

Comparative study of hysteroscopy with ultrasonography and its correlation with histopathology in cases of abnormal uterine bleeding in perimenopausal women

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Abstract:

Aim: To compare the diagnostic efficacy of ultrasonography and hysteroscopy in detecting uterine abnormalities in abnormal uterine bleeding by correlating the results with histopathological examination. **Material and Method:** This prospective study was conducted among women attending OPD of Department of Obstetrics and Gynaecology, IMS & SUM Hospital, Bhubaneswar from April 2019 to March 2021. A total of 100 perimenopausal women with abnormal uterine bleeding attending Obstetric and Gynaecology OPD were included in this study. All patients underwent transvaginal scan to note down the endometrial thickness and to rule out uterine and adnexal pathology. All the patients underwent diagnostic hysteroscopy, followed by a biopsy of the endometrium. The endometrium was sent to the pathologist. Findings of these diagnostic modalities then correlated. **Results:** Out of 100 women, USG detected that 54 patients (54%) had no pathology and 46 patients (46%) had abnormal findings, out of which maximum patients i.e., 29 patients (63.04%) had endometrial hyperplasia. According to Hysteroscopy, 46 patients (46%) had normal hysteroscopic findings while 54 patients (54%) had abnormal findings of which maximum were 18 patients (33.33%) who had endometrial hyperplasia. Histopathology findings revealed that 47 patients (47%) had normal findings and 53 patients (53%) had abnormal findings out of which maximum patients 20(37.7%) had endometrial hyperplasia. In our study of 100 women with AUB, on USG only 1 patient had endometrial malignancy and the same was reported by hysteroscopy and histopathology. **Conclusion:** In our study hysteroscopy proved to be highly sensitive and specific considering histopathology as gold standard. Ultrasonography has good sensitivity and specificity but less as compared to hysteroscopy.

Keywords: uterine, bleeding, histopathology.

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Introduction

AUB is defined as 'bleeding that is excessive either in quantity or duration or occurs outside of normal cyclic menstruation' and accounts for a great majority of hysterectomies[1,2]. Management of AUB can be complex without a proper diagnosis. 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%[3]. Perimenopausal is the period 8 -10 years preceding menopause and 1 year after the final cessation of menses. In perimenopausal women any change in frequency, duration or amount of flow during menstrual cycle as well as bleeding between cycles can occur. Although irregular bleeding patterns are a normal and expected part of perimenopause, the incidence of uterine pathology and associated medical complications also increase in this age group[4]. In present day practice, evaluation of a patient with AUB involves TVS, Hysteroscopy and endometrial histopathology. SIS (saline infusion sonography) may be a good tool for the diagnosis of focal lesions [5,6]. Diagnostic techniques such as ultra sonography (USG), despite being non-invasive, remains only a preliminary assessment tool that needs

to be further confirmed with use of more precise techniques[7,8]. The advantage of USG especially TVS is that it can be performed with empty bladder and is convenient for the patient and at the same time, it is suitable for getting more correct gynaecological diagnosis, especially in fatty women with a thick abdomen. TVS is superior to CT and approaches MRI in its ability to provide information about myometrial, cervical and perhaps, myometrial invasion of endometrial carcinoma. TVS is clinically established as the preferred technique for the evaluation of endometrial disorders, especially abnormal uterine bleeding[9,10]. Hysteroscopy is a surgical procedure in which a gynecologist uses a small lighted telescopic instrument called a hysteroscope to diagnose and treat many uterine disorders, including abnormal bleeding. The ability to observe the entire endometrium provides accuracy and precision in sampling. Hysteroscopy not only offers a quick, safe and accurate diagnosis, but also curative in cases of fibroid polyps, intrauterine adhesions, menorrhagia and lost IUCD. (intrauterine contraceptive device)[11]. The more accurate the diagnosis of endometrial pathology better the chances for alternative treatment and hysterectomies could be avoided. The accuracy or the superiority of the relatively noninvasive methods like TVS, Hysteroscopy and SIS over histopathology have not been clearly established. Thus this study was undertaken to evaluate the role of hysteroscopic guided biopsy and ultrasonography in detection of abnormal uterine bleeding among perimenopausal women[12,13]. This study aimed to compare the diagnostic efficacy of ultrasonography and hysteroscopy in detecting uterine abnormalities in abnormal uterine bleeding by correlating the results with histopathological examination.

