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(RESEARCH ARTICLE)

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An audit on the management of polycystic ovarian syndrome in a district general hospital in the UK

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Abstract

Polycystic Ovarian Syndrome (PCOS) affects approximately 9-12% of women worldwide and is caused by genetic interaction with metabolic and endocrine factors manifesting with cardiac, metabolic, reproductive, dermatologic and psychological features. PCOS is a very important common cause of infertility in young women. It also causes various complications including Cardiovascular Disease, Gestational and Type 2 Diabetes, Eclampsia, Miscarriage, Sleep apnoea, Endometrial cancer, Fatty liver disease (MAFLD) and Idiopathic Intracranial Hypertension. The whole purpose of doing the audit was to find out whether the patients referred with amenorrhoea or oligomenorrhoea, hirsutism and mostly with increased body weight, from the General Practitioners and diagnosed with PCOS were managed adequately. The audit results suggested that most parameters in relation to the audit criteria were managed successfully with scope of improvement in a few others.

Keywords: PCOS; Hirsutism; Amenorrhoea; Diabetes; Sleep apnoea; Endometrial carcinoma

1. Introduction

PCOS is the most common cause of anovulation and a leading cause of infertility. It is a complex endocrine condition that is often associated with insulin resistance and hyperinsulinemia. This results in excess production of Testosterone from the ovaries. There are ethnic variations in how PCOS manifests itself and how it affects women of childbearing age. It is a chronic condition and although cannot be cured, some clinical features can be helped through lifestyle changes, medications and fertility treatments (1). The characteristic features of PCOS include amenorrhoea or oligomenorrhoea, difficulty getting pregnant because of anovulation, excess hair growth or hirsutism, acne, weight gain and thinning of hairs or hair loss from the head.

Aim

The aim of the audit was to find out if the patients with PCOS seen at the Endocrine OPD from January 2025 for the next 4 months were investigated and managed properly

2. Methods

The patients with the above-mentioned problems seen at the Endocrine OPD between January 2025-April 2025 and also the patients who had telephonic appointment during this period were included for the purpose of the audit.

The European Society of Endocrinology (ESE Guidelines) published in November 2023 (2), National Institute of Health and Care Excellence- Clinical Knowledge Summaries (NICE CKS) Guidelines on Management of PCOS in Adults and

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Adolescents, revised March 2025 (3) and the Community Gynaecology Guidelines, 2024 (4) were considered for the purpose of the audit

The Monash University-led Centre for Research Excellence in Women's health in Reproductive life, funded by the Australian National Health and Medical Research Council (NHMRC) partnered with ESE, the European Society of Reproduction and Human Embryology, the American Society for Reproductive Medicine and the Endocrine Society and 34 other organisations for the generation of the Guidelines.

3. Results

Total no of patients: 12 (all in the cohort were overweight with excess hair growth and menstrual problems)

