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Original Research Articles

Correlation of visualization of post embryo transfer air bubble with pregnancy rate

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We assessed 77 post-embryo transfer cases in surrogates aged 23 to 30 years in 6 months. Estradiol valerate 2 mg thrice daily was started from day 2 of the period in all subjects. Transvaginal scanning was done on day 8, and day 12 was done. Embryo transfer was planned when endometrial thickness was > 8 mm. Air bubble was visible in all subjects immediately after embryo transfer. Visualization of air bubbles was recorded one hour post embryo transfers after passing the urine. The pregnancy rate was assessed after 14 days in all subjects. There was no difference regarding demographic variables, number of embryos transferred, and embryo quality in all subjects. Cases were divided into 3 groups – Group A with clear visualization of the air bubble, Group B with a faint visualization of the air bubble, and Group C with an absent visualization of the air bubble. The pregnancy rate was 56.1% (32/57) in group 1, 78.6% in group 2 (11/14), and no pregnancies (0/6) in group 3. Visualizing an air bubble after one hour appears to predict the pregnancy rate. Negative visualization of air bubbles after one hour showed no pregnancies. Faint visualization indicated good pregnancy rates. But further, well-designed studies are required to predict the pregnancy rate more precisely.

INTRODUCTION

Successful implantation depends on many factors like egg quality, sperm quality, high-quality embryo, receptive endometrium, and perfect embryo transfer technique.[1] Many studies recommended transabdominal ultrasound guidance during embryo transfer to improve clinical pregnancy and live birth rates. The ultrasound-guided transfer technique offers the opportunity to visualize the transfer catheter tip, the air bubbles, and the endometrial lining very accurately. Most studies found that embryo placement impacted pregnancy rates, with pregnancy rates highest when the embryo was placed in the upper or middle area of the uterine cavity, at least 1 cm away from the fundus.[2,3] In some studies, monitoring the air bubble's final position after embryo transfer was correlated with pregnancy rates. In our study, we correlated the clarity of visualization of post embryo transfer air bubble with pregnancy rates. This is the first study of this kind as far as our knowledge.

MATERIALS AND METHODS

The prospective study was conducted at Advanced Fertility and Gynecology Center, New Delhi, in surrogates aged 23 to 30. Between July 2019 and December 2019, 77 surrogates underwent embryo transfer using the plain estradiol valerate method. The cases were divided into three groups – Group A with a clear visualization of the air bubble, Group B with a faint visualization of the air bubble, and Group C with an absent visualization of the air bubble.

PROTOCOL

Estradiol valerate 2 mg thrice daily was started from day 2 of the period in all subjects. Transvaginal scanning was done on day 8, and day 12 was done. Embryo transfer was planned when the endometrial thickness was > 8 mm on—fresh day. Three embryos were transferred after adding vaginal natural micronized progesterone with a soft catheter. An air bubble was visible in all subjects immediately after embryo transfer. Visualization of air bubbles was recorded one hour after embryo transfers after passing the urine. Luteal phase support was given, and the pregnancy rate was assessed after 14 days in all subjects.

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Table 1. Demographic Profile

Parameters	Group A	Group B	Group C
Number of Patients	57	14	6
Age (years)	25.8	24.6	25
BMI (kg/m2)	20.8	20.5	21
Endometrial Thickness (mm)	9.4	9.0	9.1

RESULTS

A total of 77 surrogate females were prospectively included in the study. The age of the female partners was 23 to 30 years. There was no significant difference regarding demographic variables, maternal and paternal factors, number of embryos transferred, embryo quality, and endometrial thickness in all subjects. The clarity of the air bubble was assessed after one hour of embryo transfer after the passage of urine. The pregnancy rate was 56.1% (32/57) in group 1, 78.6% in group 2 (11/14), and there were no pregnancies (0/6) in group 3 (**Table 1**).

DISCUSSION

Our data indicate that the presence of the air bubbles after one hour of embryo transfer is related to pregnancy rates. Some studies were performed where the position of the air bubble after embryo transfer was localized and correlated with pregnancy rates. Few studies concluded that the embryo flash movement/migration at 60 minutes after embryo transfer toward the fundus was associated with higher clinical pregnancy rate. Actually it is difficult to predict or control the position of the air bubbles; after positioning of the transfer catheter the final position of the air bubbles is dependent on many factors like type of the syringe, the resistance of the plunger, the pressure used to press the plunger, amount of media used and patient-related determinants as a possible intrauterine resistance.[4,5] A recent prospective cohort study of 277 fresh cycle IVF/ICSI treatments assessed embryo flash position and migration at 1, 5, and 60 minutes after ET with three-dimensional ultrasound. They found that the pregnancy rate and implantation rate in cases with embryo flashes located near the fundus after 60 minutes were high.[6]

The disappearance of air bubbles later on, as in our study, may be correlated with undesirable uterine contractions. It may cause the movement of air bubbles toward the cervical canal after embryo transfer, which indicates the expulsion of the embryo. It is a common factor for IVF failure. So, efforts must be made to prevent uterine contractions while performing embryo transfer. Performing atraumatic embryo transfer using a soft catheter will prevent uterine contractions, which is essential to IVF success.[7]

In conclusion, our study found that the visualization of air bubbles after one hour appears to predict the pregnancy rate, and negative visualization of air bubbles after one hour showed no pregnancies.

The limitation of our study is that the sample size needs to be bigger. The success of IVF depends on many factors, such as maternal factors, paternal factors, the uterus lining, etc. Though we tried to consider all the factors, all factors in all patients cannot be compared. Further, well-designed studies with good sample size are required to predict the pregnancy rate more precisely.

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