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Dr. Meena Jain
MS (Obstetrics & Gynaecology), MICOG, FIMS, Assistant Professor, Department of Obstetrics & Gynaecology, Sri Shankaracharya Medical College, Bhilai, Durg, Chhattisgarh, India

Dr. Preshit Chate
MD (Obstetrics & Gynaecology), Associate Professor, Department of Obstetrics & Gynaecology, Sri Shankaracharya Medical College, Bhilai, Durg, Chhattisgarh, India

Corresponding Author:
Dr. Preshit Chate
MD (Obstetrics & Gynaecology), Associate Professor, Department of Obstetrics & Gynaecology, Sri Shankaracharya Medical College, Bhilai, Durg, Chhattisgarh, India

TAS/TVS versus histopathological diagnosis in abnormal uterine bleeding: A comparative study

Dr. Meena Jain and Dr. Preshit Chate

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Abstract
Background: Any uterine bleeding outside the normal volume, duration, regularity or frequency is considered abnormal uterine bleeding.
Objectives: This study was conducted to evaluate the efficacy of TAS/TVS and histopathological findings in AUB patients.
Methods: A prospective study was done on 101 females of various age groups attending the Department of obstetrics and gynaecology over a period of 1 year with a clinical diagnosis of AUB. Each patient irrespective of the baseline investigations and sonography findings were subjected to premenstrual dilatation and curettage as well as hysteroscopy accordingly hence endometrial tissue obtained was subjected to histopathological examination.
Result: In our present study the most recurring clinical uterine lesion noted was myoma in about 34.16%, followed by Adenomyosis in about 33.54%. Endometrial polyp was noted at 21.11% and endometrial carcinoma was in 8.69%. Cervical polyp and cervical carcinoma found in 1.24%. The sensitivity and specificity of sonography for Diagnosing Polyp as compared to HPE was 52.77% and 98.46% while positive predictive value and negative predictive value were 95.00 % and 79.01% respectively.
Conclusion: Transabdominal or transvaginal ultrasound is low cost primary modality for screening and should include as a first line screening method. Though the investigation and management of AUB among the non-gravid women was confusing, histopathological diagnosis proved to be the gold standard.

Keywords: Abnormal uterine bleeding (AUB), adenomyosis, endometrial polyp, myoma, non-gravid

1. Introduction

Investigation and management of abnormal uterine bleeding (AUB) among non-gravid women of reproductive age has been hampered both by confusing and inconsistently applied nomenclature and by the lack of standardized methods for investigation and categorization of the various potential etiologies [4, 5].

Acute AUB is an episode of bleeding in a woman of reproductive age, who is not pregnant, of sufficient quantity to require immediate intervention to prevent further blood loss. Chronic AUB is the bleeding from the uterine corpus that is abnormal in duration, volume, and/or frequency and has been present for the majority in the last 6 months.

PALM-COIEN classification in 2011, for the causes of AUB in non-gravid women of reproductive age was published in order to standardize terminology, diagnostics and investigations [6]. There are 9 main categories, which are arranged according to the acronym PALM-COEIN (pronounced "pahm-koin"): polyp; Adenomyosis; leiomyomas; 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) [6].

Ultrasound is an appropriate screening tool and, in most instances, should be performed first or early in the course of the investigation. Even in ideal circumstances, TVUS is not 100% sensitive because polyps and other small lesions may elude detection, even in the context of a normal study [7, 8]. However, if office hysteroscopy is available, there may be additional value should polyps be identified because they could be removed in the same setting. When vaginal access is difficult, as may be the case with adolescents and virgin women, TVUS, SIS and office hysteroscopy may not be feasible [6].

Estimates of the prevalence of Adenomyosis vary widely, ranging from 5% to 70% [9] an observation that, at least in part, is probably related to inconsistencies in the histopathologic criteria for diagnosis. Generally, these criteria have been based on histopathologic evaluation of the depth of "endometrial" tissue beneath the endometrial – myometrial interface, as determined via hysterectomy. The histopathologic criteria vary substantially9 and the requirement to diagnose adenomyosis solely from specimens obtained at hysterectomy is an approach that has limited value in a clinical classification system. Consequently, and because there exist both sonographic [10] and magnetic resonance imaging (MRI) based [11, 12] diagnostic criteria, Adenomyosis has been included in the classification system.

