So the sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for normal endometrium were 39.02%, 95.23%, 92.75%, 50% respectively. In 42 (15%) patients, the endometrium appeared flat, thin and fragile with petechiae and hemorrhages at some points and prominent tubal ostia. The picture was suggestive of atrophic endometrium, which was also confirmed by histopathology in 14 (33.3%) cases and endometrium was not obtained in 4 cases. So, sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for atrophic endometrium were 85.71%, 88.23%, 28.57% and 99.11% respectively. This correlated with the study of Panda *et al.*<sup>24</sup> and Haller *et al.*<sup>25</sup> had reported sensitivity and specificity of 100 and 97% respectively. Patients with endometrial polyp In 34 (12%) patients on hysteroscopy, small growths in the uterine cavity, which were soft, oval, pedunculated with a smooth surface were seen. These growths appeared as endometrial polyps. Histopathology report confirmed the findings in 18 (52.94%) cases. Diagnostic accuracy of hysteroscopy for endometrial polyp was 55.5% when compared to histopathology. In the present study sensitivity, specificity, positive predictive value and negative predictive value of

hysteroscopy for endometrial polyp compared to histopathology were 81.81%, 93.52%, 52.94% and 98.29% respectively. Haller *et al.*<sup>25</sup> had reported sensitivity and specificity of 100 and 96.7% respectively. Acharya Veena<sup>26</sup> had obtained sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for endometrial polyp as 100% each.

#### **Carcinoma endometrium**

In 3 (1%) patients, hyperplasia with polypoidal growth, with areas of ulceration, hemorrhage and increased vascularity were labeled as carcinoma endometrium on hysteroscopy and 3 cases were confirmed on histopathology with the diagnostic accuracy of hysteroscopy was 100%. So, the sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for carcinoma endometrium were 42.85%, 100%, 100% and 98.49% respectively. Mencaglia<sup>27</sup> combined hysteroscopy with endometrial biopsy for diagnosing endometrial carcinoma and found nearly 100% accuracy in the diagnosis of endometrial neoplasia and its precursors. But Haller *et al.*<sup>25</sup> had got a reduced sensitivity of 50% but better specificity of 100%. Valle<sup>28</sup> and Panda<sup>29</sup> also had obtained diagnostic accuracy of 100% each. According to Pietro Litta *et al.*<sup>30</sup> Hysteroscopy revealed sensitivity, specificity, positive predictive value and negative predictive value of 100, 49.6, 81 and 100% respectively.

#### **Submucous fibroid**

A white-colored bulge, round in shape, with a smooth surface, which was diagnosed on hysteroscopy as submucous leiomyoma, was found in 3 (1%) patients. Only one case was confirmed on histopathology and remaining 2 were found to be normal endometrium. Diagnostic accuracy of hysteroscopy for submucous fibroid was only 33.3%. So specificity and negative predictive value of hysteroscopy for fibroid compared with histopathology were 98.85% and 97.36% respectively. Similar findings were reported by Panda<sup>24</sup>. But Valle<sup>28</sup> had reported a diagnostic accuracy 88%.

### **CONCLUSION**

Hysteroscopy is a simple and a low-risk procedure which allows a sufficient exploration of the uterine cavity under visual control. It is a quick and safe procedure for the diagnosis and Treatment of conditions responsible for AUB. It helps gynaecologist in finding the source of bleeding and perform a directed biopsy of the suspected area. It affords an accurate diagnosis than blind D and C for intrauterine pedunculated pathologies. Hyperplasia and carcinoma endometrium are best diagnosed by histopathology. Whereas, lesions like endometrial polyps and pedunculated fibroid polyps can be removed under direct vision with the hysteroscope. Diagnosis of

endometrial atrophy is best made by hysteroscopy. Curettage does not always yield a positive diagnosis of this condition and may even worsen the condition. It is also helpful in patients with intrauterine synechia as their presence, extension and nature, and can be removed under visual control with the hysteroscope only. So finally it can be concluded from all that hysteroscopy offers an invaluable advantage of direct visualization of any abnormality within the uterine cavity. It actually complements other diagnostic modalities. Hysteroscopy is a simple, safe, quick, feasible and economic technique, well-accepted by the patient, with great potential in gynecology.

