



RESEARCH ARTICLE

EFFECTIVENESS OF HYSTEROSCOPY IN EVALUATION OF ABNORMAL UTERINE BLEEDING AND ITS HISTOPATHOLOGICAL CORRELATIONS

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ABSTRACT

The Study Objective:

- 1.To study the role of hysteroscopy in evaluation of abnormal uterine bleeding.
- 2.To correlate accuracy of hysteroscopic findings with histopathologic findings.

Material and methods

Designs: A retrospective study was done from from March 2014 to March 2016.

Setting: study was carried out in the Department of Gynecological endoscopy at Manchanda's Endoscopic Center, PSRI, Delhi

Patients: One hundred and two cases were selected for this study from patients of age group 18 and above, who were admitted with the history of abnormal uterine bleeding. After detailed menstrual history, both systemic and gynecological examination was done. USG pelvis was done to detect any structural abnormality and to see the endometrial thickness. Patients were admitted on D5-D10 of their menstrual cycle except patients with grossly irregular cycles. In case of post-menopausal woman, they were prepared and admitted when the bleeding decreased or stopped.

Interventions: All patients underwent hysteroscopy post-menstrually, whenever possible, except in cases where menstrual cycles were grossly irregular.endometrial biopsy was taken at the same sitting during hysteroscopy and sent for histopathology. The correlation between findings on hysteroscopy and histopathological examination was tabulated and analyzed.

Result: In our study we found that hysteroscopy serves as good tool with sensitivity of 87.5% in diagnosing intrauterine pathology. It also has high specificity of 91.3%. It has positive predictive value of 92.5% and negative predictive value of 85.7% .It was accurate in diagnosing pathology in 89.2% of patients with AUB with significant p value when compared to histopathology which is the gold standard. All the findings had significant p value.

Conclusion: Hysteroscopy is highly sensitive and accurate tool for diagnosis in patients with AUB. Due to direct visualization, pathologies like endometrial polyp, submucous myoma, carcinoma endometrium, atrophic endometrium, retained products and hyperplasia can be diagnosed with great precision. Hysteroscopy with directed biopsies should be preferred over traditional dilatation and curettage for its advantages like direct visualization of pathology, reduced hospital stay, less surgical trauma and accuracy.

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INTRODUCTION

AUB (Abnormal uterine bleeding) is probably the most common presenting symptom in gynecological out-patient especially in peri- and postmenopausal women. Any deviation from the normal pattern of menstrual bleeding is called as abnormal uterine bleeding.

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It is estimated that a woman has a 1 in 20 lifetime chance of consulting her gynecologist because of heavy menstrual bleeding (Schorge, 2008). AUB is implicated in more than one-third of gynecologic consultations and nearly two-thirds of hysterectomies (Lasmar et al., 2008; Gimpelson et al., 1988). Menstrual dysfunction is the cause of discomfort, inconvenience and disruption of healthy lifestyle, which affects millions of women in both developed and developing world (Gimpelson et al., 1988). Until recent times, usual method of evaluating this symptom was dilatation and curettage. But this

detects the cause in less than 50% of the cases. Inconsistencies in nomenclature and lack of standardized methods of classification have hampered investigation and management of AUB. In an effort to bring improvement, Federation of International Gynecology and Obstetrics (FIGO) have approved a classification system for abnormal uterine bleeding. It classifies the causes into two categories structural and functional. It is described by the acronym PALM –COEIN (Munro, 2011). PALM (structural): P- Polyp, A-Adenomyosis, L-Leiomyoma, M-Malignancy. COEIN (functional): C-Coagulopathies, O-Ovulatory dysfunction, E-Endometrial, I-Iatrogenic, N-Not yet classified.

Hysteroscopy offers a valuable extension of the gynecologist's armamentarium. It can improve the diagnostic accuracy and can permit better treatment of uterine diseases. After hysteroscopy, the elective surgery of the patient can be planned better (Cohen, 1973). Use of hysteroscopy in abnormal uterine bleeding is almost replacing blind curettage, as it "sees" and "decides" the cause. This is because the uterine cavity can be observed and the area in question can be curetted. In fact, it is an eye in the uterus (Taneja, 2002). The study was conducted with following aims and objectives:

Aims and objectives

- To study the role of hysteroscopy in evaluation of abnormal uterine bleeding.
- To correlate accuracy of hysteroscopic findings with histopathologic findings.

