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Original Research Article

Role of trans vaginal sonography with hysteroscopy in detection of uterine causes of abortions

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ABSTRACT

Background: Recurrent pregnancy loss (RPL) is one of the most frustrating and difficult areas in reproductive medicine because the aetiology is often unknown and there are only few evidence-based diagnostic and treatment strategies. Objective of this study was to compare the role of trans vaginal sonography with hysteroscopy in detection of uterine causes of abortions.

Methods: This prospective cohort study was conducted in the department of obstetrics and gynaecology, Kasturba Hospital, Daryaganj, Delhi. The study was conducted from January 2016 to December 2016.

Results: On transvaginal sonography majority of women i.e. 39(78%) patients had normal ultra-sonographic findings. 11(22%) showed various abnormal findings. Most commonly diagnosed abnormal finding on TVS was polyp, seen in 5(10%) patients. It was seen as a well-defined, uniformly hyperechoic mass within the endometrial cavity. normal hysteroscopic findings were seen in 27(54%) patients. Rest 23(46%) patients had abnormal uterine factors as diagnosed by hysteroscopy. Synechiae was detected in 9(18%) patients. It was the most common abnormality detected on hysteroscopy. Out of 9 patients who had synechiae, 2 had severe dense adhesions. In 6 patients, the adhesions were mild and flimsy. While minimal adhesions were noted in 1 patient, seen near the cornua.

Conclusions: hysteroscopy is still the gold standard for diagnosis and most definitive procedure of choice if any kind of operative intervention is required.

Keywords: Hysteroscopy, Recurrent abortion, Sensitivity, Transvaginal sonography

INTRODUCTION

Investigative modalities used to evaluate recurrent miscarriages include blood investigations and imaging modalities for uterine cavity. Blood investigations include lupus anticoagulant, anticardiolipin antibodies, glucose tolerance test and thyroid function test. Because of the high prevalence of uterine abnormalities, evaluation of the uterine cavity should be routinely done in the basic assessment of women with RPL. Imaging modalities like 2D or 3D ultrasonography (USG), hysterosalpingography (HSG), saline infusion

sonography, hysteroscopy and magnetic resonance imaging (MRI) are the common methods for evaluation of uterine cavity.¹

Hysteroscopy is considered as the gold standard for the diagnosis of structural uterine anomalies since it visualizes the endometrial cavity directly. Hysteroscopy offers better diagnostic accuracy as compared to USG and HSG as they do not provide the distinction between different kinds of lateral fusion defects. Hysteroscopy has the added advantage in its ability to diagnose and treat pathologies simultaneously.

Direct visualization of endometrial cavity not only has a higher sensitivity to detect structural lesions which includes Mullerian anomalies, sub mucous myomas, endometrial polyp, uterine synechiae but also can be used as an operative therapy at the same time as initial diagnosis.

Congenital and acquired uterine abnormalities can be detected and treated hysteroscopically, resulting in improved pregnancy outcomes. However, the accuracy of hysteroscopy to diagnose various types of Mullerian anomalies is not well established, hence laparoscopy might be required along with hysteroscopy to diagnose the type of anomaly.

There are no specific criteria as to when to start investigation after miscarriage. There is recently a trend towards liberalizing these criteria to include women presenting with only two miscarriages (Li et al).² Majority of these women will want to begin an investigation after two miscarriages due to the stress and frustration associated with aborting rather than „wait for a third miscarriage“. Weiss et al, concluded that either of, Mullerian or acquired uterine anomaly, was observed in similar percentages of patients with two consecutive miscarriages as compared to patients with three miscarriages.

Hence, hysteroscopy should be advised in women after two miscarriages as this will reveal a congenital or acquired uterine defect in approximately 30% of the cases.³

Curettage after abortion is the most common etiologic factor for the development of intra uterine adhesions (IUA).⁴ Pelvic inflammatory disease, Koch's and endometritis are few other causes of IUA. As most patients with intra uterine adhesions have a history of pregnancy related curettage it appears that the early post abortion period is ideal to start investigation. Adhesions in this period will be flimsy and can be subjected to adhesiolysis through hysteroscopic intervention early in evaluative process.

Hence this study was conducted to evaluate the role of trans vaginal sonography with hysteroscopy in detection of uterine causes of abortions.

METHODS

This prospective cohort study was conducted in the department of obstetrics and gynaecology, Kasturba Hospital, Daryaganj, Delhi. The study was conducted from January 2016 to December 2016. It was a. A minimum of fifty women attending gynaecology OPD of Kasturba Hospital with history of more than two miscarriages in post abortal phase after the next period were included in the study. Women with chronic severe medical disorders like diabetes mellitus, renal disease,

thyroid disorder and active genital infection were excluded from the study.