- Age: 20-25 years =4, 26-30 years= 5, >31 years= 3

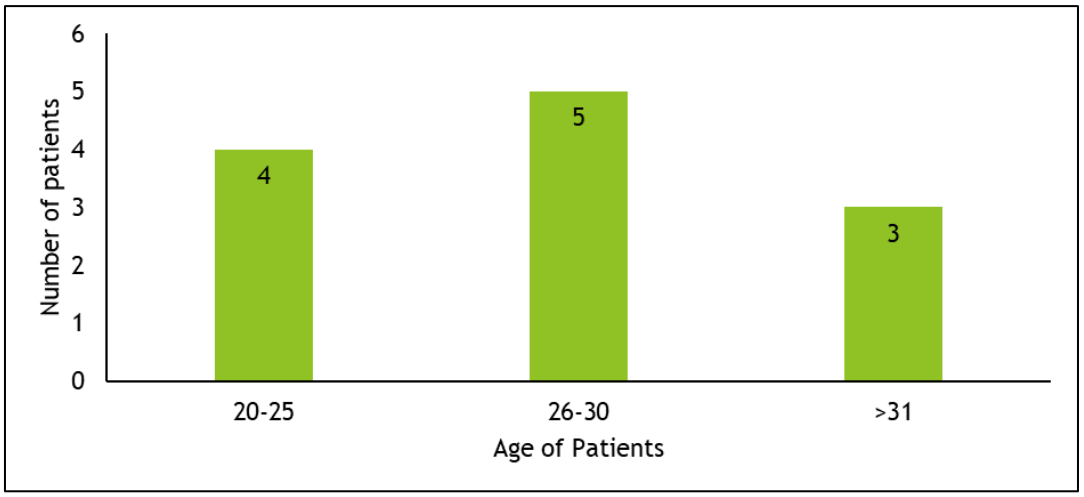

Figure 1 Age of Patients

- Counselling done on long-term complications including Type2 DM and Gestational Diabetes (8 or 67%), cardiovascular disease or CVD (3 or 25%), Obstructive sleep apnoea or OSA (3 or 25%) and Endometrial Cancer (2 or 17%)

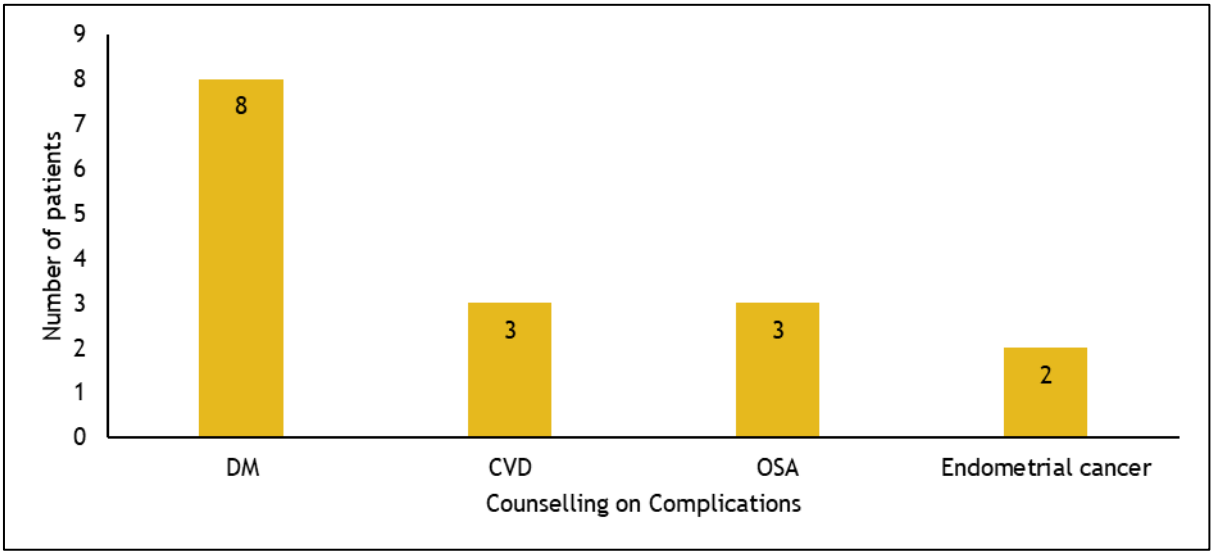

Figure 2 Counselling on Long term complications

- Whether Tests done for Cushing's (Plasma Cortisol-12 or 100%, Overnight Dexamethasone Suppression Test-1 or 8% and 24 hrs Urinary Cortisol- None), Congenital Adrenal Hyperplasia (17 alfa hydroxy progesterone or AHP-10 or 83%) and Androgen secreting tumour (DHEA or Dehydroepiandrosterone=11 or 92%, Testosterone -12 or 100%, CT scan of abdomen -3, Testosterone was quite high but < 5nmol/L in most patients)
- Whether tests were done for Premature ovarian failure (high LH and FSH)-12 or 100%, Hypothyroidism (12 or 100%) and Hyperprolactinaemia (12 or 100%)

