



**Research Article**

**COMPARISON OF HYSTEROSCOPY AND TRANSVAGINAL SONOGRAPHY IN THE DIAGNOSIS OF BENIGN UTERINE PATHOLOGIES**

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Comparison of Hysteroscopy and Transvaginal Sonography in the Diagnosis of Benign Uterine Pathologies

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**ABSTRACT**

**Objective**-To evaluate and compare the diagnostic accuracy of hysteroscopy and transvaginal sonography in patients with abnormal uterine bleeding, postmenopausal bleeding and infertility.

**Design**-Prospective comparative study

**Setting**-Endoscopic gynecology department of PSRI hospital, new delhi.

**Patients**-On the basis of inclusion and exclusion criteria, 110 patients of abnormal uterine bleeding, post menopausal bleeding and infertility attending gynecology opd in our hospital were selected for study.

**Intervention**-Transvaginal sonography and hysteroscopy both were performed on these patients with abnormal uterine bleeding, post menopausal bleeding and infertility. A biopsy was obtained from all patients during hysteroscopy. Main outcome measured - Sensitivity, specificity, positive predictive value, negative predictive value, accuracy of both diagnostic method were calculated and compared.

**Result**-Hysteroscopy had higher sensitivity in diagnosing intrauterine pathologies like polyp, submucosal fibroid (0,1,2), intrauterine adhesions, and retained products of conceptions. Trans vaginal sonography had high sensitivity and positive predictive value in diagnosis of intramural and subserosal fibroid (4- 7). The combination of hysteroscopy and transvaginal sonography had higher predictive value in diagnosis of adenomyosis.

**Conclusion**-Hysteroscopy is a better diagnostic tool for the diagnosis of endometrial polyp, submucosal, intramural fibroid (0,1,2,3), retained products of conception, intrauterine adhesions, septate uterus and bony chips inside the uterine cavity. Whereas intramural and subserosal fibroid (4,5,6,7) are best diagnosed with transvaginal sonography. Although adenomyosis is best visualized with 3D transvaginal sonography, hysteroscopic features also support the diagnosis.

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**INTRODUCTION**

Abnormal Uterine Bleeding (AUB) is a significant debilitating clinical condition and affects 14-25% of women of reproductive age and up to 50% of perimenopausal women.<sup>1-3</sup>It may have a significant impact on women's personal, social, physical and quality of life with significant financial burden to the country's economy.<sup>4</sup> FIGO classification of abnormal uterine bleeding comprises of heavy menstrual bleeding, light menstrual bleeding, frequent menstrual bleeding, intermenstrual bleeding due to various structural (PALM) and non structural (COIEN) causes.<sup>5,6</sup>Although TVU is a simple examination allowing clear visualization of most uterine conditions<sup>7</sup>, several concerns have been raised regarding its accuracy<sup>8-10</sup>. Hysteroscopy on the other hand, allows direct visualization and sampling of the uterine cavity and has an established diagnostic value for many uterine conditions<sup>11-19</sup>

The aim of this study is to evaluate and compare the diagnostic accuracy of transvaginal sonography and hysteroscopy in detecting benign uterine pathologies in a large group of patients with wide range of menopausal status and symptomatology.

**MATERIAL AND METHOD**

**Patients selection**

Patients attended to our outpatient department with complain of abnormal uterine bleeding (heavy menstrual bleeding, light menstrual bleeding, frequent menstrual bleeding, intermenstrual bleeding), postmenopausal bleeding, abnormal vaginal discharge and infertility between april 2018 to september 2018 in department of endoscopic gynecology, Pushpawati Singhania Research Institute New Delhi, underwent both Transvaginal Ultrasonography and Hysteroscopy. Patients with AUB due to hormonal disorders, ovulatory dysfunction and coagulopathies were excluded from the study. Infertile women with hormonal disorder, ovarian dysfunction or male factor infertility were excluded from the

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study. On the basis of inclusion and exclusion criteria, 110 non gravid women of reproductive age, perimenopausal and postmenopausal age, were selected for this prospective study.

### Transvaginal ultrasonography

A GE logiq E9 3D (GE Healthcare, Solingen, Germany) was used for ultrasound testing using the 7 MHz transvaginal transducer. TVS was performed in radiology department of Pushpawati Singhania Research Institute, New Delhi. The study was approved by the Institutional Review Board. A hyperechoic line in the middle of the uterus with a homogenous endometrial lining and distinct margins to the myometrium were considered as normal uterine cavity and endometrium. Other findings, such as deformations of the endometrial lining, absence of a central hyperechoic line, the appearance of any hyperechoic or hypoechoic structure with or without well-defined margins were considered as abnormal. Uterine pathologies such as polyps and intrauterine adhesions are best visualized in secretory phase of menstrual cycle.

