Introduction

Polycystic ovary syndrome (PCOS) is the most frequent circumstance of hyperandrogenism and infertility in women ***(Jorand et al .2003)*** Historically detection of polycystic ovary required visualization of the ovaries at laparotomy and histological confirmation following biopsy ***(Stein and Leventhal ,1935).***

As further studies identified the association of certain endocrine abnormalities in women with histological evidence of polycystic ovaries, biochemical criteria became the mainstay for diagnosis. Raised serum levels of LH, testosterone and androstenedione , in association with low or normal levels of FSH , described an endocrine profile which many believed to be diagnostic of polycystic ovary syndrome . Well recognized clinical presentations included menstrual cycle disturbances (oligo/amenorrhoea), obesity and hyperandrogenism manifesting as hirsutism, acne or androgen-dependent alopecia***(Balen et al 2003).***

Since the polycystic ovary syndrome (PCOS) international consensus held at Rotterdam in 2003 , ultrasound criteria are now included in the definition of the disease ***(Jonard et al 2005)*** . In addition to its role in the definition of PCOS, ultrasound is helpful to predict fertility outcome of clomiphene citrate (**Imani et al., 2002**), risk of ovarian hyperstimulation syndrome (OHSS***) (Balen et al., 2003)*** and assist in deciding whether the in vitro maturation of oocytes is desirable ***(Tan et al., 2002)*** These criteria include the ovarian volume (OV) and the follicle number (FN), which have been Considered the key feature of polycystic ovaries (PCO) for more than 15 years. They are combined according to following definition: either 12 or more follicles measuring 2-9 mm in diameter or increased ovarian volume >10cm ***(Jonrad et al , 2005).***

The follicle distribution should be omitted as well as the increase in stromal echogenicity and volume.

Although increased stromal volume is a feature of PCO **(*Bucket et al., 2003***), it has been shown that the measurement of the ovarian volume is a good surrogate for the quantification of stromal volume in clinical practice **(*Dewailly et al., 1994)***.

The 2003 Rotterdam consensus workshop concluded that PCOS is a syndrome of ovarian dysfunction along with the cardinal features hyperandrogenism and polycystic ovary (PCO) morphology. PCOS remains a syndrome and, as such, no single diagnostic criterion (such as hyperandrogenism or PCO) is sufficient for clinical diagnosis. Its clinical manifestations may include: menstrual irregularities, signs of androgen excess, and obesity.

Insulin resistance and elevated serum LH levels are also common features in PCOS. PCOS is associated with an increased risk of type 2 diabetes and cardiovascular events**.(The Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group 2004)** .

Insulin resistance is associated with reproductive abnormalities in women with PCOS Improving insulin sensitivity through both lifestyle and pharmacological intervention can ameliorate these abnormalities. Insulin resistance, defined as decreased insulin-mediated glucose utilization, is commonly found in the larger population (10–25%) when sophisticated dynamic studies of insulin action are performed ***(Ferrannini et al., 1997)***
A woman having PCO in the absence of an ovulatory disorder or hyperandrogenism (‘asymptomatic’ PCO) should not be considered as having PCOS until more is known regarding the clinical presentation ***(Dewailly, 1997***).the prevalence of PCO in asymptomatic women is 18%,(***S. Taponen et al 2004***).

The diagnostic criteria for PCOS have long been an issue of debate. However, a much-needed consensus was recently reached at a congress of the ESHRE and American Society for Reproductive Medicine (ASRM) in Rotterdam 2003, on the diagnostic criteria and long-term health risks related to PCOS. The newly revised criteria for the diagnosis of PCOS are: (two out of three) (i)

oligo- and/or anovulation, (ii) clinical and/or biochemical signs of hyperandrogenism and (iii) PCO. .(The Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group 2004)

Aim Of The Work

To exclude or to confirm if all patients with PCO diagnosed by ultrasound have PCOS regarding history, clinical examination, and laboratory findings based on the Rotterdam criteria for diagnosis of PCOS .

Patient and Methods

The study will be carried out at Ain Shams University Maternity Hospital .

Using statistical program Epi Info 2000 version 1.0 for calculation of the least acceptable sample needed to be fully investigated females with PCO out of those attending to imaging centre , the sample that has been calculated is 57 subjected with confidence level 44%, expected frequency of PCOS among PCO is 28% and the worst acceptable level 18%

Inclusion Criteria

Ultrasound picture :

- Ovarian volume more than $10cm^3$
- 12 or more follicles measuring 2-9 mm in diameter.

Regularly menstruating women should be scanned in the early follicular phase (cycle days 3–5).

Oligo-/amenorrhoeic women should be scanned either at random or between days 3 and 5 after a progestin-induced withdrawal bleeding.

Calculation of ovarian volume is performed using the simplified formula for a prolate ellipsoid (0.5 x length x width x thickness)

Follicle number should be estimated in both longitudinal and antero-posterior cross-sections of the ovaries.

The size of follicles <10 mm should be expressed as the mean of the diameters measured on the two sections. **.(The Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group 2004)** .

