

# Efficacy of Saline Infusion Sonography in Diagnosing Intrauterine Pathology in Patients with Abnormal Uterine Bleeding: An Observational Study

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## Abstract

**Background:** To describe the efficacy of saline infusion sonography (SIS) in the diagnosis of abnormal uterine bleeding (AUB).

**Methods:** This prospective observational study was conducted in patients with AUB admitted to our hospital gynecology ward. After obtaining consent from each patient, 100 women in the age group of 25-45 with H/O AUB from March 2015 to March 2016 (a period of 1-year). SIS was done using an 8 Fr size Foley's catheter, and the results were analyzed.

**Results:** The most common lesion in the study group was adenomyosis followed by intramural fibroid, submucous myoma, and endometrial hyperplasia. Least common lesions found in our study were endometrial polyp and Mullerian anomalies. Positive predictive value of SIS in the diagnosis of AUB was 100% for Mullerian anomalies and submucous myoma. Positive predictive value for diagnosing adenomyosis was 90% and 88% for intramural fibroid. Positive predictive value for diagnosing endometrial polyps was 85%, and positive predictive value for endometrial hyperplasia was 85%.

**Conclusion:** SIS has the advantages of being non-invasive, cheap, affordable, shorter duration, and accurate method for uterine cavity evaluation. SIS has enhanced the diagnostic accuracy of transvaginal scan and can be an effective screening test before hysteroscopy.

**Key words:** Abnormal uterine bleeding, Intrauterine pathology, Saline infusion sonography

## INTRODUCTION

Abnormal uterine bleeding (AUB) is defined as any bleeding from the genital tract, which is a deviation of normal in frequency, cyclicity, and quantity. It is one of the most common disorders in gynecology and accounts for 30-40% of cases in the outpatient clinic. It can occur at any age but is most common in premenopausal age group. If the treatment not is instituted early, it can lead to severe anemia. If blood loss is acute, it can result in hypovolemic shock.

AUB includes menorrhagia, polymenorrhea, menometrorrhagia, and metrorrhagia. In patients who do not respond to medical treatment, it is ideal to evaluate the endometrial status. It can be used in patients above 40 years also. Even though ovulation and breakthrough bleeding are considered normal, other forms of irregular uterine bleeding necessitate excluding local causes. The most common cause of AUB in premenopausal women is oligoanovulation, which reflects dysfunction in the hypothalamo-pituitary-ovarian axis. Without cyclic progesterone, endometrial lining remains proliferative and hyperplastic and present with non-cyclic menstrual blood flow with timing and amount being erratic. AUB can also be caused by anatomic conditions such as polyps, fibroids, hyperplasia, and even frank carcinomas, which needs appropriate evaluation.

Hysteroscopy combined with guided biopsy has been considered as gold standard in the evaluation of AUB.

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Even though hysteroscopy is gold standard, it requires trained personnel, equipment, and anesthesia. It has its own complications and needs hospital stay. The search of a procedure, which is less invasive, cost-effective, and accurate in diagnosis led to the advent of endometrial imaging using saline as a contrast medium. Sonosalpingography otherwise called as saline infusion sonography (SIS) was first described by Nannini *et al.*,<sup>1</sup> in 1981, it was Richman *et al.*,<sup>2</sup> in 1984, used this technique first for evaluation of tubal patency in infertile women.

This test is easier, better, cost-effective, less time-consuming, and an efficient diagnostic modality with minimal morbidity in patients with AUB. The instillation of saline into uterine cavity provides a contrast that helps to localize abnormalities as intracavitary; endometrial or submucosal fluid represents an excellent medium for transmission of sound waves and provides a good contrast to examine the endometrial cavity, just as it is better to look at the fetus in case of polyhydramnios. We designed this study to analyze the efficacy, safety of SIS in the diagnosis of women with AUB.

## MATERIALS AND METHODS

This prospective observational study was conducted in patients with AUB admitted to our hospital gynecology ward. Hospital ethical committee approval was obtained to conduct the study. After obtaining consent from each patient, 100 women with H/O AUB were included in the study. The inclusion criteria of women with age group of 25-45 years are:

1. Irregular uterine bleeding
2. Heavy and/or prolonged periods aged 40 years or more after excluding fibroid in ultrasonography (USG)
3. Heavy and/or prolonged periods below 40 years of age, who do not respond to medical treatment
4. Cystic, echogenic endometrium on USG
5. Hyperechoic line around the endometrium
6. Failure to visualize the endometrium on ultrasound.

