



## ROLE OF HYSTEROSCOPY IN DIAGNOSIS OF ABNORMAL UTERINE BLEEDING: A RETROSPECTIVE STUDY OF 1276 CASES

Indranil Ghosh<sup>\*1</sup>, Hu YU Hong<sup>2</sup> and Li Jian<sup>3</sup>

<sup>1,3</sup>Resident, Department of Gynecology and Obstetrics, Jiamusi University, 188 xuefu lu Jiamusi, Heilong jiang, China

<sup>2</sup>Professor and Head of Department of Gynecology and Obstetrics, Jiamusi University First Affiliated Hospital, Jiamusi, Heilong jiang, China

### ABSTRACT

**Background:** Abnormal Uterine Bleeding is a common gynecological problem. It may signal to many endometrial diseases including endometrial cancer. Hysteroscopy is an emerging modality used for diagnosing Abnormal Uterine Bleeding. Our study aims to compare hysteroscopy impressions with histopathology findings and to assess the accuracy of hysteroscopy diagnosing common intrauterine lesions causing Abnormal Uterine Bleeding.

**Materials and method:** A retrospective study was conducted in which hysteroscopy impressions of 1276 patients who underwent hysteroscopy for Abnormal Uterine Bleeding at a the first Affiliated Hospital of Jiamusi University from March 2013 to March 2016 were compared with their histopathology reports obtained from directed biopsies, hysteroscopy resection and hysterectomy specimens. Histopathological diagnosis was considered as the final diagnosis in the study. Data was analyzed using SPSS.

**Results:** In 564(44.2%) cases the endometrium was found normal on histology. 15%(n=192) had polyp, 11.1%(n=141) had submucous fibroid, 14%(n=179) had hyperplasia, 2.4%(n=31) had carcinoma, 8.5%(n=108) had benign cervical canal lesions (cervical canal polyp and cervical canal myoma), 4.2%(n=54) had atrophy and 0.5%(n=7) had endometritis. The overall sensitivity for hysteroscopy was 95.5% (95%CI 93.3%-96.6%), specificity was 81.7% (95%CI78.3%-84.8%), positive predictive value was 86.8% (95% CI 84.2%-89.11%), negative predictive value was 93.3% (95% CI 90.5%-95.2%) and accuracy was 89.2% (95% CI 87.5%-90.9%). Hysteroscopy had high sensitivity, specificity, positive predictive value, negative predictive

value and accuracy for polyp, submucous fibroids, endometrial carcinoma and benign cervical canal lesions and moderate sensitivity and positive predictive value for hyperplasia.

**Conclusions:** Although hysteroscopy is highly sensitive and specific in diagnosing intrauterine lesions in cases of Abnormal Uterine Bleeding, directed biopsy is mandatory in every patient.

**Key-words:** Abnormal Uterine Bleeding, hysteroscopy, histopathology, sensitivity, specificity, positive and negative predictive value

## INTRODUCTION

Abnormal Uterine Bleeding (AUB) is defined as any change in the amount, duration or frequency of menstrual flow from what is normal for a woman[1, 2]. About 20% of women of reproductive age and 10% of women of postmenopausal age who visit gynecology clinic have AUB[3, 4]. AUB may signal to various endometrial diseases[5]. It is the commonest symptom of endometrial carcinoma[6]. AUB affects both physical and mental health and quality of life of women[7, 8].

Dilatation and Curettage (D/C) has been the most widely used procedure in management of AUB[9]. D/C is a blind procedure and is more likely to miss the diagnosis, especially in cases of focal endometrial lesions[9, 10]. Hysteroscopy is a "Gold standard" test for diagnosing intrauterine lesions causing AUB[11]. It is like an eye inside the uterus as it gives a complete view of the uterine cavity. Hysteroscopy allows directed biopsies of endometrial lesions and also facilitates treatment in the same sitting, thus avoiding multiple hospital visits and providing better patient satisfaction[12].

