

An Analytical Review of Cervical Canal Abnormalities Detected by Transvaginal Ultrasound Vs Hysteroscopy in Female Infertility Evaluation with Special Reference to Endocervical Synechiae

Research Article

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Introduction

Cervix and endocervical canal are an essential and important part of female reproductive environment. Cervix is a gateway for entry of sperm and store house for sperm. Beside it is liable to get infected and injured by pathogens and operative procedures. Cervical pathology accounts for 3-8% of all cases of female infertility [1,2] yet cervical canal evaluation receives very little attention in infertility evaluation and management. Present study gives an analytical review of cervical canal abnormalities detected via Trans Vaginal Sonography (TVS) Vs Hysteroscopy in female infertility evaluation.

Keywords: Endocervical canal; Transvaginal sonography; Hysteroscopy; Endocervical synechia

Abbreviations: TVS: Transvaginal Sonography; SSG: Sonosalpingography

Material and Methods

Present Cohort prospective study was done from period of January 2019 to May 2021 at infertility unit of Jeevan Jyoti Hospital & Medical Research Centre, Gorakhpur in 150 women of infertility (120-Primary and 30 Secondary). Women selected for study were in age group of 22-35 years having normal ovulation study, hormonal profile and normal husband semen analysis.

These women were subjected to Transvaginal Sonography (TVS) with Sonosalpingography (SSG) on 10th - 12th day of menstrual cycle followed by Hysteroscopic evaluation within 120-180 days. Findings of endocervical canal were carefully noted while performing TVS / SSG and Hysteroscopy. Predictive value of two methods in detection of cervical canal abnormalities was compared by statistical analysis using Z test.

Results:

A total of 150 women (120 having primary and 30 secondary

infertility) attending infertility clinic in age group of 22-35 years, who had normal ovulation study, hormonal profile and average husband semen analysis were included in study. (Figure 1 A, B) shows age and type of infertility wise distribution of women in study.

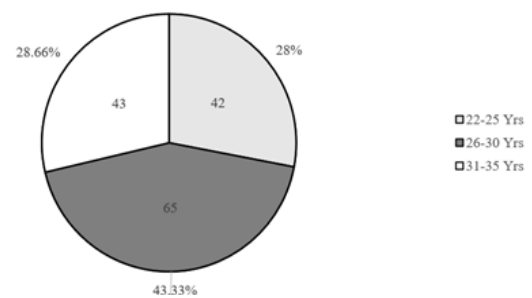


Figure 1A: Age wise distribution of women in study (n = 150).

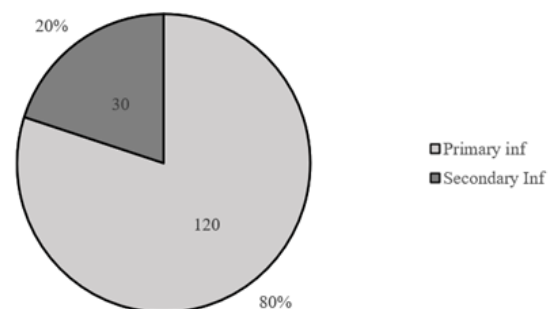


Figure 1B: Distribution of women in study according to type of infertility (n = 150).

Cervical canal finding detected during transvaginal ultrasound / SSG and hysteroscopy are noted (Table 1).

Table 1: Cervical Canal Findings in Study observed via TVS Vs Hysteroscopy (n = 150).

Cervical Canal Findings	TVS		Hysteroscopy		ZPI-P2	P
	No.	%	No.	%		
Stenosed Os	12	8	18	12	1.1547	> .05
Elongation of Endocervical Canal	5	3.33	8	5.33	0.8506	> .05
Absent Cervical Mucus	12	8	0	0	3.5355	< .001**
Nabothian Cyst	8	5.33	4	2.66	0.8706	> .05
Difficulty in passing Catheter in SSG / Hysteroscope	8	5.33	12	8	0.92581	> .05
Endocervical Polyp	1	0.66	3	2	1.0067	> .05
Endocervical Synechiae	0	0	39	26	6.6953	< .001**
-Mild			18	12	4.3759	< .001
- Moderate			7	4.66	2.6771	< .01
- Severe			14	9.33	3.8321	< .001
Normal Cervix	104	69.3	66	44	4.42739	< .001**

**Highly Significant

Table 1 shows that TVS / SSG is able to detect cervical pathology in 46 women (30.66%). Stenosed Os (8%) and absent cervical mucus (8%) were significant findings during ultrasound evaluation of cervix. Endocervical polyp was noted in 1 woman. Difficulty in passing Sonosalpingography catheter gives a clue to endocervical synechiae in 8 women (5.33%) but does not diagnose it definitively.