Patients with unhealthy cervix, genital infection, tuberculosis, genital malignancy, suspected endocrinological abnormality, large myoma, cervical stenosis were excluded from the study. A detailed history was taken, and medical and gynecological examination was done to rule out the pelvic inflammatory disease. The patients had taken tablet doxycycline 200 mg and metronidazole 400 mg 1 h before the procedure.

### Timing of the Procedure

Procedure is done on 8<sup>th</sup> or 9<sup>th</sup> day of the menstrual cycle in patients with regular cycles or just after cessation of the bleeding in those with irregular cycles. Patients with bleeding are best seen in proliferative phase, to rule out polyps and

with suspected fibroid, best in the secretory phase. In proliferative phase, since the endometrium is thickened, it provides a contrast to hypoechoic leiomyomata.

### Procedure

Patients positioned in dorsal lithotomy position. Before SIS, routine standard transvaginal ultrasound is done with empty bladder. Transvaginal probe is removed. SIMS speculum is introduced to retract the anterior vaginal wall and cervix visualized. Size 8 Fr Foley's catheter was introduced into the external Os, and the Foley bulb was inflated with 2 ml of sterile distilled water, and the catheter was withdrawn so that the Foley's bulb is placed at the level of internal Os. The transvaginal probe is reintroduced into the vagina beneath the catheter, and 20 ml of sterile saline is slowly injected through the catheter and the uterine cavity distended. The uterus is scanned in longitudinal axis (sagittal plane) and transverse axis (coronal plane) and the intracavitary pathologies if present is detected. After the procedure is over, the probe is removed, Foley's bulb is deflated and the catheter withdrawn and the patient is allowed to dress before discussing further management.

Criteria for diagnosis in SIS:

1. Normal endometrium: Normal looking endometrium with uniform thickness all around within the normal range
2. Endometrial hyperplasia: Diffuse and irregularly thickened endometrium, without any breach in surface, with intact endomyometrial interface; thickness >10 mm
3. Endometrial polyps: Not as round and regular in outline as fibroid polyp; smooth marginated echogenic mass with homogenous echotexture; sway with the movement of the fluid in the cavity
4. Endometritis: Bright echogenic foci with irregular surface
5. Submucous fibroid: Solid round structures of mixed echogenicity that cause bulge or protrusion of the endometrium that does not move with the medium
6. Intrauterine adhesions: Thread-like immobile strands
7. Subseptate/bicornuate uterus.

## OBSERVATION AND RESULTS

In our observational study, 100 patients were studied for the efficacy of SIS in detecting intracavitary lesions. Patients from 25 to 45 years patients were taken in this study. Out of 100 patients, 28 belong to 25-35 years age group and remaining 72 belong to 36-45 years age group. This shows the incidence of AUB more common around perimenopausal age (Table 1). In our study, nullipara and Para 1 were 2% only. 3 patients had one abortion. Patients with Para 4 were 3. Patients with Para 1, Para 2, and Para 3 totally occupied 90% out of 100 patients. Para 2 had

the highest incidence of AUB of about 53% followed by Para 3, which included 28% of patients. This clearly denoted that AUB more common in multiparous women.

About 27 patients out of total 72 patients in the age group between 36 and 45 were having menorrhagia with 37% as the most common symptom. This was followed by polymenorrhagia with 25% of patients. Patients with polymenorrhagia were 23%. Menometrorrhagia and metrorrhagia were the least common symptoms. Out of 100 patients, the most common symptom was polymenorrhagia which included 35% of the patients, followed by menorrhagia which included about 32% of the patients. This was followed by polymenorrhagia with 20% of patients. Menometrorrhagia, metrorrhagia, and oligomenorrhagia all constituted about 13% of patients (Table 2).

The most common lesion in the age group 36-45 years were adenomyosis with 25% of patients followed by fibroid with 21% of patients. Patients with submucous myoma were 15%. Patients with endometrial hyperplasia and polyps were least in number. There were no patients with Mullerian anomaly. 20 patients had a normal uterus. In age group between 25 and 35, all the pathologies were almost equal. Fibroid, polyp, and Mullerian anomaly were equal in number with 2 patients each. Submucous myoma and endometrial hyperplasia group patients were in equal in number with 3 patients. Patients with adenomyosis were 6 in number. 10 patients had a normal uterus (Table 3).

