

# Live Birth Following Transmyometrial Embryo Transfer

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ABSTRACT

Occasionally, embryo transfer may be difficult, which is often because of anatomical position of the uterus or cervical stenosis. An alternative technique in such a scenario is the transmyometrial transfer of the embryos with the help of transvaginal ultrasound. Here, we describe the first case of successful embryo transfer through transmyometrial route leading to pregnancy and successful delivery in India.

**KEYWORDS:** *Difficult embryo transfer, endometriosis, transmyometrial transfer*

## INTRODUCTION

A critical point *in vitro* fertilization (IVF) is the stage of embryo transfer, which can have a significant bearing on the success or failure of the entire process. The most common route utilized to achieve this is the transcervical intrauterine route. Much is now known on how to perform this step optimally.<sup>[1]</sup>

Occasionally (in 5%–7% of cases), embryo transfer may be difficult, which is often because of anatomical position of the uterus or cervical stenosis. In such cases, multiple attempts through transcervical route may be needed leading to discomfort and increasing risk of implantation failure.<sup>[2,3]</sup> An alternative technique in such a scenario is the transmyometrial transfer of the embryos with the help of transvaginal ultrasound. First described in the 1990s, in this technique, the uterine cavity is reached through the myometrium and the embryo is deposited in the subendometrial zone with special catheter [Figure 1].<sup>[4]</sup>

Here, we describe the first case of successful embryo transfer through transmyometrial route leading to pregnancy and successful delivery in India.

## CASE REPORT

A couple married for 5 years presented to us with a duration of subfertility of 3 years. The age of the female partner was 30 years and the male partner 34 years. There was no significant surgical and medical

history. Gynecological history was insignificant with regular menstrual cycles. Subfertility assessment was done and showed an anti-Mullerian hormone level of 10 ng/dl, follicle-stimulating hormone (FSH) of 4.42, luteinizing hormone of 2.92, and prolactin of 22.19. Other baseline investigations were normal. Baseline scan revealed uterus 8.2 cm × 3.8 cm × 3.4 cm with focal adenomyotic area in the anterior wall of the uterus measuring 3.3 cm × 2 cm, left ovary behind the uterus with ten antral follicles, right ovary with 12 antral follicles, and an endometriotic cyst of size 2 cm × 2 cm. Hysterosalpingogram done before coming to us revealed normal uterus with patent right fallopian tube and left fallopian tube with fimbrial block.

Previous infertility treatment in the past history included treatment with ovulation induction drugs (clomiphene and gonadotropins) for eight cycles in 2 years. The couple was counseled for diagnostic laparoscopy and hysteroscopy, which showed Grade 4 endometriosis, with obliterated pouch of Douglas and bilateral fallopian tubes adherent to the posterior wall of the uterus. These adhesions were released, chromotubation subsequently showed patent tubes, and bilateral ovaries were adherent to the pouch of Douglas. Hysteroscopy showed difficulty in cannulating cervical canal, but other findings were normal. Cervix was dilated till Hegar 8. Male partner sperm count and morphology was 25 million/ml, 45% progressive motility, and 1% normal forms.

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The patient was counseled for IVF/ Intra-cytoplasmic sperm injection (ICSI) postlaparoscopy findings. The protocol planned was antagonist protocol with downregulated frozen embryo transfer. The patient was started with gonadotropin antagonist cycle on day 2 and a total of FSH 1500 IU, and human menopausal gonadotrophin (HMG) 1500 IU was given. Ovum pickup was done on day 12, and three 11-day embryos (cleavage stage) were cryopreserved (this was the institutional policy at that time, and more recently, our practice has changed and all embryos are frozen at day 5). Downregulated hormone replacement therapy was started with estradiol valerate. On day 14 of hormone replacement therapy (HRT), endometrial thickness was 12.5 mm, micronized progesterone was started, and five 2-day embryos were transferred on day 19 of HRT. Embryo transfer was classed as difficult at the level of internal os. Blood and mucus were there on the catheter. The patient was discharged with the routine postembryo transfer protocol and advised repeat hysteroscopy and cannulation if beta-human chorionic gonadotropin (HCG) was negative.

Beta-HCG was negative and hysteroscopy was repeated which showed a normal endocervical canal, internal os constricted again, with normal endometrial cavity. HRT was again started in the next cycle after downregulation with gonadotrophic releasing hormone (GnRH) agonist, and on day 19 of HRT, five 2-day embryos were transferred and routine postembryo transfer advice was given. Serum beta-HCG was negative again, and now, the patient was left with no embryos. Before the second stimulation, the patient was advised an evaluation cycle – endometrial receptivity assay at progesterone +5 because of implantation failures. Endometrial receptive assay showed receptive endometrium.

