Sonohysterographic evaluation of uterine abnormalities noted on hysterosalpingography

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Transvaginal sonohysterography was performed on 40 consecutive patients with infertility or recurrent pregnancy loss and uterine abnormalities on hysterosalpingography. The findings were correlated with the hysterosalpingogram and subsequent diagnostic and/or operative hysteroscopy. Hysterosalpingography was incorrect in nine cases. Sonohysterography was more accurate than hysterosalpingography and provided more information about uterine abnormalities. Sonohysterography was in complete agreement with hysteroscopy. Diagnostic hysteroscopy can therefore be avoided if the sonohysterogram is normal. Sonohysterography also provides additional information on the relative proportion of the intracavitary and intramyometrial components of submucus myomas, as well as extravasatory myomas and the adnexa. This may help in planning the surgical procedure.

Key words: hysterosalpingography/hysteroscopy/infertility/sonohysterography/uterine pathology

Introduction

Hysterosalpingography is a standard part of the basic infertility investigation to screen for abnormalities of the uterine cavity and to assess tubal patency. Hysteroscopy is the definitive diagnostic study for evaluating intrauterine abnormalities noted on hysterosalpingography. Sonohysterography is another tool for examining the uterine cavity which yields additional information about the myometrium, the ovaries, and to a limited extent, tubal patency. Several studies have demonstrated that its sensitivity and specificity are comparable to hysteroscopy for patients with abnormal uterine bleeding, postmenopausal bleeding, or endometrial abnormalities noted on transvaginal ultrasonography (van Roessel et al., 1987; Bonilla-Musoles et al., 1992; Syrop and Sahakian, 1992; Fukuda et al., 1993; Parsons and Lense, 1993; Goldstein, 1994; Romano et al., 1994; Cicinelli et al., 1995; Turner et al., 1995; Widrich et al., 1996).

This technique has not been adequately compared to hysteroscopy as a follow-up test for uterine filling defects noted on hysterosalpingography. Randolph et al. (1986) performed sonohysterography prior to hysteroscopy and laparoscopy in 61 women undergoing investigation for infertility or recurrent pregnancy loss. However, they used transabdominal sonohysterography and only a few of the patients had intrauterine filling defects.

A recent study comparing transvaginal sonohysterography with hysterosalpingography and hysteroscopy in infertile patients showed excellent correlation of sonohysterography and hysteroscopy but only eight patients had an abnormal hysterosalpingogram (Alatas et al., 1997). In another recent study, 15 patients with recurrent loss had an abnormal hysterosalpingogram with subsequent sonohysterography and hysteroscopy (Keltz et al., 1997). The sensitivity and specificity of sonohysterography was 100% compared with hysteroscopy. Hysterosalpingography had a false positive rate of 30.8%. The purpose of the current study was to prospectively assess the diagnostic accuracy of transvaginal sonohysterography compared with hysteroscopy in evaluating uterine defects noted on hysterosalpingography as part of the work-up for infertility and recurrent pregnancy loss.

Materials and methods

All of the procedures were performed by the authors with the exception of six hysterosalpingograms which were performed at other institutions. All of the films from those studies were reviewed by the authors. Hysterosalpingography was performed as part of a basic evaluation for infertility and recurrent pregnancy loss using ioxaglate, Hexabrix® (Mallinckrodt, Medical Inc., St Louis, MO, USA), a water-soluble ionic iodine contrast under fluoroscopic guidance. Patients with uterine abnormalities underwent transvaginal sonohysterography in the clinic. All had negative cervical cultures for gonorrhoea and chlamydia. The cervix was cleansed with betadine swabs and a 5.3F Soules intrauterine insemination catheter (Cook Ob/Gyn, Spencer, IN, USA) was inserted with the assistance of uterine packing forceps. A tenaculum was not needed in any case. A 60 cc syringe containing sterile saline was connected to the catheter. Transvaginal sonography was performed with an ALR Ultramark 4 with a 5 MHz transducer. Following complete evaluation of the uterus and adnexa, saline was slowly infused as the uterus was re-examined in longitudinal and transverse sections. Most procedures were completed with <30 cc of fluid, though in some cases ~200 cc were required due to reflux around the catheter.

Diagnostic hysteroscopy (n = 17) was performed in the clinic or operating room with a 3.5 mm flexible hysteroscope (Olympus, Lake Success, NY) using saline for uterine distension. Like sonohysterography, office hysteroscopy was performed without antibiotics or anaesthesia. Occasionally a tenaculum or uterine sound was required to assist insertion of the hysteroscope. Operative hysteroscopic procedures (n = 23) were performed with an Olympus® 27F resectoscope with 1.5% glycine as the uterine distension medium. All of the procedures were performed during the follicular phase, though not necessarily in the same menstrual cycle. This eliminated the potential...
Recent studies suggest that magnetic resonance imaging uterine fundus was necessary to make the definitive diagnosis. Laparoscopic visualization of the serosal surface of the procedures could distinguish between septate and bicornuate diagnosed by hysterosalpingography or hysteroscopy. Sonohysterography demonstrated extracavitary myomas in three patients that were not myoma within a septate uterus. Sonohysterography delineated the intramyometrial procedures could distinguish between septate and bicornuate diagnosed with polyps or myomas on hysterosalpingography, it cannot always assess the depth of myometrial extension of intracavitary myomas. Sonohysterography can differentiate myomas from polyps and will also demonstrate the full intramural component of submucus myomas. This information may be helpful in determining whether the lesion can be resected hysteroscopically and whether preoperative GnRH agonist therapy may be useful.