MATERIAL AND METHODS

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Interventions: All patients underwent hysteroscopy post-menstrually, whenever possible, except in cases where menstrual cycles were grossly irregular. Endometrial biopsy was taken at the same sitting during hysteroscopy and sent for histopathology. The correlation between findings on hysteroscopy and histopathological examination was tabulated and analyzed using Microsoft excel and SPSS.p value of <0.5 was taken as significant.

RESULTS

Age of patient in above study was taken as 18 years and above. Abnormal uterine bleeding was most prevalent among women of age group 35–45 years. Out of 102 patients, menorrhagia was seen to be the most common presenting feature in 53 out of 102 patients (51.96%), polymenorrhea in 15 (14.7%), post menopausal bleeding was the cause of presentation in 20 patients (19.61%), 13 had metrorrhagia as presentation (12.75%) and oligomenorrhea was seen in just 1 patient (0.98%). (Fig 1)

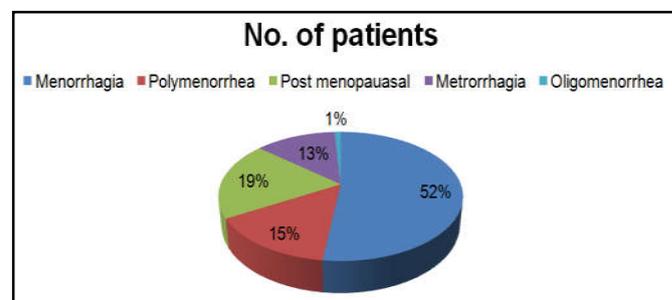


Figure 1. Distribution of symptoms in study group

Hysteroscopy showed abnormality in 59 cases i.e 57.84 % while 43 showed normal phasic endometrium (42.16%). Among the abnormal cases on hysteroscopy 11 (10.78%) were submucous fibroids, 27(26.47%) were endometrial polyps, 8(7.84%) were atrophic, RPOC retained products of conception was seen in 3(2.94%), Endometrium seemed carcinomatous in 2(1.96%) and hyperplasia was seen in 8 cases (7.85%). (Table 1). Of the total cases (n=102) on histopathology normal endometrium was seen in 46(45.1%), fibroid constituted 10 cases (9.8%), endometrial polyp seen in 23 cases (22.55%), atrophic endometrium 6 cases (5.88%), RPOC was seen in 3 (2.94%), Ca. Endometrium seen is 6 cases (5.88%). Hyperplasia was evident in 8 cases (7.85%). On hysteroscopy, 43 cases were found to have normal endometrium with no pathology, out of which 42 (97.7%) were confirmed as normal endometrium on histopathology and 1(2.33%) turned out to be endometrial hyperplasia.

Table 1. Hysteroscopic observation and their histopathologic findings

Hysrteroscopic findings	Histopathologic findings							
	Normal Endometrium	Fibroid	Endometrial polyp	Atrophic	RPOC	Carcinoma	Endometrium	Hyperplasia
Normal Endometrium	43	0	0	0	0	0	0	1
Fibroid	11	9	1	0	0	0	1	0
Endometrial polyp	27	1	22	0	0	3	0	0
Atrophic	8	0	0	6	0	0	0	0
RPOC	3	0	0	0	3	0	0	0
Ca. Endometrium	2	0	0	0	0	2	0	0
Hyperplasia	8	0	0	0	0	0	0	7
TOTAL	102	46	10	23	6	3	6	8

Submucosal Fibroid was seen in 11 cases on hysteroscopy of which 9 were confirmed on histopathology whereas 1 turned out to be endometrial poly and 1 was carcinoma. Although sensitivity of hysteroscopy in diagnosing fibroid was 90% but it was found to be highly specific 100% in diagnosing fibroids. Positive predictive value was 100%, negative predictive value of 97.7% whereas accuracy in diagnosing was 98.1%. The findings were significantly correlated by p value of <0.001. Figure 2.

