Role of saline infusion sonography in uterine evaluation before frozen embryo transfer cycle

Puja S. Gera, M.D., Michael C. Allemand, M.D., Laura L. Tatpati, M.D., Terri M. Galanits, B.A., Dean Morbeck, Ph.D., and Charles C. Coddington, M.D.

Division of Reproductive Endocrinology & Infertility, Department of Obstetrics & Gynecology, Mayo Clinic College of Medicine, Rochester, Minnesota

Objective: To determine the role of saline infusion sonography (SIS) in uterine evaluation before a frozen embryo transfer (FET) cycle.
Design: Retrospective cohort analysis.
Setting: University hospital.
Patient(s): Thirty-six patients who had uterine evaluation by SIS before FET cycle.
Intervention(s): The SIS was performed in the follicular phase of the menstrual cycle before the actual FET cycle.
Main Outcome Measure(s): The SIS findings, clinical pregnancy rate (PR), ongoing PR, and correlation between positive SIS findings with and without subsequent treatment and pregnancy outcome.
Result(s): Positive SIS findings were found in 11/36 patients (30.5%), which included uterine septum (9.0%), endometrial polyp (45.4%), intramural fibroid with normal cavity (9.0%), cystic endometrial changes (9.0%), cervical stenosis (18.1%), and calcification with normal cavity (9.0%). The overall clinical PR in all groups was 51.4%, with an ongoing PR of 45.7%. Patients with positive SIS finding who underwent subsequent hysteroscopic correction (7/11) had a clinical PR of 85.7% as compared to 54.1% in patients with normal uterine cavity (24/35). Patients with positive SIS findings and no operative hysteroscopy (4/11) had a clinical PR of 50% and pregnancy loss rate of 100%.
Conclusion(s): Obtaining an SIS before the FET cycle can be helpful in the detection of uterine abnormalities. If time since uterine evaluation has been more than 1–2 years, performing an SIS is recommended as subsequent correction of the anomalies may improve FET outcome. (Fertil Steril® 2008;89:562–6. ©2008 by American Society for Reproductive Medicine.)

Key Words: SIS, sonohysterography, frozen embryo transfer, uterine anomalies, IVF–embryo transfer

To optimize the outcome of an IVF cycle it is desired that the uterine cavity contain no lesions and have a lush, receptive endometrium. Structural uterine anomalies seen in 1.3% of patients undergoing IVF–frozen embryo transfer (FET) have been reported to be associated with implantation failure and early pregnancy loss, as well as obstetric problems (1–3). Difficult embryo transfer secondary to cervical or uterine pathology can also adversely affect the outcome in women undergoing IVF–embryo transfer (4).

Saline infusion sonography (SIS) has been used in the evaluation of structural uterine abnormalities in infertile patients undergoing IVF (5). It gives excellent anatomic detail of the uterus and is accurate in the diagnosis of polypoid lesions, uterine septum, synechiae, and other anomalies (6). Compared to hysteroscopy, it is less invasive, better tolerated, and less expensive (7). It is superior to hysterosalpingography in the detection of uterine abnormalities and avoids the radiation exposure and iodine contrast medium associated with hysterosalpingography (8, 9).

No studies were found in a literature search using Pub med (with key words SIS, sonohysterography, frozen embryo transfer) that address the value of a repeat SIS in patients undergoing FET cycles. This study aims to determine the role of SIS in uterine evaluation before the FET cycle and the pregnancy outcome in patients undergoing this evaluation.

MATERIALS AND METHODS

This study was a retrospective cohort analysis conducted at the division of Reproductive Endocrinology and Infertility. After obtaining Institutional Review Board (IRB) approval, the patients undergoing FET cycles, who had consented for review of their medical records, were included in the study and their medical records were screened for SIS findings.

Fifty-nine patients underwent FET between September 2005 and June 2006, using their own or donor embryos. The SIS was performed in 36/59 patients before the FET cycle and these patients were included in the study. All of these patients had a normal uterine evaluation in the past using either SIS or hysterosalpingography before their fresh IVF

Received July 17, 2006; revised and accepted March 21, 2007.
Accepted for poster presentation at the 62nd Annual Meeting of American Society for Reproductive Medicine, New Orleans, Louisiana, October 21–25, 2006.
Reprint requests: Charles C. Coddington, M.D., Division of Reproductive Endocrinology & Infertility, Department of Obstetrics & Gynecology, Mayo Clinic College of Medicine, 200, 1st Street SW, Rochester, MN 55905 (FAX: 507-284-1774; E-mail: Coddington.charles@mayo.edu).