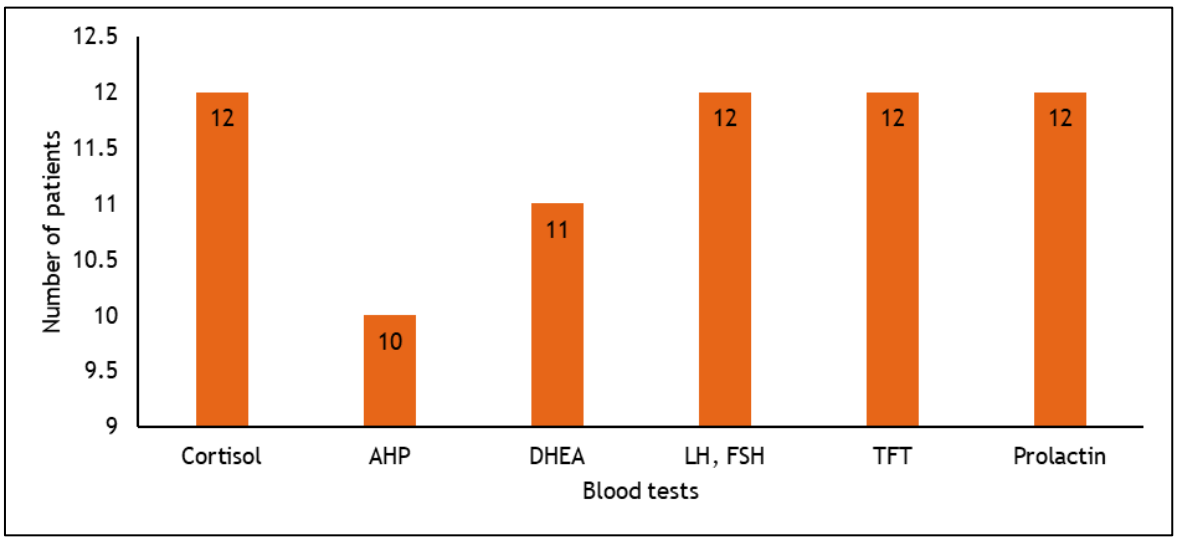

Figure 3 Blood tests performed

- Whether screening was done for Sleep Apnoea (Epworth sleepiness Scale- 3 or 25%), Diabetes (HBA1C-12 or 100%), Hypertension (12 or 100%), Hyperlipidaemia (5 or 42%) and Q Risk 3 (Calculated)- None
- Pelvic US done -12 (100%)
- Advise given regarding weight loss (Diet and Exercise)-12 (100%) and Orlistat considered (2 or 17%)
- Whether Progesterone (Desogestrel-1 or 8%), Low dose COC (5 or 42%) or Levonorgestrel releasing IUD (None) were tried
- Whether Metformin was advised (with or without Spironolactone)- Metformin alone- 3 (25%); Metformin and Spironolactone-4 (33%)
- Whether Anti-androgens advised like Co-cyprindiol (Dianette)- None, Spironolactone-2 or 17%
- Whether Topical Eflornithine (Vaniqa) was prescribed for facial hirsutism-6 (50%)