As routine transvaginal ultrasound is performed before SIS, scan findings were also observed. Out of 100 patients, 30 patients SIS test were normal. In remaining 70 patients, adenomyosis was the most common diagnosis with 18% of total 100 patients followed by patients with fibroid with 16%. Patients with endometrial hyperplasia and submucous myoma were 12%. Patients with endometrial polyp were 10%. The least common was Mullerian anomalies, which were only 2% (Table 4).

About 60 patients in this study underwent hysterectomy. Their uterine specimen were analyzed and found to be normal in 24 patients with 40%. Polyp was found in 9 patients with 15%. Patients with submucous myoma were found to be 19%. 16 patients had intramural fibroid with 26%.

The positive predictive value of each condition varies from 85% to 100%. The positive predictive value was 85% for endometrial hyperplasia which was the least. The positive predictive value for fibroid was 88% followed by the positive predictive value of adenomyosis which was 90%. The positive predictive values for submucous myoma and Mullerian anomalies were 100%. The positive predictive value for diagnosing normal uterine cavity was 100% (Table 4).

**Table 1: Age incidence**

Age group in years	Number of patients (%)
25-35	28 (28)
36-45	72 (72)

**Table 2: Various symptoms in study group**

Symptoms	Number of patients (%)
Menorrhagia	32 (32)
Polymenorrhagia	35 (35)
Polymenorrhagia	20 (20)
Menometrorrhagia	7 (7)
Metrorrhagia	5 (5)
Oligomenorrhagia	1 (1)

**Table 3: Incidence of lesions in study group**

Lesion	Number of patients (%)	
	25-35 years of age	36-45 years of age
Intramural fibroid	2 (8)	15 (21)
Endometrial polyp	2 (8)	2 (3)
Submucous myoma	3 (11)	11 (15)
Endometrial hyperplasia	3 (11)	5 (7)
Adenomyosis	6 (14)	19 (25)
Mullerian anomalies	2 (8)	0 (0)
Normal	10 (40)	20 (29)
Total	28 (100)	72 (100)

**Table 4: Diagnosis by saline infusion sonography and positive predictive value**

Diagnosis	Saline infusion sonography	Positive predictive value (%)
	Number of patients (%)	
Intramural fibroid	16 (16)	88
Endometrial polyp	10 (10)	85
Submucous myoma	12 (12)	100
Endometrial hyperplasia	12 (12)	85
Anomaly	2 (2)	100
Adenomyosis	18 (18)	90
Normal	30 (30)	100

## DISCUSSION

AUB is often seen in peri- and post-menopausal women. The etiology varies from simple dysfunctional uterine bleeding to benign lesions such as polyps and even frank malignancies. Apart from the clinical diagnosis, various diagnostic methods are available to confirm the diagnosis. AUB can cause anemia, and in some cases, it can cause hypovolemic shock and the patient may collapse if the bleeding is too severe and acute. Various diagnosing tools are available to detect the pathology. In our study, the efficacy of SIS in the diagnosis of AUB studied because SIS is a cost-effective, easy, reliable, and an outpatient procedure. Even though, hysteroscopy is the

gold standard investigation of choice in evaluating patients with AUB, its disadvantages, does not make it the first line of investigation in these people.

As stated by de Kroon *et al.*,<sup>3</sup> SIS can effectively replace hysteroscopy and reduces the cost of anesthesia, theater set up, disinfection, sterilization, and reserialization and guides the need for hysteroscopy in a particular patient. This technique is quite safe with occasional vasovagal reaction and exacerbation of dormant pelvic infection being very rare complications.

In our study, most of the patients present with history of menorrhagia (in 32% of patients), poly menorrhea (35% of patients), poly menorrhea being the most common symptom. In our study, when 100 patients are subjected to clinical examination, 50% of the patients were found to have normal size uterus and were diagnosed to be having dysfunctional uterine bleeding, and the next most common diagnosis being fibroid and adenomyosis. This finding was well correlated with the study conducted by Mathew *et al.*,<sup>4</sup> who concluded that 48% of patients were normal uterine cavity, and fibroid and polyp were the next most common pathologies found in patients with AUB.

