

Comparison between sonohysterography and hysterosalpingography in screening for infertile patients

Iskandar Zulqarnain

Department of Obstetrics and Gynecology, Mohammad Hoesin
General Hospital, Faculty of Medicine of Sriwijaya
University, Palembang, Indonesia

Introduction

- Infertility caused by uterine abnormalities: 10% - 15%
- Abnormal intrauterine findings in 34% - 62% of infertile women
- Examination of the uterus routinely in infertility
- Evaluation of the pelvis and upper genital organ:
 - Nonsurgical investigation
 - hysterosalpingography
 - transvaginal sonography
 - Surgical investigation
 - hysteroscopy
 - laparoscopy

Hysterosalpingography (HSG)

- Commonly used to diagnose intrauterine abnormalities
- Disadvantages
 - Exposure to ionizing radiation and iodine containing contrast media
 - Field limitation (inner contour of upper genital tract)
 - Pain



- Transvaginal sonography has completely transformed the diagnostic approach to the pelvic cavity
- Saline infusion sonohysterography (SHG)
 - by Randolph 1986
 - alternative for pelvic pathology screening
 - based on injection saline into the uterine cavity



Objectives

To compare the diagnostic accuracy of SHG and HSG to assess uterine abnormalities in women with infertility



Criteria for considering studies

Types of studies

Studies comparing SHG and HSG in diagnosing uterine abnormalities in women with infertility

Type of participants

women with:

- primary infertility
- secondary infertility
- recurrent pregnancy loss
- clinically or sonographically suspected uterine abnormality



Types of outcome measures

- Endometrial polyps
- Myoma
- Uterine anomaly
- Intrauterine adhesion



Table 1. Description of studies

Author study	Study design	Study participants	Cases	Gold standard	Outcomes
Goldberg 1997	Prospective descriptive	Infertile patients	40	Hysteroscopy	Myomas, polyps, uterus anomaly, intrauterine pathology
Keltz 1997	Prospective descriptive	Infertile patients	34	Hysteroscopy	Submucous myomas, endometrial polyp, uterus anomaly, intrauterine pathology
Alatas 1997	Prospective descriptive	Infertile patients	62	Hysteroscopy and laparoscopy	Endometrial polyps, submucous myoma, uterus anomaly
Brown 1999	Prospective descriptive	Infertile patients	42	Hysteroscopy	Endometrial polyps, submucous myoma, uterus anomaly, intrauterine pathology
Valenzano 2003	Prospective descriptive	Infertile patients	54	Hysteroscopy and laparoscopy	Uterus anomaly, intrauterine pathology



Table 2. Results

Outcomes	SHG	HSG	Hysteroscopy	Results
Goldberg 1997 (n=40)				
Concordant findings				
Polyps	17	26	17	SHG: Sensitivity 100%, specificity 100% HSG: False positive rate 20%, positive predictive value 80%
Myomas	9	-	9	
Adhesions	6	6	6	
Septate / bicornuate uterus	2	2	2	
Discordant findings				
Polyps / myomas	normal	6	normal	
Adhesions	normal	2	normal	
Adhesions	polyp	1	polyp	
Keltz 1997 (n=34)				
Normal uterus	17	12	6	SHG: Sensitivity 100%, specificity 100% HSG: Sensitivity 90.0%, specificity 20.0%
Uterine synechiae	6	4	6	
Submucous myomas	4	0	2	
T-shaped uterus	2	2	1	
Partial septum	2	0	0	
Bicornuate uterus	1	0	1	
Polypoid endometrium	1	0	1	
Retained placenta	1	0	1	
Filling defect	0	8	0	
Irregular contour	0	1	0	
Alatas 1997 (n=62)				
Normal uterus	52	54	51	Ability to detect of uterine anomalies: SHG 90.9% HSG 72.7%
Endometrial polyps	2	1	3	
Uterine anomaly	4	4	4	
Submucous myomas	4	3	4	

Brown 1999 (n=42)

Normal uterus	19	20	17
Abnormal uterus	23	22	25
Submucous myomas	10	4	
Endometrial polyps	9	8	
Intrauterine adhesions	1	7	
Uterine septum	3	3	
Hysteroscopic findings			
Normal uterus	19	20	
Discordant			
Adhesion as normal	2	3	
Abnormal uterus	23	22	
Concordant	13	15	
Discordant	10	7	
Adhesions as normal	-	2	
Polyps as normal	3	-	
Polyps as myomas	3	3	
Myomas as polyps	4	2	

SHG: Sensitivity 52%, specificity 41.2%, PPV 56.5%, NPV 36.8%
HSG: Sensitivity 60%, specificity 58.8%, PPV 68.2%, NPV 50%

Valenzano 2003 (n=54)

Normal uterus	18	34	18
Abnormal uterus			
Septate uterus	3	6	3
Sub-septate uterus	2	0	2
Arcuate uterus	6	0	6
Didelphic uterus	2	0	2
Intrauterine synechiae	4	0	4
Bicornuate uterus	9	14	9
Other pathologies	10	0	10

SHG: Sensitivity 100%, specificity 100%
HSG : Sensitivity 88,9%, specificity 50%



Results

Goldberg et al:

SHG was in complete agreement with hysteroscopy in all cases, giving it a sensitivity and specificity of 100%. Eight of 40 patients with uterine filling defects on HSG had normal endometrial cavities - false positive rate:20%, positive predictive value (PPV): 80%.

