ORIGINAL ARTICLE

The Role of Hysterosonography in Uterine Lesion Detection: A Study Comparing its Accuracy with Hysteroscopy

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ABSTRACT

Objective: To evaluate the diagnostic accuracy of hysterosonography (HSN) in detecting uterine lesions by comparing its findings with hysteroscopy, the gold standard.

Methods: A total of 140 women who presented with symptoms suggestive of uterine lesions, including abnormal uterine bleeding or infertility, were enrolled in the study. Each patient underwent hysterosonography followed by hysteroscopy. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy of hysterosonography were calculated using SPSS 24.0, with the p-value for statistical significance set at <0.05.

Results: The sensitivity of hysterosonography was 92% for detecting endometrial polyps and 85% for detecting fibroids. The specificity was 89% for polyps and 84% for fibroids. The overall diagnostic accuracy of hysterosonography was 88%. False positives were observed primarily in cases of uterine adhesions, while false negatives were seen in submucosal fibroids. The p-value for the comparison between hysterosonography and hysteroscopy was 0.04, indicating statistical significance.

Conclusion: Hysterosonography is a reliable and effective diagnostic tool for detecting uterine lesions, particularly endometrial polyps and fibroids. Its non-invasive nature, combined with high sensitivity and specificity, makes it a valuable tool for initial screening, although hysteroscopy remains the definitive diagnostic method.

Keywords: Hysterosonography (HSN), Uterine lesions, Endometrial polyps, Fibroids, Abnormal uterine bleeding (AUB), Infertility, Hysteroscopy, Diagnostic accuracy

INTRODUCTION

Uterine lesions, including fibroids, polyps, and endometrial hyperplasia, are prevalent causes of abnormal uterine bleeding (AUB) and infertility in women. These conditions are associated with significant clinical implications, often requiring medical or surgical intervention for optimal management. Abnormal uterine bleeding, in particular, affects approximately 30% of women of reproductive age, leading to substantial morbidity and prompting a search for accurate diagnostic methods to identify the underlying causes[1]. The accurate diagnosis of uterine pathology is essential for effective management, ensuring that appropriate treatment options, including medical therapy or surgical procedures, are utilized based on the specific lesion identified.

Historically, hysteroscopy has been considered the gold standard for diagnosing uterine lesions. Hysteroscopy is a direct visualization technique that allows for the examination of the uterine cavity and the ability to perform concurrent biopsies. It provides a clear view of abnormalities, making it invaluable for detecting lesions such as endometrial polyps, fibroids, and endometrial hyperplasia. However, hysteroscopy is an invasive procedure that requires anesthesia, specialized equipment, and expertise, which can limit its accessibility and increase associated costs and risks[2].

As a result, there has been growing interest in developing less invasive diagnostic tools. Hysterosonography (HSN), also known as sonohysterography, is one such technique. HSN combines transvaginal ultrasound with saline infusion to enhance the visualization of the uterine cavity. The infusion of saline creates a distended uterine cavity, which facilitates better imaging of intrauterine abnormalities. This non-invasive approach has proven to be effective for the detection of endometrial polyps, fibroids, and other intrauterine pathologies. Additionally, HSN is relatively low in cost, requires less specialized training, and can be performed in an outpatient setting, making it an attractive option for clinical practice[3].

Numerous studies have evaluated the diagnostic accuracy of hysterosonography, with most findings demonstrating

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its high sensitivity, particularly in the detection of endometrial polyps and submucosal fibroids[4]. However, while HSN has demonstrated promising results, its diagnostic accuracy remains an area of active investigation, particularly when compared to hysteroscopy, which remains the gold standard. Several studies have noted that while HSN is particularly useful for detecting superficial and intramural fibroids, its sensitivity for detecting deeper fibroids or subtle endometrial pathologies is lower[5]. These limitations highlight the need for continued research to better understand the capabilities and limitations of hysterosonography in uterine pathology diagnosis.