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Material and Method

This prospective study was conducted among women attending OPD of Department of Obstetrics and Gynaecology of IMS & SUM Hospital, Bhubaneswar over a period of two years. The study was approved by the Institutional Ethical Committee. All patients were asked to sign a written informed consent form prior to commencement of the study. A total of 100 perimenopausal women with abnormal uterine bleeding attending Obstetrics and Gynaecology OPD were included in this study. Patients in perimenopausal age group presenting with abnormal uterine bleeding were included in the study. Pregnant women, vulval, vaginal or cervical cause of bleeding, known genito-urinary malignancies, known cases of bleeding disorders, drug intake causing bleeding (anti-coagulant, hormonal replacement therapy, contraceptives), known cases of endocrine disorders and PID women were excluded from the study.

Methods

- Detailed history of patient was taken which included presenting complaints, history of presenting illness, menstrual history, obstetric history, family, past and personal history followed by a complete general physical examination including pulse rates, blood pressure and temperature.
- Systemic examination respiratory system, CVS, central nervous system was done to rule out any medical disorder.
- The patient laid down in dorsal lithotomy position and with all asepsis per speculum was done to look for cervix and vagina, per vaginal examination done to look for uterine size, consistency, mobility and bilateral adnexa.
- Laboratory investigation whenever indicated was done like CBC, FBS, thyroid profile, LFT, RFT, BT/CT, Pap smear.
- After that all patients underwent ultrasonography and hysteroscopic guided biopsy was done and tissue was placed in 10% formalin for histopathological examination.
- If endometrial thickness (double layer) measured less than 15 mm in premenopausal women and less than 4mm in postmenopausal women and seemed regular by TVS, it was considered a normal finding. A centrally placed echodense line within the uterus and homogeneous endometrial lining with distinct margins to the myometrium were also considered normal. Deformations of the endometrial lining, absence of central hyperechoic line and the appearance of any structure with or without well-defined margins or variable echogenicity, were considered abnormal.

Hysteroscopy

Hysteroscopic findings were defined as the diagnostic impression based on the appearance of the surface of the uterine cavity, before biopsy which are as follows:

- Early proliferative phases:** 3rd to 8th day of 28 days menstrual cycle. The basal arteries are seen lying on surface of the basal endometrium parallel to one another.
- Late Proliferative phase:** 9th to 13th of 28 days menstrual cycle. The coiled arteries are very convoluted and spiral like.
- Early secretory phase:** Double layered endometrium is seen. The superficial network of terminal arterioles surrounding the glandular opening, just underneath the surface of the

endometrium and overlying the deeper lying coiled arteries can be seen.

- Late secretory phase:** The lower lying coiled arteries are not visible and the colour changes from pinkish to ivory.
- Premenstrual menstrual phase:** The small hematomas can be seen in the stroma surrounding the glands.
- Acute Endometritis** – The thickened reddish endometrium with lots of reflection in the light beam of the scope due to abnormal amount of mucus present.
- Chronic endometritis** – Typical strawberry appearance of endometrium is seen. Endometrium is normal in height with a reddish colour punctuated by small white dots at irregular distances. This change can be present in patches or throughout cavity.
- Endometrial hyperplasia:** The cobble stone appearance due to increase vascular branching.
- Endometrial atrophy:** If the atrophy is recent, parallel vessels lying in the basal layer of the endometrium are seen. As these vessels are no longer covered with functional layer, these become fragile and tend to break during examination causing generalized bleeding (the crying endometrium).
- Submucous myoma:** Typically appear as round protrusion bulging towards the uterine lumen. It is hard in consistency which is demonstrated by the resistance it offers to the pressure of the hysteroscope.
- Polyp** – polyp is generally small in size, broad based and soft. Its colour and vasculature resemble that of the surrounding endometrium.
- Endometrial carcinoma:** Main feature is the erratic vascularisation and vessels show abrupt changes in course and calibre. When the carcinoma is related to hyperplasia, hysteroscopy shows polypoid surface with area of necrosis and microcalcification. When carcinoma is not related to hyperplasia, hysteroscopy shows atrophic surface of uterine cavity with some isolated islands of tropic tissue.
- Foreign body** – visualisation of the uterine cavity directly permits detection of foreign body.

Post Procedure

Patients general condition and vitals were checked. Any bleeding per vagina is watched for.

