ORIGINAL ARTICLE

Diagnostic Accuracy of Hysterosonography in Diagnosis of Uterine Lesions by Taking Hysteroscopy as Gold Standard

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ABSTRACT

Background and Aim: Evaluation of uterine abnormalities is infertility core partto be assessed in impaired reproduction cases. Uterine abnormalities can be assessed by various radiological imaging modalities such as transvaginal sonography, hysterosalpingography and hysterosonography. The current study aims to evaluate the diagnostic accuracy of hysterosonography in diagnosis of uterine lesions by taking hysteroscopy as gold standard.

Materials and Methods: This observation-based cross-sectional study was carried out on 108 reproductive-age women at the Department of Obstetrics and Gynecology of Liaquat University of Medical and Health Sciences, Jamshoro during the period from January 2020 to June 2020.These women had uterine abnormalities such as recurrent pregnancy loss, abnormal uterine bleeding, infertility, and clinically diagnosed lesions of intrauterine. All individuals underwent hysteroscopy evaluation.Global sensitivity analysis technique was used to calculate the bias-adjusted specificity and sensitivity of hysterosonography. Uterine abnormalities were assessed by hysteroscopy taking it as a gold standard. SPSS version 20 was used for data analysis.

Results: The mean age of the women was 27.3 ± 5.63 with age range 20 to 34 years and parity ranged from 0 to 5. Out of 108 patients, 49 (45.4%) had positive findings of abnormal uterine lesions including myomas in 13 (12.3%), polyps 17 (15.7%), uterine septum 7 (6.4%) and intrauterine adhesions 12 (11.1%). Among all, forty-nine (45.4%) women had infertility, previous cesarean section 20 (19.1%), recurrent pregnancy loss 18 (16.6%), and menstrual disorders 21 (19.4%).Diagnostic accuracy of hysterosonography in terms of specificity, sensitivity, and Positive prediction value (PPV) was 94%, 77%, and 74% for uterine lesions respectively while taking hysteroscopy as a gold standard.

Conclusion: The present study concluded that uterine lesions among reproductive-age women could be easily assessed with higher accuracy of hysterosonography. Based on the specificity and sensitivity of hysteroscopy as a gold standard for hysterosonography is the most reliable, safe and accurate diagnostic technique for uterine lesions.

Keywords: Hysterosonography, Uterine lesions

INTRODUCTION

Impaired reproduction developed with abnormal uterine lesions needs to be assessed [1]. The female pelvis can be easily evaluated with hysterosonography due to its availability and quick performance. However, conflicting studies were found on the accuracy of hysterosonography [2, 3]. Uterine activities can be evaluated with equivocal findings and invasive investigation with hysterosonography [4]. Diagnostic hysteroscopy was considered as a gold standard for uterine lesions abnormalities.Operative sonohysterography may be suggested by the surgeon provided the diagnosis specificity of it. Diagnostic hysteroscopy may be precluded by less invasive sonohysterography [5]. The investigation method has not been presented as alternate gold standard tests. The prevalence of uterine lesions was found higher in infertile patients. Therapeutic success could be mostly related to abnormal uterine cavity treatment and detection. In such cases, son- hysteroscopy has been an approved diagnostic tool [6].

Fertility problems like excessivemenstrual blood loss in reproductive-age women were diagnosed withhyterosonography. However, for uterine lesions, a detailed examination was not carriedout [8]. Another reliable evaluation techniques are three-dimensional sonohysterographywhich enables uterine contour assessment, focal disease, and adhesions [9]. Three perpendicular plans demonstration can be enabled by giving access to unobtainable sections simultaneously by3-dimensional sonohysterography. Additionally, the endometrium on both sides with the inner surface clearly visible can be visualized by saline solution in the distendedcavity [10]. Another study compared the three-dimensional hysteroscopy withconventional one but found three-dimensional hysteroscopy economical, lessinvasive, and does not require anesthesia [11]. Another study compared two and three-dimensionalhysteroscopy [12, 13]. Therefore, a detailed study needs to be conducted on the hysteroscopydiagnostic accuracy for uterine lesions abnormalities. The primary aim of the current study was to evaluate the diagnostic accuracy in terms of specificity and sensitivity in the diagnosis of uterine lesions among reproductive age women taking hysteroscopy as a gold standard.