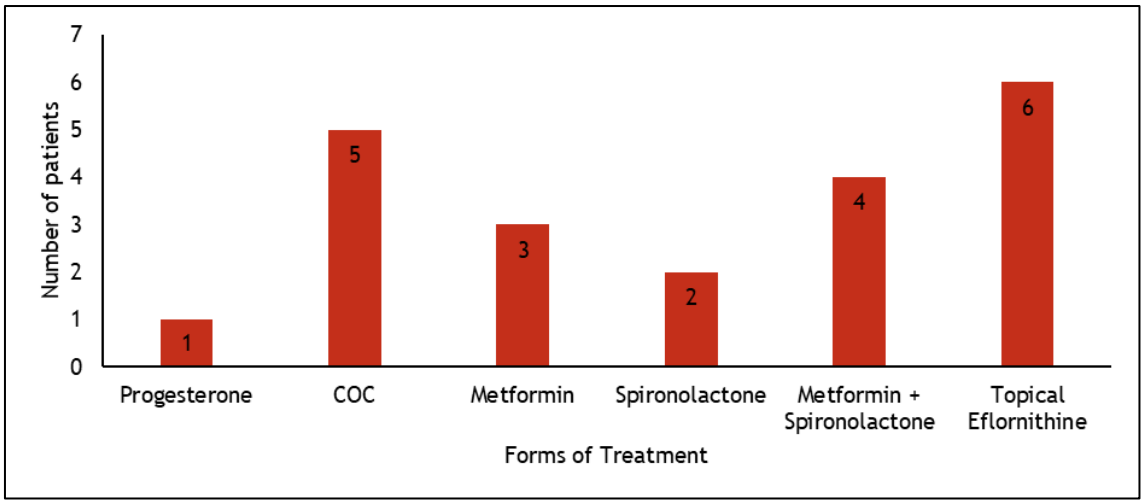

Figure 4 Treatment given

- Referral done to Dermatology for excess hair removal- For consideration of Electrolysis and Laser- 5 (42%)

- Record of Gallwey Ferriman score for at least 6 months-4 or 33%
- Discussion about Letrozole or Clomiphene and Clomiphene with Metformin done- 3 (25%)
- Referral done to Gynaecology-5 (42%); IVF-2 (1-successful, 1-unsuccessful)
- Referral to Psychiatry needed- 1 patient

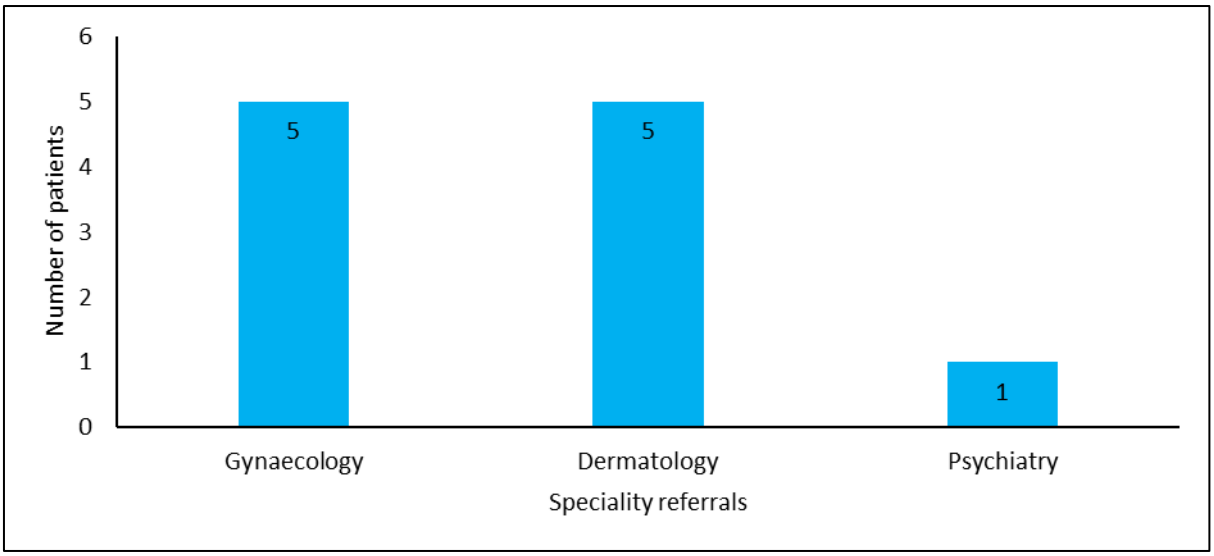

Figure 5 Speciality referrals

4. Discussion

Diagnosis: The diagnostic Criteria which build on the consensus Rotterdam Criteria- in adults, requires two of the following: 1. Clinical/Biochemical Hyperandrogenism, 2. Ovulatory Dysfunction, 3. Polycystic Ovaries on US (>20 follicles per ovary) or elevated anti-Mullerian Hormone (AMH) levels.

