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ARTICLE

Transmyometrial versus very difficult transcervical embryo transfer: efficacy and safety

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Dr Mohammed Khairy graduated in 1998 in Egypt and, after finishing a residency programme, obtained a scholarship to the UK in 2005. In 2008 he was awarded a MD in infertility and reproductive medicine for work on the role of ultrasound markers of ovarian reserve (antral follicle count, ovarian volume and ovarian stromal Doppler) in the prediction of ovarian response in assisted conception cycles. Dr Khairy is now training in reproductive medicine at Birmingham Women's Hospital Fertility Centre. His main area of interest is recurrent implantation failure and interventions for improving endometrial receptivity, embryo selection and embryo transfer.

Abstract A difficult and traumatic embryo transfer can negatively impact on embryo implantation. This study retrospectively compared the outcomes of "very difficult transcervical embryo transfer" (vdTCET) versus transmyometrial embryo transfer (TMET) in a single centre over 10 years, reporting on 128 patients with vdTCET and 46 patients with TMET. The definition of vdTCET was a procedure rated by an experienced practitioner (with more than 100 transfers per year for >2 years) as very difficult and required two or more of the following: use of tenaculum, change of embryo transfer catheter and use of a stylet, reloading of the embryos or cancelling the procedure and freezing the embryo to transfer after cervical dilatation. The clinical pregnancy rates for TMET and vdTCET were 32.6% and 25%, respectively and the live birth rates were 26.1% and 16.4%, respectively. There was only one case of minor bleeding in the TMET group (2.2%). This study showed that TMET is a good alternative option in cases of vdTCET where it is impossible to achieve transcervical embryo transfer and may benefit cases with repeated failed cycles after vdTCET. Its superiority over vdTCET however could not be demonstrated.

KEYWORDS: Assisted reproduction techniques, Embryo transfer, Implantation, Transmyometrial embryo transfer

Introduction

Successful implantation of embryos remains the most crucial and least successful step in assisted reproduction treatment. The success of implantation depends on selection of high-quality competent embryo(s), receptive endometrium and a gentle, atraumatic embryo transfer. It has been reported, however, that embryo transfer is inevitably traumatic and

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difficult in 5–7% of patients having assisted reproduction treatment (Boussin et al., 1998; Tur-Kaspa et al., 1998; Wood et al., 1985) and may be almost impossible transcervically even with experienced practitioners in about 1%, owing to various anatomical/pathological reasons such as congenital cervical stenosis/atresia or previous trachelectomy (Wood et al., 1985). Clinicians faced with this scenario have the options of: (i) persevering with the traumatic very difficult transcervical embryo transfer (vdTCET) using various manipulations; (ii) cancelling the fresh embryo transfer and performing frozen embryo transfer later after cervical dilatation and/or hysteroscopy, hoping this will alleviate the difficulty; or (iii) attempting transmyometrial embryo transfer (TMET) if the other options prove futile.

The procedure of TMET has been described since 1993 in humans (Kato et al., 1993). Despite this, TMET has not been widely embraced by assisted reproduction treatment clinicians owing to the potential for detrimental trauma inflicted by the procedure on the endometrium and myometrium, and fears of inadvertent injury and bleeding complications. Indeed, one study reported that TMET led to increased junctional zone contractions, which is believed to decrease the chance of implantation (Biervliet et al., 2002). However, the same study showed that vdTCET is equally provocative of junctional zone contractions of similar frequency and amplitude (Biervliet et al., 2002). There is paucity of evidence in the literature regarding the best method of embryo transfer in very difficult cases, possibly due to lack of consensus on a definition of vdTCET. In our centre, we have been practicing TMET in cases with expected or known vdTCET since 1995 and published an earlier study in 1996 quoting a clinical pregnancy rate with TMET of 23% (Sharif et al., 1996). Various groups have published variable success rates with TMET (Boussin et al., 1998; Ghazzawi et al., 1999; Kato et al., 1993).

This study sought to report on our current success rate of TMET over the last decade and compare its success and safety with vdTCET.

Materials and methods

This is a retrospective study of all patients who had TMET and vdTCET in the Birmingham Fertility Centre (BFC) during the period from January 2004 to December 2013.

Selection criteria

The inclusion criteria were: (i) patients who had TMET for the first time during the study period; and (ii) patients who had been reported to have vdTCET for the first time in the study period.

Only one cycle per patient was included and the outcomes of repeat TMET and vdTCET were excluded to minimize the effect of selection bias from inclusion of patients with a higher number of previous failed cycles. However, according to our protocol, there was a higher chance of TMET patients having a previous failed cycle, as a large proportion of patients having TMET was selected for this procedure after a previous failed vdTCET.

Definition of vdTCET

As there is no standard definition of very difficult embryo transfer, the definition of vdTCET used for this study was cases reported by an experienced embryo transfer practitioner (who has performed at least 100 embryo transfers per year for 2 years) as very difficult and that took a longer time than usual and required two or more of any of the following manoeuvres: use of tenaculum and/or change of embryo transfer catheter and/or use of a stylet and/or reloading of the embryos or cancelling the procedure or cancellation of fresh embryo transfer and opting for frozen embryo transfer after cervical dilatation and hysteroscopy.

Patient data

Cases were identified through reviewing the BFC register and extracting data from the patients' hospital records. A proforma was used to collect data regarding the patients' baseline characteristics such as age, body mass index (BMI), duration of infertility, type of infertility (primary or secondary) and cause of infertility (male, anovulatory, tubal, endometriosis-related, combined factors, unexplained) and ovarian stimulation protocol, including dose and duration of gonadotrophin use. The patients' response data were also extracted, including number of oocytes retrieved, fertilization rate and number and grading of developing embryos. Data collected regarding the embryo transfer procedure included day of embryo transfer, number and grade of embryos transferred, catheter used, difficulties reported and operator.

Finally, the pregnancy outcomes of the included assisted reproduction treatment cycle were collected for the two groups. These included clinical pregnancy, live birth, implantation rate, miscarriage rate and ectopic pregnancy. The study also sought to identify any potential complications such as bleeding or injuries related to the embryo transfer procedure. In patients who had TMET, the specific indications for the procedure were sought and summarized.

Live birth was defined as any pregnancy that ended in the delivery of a live baby after 24 weeks' gestation. Clinical pregnancy was defined as cases who were pregnant with an identifiable intrauterine gestational sac and a fetal pole with visible fetal heart pulsations at 7–8 weeks' gestation scan. Implantation rate was defined as the number of intrauterine gestational sacs identified by ultrasound scan over the number of embryos transferred. The miscarriage rate included cases with either biochemical pregnancy loss (positive pregnancy test with pregnancy loss before identifiable gestational sac on ultrasound) or a clinical pregnancy loss after identification of gestational sac up until completed 23 weeks' gestation.

Pituitary down-regulation/ovarian stimulation protocol

The pituitary down-regulation was achieved using one of two protocols. A long protocol using the gonadotrophin-releasing hormone analogue Buserelin (Supercur®, Sanofi-Aventis, UK) 500 μg subcutaneously daily starting in the mid-luteal phase of a natural cycle and continued during gonadotrophin