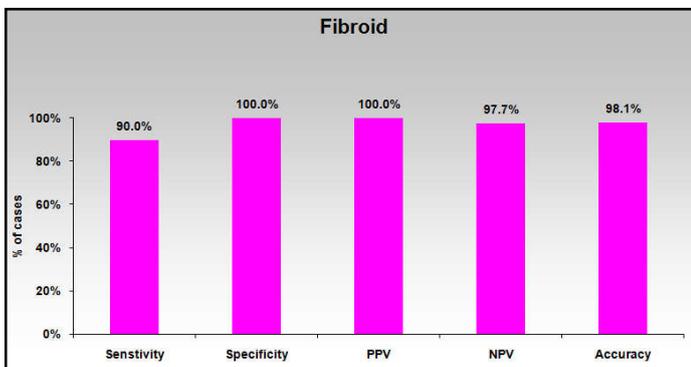


Figure 2. Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing fibroid

Hysteroscopy picked up endometrial polyp in 27 cases of which 22 proved to be the same. Hysteroscopy went wrong in diagnosing 1 normal proliferative endometrium as polyp, 1 turned out to be a fibroid where as 3 cases were carcinomatous. Hence, hysteroscopy was 95.7% sensitive in diagnosing Endometrial polyp with specificity of 97.7%. It has positive predictive value of 95.7% and negative predictive value of 97.75. It was 97% accurate in diagnosing endometrial polyps. It had a significant correlation of p<0.001. Figure 3

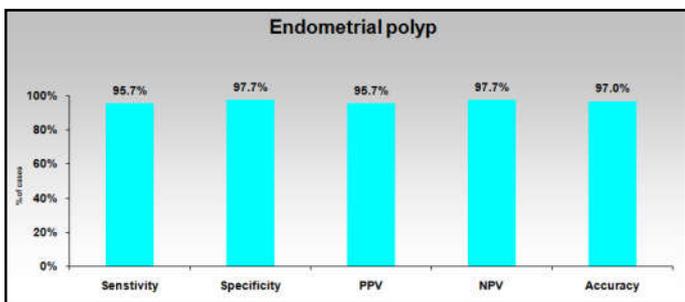


Figure 3. Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing endometrial polyp

8 cases of atrophic endometrium were diagnosed on hysteroscopy of which 6 were confirmed but 2 revealed normal proliferative endometrium. Hence hysteroscopy was 100% sensitive and 95.5% specific in diagnosing an atrophic endometrium. Hysteroscopy has Positive predictive value of 75% and negative predictive value of 100%. Diagnostic accuracy of hysteroscopy in diagnosing atrophic endometrium was 96% with a significant correlation of p <0.001. Figure 4. 3 cases were found to have retained products of conception on hysteroscopy all of which proved the same, hence hysteroscopy had 100% sensitivity, specificity, positive predictive value, negative predictive value, accuracy and significant p value of <0.001 in this case. Figure 5

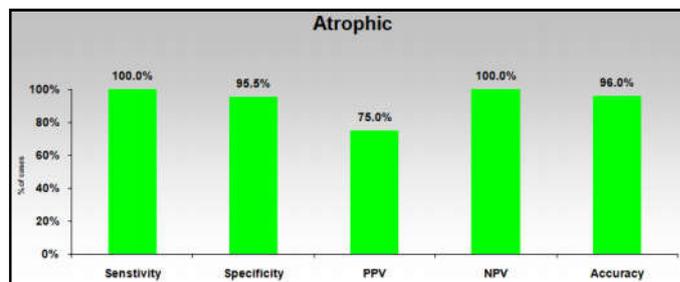


Figure 4. Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing Atrophic endometrium

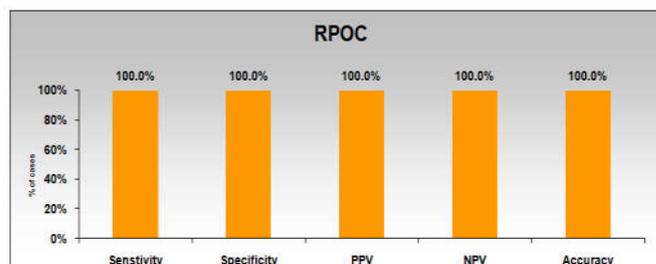


Figure 5 Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing Retained products of conception