MATERIALS AND METHODS

This observation-based cross-sectional study was carried out on 108 reproductive-age women at the Department of

Obstetrics and GynecologyofLiaquat University of Medical and Health Sciences,Jamshoro during the period from January 2020 to June 2020. These women had uterine abnormalities such as recurrent pregnancy loss, abnormal uterine bleeding, infertility, and clinically diagnosed lesions of intrauterine. All individuals underwent hysteroscopy were evaluated.Ethical committee approval was taken and a written consents form was obtained from all the individual prior to conducting the study. The study population was 108 reproductive age women with suspected intrauterine abnormalities, recurrent pregnancy loss, infertility and menstrual disorder. Profuse uterine bleeding or perforation, cervical malignancy, pelvic inflammatory diseases, pregnancy and cervical stenosis were excluded from the study. Global sensitivity analysis technique was used to calculate the bias-adjusted specificity and sensitivity of hysterosonography. Uterine abnormalities were assessed by hysteroscopy taking it as a gold standard. The mean age of the women was 27.3 ± 5.63 with age range 20 to 34 years and parity ranged from 0 to 5. Out of 108 patients, 49 (45.4%) had positive findings of abnormal uterine lesions including myomas in 13 (12.3%), polyps 17 (15.7%), uterine septum 7 (6.4%) and intrauterine adhesions 12 (11.1%). Among all, forty-nine (45.4%) women had infertility, previous cesarean section 20 (19.1%), recurrent pregnancy loss 18 (16.6%), and menstrual disorders 21 (19.4%). Diagnostic accuracy of hysterosonography in terms of specificity, sensitivity, and Positive prediction value (PPV) was 94%, 77%, and 74% for uterine lesions respectively while taking hysteroscopy as a gold standard.

Hysterosonography was conducted with 5 to 7 MHz transduceron ultrasound. Lithotomy position was followed for women with an empty bladder. The antiseptic solution was used to clean the cervix and the vaginal speculum was inserted with sterile. Air artifact was mitigated withsaline solution prefilled the catheter inside the uterine cavity beforeinsertion. Foley catheter (8F pediatric) was label-off. Long traumatic forceps was utilized to guidethe catheter into the uterine cavity and inflated balloon with sterile saline solution(1-2 mL) was inserted for internal cervical os and stabilization. Then careful withdrawalof speculum and probe insertion was done with vaginal posterior fornix. Catheter with 20 mL saline solution sterilewas attached to a plastic syringe and inside the uterine cavity, catheter positionwas ascertained. Hysterosography visualized the fluid inside uterine distention. Data analysis was carried out in SPSS version 20. Frequency and percentage for categorical variables such as age, the accuracy of hysteroscopy, and intrauterine lesions were calculated with sensitivity and specificity. A p-value was considered a significant value.

RESULTS

The mean age of the women was 27.3 ± 5.63 with age range 20 to 34 years and parity ranged from 0 to 5. Out of 108 patients, 49 (45.4%) had positive findings of abnormal uterine lesions including myomas in 13 (12.3%), polyps 17 (15.7%), uterine septum 7 (6.4%) and intrauterine adhesions 12 (11.1%). Among all, forty-nine (45.4%) women had infertility, previous cesarean section 20 (19.1%), recurrent pregnancy loss 18 (16.6%), and menstrual disorders 21 (19.4%) as shown in Figure 1.

Diagnostic accuracy of hysterosonography in terms of specificity, sensitivity, and Positive prediction value (PPV) was 94%, 77%, and 74% for uterine lesions respectively while taking hysteroscopy as a gold standard. A total of 108 suspected intrauterine eligible women were included with clinical details shown in Table 1.

Table 1. Clinical data of 108 patients

Variables	Value n (%)
Age (mean±SD) (years)	27.3± 5.63
Parity	0.96
Previous cesarean section	20 (19.1)
Infertility	49 (45.4)
Menstrual disorders	21 (19.4).
Pregnancy recurrence	18 (16.6)

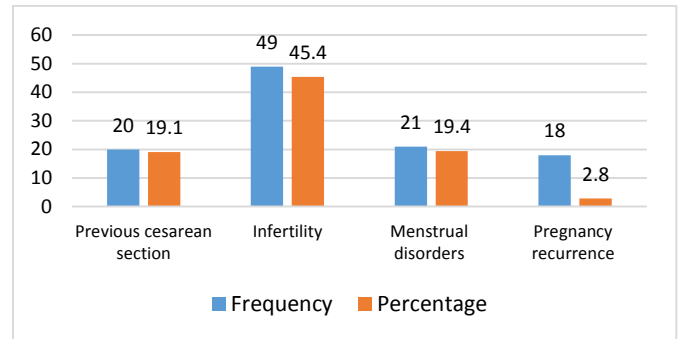

Figure 1. Prevalence of reproductive abnormalities

Table 2. Intrauterine lesions diagnostic parameters

Parameters	Value (%)
Specificity	94
Sensitivity	77
Negative predictive value	81
Positive predictive value	74
Overall accuracy	92

