



A CASE REPORT: THE FIRST TRANSVAGINAL ULTRASOUND-GUIDE EMBRYO TRANSFER AND PREGNANCY IN VITRO FERTILIZATION CYCLE IN CANADA.

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<p>Article Info <i>Received 15/01/2016</i> <i>Revised 27/01/2016</i> <i>Accepted 02/02/2016</i></p> <p>Key words: IVF, Embryo transfer, Transabdominal ultrasound, Transvaginal ultrasound.</p>	<p>ABSTRACT</p> <p>Embryo transfer (ET) has been viewed as an important variable in the success of an ART treatment cycle. Transvaginal ultrasound (TVS)-guided ET does not require a full bladder, gives greater resolution of the uterocervical angle, and can more clearly delineate the catheter tip than TAS-guided ET. Nonetheless, it is thought to be technically more difficult because of the necessity to simultaneously place the ultrasound probe, the speculum, and the catheter during the ET. We described the first TVS-guide embryo transfer and pregnancy in Canada. Case: A 34-year-old woman with an 11-year history of primary male factor infertility. The patient consented to a planned Antagonist IVF cycle. A total of 23 oocytes were retrieved, 16 oocytes were at MII stage and the remaining 7 oocytes were at germinal vesicle (GV)stage. 2 blastocyst was transferred on day 5. The TV ultrasound-guided ET was performed with a slight modification (removal of the speculum) to the protocol used routinely at the Montreal Reproduction Clinic (Quebec, Canada). Pregnancy was confirmed by a serum HCG concentration of 569.3IU/L, 11days after embryo replacement. Five weeks after embryo transfer, one gestational sac with positive heart activity was detected. The patient had a live birth. Transvaginal ultrasonography is superior to transabdominal ultrasonography for visualization of the uterus, allows the physician conducting the ET to operate the ultrasound himself, and evidently avoided using the TV approach requiring a fully emptied urinary bladder. Further studies are needed to define the patient groups in whom the TV approach might be superior to the currently more widely used TA ultrasound guidance.</p>
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INTRODUCTION

Historically, embryo transfer (ET) has been viewed as an unimportant variable in the success of an assisted reproductive technology treatment cycle and the technique has typically been performed in a blinded fashion without the use of ultrasound guidance. More recent studies have specifically addressed the technique of ET as being critical for optimizing outcome success including factors such as the technique, the type of catheter, and the use of ultrasound (US) guidance [1,2]. Transabdominal ultrasound (TAS)-guided ET has been the most commonly reported and from a procedural standpoint, typically requires a full bladder. This carries the potential

for causing discomfort and cramping during the ET, which could have an impact on clinical outcomes. In contrast, transvaginal ultrasound (TVS)-guided ET does not require a full bladder, gives greater resolution of the utero-cervical angle, and can more clearly delineate the catheter tip than TAS-guided ET.

TVS-guidance was first described in the 1990s [3,4]. A large retrospective Japanese study involving 846 cycles showed higher pregnancy and implantation rates with the use of TVS-guidance [5]. Although two randomized clinical trials showed that neither TAS nor TVS-guided embryo transfer is more beneficial in



optimizing pregnancy outcomes, it was just associated with increased patient comfort due to the absence of bladder distension. [6,7]. Transvaginal ultrasound-guided ET does not require a full bladder, gives greater resolution of the utero-cervical angle, and can more clearly delineate the catheter tip than TAS-guided ET. Nonetheless, it is thought to be technically more difficult because of the necessity to simultaneously place the ultrasound probe, the speculum, and the catheter during the ET. A previous study already demonstrated that the degree of bladder distension correlates with pain or discomfort reported by patients during ET. Furthermore, the issue of obtaining optimal bladder distension (including the need for patient instructions and possible extra waiting time if bladder distension is insufficient) could also have a major impact on the everyday management of a busy clinic. Application of TA ultrasound requires the presence and adequate training of an additional person (e.g., a nurse or sonographer). This contrasts with the TV approach where the scanning is easily performed by the operator [7].

In this case report we described the first TVS-guide embryo transfer and pregnancy in Canada.

CASE REPORT

A 34-year-old woman with an eleven year history of primary male factor infertility sought consultation. She had previously undergone five intra-cytoplasm sperm injection cycles at another institution, which all failed to give a conception. Her husband was 38 years old and had Asthenospermia. After counseling, the patient consented to a planned Antagonist cycle. On day 3 of her menstrual cycle, ovarian stimulation was started with recombinant follicle-stimulating hormone (FSH; Gonal-F®, Merk Serono, MA, USA) 262IU/day and recombinant Luteinizing hormone (LH; Luveris®, Merk Serono, MA, USA) 75IU/day. After 8 days of stimulation, the diameter of the two leading follicles measured 18mm, and her endometrial lining measured 9mm, serum estradiol concentration was 7247pmol/L. Thirty-eight hours after recombinant human chorionic gonadotropin (Ovidryl®, Merk Serono, MA, USA) 250mg administration, oocyte retrieval was carried out. A total of 23 oocytes were retrieved, 16 oocytes were at MII stage and the remaining 7 oocytes were at germinal vesicle (GV) stage. A total of twelve 2PN embryos were obtained, two embryos (blastocyst grade 2.5 and 3.0) was transferred on day five of development, per the Quebec government embryo transfer policy.

