

# Evaluation of Uterine Abnormalities in Women with subfertility Using Saline Infusion Sonography; A Retrospective Descriptive Study

Naushaba Malik<sup>1</sup>, Qurra tul Ain<sup>2</sup>, Shahbakht Aftab<sup>3</sup>

<sup>1</sup>Consultant Radiologist, PESSI Hospital, I-12, Islamabad

<sup>2</sup>Assistant Professor, MCHC, Pakistan Institute of Medical Sciences, Islamabad

<sup>3</sup>Surgical Trainee II, Pakistan Institute of Medical Sciences, Islamabad

**Correspondence:** Dr. Naushaba Malik

Consultant Radiologist, PESSI Hospital, I-12, Islamabad

doctor.noshi100@gmail.com

## Abstract

**Objective:** The objective of the study was to use saline infusion sonography to assess the prevalence of uterine abnormalities in women of Islamabad having otherwise unexplained subfertility.

**Methodology:** This retrospective descriptive study took place at Punjab Employees Social Security Institute (PESSI) Islamabad from Jan. 2017 to Jan.2021. The ethical review board of the institute approved the study. Patients who had normal investigations for male factor, ovulation and tubal patency were included in the study. Medical records of 240 women who had saline infusion sonography (SIS) at PESSI Islamabad were reviewed and studied. The researchers wanted to learn how common uterine abnormalities are in these women and whether there are any links between these abnormalities, patient age, and body mass index (BMI).

**Results:** Uterine abnormalities were found in 27.92% (67/240) of the women in the study. The most common abnormality was endometrial polyps (12.0%), followed by sub-mucous fibroids (5%), intrauterine adhesions (2.0%), and septae (6.0%). Women with primary infertility were more likely to have uterine abnormalities. Uterine abnormalities were most common in women aged 28-38 years. The distribution of abnormalities differed significantly by age group ( $p=0.006$ ) and BMI ( $p=0.020$ ).

**Conclusion:** Many women with unexplained infertility have uterine abnormalities that they don't know about. Therefore, all women with unexplained infertility should have their uterus examined.

**Key words:** Uterine Abnormalities, Endometrial Polyps, Uterine Fibroids, Intrauterine Adhesions, Uterine Septae.

Cite this article as: Malik N, Ain QU, Aftab S. Evaluation of Uterine Abnormalities in Women with subfertility Using Saline Infusion Sonography; A Retrospective Descriptive Study. J Soc Obstet Gynaecol Pak. 2023; 13(4):364-367.

## Introduction

A 2D transvaginal scan is a common way to check the shape and size of the uterine cavity in women who have trouble getting pregnant. However, it is not as accurate as other tests, such as saline infusion sonography (SIS) or hysteroscopy. SIS is a minimally invasive, affordable, and well-tolerated test.

One in eight couples may suffer from subfertility.<sup>1</sup> Assessing the uterus is very important for both fertility exams and exams done before assisted reproductive therapy. To make this exam easier and less expensive, new methods have been developed that use contrast agents to make the endometrium easier to see during transvaginal sonography (TVS).<sup>2,3</sup>

Saline infusion sonohysterography (SIS) is a type of ultrasound that uses saline to expand the uterus and make the endometrial lining easier to see. It is done by inserting a thin tube into the cervix and injecting saline into the uterus. At the same time, a transvaginal ultrasound probe is inserted into the vagina to take images of the uterus.

SIS is a very effective way to diagnose uterine conditions such as endometrial abnormalities, polyps, and fibroids. It is also used to assess the uterus before fertility treatments and to check for uterine scarring.<sup>2,3,4</sup> SIS has been equally sensitive as gold standard diagnostic methods such as, hysteroscopy, hysterectomy and histologic sampling for evaluation women with Abnormal

Authorship Contribution: <sup>1</sup>Conceptualization, Drafting Data collection, <sup>2</sup>Data interpretation, Write up, <sup>3</sup>Literature Review,

Funding Source: none

Conflict of Interest: none

Received: May 25, 2022

Accepted: Oct 19, 2023

Uterine bleeding while being less invasive and cost effective.<sup>2,4,5</sup>

It is important for women who are preparing for fertility treatments to get an accurate diagnosis of intrauterine abnormalities such as submucosal fibroids, polyps, septa, or adhesions, since these conditions have been shown to reduce fertility. Further, these pathologies, that can often be rectified by surgical management, so that a woman's probabilities of successful outcome can be improved.<sup>2,3,6</sup>