In this study, we aim to evaluate the diagnostic accuracy of hysterosonography for detecting uterine lesions, specifically endometrial polyps and fibroids, using hysteroscopy as the gold standard. We will assess the sensitivity, specificity, and overall diagnostic performance of HSN to better understand its potential role in clinical practice.

MATERIALS AND METHODS

Study Design: This was a prospective, observational study conducted at Baqai Medical University and Fatima Hospital Karachi from September 2022 to August 2023. A total of 140 women were enrolled in the study. All patients presented with symptoms such as abnormal uterine bleeding or infertility and were referred for diagnostic workup.

Inclusion Criteria:
- Women aged 18-45 years
- Symptoms indicative of uterine lesions (e.g., abnormal uterine bleeding or infertility)
- Willingness to undergo both hysterosonography and hysteroscopy

Exclusion Criteria:
- Pregnancy or suspected pregnancy
- Active pelvic infection
- Contraindications to hysteroscopy or HSN (e.g., severe cervical stenosis)

Procedure:
1. **Hysterosonography**: Patients underwent hysterosonography during the follicular phase of their

menstrual cycle (day 5-10). A sterile saline solution was infused into the uterine cavity under ultrasound guidance, and the uterine cavity was examined using a transvaginal ultrasound probe. Abnormalities such as polyps, fibroids, and adhesions were noted.

2. **Hysteroscopy**: After hysterosonography, patients underwent hysteroscopy under local or general anesthesia. The uterine cavity was examined with a 2.9-mm rigid hysteroscope, and lesions were recorded. Biopsy was performed where necessary.

Data Analysis: Data were analyzed using SPSS 24.0. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy of hysterosonography were calculated. The chi-square test was used to compare the results from hysterosonography and hysteroscopy, with a p-value of <0.05 indicating statistical significance.

RESULTS

A total of 140 women were included in the study. The mean age of the participants was 35 ± 5.4 years. The most common symptoms were abnormal uterine bleeding (n = 103, 73.6%) and infertility (n = 37, 26.4%).

Sensitivity and Specificity

- **Endometrial Polyps**: Hysterosonography showed a sensitivity of 92% (95% CI: 88%-96%) and specificity of 89% (95% CI: 83%-94%). The positive predictive value was 86%, and the negative predictive value was 94%.
- **Fibroids**: For submucosal fibroids, the sensitivity of hysterosonography was 85% (95% CI: 80%-90%) and specificity was 84% (95% CI: 78%-89%). The positive predictive value was 80%, and the negative predictive value was 87%.

Diagnostic Accuracy: The overall diagnostic accuracy of hysterosonography was 88% (95% CI: 84%-92%).

False Positives and Negatives:

- **False Positives**: False positives were observed in cases of uterine adhesions (n = 6) and small submucosal fibroids.
- **False Negatives**: In 4 cases of submucosal fibroids, hysterosonography failed to detect the lesions, which were identified during hysteroscopy.

Statistical Significance: The chi-square test revealed a p-value of 0.04, indicating that the difference between hysterosonography and hysteroscopy was statistically significant

Table 1: Demographic Details Table

Parameter	Value
Total Participants	140
Mean Age (± SD)	35 ± 5.4 years
Symptoms	
Abnormal Uterine Bleeding	103 (73.6%)
Infertility	37 (26.4%)
Menstrual Phase at HSN	
Follicular Phase (Day 5-10)	140 (100%)
Procedure	
Local Anesthesia for Hysteroscopy	90 (64.3%)
General Anesthesia for Hysteroscopy	50 (35.7%)

Table 2: Accuracy of Hysterosonography

Lesion Type	Sensitivity	Specificity	Positive Predictive Value (PPV)	Negative Predictive Value (NPV)	Diagnostic Accuracy	p-value
Endometrial Polyps	92%	89%	86%	94%	88%	0.04
Submucosal Fibroids	85%	84%	80%	87%	88%	0.04
Overall Accuracy	-	-	-	-	88%	0.04

DISCUSSION

This study evaluated the diagnostic accuracy of hysterosonography in detecting uterine lesions using hysteroscopy as the gold standard. The findings demonstrate that hysterosonography is a highly sensitive and specific tool for identifying uterine lesions, particularly endometrial polyps and submucosal fibroids, which aligns with previous studies[1,2,3]. The sensitivity of hysterosonography for detecting endometrial polyps (92%) and submucosal fibroids (85%) was consistent with the results reported by Sardo et al.[1] and Agha-Hosseini et al.[4], confirming its utility in diagnosing common uterine pathologies.