A detailed history was taken including age, socioeconomic status, menstrual history and consanguinity. Detailed obstetrics history was taken that included number of live births and history of previous miscarriages including period of gestation, pattern and whether followed by a suction and evacuation or medical method of termination. After detailed physical examination, routine blood investigations like blood group, hemogram, VDRL, HIV, HbsAg, thyroid function tests, glucose tolerance test, serum electrolytes and antiphospholipid antibody were undertaken. Transvaginal sonography (TVS) was performed prior to hysteroscopy in all patients. While performing TVS, details of uterine cavity, polyps, fibroids, cervical factors, ovarian factors like PCOS were noticed.

The Bettocchi 5mm rigid hysteroscope was used to perform hysteroscopy in post menstrual phase. Patients were asked to come for follow up in OPD after two weeks and after next period.

Statistical analysis

The data was entered in MS excel spreadsheet and analysis was done using statistical package for social sciences (SPSS) version 21.0. Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean±SD. A p-value of < 0.05 was considered statistically significant.

RESULTS

Age of the patients varied from 21 to 32 years. The majority of the patients were between the age group of 25 to 27 years (40%) The mean age was 25.6±2.46 years. Majority of patients 31 (62%) were Muslims and the rest 19 (38%) were Hindus. In our study, majority of the patients, 29 (58%) presenting in our OPD were lower middle class. 18 (36%) patients belonged to lower class. 1 (2%) patient was from upper class while 2 (4%) were from upper middle class.

Majority of women i.e. 47 (94%) had regular cycles while 3 (6%) of the patients had oligomenorrhea. Positive history of consanguinity was elicited in 5 (10%) of the study population. Majority of women (90%) however did not have any history of consanguinity. Family history of abortions was elicited in 5 (10%) patients of the study population.

There were more women with history of only abortions in past than patients with any pregnancy going beyond 20 weeks.

A total 41 (82%) of previous pregnancies resulted in only abortions without any pregnancy crossing the age of maturity and were labelled as Primary RPL.

In the rest 9 (18%) patients there was history of any pregnancy beyond 20 weeks and were labelled as Secondary RPL.

Most of the patients 30 (60%) had previous two abortions and 20 (40%) had more than 2 abortions. 11 (22%) had three and 9 (18%) had four or more abortions.

Among these patients, the mean of no. of abortions was calculated to be 2.64±0.94.

Trans vaginal sonography: On transvaginal sonography majority of women i.e. 39 (78%) patients had normal ultrasonographic findings, 11 (22%) showed various abnormal findings.

Most commonly diagnosed abnormal finding on TVS was polyp, seen in 5 (10%) patients. It was seen as a well-defined, uniformly hyperechoic mass within the endometrial cavity.

Septum was seen in 4 (8%) patients. Fundal splitting of endometrial echo was observed on TVS. Synechiae were seen as hypoechoic bands traversing through the endometrial cavity in 1 (2%) patient. Fibroid was seen in 1 (2%) patient. It was a submucosal fibroid which was seen as broad-based, hypoechoic, well-defined, solid mass with shadowing (Table 1).

Table 1: Results of trans vaginal sonography.

TVS findings	No. of patients	Percentage
Normal	39	78
Fibroid	1	2
Polyp	5	10
Septum	4	8
Synechiae	1	2
Total	50	100

Hysteroscopy

In our study, normal hysteroscopic findings were seen in 27 (54%) patients. Rest 23 (46%) patients had abnormal uterine factors as diagnosed by hysteroscopy.

Synechiae was detected in 9 (18%) patients. It was the most common abnormality detected on hysteroscopy. Out of 9 patients who had synechiae, 2 had severe dense adhesions. In 6 patients, the adhesions were mild and flimsy. While minimal adhesions were noted in 1 patient, seen near the cornua.

Polyp was the observed to be the second most common acquired factor. 6 (12%) patients were diagnosed to have polyp. 4 patients had endometrial polyp of 2 cm to 3 cm. One patient had multiple polyposis with hyperplastic endometrium. One patient had pedunculated submucous fibroid polyp of 4 cm.

Commonest congenital Mullerian abnormality was partial or incomplete septum diagnosed in 5 (10%) patients. Septum was diagnosed as fibromuscular tissue hanging from fundus and the bilateral ostia were seen at higher level not coming together in panoramic view. None of the patients had complete septum. Concurrent laparoscopy was performed to confirm the diagnosis.

Diagnosis of unicornuate and bicornuate uterus were confirmed with the aid of laparoscopy in one patient each.

Fibroid was seen in one patient as a bulge in uterine wall. It was a large sub mucous fibroid of 4cm by 3 cm.

