Research Article

Determining causes of AUB by Clinical Diagnosis, SIS & Ultrasound Findings to Assertain PALM COEIN Status for Planning Line of Management

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Access this article online

Website: www.cijmr.com

DOI: 10.58999/cijmr.v5i01.246

Keywords: Abnormal Uterine Bleeding, Saline infusion sonography, International Federation of Gynecology and Obstetrics

Introduction: Abnormal uterine bleeding (AUB) affects about 14 to 25% of the population, with a prevalence of 17.9% in India. This condition poses an intricate gynaecological challenge for women. Across all age groups, varied diagnostic approaches are available, viz., History taking, Ultrasound examination, Saline infusion sonography with or without 3D, Hysteroscopy, MRI imaging, CT scan, and so on. All these help us ascertain the PALM COEIN of the underlying pathology. (PALM: Polyp, Adenomyosis, Leiomyoma, Malignancy) (COEIN: Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, Not classified). This study aims to investigate the causes of menorrhagia to improve patient management according to the PALM-COEIN classification developed by the International Federation of Gynaecology and Obstetrics (FIGO).

Materials and Methods: A prospective observational study was conducted over one year at Ruxmaniben Deepchand Gardi Medical College, Ujjain, involving 151 women aged 18 to 65 years with AUB. Participants underwent comprehensive assessments, including menstrual history review, physical examinations, transvaginal ultrasound, and saline infusion sonography (SIS), with histopathological analysis performed on tissue samples.

Results: The majority of participants (48.3%) were aged 40 to 49, with 90.7% from rural areas and predominantly employed in farming (42.4%). Heavy menstrual bleeding was the most prevalent symptom (45%). Ultrasound detected normal findings in 50.3% of cases, whereas SIS revealed normal findings in 41.7%. Histological findings showed normal results in 47%, while SIS demonstrated superior diagnostic performance for detecting polyps (AUC: 0.970) and endometrial hyperplasia (AUC: 0.917) compared to transvaginal ultrasound.

Conclusion: This study highlights the superior diagnostic accuracy of SIS over ultrasound in identifying uterine pathologies associated with AUB. SIS (Saline Infusion Sonography) provides greater sensitivity and specificity, identifying key etiological factors such as polyps, submucosal fibroids, and endometrial hyperplasia. These findings propose that SIS can enhance patient management strategies and improve treatment outcomes, ultimately preserving uterine health.

Introduction

Abnormal uterine bleeding (AUB) refers to irregular bleeding patterns differing from normal menstruation, affecting frequency, duration, or volume.[1] It affects 14 to 25% of reproductive-age women,[2] with a prevalence of 17.9% in India.[3] This condition poses a common and intricate gynecological challenge for women across all age groups, particularly those within the reproductive phase, potentially exerting a profound influence on their overall quality of life.[4] AUB encompasses a diverse spectrum of menstrual irregularities, including instances of excessive or prolonged bleeding, intermenstrual bleeding, and irregular menstrual cycles, often precipitating substantial physical and psychological distress among affected individuals.[5] Diagnostic approaches include mainly pelvic ultrasound and endometrial biopsy. Saline infusion sonography (SIS) offers enhanced visualization of intracavitary abnormalities.[6] This study aims to explore causes of menorrhagia for better management of patients according to PALM COEIN.

Material and Methods

This one-year prospective observational study was conducted in the Department of Obstetrics and Gynaecology at Ruxmaniben Deepchand Gardi Medical College, Ujjain, involving 151 women aged 18 to 65 years

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Submitted: 01/02/2026 Revision: 15/02/2026
Accepted: 01/03/2026 Published: 20/04/2026

How to cite this article: Agrawal S, Jain D, Srivastava S, Roy PK. Determining causes of AUB by Clinical Diagnosis, SIS & Ultrasound Findings to Assertain PALM COEIN Status for Planning Line of Management. Central India Journal of Medical Research. 2026;5(1):16-20.