Intrauterine adhesions appear as anechogenic, irregular eccentric lines within the endometrium or as a focal narrowing of the endometrial thickness<sup>20</sup>.

An adenomyomatous nodule may be suspected on TVS when there is an oval, hypoechoic, or hyperechoic, noncapsulated area in the myometrial thickness, without the posterior cone of shadow and the hyperechoic margin (typical of uterine myomas), variable in diameter moreover, small cystic spaces filled with blood, which are rarely >5 mm, may be present [21]. Generally, colour Doppler sonography reveals rich vascularity, which does not circumscribe the lesion and presents an orthogonal orientation in relation to the endometrium [22, 23]. 3D ultrasound signs of adenomyosis are based on the evaluation of the Junctional Zone (JZ) (i.e., the inner myometrial layer immediately underlying the endometrium, composed of higher cellular density and a higher nuclear area compared to the outer myometrium) such as junctional zone hyperplasia, irregularity or interruption of junctional zone which normally appears as a hypoechoic zone around the endometrium [24, 25].

### Hysteroscopy

Hysteroscopy was performed on all patients irrespective of result of transvaginal ultrasonography by using 2.9 mm Bettocchi's Office Hysteroscope with 30 degree optic telescopes (Storz Telecam SL 11 camera with a light source of Xenon Nova, Germany) in gynecologic endoscopic unit of Pushpawati Singhania Research Institute, New Delhi. Normal saline was used as the distension media. Maximum intrauterine pressure of 100 mm Hg was allowed to distend the uterine cavity. Diagnostic endometrial sampling, resection with cold scissor, polypectomy or adhesiolysis was performed on the same sitting of hysteroscopy and samples were sent for histopathological examination. Histopathology report was considered as gold standard. However, diagnostic hysteroscopy cannot establish a definitive diagnosis of Adenomyosis, considering that its field of vision is restricted to the endometrial surface layer. The following aspects are generally indicative of the pathological condition:

1. Irregular endometrium with tiny openings seen on the endometrial surface.
2. Pronounced hypervascularization.
3. An endometrial "strawberry" pattern.

4. Fibrous cystic appearance of intrauterine lesions (following 3-5 episodes of intramyometrial haemorrhage).
5. Haemorrhagic cystic lesions assuming a dark blue or chocolate brown appearance.

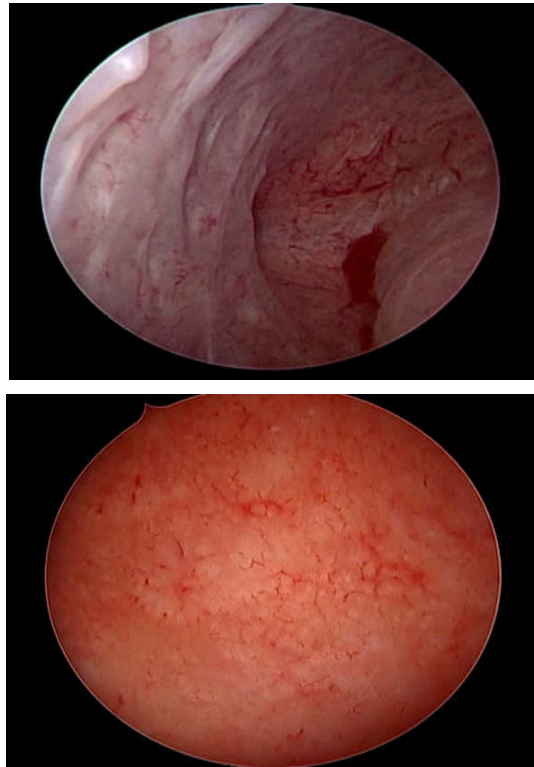


Fig 1 Irregular endometrium with hypervascularization (adenomyotic features on hysteroscopy)