The previous National Guideline (UK) and Rotterdam Criteria, 2003 stated: Polycystic ovaries on ultrasound were defined as the presence of 12 or more follicles in at least one ovary, measuring 2–9 mm diameter and/or increased ovarian volume > than 10 cm ^{3}(5).

Exclusion of other causes is necessary, such as late-onset congenital adrenal hyperplasia, Cushing's syndrome, or an androgen-secreting tumour, more so if: There are signs of virilization, rapidly progressing hirsutism and/or the total testosterone level is significantly elevated- greater than 5 nmol/l or more than twice the upper limit of normal reference range (upper limit 1.6nmol/L). Also, it is important to exclude other causes of oligomenorrhoea and amenorrhoea, like premature ovarian failure, hypothyroidism and hyperprolactinaemia.

In adolescents both ovulatory dysfunction and hyperandrogenism are needed and US and AMH are not recommended, with poor specificity and overlap with physiological pubertal features (1). Ultrasound scan should not be used for the diagnosis of PCOS in those with less than 8 years after menarche. The Total Testosterone is usually elevated in women (N: <1.6 nmol/L) with PCOS, Sex Hormone-Binding Globulin (SHBG) is usually low (N: 18-138 nmol/L) and provides a surrogate measurement of the degree of hyperinsulinemia. The Free Androgen Index (FAI) is calculated by multiplying the Total Testosterone by 100 and dividing the product by SHBG and is usually elevated in women with PCOS (N: <4.6).

In adolescents, it is important to consider PCOS if there are signs and symptoms of hyperandrogenism and irregular menstrual cycles (Primary amenorrhoea by age 15 years, or more than 3 years of irregular cycles following the onset of breast development) and also suspect PCOS if there is a family history of PCOS, or indirect evidence of insulin resistance including central obesity and/or acanthosis nigricans.

4.1. Management (2,3,4,5,6)

PCOS Assessment and Management encompass Reproductive, Metabolic, Cardiovascular, Dermatological and Psychological features. Metabolic Risk factors: Diabetes, Cardiovascular disease and sleep disorders (sleep apnoea) are increased in PCOS with recommended screening and management. Increased risks of Premenopausal Endometrial

Cancer should be recognised but routine screening is not recommended. Risk of endometrial cancer has been shown to rise by 2–6 times in women with PCOS.

Latest ESE Guidelines can be summarised as follows (2):

- Combined oral contraceptive pills (COCPs) are the first line treatment for menstrual irregularity and hyperandrogenism, with lower dose recommended.
- Metformin is recommended for metabolic features with greater efficacy than Inositol which offers limited clinical benefits (<30%) in PCOS
- Laser therapy is effective for hair reduction in some patients
- Antiandrogens like Co-Cyprindiol or Dianette (Ethinyloestradiol 35mcg and Cyproterone 2mg) should be considered as second line therapy for hirsutism after 6-12 months of COCP. Dianette is associated with increased risks of Thromboembolism (40/100000), breast cancer and Meningioma (cumulative dose effect of 3g; incidence-28.3/100000). Dianette needs to be tried for at least 3 months. The other anti-androgens are Spironolactone, Flutamide, Bicalutamide.
- Anti-obesity agents (Orlistat) and Bariatric Surgery may be considered but greater research is required
- Topical Eflornithine (Vaniqa) for facial hirsutism is not recommended according to ESE. It starts to produce its effects after 6-8 weeks and should be used for a minimum period of 4 months
- Infertility treatment- Letrozole (aromatase inhibitor) is the first line drug. Many studies have recently shown that using Letrozole for ovulation induction has better rates of successful ovulation than Clomiphene. Letrozole is also associated with lower multiple pregnancies compared with Clomiphene (3.4% v 7.4% respectively). Alternatively, Clomiphene can be used with Metformin or alone. Gonadotrophins (LH, FSH, HCG) or ovarian surgery (Laparoscopic ovarian cauterisation, ovarian drilling and Laparoscopic Electro-cauterisation of ovarian stroma or LEOS) have a role as second-line therapies. IVF has a role as third line therapy in Infertility.

