INTRODUCTION

Since the birth of Louise Brown, the first test tube baby, in 1978, in vitro fertilization (IVF) has become a well established treatment procedure for certain types of infertility including long standing infertility due to tubal disease, endometriosis, unexplained infertility, or infertility involving a male factor ***(Steirteghem,2007)***.

(Palermo et al., 1992) reported the first human pregnancies and births after replacement of embryos generated by intracytoplasmic sperm injection (ICSI) procedure for assisted fertilization. Since then, the number of worldwide centers offering ICSI has increased tremendously, as has the number of treatment cycles per year ***(Steirteghem, 2007)***.

Conventional assisted reproduction treatment (ART) involves the induction of a multifollicular response to gonadotropins in an attempt to maximize the number of oocytes retrieved and therefore the number of embryos available for transfer allowing a degree of selection ***(Arslan et al., 2005).***

A critical step in the success of IVF is the appropriate timing of administration of human chorionic gonadotropin (hCG) ***(Kolibianakis et al., 2005).***

Follicular maturation and timing of oocyte retrieval must be appropriate to maximize the mature oocyte yield and thereby

increase the likelihood of achieving and sustaining a pregnancy ***(Shmorgun et al., 2010)***.

As hCG administration practices vary markedly and still are based largely on clinical impression rather than scientific evidence ***(Shmorgun et al., 2010).***

Some indices that have been evaluated as potential indicators for timing of hCG administration include two dimensional (2D) ultrasound measurements of lead follicles, endometrial thickness, estradiol (E2) level, and cervical mucus production ***(Kosma et al., 2004; Zhang et al., 2005)***.

Ultrasound has become an essential tool in the assessment and management of women undergoing ART ***(NICE, 2004)***.

It permits the pretreatment screening of women, allows for direct monitoring of response to controlled ovarian stimulation and facilitates oocyte retrieval and embryo transfer ***(Jayaprakasan et al., 2008)***.

Accurate assessment of the size of follicles is important because the timing of oocyte maturation and subsequent egg collection is based on the principle that a follicle is more likely to contain a mature oocyte when it measures between 12 and 24 mm in diameter ***(Wittmaack et al., 1994; Bergh et al., 1998)***.

Therefore, this should result in the retrieval of a higher number of mature oocytes and result in improved fertilization rates

and ultimately a higher chance of pregnancy ***(Raine-Fenning et al., 2010)***.

Most investigators have used conventional 2D ultrasound to assess ovarian morphology and quantify these variables,but the recent use of three dimensional (3D) ultrasonography and quantitative 3D power Doppler angiography (3D-PDA) as a diagnostic modality has an important role in improving the predictive accuracy of ultrasound assessment of IVF\ICSI outcome ***(Jayaprakasan et al., 2008)***.

Recent advances in the technology of 3D ultrasound have made it possible to accurately monitor follicular, ovarian, and endometrial volumes without using invasive techniques ***(Kyei-Mensah et al., 1996; Amer et al., 2003)***.

These measurements may prove more useful than 2D imaging of irregular spheroid structures (follicles) seen in ovaries stimulated for IVF ***(Raine-Fenning et al., 2010)***.

Three-dimensional follicular volume measurements have a stronger correlation with the number of mature oocytes retrieved than 2D measurements ***(Shmorgun et al., 2010)***.

As 3D technology improves, this parameter may replace 2D measurements in the optimal timing of hCG before oocyte retrieval ***(Rodriguez -Fuentes et al., 2010)***.