Statistical analysis

All the findings and observations were coded and entered in Excel master sheet. Data was analysed using SPSS software version 24.

Results

In present study, maximum women belonged to the age group 40-45 years. 54 patients (54%) belong to this age group. 35 patients (35%) belong to age group between 45-50 years. Only 11 patients (11%) belong to age group more than 50 years. Out of 100 patients presenting with AUB included in our study, majority of patients 92(92%) were multiparous and only 8 patients (8%) were nulliparous. 59 patients (59%) stayed in urban area and 41 patients (41%) stayed in rural area. We analyzed the presenting complaint of these patients and found that majority of women (38%) presented with heavy menstrual bleeding. The second commonest presenting complaint was polymenorrhoea (24%) as shown in graph 1.

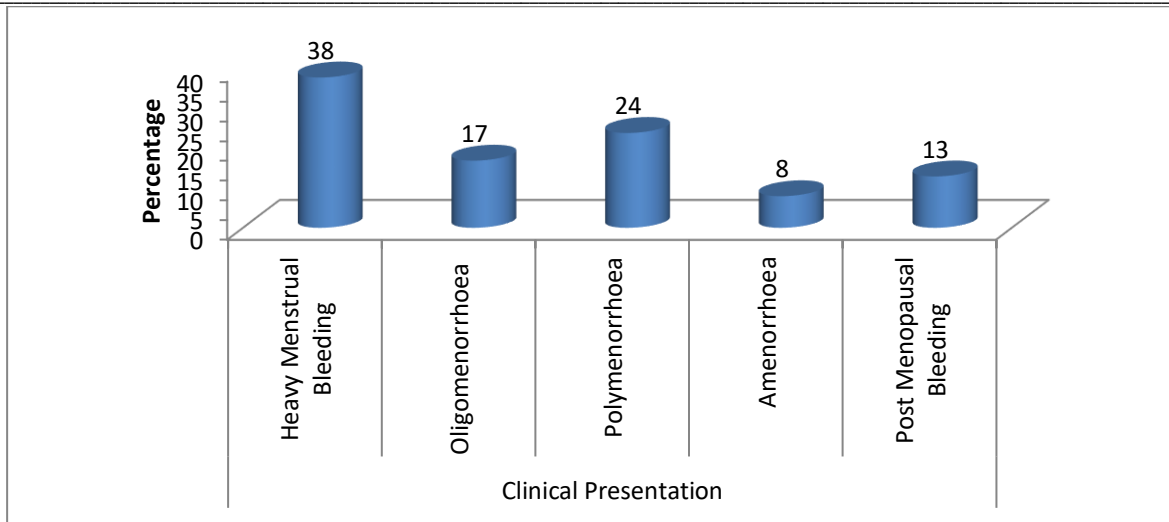


Fig 1: Distribution of women according to clinical presentation

Out of 100 women, USG detected that 54 patients (54%) had no pathology and 46 patients (46%) had abnormal findings, out of which maximum patients i.e., 29 patients (63.04%) had endometrial hyperplasia. 6 patients (13.04%) had adenomyosis. 6 patients (13.04%) had endometrial polyp. 2 patients (4.35%) were diagnosed to have submucous fibroid. 2 patients (4.35%) had atrophic endometrium and least was 1 case of endometrial malignancy (2.17%). Hysteroscopy was performed in all 100 women with AUB out of which 46 patients (46%) had normal hysteroscopic findings while 54 patients (54%) had abnormal findings of which maximum were 18 patients (33.33%) who had endometrial hyperplasia. Second commonest were 15 patients (27.78%) who had endometrial polyp. 7 patients (12.96%) had submucous fibroid. 5 patients (9.26%) had

endometritis. 5 had intra uterine adhesions and 1 case (1.85%) showed malignant changes in endometrium. Hysteroscopic guided dilatation and curettage was done of 100 women with AUB and endometrial tissue was sent for histopathology out of which 47 patients (47%) had normal findings i.e., 28 patients (28%) had proliferative and 19 patients (19%) had secretory changes. 53 patients (53%) had abnormal findings out of which maximum patients 20(37.7%) had endometrial hyperplasia.17 patients (32%) had endometrial polyp.10 patients (18.8%) had atrophic endometrium. 4 patients (7.5%) had cervical polyp and least patients were 2 (3.7%) whose histopathological reports showed malignant changes in endometrium (table 1).

