Gel instillation sonohysterography: first experience with a new technique

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Objective: A practical attempt to simplify and improve the technique of artificial uterine cavity distension by instilling gel instead of flushing saline.
Design: Prospective observational study.
Setting: Teaching hospital.
Patient(s): One hundred twenty patients with an indication for sonohysterography (abnormal uterine bleeding, exclusion of congenital abnormalities, or preoperative or postoperative evaluation of submucous myomas, polyps, or synechiae).
Intervention(s): A hydroxyethylcellulose gel containing anesthetic and antiseptic agents was instilled in the uterine cavity through a plastic intrauterine insemination cannula attached to a flexible plastic tube and a syringe. Transvaginal (3-dimensional) ultrasonography was performed concomitantly.
Main Outcome Measure(s): Stable filling of the uterine cavity allowing a high-quality ultrasonographic visualization.
Result(s): An optimal distension of the uterine cavity could be achieved with an average of only 4 mL (range, 2–10 mL) in 113 patients. As expected, a stable filling of the uterine cavity permitted a precise visualization of the uterine cavity and its linings and offered an optimal presentation for a 3-dimensional ultrasound recording and reconstruction.
Conclusion(s): Gel instillation is a simple technique with minimal inconvenience for the patient and seems to be an attractive alternative to saline infusion during sonohysterography. (Fertil Steril® 2007;87:152–5. ©2007 by American Society for Reproductive Medicine.)

Key Words: Gel instillation sonohysterography, uterine cavity, 3-dimensional ultrasound

During the past decade, transvaginal ultrasonography of the uterus has become a routine procedure in the diagnostic work-up of several gynecologic problems. It has been demonstrated that a normal sonographic finding is very accurate for the exclusion of intracavitary abnormalities (1). Furthermore, this normal sonographic finding is very well reproduced in the hands of different examiners (2). However, in the case of abnormal or inconclusive sonographic findings, diagnostic accuracy and reproducibility decline.

Sonographic examination using artificial uterine cavity distension to improve the imaging in these cases was first described by our department (3). Saline infusion sonohysterography (SIS) is extensively described in the literature (4–8). There now exists international consensus that SIS improves the diagnostic accuracy of transvaginal ultrasonography in case of abnormal or inconclusive findings and that SIS is an effective early diagnostic step in the evaluation of patients with premenopausal and postmenopausal abnormal uterine bleeding.

The only contraindications for this method are pregnancy and pelvic infection. Although the visualization of the uterine cavity and its linings improves significantly, patients experience inconveniences and discomfort due to either fluid leakage while using a catheter without a balloon or pain with the use of a balloon catheter. In trying to overcome these disadvantages and to create a more stable filling of the uterine cavity, we modified the SIS technique by instilling gel instead of flushing saline. The new technique of gel instillation sonohysterography (GIS) and our first experiences with this technique are described as preliminary results.

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MATERIALS AND METHODS

Gel instillation sonohysterography was performed (Aloka ProSound SSD 3500/5500SV; Aloka Co., LTD., Tokyo, Japan) as an office procedure in an observational study of patients who had an indication for SIS, such as suspected abnormalities, inadequate ultrasound imaging in cases of abnormal uterine bleeding, exclusion of congenital abnormalities, or preoperative or postoperative evaluation of submucous myomas, polyps, or synechiae (7). This study did not include patients with a significantly enlarged myomatous uterus because we do not perform a SIS in these cases.

A sterile gel preparation of hydroxyethylcellulose and glycerol containing lidocaine (2 g in 100 g of gel) and chlorhexidine gluconate (0.25 g in 100 g of gel) was used. These substances

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FIGURE 1

The gel instillation sonohysterography (GIS) application device.

Exalto. Gel instillation sonohysterography. Fertil Steril 2007.

have long been used for vaginal and intrauterine local and topical anesthesia and disinfection prior to various diagnostic or therapeutic procedures (9, 10). This type of gel is used by urologists for intraurethral instillation prior to cystoscopy. Hydroxyethylcellulose and glycerol are considered to be safe in cases of intravasation or intra-abdominal application (11–14).

For the instillation of the gel, a plastic intrauterine insemination cannula (Gynétics Medical Products N.V., Harmont-Achel, Belgium) attached to a flexible plastic tube (Avon Kwill Filling Tube, 127 mm, Avon Medicals, Sim Portex Ltd., Hythe, Kent, UK) was used. This tube was connected to the syringe resulting in an easy-to-handle application device (Fig. 1). The device was flushed to clear air bubbles before being placed in the uterine cervix and was kept in position during the ultrasound examination, resulting in a real-time visualization of the distended uterine cavity.

Gel instillation sonohysterography was considered to be a minor SIS modification and a safe procedure by our institutional review board.

RESULTS

The sonographic properties of the gel appeared to be comparable with saline in the first patients (15, 16). Gel instillation sonohysterography indications and findings in 120 patients are presented briefly in Table 1. The uterine cavity could not be visualized in 7 patients due to an inaccessible cervix (n = 3) or an intermediate position of the uterus between anteflexion and retroflexion (n = 4).