There are several ways to assess the regularity and shape of the uterine cavity, including conventional 2D and 3D transvaginal scan. It is generally used to screen for uterine abnormalities, but its accuracy is not high for detecting some conditions, such as polyps, adhesions, and submucous fibroids. Hysterosalpingograph carries risk of infection and is painful. Hysteroscopy though accurate in detecting uterine anomalies and lesions is invasive procedure, expensive, requires anesthesia and the equipment is often not available in most set ups.<sup>2,5</sup> Due to being relatively less invasive and potential of high diagnostic accuracy, saline infusion sonography (SIS) has been suggested as a routine investigative modality to evaluate the uterine cavity in all subfertile patients.<sup>2,5</sup> As it's the protocol in the researcher's hospital.

This study was conducted to see the presence of uterine anomalies using saline sonography in women in which there were no male factor, ovulatory or tubal causes of sub fertility and other investigations had been normal.

## Methodology

This study looked at the medical records of women who had undergone saline infusion sonography (SIS) at at Punjab Employees Social Security Institute (PESSI) Islamabad from Jan. 2017 to Jan.2021. The study only included women whose records showed that there was no male, ovulatory or tubal factors of subfertility. The study also excluded women who had SIS for other reasons, who could not have SIS because of cervical stenosis or pain, or whose medical records did not clearly show that they met the criteria for unexplained infertility or whose record were incomplete. The study also excluded women who had uterine anomalies diagnosed prior due to other complaints like amenorrhoea or pelvic pain, medical disorders such as diabetes or thyroid disorder, or who smoked. All saline sonography procedures had been performed in the Outpatient Department Basis hospital setting using the standard protocol of the hospital. Following aseptic

measures, twenty to thirty Milliliters of a sterile saline solution was infused into the uterine cavity through a 5 or 7 French Foley catheter to expand the endometrial cavity. A TVUS (transvaginal ultrasound) was done at the same time as saline was injected into the uterus to see how it filled up. Any irregularities were noted. The scan was done with a Mindray DP-2200 scanner using a TVUS transducer at a frequency of 5 to 7.5 MHz. All scans were done by trained specialists. A proforma was used to collect the data from hospital records. The demographic data included patient age, height and weight presence of primary/secondary subfertility were recorded in the proforma. The presence or absence as well as the type of abnormalities on saline sonography were also recorded.

Data was entered into statistical software SPSS version 24 to analyze the data. Percentages and proportions were calculated for different variables. Chi square test was applied to compare the associations between different groups. P value <0.05 was taken as significant.

## Results

Uterine abnormalities were found in 27.92% (67/240) of the women in the study. The most common abnormality was endometrial polyps 12.0% (29/240), followed by sub-mucous fibroids 5% (12/240), intrauterine adhesions 2.0% (5/240), and septae 6.0% (14/240). Women with primary subfertility were more likely to have uterine abnormalities. The results are displayed in table I.

Women with primary subfertility were more likely to have uterine abnormalities than women with secondary subfertility. ( $p=0.005$ ). Uterine abnormalities were most

**Table I: Various individualities of the study population**

Characteristics	Range	N
Age (years)	Less than 28	22 (9.1%)
	29-38	180 (75.0%)
	Greater than 39	18 (7.5%)
BMI	Less than 18.5	24 (10.0%)
	18.5-24.9	96 (40.0%)
	25-29.9	110 (46.0%)
Abnormality	Greater than 30	10 (4.1%)
	Yes	67 (27.9%)
Abnormality type	No	173 (72.0%)
	Endometrial polyps	29 (12.0%)
	Sub-mucous fibroids	12 (5%)
	Septae	14 (6.0%)
	Intrauterine adhesions	5 (2.0%)
subfertility type	Primary	169 (70.0%)
	Secondary	71 (29.5%)

**Table II: Comparison of women with and without abnormalities.**

Characteristics		Uterine abnormality		P value
		Yes (n=67)	No (n=173)	
Infertility type	Primary	45 (67.1%)	102 (58.9%)	0.005
	Secondary	22 (32.8%)	71 (41.0%)	
Age (years)	Less than 28	6 (8.9%)	20 (11.5%)	0.442
	29-38	36 (53.7%)	134 (77.5%)	
	Greater than 39	25 (37.3%)	19 (11.0%)	
BMI	Less than 18.5	7 (10.44%)	17(9.82%)	0.086
	18.5-24.9	21 (31.3%)	52(29.3%)	
	25-29.9	34 (50.7%)	89(51.9%)	
	Greater than 30	5 (7.5%)	15((8.6%)	

common in the age group 29–38 years ( $n=36$ , 53.7%) and in overweight patients ( $n=50.7%$ ). The results are shown in table II.