The second stimulation cycle was started on day 2. Flexible antagonist protocol cycle with r-FSH and HMG was given (total dose of r-FSH 2100 IU, HMG 1425 IU). Follicular monitoring was done as per protocol. Ovum pick up was done on day 13 of menstrual period. Subsequently, eighteen embryos at days 3 stage were obtained and cryopreserved. Cervical dilatation was done during OPU, which again was found to be difficult. At this point, the patient was given the option of transmyometrial embryo transfer which the patient preferred.

In subsequent month, hormone replacement cycle was started after downregulation. Transmyometrial embryo transfer of five 2-day embryos under general anesthesia was done on day 20 of HRT cycle after 5 days of progesterone with the transmyometrial Towako needle by pull-back technique [Figure 2]. The patient was discharged

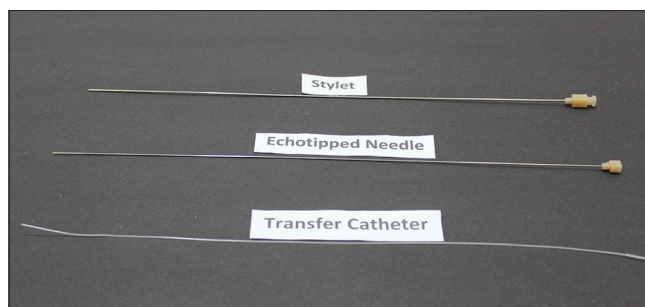


Figure 1: Parts of Towako catheter



Figure 2: Ultrasound image of transmyometrial embryo transfer

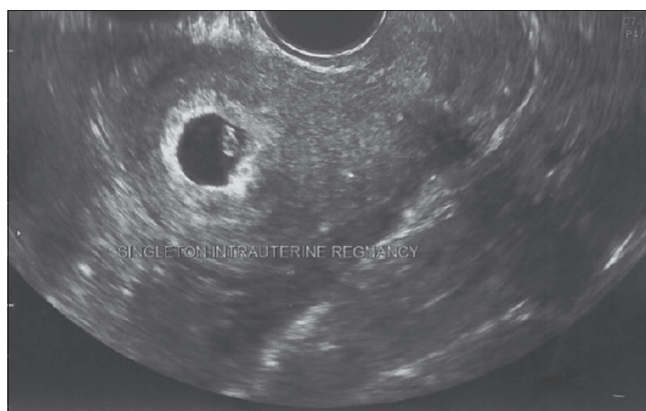


Figure 3: Ultrasound image showing 6-week pregnancy

with the routine posttransfer protocol, and serum beta-HCG on day 14 was 1656 and day 16 was 3566.

Ultrasound at 6 weeks showed a viable singleton pregnancy [Figure 3]. A dating scan came normal and was also corresponding with dates. Subsequent Level I and Level II scan at 12 weeks showed a low risk for trisomies. The patient was referred for obstetric care. She had an uneventful antenatal course and delivered a healthy baby girl by cesarean section weighing 2.85 kg. We have followed baby 2 years postdelivery, and there have been no concerns with developmental milestones so far.

## DISCUSSION

Transmyometrial transfer of embryos has been shown to be a viable and effective procedure and has been used in case of cervical abnormalities.<sup>[4]</sup> It has also been used when the dummy or mock transfer using an unchanged catheter is difficult.<sup>[5]</sup> In such a situation, the transmyometrial transfer has an equal success rate compared to difficult transcervical embryo transfer. We use the Towako method as described in the case report above. The complications following transmyometrial transfer are minor and rare.<sup>[6]</sup> Biervliet *et al.* showed an increase in the junctional zone contractions following transmyometrial embryo transfer.<sup>[7]</sup> However, this is similar to those seen after alternative procedures such as a difficult transcervical embryo transfer and does not impact pregnancy outcomes in comparison to other procedures.<sup>[6,8,9]</sup>

There are no published alternatives to Towako catheter set for transmyometrial transfer. Alternative to transmyometrial transfer includes hysteroscopic canal shaving or hysteroscopic-guided ET. Other alternatives include cervical dilatation and use of Malecot catheters.<sup>[6]</sup> Much of the evidence of all the above strategies is based on case reports and retrospective case series. The absence of uniformity in grading the difficulty of ET makes a comparison of outcomes and studies difficult.<sup>[6]</sup> Nevertheless, there are sufficient data to show the efficacy and safety of transmyometrial embryo transfer during difficult situations.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that

their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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