In hysteroscopic assessment of endocervical canal, finding of Stenosed Os, elongated endocervical canal, Nabothian cyst, difficulty in passing catheter/ hysteroscope and endocervical polyp was in higher number of cases but not significantly different from TVS. Detection of varying grades of endocervical synechiae by hysteroscopy was significantly higher ($Z = 6.6953, p < .001$). Absent cervical mucus is better observed via TVS as compared to hysteroscopy ($Z = 3.5355, p < .001$). Hysteroscopy detected cervical abnormality in significantly higher number of cases. Thus, normal cervical evaluation via TVS was found in 69.33% of cases as compared to 44% by hysteroscopy ($Z = 4.42739, p < .001$).

(Table 2) depicts significant associated finding suggestive of inflammatory pathology in uterine cavity in study during hysteroscopic evaluation. Varying degree of endometrial synechiae (13.33%), Distorted cavity of uterus (8%), PCR positive for endometrial tuberculosis (10%) and histologic chronic endometritis (5.33%) were additional positive findings in study.

Table 2: Other Finding Suggestive of Uterine Inflammatory Pathology in Infertile Women in Study (n = 150).

	No.	%
Endometrial Synechiae	20	13.33
Distorted Cavity Uterus	12	8
P.C.R Detected for Tuberculosis	15	10
Chronic Endometriosis	8	5.33

Discussion

The cervix and endocervical canal are a gateway for sperm entry in female reproductive tract. For fertilization of ovum to occur in the fallopian tube, the cervix must permit the sperm to pass through. This is facilitated by the changes in the mucus secreted by the columnar cells lining the cervix, brought on by hormonal variation in menstrual cycle. Cervical gland and crypt are also store house for sperm. Thus, favourable cervical environment is needed for sperm survival as well motility [1-3].



At the same time, cervix is also exposed to intercourse, natural and abnormal pathogens. Besides in minor operative procedure as well vaginal delivery, the cervix is liable to get repeatedly infected and injured. It is more significant in developing country like India. Thus, cervical pathology contributes directly or indirectly to 3-8% of cause of infertility. In last decade while management of ovulatory and fallopian tube dysfunction has been main focus of reproductive medicine, cervix and endocervical canal evaluation has not received due and desired attention in infertility evaluation and management in any level setup.

Transvaginal ultrasound and Sonosalpingography is cheap, easily available and effective mean of detecting various factors in infertility in expert hands [4]. Hysteroscopy has been added in recent years in evaluation of infertile women. Though hysteroscope as the name suggest is for evaluation of uterine cavity but it provide the good and optimum opportunity to study cervix and endocervical canal [5,6]. Till now little research is available on cervical canal evaluation in infertility management.

Our study reveals that pick-up rate of finding of stenosed Os, elongated endocervical canal, endocervical polyp, and difficult entry of catheter / hysteroscope was higher with hysteroscopy than TVS, but not significantly different (Table 1). Presence or absence of cervical mucus is detected highly significantly via TVS as compared to hysteroscope. Thus, carefully conducted and documented TVS and SSG is a cheap, non-invasive, safe and effective mean of detecting cervical abnormalities.

Diagnostic and operative Hysterolaparoscopy is nowadays considered a comprehensive gold standard technique for diagnosis of infertility factors as well performing fertility enhancing operative procedure in the same sitting. Hysteroscopy is a much simple and safer than laparoscopy and can be done even in outpatient settings [7]. Hysteroscopic observation begins with cervical canal yet cervical canal finding are usually either missed or not documented well.

Present study shows that hysteroscopy can be very important procedure for detection as well treatment of cervical pathology. In our study hysteroscopy detected various cervical pathology in 84 cases in study (56%). The difference is highly significant as compared to TVS/SSG (Table 1). Stenosed Os, elongation of cervical canal endocervical polyp were better detected by hysteroscope as compared to TVS (12% Vs 8%, 5.33% Vs 3.33%, 2% Vs 0.66% respectively).

The significant observation of endocervical canal by hysteroscopy was presence of endocervical synechiae in 26% of women, which was missed by TVS. Present study emphatically confirms the superiority of hysteroscope in detection of cervical canal pathology over TVS / SSG. It also points clearly that cervical pathology in Indian women is one of the major contributory factors in causing infertility (56% via hysteroscopy, 38.66% via TVS). Infertility management thus should be preventive by making safe delivery and safe abortion services available for majority of population, adequate treatment of STD of couple, and sex education at early age.