Table 1: Findings on USG, Hysteroscopy and Histopathology

Findings	USG		Hysteroscopy		Histopathology	
	n	%	n	%	n	%
Normal	54	54	46	46	47	47
Abnormal	46	46	54	54	53	53
Submucous Fibroid	2	4.35	7	12.96	0	0
Adenomyosis	6	13.04	0	0	0	0
Endometrial Polyp	6	13.04	15	27.78	17	32
Endometrial Hyperplasia	29	63.04	18	33.33	20	37.7
Endometritis	0	0	5	9.26	0	0
Endometrial Malignancy	1	2.17	1	1.85	2	3.7
Intrauterine adhesions	0	0	5	9.26	0	0
Atrophic endometrium	2	4.35	3	5.56	10	18.8
Cervical Polyp	0	0	0	0	4	7.5
Cervical malignancy	0	0	0	0	0	0

In 100 patients with AUB, on ultrasonography 2 patients had fibroid out of which on hysteroscopy 1 patient (50%) had normal finding and 1 patient (50%) had submucous fibroid while on histopathology 1 patient (50%) showed secretory changes and 1 patients (50%) had endometrial polyp (table 2).

Table 2: Comparison of USG finding (fibroid) with hysteroscopy and histopathology

Findings	USG	Hysteroscopy		HPE		
		n	%	n	%	
FIBROID	2	Normal	1	50	1	50
		Fibroid	1	0	0	0
		Adenomyosis	0	0	0	0
		Endometrial polyp	0	50	1	50
		Endometrial hyperplasia	0	0	0	0
		Endometrial malignancy	0	0	0	0
		Intrauterine adhesions	0	0	0	0
		Cervical polyp	0	0	0	0
Atrophic endometrium	0	0	0	0		

In our study of 100 women with AUB, on ultrasonography 6 patients had Adenomyosis out of which on hysteroscopy, 4 patients (66.6%) had normal findings. 2 patients (33.3%) had atrophic endometrium and 1 patient (16.6%) had submucous fibroid. On histopathology, 4 patients (66.6%) had normal findings, 2 patients (16.6%) had endometrial hyperplasia, 1 patient (16.6%) had endometrial polyp (table 3).

Table 3: Comparison of USG finding (ADENOMYOSIS) with hysteroscopy and histopathology

Findings	USG	Hysteroscopy	%	HPE	%	
ADENOMYOSIS	6	Normal	4	66.6	4	66.6
		Fibroid	1	16.6	0	0
		Adenomyosis	0	0	0	0
		Endometrial polyp	0	0	1	16.6
		Endometrial hyperplasia	0	0	2	33.3
		Endometrial malignancy	0	0	0	0
		Intrauterine adhesions	0	0	0	0
		Cervical polyp	0	0	0	0
		Atrophic endometrium	2	33.3	0	0

In our study, on ultrasonography, 6 patients had endometrial polyp out of which on hysteroscopy, 5 patients (83.3%) had endometrial polyp and 1 patient (16.6%) had proliferative changes (normal). On histopathology, 5 patients (83.3%) had endometrial polyp and 1 patient (16.6%) had proliferative changes (normal) as shown in table 4.

Table 4: Comparison of USG finding (Endometrial Polyp) with hysteroscopy and histopathology

Findings	USG	Hysteroscopy	%	HPE	%	
Endometrial Polyp	6	Normal	1	16.6	1	16.6
		Fibroid	0	0	0	0
		Adenomyosis	0	0	0	0
		Endometrial polyp	5	83.3	5	83.3
		Endometrial hyperplasia	0	0	0	0
		Endometrial malignancy	0	0	0	0
		Intrauterine adhesions	0	0	0	0
		Cervical polyp	0	0	0	0
		Atrophic endometrium	0	0	0	0

In our study, on USG 29 patients had endometrial hyperplasia out of which on hysteroscopy 22 patients (75.8%) had endometrial hyperplasia . 6 patients (20.6%) had normal findings, 1 patient (0.3%) had submucous fibroid and 1 patient (0.3%) had endometrial polyp. On histopathology out of these 29 patients, 21 patients (72.4%) had endometrial hyperplasia, 7 patients (24.1%) had normal findings and only 1 patient (0.3%) had endometrial polyp (table 5).