All patient will be subjected to:

1) complete history taking
2) general and local examination
3) measuring weight and height "to calculate body mass index " .
4) serum sampling for fasting insulin level & fasting glucose level "as a measure of insulin resistance "
5) diagnosis of PCOS patient will follow the Rotterdam criteria " presence of at least 2 of the following :
    a) - anovulation ± irregular menstruation
    b) - hyperandrogenism (testosterone level) ± hyperandrogenemia (Ferriman - Gallawy score for hirsutism) .
    c) - PCO by ultrasound.

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Do all PCO patients have PCOS? Fulfilling the Rotterdam criteria for diagnosis of PCOS

A thesis submitted for partial fulfilment of master degree in obstetrics and gynaecology

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Do all PCO patients have PCOS

Master sheet

Personal history

Name : age :
Married for : parity :

Menstrual history

Duration: cycle : amount : regularity:
LMP :

Medical history :

Past history for acne : yes no
Past history for hirsutism : yes no

Clinical examination :

Height weight BMI
hair distribution: face chest abdomen
acne yes no

ultrasound examination

ovarian volume : follicular number :

Lab results :

Fasting insulin : fasting sugar: FI/FS :
Free testosterone :

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Contents

Introduction

Polycystic Ovary Syndrome (PCOS)

Polycystic ovary syndrome (PCOS) is a very common endocrinopathy with a heterogeneous presentation whose etiology is still uncertain. Not surprisingly, therefore, the definition of, and diagnostic criteria for, PCOS remain controversial. (**Franks, 2006**).

PCOS is a syndrome of ovarian dysfunction. Its cardinal features are hyperandrogenism and polycystic ovary (PCO) morphology (**Laven et al., 2002).**

PCOS is a spectrum of disorders with any combination of oligo/anovulation, clinical and/or biochemical evidence of androgen excess,obesity, insulin resistance and polycystic ovaries on ultrasound .(**Harwood et al., 2007**)

The most widely accepted clinical definition of the polycystic ovary syndrome is the association of hyperandrogenism with chronic anovulation in women without specific underlying diseases of the adrenal or pituitary glands**. (Franks, 1995).**

Its clinical manifestations may include: menstrual irregularities, signs of androgen excess, and obesity (**Lakhani, 2002**)

Despite being heterogeneous in nature, the hallmarks of the disease are hyperandrogenism and chronic anovulation. Since its description in 1935 by **Stein and Leventhal** much has been learned about the pathophysiology of PCOS from its neuroendocrine underpinnings4 to an ever-growing

understanding of the link between obesity, insulin resistance (IR) and PCOS. Based on this current understanding of PCOS, it is important that the patient and medical provider approach management not only toward improving the often troublesome hirsutism and infertility but also toward the long-term risks associated with IR **(Sheehan, 2004)**

Polycystic ovarian syndrome (PCOS) was first described by **Stein and Leventhal** in 1935 as comprising amenorrhoea, hirsutism, obesity and sclerotic ovaries. (**Lakhani et al., 2000,)**

Stein and Leventhal were the first to report the association between bilateral polycystic ovaries and amenorrhea, oligomenorrhea, infertility, hirsutism and obesity in 1935. The term 'PCOS' came into use in the 1960's, when it was understood that clinical and histological diversity was typical of the syndrome (**Goldzieher & Green, 1962**).

The first reported biochemical disturbance in PCOS was disordered gonadotropin secretion, especially increased LH secretion (**McArthur et al., 1958).**

The association between hyperandrogenism and insulin resistance was first reported in 1976 (**Kahn et al., 1976)**

In 1980, it was found that women with PCOS have elevated basal and post-glucose load insulin levels compared with weight-matched controls (**Burghen et al., 1980).**

In the 80s, transvaginal ultrasonographic imaging replaced ovarian biopsy as a non-invasive, simple technique to assess the size, shape and the internal structure of the ovaries (**Dewailly, 1997**).

In 1990, the National Institutes of Health – National Institute of Child Health and Human Development (NIH-NICHD) Conference was held and although no consensus was reached, the majority of participants agreed that PCOS should be defined by clinical and/or biochemical evidence of hyperandrogenism, chronic anovulation and exclusion of other known disorders (**Zawadski & Dunaif, 1992).**

These criteria, which do not include ultrasonographic examination of the ovaries, have been widely used in North America. On the other hand in Europe, polycystic ovaries detected by ultrasonography with one or more of the clinical symptoms and/or one or more of the recognized biochemical disturbances have been used to diagnose PCOS (**Balen &Michelmore, 2002).**

The differences of definitions of PCOS have resulted in varying populations of PCOS women in studies, which are then difficult to compare. In Europe, it is believed that PCOS manifests itself as various combinations of characteristics and there are women with polycystic ovaries and mild biochemical changes at one end and women with severe metabolic and endocrine disturbances at the other end of the syndrome's spectrum. The North American stringent definition includes only women with more severe changes, PCOS-diagnosed women being, for instance, more overweight than European PCOS patients. An American study on prevalence and predictors of 16 dyslipidemia involved investigation of 195 PCOS-diagnosed women, of whom as many as 79% were obese (BMI ≥ 27 kg/m2) (**Legro et al., 2001).**

While in a European study of 1741 PCOS-diagnosed women, the prevalence of overweight was 38.4% (BMI > 25kg/m2) (**Balen et al., 1995).**

Therefore, the PCOS populations studied may have varied considerably. The debate over the diagnostic criteria of PCOS went on for almost 15 years after