Table 3. Intrauterine Lesionsof positive findings among 49 patients

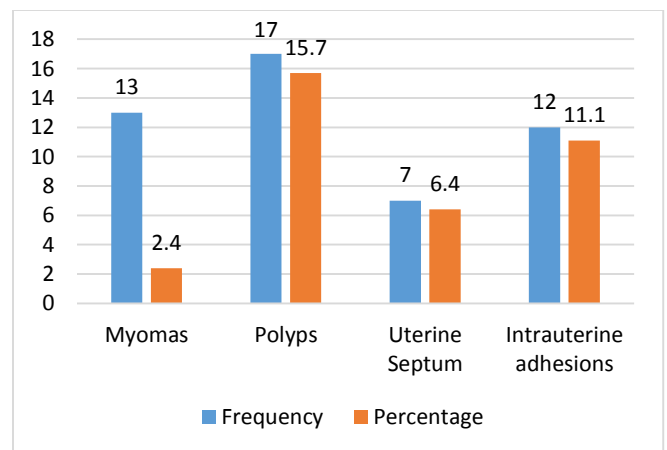| Intrauterine Lesions	Frequency n	Percentage %
Myomas	13	12.3
Polyps	17	15.7
Uterine Septum	7	6.4
Intrauterine adhesions	12	11.1

Figure 2. Prevalence of Intrauterine Lesions of positive findings among 49 patients

Out of 108 patients, 49 (45.4%) had positive findings of abnormal uterine lesions including myomas in 13 (12.3%), polyps 17 (15.7%), uterine septum 7 (6.4%) and intrauterine adhesions 12 (11.1%).For hysterosonography, specificity, sensitivity, negative predictive value (NPV), positive predictive value and overall accuracy were 94%, 77%, 81%, 74%, and 92% respectively. Intrauterine lesions diagnostic parameters are as shown in Table 2. Figure 2 and Table 3 demonstrates individual intrauterine lesions such as myomas, polyps, uterine spectrum, and intrauterine adhesion. No serious complications were found in our study.

DISCUSSION

The direct visualization ofuterine lesions or cavities could be the advantage offers by hysteroscopy overconventional modalities. In obstetrics and gynecology complex cases, diagnosticprocedures can be improved by three-dimensional sonography which evaluatesdifficult scanning and diagnosis. Availing hysterosongraphy diagnostic techniquescan improve specificity and sensitivity [14]. However, the protrusion and submucousmyoma assessment in the uterine cavity cannot be accurately diagnosed with other modalities like 2D ultrasound. A uterine cavity in either case normal and collapsed form, Sonohysteroscopy are accepted and can improve the images [15]. Compared to 2D, 3D sonohysteroscopy, insofar as submucous can accurately determine the submucousmyomas protrusion and diameter of the uterine cavity which significantly influence the resection's completeness [16].

Although the various studies concludedcongenital anomalies diagnosis with 3D sonohysterography as accurate modalities[17] but others found no subsequent differences between 2D and 3Dsonohysterography [18].Many researchers found a satisfactory and accurate diagnosis of sonohysteroscopy in the diagnosis of various situations like infertility compared to conventional hysteroscopy [20]. Abnormal uterine bleeding, spontaneous recurrence miscarriage, and the present study investigated hysterosonography in women of reproductive ages. Another study's [21] results matched this investigation's findings. The author found higher specificity, sensitivity, NPV, PPV, and overall accuracy in hysterosonography compared to simple hysteroscopy. It has been reported that hysterosonography is an important technique for the evaluation of the uterine cavity with premenopausal bleeding. Additionally, 180 patients were investigatedin order to determine infertility among them by sonohysteroscopy and outpatienthysteroscopy fund comparable in detecting uterine lesions. Moreover, thesuggested that hysterosonography could be included in assessing women of normaluterine cavity with infertility [22]. Sonographic methods have the primary advantage of providing important extracavity information; adnexal masses and myometrial disorders, such as intramural myomas and adenomyosis, can be detected and explained [23].

Additionally, Sonohysteroscopy is comparatively economical, less time taker gives lower pain or discomfort to patients. However, a small size sample was the main limitation besides histopathology finding relation to study design and lack of correlation. Another study [24] carried out on 49 abnormal uterine bleeding women with prospective study design and randomized control trial technique to compare diagnostic accuracy, discomfort to the patient, and time taken for procedure completion between sonohysteroscopy and conventional hysteroscopy. Both were found comparable in the diagnosis of pain rating, procedure time, and intracavity lesions investigation. Hysterosonography or sonohysteroscopy was a more acceptable and comfortable imaging modality among patients.

CONCLUSION

The present study concluded that uterine lesions among reproductive-age women could be easily assessed with higher accuracy of hysterosonography. Based on the specificity and sensitivity of hysteroscopy as a gold standard for hysterosonography is the most reliable, safe and accurate diagnostic technique for uterine lesions.

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