The accuracy of hysteroscopy varies with different types of endometrial lesions. In our study we have compared the hysteroscopy diagnosis of patients with AUB with their histopathology reports and tried to assess the accuracy of hysteroscopy in diagnosing common intrauterine lesions causing AUB.

## METHODS

Our study was a retrospective study done at the first Affiliated Hospital of Jiamusi University. A complete history of all patients (as documented in hospital's computerized recording system) with AUB who underwent hysteroscopy between March 2013 and March 2016 was reviewed. The inclusion criteria were: cases of AUB who both underwent hysteroscopy and had pathology reports obtained from directed biopsies, hysteroscopic resection or hysterectomy piece. The exclusion criteria were: cases whose either hysteroscopy or pathology reports were not available, cases that were under hormonal treatment or taking tamoxifen, cases related to pregnancy and known cases of lower genital tract malignancies. Routine blood tests, screening for HIV and syphilis and Papanicolaou smear were done in all cases before performing hysteroscopy. Hysteroscopy was avoided in patients suspected of having active pelvic infection, vaginitis or

any medical condition that contraindicates any invasive procedure.

All diagnostic hysteroscopies were performed as day care procedure and without any anesthesia. Rigid hysteroscopes with 3.5mm to 5mm outer diameter sheath and 30° fore oblique lens were used. 5% mannitol was used as distention media. Intrauterine pressure was maintained at 70-100mm of Hg. Paracervical block was used for hysteroscopy resection of intrauterine lesions.

Hysteroscopy impressions were classified as normal, endometrial polyp, submucous fibroid, endometrial hyperplasia, atrophic endometrium, benign cervical canal lesions (cervical canal polyp and cervical canal myoma), endometrial carcinoma and endometritis. Histopathological diagnosis obtained from directed biopsies, hysteroscopic resections or hysterectomy specimens was considered as the final diagnosis. Standard histopathological criteria were used for diagnosing endometrial lesions.

The collected data was entered in Microsoft Excel spread sheet, coded in numbers and was analyzed using SPSS. The correlation between hysteroscopy impressions and histopathology reports were analyzed. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy for hysteroscopy were calculated. Exact 95% confidence intervals were calculated by using binomial distribution.

## RESULTS

2132 diagnostic hysteroscopy were performed in total during the study period. Of these, 1420(66.6%) hysteroscopy procedures were performed for AUB. Pathology reports were missing in 39(2.7%) cases, 56(3.9%) cases were due to pregnancy related causes and 49(2.9%) cases were under hormonal therapy including tamoxifen and were thus not included in our study. Thus, our study was done on 1276(59.8%of total) cases.

The range of age of patients included in our study was from 21 – 80 years. The mean  $\pm$  standard deviation (SD) age was  $44.6 \pm 10.29$ . The mean $\pm$ SD age of menarche was  $13.1\pm 1.15$  and the mean $\pm$ SD age of menopause was  $51.2 \pm 3.2$ . The average parity of patients was 1.49. 53.9% (n=688) women were in reproductive age, 24.6% (n=314) women were in perimenopausal age ( $\geq 45$ years) and 21.4% (n=274) women were in postmenopausal age(menstruation did not occur for more than 12 months).

In 564(44.2%) cases the endometrium was found normal on histology. 15%(n=192 ) had polyp, 11.1%(n=141) had submucous fibroid, 14%(n=179 ) had hyperplasia, 2.4%(n=31 ) had carcinoma, 8.5%(n=108) had benign cervical canal lesions, 4.2%(n=54) had atrophy and 0.5%(n=7) had endometritis. The summary of hysteroscopy impressions and histopathological findings is given in Table 1.