Study also revealed infection and inflammatory pathology in uterine cavity (36.66%) during hysteroscopic evaluation (Table 2) which warrants comprehensive hysteroscopic as well histopathologic evaluation for inflammatory pathology as well sequel of infection

Observation and Grading of Endocervical Synechiae

One of the very interesting and significant hysteroscopic finding in evaluation of endocervical canal was presence of varying grade of endocervical synechiae in substantial number of women (26%). Though intrauterine adhesion has been classified and documented [8], but endocervical synechiae has not been graded.

In study varying grades of hysteroscopically detected endocervical synechiae are highly significant. We propose grading of endocervical synechiae based on hysteroscopic appearance of endocervical canal. (Figure 2 A, B) shows normal hysteroscopic view of endocervix, in which one can appreciate smooth wall of endocervix. (Figure 3 A, B) shows superficial ridge like appearance of endocervical wall, suggestive of mild synechiae. (Figure 4 A, B) reveals deep ridges like appearance of endocervical canal suggesting moderate synechiae. (Figure 5 A, B) shows dense white fibrous tissue of endocervix which can be categorized as severe synechiae of endocervix.

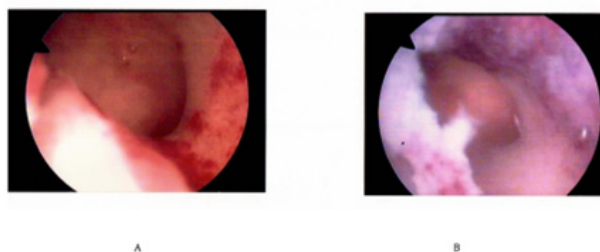


Figure 2A, B: Hysteroscopic view of normal endocervical canal.

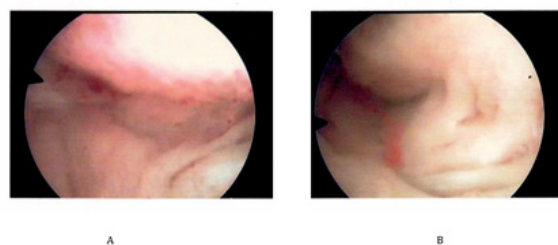


Figure 3A, B: Hysteroscopic view of mild endocervical synechiae.

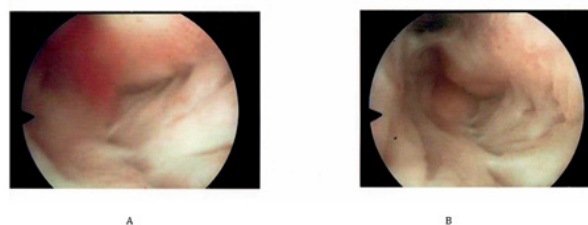


Figure 4A, B: Hysteroscopic view of moderate endocervical synechiae.

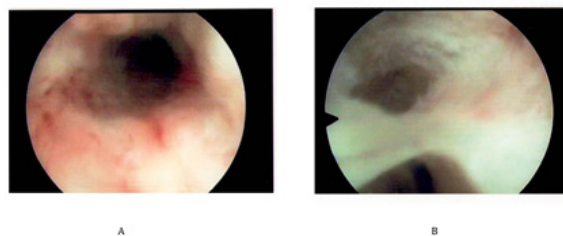


Figure 5A, B: Hysteroscopic view of severe endocervical synechiae.

Thus, on the basis of hysteroscopic observation of endocervix, not only we can detect endocervical synechiae but also grade the endocervical synechiae, which can be of prognostic value in infertility management (Box 1). However, we need larger studies for endorsement of grading of endocervical synechiae.

Box 1: Grading of Hysteroscopically detected Endocervical Synechia suggested in study.

Grade 0	Normal endocervical canal having smooth wall
Grade I	Endocervical canal having appearance of superficial ridges
Grade II	Endocervical canal having appearance of deep ridges
Grade III	Dense fibrous bands between opposing wall of endocervical canal

Conclusion

Present study concludes that detailed endocervical canal evaluation should be an integral part of infertility management. Hysteroscopy is superior to TVS / SSG in detecting endocervical pathology especially endocervical synechia.

Strength of Study

It is one of the first study which takes account of study of endocervical canal via Transvaginal ultrasound and hysteroscopy. However, we need larger studies to evaluate various modalities for detection of endocervical pathologies in infertility and appropriate management.

Acknowledgement

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