Endometrial cancer is staged surgico-pathologically according to FIGO (International Federation of Gynecology and Obstetrics) criteria. Preoperative magnetic resonance imaging is performed to identify patients with deep myometrial invasion, enlarged pelvic nodes, and extra uterine extension of disease, which alter the extent of surgery.

The term "DUB," which was previously used as a diagnosis when there was no systemic or locally definable structural cause for AUB, is not included in the system and should be abandoned, per the agreement process [13, 14]. Women who fit this description generally have one or a combination of coagulopathy, disorder of ovulation, or primary endometrial disorder the last of which is most often a primary or secondary disturbance in local endometrial homeostasis.

This study was conducted to asses sonography as a diagnostic investigation modality in patients of abnormal uterine bleeding and to correlate it with histopathological findings.

Material and methods

A prospective study was done on 101 females of various age groups attending the Department of obstetrics and gynecology over a period of 1year with a clinical diagnosis of AUB.

Patients fulfilling the inclusion criteria were selected through detailed clinical history, examination: general physical, systemic, gynecological (per speculum, per vaginal) and all general and specific investigations were carried out. Written informed consent (form attached) was taken from patient interviewed, examined and investigated as per the predesigned proforma (attached). All the patients were subjected to premenstrual dilatation and curettage and hysterosopic guided biopsy accordingly. Tissue obtained was subjected to histopathological examination.

After primary data collection, a master chart was prepared with the help of Microsoft excel sheet and data entered into it was analyzed according to the set objectives.

Non-parametric (discrete) data was analyzed using chi-square test. Mean, standard deviation and percentage was used for analysis of parametric (continuous) data. A P value of <0.05 was considered statistically significant.

Results

Table 1: Age wise distribution of AUB cases

Age group	N (101)	Percentage (%)
31-40	17	16.83
41-50	63	62.38
51-60	11	10.89
61-70	8	7.92
>70	2	1.98

Most of the cases were found in 41-50 year age group i.e. 63 and least case were found in 70<age group

Table 2: Distribution of menstrual pattern in various age groups

Age group (years)	31-40	41-50	51-60	61-70	>70	Total
Menstrual pattern						
HMB	9	25	1	1	0	36
HPMB	7	22	3	0	0	32
IMB	1	15	3	2	0	21
PMB	0	1	4	5	2	12
Total	17	63	11	8	2	101

68 patients had menorrhagia as a primary complaint. Heavy Menstrual bleeding (HMB) in 36 (35.69%) and Heavy and Prolonged Menstrual Bleeding (HPMB) in 32 (31.68%), 21(20.79%) patients have irregular menstrual bleeding patterns, while 12(11.88%) patients had post- Menopausal bleeding.

Table 3: Tabulating the histopathological findings in all age group.

Pathology / Age group (years)	31-40	41-50	51-60	61-70	>70	Total
Myoma	4	15	0	0	0	19
Adenomyosis	4	11	1	0	0	16
Endometrial polyp	1	3	1	0	0	5
Cervical polyp	0	2	0	0	0	2
Endometrial carcinoma	0	1	2	4	1	8
Cervical carcinoma	0	0	0	0	0	0
Myoma+ Adenomyosis	2	11	3	0	0	16
Myoma+ polyp	1	4	1	0	0	6
Myoma+ endometrial carcinoma	0	0	1	2	0	3
Myoma+ cervical carcinoma	1	0	0	0	1	2
Polyp+ Adenomyosis	3	8	1	0	0	12
Polyp+ endometrial carcinoma	0	1	0	1	0	2
Adenomyosis+ endometrial carcinoma	0	0	0	1	0	1
Myoma+ polyp+ Adenomyosis	1	7	1	0	0	9
Total	17	63	11	8	2	101

Histopathological examination maximum number of patients were found having Myoma in 19 cases (18.81%) followed by Adenomyosis in 16 cases (15.84%) and Myoma+ Adenomyosis existed in 16 (15.84%) cases. Least frequently condition was myoma with endometrial carcinoma and 1 case (0.99%) of Adenomyosis with endometrial carcinoma.