	Hysteroscopy=n (%)	Histopathology=n (%)
Normal	495(38.8%)	564(44.2%)
Polyp	201(15.8%)	192(15%)
Submucous fibroid	164(12.9%)	141(11.1%)
Hyperplasia	185(14.5%)	179(14%)
Endometrial carcinoma	36(2.8%)	31(2.4%)
Benign cervical canal lesions	114(8.9%)	108(8.5%)
Atrophy	72(5.6%)	54(4.2%)
Endometritis	9(0.7%)	7(0.5%)
Total	1276(100%)	1276(100%)

**Table 1:** Summary of hysteroscopy and histopathological findings (Original Table)

Out of 495(36.4%) cases diagnosed as normal by hysteroscopy, histopathology reports were normal in 461(93.1%), showed hyperplasia in 23(4.6%), atrophy in 7(1.4%) and benign cervical canal lesions in 4(0.8%). Polyp (n=201, 15.7%) was the commonest abnormality found in hysteroscopy. Out of 164(12.8%) cases diagnosed as submucous fibroid on hysteroscopy, 6(3.6%) cases were finally diagnosed as polyp and 6(3.6%) were diagnosed as hyperplasia on histopathology.

Hysteroscopy showed endometrial carcinoma in 36(2.8%) cases. Of these, 31(86.1%) cases were confirmed by histopathology and the remaining 5 (13.8%) cases showed hyperplasia on histopathology. Hysteroscopy did not miss any case of endometrial carcinoma.

Out of 179(14%) cases of hyperplasia, 116(65%) were simple endometrial hyperplasia without atypia, 26(14.5%) were simple endometrial hyperplasia with atypia, 27(15%) were complex endometrial hyperplasia without atypia and 10(5.5%) were complex atypical hyperplasia with atypia. Hysteroscopy was able to diagnose hyperplasia only in 79.3% (n=142) of cases that had hyperplasia on histopathology. 12.8% (n=23) cases that had hyperplasia were diagnosed as normal by hysteroscopy. In 5 % (n=9) cases that had

hyperplasia, hysteroscopy gave a more benign impression. Table 2 shows a comparison of hysteroscopy impressions and histopathologic diagnosis

Hysteroscopy Impressions	Histopathological Diagnosis								
	Normal	Polyp	Submucous Fibroid	Hyperplasia	Carcinoma	Benign Cervical lesions	Atrophy	Endometritis	Total
Normal	461	0	0	23	0	4	7	0	495
Polyp	10	186	3	2	0	0	0	0	201
Submucous Fibroid	14	6	138	6	0	0	0	0	164
Hyperplasia	41	0	0	142	0	0	0	2	185
Carcinoma	0	0	0	5	31	0	0	0	36
Benign Cervical lesions	10	0	0	0	0	104	0	0	114
Atrophy	25	0	0	0	0	0	45	2	72
Endometritis	3	0	0	1	0	0	2	3	9
<b>Total</b>	<b>564</b>	<b>192</b>	<b>141</b>	<b>179</b>	<b>31</b>	<b>108</b>	<b>54</b>	<b>7</b>	<b>1276</b>

**Table 2:** Comparison of hysteroscopy impression with histopathological findings (Original Table)

## DISCUSSION

	Prevalence%	Sensitivity%(95%CI)	Specificity%(95%CI)	Positive Predictive Value%(95%CI)	Negative Predictive Value%(95%CI)	Accuracy%(95%CI)
Overall	55.7	95.5(93.3-96.6)	81.7(78.3-84.8)	86.8(84.2-89.11)	93.3(90.5-95.2)	89.2(87.5-90.9)
Normal	44.2	81.7(78.3-84.8)	95.5(93.3-96.6)	93.3(90.5-95.2)	86.8(84.2-89.1)	89.2(87.5-90.9)
Polyp	15	96.8(93.3-98.4)	98.6(97.7-99.2)	92.5(87.9-95.7)	99.4(98.7-99.7)	98.30(97.5-99)
Submucous Fibroid	11	97.8(93.9-99.5)	97.7(96.6-98.5)	84.1(77.64-89.37)	99.7(99.2-99.4)	97.70(96.8-98.6)
Hyperplasia	14	79.3(72.6-85.1)	96(94.7-97.1)	76.7(70-82.6)	96.6(95.3-97.6)	93.70(92.3-95.1)
Endometrial Carcinoma	2.4	100((88.7-100)	99.6(99-99.8)	86.1(70.5-95.3)	100(99.7-100)	99.60(99.1-100)
Benign Cervical Canal Lesions	8.4	96.3(90.7-98.9)	99.1(98.4-99.5)	91.2(84.4-95.7)	99.6(99.1-99.9)	98.90(98.1-99.7)
Atrophy	4.2	83.3(70.7-92)	97.7(96.8-98.5)	62.5(50.3-73.6)	99.2(98.5-99.6)	97.10(96.2-98.1)