Table 1: Distribution of patients according to age

Age group	*No.*	*Percentage*	
<29 years	9	6.0	
30–39 years	43	28.5	Min.: 23 years
40–49 years	73	48.3	Max.: 60 years
50–59 years	21	13.9	Mean:41.07 ± 8.12
>60 years	5	3.3	
Total	151	100.0	

Table 2: Distribution of patients according to their geographic location

Geographic location	*No.*	*Percentage*
Rural	137	90.0
Urban	14	9.3
Total	151	100.0

Table No-3: Distribution of patients according to their Occupation

Occupation	No.	Percentage
Farmer	64	42.4
Housewife	54	35.8
Labourer	33	21.9
Total	151	100.0

Table 4: Distribution of cases according to parity

Parity	*No.*	*Percentage*
Nulliparous	1	0.7
>2	116	76.8
<2	34	22.5
Total	151	100.0

Table No-5: Distribution of patients according to Clinical Presentation

Symptoms	No.	Percentage
Heavy Menstrual bleeding	68	45.0
Intermenstrual spotting	22	14.6
Prolonged menses	15	9.9
Frequent & Heavy Menstrual bleeding	46	30.5
Total	151	100.0

Table No-6: Distribution of patients according to Duration of Complaints

Duration of Complaints	No.	Percentage
<6 months	74	49.0
6-12 months	67	44.4
>12 months	10	6.6
Total	151	100.0

Table 7: Distribution of patients according to USG Finding

USG Finding	*No.*	*Percentage*
Normal	76	50.3
Polyp	36	23.8
Submucal Fibroid	39	25.8
Total	151	100.0

Table 8: Distribution of patients according to Saline Infusion Sonography Finding:

Saline infusion sonography finding	*No.*	*Percentage*
Normal	63	41.7
Polyp	43	28.5
Endometrial hyperplasia	5	3.3
Submucal Fibroid	40	26.5
Total	151	100.0

with abnormal uterine bleeding (AUB). After obtaining informed consent, participants underwent a detailed menstrual history review, general physical examination, and uterine and adnexal assessment. Conventional transvaginal ultrasound and saline infusion sonography (SIS) were performed to detect endometrial abnormalities and tissue samples were sent for histopathological analysis. The findings were systematically recorded, and SPSS version 20 was used for data analysis to evaluate the correlation between ultrasound, SIS, and histopathological findings in AUB cases.

Results

Distribution of patients according to age

A total of 151 participants were included, with the majority (48.3%) in the 40 to 49 year age group (Table 1).

Distribution of patients according to geographical location

Most patients (90.7%) were from rural areas (Table 2).

Distribution of Patients According to Occupation

The most common occupation was farming (42.4%) (Table 3).

Distribution of patients according to Parity (Table 4)

Distribution of patients according to Clinical presentation

Heavy menstrual bleeding (45.0%) was the most frequent clinical presentation (Table 5)

Distribution of patients according to duration of complaints

49.0% of patients reported symptoms lasting less than six months (Table 6)

Distribution of patients according to Ultrasound findings

Ultrasound detected normal findings in 50.3% of cases, polyps in 23.8%, and submucosal fibroids in 25.8%. (Table 7)

Distribution of patients according to Saline Infusion Sonography Finding: SIS identified normal findings in 41.7%, polyps in 28.5%, endometrial hyperplasia in 3.3%, and submucosal fibroids in 26.5%. (Table 8)

Histological examination revealed normal findings in 47.0%, polyps in 23.8%, endometrial hyperplasia in 4.0%, and submucosal fibroids in 25.2%.

The prevalence of submucosal fibroids increased with uterine size, while normal findings declined. SIS demonstrated superior diagnostic performance, with an area under the ROC curve (AUC) of 0.930 for normal findings compared to 0.862 for USG.For polyps, SIS showed an AUC of 0.970 versus 0.891 for USG.Similarly, in detecting endometrial hyperplasia, SIS had an AUC of 0.917, significantly outperforming USG (0.500). Sensitivity and specificity were higher for SIS in most categories, particularly for detecting polyps (100% sensitivity) and submucosal fibroids.Overall, SIS showed higher diagnostic accuracy across all histological categories, making it a more effective modality for uterine pathology assessment.

Discussion

This study evaluated the diagnostic accuracy of ultrasonography (USG) and saline infusion sonography (SIS) in identifying uterine abnormalities among patients with abnormal uterine bleeding (AUB).