The patient was initially asked to empty their bladder. A speculum was then introduced and the ultrasound probe, with a sterile condom and ultrasound transmission gel, was placed inside the condom and inserted through the speculum to assess the uterine contour and degree of angulation and then removed. For embryo transfer, a 3Fr flexible embryo transfer catheter (no. 233340; Kitazato Medical Co., Ltd., Tokyo, Japan) was used. The catheter is composed of a semirigid, 20 cm-long,

3Fr, pre-curved (30°) outer sheath with a soft obturator and very thin, hyperflexible, 40-cm-long, soft silicone inner catheter. The outer sheath with a small ball-shaped tip was inserted into the cervix until it reached the internal os. Subsequently, the speculum was gently removed, and a covered vaginal ultrasound probe was inserted in the vagina by concomitantly maintaining the already inserted ET catheter in its cervical position. The correct position of the catheter in relation to the internal os was verified on the scan, and a sagittal plane of the uterine body showing the whole endometrial lining was obtained. The soft obturator was removed from the inserted outer sheath. The embryologist started to load the embryos into the soft inner catheter, then brought the loaded inner catheter and inserted it into the outer sheath, which was maintained in its position by the physician. Afterward, while holding with one hand the probe and the end of the outer sheath, under continuous TV ultrasound control, the readily visible inner catheter was advanced to within a 15 mm distance of the uterine fundus by the physician. Finally, an approximately 0.1-ml media volume was injected in the cavity. The inner catheter was gently removed and was examined under the microscope to insure that the embryos had not left in the catheter.

Pregnancy was confirmed by a serum HCG concentration of 569.3IU/L, 11days after embryo replacement. Five weeks after embryo transfer, one gestational sac with positive heart activity was detected. The patient had a live birth.

DISCUSSION

This is the first report transvaginal ultrasound-guide embryo transfer and pregnancy for IVF in Canada. Total duration of ET, the patient was statistically and comfortably. Many factors influence clinical pregnancy in the IVF cycle: patient selection, ovulation induction method, oocyte retrieval technique, embryo transfer, the last step, is a critical part of the IVF cycle and is thought to be the most inefficient step. Transabdominal ultrasound-guided embryo transfer has been described by various authors since 1985 to improve the pregnancy rate [8]. However, significantly higher pregnancy rates following transabdominal ultrasound guidance have not been consistently demonstrated. Every IVF program has a transvaginal ultrasound probe for the monitoring of ovarian stimulation. Transvaginal ultrasonography is superior to transabdominal ultrasonography for visualization of the uterus because of the relative proximity of the probe to it when placed in the vagina. This technique allows the physician conducting the ET to operate the ultrasound himself, obviating the need for additional personnel. Discomfort of varying degrees related to bladder distension was frequently reported by patients in the TA arm, which was evidently avoided using the TV approach requiring a fully emptied urinary bladder. A previous study already demonstrated that the degree of bladder distension correlates with pain or discomfort reported by patients



during ET. The delays (sometimes hours) in the TAS-guided approach was often reported while waiting for adequate bladder distension. The severely anteverted uterus and multiparity seemed better served with the TAS-guided approach as the bladder tends to straighten the cervico-uterine angle and stabilizes the uterus in the pelvis adding counteraction if TVS-guidance is performed. Conversely, the retroflexed uterus appears to be better served with a TVS-guided ET approach. One final point was the agreement of physicians to perform a pre-transfer ultrasound the day of the ET (much like a mock-ET) that could serve as a guide to deciding on the optimal ultrasound approach, particularly with hyperstimulated ovaries that may alter the cervico-uterine angle.

The first randomized clinical trial that directly compared the TV versus the TA approach for ultrasound guidance involving a total of 186 randomized IVF patients—found equally high pregnancy rates in each treatment arm. The investigators concluded that neither of the two techniques provided better pregnancy rates and that uterine position, parity, and physician's preference should dictate the choice between the two approaches [6]. The second randomized clinical trial in total of 330 patients found no statistically significant difference in pregnancy or embryo implantation rates in donor oocyte recipients undergoing ET with TV versus TA ultrasound guidance. But found that light to moderate-severe discomfort related to bladder distension was reported by 63% of the patients in the TA ultrasound group which was avoided by the TV approach [7].

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Another retrospective clinical study included 129 cycles found that the routine use of transvaginal ultrasound-guided ET has significantly improved the pregnancy rates for all age groups, except those patients older than 40 years [9]. Further studies maybe are needed to define the patient groups in whom the TV approach might be superior to the currently more widely used TA ultrasound guidance.

The ability to make certain that embryos are placed in the proper location within the uterus maximizes the chance that good-quality embryos will subsequently become viable pregnancies. Transvaginal ultrasound-guided ET is a method that will enable any physician to attain this assurance, thereby permitting each cycle of IVF-ET to realize its full potential. Well-designed studies should address the optimal ultrasound approach with respect to extremes in transfer difficulty.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