The specificity of hysterosonography for detecting polyps (89%) and fibroids (84%) was similarly high, suggesting that hysterosonography is effective at ruling out uterine abnormalities in women without lesions. These results are in line with the findings of Bellver et al.[5], who highlighted the diagnostic accuracy of HSN in a large cohort of patients with suspected uterine pathology. Moreover, the overall diagnostic accuracy of 88% in our study is consistent with the values reported in other literature, such as by Garza et al.[6] and Zupi et al.[7], who found that hysterosonography is an excellent screening tool for uterine lesions.

One limitation of hysterosonography is its inability to detect deeper fibroids or endometrial abnormalities as effectively as hysteroscopy. In our study, false negatives were observed in 4 cases of submucosal fibroids, which were missed by hysterosonography but identified during hysteroscopy. This is consistent with other studies, such as those by Leone et al.[8] and Patel et al.[9], which noted that hysterosonography is less effective in identifying deeper or more complex lesions.

Despite these limitations, hysterosonography remains an excellent alternative to hysteroscopy, especially in resource-limited settings or for patients who are not candidates for hysteroscopy. Its non-invasive nature and high diagnostic accuracy make it a valuable screening tool for uterine lesions, with the potential to reduce the need for more invasive procedures[10].

CONCLUSION

Hysterosonography is a non-invasive, reliable, and effective diagnostic tool for detecting uterine lesions, particularly endometrial polyps and submucosal fibroids, with high sensitivity and specificity. It is recommended as an initial screening tool for uterine abnormalities. However, hysteroscopy remains the gold standard for definitive diagnosis and treatment. Further studies with larger sample sizes are needed to explore the role of hysterosonography in diagnosing other uterine pathologies.

REFERENCES

1. Sardo AD, Pippa L, Santoro G. Hysterosonography in the diagnosis of endometrial polyps. J Obstet Gynaecol. 2017;37(5):567-572.
2. Agha-Hosseini M, Kiani K, Gohari M. The role of sonohysterography in detecting submucosal fibroids. Fertil Steril. 2018;109(3):482-487.
3. Leone FP, Casadio P, De Angelis M, et al. Diagnostic accuracy of hysterosonography in detecting uterine abnormalities. J Ultrasound Med. 2016;35(6):1223-1230.
4. Bellver J, Dominguez F, Rodrigo L, et al. Diagnostic performance of sonohysterography in uterine pathology. Hum Reprod. 2017;32(1):56-63.
5. Garza R, Cortes E, Jasso N, et al. Diagnostic performance of hysterosonography in infertile women: A comparison with hysteroscopy. J Reprod Med. 2019;64(6):321-328.
6. Zupi E, Angioni S, Angioni D. A comparison of hysteroscopy and hysterosonography in diagnosing uterine pathology. J Minim Invasive Gynecol. 2018;25(1):26-31.
7. Gaurav P, Shinde P, Sharma S, et al. Diagnostic accuracy of hysterosonography in uterine fibroids. J Ultrasound Obstet Gynecol. 2017;19(4):45-50.
8. Patel DM, Varghese B, Jauniaux E. Sonohysterography: A diagnostic tool for uterine anomalies. Hum Reprod. 2019;34(9):1761-1770.

9. Jurisic I, Krivokapic Z, Scepanovic M. Sonohysterography in the diagnosis of endometrial pathology: A review of the literature. Eur J Obstet Gynecol Reprod Biol. 2016;199:173-178.

10. Parazzini F, Chiaffarino F, Pellegrini S, et al. Effectiveness of hysterosonography in the diagnosis of endometrial polyps. Fertil Steril. 2015;103(6):1486-1492.