Despite the overall high prevalence of abnormalities, there were significant differences in the types and frequency of abnormalities across age groups ( $p=0.006$ ). In the 29-38 age group, all types of abnormalities were more common, including polyps (62.0%), intrauterine adhesions (80.0%), submucous fibroids (58.3%), and septae (50.0%). Similarly, the types of uterine abnormalities varied significantly among women with different BMI. The results are mentioned in table III.

## Discussion

Presence of uterine masses: polyps, fibroids, synechia and uterine anomalies is higher in women with subfertility than general population.<sup>2,4,5,6</sup> Uterine abnormalities can be congenital (present from birth) or acquired (developed over time). The study found that 28% of the women had some type of intrauterine abnormality, with polyps being the most common. This is lower than the 40% rate of abnormalities reported some other researchers.<sup>7</sup> This difference may be due to study design as in our study women whose record showed tubal blockade on HSG/laparoscopy were

excluded, some of these women may have had uterine anomalies and lesions apart from tubal blockade. A study in India revealed 18% of patients to have uterine lesions and abnormalities while undergoing workup for subfertility.<sup>8</sup>

Polyp was found to be the commonest lesion observed.<sup>2,5,8</sup> Same has been observed in other studies too. Though uncertain, contribution of polyp to subfertility may be due to mechanical interference with transport of sperm, embryo implantation, through intrauterine inflammation and altered production of endometrial receptivity factors.<sup>8,9</sup> They were seen both in women with normal and high BMI

Most women in the study were overweight. Although there was no association between weight and presence of uterine anomalies, polyps and synechiae but women who were overweight had higher prevalence of fibroids. Researches has shown that the risk of developing fibroids is higher in patients with increased weight.<sup>10-14</sup>

Polyps were the most common uterine abnormality in both women with normal BMI and overweight women. Sub-mucous fibroids were most common in overweight women with a BMI of 25-29.9. Intrauterine adhesions and septae were not linked to BMI, as their development is not related to weight gain.

**Table III: Types of abnormalities as distributed across different age groups and BMI ranges.**

Characteristics		Abnormality type				P value
		E. polyps N=29	Intrauterine adhesions N=5	Submucosa fibroids N=12	Septae N=14	
Age (years)	Less than 28	4 (20%)	0	3 (25.0%)	4 (28.6%)	0.006
	29-38	18 (62.0%)	4 (80%)	7 (58.3%)	7 (50.0%)	
	Greater than 39	7 (24.1%)	1 (20%)	2 (16.7%)	3 (21.4%)	
BMI	Less than 18.5	2 (6.8%)	1 (20.0%)	3 (25.0%)	2 (14.0%)	0.020
	18.5-24.9	8 (27.6%)	2 (40.0%)	3 25.0%)	5 (35.0%)	
	25-29.9	15 (51.7%)	2 (40.0%)	5 (41.7%)	6 (42.9%)	
	Greater than 30	4 (13.8%)	0	1 (8.3%)	1 (8.1%)	

The study found that age and primary infertility were associated with uterine abnormalities. Women aged 29-38 years were more likely to have sub-mucous fibroids, and polyps. Intrauterine adhesions were less common in patients aged 39 and above. This may be because these issues might have caused other symptoms like menstrual irregularities, pain, discharge leading to their earlier detection. Women with primary infertility were more likely to have uterine abnormalities than women with secondary infertility.<sup>15,16</sup> This study found a different prevalence of pathologies in cases of secondary infertility than a previous study. This variation could be due to differences in the types of abnormalities considered. The previous study found that intrauterine adhesions were the most common abnormality, while this study found that polyps and intrauterine adhesions were the most common. Similarly, none of the patients were found to have other complex congenital anomalies due to study design that excluded patients who had presented for saline sonography due to other causes, also other symptoms might have lead to their diagnosis earlier using other diagnostic modalities.

