The difficulties encountered with embryo transfer and the role of catheter choice in clinical pregnancy success rates in an IVF cycle

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ABSTRACT

Objective: The aim of the study was to compare the clinical pregnancy rates of soft catheters and catheters with stylet in according to the difficulty levels of transfer.

Setting: Zeynep Kamil Women and Children's Hospital Reproductive endocrinology and Infertility division and Ferti-Jin ART center.

Materials and methods: The total number of 1158 embryo transfers performed are examined retrospectively. The embryo transfer performances are divided into three groups as easy, moderately-difficult and difficult. 827 transfers were in the easy group, 284 were in moderately-difficult group and 47 were in the difficult group.

Results: The pregnancy rates were % 41.4, % 36.2, and % 17, respectively. There were statistically significant difference between group 1 and group 3, p<0.05 and between group 2 and group 3, p<0.05. There were no statistically significant difference between group 1 and group 2, p>0.05.

Conclusions: In case of the failure of the embryo transfer by soft catheter by detected in mock transfer, it may be replaced by catheter with stylet to achieve the transfer. But the success of IVF is the highest in the easy-transferred and soft catheter used group. In moderately difficult group, it is possible to improve the clinical pregnancy rates by choosing catheter with stylet but not in difficult transfer group. Therefore examining the cervical canal, "trying mock transfer and deciding which catheter is to be used", before the transfer is very useful.

Key words: IVF-ET, Embryo transfer

In vitro fertilization and embryo transfer (IVF-ET) is being used in treatments of different etiologies of infertility because of its high pregnancy success. In spite of the developing technology, the implantation failure is still a remaining problem to be solved (1). Many factors such as uterine receptivity, embryo quality and the application of the embryo transfer (ET) affect the success of pregnancy (2). ET is a critical step, which affects the rate of success in IVF (3, 4).

It has been reported that the technical difficulties, which appear during the ET cause relatively low implantation rates (5,6). When it is faced with a difficulty in soft catheter performance of ET, the catheter can be displaced with a stylet catheter, and the embryo can be transferred.

To prevent the difficulties in the transfer, the chosen type of the catheter that will be used is very important. Although it is possible to change the embryo-loaded catheter to a stylet catheter in any
difficulty during the process, the risk is losing the embryo. So Mock transfer is very important to choose the type of the transfer catheter.

The aim of our study was to compare the clinical pregnancy rates of soft catheters and catheters with stylet in according to the difficulty levels of transfer.

**MATERIALS AND METHODS**

The total number of 1158 embryo transfers that were performed in the IVF Center of ZEYNEP KAMIL WOMEN AND CHILDREN'S HOSPITAL (280 cases) and in FERTI-JIN IVF Center (878 cases) were examined retrospectively.

Initially, Mock transfers were performed with soft transfer catheters after aspiration cervical mucus pre-embryo transfer. In case of the soft catheter couldn't pass through the cervical canal easily, than Malleable Wallace catheter was used. All embryo transfers were performed under ultrasound guidance by the same physician in the third day of oocyte retrieval. The catheter was molded according to the uterocervical angle measured by abdominal ultrasound. Embryos were deposited 2 cm below the uterine fundus and the catheter slowly withdrawn after 30 seconds.

The embryo transfer performances are divided into three groups as easy, moderately difficult and difficult.

'EASY TRANSFER' describes the transfer, which is performed only with the use of Wallace soft transfer catheter without any resistance.

'MODERATELY DIFFICULT TRANSFER' describes the resistance to the soft transfer catheter and the use of Malleable transfer catheter and requiring some soft manipulation.

'DIFFICULT TRANSFER' describes the requirement of Tenaculum using, need of cervical dilatation, hysterometry, occurrence of cervical hemorrhage and the using of Malleable transfer catheter.

The patient had bed rest following ET for 20-minute period.

Beta-hCG titers were drawn 11 days after retrieval and if positive, repeated two days later. In patients exhibiting a doubling in beta hCG titers, transabdominal ultrasonography was performed using 4 weeks after the day of first positive beta hCG titers. Evidence of gestational sac confirmed clinical pregnancy.

Only clinical pregnancies were evaluated and the results were analyzed by statistical package for social sciences (SPSS, Chicago). The significance level was set at p<0.05.