Out of 6 cases which turned out to be carcinomas, hysteroscopy was successful only in diagnosing 2 cases, but both the cases diagnosed on hysteroscopy were proved to be carcinoma on histopathology. Therefore hysteroscopy was only 33.3% sensitive but 100 % specific in diagnosing a malignancy with positive predictive value of 100%, negative predictive value of 91.3%. However accuracy in diagnosis carcinoma was 97.1% but the p value was significant (0.013). Figure 6

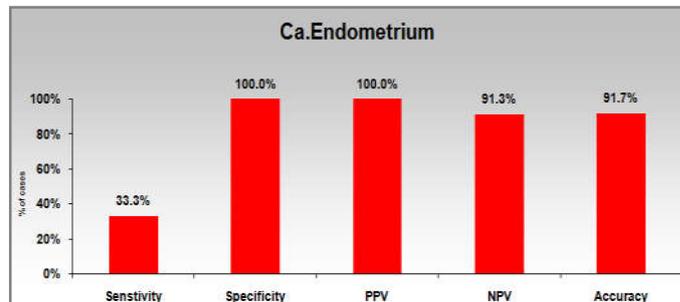


Figure 6. Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing carcinoma endometrium

Hysteroscopy diagnosed 8 cases with hyperplasia of which 7 proved correct and 1 turned out to be normal proliferative mucosa. Sensitivity of 87.5%, specificity of 97.7%, positive predictive value of 87.5 %and negative predictive value of 97.7% was recorded. Accuracy was 96.1%.significant correlation was seen with p value <0.001 (Figure 7).

Overall hysteroscopy was 87.5% sensitive and 91.3% specific in diagnosing a cause in women with AUB. It could positively predict a cause in 92.5% and could negatively rule out a cause in 85.7% cases. Hysteroscopy has diagnostic accuracy of 89.2%. The findings on hysteroscopy and histopathological findings were significantly correlated Figure 8.

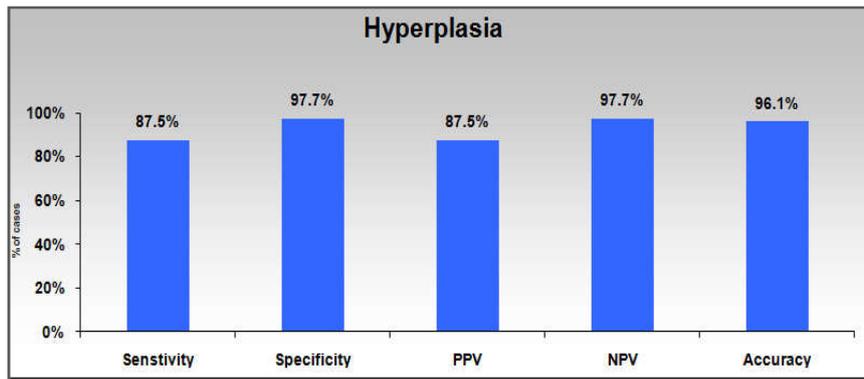


Figure 7. Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing hyperplasia

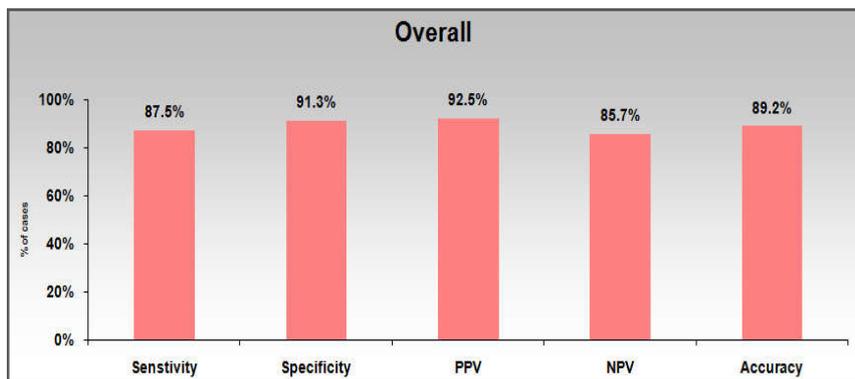


Figure 8. Overall Sensitivity, Specificity, PPV, NPV and Accuracy of hysteroscopy in diagnosing AUB