Age Group Correlation

The most affected age group was 40–49 years (48.3%), followed by 30–39 years (28.3%). These findings are consistent with studies by Sekar et al. and Tahir et al., highlighting a higher AUB incidence in women aged 30 to 50 years.[7,8] Kumari et al. and Patil et al. also reported similar trends.[9,10]Krishnamoorthy et al. also conducted study in AUB patients, finding mean age 42.9 years.[11](Table No.1)

Geographic and Occupational Correlation

The majority of patients were from rural areas (90.7%) and predominantly farmers (42.4%), which aligns with the rural setting of the study hospital.(Table No. 2,3)

Parity Correlation

A significant proportion (76.8%) of patients were multiparous, consistent with findings from Kumari et al. and Patil et al., indicating that AUB is more prevalent in multiparous women in their late reproductive years.[9,10] Kumari et al. reported that 61% of patients with AUB were multiparous 13 [9] while Patil et al. found that 71% of AUB patients were multiparous in their respective studies.[10] Sekar et al. observed that the majority of study participants were multipara with a parity of three or more (47.1%), while 41.2% of the participants had a parity of two.[7](Table No.4)

Clinical Presentation

Heavy menstrual bleeding was the most frequent symptom (45%), followed by frequent bleeding (30.5%), intermenstrual spotting (14.6%), and prolonged menses (9.9%). This aligns with findings from Pillai et al., Kumari et al., and Sekar et al., emphasizing menorrhagia as a common presentation.[12,7,9]Shobhitha et al. showed that 40% of patients of reproductive age experienced menorrhagia.[13]Other bleeding patterns in their study included menometrorrhagia (28.3%), polymenorrhagia (16.7%), metrorrhagia (5.8%), and polymenorrhea (4.2%). (Table No. 5)

Duration of Complaints

Most patients experienced symptoms for less than 6 months (49%), with 44.4% reporting 6–12 months duration. A minority (6.6%) had symptoms persisting for over a year, similar to Sekar et al.'s findings.[7](Table 6).

Uterine Size Correlation

The most common uterine size was 6–8 weeks (68.9%). Other categories included 10–12 weeks (17.2%) and 8–10 weeks (7.9%). Sekar et al. also noted a prevalence of bulky and enlarged uteri among AUB patients.[7]

USG Findings

Normal findings were most common (50.3%), followed by submucosal fibroids (25.8%) and polyps (23.8%). Compared to Sekar et al. and Mishra and Pandya, our findings differed slightly in the frequency of fibroids and polyps.[7,14]Chawla et al. reported that 61.66% of patients had a normal uterine cavity, while 38.34% were diagnosed with uterine cavity abnormalities, including polyps (15%), submucous myomas (6.66%), and hyperplasia (16.66%).[15](Table No.7)

SIS Findings

SIS identified more intrauterine pathologies than USG, including polyps (28.5%) and submucosal fibroids (26.5%). SIS detected endometrial hyperplasia (3.3%) that USG missed. Chawla et al. also observed superior detection of polyps via SIS.(Table No.8)

Correlation of USG and SIS

SIS detected more polyps (28.48%) and submucosal fibroids (26.49%) than USG (23.84% and 25.83%, respectively), and identified 5% endometrial hyperplasia

missed by USG. SIS also revealed additional pathologies in cases labeled normal by USG, highlighting its superior diagnostic accuracy in correlating uterine size and pathology in AUB evaluation.

Comparative Literature

Multiple studies support the superior sensitivity and specificity of SIS over USG/TVS. Chawla et al., Erdem et al., and Yildizhan et al. confirmed SIS's diagnostic advantages in detecting polyps, fibroids, and hyperplasia.[16,17]

Conclusion

In conclusion, this study underscores the enhanced diagnostic utility of SIS over USG in evaluating gynecological conditions, providing higher accuracy, sensitivity, and specificity across various patient demographics and clinical presentations. SIS is good diagnostic modality as compared to USG where polyp, sub mucosal fibroid and endometrial hyperplasia is the etiological factors for AUB and so we can manage patient better and save uterus.