**Table 3:** Statistical values of hysteroscopy in diagnosing different intrauterine lesions causing AUB (Original Table)

Abnormal Uterine Bleeding is a major gynecological problem that often indicates endometrial

pathology. Hysteroscopy is effective in diagnosing endometrial pathology in cases of AUB. Endometrial cavity can be directly visualized during hysteroscopy. This facility offered by hysteroscopy highly increases its sensitivity and specificity in diagnosing endometrial pathology. In our study the overall sensitivity of hysteroscopy was 95%, specificity was 81%, PPV was 87%, NPV was 93% and accuracy was 89.2%. This is consistent with the literature. In a systemic review and meta-analysis done by H Van Dongen et al. [11] the pooled sensitivity and pooled specificity of hysteroscopy was 96% and 90% respectively. In a study done by Allameh et al. [12] the overall sensitivity of hysteroscopy was 100%, specificity was 80.5%, PPV was 88% and NPV was 100%. Chaudhari et al. [13] showed an overall sensitivity of 98.3%, specificity of 80.5%, positive predictive value of 89.7% negative predictive value of 91.8% and accuracy of 91.8% for hysteroscopy. Statistical values of hysteroscopy in diagnosing different intrauterine lesions causing AUB obtained in our study are listed in table3.

In our study hysteroscopy had an accuracy of 89.2% in diagnosing a normal endometrium. Diagnostic accuracy of hysteroscopy for normal endometrium was 92.5% and 85.93% in studies done by Panda et al. [14] and Patil et al. [15] respectively.

Polyp (15%, n=192) was the commonest endometrial pathology in our study. Our study shows a high sensitivity and specificity for polyps which is consistent with the literature. In our study the sensitivity of hysteroscopy for diagnosing polyp was 96.8%, specificity was 98.6%, PPV was 92.5% and NPV was 99.4%. Gkrozou et al. [16] in a meta-analysis reported a sensitivity and specificity of 95.4% and 96.4% respectively. Patil et al. [15] in their prospective study reported a sensitivity, specificity, PPV and NPV of 100% each. Chaudhari et al. [13] documented the sensitivity, specificity, PPV and NPV of 94%, 96%, 87% and 98% respectively for polyp. These parameters were 93%, 100%, 100% and 95.4% in a study done by Allameh et al.[12]. N=6(3.1%) polyps were diagnosed as submucous fibroids on hysteroscopy. Polyps that are not pedunculated may sometimes be confused as submucous fibroids on hysteroscopy.

Our study showed that hysteroscopy was 100% sensitive and 99.5% specific in diagnosing endometrial carcinoma. PPV, NPV and accuracy for endometrial carcinoma were 86.5%, 100% and 99% respectively. Gkrozou et al. [16] in their systemic review and meta-analysis reported that hysteroscopy had 82.6% sensitivity and 99.7% specificity for diagnosing endometrial carcinoma. Lamsar et al. [17] reported a sensitivity of 80%, specificity of 99.5%, PPV of 81.6%, NPV of 99.5% and accuracy of 99%. Patil et al. [15] obtained a sensitivity of 100%, specificity of 98.97%, PPV of 66.66% and NPV of 100%. Chaudhari et al. [13] showed a sensitivity of 75%, specificity of 98%, PPV of 75% and NPV of 98%. Panda et al. [14] obtained the diagnostic values of 100% each. In our study hysteroscopy did not miss any case of endometrial carcinoma.