0015-0282/08/$34.00
doi:10.1016/j.fertnstert.2007.03.067

cycle or a previous FET cycle between 1998 and 2004. In the remaining 23/59 patients, SIS was not done as they were undergoing an FET cycle within a year of their fresh IVF/previous FET cycle. These 23 patients were excluded from the study.

Transvaginal sonography was performed followed by SIS in the follicular phase of the menstrual cycle before the actual FET cycle. Prophylactic antibiotics were not routinely given. Uterine position evaluation was done by either transvaginal ultrasound or pelvic examination. A Tampa catheter (Cooper Surgicals, Trumbull, CT) was used for SIS. After catheter insertion, sterile saline was instilled to distend the uterine cavity slowly under direct sonographic visualization.

The uterine cavity and the endocervical canal were evaluated for any evidence of intracavitary polyps, myomas, focal endometrial thickening, uterine septum, cavity distortion, and endometrial changes.

The main outcome measures of the study were SIS findings, clinical pregnancy rate (PR), and ongoing PR. Correlation between positive SIS findings with and without subsequent treatment and pregnancy outcome was done to determine the impact of SIS findings on implantation rates and PRs. Statistical analysis was done using JMP 6.0.0 software (2004 SAS Institute, Cary, NC). Analysis of variance was used and a P value of $<.05$ was considered significant.

RESULTS

The mean age of the patients was 34.2 ± 4.7 years. Eleven of 36 patients (30.5%) had positive findings on SIS. The positive findings on SIS included uterine septum (9.0%), endometrial polyp (45.4%), intramural fibroid, 1 cm in size, with normal endometrial cavity (9.0%), cystic endometrial changes with negative Doppler findings (9.0%), cervical stenosis (18.1%), and calcification in superior aspect of uterine cavity with no distortion of cavity (9.0%). All of these patients were asymptomatic at the time of their evaluation.

Intervention was undertaken in 7/11 patients with positive SIS findings (Table 1). One patient with cervical stenosis had easy cervical dilatation at the time of SIS. The other patient required dilatation under anesthesia and SIS could not be carried out in her in spite of proper catheter insertion. Hysteroscopy revealed intrauterine adhesions, which were subsequently lysed. Operative hysteroscopy was used in five patients with endometrial polyps for polyp removal.

One patient with a history of recurrent pregnancy loss and negative SIS findings did not undergo FET because preimplantation genetic diagnosis revealed chromosomal aneuploidy in all three embryos that were tested.

Patients ($n = 35$) were divided into three groups; group A consisted of patients with positive SIS findings and treated ($n = 7$), group B consisted of those with positive SIS findings and not treated ($n = 4$), and group C of those with negative SIS findings ($n = 24$). The mean age, infertility diagnosis, number and grade of embryos transferred on day 3 were comparable in all groups (Table 2).

The overall clinical PR for FET in all groups was 51.4%, with an ongoing PR of 45.7%. The clinical PR was 85.7%

TABLE 1

Positive saline infusion sonography (SIS) findings in 11 patients.

Patient no.	SIS finding	Intervention/ hysteroscopy done	Clinical pregnancy	Pregnancy loss
1	Endometrial polyp	Yes	Yes	No
2	Endometrial polyp	Yes	Yes	No
3	Endometrial polyp	Yes	Yes	No
4	Endometrial polyp	Yes	Yes	No
5	Endometrial polyp	Yes	Yes	No
6	Uterine septum	No	Yes	Yes
7	Intramural fibroid, 1 cm in size, cavity normal	No	Yes	Yes
8	Cervical stenosis	Yes, dilatation	Yes	No
9	Cervical stenosis	Yes, hysteroscopy	No	—
10	Cystic endometrial changes, negative Doppler USG	No	No	—
11	Calcification in superior aspect of cavity, no distortion of cavity	No	No	—

Gera. Role of SIS before an FET cycle. Fertil Steril 2008.