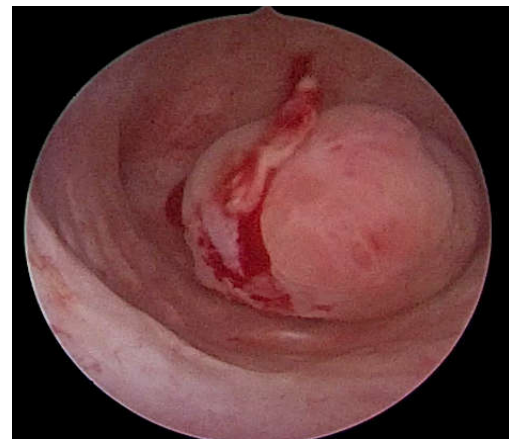


Fig 2 endometrial polyp (hysteroscopic view)

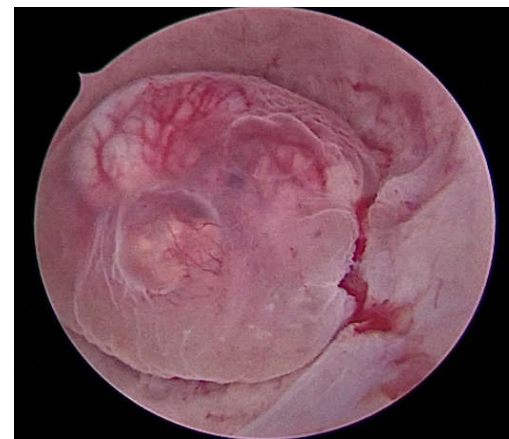


Fig 3 fibroid polyp (hysteroscopic view)

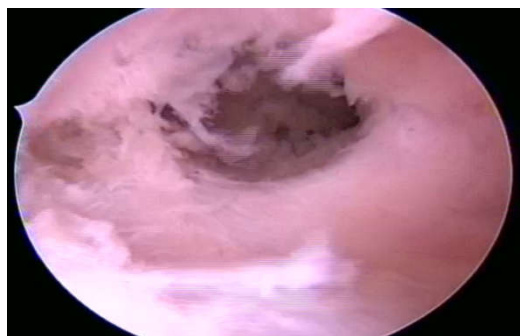


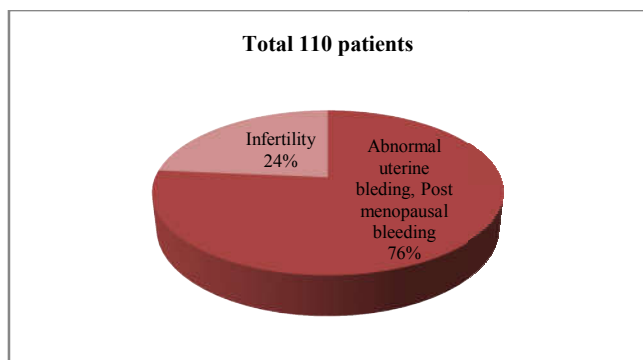
Fig 4 Asherman's syndrome ( hysteroscopic view)

**Statistical analysis**

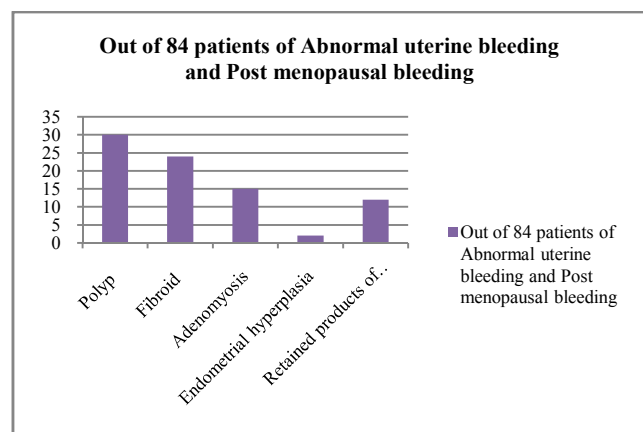
SPSS version 21 was used for statistical analysis. Diagnostic parameter including sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of transvaginal sonography, hysteroscopy and combined method were calculated for diagnosis of benign uterine pathologies. A p value less than 0.05 was considered as an indication for statistical significance.