Hysteroscopy is moderately sensitive in diagnosing hyperplasia. In its early stages endometrial hyperplasia may produce lesions that cannot be easily seen[18]. In our study, hysteroscopy failed to diagnose 37(20.6%) out of 179 cases of hyperplasia. 23(12.8%) cases of hyperplasia had a normal impression on

hysteroscopy. We found that the sensitivity, specificity, PPV, NPV and accuracy of hysteroscopy for hyperplasia were 79%, 96%, 76.6%, 96% and 93% respectively. Patil et al. [15] showed a sensitivity of 75%, specificity of 92.5%, PPV of 71.4% and NPV of 93.6%. Gkrozou et al. [16] reported a sensitivity of 75.2% and a specificity of 91.5%. Lamsar et al. [17] showed a lower sensitivity (56.3%) and PPV (48%) but a higher specificity (89.1%), NPV (92%) and accuracy (82.4%) for diagnosing hyperplasia. Lovero et al. [19] showed a sensitivity, specificity, PPV and NPV of 98%, 95%, 63% and 99%. Chaudhari et al. [13] showed sensitivity of 92%, specificity of 92%, positive PPV of 89%, NPV of 94% and an accuracy of 92%. The variation in the results of different studies could be because there is a lack of uniformity in the diagnostic criteria of hyperplasia [20].

In our study sensitivity, specificity, PPV, NPV and accuracy of hysteroscopy for submucous fibroid was 97.8%, 97.7%, 84.14%, 99.7% and 97.7% respectively. Gkrozou et al. [16] reported sensitivity of 97% and specificity of 98.8%. Patil et al. [15] showed sensitivity, specificity, PPV and NPV of 100% each. Chaudhari et al. [13] reported 91% sensitivity, 95% specificity, 78% PPV, 98% NPV and 94% accuracy for submucous fibroids.

We found that the sensitivity of hysteroscopy for diagnosing atrophy was 83.3%, specificity was 97.8%, PPV was 62.5%, NPV was 99.2% and accuracy was 97.1%. Patil et al. [15] reported 100%, 96.8% specificity, 62.5% PPV and 100% NPV. Chaudhari et al. [13] showed a sensitivity of 66%, specificity of 95%, PPV of 60%, NPV of 98% and accuracy of 94%.

From our study we found that hysteroscopy is a high sensitivity and specificity for diagnosing intrauterine lesions. Literature shows that modern day hysteroscopy has a low failure rate, is less painful and has a very low rate of complications [21, 22]. It is a day care office procedure that can be done without using anesthesia. See and treat approach possible in hysteroscopy allows one stop management of intra uterine lesions [21, 23]. Directed biopsy offered by hysteroscopy is the main benefit over dilatation and curettage [24, 25]. We also learn from our study that hysteroscopy has a low accuracy in diagnosing hyperplasia. Hyperplasia can be present even when hysteroscopy shows a normal endometrium or often coexist with more benign endometrial lesions. Hyperplasia if not treated can progress to adenocarcinoma [26]. Hysteroscopy has a high accuracy in diagnosing polyp but symptomatic polyps may harbor areas of cellular atypia or cancer even when they have a benign aspect [27]. Furthermore, hysteroscopy impressions are affected by the type of distention media used [28]. Hormonal treatments like progesterone therapy induce endometrial changes that make it more difficult for hysteroscopy impressions to be interpreted [26]. Thus, we strongly recommend a directed biopsy along with hysteroscopy for the management of Abnormal Uterine Bleeding.



## CONCLUSION

Although hysteroscopy is highly sensitive and specific in diagnosing intrauterine lesions, endometrial biopsy is mandatory in all cases of Abnormal Uterine Bleeding.

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