Table 2. Comparison of results of various studies published earlier

Study	Total Case	Normal	Fibroid	Polyp	Hyperplasia
Jyotsana <i>et al.</i> (2004)	100	34%	17.33%	20%	22.66%
Patil Sg <i>et al.</i> (2009)	100	50%	11%	9%	18%
Dasgupta (2011)	252	38.8%	18.2%	12.3%	25.7%
Trajkovic (2011)	239	41.02%	7.7%	20.5%	8.5%
Aisha Razzaq (2011)	80	37.5%	11.3%	18.8%	17%
Guingeeta (2011)	100	26%	16%	28%	30%
Sudhanshu Sekhar (2013)	100	38%	10%	18%	16%
Singh <i>et al.</i> (2014)	100	48%	7%	8%	26%
Valson <i>et al.</i> (2016)	50	58%	4%	16%	12%
Present Study	102	41.17%	10.78%	26.47%	7.85%

DISCUSSION

Abnormal uterine bleeding is one of the most frequently encountered conditions in gynecology out patient (Prentice, 2000). Variety of causative pathologies can lead to this condition. Directly resorting to a radical approach of hysterectomy is neither correct nor feasible in all patients. Hysteroscopy in this place offers a much more appreciable diagnostic and operative approach. Hysteroscopy has an edge due to great vision, less operative time, less operative trauma, easy patient compliance and lesser pain. It also offers a wide range of operative procedures that can be performed during the same sitting with the diagnostic procedure. In case of AUB, hysteroscopy is completely replacing the blind procedure of dilatation and curettage. Due to visual interpretation of the pathology it was feasible for us to correlate the hysteroscopic findings with histopathological findings. The cavity could be panoramically viewed and the area in question was directly

biopsied for histopathology. The complication rate of the procedure is very less; hence nowadays many gynecologists are performing office hysteroscopy (Nikolaou *et al.*, 2009). In our study there were no operative complications. In the large study done by Singhi *et al*, the complication rate was 0.6%, (Singhi, 2009). The complications in comparison to D & C are much lower, as hysteroscope is inserted under vision (Baggish, 2007). In our retrospective study, 102 women above 18 years of age who presented with complaints of abnormal uterine bleeding pattern underwent the two modalities of investigations to reach a conclusion - diagnostic hysteroscopy and endometrial histpathology report.

Proliferative Endometrium

In 43 patients, endometrium was pink, smooth and thin, appearing to be of proliferative type. The same was confirmed by histopathology in 42 patients. Histology of the endometrial

curetting revealed proliferative endometrium with tall columnar cells and pseudostratification. It was highly accurate in detecting normal endometrium. In a similar study conducted by Patil *et al.* Diagnostic accuracy of hysteroscopy for proliferative endometrium was 81%, (Patil *et al.*, 2009).

Submucous Fibroid

Intrauterine myomas are liable to remain latent for a long time. They appear as white-colored bulge round in shape with a smooth shine surface. In our study Sensitivity of hysteroscopy in diagnosing fibroid was 90% but it was highly specific 100% in diagnosing fibroids. Positive predictive value was 100%, negative predictive value of 97.7% whereas accuracy in diagnosing was 98.1%. The findings were significantly correlated by p value of <0.001. In study conducted by Patil *et al.* (2009) sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for fibroid compared with histopathology were 100, 89.89, 9.09 and 100%, respectively. Similar findings were reported by Panda (1999) and Veena, (Acharya *et al.*, 2003) But Valle (1981) and Sheth, (1989) had reported 88 and 81%, respectively, of diagnostic accuracy.