**RESULT**

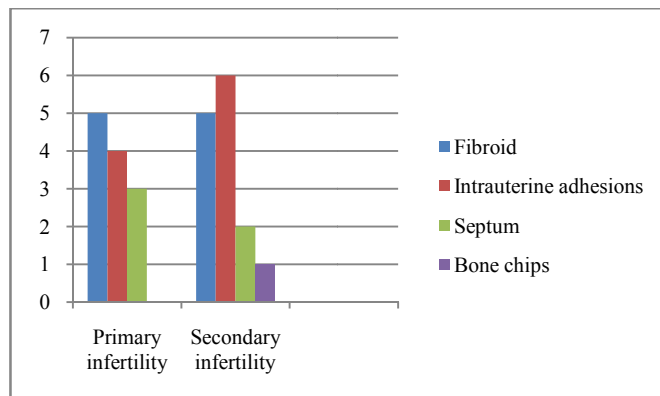
Total 110 non gravid women were included in this study from april 2018 to September 2018. Mean age of the women was 42.6 yr among which 28% womens were nulliparous and 72% womens were multiparous. 76. 3 % women (84) came with complain of abnormal vaginal bleeding and post menopausal bleeding, while 23.6 % womens (26) were infertile. Transvaginal ultrasonography and hysteroscopy was performed on all patients.



Out of 84 (76. 3%) women of AUB and post menopausal bleeding, polyp was present in 30 women, fibroid in 24 patients, adenomyosis in 16 patients, endometrial hyperplasia in 2 patients and retained product of conception were found in 12 patients.



Out of 26 patients of infertility, 12 patients were identified as primary infertility and 14 patients were identified as secondary infertility. Fibroid(5 patients), intrauterine adhesions (4 patients) and septum(3 patients) were found as major uterine pathology in 12 patients of primary infertility, while in 14 patients of secondary infertility, intrauterine adhesion were diagnosed in 6 patients, septum in 2 patients, fibroid in 5 patients, bone piece in 1 patient.



Total 30 cases of polyp were confirmed on histopathology report. Out of these 30 cases, only 20 patients were diagnosed on transvaginal sonography and 28 patients were diagnosed during hysteroscopy. Polypectomy was performed simultaneously in all patients diagnosed during hysteroscopy. Out of total 34 cases of fibroid confirmed on histopathology report, 23 cases were diagnosed as submucosal and intramural (0,1,2,3), while 11 were confirmed as intramural and subserosal (4,5,6,7). Resection of only submucosal and intramural fibroid (0,1,2) was done during hysteroscopy. Laparoscopic myomectomy was performed later in patients with intramural and subserosal fibroid, and sent for histopathology.

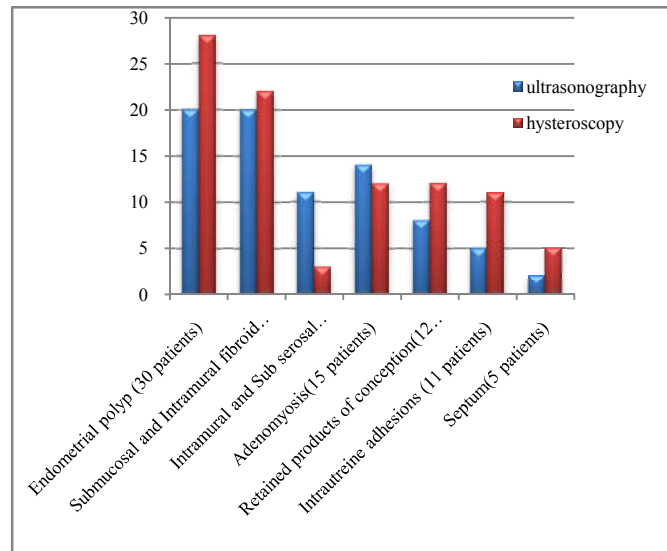
Out of total 12 case of retained product of conception confirmed on histopathology, only 8 cases were diagnosed during transvaginal sonography while all 12 cases were diagnosed during hysteroscopy with simultaneous hysteroscopic removal of RPOC was done and sent for histopathology.

Adenomyosis was confirmed in 15 cases on histopathology. 14 cases were diagnosed by transvaginalsonography while adenomyotic features were diagnosed in 12 patients during hysteroscopy.

Intrauterine adhesions were diagnosed in 11 patients during hysteroscopy followed by adhesiolysis done in same sitting. Only 5 out of 11 patients was diagnosed during Transvaginal sonography.