References

1. Kaveh M, Sadegi K, Salarzaei M, Parooei F: Comparison of diagnostic accuracy of saline infusion sonohysterography, transvaginal sonography, and hysteroscopy in evaluating the endometrial polyps in women with abnormal uterine bleeding: a systematic review and meta-analysis. Videosurgery Other Miniinvasive Tech. 2020;15(3):403-415. doi:10.5114/wiitm.2020.93791
2. Whitaker L, Critchley HOD: Abnormal uterine bleeding. Best Pract Res Clin Obstet Gynaecol. 2016;34:54-65. doi:10.1016/j.bpobgyn.2015.11.012
3. Yadav S, Parashar S, Gupta H, Yada SS: Prevalence of Abnormal Uterine Bleeding in Young Females (less than 40 years) and its Risk Factors. Int J Pharm Clin Res. 2023;15(6):2416-2420.
4. Overview | Heavy menstrual bleeding: assessment and management | Guidance | NICE. Accessed April 18, 2024. https://www.nice.org.uk/guidance/ng88
5. Valiaveettil C, Loutfy M, Kennedy VL, et al: High prevalence of abnormal menstruation among women living with HIV in Canada. PLoS One. 2019;14(12). doi:10.1371/journal.pone.0226992.
6. Padilla O, Arya S, Noble LS, Plavsic SK: Saline infusion sonography: Tips and tricks for improved visualization of the uterine cavity. Donald Sch J Ultrasound Obstet Gynecol. 2018;12(1):32-51. doi:10.5005/jp-journals-10009-1550.
7. Sekar GS, Ruby AE, Lalitha P: Transvaginal Ultrasonography and Hysteroscopy in Evaluation of Abnormal Uterine Bleeding- A Cross-sectional Study. J Clin DIAGNOSTIC Res. Published online 2021. doi:10.7860/jcdr/2021/46163.15095
8. Tahir MM, Bigrigg MA, Browning JJ, Brookes T, Smith PA: A randomised controlled trial comparing transvaginal ultrasound, outpatient hysteroscopy and endometrial biopsy with inpatient hysteroscopy and curettage. BJOG An Int J Obstet Gynaecol. 1999;106(12):1259-1264. doi:10.1111/j.1471-
9. Kumari M, Gupta A: A prospective comparative study to evaluate the efficacy of ultrasonography and hysteroscopy and their correlation with the histopathology of endometrium in a case of abnormal uterine bleeding. Int J Reprod Contraception, Obstet Gynecol. Published online 2015:1926-1934. doi:10.18203/2320-1770.ijrcog20151288
10. Patil R, Patil RK, Andola SK, Laheru V, Bhandar M: Histopathological spectrum of endometrium in dysfuctional uterine bleeding. Int J Biol Med Res. 2013;3(1):2798-2801.
11. Krishnamoorthy N, N F: Role of transvaginal sonography and hysteroscopy in abnormal uterine bleeding: does the diagnostic yield increase by combining transvaginal sonography, hysteroscopy and biopsy? Int J Reprod Contraception, Obstet Gynecol. 2014;3(4):919. doi:10.5455/2320-1770.ijrcog20141209
12. Pillai S: Sonographic and histopathological correlation and evaluation of endometrium in perimenopausal women with abnormal uterine bleeding. Int J Reprod Contraception, Obstet Gynecol. Published online 2014:113-117. doi:10.5455/2320-1770.ijrcog20140323
13. Shrestha P, Shrestha S, Mahato V: Endometrial study by Ultrasonography and its correlation with Histopathology in Abnormal uterine bleeding. Asian J Med Sci. 2018;9(2):31-35. doi:10.3126/ajms.v9i2.19171
14. Mishra S, Panda B: Efficacy of Ultrasonography and Hysteroscopy and Their Correlation with Endometrial Histopathology in a Case of Abnormal Uterine Bleeding In Late Reproductive Age. Ann Int Med Dent Res. 2018;4(5):OG10-OG14.
15. Chawla I, Tripathi S, Vohra P, Singh P: To evaluate the accuracy of saline infusion sonohysterography (SIS) for evaluation of uterine cavity abnormalities in patients with abnormal uterine bleeding. J Obstet Gynecol India. 2014;64(3):197-201. doi:10.1007/s13224-013-0501-4
16. Erdem M, Bilgin U, Bozkurt N, Erdem A: Comparison of transvaginal ultrasonography and saline infusion sonohysterography in evaluating the endometrial cavity in pre- and postmenopausal women with abnormal uterine bleeding. Menopause. 2007;14(5):846-852. doi:10.1097/gme.0b013e3180333a6b
17. Yildizhan B, Yildizhan R, Ozkesici B, Suer N: Transvaginal ultrasonography and saline infusion sonohysterography for the detection of intra-uterine lesions in pre- and post-menopausal women with abnormal uterine bleeding. J Int Med Res. 2008;36(6):1205-1213. doi:10.1177/147323000803600606