Endometrial polyp

They are exophytic mucous lesions that differ in shape, size, number and appearance. The surface epithelium is similar to that of the surrounding endometrium and is soft in consistency. Polyps can be associated with glandular hyperplasia and can remain latent for rather long periods. On diagnosis they can be removed by hysteroscopy in same sitting. In our study Hysteroscopy picked up endometrial polyp in 27 cases of which 22 proved to be the same hence hysteroscopy was 95.7% sensitive in diagnosing endometrial polyp with specificity of 97.7%. It has positive predictive value of 95.7% and negative predictive value of 97.75. It was 97% accurate in diagnosing endometrial polyps. It had a significant correlation of $p < 0.001$. According to Patil *et al.* Diagnostic accuracy of hysteroscopy for endometrial polyp was 62% when compared to histopathology. But considering the final diagnosis, diagnostic accuracy was 100%. So, sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for endometrial polyp compared to histopathology were 100, 95.78, 55.55 and 100%, respectively. But compared to final diagnosis, sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for endometrial polyp were 100% each. Haller *et al.* (1996) had reported sensitivity and specificity of 100 and 96.7%, respectively. Anuradha Panda (Panda, 1999) had reported diagnostic accuracy of 100% in diagnosing polyp. Acharya Veena (Acharya, 2013) had obtained sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for endometrial polyp as 100% each. But Valle (1981) and Seth (1989) had obtained a diagnostic accuracy of 88.6 and 81.8%, respectively.

Atrophic endometrium

It is postmenopausal physiological phenomenon and nevertheless gives rise to bleeding. The hormonal changes that

occur lead to endometrial mucosal atrophy, with thinning of the epithelial lining and network of vascular capillaries closest to the surface. These changes are associated with rarefaction of the glandular structure and increased fragility of the stroma. The hysteroscopic image is characteristic of thin mucosa, it often looks transparent, revealing underlying vasculature and presence of hemorrhagic suffusion and petechiae. In severe atrophy it is porcelain white and smooth. We conclude that hysteroscopy is 100% sensitive and 95.5% specific in diagnosing an atrophic endometrium. Hysteroscopy has Positive predictive value of 75% and negative predictive value of 100%. Diagnostic accuracy of hysteroscopy in diagnosing atrophic endometrium as per our study is 96% with a significant correlation of $p < 0.001$. Patil *et al.* (2009) in their study stated the diagnostic accuracy of hysteroscopy as 63%. Sensitivity, specificity; positive predictive value and negative predictive value of hysteroscopy for atrophic endometrium were 100, 96.84, 62.5 and 100%, respectively. This correlated with the report of Panda *et al.* (1999) Haller *et al.* (1996) had reported sensitivity and specificity of 100 and 97%, respectively.

Retained products of conception

Hysteroscopy is most accurate method in diagnosis and curetting retained products. We in our experience have encountered many cases of retained fetal bones, placental polyp and retained placenta. Hysteroscopy provides the ease of diagnosing and curetting these products with precision at the same time. 3 cases were found to have retained products of conception on hysteroscopy all of which proved the same, hence hysteroscopy had 100% sensitivity, specificity, positive predictive value, negative predictive value, accuracy and significant p value of <0.001 in this case.

Carcinoma endometrium

For patients who choose conservative hormonal treatment and who want to preserve their fertility, hysteroscopy plays a vital role during tumor removal and follow up. Early stages of the disease can be removed and ablated using hysteroscopy. Hysteroscopy was only 33.3% sensitive but 100% specific in diagnosing a malignancy with positive predictive value of 100%, negative predictive value of 91.3%. The p value was also significant (0.013). As per Patil *et al.* (2009) Diagnostic accuracy of hysteroscopy was 67%. sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for carcinoma endometrium were 100, 98.97, 66.66 and 100%, respectively.

Mencaglia (1995) combined hysteroscopy with endometrial biopsy for diagnosing endometrial carcinoma and found 100% accuracy in the diagnosis of endometrial neoplasia and its precursors. Haller *et al.* (1996) had got a reduced sensitivity of 50% but better specificity of 100%. Valle (1981) and Panda (Panda, 1999), had obtained diagnostic accuracy of 100% each. Hysteroscopy revealed a sensitivity, specificity, positive predictive value and negative predictive value of 100, 49.6, 81 and 100%, respectively, according to Pietro Litta *et al.* (Litta, 2005).

