Original Article

Validity of trans-rectal ultrasound-guided embryo transfer against retroflexed uterus

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Background: Embryo transfer is one of the most critical steps affecting the success of in vitro fertilization/intracytoplasmic sperm injection-embryo transfer. It has been reported that uterine contraction caused by touching the uterine fundus at the time of embryo transfer decreased the pregnancy rate. It was demonstrated that there is a significant rise in the pregnancy rate by adequate positioning of embryos. Transabdominal ultrasound-guided embryo transfer has been reported to improve the pregnancy rate compared with the clinical touch method. The improvement of the pregnancy rate under ultrasound guidance can be attributed to the accurate positioning of the embryos aided by good visualization without touching the uterine fundus. However, sometimes difficulties are encountered when visualizing the tip of the catheter in cases where the patient has a retroflexed uterus.

Methods: In the present study, we investigated the difference in the pregnancy rates and in the implantation rates between transabdominal ultrasound-guided group and trans-rectal ultrasound-guided group in retroflexed cases.

Results and Conclusion: We found that the pregnancy rate and the implantation rate were higher among the trans-rectal group compared with the transabdominal group in retroflexed cases. The difference between the two groups was statistically significant. (Reprod Med Biol 2003; 2: 159–163)

Key words: embryo transfer, pregnancy rate, rectal, retroflexed, ultrasound.

INTRODUCTION

Clinical pregnancy is influenced by many factors in the in vitro fertilization/intracytoplasmic sperm injection-embryo transfer (IVF/ICSI-ET) cycle. The majority of transferred embryos fail to implant successfully. This failure may be ascribed to deficiencies in embryo quality or uterine receptivity as suggested by Speirs, or to the technique of embryo transfer.1 Embryo transfer is one of the most critical steps affecting the success rate of the IVF/ICSI-ET cycle. Fanchin et al. and Lesny et al. noted that uterine contraction caused by touching the uterine fundus at the time of embryo transfer was associated with lower clinical pregnancy and implantation rates.2,3 Waterstone et al. reported a significant rise in the pregnancy rate by changing only the depth of the catheter introduction to avoid placement of the embryos close to the uterine fundus.5 Stricker et al. and Leong et al. were first to raise the possibility that ultrasound guidance may improve the pregnancy rate.5,6 Transabdominal ultrasound-guided embryo transfer has been described by various authors since 1985 to improve the pregnancy rate, compared with the clinical touch method.5,6 Kojima et al. reported that the use of transvaginal ultrasound-guided embryo transfer significantly improved both pregnancy and implantation rates.9 Transvaginal ultrasound removed the necessity for a full bladder. However, it is very difficult to simultaneously place the ultrasound probe, the speculum and the catheter during embryo transfer. We have carried out transabdominal ultrasound-guided embryo transfer. It is difficult to verify the placement of the tip of the catheter in retroflexed cases even when the bladder is full. Since April 2002, we have been adopting trans-rectal ultrasound guidance during embryo transfer in retroflexed cases. In the present study, the pregnancy and implantation rates were compared between transabdominal ultrasound-guided embryo transfers...
group and trans-rectal ultrasound-guided embryo transfers group in retroflexed cases.

MATERIALS AND METHODS

BETWEEN SEPTEMBER 2001 and February 2003, a total of 42 patients were enrolled in the present study who had a retroflexed uterus and underwent embryo transfer after IVF/ICSI. We attempted embryo transfers to 31 patients under trans-rectal ultrasound guidance. A total of 76 embryo transfers were performed. Among these, 38 embryo transfers were performed using the transabdominal ultrasound-guided method and 38 embryo transfers were performed using the trans-rectal ultrasound-guided method. None of the patients had any history of medical problems. We carried out a retrospective study in transabdominal ultrasound guidance and a prospective study in trans-rectal ultrasound guidance. Before we began performing trans-rectal ultrasound-guided embryo transfer, transabdominal ultrasound-guided embryo transfer was performed on all consecutive patients. There was no change in the ovarian stimulation method, oocyte retrieval, culture media, culture system, or luteal support in either period.

All patients had undergone a controlled ovarian stimulation program using a follicle stimulating hormone with a gonadotropin releasing hormone agonist. When the leading follicle reached a diameter of 20 mm, 5000 IU human chorionic gonadotropin was given as an ovulatory trigger 36 h prior to vaginal oocyte retrieval. After culturing, on day 2, 3, or 5 following oocyte retrieval, a maximum of three embryos were transferred as a rule. However, in a lower number of cases of poor curability, four embryos were transferred. We performed embryo transfers using 4-Fr flexible embryo transfer catheter (soft or hard) (Fuji Systems, Tokyo, Japan), or Edwards-Wallace embryo replacement catheter (SIMS, Portex Ltd UK) in the lithotomy position. The catheter was loaded with 30 µL of medium (human tubal fluid medium; Irvine, CA, USA) between air bubbles (~2 µL). Then the catheter containing the embryos was inserted. The tip of the catheter was placed within 1 cm from the fundal limit of the uterine cavity. The embryos were then injected over 15 s, allowing observation of the movement of the air bubbles into the uterine cavity. Finally, the catheter was checked microscopically to ensure no embryos remained within it.

In the transabdominal ultrasound-guided group, after inserting the speculum and exposing the cervix, the external cervical ostium was then cleaned with a moist cotton bud and mucus in the cervical canal was removed with a mucus extractor. The test catheter was inserted and moved towards the fundus by gently touching the fundus. After verifying the length from the external ostium to the fundus, the new catheter loaded embryos was re-inserted. The catheter was withdrawn approximately 1 cm, such as in the clinical touch method. It was impossible to detect the transfer catheter in the uterine cavity in spite of using an ultrasound machine with a 5.0 MHz transabdominal probe (Mochida Sonovista ST, Tokyo, Japan).

In the trans-rectal ultrasound-guided group, a single clinician performed all procedures in the present study. The method was performed according to the following regimen. First, after we confirmed that the patient had no history of disease of the rectum, a transvaginal microconvex probe (Mochida Sonovista) coated with xylocaine jelly was inserted into the rectum from the anus in a lithotomy position with either an empty bladder or a full bladder. After setting the speculum and exposing the cervix, the test catheter was inserted into the external ostium of the uterus. We advanced the catheter tip until it was near the uterine fundus and took care to avoid touching the fundus as visualized in a sagittal plane using an ultrasound machine with a 7.5 MHz transvaginal probe. The transfer catheter was seen to be embedded within the endometrium as shown in Fig. 1. The tip of the catheter was positioned to within 1 cm of the fundus of the uterine cavity, and

Figure 1 In the patients who have a retroflexed uterus with a empty bladder, the transfer catheter can be seen to be embedded within the endometrial cavity under trans-rectal ultrasound guidance.