Table 5: Comparison of USG finding (Endometrial Hyperplasia) with hysteroscopy and histopathology

Findings	USG	Hysteroscopy	%	HPE	%	
Endometrial Hyperplasia	29	Normal	6	20.6	7	24.3
		Fibroid	1	0	0	0
		Adenomyosis	0	0	0	0
		Endometrial polyp	1	0.3	1	0.3
		Endometrial hyperplasia	22	75.8	21	72.4
		Endometrial malignancy	0	0	0	0
		Intrauterine adhesions	0	0	0	0
		Cervical polyp	0	0	0	0
		Atrophic endometrium	0	0	0	0

In our study of 100 women with AUB, on USG only 1 patient had endometrial malignancy and the same was reported by hysteroscopy and histopathology (table 6).

Table 6: Comparison of USG finding (Endometrial Malignancy) with hysteroscopy and histopathology

Findings	USG	Hysteroscopy	HPE
Endometrial Malignancy	1	Normal	0
		Fibroid	0
		Adenomyosis	0
		Endometrial polyp	0
		Endometrial hyperplasia	0
		Endometrial malignancy	1
		Intrauterine adhesions	0
		Cervical polyp	0
		Atrophic endometrium	0

Discussion

Anything that can significantly improve the accuracy of diagnosis, the cause of abnormal uterine bleeding in peri-menopausal women can reduce the frequency of hysterectomy as a cure. Abnormal uterine bleeding has become more important on 2nd half of twentieth century, because women are experiencing more abnormalities in menstrual cycles during their reproductive life[14]. Ultrasonography (USG) can

be used to exclude organic pathology for AUB. It is well accepted that various disease pathology can be detected accurately by histopathological examination (HPE). The current study was carried out to evaluate various clinical presentations of perimenopausal AUB and to correlate ultrasonographic findings with histopathological examination in those patients undergoing hysterectomy.

In present study, maximum women belonged to the age group 40-45 years. The increased incidence of AUB in this age group was maybe because of initiation of menopause due to which the number of ovarian follicles decreases, and there was increased resistance to the stimulation of gonadotropin hormone that resulted in declining the level of estrogen. This event did not help the endometrium to grow further. Bharat Talukdar et al[15] described that most of the patients were between 40 and 45 years of age (67.97%). In a study by CS Patil[16], most of the patients with AUB were between 37-41 years of age (56%). However, there was a little difference in the study conducted by Kaur et al[17], range was 46-65 years with mean 50.80 ± 4.06 years. This was found because of the reason that they had included only patients of postmenopausal bleeding and sample size of 70 which is a small amount as compared to the prevalence of AUB in India.

Out of 100 patients presenting with AUB included in our study, majority of patients 92(92%) were multiparous and only eight patients (8%) were nulliparous. Similar to the study, Joshi et al[18] and Amruta Gadge et al[19] in their study too revealed that the highest incidence of AUB was seen in multiparous. This shows incidence of abnormal uterine bleeding increases as the parity increases.

In our study, USG detected that 54 patients (54%) had no pathology and 46 patients (46%) had abnormal findings, out of which maximum patients i.e., 29 patients (63.04%) had endometrial hyperplasia and only case was found to have endometrial malignancy (2.17%). According to Sujatha Audimulapu et al[20], USG detected that 52% had no pathology and 48% had abnormal findings, out of which maximum patients i.e., 30% had endometrial hyperplasia.

In our study hysteroscopy was performed in all 100 women with AUB out of which 46 patients (46%) had normal hysteroscopic findings while 54 patients (54%) had abnormal findings of which maximum were 18 patients (33.33%) who had endometrial hyperplasia. According to Sujatha Audimulapu et al[20], hysteroscopy detected that 46% had no pathology and 54% had abnormal findings, out of which maximum patients i.e., 18% had endometrial hyperplasia. 16% had endometrial polyp. 6% of the patients were diagnosed to have submucous fibroid.

In the present study, histopathology revealed that forty seven patients (47%) had normal findings i.e., twenty eight patients (28%) had proliferative and 19 patients (19%) had secretory changes. 53 patients (53%) had abnormal findings out of which maximum patients (37.7%) had endometrial hyperplasia. According to Sujatha Audimulapu et al[20], histopathology revealed that 30% had normal findings. 70% had abnormal findings out of which maximum patients 20% had endometrial hyperplasia.