## REFERENCES

1. Uterus-corporis. In: Rosai J editor. Rosai Ackerman's Surgical Pathology, 9th edition. Missouri, USA: Mosby Elsevier; 2004:1579-80.
2. Crum CP, Hornstein MD, Stewart EA. Evaluation of cyclic endometrium and benign endometrial disorders. In: Crum CP, Lee KR editors. Diagnostic Gynecologic and Obstetric Pathology. Philadelphia, USA: Elsevier Saunders; 2006:457, 477-8.
3. Sherman ME, Mazur MT, Kurman RJ. Benign diseases of the endometrium. In: Kurman RJ editor. Blaustein's pathology of the female genital tract, 5th edition. New Delhi, India: Springer; 2004:432,438.
4. ACOG practice bulletin: management of anovulatory bleeding. Int J GynaecolObstet 2001; 72:263-71.
5. Munro MG, Critchley HO, Broder MS, Fraser IS, for the FIGO Working Group on Menstrual Disorders. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Int J Gynaecol Obstet. 2011; 113:3-13.
6. Alfhaily F and Ewies AA. The first-line investigation of postmenopausal bleeding: transvaginal ultrasound scanning and endometrial biopsy may be enough. Int J Gynecol Cancer 2009; 19:892-895.
7. Kasraeian M, Asadi N, Ghaffarpassand F and Karimi AA. Value of transvaginal ultrasonography in endometrial evaluation of non-bleeding postmenopausal women. Climacteric 2011; 14:126-131.
8. Vitner D, Filmer S, Goldstein I, Khatib N and Weiner Z. A comparison between ultrasonography and hysteroscopy in the diagnosis of uterine pathology. Eur J ObstetGynecolReprodBiol 2013; 171: 143-145.
9. Dasgupta S, Sharma PP, Mukherjee A and Ghosh TK. Ultrasound assessment of endometrial cavity in perimenopausal women on oral progesterone for abnormal uterine bleeding: comparison of diagnostic accuracy of imaging with hysteroscopy-guided biopsy. J ObstetGynaecol Res 2011; 37: 1575-81.
10. Pop-Trajkovic-Dinic S, Ljubic A, Kopitovic V, Antic V, Stamenovic S and Pjevic AT. The role of hysteroscopy in diagnosis and treatment of postmenopausal bleeding. Vojnosanit Pregl 2013; 70: 747-750.
11. Soguktas S, Cogendez E, Kayatas SE, Asoglu MR, Selcuk S and Ertekin A. Comparison of saline infusion sonohysterography and hysteroscopy in diagnosis of premenopausal women with abnormal uterine bleeding. Eur J ObstetGynecolReprodBiol 2012; 61:66-70.
12. Yela DA, Ravacci SH, Monteiro IM, Pereira KC and Gabiatti JR. [Comparative study of transvaginal sonography and outpatient hysteroscopy for detection of pathologic endometrial lesions in postmenopausal women]. Rev Assoc Med Bras 2009; 55:553-556.
13. De Wit AC, Vleugels MP and de Kruif JH. Diagnostic hysteroscopy: a valuable diagnostic tool in the diagnosis of structural intra-cavitary pathology and endometrial hyperplasia or carcinoma? Six years of experience with non-clinical diagnostic hysteroscopy. Eur J ObstetGynecolReprodBiol 2003;110: 9-82
14. Elfayomy AK, Habib FA and Alkabalawy MA. Role of hysteroscopy in the detection of endometrial pathologies in women presenting with postmenopausal bleeding and thickened endometrium. Arch GynecolObstet 2012; 285:839-43.
15. Guruwadayarhalli B, Jones SE and Srinivasan V. Hysteroscopy in the diagnosis of postmenopausal bleeding. Menopause Int 2007; 13:132-4.
16. Liberis V, Tsikouras P, Christos Z, Ammari A, Dislian V, Koutlaki N, Liberis A and Maroulis G. The contribution of hysteroscopy to the detection of malignancy in symptomatic postmenopausal women. Minim Invasive Ther Allied Technol 2010; 19: 83-93.
17. Ribeiro CT, Rosa-E-Silva JC, Silva-de-Sá MF, Rosa-E-Silva AC, PoliNeto OB, Candido Dos Reis FJ, Nogueira AA. Hysteroscopy as a standard procedure for assessing endometrial lesions among postmenopausal women. Sao Paulo Med J 2007; 125:338-42.
18. Spicer JM, Siebert I and Kruger TF. Postmenopausal bleeding: a diagnostic approach for both private and public sectors. GynecolObstet Invest 2006; 61:174-8.
19. Dreisler E, Poulsen LG, Antonsen SL, Ceausu I, Depypere H, Erel CT, Lambrinoudaki I, Perez-Lopez FR, Simoncini T, Tremollieres F, Rees M and Ulrich LG. EMAS clinical guide: assessment of the endometrium in peri and postmenopausal women. Maturitas 2013; 75:181-190.
20. Menon MKK Devi PK Rao K B. Postgraduate Obstetrics and Gynecology. India: Orient Longman; 1982:253.
21. Loverro G, Bettocchi S, Cormio G, Nicolardi V, Porreca MR, Pansini N *et al.* Diagnostic accuracy of hysteroscopy in endometrial hyperplasia. Maturitas 1996; 25:187-91.
22. Arslan S, Aytan H, Gunyeli I, Koi O, Tuncay G, Tapisiz OL. Office hysteroscopic evaluation of endometrium: Can we hit the target. Arch GynecolObstet 2004; 271:200-2.
23. Madan SM, Zainab A. Abnormal uterine bleeding. Diagnostic value of hysteroscopy. Saudi Medical Journal 2001; 22:153-156.
24. Panda A, Parulekar SV, Gupta A. Diagnostic hysteroscopy in abnormal uterine bleeding and histopathological correlation. J ObstetGynaecol India 1999; 49, 74-76.
25. Haller H, Maehjic N, Rukarina B, Krasevic M, Rupcic S, Mozetic D. Transvaginal sonography and hysteroscopy in women with postmenopausal bleeding. Int J GynaecolObstet 1996; 54:155-9.

26. Acharya V, Mehta S, Randar A. Evaluation of dysfunctional uterine bleeding by TVS, hysteroscopy and histopathology. *J Obstet Gynaecol India* 2003; 53:170-7.
27. Mencaglia L. Hysteroscopy and adenocarcinoma. *ObstetGynecolClin North Am* 1995; 22:573-9.
28. Valle RF. Hysteroscopic evaluation of patients with abnormal uterine bleeding. *SurgGynecolObstet* 1981; 153:521-6.
29. Panda A, Parulekar SV, Gupta A. Diagnostic hysteroscopy in abnormal uterine bleeding and histopathological correlation. *J Obstet Gynaecol India* 1999; 49, 74-76.
30. Jaiswar SP, Schan R, Srivatava PK, Madumathi G, Monika P. A comparative diagnostic evaluation of hysteroscopy, transvaginal ultrasonography and histopathological examination in cases of abnormal uterine bleeding. *J Obstet Gynecol India*. 2006; 56:240-243.

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