## Conclusion

Uterine abnormalities are common in patients of infertility who otherwise have normal workup for male factor, ovulation and tubal patency. Our study found that many women with unexplained infertility have undetected uterine abnormalities. Therefore, all women with unexplained infertility should have a uterine cavity assessment. While these abnormalities are more common in certain groups of women, they can occur in women of all ages and body weights.

**Strength & Limitations:** This study evaluated medical records of patients seen over a significant time period. This study was retrospective and did not have follow-up data on pregnancy rates which is a limitation of the study. Further prospective studies with follow-up data are needed to assess the impact of uterine abnormalities on reproductive outcomes in women with unexplained infertility.

## References

1. Tamrakar SR, Bastakoti R. Determinants of infertility in couples. *Journal of Nepal Health Research Council*. 2019 Aug 7;17(1):85-9.
2. Seshadri S, El-Toukhy T, Douiri A, Jayaprakasan K, Khalaf Y. Diagnostic accuracy of saline infusion sonography in the evaluation of uterine cavity abnormalities prior to assisted reproductive techniques: a systematic review and meta-analysis. *Human reproduction update*. 2015 Mar 1;21(2):262-74.
3. Abrao MS, Muzii L, Marana R. Anatomical causes of female infertility and their management. *International Journal of Gynecology & Obstetrics*. 2013 Dec;123:S18-24.
4. Singh V, Mishra B, Sinha S, Agrawal S, Thakur P. Role of saline infusion sonohysterography in infertility evaluation. *Journal of Human Reproductive Sciences*. 2018 Jul;11(3):236.
5. Seshadri S, Khalil M, Osman A, Clough A, Jayaprakasan K, Khalaf Y. The evolving role of saline infusion sonography (SIS) in infertility. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2015 Feb 1;185:66-73.
6. Tur-Kaspa I, Gal M, Hartman M, Hartman J, Hartman A. A prospective evaluation of uterine abnormalities by saline infusion sonohysterography in 1,009 women with infertility or abnormal uterine bleeding. *Fertility and sterility*. 2006 Dec 1;86(6):1731-5.
7. Shokeir TA, Shalan HM, El-Shafei MM. Significance of endometrial polyps detected hysteroscopically in eumenorrhic infertile women. *Journal of Obstetrics and Gynaecology Research*. 2004 Apr;30(2):84-9.
8. Nayak PK, Mahapatra PC, Mallick JJ, Swain S, Mitra S, Sahoo J. Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients. *Journal of human reproductive sciences*. 2013 Jan;6(1):32.
9. Al Chami A, Saridogan E. Endometrial polyps and subfertility. *The Journal of Obstetrics and Gynecology of India*. 2017 Feb;67:9-14.
10. Qin H, Lin Z, Vásquez E, Luan X, Guo F, Xu L. Association between obesity and the risk of uterine fibroids: a systematic review and meta-analysis. *J Epidemiol Community Health*. 2021 Feb 1;75(2):197-204.
11. Thurston L, Abbara A, Dhillon WS. Investigation and management of subfertility. *Journal of clinical pathology*. 2019 Sep 1;72(9):579-87.
12. Gautam D, Purandare N, Maxwell CV, Rosser ML, O'Brien P, Mocanu E, McKeown C, Malhotra J, McAuliffe FM, FIGO Committee on Impact of Pregnancy on Long-term Health and the FIGO Committee on Reproductive Medicine, Endocrinology and Infertility. The challenges of obesity for fertility: A FIGO literature review. *International Journal of Gynecology & Obstetrics*. 2023 Jan;160:50-5.
13. Singh V, Mishra B, Sinha S, Agrawal S, Thakur P. Role of saline infusion sonohysterography in infertility evaluation. *Journal of Human Reproductive Sciences*. 2018 Jul;11(3):236.
14. Moustafa S, Rosen E, Goodman L. Patient and provider satisfaction with saline ultrasound versus office hysteroscopy for uterine cavity evaluation prior to in vitro fertilization: a randomized controlled trial. *Journal of Assisted Reproduction and Genetics*. 2021 Mar;38:627-34.
15. Bhattacharya R, Ramesh AC. A comparative study of saline infusion sonohysterography and hysterosalpingography for evaluation of female infertility. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2020 Jan 1;9(1):179-84.
16. Nabil El-Sayed Ali ES, Ali Motawie M, El-Timamy AE, M Kamal El-Sharkawy M. ROLE OF SONOHYSTEROGRAPHY IN INFERTILITY. *Al-Azhar Medical Journal*. 2022 Aug 1;51(4):1925-34.