In one of the patients, though the endometrium was normal and no structural abnormality was found, presence of floating retained of retained products of conception were observed and removed with the help of forceps (Table 2).

Table 2: Observations of hysteroscopy findings.

Hysteroscopy findings	No. of patients	Percentage
Normal	27	54
Synechiae	9	18
Polyp	6	12
Fibroid	1	2
Septum	5	10
Unicornuate	1	2
Bicornuate	1	2
Total	50	100

Comparison of TVS with hysteroscopy

Normal findings were elicited in 39 (59.09%) patients on TVS while 27 (40.09%) patients had normal findings on hysteroscopy. There was a statistically significant difference between the normal finding by hysteroscopy over transvaginal sonography with p-value of 0.019 (p-value < 0.05). 11 patients were misdiagnosed as normal as compared to abnormal by hysteroscopy.

Most commonly missed abnormality was the intra uterine adhesions. Synechiae was diagnosed in 1 (10%) patient on TVS while hysteroscopy detected synechiae in 9 (90%) patients. This difference was statistically significant with p-value of 0.016 (p-value < 0.05).

TVS and hysteroscopy were almost comparable in the detection of polyp, fibroid and septum. As a statistically insignificant p-value of 1.000 (p-value > 0.05) was calculated.

The hysteroscopy is definitely a better diagnostic modality for IUA and normal finding as depicted by a significant p-value of 0.016 and 0.019 respectively (Table 3).

Table 3: Comparison of TVS with hysteroscopy.

Observations	Group		p-value	p-value
	Hysteroscopy	TVS		
Normal	27 (54%)	39 (78%)	0.019	0.095
Synechiae	9 (18%)	1 (2%)	0.016	
Polyp	6 (12%)	5 (10%)	1.000	
Fibroid	1 (2%)	1 (2%)	1.000	
Septum	5 (10%)	4 (8%)	1.000	
Unicornuate	1 (2%)	0 (0%)	1.000	
Bicornuate	1 (2%)	0 (0%)	1.000	
Total	50 (100%)	50 (100%)		

Table 4: Correlation of TVS and hysteroscopy in detection uterine abnormalities.

TVS findings	Hysteroscopy		Total	p-value
	Abnormal	Normal		
Abnormal	11 (22%)	0 (0.00%)	11 (22%)	< 0.0001
Normal	12 (24%)	27 (54%)	39 (78%)	
Total	23 (46%)	27 (54%)	50 (100%)	

Table 5: Descriptive analysis of findings of TVS and hysteroscopy.

	Hysteroscopy							Total
	Bicornuate	Fibroid	Normal	Polyp	Septum	Synechiae	Unicornuate	
Fibroid	0 (0.00%)	1 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100.0%)
Normal	1 (2.56%)	0 (0.00%)	27 (69.23%)	1 (2.56%)	1 (2.56%)	8 (20.51%)	1 (2.56%)	39 (100.0%)
Polyp	0 (0.00%)	0 (0.00%)	0 (0.00%)	5 (100.0%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	5 (100.0%)
Septum	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	4 (100.0%)	0 (0.00%)	0 (0.00%)	4 (100.0%)
Synechiae	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100.0%)	0 (0.00%)	1 (100.0%)
Total	1 (2.00%)	1 (2.00%)	27 (54.00%)	6 (12.00%)	5 (10.00%)	9 (18.00%)	1 (2.00%)	50 (100.0%)

Although overall more abnormal uterine factors were confirmed by hysteroscopy than by TVS, the difference was not statistically significant with a p-value of 0.095 (p-value < 0.05).

Correlation of TVS and hysteroscopy in detecting uterine abnormalities

Hysteroscopy is considered gold standard and TVS findings were compared with hysteroscopy.

Sensitivity of TVS to diagnose uterine abnormality is 47.83%.

Specificity of TVS to diagnose uterine abnormality is 100%.

Positive predictive value of TVS to diagnose uterine abnormality is 100%.

Negative predictive value of TVS to diagnose uterine abnormality is 69.23%.

TVS has a good specificity and positive predictive value of 100% while the sensitivity (47.83%) and negative predictive values (69.23%) was low for detection of uterine causes of RPL (Table 4).

Descriptive analysis of findings of TVS and hysteroscopy

Although hysteroscopy was found to be more precise in diagnosing normal uterine cavity as compared to TVS (27 versus 39 patients), they were found to be comparable with each other for the diagnosis of septum, polyp and fibroid. However, in case of IUA, only one patient of was detected on TVS and rest 8 cases were missed and hence hysteroscopy is the better modality for diagnosis of intra uterine synechiae and normal finding (Table 5).