With an average of 4 mL (range, 2–10 mL), an optimal distension of the uterine cavity could be achieved. Because of a much lower leakage velocity of the gel through the cervix and the fallopian tubes compared with saline, sonographic examination of the uterine cavity was optimal for several minutes even after removal of the instillation device. A quick collapse of the uterine cavity directly after removal of the device at the end of the procedure was seen only in a few cases.

The stability of the filling of the uterine cavity permitted a precise visualization of the uterine cavity and its linings (Fig. 2) and an optimal presentation for a very stable 3-dimensional ultrasound recording and reconstruction afterward (Fig. 3).

Because of less fluid leakage and pain, the GIS technique seemed to reduce inconvenience for the patient compared with SIS. Only in 1 patient was a vasovagal episode observed. There were no serious complications such as allergic reactions, infections, or cardiac complications.

The ultrasonic appearance of intracavitary blood clots is different in GIS compared with SIS. These clots may resemble polyps because they are not flushed out by the gel. This is a disadvantage of GIS in comparison with SIS.

DISCUSSION

Gel instillation can be used as an alternative for saline infusion during sonohysterography. The technique is easy to learn and seems attractive as a first choice because the technique is convenient for both the patient and the ultrasonographer. GIS offers a more stable filling of the uterine cavity, which allows detailed examination with a very precise visualization of the uterine cavity and its linings.

The use of gel for this purpose is not entirely new. We described the use of a dextran 70 solution in 1987 in our first study on ultrasound and uterine cavity distension (3). A recent extensive literature search revealed another publication on uterine cavity distension with gel (Instillagel®, Farco

TABLE 1

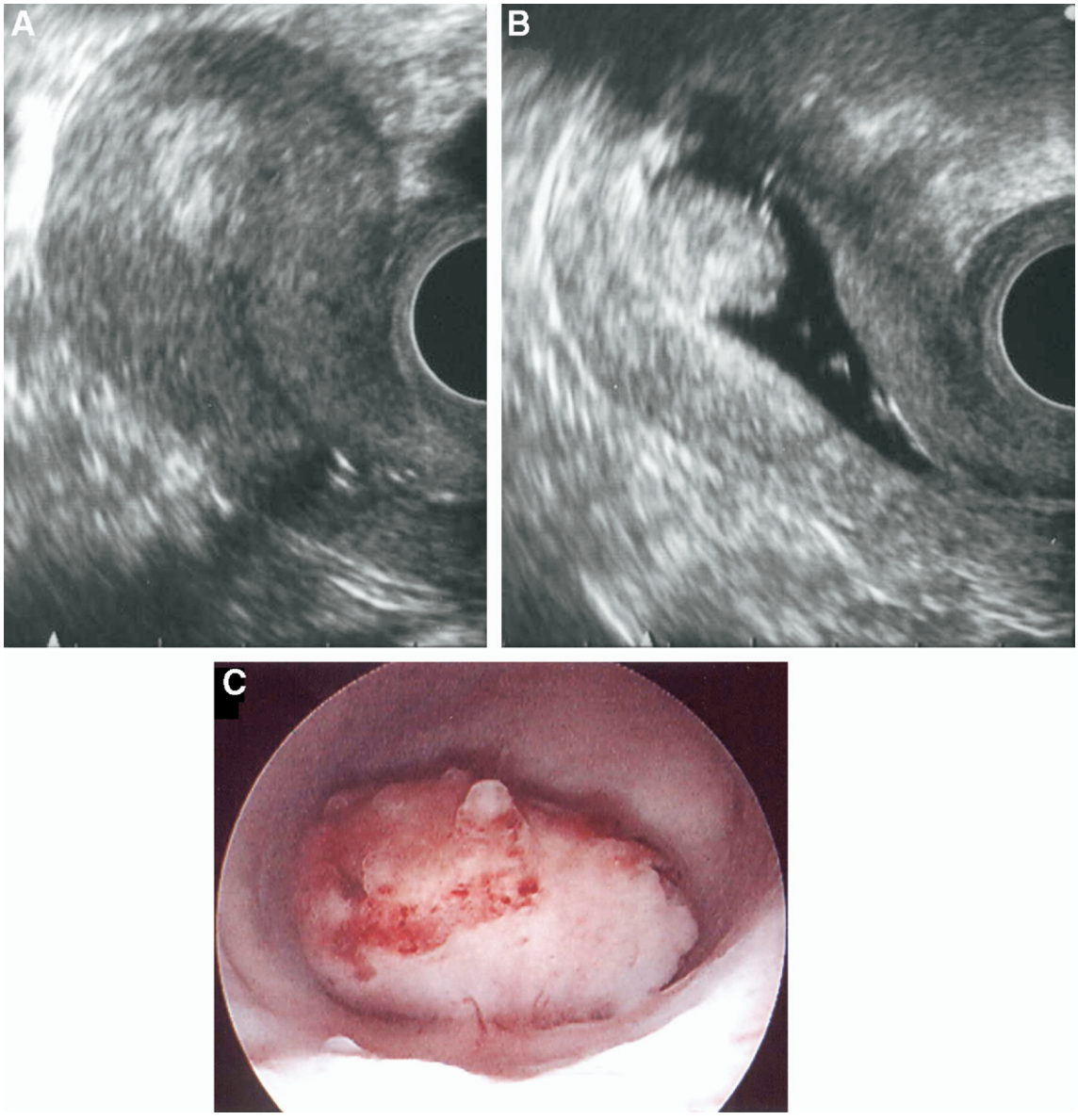
Gel instillation sonohysterography (GIS) indications and findings in 120 patients.