Uterine pathology	Histopathology	Ultrasonography	Hysteroscopy
Endometrial polyp	30	20	28
Sub mucosal and intramural Fibroid (0,1,2,3)	23	20	22
Intramural and sub serosal fibroid (4,5,6,7)	11	10	3
Retained products of conception	12	8	12
Adenomyosis	15	14	12
Intrauterine adhesions	11	5	11
Septum		2	5

2 cases of endometrial hyperplasia were detected on histopathology. Bone chip was found on hysteroscopy in 1 case of secondary infertility.



**Table 4** summarizes the sensitivity, specificity, positive predictive value and negative predictive value of transvaginal sonography and hysteroscopy in diagnosing 4 major benign uterine pathologies

Uterine pathology		sensitivity	specificity	PPV	NPV	Diagnostic accuracy
Endometrial poly	TVS	56.67%	95.7	85	83.7	84%
	hysteroscopy	86.67%	97.14	92.8	94.4	94%
	P value	S	NS			
Submucosal and intramural (0,1,2,3)	TVS	78.2%	97.4	90	93.7	93%
	Hysteroscopy	91.3%	98.7	95.4	97.4	97%
	P value	S	NS			
Fibroid	Intramural TVS	72.7	96.6	72.7	96.6	94%
	and Hysteroscopy	18.1	75.8	66.6	90.7	90%
	P value	S	S			
Retained products of conception	TVS	58.3	98.8	87.5	94.5	94%
	Hysteroscopy	100	100	100	100	100%
	P value	S	NS			
Intrauterine adhesions	TVS	36.3	76.4	80	92.6	88%
	Hysteroscopy	100	100	100	100	100%
	P value	S	NS			
Septum	TVS	40	66.7	68.2	90.2	87.3%
	Hysteroscopy	100	100	100	100	100
	P value	S	S			
Adenomyosis	TVS	80	97.7	85.7	94.5	94%
	Hysteroscopy	66.6	87.2	73.3	65.3	82%
	P value	NS	NS			

**DISCUSSION**

Although Transvaginal sonography is a non invasive excellent tool for diagnosing benign uterine pathologies presenting with abnormal uterine bleeding, post menopausal bleeding and infertility. Nonetheless, ultrasound does not allow for exact diagnosis, it is only a method which can indicate some abnormality in the uterine cavity or endometrium<sup>27,28,29</sup>.

D. Vitner *et al*<sup>9</sup> reported a sensitivity and specificity of transvaginal sonography and hysteroscopy for diagnosing endometrial polyps are as following 44.8% , 88.8% and 65.5%, 89.6% and for diagnosing uterine fibroid are as following 85.7%, 73.9% and 100%, 86.9%. Yela *et al*<sup>13</sup> reported that ultrasound presented a 95.6% sensitivity and a 7.4 %specificity, whereas hysteroscopy showed a 95.7%sensitivity and 83% specificity for the diagnosis ofintrauterine diseases. Mukhopadhyay *et al*.<sup>30</sup>found a high sensitivity (71.4%) and specificity (100.0%) for hysteroscopy for diagnosing polyps;

Similarly, Mathlouthi *et al*.<sup>31</sup> and Yela *et al*.<sup>13</sup> found diagnostic values in favor of hysteroscopy for the diagnosis of uterine pathologies.

Similarly, in our study hysteroscopy has higher sensitivity (86.67%) for diagnosing endometrial polyp in comparison to transvaginal sonography (56.67%). We observed that for the diagnosis of submucosal and intramural fibroid (0,1,2,3) hysteroscopy showed higher sensitivity (91.3%) as comparison to transvaginal sonography (78.2%) whereas no significant difference was found in specificity of two method. Transvaginal sonography had higher sensitivity (72.7%) for the diagnosis of intramural and subserosal fibroid (4,5,6,7).

We also observed hysteroscopy had 100% sensitivity, specificity and accuracy for diagnosing intrauterine adhesions, septum and retained products of conception whereas transvaginal sonography showed lower sensitivity.

In our study, for the diagnosis of adenomyosis TVS had higher sensitivity (80.3%) in comparison of hysteroscopy (66.6%).

**CONCLUSION**

Hysteroscopy is better diagnostic tool for the diagnosis of endometrial polyp, submucosal, intramural fibroid (o,1,2,3), retained products of conception, intrauterine adhesions, septate uterus and bony chips inside the uterine cavity. Whereas intramural and subserosal fibroid (4,5,6,7) are best diagnosed with transvaginal sonography. Although adenomyosis is best visualized with 3D transvaginal sonography, hysteroscopic features also support the diagnosis.

**Disclosue of conflict of interest** - None

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