In our study, most of the patients (54%) have given birth to two children (parity two), and this is because of the increasing awareness of the family welfare programs and health education made available. Multiparous women suffer more from AUB.

In our study, most of the patients present in the perimenopausal age group. 72% of the patients belong to 36-45 years of age and with less incidence of the problem in the age group of 25-35 years (28%). These findings well correlated with study conducted by Pasrija *et al.*<sup>5</sup>

Grimbizis *et al.*<sup>6</sup> compared the transvaginal sonography (TVS) and SIS and concluded that SIS detected more intrauterine abnormalities than TVS alone. This finding was well correlated with our study. The detection of intrauterine pathologies, such as polyp, submucous myoma, and endometrial hyperplasia, was more accurate and more in number with SIS when compared to an initial survey by TVS.

The diagnostic accuracy for SIS is highest for Mullerian anomalies, polyps, endometrial hyperplasia, and submucous

myoma. 60 patients out of 100 patients were subjected to hysterectomy, and the findings were correlated with SIS. In our study, the overall sensitivity was 95%, and the overall positive predictive value was 90%. These findings were comparable to Reddi Rani *et al.*<sup>7</sup> and Ryu *et al.*<sup>8</sup> Sharma *et al.*<sup>9</sup> also showed similar sensitivity for SIS in their study.

Bonnamy *et al.*<sup>10</sup> warned about possible side effect-like endometritis in SIS. In our study, there were no complications occurred.

## CONCLUSION

SIS has the advantages of being non-invasive, cheap, affordable, shorter duration, and accurate method for uterine cavity evaluation. SIS has enhanced the diagnostic accuracy of transvaginal scan and can be an effective screening test before hysteroscopy.

## REFERENCES

1. Nannini R, Chelo E, Branconi F, Tantini C, Scarselli GF. Dynamic echohysteroscopy: A new diagnostic technique in the study of female infertility. *Acta Eur Fertil* 1981;12:165-71.
2. Richman TS, Viscomi GN, deCherney A, Polan ML, Alcebo LO. Fallopian tubal patency assessed by ultrasound following fluid injection. *Work in progress. Radiology* 1984;152:507-10.
3. de Kroon CD, de Bock GH, Dieben SW, Jansen FW. Saline contrast hysterosonography in abnormal uterine bleeding: A systematic review and meta-analysis. *BJOG* 2003;110:938-47.
4. Mathew M, Gowri V, Rizvi SG. Saline infusion sonohysterography - an effective tool for evaluation of the endometrial cavity in women with abnormal uterine bleeding. *Acta Obstet Gynecol Scand* 2010;89:140-2.
5. Pasrija S, Trivedi SS, Narula MK. Prospective study of saline infusion sonohysterography in evaluation of perimenopausal and postmenopausal women with abnormal uterine bleeding. *J Obstet Gynaecol Res* 2004;30:27-33.
6. Grimbizis GF, Tsolakidis D, Mikos T, Anagnostou E, Asimakopoulos E, Stamatopoulos P, *et al.* A prospective comparison of transvaginal ultrasound, saline infusion sonohysterography, and diagnostic hysteroscopy in the evaluation of endometrial pathology. *Fertil Steril* 2010;94:2720-5.
7. Reddi Rani P, Lakshmikantha G. Transvaginal sonography (TVS) and Saline infusion sonohysterography (SIS) in the evaluation of abnormal uterine bleeding (AUB). *J Obstet Gynecol India* 2010;60:511-5.
8. Ryu JA, Kim B, Lee J, Kim S, Lee SH. Comparison of transvaginal ultrasonography with hysterosonography as a screening method in patients with abnormal uterine bleeding. *Korean J Radiol* 2004;5:39-46.
9. Sharma M, Joshi S, Sharma A, Nagar O, Khuteta R, Bagarahatta M. Role of saline infusion sonography in abnormal uterine bleeding. *Int J Reprod Contracept Obstet Gynecol* 2013;2:533-8.
10. Bonnamy L, Marret H, Perrotin F, Body G, Berger C, Lansac J. Sonohysterography: A prospective survey of results and complications in 81 patients. *Eur J Obstet Gynecol Reprod Biol* 2002;102:42-7.

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