INTRODUCTION

Polycystic ovary syndrome(PCOS) is the most common reproductive endocrinopathy of women during their child bearing years. It is a syndrome and therefore no single diagnostic criterion is sufficient for clinical diagnosis(**Franks, 1995**).

During the first international conference on PCOS at the National Institutes of Health (NIH) in the USA in 1990, three key features of PCOS were generally agreed on: chronic anovulation, hyperandrogenism (clinical or laboratory evidence) and the absence of other endocrine disorders (e.g. congenital adrenal hyperplasia or hyperprolactinaemia) .(**Zawadzki and Dunaif, 1992).**

The presence of PCOs on ultrasonography was not included in the definition despite this feature being mandatory in many centers.(**Balen et al, 2003**).

In 2003, a joint meeting of the European Society of Human Reproduction and Embryology (ESHRE) and the American Society of Reproductive Medicine (ASRM) was held in Rotterdam. At this PCOS Consensus Workshop, new guidelines for the diagnosis of PCOS were suggested **(The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, 2004)**. A diagnosis of PCOS was to be made when at least two of three elements were present: chronic anovulation, clinical or biochemical hyperandrogenism and clearly defined PCOs on ultrasound.

The 2003 Rotterdam diagnostic criteria for polycystic ovary syndrome (PCOS) support the objective role of ultrasound in defining the appearance of the PCO, but there are significant limitations of these new guidelines from

an ultrasound perspective that must be considered. These include either 12 or more follicles measuring 2–9 mm in diameter or an increased ovarian volume >10 cm^3. It is essential that the ultrasound scan is performed at atime of ovarian quiescence, such as during the early follicular phase of the menstrual cycle . Contrary to the original ultrasound features described by **Adams *et al*. (1985)**, the distribution of follicles and a description of the stroma are not included in the revised Rotterdam criteria, and the presence of a single PCO is sufficient to make the diagnosis.

The 2003 Rotterdam guidelines represent an important first step in defining uniform diagnostic criteria for PCOS and, therefore, a method of clinical standardization that has important connotations for clinical management and research activities. (**Lam and Raine-Fennings 2006).**

There are important considerations and limitations of the new ultrasound guidelines, however, that must be addressed. Calculation of ovarian volume is based on geometric assumptions from two-dimensional (2D) measurements (**Gilja *et al*., 1999)**. A simplified formula for a prolate ellipsoid (0.5 x length x width x thickness) is used, which assumes a degree of regularity of the ovary that is presumed to be ovoid; yet, PCOs are generally less regular (**DePriest *et al*., 1993**).

A part from an increased number of antral follicles and a larger ovarian volume, women with POCS have also been shown to have an increased ovarian stromal volume and blood flow(**Kyei-Mensah *et al*., 1998; Pan *et al*., 2002)** . These are important parameters that may be relevant to our understanding of the pathogenesis and clinical presentation of PCOS and as prospective predictors of the response to the various treatments used in patients with PCOS(**Aleem and Predanic, 1996).**

However, neither stromal description nor Doppler ultrasound measurements are mentioned in the new guidelines for the ultrasonographic diagnosis of PCOS. Three-dimensional (3D) ultrasound is a relatively new imaging modality that has the potential to address these points and improve the sensitivity and specificity of ultrasound in the diagnosis of PCOS (**Raine-Fenning *et al*., 2003, 2004)**.

Three- dimensional ultrasound not only permits improved spatial awareness and volumetric and quantitative vascular assessment but also provides a more objective tool to examine stromal echogenicity. Further more three-dimensional (3D) ultrasound provides a new method for the objective quantitative assessment of follicle count, ovarian volume, stromal volume and blood flow within the ovary as a whole. **(Lam and Raine-Fennings , 2006**).