Table 4: Correlation of various diagnostic modalities in AUB

Findings	USG	HPE	p value
Normal	33	0	<0.0001
Myoma	18	19	0.97
Endometrial polyp	3	5	0.72
Cervical polyp	0	2	0.36
Adenomyosis	10	16	0.44
Endometrial carcinoma	4	8	0.49
Cervical carcinoma	0	0	0
Myoma+ Adenomyosis	14	16	0.83
Myoma+ polyp	3	6	0.53
Myoma+ Endometrial carcinoma	1	3	0.56
Myoma+ Cervical carcinoma	1	2	0.81
Polyp+ Adenomyosis	7	12	0.48
Polyp+ Endometrial carcinoma	1	2	0.81
Adenomyosis+ Endometrial carcinoma	0	1	0.60
Myoma+ polyp+ Adenomyosis	6	9	0.30

Table 5: Pathological findings in patients of AUB

Findings	Pathology	n	%
Tissue findings	Normal Endometrium	20	16.53
	Endometrial hyperplasia	27	22.31
	Proliferative phase	11	9.09
	Secretary	17	14.04
	Mixed	3	2.47
	Atrophic endometrium	3	2.47
	Endometritis	1	0.83
	Endometrial polyp	5	4.13
	Endometrial Carcinoma	12	9.91
	Cervical Carcinoma	2	1.65
Uterine Pathologies	Myoma	55	34.16
	Adenomyosis	54	33.54
	Endometrial polyp	34	21.11
	Cervical polyp	2	1.24
	Endometrial carcinoma	14	8.69
	Cervical carcinoma	2	1.24

In our study dilatation and curettage findings 20 cases (16.53%) had normal endometrium. Highest number of patients. i.e. 27 corresponding to 22.31% were detected as endometrial hyperplasia. secretary endometrium was detected in 17(14.04%), proliferative in 11(9.09%) cases. 1 case (0.83%) had endometritis and 5 cases (4.13%) had endometrial polyp while 12 (9.91%) cases were diagnosed as endometrial carcinoma and 2 (1.65%) had cervical carcinoma.

In our present study the most recurring clinical uterine lesion noted was myoma in about 34.16% followed by Adenomyosis in about 33.54% of times. Endometrial polyp was noted at 21.11% of times and endometrial carcinoma was noted in 8.69% cases while cervical polyp and cervical carcinoma was noted at 1.24% of cases.

In our present study polyps was detected by USGs in 3 patients and HPE diagnosis of polyps was in 5 patients.2 cases of Cervical polyp were missed by sonography.

Statistic	value
Sensitivity	52.77%
Specificity	98.46%
Positive Predictive Value	95.00%
Negative Predictive Value	79.01%

The sensitivity and specificity of TAS for Diagnosing Polyp as compared to HPE was 52.77% and 98.46% while positive predictive value and negative predictive value were 95.00 % and 79.01% respectively.

Discussion

USG forms the baseline imaging modality, Ultrasonography (USG) helps excludes organic pathology for AUB and is well accepted that for various disease, pathology can be detected accurately by histopathological examination (HPE) [15].

A comprehensive history and physical examination, with focus on the menstrual history and genitourinary exam was most helpful in determining the diagnosis; however, based on the findings, laboratory evaluation or imaging may be necessary [16]. Thus the demographic findings of our study were consistent with other studies. Higher number of patients found in the age group of 41-50 years. In the post-menopausal age group AUB was less, thus may be attributable to the increased rate of hysterectomy for benign indications.

Myoma was the most prevalent histopathological finding during the examination. In 19 (18.81%) patients while Adenomyosis existed in 16 (15.84%) patients out of total findings dual pathology of Myoma + Adenomyosis was found in again 16 patients i.e. 15.84. In various combinations, Myoma was obtained in maximum number of cases i.e in 55 patients in 54.46 % of the total his to pathological examination.

According to a retrospective study conducted by Ghazala Rizvi *et al.* (2015) and published in 2013 Tilted "Histological correlation of Adenomyosis and leiomyomas in hysterectomy specimen as a cause of abnormal uterine bleeding." 94 patients i.e. 51.08% were found to have Adenomyosis and 39.13 % were found to have myoma while 9.78% of the patients have dual pathology.17

Though the comparison of percentage in our study was favorable to other study but the other studies was retrospective and ours being prospective and since we have taken all the structural causes of abnormal uterine bleeding the overall percentage has come to lower studies.