**RESULTS**

There were 1158 patients; embryo transfers of 827 patients were reported as easy transfer, 284 as moderately difficult transfer and 47 as difficult transfer. There were no statistically difference among groups according to ages, 34 ± 3.5, 35 ± 4.3, 32.5 ± 4.5 in easy, moderately difficult and difficult transfer group, respectively p>0.05.

The pregnancy rate in easy transfer group was %41.4 and %36.2 in moderately difficult transfer group but it was only %17 in extremely difficult group. There is statistically significant difference between group 1 and group 3, p<0.05 and between group 2 and group 3, p<0.05. There is no statistically significant difference between group 1 and group 2, p>0.05. Also there is no statistically significant difference among three groups according to ages and number of transferred embryo, p>0.05. (Table 1). Only one heterotopic pregnancy was diagnosed in easy transfer group and dropped out the study.

<table>
<thead>
<tr>
<th></th>
<th>Easy Transfer GROUP 1 (n: 826)</th>
<th>Moderately Difficult Transfer GROUP 2 (n: 284)</th>
<th>Difficult Transfer GROUP 3 (n: 47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transferred embryo</td>
<td>4.0 ± 0.2</td>
<td>4.0 ± 0.3</td>
<td>3.8 ± 0.6</td>
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<tr>
<td>Clinical pregnancy rate</td>
<td>41.4%</td>
<td>36.2%</td>
<td>17%</td>
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</table>
DISCUSSION

Various types of embryo transfer catheters are used in the ART programs. Many factors such as the type of the catheter, the difficulty of transfer, the uterine contractions, ultrasound guided embryo transfer may affect the outcome of pregnancy.

There are a lot of studies, which compare different types of embryo transfer catheters. The use of the soft transfer catheters and easily performed ET will increase the chance of pregnancy.

As it's clearly seen regarding the results, the easy embryo transfer and the use of soft catheters increase the success of IVF (7-11). Difficulties in the embryo transfer affect the rates of implantation and pregnancy negatively.

Some of the authors (5, 6) have found low rates of pregnancy after difficult ET whereas some of them have found just the opposite findings (12, 13). In our study we have found that high pregnancy rates can be accomplished with easy ET method, which is performed by the soft catheter that easily passes through the cervical canal. To choose a suitable catheter according to the result of the Mock Transfer performed by soft catheter is very important because there is a risk to lose the loaded embryos if there is resistance in passing the cervical canal. To prevent the risk of losing the embryo, ultrasound guided cervical positioning of the catheters will provide an easy, soft and atraumatic performance (12-14). Also Changing the catheter and blood on the catheter tip significantly diminish the pregnancy and implantation rates (11). Therefore examining the cervical canal, "trying mock transfer and deciding which catheter is to be used", before the transfer is very useful.

In case of failure in easy pass of the soft catheter, it will be wise to use catheter with stylet. There is no significant statistically difference between the use of catheter with stylet and the use of the soft catheter in ET in terms of pregnancy rates.

The use of tenaculum to straighten the axis of the uterus might lead to some complication such as contraction of the uterus and pain. Therefore we have categorized these transfers in the difficult transfer group. Another complication of the use of tenaculum might be hemorrhage in cervix and the necessity of tamponade can be too uncomfortable for the patient.

We have found that as a result of using tenaculum, the clinical pregnancy rates are low. Lesny et al. (15) have showed that the manipulation of cervix with tenaculum might lead to contraction in the junctional zone. Franckin et al. (16) have showed that the increasing of the contractions in the junctional zone of cervix related to low rates of pregnancy.

Making a decision regarding the transfer technique and the type of the catheter, which will be used has an important affect on the improvement of the pregnancy rates. Difficult and manipulation requiring transfers evoke uterine contractions and therefore result in expulsion of the embryo.

Many factors such as the type of the catheter, the difficulty of transfer, uterine contractions and ultrasound guided ET, affect the results of ART (17). Ultrasound-guided embryo transfer increases the clinical pregnancy and ongoing pregnancy rates significantly compared to the clinical touch method (18). Primarily the soft transfer catheter must be preferred in embryo transfer. In case of failure of the soft catheter, it may be replaced by the Malleable catheter to achieve the transfer. It is possible to improve clinical pregnancy rates, especially in moderately difficult transfer group, by this way.

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Received on August 19, 2004; revised and accepted on December 6, 2004