For patients with infertility, hysterosalpingography remains the standard technique for evaluating the uterine cavity as it also provides information on tubal patency and architecture, and may even have a therapeutic effect. There have been several small studies using various ultrasonographic techniques to assess tubal patency (Bonilla-Musoles et al., 1992; Heikkinen et al., 1995; Widrich et al., 1996). This method often cannot distinguish whether one or both tubes are patent and gives little or no information on the tubal diameter, presence of mucosal folds, salpingitis isthmica nodosa, or post-spill loculations. At this time sonohysterography cannot be considered as a substitute for hysterosalpingography for tubal assessment (Bonilla-Musoles et al., 1992).

The 20% false positive rate with hysterosalpingography in the present study is consistent with those reported by others comparing hysterosalpingography with hysteroscopy, approximately 10–30% (Snowden et al., 1984; Fayez et al., 1987). Sonohysterography can avoid an unnecessary diagnostic hysteroscopy in these patients. The false negative rate with hysterosalpingography is <1%, with missed lesions being of little clinical significance (Snowden et al., 1984; Fayez et al., 1987). Therefore, normal hysterosalpingograms do not require any further evaluation. In cases where tubal status is not an issue, such as recurrent pregnancy loss, infertility patients with tubal patency documented at prior laparoscopy, or patients scheduled for in-vitro fertilization, sonohysterography may be substituted for hysterosalpingography. This would result in

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<th>Histology</th>
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<tr>
<td>Polyps</td>
<td>26</td>
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<td>Myomas</td>
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Note: The diagnoses of polyps and myomas were grouped together under hysterosalpingography as this technique does not distinguish between the two very well. Also, the diagnosis of septate versus bicornuate uterus could not be made reliably with any of these techniques. Two patients had adhesions and myomas. One patient had a septate uterus with a myoma.

Results

The results are summarized in Table I. Of the 32 patients diagnosed with polyps or myomas on hysterosalpingography, six had a normal endometrial cavity on sonohysterography and hysteroscopy. Intrauterine adhesions were diagnosed by hysterosalpingography in nine patients. Of those, one had a small endometrial polyp instead and two had a normal uterine cavity on sonohysterography and hysteroscopy. Thus, eight of the 40 patients with uterine filling defects on hysterosalpingography had normal endometrial cavities for a false positive rate of 20%, positive predictive value of 80%.

Sonohysterography was in complete agreement with hysteroscopy in all cases, giving it a sensitivity and specificity of 100%. In addition, sonohysterography delineated the intramyometrial extension of submucus myomas.

All nine myomas and all of the 14 polyps excised were confirmed histologically. Three additional polyps were not clinically significant and were not removed. Two patients had intrauterine adhesions and myomas and one patient had a myoma within a septate uterus. Sonohysterography demonstrated extracavitary myomas in three patients that were not diagnosed by hysterosalpingography or hysteroscopy.

Two patients had a uterine septum. None of the three procedures could distinguish between septate and bicornuate uteri. Laparoscopic visualization of the serosal surface of the uterine fundus was necessary to make the definitive diagnosis. Recent studies suggest that magnetic resonance imaging (Doyle, 1992) or three dimensional ultrasonography (Raga et al., 1996) may be able to replace diagnostic laparoscopy for this purpose.

Patients were not given any anaesthetic but were instructed to take a non-steroidal anti-inflammatory agent for analgesia ~30 min prior to each procedure. They experienced minimal or no discomfort during the 3–5 min required to complete the sonohysterogram and there were no immediate or delayed complications.

Discussion

Similar to the previously published studies, we found a very high correlation between sonohysterography and hysteroscopy. In addition to eliminating the need for more expensive and invasive diagnostic hysteroscopy, sonohysterography can also reveal intramural myomas and adnexal masses. Although hysteroscopy can distinguish between polyps and myomas, it cannot always assess the depth of myometrial extension of intracavitary myomas. Sonohysterography can differentiate myomas from polyps and will also demonstrate the full intramural component of submucus myomas. This information may be helpful in determining whether the lesion can be resected hysteroscopically and whether preoperative GnRH agonist therapy may be useful.

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less expense and patient discomfort and avoid any radiation exposure.

In our study, sonohysterography was painless and well tolerated in every case. Sonohysterography has been shown to cause less discomfort than office hysteroscopy (Widrich et al., 1996). There were no cases of vaso-vagal reactions with sonohysterography and the risk of injury from uterine perforation with the soft flexible catheter is virtually non-existent. Sonohysterography costs $330 less than office hysteroscopy and $350 less than hysterosalpingography in our institution.

In conclusion, sonohysterography is an easier, less expensive, safer, and better tolerated alternative to diagnostic hysteroscopy for patients with intrauterine filling defects on hysterosalpingography. There was 100% correlation between sonohysterography and hysteroscopy. Sonohysterography also provides added information which may be helpful in the preoperative assessment of these patients. In patients who do not require assessment of tubal patency, sonohysterography may replace hysterosalpingography to evaluate the uterine cavity in patients with infertility and recurrent pregnancy loss.

References


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