In our study polyp with Adenomyosis existed in 12 patients as confirmed by histological examination i.e. in 11.88%. While myoma with polyp and Adenomyosis existed in 9 patient i.e 8.91% of cases. Endometrial Carcinoma independently was found in 8 cases i.e 7.92% while independently endometrial polypexisted in 5 cases while cervical polyp was found in 2 cases. Myoma with polypexisted in 6 cases. Similarly endometrial carcinoma existed with Myoma in 3 cases and cervical carcinoma was found in 2 cases. Endometrial carcinoma with polyp was reported in 2 cases and endometrial carcinoma with Adenomyosis was reported in 1 cases. There was no comparative study found for establish the correlation of our study.

Myoma and Adenomyosis existed in reproductive and perimenopausal age group, while carcinomas mainly constituted the post-menopausal age group. Maximum number of myoma, Adenomyosis and the dual pathology existed in the age group of 31-50 years. Polyp existed in the age group of 41-60 years. Endometrial carcinomas were maximally seen in the age group of 61-70 years of the 2 cases diagnosed as cervical carcinoma one case was diagnosed at 38 years of age and other at 74 years of age this is in accordance with the bimodal distribution of the cervical carcinoma.

The pathological findings of Myoma and Adenomyosis are more consistent with the menorrhagia while carcinomas are more consistent with postmenopausal bleeding and inter-menstrual bleeding.

In our present study of 101 patients complaining of Abnormal uterine bleeding 33 patients were declared Normal as per trans abdominal sonographic findings and7 were having normal MRI finding While none of the Symptomatic patients were having normal histopathological finding. Trans Abdominal Sonography missed the diagnosis of Adenomyosis in about 23 cases and incorrectly diagnosed 2 cases as Adenomyosis.

Histopathology diagnosed a total of 36 cases of polyp in which 30 cases were correctly diagnosed by MRI while 3 cases were incorrectly diagnosed as polyp by MRI. Transabdominal sonography diagnosed only 19 cases and missed 17 cases moreover wrongly diagnosed 1 case as polyp. Transabdominal sonography was not able to diagnose cervical carcinoma cases. Transabdominal sonography diagnosed only 4 cases of endometrial carcinoma while of total 8 cases diagnosed by histopathology.

The p value was found to be highly significant for diagnosing normal findings in symptomatic patients and for preoperative evaluation, counseling, and planning of surgical management.

In diagnosing other uterine lesions, the p value was not found significant. And thus, this preoperative imaging modality plays role in diagnosis and management of uterine pathologies in patients complaining of abnormal uterine bleeding.

In our study, all the patients were subjected to dilatation and curettage so as to get endometrial tissue for histopathological examination before proceeding and deciding for surgical management.

Dilatation and curettage findings of 20 patients were normal endometrium for the menstrual day and they were excluded from the study and managed conservatively. highest number of patients. i.e. 27 corresponding to 22.31% were having endometrial hyperplasia, secretary endomctrium was found in 18 patients proliferative in 11 patients 1 patient had endometritis and 5 patients had endometrial polyp while 12 patients were detected to have endometrial carcinoma and 2 had cervical carcinoma.

In a study conducted by Sujith K *et al.* (2014) titled "Study of histopathological patterns of endometrium in abnormal uterine bleeding" Endometrial hyperplasia was the most common histopathological findings in 25% of the patients followed by secretary endometrium in 16.7%patients and proliferative phase in 12.2%. Malignancy was detected in 6.4% of cases and endometrial carcinoma was most common malignancy in 4.5%.19

Where as in a study conducted by Saraswath Doraiswami *et al.* (2011); in "study of endometrial pathology in abnormal uterine bleeding" normal cyclical endometrium was found in 28.4% proliferative pattern was seen in 20.5%. Endometrial hyperplasia in only 6.1%. carcinoma in 4.4% and endometritis in 4.2%,20 Thus, our findings of study were consistent to other studies.

In our present study the most recurring uterine lesion noted is myoma found in about 34.16% of circumstances, followed by Adenomyosis in about 33.54% of times. Endometrial polyp was noted at 21.11% of times and endometrial carcinoma was noted in 8.69% of times while cervical polyp and cervical carcinoma was noted at 1.24% of times.