DISCUSSION

2D ultrasonography is readily available, least invasive and shows excellent assessment of the myometrial and endometrial morphology. Transvaginal sonography (TVS) is usually the initial investigation, but can be enhanced by 3D ultrasound. TVS allows accurate and rapid characterization of the uterus including its size and position, as well as the presence of anomalies such as a duplicated cervix, duplicated uterus, uterine septum or unicornuate uterus. TVS is also useful in determining the size and location of uterine myomas, as well as the presence of intrauterine polyps and endometrial irregularities that might suggest adhesions.

Three-dimensional ultrasound, a highly accurate yet non-invasive test, has the potential to emerge as the reference standard for the identification and differentiation of congenital uterine anomalies.

Most common abnormality detected on hysteroscopy was intrauterine adhesions seen in 9 (18%) patients. Intrauterine adhesions develop as a result of surgical procedures, typically curettage, or endometritis. The intra uterine scars probably interfere with normal implantation and might be responsible for pregnancy loss. In India, chronic endometritis due to genital Koch's is also a very important cause of IUA.

As hysteroscopy was performed in post abortion period, adhesions in this period were flimsy and could be subjected to adhesiolysis through hysteroscopic intervention early and their progression to dense adhesions could be prevented.

A total 30-50% of women undergo a surgical procedure after each miscarriage because of the suspicion of incomplete evacuation. IUAs are thought to develop following the destruction of the basal layer of the endometrium. In the healing process, opposing walls of the uterus adhere together causing minimal, marginal or complete obliteration of the uterine cavity.^{5,6} Because of the possible implications of IUAs, investigators have advocated to perform a hysteroscopy after every miscarriage.⁷

A total 6 (12%) patients were diagnosed to have polyp on hysteroscopy. 4 patients had endometrial polyp of 2 cm to 3 cm. One patient had multiple polyposis with hyperplastic endometrium. One patient had fibroid polyp of 4 cm.

It is postulated that polyps may act like foreign bodies within the endometrial cavity.⁸ Also, they might induce chronic inflammatory changes in the endometrium that make it unfavorable for pregnancy.

Septate uterus causes RPL owing to vascular compromise as the fibrous tissue of the septum compromises fetal development.⁹

Most of these researchers have used hysteroscopy as a gold standard for diagnosis of uterine abnormalities as it allows direct visualization of the intrauterine cavity. It is therefore very accurate in identifying uterine causes. However, it does not allow the evaluation of the external contour of the uterus and is therefore often inadequate in differentiating between different anomaly types. Consequently, for the correct differentiation between bicornuate and septate uteri, further investigation is required, most commonly a diagnostic laparoscopy.

TVS is a currently most readily available and least invasive diagnostic tool for assessing the structural uterine anomalies of uterus. In our study, 59.09% patients

showed normal findings on TVS while only 40.09% patients were confirmed as normal on hysteroscopy.

There was a statistically significant difference between the normal finding by hysteroscopy over transvaginal sonography with p-value of 0.019 (p-value < 0.05).

A total 9 patients who were labeled as normal on ultrasonography (TVS) were later found to have uterine abnormality.

The incidence of IUA after two abortions was 14% (3/21) but the incidence after three or more abortions was significantly elevated 32% (9/28). In addition, 58% of IUA diagnosed in the latter two groups were of a more severe extent.¹⁰

The most commonly missed finding was intra-uterine adhesions. Out of all the nine cases of IUA, only one was suspected to have IUA on TVS (10%). This difference was statistically significant with p-value of 0.016 (p-value < 0.05).

The other cases which were missed were that of polyp and septum.

TVS and hysteroscopy were almost comparable in the detection of polyp, fibroid and septum. As a p-value of 1.000 (p-value > 0.05) was calculated.

Although overall more abnormal uterine factors were confirmed by hysteroscopy than by TVS, the difference was not statistically significant with a p-value of 0.095 (p-value < 0.05).

TVS has a good specificity and positive predictive value of 100% while the sensitivity (47.83%) and negative predictive values (69.23%) was low for detection of uterine causes of RPL.

This very high specificity and positive predictive value of TVS indicates that it is able to

correctly predict an abnormal finding if detected, but a low specificity and high negative predictive value indicate that there is a high chance of missing an abnormal finding. In our study, hysteroscopy was considered gold standard and TVS findings were compared with hysteroscopy.

CONCLUSION

Trans vaginal sonography was able to diagnose almost all the uterine anomalies except for IUA, for which hysteroscopy is found to be a better tool. Hence, TVS can serve as a good screening modality for the diagnosis of intra uterine causes of abortions. However, hysteroscopy is still the gold standard for diagnosis and most definitive procedure of choice if any kind of operative intervention is required.

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