Keltz et al:

All confirmed the positive or negative sonohysterographic findings, resulting in a sensitivity and specificity of 100%. Twenty-seven of 34 patients also had a hysterosalpingogram that demonstrated a 90.0% sensitivity and 20.0% specificity based on hysteroscopic findings.

Alatas et al:

HSG was able to detect 8 of 11 (72.7%) of uterine pathologies. SHG was able to detect all anomalies except for a single endometrial polyp (90.9%)

Brown et al:

25/42 abnormal uterus findings were seen with hysteroscopy. SHG: 52% sensitivity, 41.2% specificity, 56.5% PPV, and 36.8% negative predictive value (NPV). HSG: 60% sensitivity, 58.8% specificity, 68.2% PPV and 50.0% NPV.

Valenzano et al:

- SHG : sensitivity and specificity of 100%
- HSG : sensitivity of 88.9% and specificity of 50%.



Table 3. Results (based in category of study outcome)

Author study	no	SHG (%)	HSG (%)	Hysteroscopy (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Outcome: Normal uterus								
Goldberg 1997	40	8/40 (20)	0/40 (0)	8/40 (20)	100/	100/	100/	100/
Keltz 1997	34	17/34 (50)	12/34 (35.3)	6/19 (31.6)	100/33.3	8.3/16.7	35.3/16.7	100/33.3
Alatas 1997	62	52/62 (83.9)	54/62 (87.1)	51/62 (82.3)	41.2/58.8	52/60	36.8/50	56.5/68.2
Brown 1999	42	19/42 (45.2)	20/42 (47.6)	17/42 (40.5)	100/88.9	100/50	100/	100/
Valenzano 2003	54	18/54 (33.3)	34/54 (62.9)	18/54 (33.3)				
Outcome: Polyps and myomas								
Goldberg 1997	40	26/40 (65)	32/40 (80)	26/40 (65)	100/100	100/57.1	100/18.8	100/100
Keltz 1997	34	5/34 (14.7)	0/34 (0)	4/19 (21.1)	100/90	100/20		
Alatas 1997	62	6/62 (9.7)	4/62 (6.5)	7/62 (11.3)				
Brown 1999	42	19/42 (45.2)	12/42 (28.8)	0/42 (0)				
Outcome: Uterus anomalies								
Goldberg 1997	40	2/40 (5)	2/40 (5)	2/40 (5)	100/100	100/100	100/100	100/100
Keltz 1997	34	5/34 (14.7)	2/34 (5.9)	2/19 (10.5)				
Alatas 1997	62	4/62 (6.5)	4/62 (6.5)	4/62 (6.5)				
Brown 1999	42	3/42 (7.1)	3/42 (7.1)	0/42 (0)				
Valenzano 2003	54	19/54 (35.2)	26/54 (48.0)	19/54 (35.2)				
Outcome: Intrauterine adhesions								
Goldberg 1997	40	6/40 (15)	9/40 (22.5)	6/40 (15)	100/100	100/91.2	100/66.7	100/100
Keltz 1997	34	6/34 (17.6)	4/34 (11.8)	6/19 (31.6)				
Brown 1999	42	1/42 (2.4)	7/42 (16.7)	0/42 (0)				
Valenzano 2003	54	4/54 (7.4)	0/54 (0)	4/54 (7.4)				



Based on outcomes

Comparing diagnostic accuracy and frequency distribution

Detection of normal uterus

Diagnostic accuracy: SHG is superior in 3 out of 4 studies, HSG in 1 out of 4 studies

Frequency:

SHG : 2 studies show agreement with hysteroscopy and 1 study shows better results than HSG

HSG : 2 studies show better results than SHG



Detection of polyps and myomas

2 studies reported that diagnostic accuracy with SHG was superior.

Detection of uterine anomalies

One report shows similar diagnostic accuracy for SHG and HSG. Frequency data: 3 out of 5 studies showed similar results and 2 out of 5 studies reported that SHG was better than HSG



Detection of intrauterine adhesions

Diagnostic accuracy: only 1 study reported that SHG is more accurate

Frequency:

- 3 out of 4 studies: SHG superior to HSG
- 1 out of 4 studies: HSG superior to SHG



Discussion

Diagnostic accuracy

- Different ways of calculation
- 4 of 5 studies SHG better than HSG
- 1 of 5 studies HSG better than SHG

Detection of normal uterus

- SHG seems to be better than HSG in exploring the uterus in general.
- Diagnostic tool only



Detection of polyps and myomas

Endometrial polyps and myomas can be easier explored by SHG

Detection of uterine anomalies

HSG and SHG can both detect filling defects caused by septum or disparity from the uterus, although SHG may be more accurate



Detection of intrauterine adhesions

SHG seems to be better in assessing the endometrium for adhesions

Advantages of SHG with saline injection:

- Uterine distension
- Increased sonographic contrast



Conclusion

SHG is an accurate tool to diagnose uterine abnormalities.

It is not time consuming and does not require anaesthesia.

It can be performed as an outpatient procedure.



Ampera Bridge, Palembang



Thank You