In a study conducted by Bharat Talukdar *et al.* histopathologic ally myoma was seen in about 44.66% of cases and Adenomyosis was seen in 20.39% of cases. The findings are consistent with our study.21

Similarly, in a study conducted by N Bhavani *et al.* (2015), among the causes of abnormal uterine bleeding, Structural causes accounted for 54.5% of cases. 45.5% of them had nonstructural causes of abnormal uterine bleeding. Myoma in 38.5% is the commonest Cause of abnormal uterine bleeding, followed by hyperplasia and malignancy 7.5%, adenomyosis in 6%, polyp in 2.5%.18 Thus findings in our study are consistent with other study.

In our study total no of cases diagnosed as myoma in MRI is 55 and in Histopathological Specimen who underwent Surgical treatment also diagnosed myoma as a total in 55 patients.

One case of endometrial polyp was diagnosed as myoma by TAS and one case of small myoma

<1cm was diagnosed on Histopathological examination. Thus, the positive predictive value and Sensitivity of TAS in correlation to HPE for myoma was 98.18% while negative predictive value and specificity was calculated as 97.83%, in which both were high. Thus, in our study sensitivity came out to be 87.04% specificity was found to be 95.74 % positive predictive value 95.92 % and negative predictive value 86.54 %.

In our present study transabdominal ultrasonography diagnosed a total of 35 patients as having Adenomyosis while histopathology detected a total of 54 patients as Adenomyosis TAS missed 19 cases as Adenomyosis and diagnosed 2 other lesions as Adenomyosis.

Thus, in our study statistical values of TAS with respect to HPE for adenomyotic lesions are; sensitivity came out to be 64.81%, specificity was found to be 95.74 % positive predictive value94.59% and negative predictive value 29.68 %.

In a study conducted by Devimeenal Jaganathan *et al.* (2016) and published in 2017 titled as 'Comparison of the Diagnostic accuracy of Magnetic Resonance Imaginary (MRI) Trans abdominal ultrasonography (TAS), Trans Vaginal Ultrasonography (TVS)in characterizing the uterine mass lesion,"22 Thus the findings in our study are consistent with other studies.

Kang S *et al.* study on specificity of 5mm as the maximum normal uterine JZ thickness in detecting Adenomyosis concluded that if a diagnosis of Adenomyosis is based solely on JZ thickness of 5mm as upper limit of normal may result in a high false positive rate.23

Our study has showed 12 mm as minimal thickness in positive cases of adenomyosis and p value is found to be highly significant.

In our present study polyps was diagnosed by TAS in 19 patients and HPE diagnosis of polyps was in 36 patients TAS labeled 1 other cases as polyp while HPE diagnosed a total of 36 cases

i.e. as a whole 17 cases of polyp was missed by TAS. The sensitivity and specificity of TAS for Diagnosing Polyp as compared to HPE was 52.77% and 98.46% while positive predictive value and negative predictive value were 95.00% and 79.01% respectively. While negative predictive value comes out to be 96.67%. Thus, the sensitivity and specificity of our study in diagnosing endometrial carcinoma is comparable to other

studies.

The total cases diagnosed as endometrial carcinoma by trans-abdominal sonography is only 4, while HPE diagnosed all 14 cases, thus the sensitivity of TAS against MRI in diagnosing endometrial carcinoma is 28.57% and specificity is 97.70%. all the results were consistent with few previous studies.18,21,22

Conclusion

We can conclude from our discussion that AUB Abnormal uterine bleeding iscommon during the perimenopausal age group of 40-51 years while the causes ranged from medical disorders to simple pathologies like myoma to malignancy.

AUB existed among the parity-2 with chronic onset and associated with hypothyroidism being most common symptoms ranged from heavy menstrual bleeding to the post-menopausal bleeding. Endometrial biopsy sample revealed a wide range of findings from normal to endometrial carcinoma. Maximum histopathological finding detected in our study was of myoma and Adenomyosis.

Sensitivity and specificity for detecting myoma in respect to HPE was found high. Transabdominal ultrasound is low cost primary modality for screening and should include as a first line screening method. Though the investigation and management of AUB among the non- gravid women was confusing, histopathological diagnosis proved to be the gold standard.

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