Inofolic alpha (not in the Guideline) comprising of Myoinositol, Folic acid and Alpha Lactalbumin) is not available on NHS prescription.

4.2. Criteria for the audit

- Whether Cushing's (plasma cortisol and ACTH, Overnight Dexamethasone Suppression Test and 24 hrs Urinary Cortisol) , Congenital Adrenal Hyperplasia (17 hydroxy progesterone) and Androgen secreting tumour (DHEA, Testosterone, Urinary 17 Ketosteroids, CT scan) have been excluded
- Whether Premature ovarian failure (high LH and FSH), Hypothyroidism and Hyperprolactinaemia have been excluded
- Whether screening has been done for Sleep apnoea and Diabetes (Baseline and then every 1-3 years), Hypertension, Hyperlipidaemia and Q Risk 3 have been checked
- Pelvic US done for endometrial hyperplasia
- Advice given regarding weight loss and Orlistat considered
- Whether Medroxyprogesterone, Low dose COC or Levonorgestrel releasing IUD have been advised
- Whether Metformin has been advised (with or without Spironolactone 50-200 mg/day)
- Whether Anti-androgens like Co-cyprindiol (Dianette), Spironolactone, Flutamide or Bicalutamide have been advised
- Whether Topical Vaniqa (Eflornithine) has been prescribed for facial hirsutism and used for 4 months
- Referral done to Dermatology for excess hair removal
- Record of modified Gallwey Ferriman score done for at least 6 months (score out of 36, no hirsutism <7, severe >24)
- Discussion about Letrozole or Clomiphene and Clomiphene with Metformin done
- Referral done to Gynaecology for consideration of Fertility
- Referral done to Psychiatry (PCOS is associated with Insulin resistance which in turn is associated with Schizophrenia and Bipolar Disorder). Also, Adolescents may suffer from depression, Generalised Anxiety disorder, Negative body image and eating disorders (anorexia nervosa, bulimia nervosa).

5. Conclusion

- Weight Loss is the main stay of Treatment

- Menstrual dysfunction (Oligomenorrhoea and Amenorrhoea)- Treatment is with COCP, Medroxyprogesterone, Mirena coil (Levonorgestrel-releasing IUD)
- Infertility (Referral to Gynaecology): Letrozole is taken once a day for five days, usually beginning on day three or five of the menstrual cycle. Clomiphene- It's prescribed for five days, beginning the second day of the menstrual cycle, and may take a few months before ovulation occurs. Metformin may enhance the effectiveness of fertility drugs and improve menstrual regularity. It is not approved for use in people with PCOS without diabetes but is often used off-label. Gonadotrophins: injectable hormones comprised of follicle-stimulating hormone (FSH) and/or luteinizing hormone (LH), are commonly used when clomiphene citrate doesn't induce ovulation. Also, IVF may be considered.
- Insulin Resistance: Treatment is with Metformin (Pioglitazone, SGLT2i and GLP-1 and GIP analogues are not licensed)
- Weight gain: Treated with Orlistat (Xenical); Semaglutide and Tirzepatide are not licensed