On ultrasonography, fifty four patients had normal finding out of which on hysteroscopy, maximum patients 48 (88.8%) had normal findings also on histopathology, maximum patients 44 (81.4%) had normal findings. five patients (0.9%) had atrophic endometrium, three patients (0.5%) had endometrial hyperplasia and one patient (0.1%) had endometrial polyp.

In a study by Pratibha Garg et al[21], TVS compared to hysteroscopy has a higher specificity for diagnosis of endometrial hyperplasias. Hysteroscopy has been found to be more sensitive and specific in diagnosing endometrial polyps compared to TVS. TVS detected abnormal endometrial growth in one patient which was confirmed by histopathology. Hysteroscopy detected abnormal endometrial growth in one patient, which was confirmed by histopathology. This gave sensitivity of 100%, specificity of 100%, positive predictive value of 100% and negative predictive value of 100% in diagnosing endometrial cancer. This correlates with the study done by Rita Souse et al[22], Haller H et al[23] and Pekka Taipale et al[24].

Bharat Talukdar et al[15] in their study described that twenty one cases were diagnosed as adenomyosis by histopathologically, ultrasound diagnosed 11 of them. According to Sujatha Audimulapu et al[20] in 2017 conducted a study on a comparative diagnostic evaluation of hysteroscopy, transvaginal ultrasonography and histopathological examination in cases of abnormal uterine bleeding. Out of 50 cases, thirty eight cases (76%) of Hysteroscopy findings

correlated with Histopathology and discrepancy in findings was noted in twelve cases (24%). In twenty six cases (52%), TVS findings correlated with histopathology findings, and the results differed in twenty four patients (48%).

Vitner et al[25] showed that ultrasound has 93% sensitivity, 58% specificity, 84.3% positive and 78.3%, negative predictive value while hysteroscopy had 92% sensitivity, 67% specificity, 87.3% positive and 77.7% negative predictive values. Hysteroscopy had a significantly higher sensitivity in diagnosing intra-uterine fibroids while TVS had a significantly higher sensitivity in diagnosing retained products of conception. Although hysteroscopy had better predictive values for diagnosing uterine polyps the difference was not statistically significant. The combination of both TVS and hysteroscopy did not seem to improve the sensitivity and specificity.

Although Transvaginal ultrasonography represents a practical approach for the initial evaluation of uterine pathologies, a hysteroscopy examination would be necessary in most of the suspicious cases. Hysteroscopy remains the best option for the assessment of AUB owing to its diagnostic performance when compared to Transvaginal ultrasonography. It allows direct visualization of the cavity and also sampling for histopathological examination.

However more multicentric studies are required to formulate guidelines to recommend TVUS/ Hysteroscopy as diagnostic/ screening modality alternative to conventional endometrial biopsy.

Conclusion

In our study hysteroscopy proved to be highly sensitive and specific considering histopathology as gold standard. Ultrasonography has good sensitivity and specificity but less as compared to hysteroscopy. The disadvantage to ultrasonography is it fails to identify the accurate pathology, therefore hysteroscopy should be considered as a better modality. So we concluded that ultrasonography should be used as routine first step diagnostic technique, but it may miss some small lesions like polyps, so hysteroscopy followed by histopathology should be considered as a standard modality to evaluation of abnormal uterine bleeding in perimenopausal and postmenopausal bleeding.

References

1. Jaiswar SR, Sachan R, Srivastava PK et al. A comparative diagnostic evaluation of hysteroscopy, transvaginal Ultrasonography and histopathological examination in cases of abnormal uterine bleeding. *Obstet Gynecol India*. 2006; 56: 240-3.
2. VMO'Connor Heavy menstrual loss. Part1: is it really heavy loss? *Med Today*. 2003; 4: 51-9.
3. Viols GA, Lefebvre G, Graves GR. Guidelines for the management of abnormal uterine bleeding. *J Obstet Gynaecol Can* 2001; 23: 704-9.
4. Veena BT, Shivalingaiah N. Role of transvaginal sonography and diagnostic hysteroscopy in abnormal uterine bleeding. *J Clin Diagn Res* 2014; 8(12): OC06-8.
5. Hunter DC, McClure N. Abnormal uterine bleeding: an evaluation endometrial biopsy, vaginal ultrasound and out patient hysteroscopy. *Ulster Med J* 2001; 70:25-30.
6. Dangal G. A study of endometrium of patients with abnormal uterine bleeding at Chitwan valley. *Kathmandu Univer Med J* 2003; 1(2): 110-112.
7. Jain M, Kanhere A, Jain AK. Abnormal uterine bleeding: a critical analysis of two diagnostic methods. *Int J Reprod Contracept Obstet Gynecol*. 2014;3(1):48-53.
8. Goyal BK, Gaur I, Sharma S, et al. Transvaginal sonography versus hysteroscopy in evaluation of abnormal uterine bleeding. *Med J Armed Forces India* 2015;71(2):120-5.
9. Dubinsky TJ, Parvey HR, Maklad N. The role of transvaginal sonography and endometrial biopsy in the evaluation of peri and postmenopausal bleeding. *Am J Roentgenol* 1997;169(1): 145-149.