Hyperplasia

It is deemed as a precursor of endometrial carcinoma but only some of them pose a real risk of malignant transformation. Hysteroscopy offers the opportunity to inspect the lesion. Unfortunately it is not possible to find a corresponding hysteroscopic image for every histological aspect of endometrial hyperplasia. In our study Hysteroscopy diagnosed 8 cases with hyperplasia of which 7 proved correct and 1 turned out to be normal proliferative mucosa. Sensitivity of 87.5%, specificity of 97.7%, positive predictive value of 87.5% and negative predictive value of 97.7% was recorded. Accuracy was 96.1%. Significant correlation was seen with p value <0.001 . In study by Patil *et al.* (2009) hysteroscopic diagnostic accuracy for hyperplasia was 72%. So, sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for hyperplasia were 75, 92.5, 71.4 and 93.67%, respectively. Loverro *et al.* (1996) stated the sensitivity, specificity, positive predictive value and negative predictive value as 98, 95, 63 and 99%, respectively, for endometrial hyperplasia. Arslan *et al.* (1996) did hysteroscopy in 216 premenopausal and 114 postmenopausal women for diagnosing hyperplasia. The positive predictive value was 71.4% and negative predictive value was 95.4% in diagnosis. Diagnostic accuracy of hysteroscopy for endometrial hyperplasia was 68.2, 71.4 and 76.4% in a series reported by Valle *et al.* (1981) Seth *et al.* (1989) and Panda *et al.* (1999) respectively. Madan *et al.* (29) concluded that Hysteroscopy was highly specific for diagnosis of both endometrial hyperplasia and endometrial carcinoma (specificity was 85% for endometrial hyperplasia and 99.5% for endometrial carcinoma), however the sensitivity of hysteroscopy for diagnosing endometrial cancer was 40% and 30% for endometrial hyperplasia Torrejon *et al.* (1997) observed endometrial hyperplasia in premenopausal women with, sensitivity of 71.8%, specificity 96.4%, and global diagnostic precision 92.5%; while in postmenopausal women; respective figures were 85.1%, 100%, and 97.3%. For diagnosing adenocarcinoma in premenopausal patients, hysteroscopy was 100% sensitive, with specificity 99.4% and global diagnostic precision 99.5%; in postmenopausal women, respective figures were 100%, 99.4%, and 99.5%.

Overall

To conclude, our overall hysteroscopy was 87.5% sensitive and 91.3% specific in diagnosing a cause in women with AUB. It could positively predict a cause in 92.5% and could negatively rule out a cause in 85.7% cases. Hysteroscopy has diagnostic accuracy of 89.2%. In the study by Jyotsna *et al.* (2004) hysteroscopy showed its abnormality detection rate of 66%. These findings correlate with Siegler (1976) who reported abnormality detection rate of hysteroscopy as 43-47%. Saraiya *et al.* (1994) reported similar findings. H Van Dongen *et al.* (2007) Conducted a meta analysis of hysteroscopy in abnormal uterine bleeding which was suggestive of good correlation. In their analysis one population of homogeneous data could be identified, consisting of patients with postmenopausal bleeding. In this subgroup the positive and negative likelihood ratios were 7.9 (95% CI 4.79–13.10) and 0.04 (95% CI 0.02–0.09), raising the pretest probability

from 0.61 to a post-test probability of 0.93 (95% CI 0.88–0.95) for positive results and reducing it to 0.06 (95% CI 0.03–0.13) for negative results. The pooled likelihood ratios of all studies included, calculated with the random effects model, were 6.5 (95% CI 4.1–10.4) and 0.08 (95% CI 0.07–0.10), changing the pre-test probability of 0.46 to post-test probabilities of 0.85 (95% CI 0.78–0.90) and 0.07 (0.06–0.08) for positive and negative results respectively. Subgroup analyses gave similar results. The overall success rate of diagnostic hysteroscopy was estimated at 96.9% (SD 5.2%, range 83–100%).

Conclusion

To become an appropriate screening tool a investigation or procedure needs to be highly sensitive and specific. In patients with AUB, hysteroscopy is without doubt highly accurate and sensitive tool. Hysteroscopy despite its diagnostic precision must not be considered a diagnostic procedure per se but rather an investigation method to be combined with biopsy. Whether or not the hysteroscopy is sufficient to establish a definitive diagnosis without taking further tissue samples will depend directly upon the endoscopist's experience. Thus, We suggest use of diagnostic and therapeutic hysteroscopy with endometrial biopsy in all cases as initial approach to patients with abnormal uterine bleeding.

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