Hyperandrogenism

- Hirsutism- Treated with Contraceptives, Co-cyprindiol, Spironolactone, Metformin, Topical Eflornithine or Vaniqa (not under 19 yrs); Electrolysis and laser (following shaving, waxing and use of Depilatory cream).
- Acne: Treated with Topical Benzoyl Peroxide, Retinoids (Adapalene. Tretinoin/ Clindamycin), Salicylic acid and Antibiotics (Lymecycline and Doxycycline)
- In our audit: Blood tests for TFTs (Thyroid Function), HBA1C, Prolactin, DHEA, 17 hydroxy Progesterone and Cortisol were done in almost all cases. Counselling with regards to developing sleep apnoea, cardiovascular disease and Endometrial ca need to improve. The patients were treated variably with COCP, Metformin, Spironolactone and their combination according to their needs. Use of Epworth Sleepiness scale as screening for sleep apnoea, Q Risk 3 for CVD and Gallwey Ferriman score in hirsutism need to be done in more patients. Speciality referrals to Dermatology, Gynaecology and Psychiatry were done as and when required
- This audit aims to help the society in understanding the aetiology, significance and complications of PCOS, a very complex entity in women of childbearing age, and the way forward to managing such patients, as mentioned above.

Recommendations

- All the 4 Features of PCOS- Cardiometabolic, Dermatologic (Hirsutism and Acne), Reproductive and Psychological components should be addressed
- Fasting Plasma Lipids and Glycaemic status should be checked in all cases
- Assessment of glycaemic status is needed at baseline in all women with PCOS. Thereafter, assessment (OGTT or HBA1C) should be done every 1–3 years, depending on the presence of other diabetes risk factors.
- Assessment of Sleep Apnoea should be done as well
- Advice on weight loss is very important for the management of PCOS
- For management of Menstrual irregularities (1,4)- As oligo- or amenorrhoea is a risk factor for endometrial hyperplasia and carcinoma, it is needed to aim for a minimum of 4 periods per year to protect the endometrium. Investigations required (if not already done): Transvaginal Ultrasound scan to assess Endometrial Thickness or ET (ET < 7mm - unlikely hyperplasia) - If raised ET usually >10mm- there is a need to consider for referral to hospital gynaecology (Biopsy +/- hysteroscopy). Treatment options include: a cyclical progestogen e.g. medroxyprogesterone 10 mg OD for 14 days every 1-3 months, Combined hormonal contraceptive- oral, patch or Mirena coil. Metformin may be most beneficial in high metabolic risk groups. Inositol could be considered in women with PCOS with limited clinical benefits in ovulation, hirsutism and excess weight. It reduces insulin resistance, reduces testosterone production and improves menstruation, ovulation and fertility.
- For Hirsutism- COC is the first line drug. Dianette or Co-cyprindol (Cyproterone 2mg and Ethinylestradiol 35 mcg) is no longer the first line drug but can be used. Metformin, Spironolactone or Metformin together with Spironolactone can be effective in Hirsutism. Topical Eflornithine (Vaniqa) may be tried. Self- help methods include- Shaving, Waxing, Depilatories, Bleaching and Physical treatments (needs referral to Dermatology) include Electrolysis, Laser and Intense Pulsed Light (IPL)
- Gallwey Ferriman chart should be maintained for 6-12 months.
- Gynaecological referral if the patients are contemplating Pregnancy- for Letrozole or Clomiphene (or Clomiphene + Metformin) or Gonadotrophins or IVF
- Psychiatric referral may be necessary in some patients- those with depression, eating disorders, etc.
- Re-audit in 1year + Local Guideline preparation

Compliance with ethical standards

Acknowledgments

We would like to acknowledge all Endocrine colleagues and the Secretaries for helping us with the data collection towards preparation of the audit.

Disclosure of conflict of interest

No Conflict of Interest to be disclosed.

Statement of informed consent

Informed consent was not necessary for the purpose of the Audit

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