10. Breitkopf D, Frederickson R, Snyder R. Detection of benign endometrial masses by endometrial stripe measurement in premenopausal women. *Obstet Gynecol* 2004;104(1):120-125.
11. Sharma J, Tiwari S. Hysteroscopy in Abnormal Uterine Bleeding vs Ultrasonography and Histopathology Report in Perimenopausal and Postmenopausal Women. *Women*. 2016; 55: 203-209.
12. Kotdawala P, Kotdawala S, Nagar N. Evaluation of endometrium in perimenopausal abnormal uterine bleeding. *J Midlife Health* 2013;4(1):16–21.
13. Word B, Gravlee LC, Wideman GL. The fallacy of simple uterine curettage. *Obstet Gynecol* 1958;12(6):642–648.
14. Bree RL, Bowerman RA, Bohm-Velez M, et al. US evaluation of the uterus in patients with postmenopausal bleeding: a positive effect on diagnostic decision making. *Radiol* 2000; 216: 260-264.
15. Talukdar B, Mahela S. Abnormal uterine bleeding in perimenopausal women: Correlation with sonographic findings and histopathological examination of hysterectomy specimens. *J Mid-life Health* 2016; 7: 73-7.
16. Patil CS. A study of clinical correlation with histopathological diagnosis of abnormal uterine bleeding. *Med Pulse. Int Med J* 2016; 3(7):697 -699.
17. Kaur H, Goyal L, Kaur P. To validate the use of trans vaginal sonography – A noninvasive tool as a screening method for patients with postmenopausal bleeding. *Internet J Gynecol Obstet* 2012; 16:1-5.
18. Joshi SK. Atypical uterine bleeding-Histopathological audit of endometrium A study of 638 cases. *Al Ameen J Med Sci*. 2013;6(1):21-28.
19. Gadge A, Acharya N, Shukla S, Phatak S, Comparative Study of Transvaginal Sonography and Hysteroscopy for the Detection of Endometrial Lesions in Women with Abnormal Uterine Bleeding in Perimenopausal Age Group. *J South Asian Feder Obst Gynaecol* 2018; 10(3): 155-160.
20. Audimulapu S, Sudeepti M. A comparative diagnostic evaluation of hysteroscopy, transvaginal ultrasonography and histopathological examination in 50 cases of abnormal uterine bleeding. *IAIM* 2017; 4(8): 1-11.
21. Garg P, Yadav S. Comparison of transvaginal ultrasonography and hysteroscopy in the evaluation of peri and postmenopausal bleeding. *J Evolution Med Dent Sci* 2016; 5(21):1133-1136.
22. Sousa R, Silvestre M, Almeida E, et al. Transvaginal ultrasonography and hysteroscopy in postmenopausal bleeding: a prospective study. *Acta Obstet Gynaecol Scand* 2001; 80(9): 856-62.
23. Haller H, Matejcic N, Rukavina B, et al. Transvaginal sonography and hysteroscopy in women with postmenopausal bleeding. *Int J Gynaecol Obstet* 1996;54(2):155-9.
24. Taipale P, Tarjanne H, Heinonen UM. The diagnostic value of transvaginal sonography in the diagnosis of endometrial malignancy in women with peri- and postmenopausal bleeding. *Acta Obstetrica et Gynecologica Scand* 1994;73(10):819-823.
25. Vitner D, Filmer S, Goldstein I, Khatib N, Weiner Z. A comparison between ultrasonography and hysteroscopy in the diagnosis of uterine pathology. *European J Obstet Gynecol Reproductive Biol* 2013; 171(1):143- 145.

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