Indication	N	GIS normal (n)	GIS abnormal (n)
Abnormal uterine bleeding	52	27	25
Postmenopausal bleeding	32	11	21
Residual trophoblastic tissue	10	2	8
Habitual miscarriage/infertility	4	1	3
Evaluation myomas/polyps	5	—	5
Miscellaneous	10	8	2
Failed procedure	7	—	—
Total	120	49	64

Exalto. Gel instillation sonohysterography. Fertil Steril 2007.

FIGURE 2

Sonographic visualization of an endometrial polyp (A) before and (B) after uterine cavity distension with gel; (C) hysteroscopic confirmation.



Exalto. Gel instillation sonohysterography. Fertil Steril 2007.

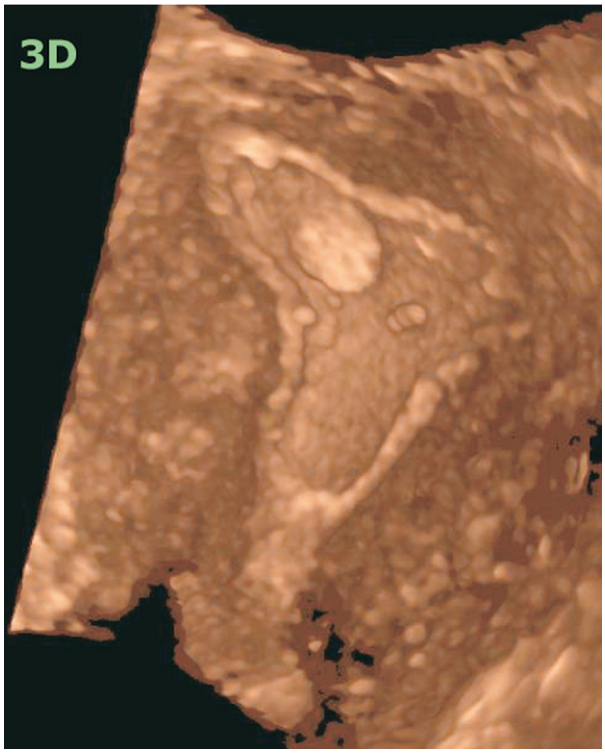
Pharma GmbH, Köln, Germany) that appeared in the German literature in 1991 (17). Hydroxyethylcellulose gels containing glycerol, lidocaine, and chlorhexidine have been used in several studies as an intrauterine local and topical anesthetic prior to various diagnostic and therapeutic procedures, unfortunately without achieving an adequate reduction of pain (9, 10). After intrauterine application of lidocaine gel for pain relief, only minimal systemic absorption of lidocaine was observed even when applied directly after endometrial ablation (18). Glycerol is an osmotic agent used intravenously to treat brain edema in stroke patients (11).

Hydroxyethylcellulose is used as artificial tears in dry-eye syndrome patients, intraperitoneally for reduction of adhesion formation, and intravascularly for reduction of local tissue reaction (12–14). Hydroxyethylcellulose gel was also used as an intravaginal contrast agent for sonographic examination of the cervix during pregnancy (19).

It can be concluded from the available data in literature that the intrauterine application of hydroxyethylcellulose gel is safe. The safety of the use of the described gel in the uterine cavity was confirmed in our first 120 patients. We

FIGURE 3

Three-dimensional (3D) gel instillation sonohysterography (GIS) reconstruction of an endometrial polyp.



Exalto. Gel instillation sonohysterography. Fertil Steril 2007.

have now begun using hydroxyethylcellulose gel without chlorhexidine and lidocaine because we do not believe that either lidocaine or chlorhexidine are of any additional value.

Recent publications have appeared about 3-dimensional sonohysterography with SIS (20, 21). A more stable filling of the uterine cavity with gel allows a longer investigation time, which results in better 3-dimensional sonohysterographic images with fewer artifacts and moving tissue elements than with flushing saline.

Because a small number of patients still have a quick collapse of the uterine cavity, the application device will be further modified in the future, resulting in better fixation and closure at the level of the cervix. Thereafter, GIS is expected to become a superior contrast method for investigation of uterine pathology with computed tomography (CT) and magnetic resonance imaging (MRI) as well.

From the current study, it can be concluded that GIS is an attractive alternative for SIS for several technical reasons. The only disadvantage is that blood clots are not flushed out by the gel and may mimic a polyp or myoma. Furthermore, when compared with SIS, the GIS technique seems to reduce inconveniences such as fluid leakage and pain for the patient. This will be further studied in a randomized, controlled trial comparing both techniques.

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