Chapter 1 : Polycystic ovary syndrome - Wikipedia

The Polycystic Ovary Syndrome (PCOS) is a heterogeneous disorder, whose principal features include androgen excess, ovulatory dysfunction, and/or polycystic ovaries, and is recognized as one of the most common endocrine/metabolic disorders of women.

Standard assessment[edit] History-taking, specifically for menstrual pattern, obesity, hirsutism and acne. A clinical prediction rule found that these four questions can diagnose PCOS with a sensitivity of These are believed to be the result of disturbed ovarian function with failed ovulation, reflected by the infrequent or absent menstruation that is typical of the condition. After ovulation, the follicle remnant is transformed into a progesterone -producing corpus luteum , which shrinks and disappears after approximately 12â€"14 days. In PCOS, there is a so-called "follicular arrest"; i. According to the Rotterdam criteria, which are widely used for diagnosis, [10] 12 or more small follicles should be seen in an ovary on ultrasound examination. This would usually be an incidental finding if laparoscopy were performed for some other reason, as it would not be routine to examine the ovaries in this way to confirm a diagnosis of PCOS. The pattern is not very sensitive; a ratio of 2: Elevated insulin levels have been helpful to predict response to medication and may indicate women needing higher dosages of metformin or the use of a second medication to significantly lower insulin levels. Elevated blood sugar and insulin values do not predict who responds to an insulin-lowering medication, low-glycemic diet, and exercise. Many women with normal levels may benefit from combination therapy. A hypoglycemic response in which the two-hour insulin level is higher and the blood sugar lower than fasting is consistent with insulin resistance. Lowering of insulin resistance levels Restoration of fertility Restoration of regular menstruation, and prevention of endometrial hyperplasia and endometrial cancer In each of these areas, there is considerable debate as to the optimal treatment. One of the major reasons for this is the lack of large-scale clinical trials comparing different treatments. Smaller trials tend to be less reliable and hence may produce conflicting results. General interventions that help to reduce weight or insulin resistance can be beneficial for all these aims, because they address what is believed to be the underlying cause. As PCOS appears to cause significant emotional distress, appropriate support may be useful. A scientific review in found similar decreases in weight and body composition and improvements in pregnancy rate , menstrual regularity, ovulation, hyperandrogenism, insulin resistance, lipids, and quality of life to occur with weight loss independent of diet composition. The oral contraceptives increase sex hormone binding globulin production, which increases binding of free testosterone. This reduces the symptoms of hirsutism caused by high testosterone and regulates return to normal menstrual periods. In many cases, metformin also supports ovarian function and return to normal ovulation. A newer insulin resistance medication class, the thiazolidinediones glitazones , have shown equivalent efficacy to metformin, but metformin has a more favorable side effect profile. Medications to induce fertility when trying to conceive include the ovulation inducer clomiphene or pulsatile leuprorelin. Metformin improves the efficacy of fertility treatment when used in combination with clomiphene. For those that do, anovulation or infrequent ovulation is a common cause. Other factors include changed levels of gonadotropins , hyperandrogenemia and hyperinsulinemia. For overweight anovulatory women with PCOS, weight loss and diet adjustments, especially to reduce the intake of simple carbohydrates, are associated with resumption of natural ovulation. For those women that after weight loss still are anovulatory or for anovulatory lean women, then the medications letrozole and clomiphene citrate are the principal treatments used to promote ovulation. Though surgery is not commonly performed, the polycystic ovaries can be treated with a laparoscopic procedure called " ovarian drilling " puncture of 4â€"10 small follicles with electrocautery, laser, or biopsy needles , which often results in either resumption of spontaneous ovulations [74] or ovulations after adjuvant treatment with clomiphene or FSH. There are, however, concerns about the long-term effects of ovarian drilling on ovarian function. Hirsutism When appropriate e. Metformin can reduce hirsutism, perhaps by reducing insulin resistance, and is often used if there are other features such

as insulin resistance, diabetes, or obesity that should also benefit from metformin. Eflornithine Vaniqa is a medication that is applied to the skin in cream form, and acts directly on the hair follicles to inhibit hair growth. It is usually applied to the face. Individuals vary in their response to different therapies. It is usually worth trying other medications if one does not work, but medications do not work well for all individuals. Menstrual irregularity[edit] If fertility is not the primary aim, then menstruation can usually be regulated with a contraceptive pill. If a regular menstrual cycle is not desired, then therapy for an irregular cycle is not necessarily required. Most experts say that, if a menstrual bleed occurs at least every three months, then the endometrium womb lining is being shed sufficiently often to prevent an increased risk of endometrial abnormalities or cancer. Endometrial hyperplasia and endometrial cancer cancer of the uterine lining are possible, due to overaccumulation of uterine lining, and also lack of progesterone resulting in prolonged stimulation of uterine cells by estrogen. A review published in concluded that women with PCOS have an elevated prevalence of insulin resistance and type II diabetes, even when controlling for body mass index BMI.

Chapter 2 : The Polycystic Ovary Syndrome - Ricardo Azziz - Bok () | Bokus

Polycystic ovary syndrome (PCOS) is a heterogeneous disorder of functional androgen excess, although its definition remains fluid and controversial.

Advanced Search Abstract Notwithstanding the potential public health impact of the polycystic ovary syndrome PCOS , estimates regarding its prevalence are limited and unclear. Between July and October , unselected consecutive premenopausal women 18â€"45 yr of age seeking a preemployment physical at the University of Alabama at Birmingham were studied Black, White, and 11 of other races. Evaluation included a history and physical examination, a modified Ferriman-Gallwey hirsutism score, and serum screening for hyperandrogenemia, hyperprolactinemia, and hydroxylase-deficient nonclassical adrenal hyperplasia. PCOS was diagnosed by the presence of the following: Confirmed PCOS was established in those individuals whose evaluation was complete and indicative of PCOS, and possible PCOS was established when the hormonal evaluation was not complete or was unavailable, but the clinical phenotype was otherwise suggestive of the disorder. The individual probability of PCOS in women with possible PCOS was assigned a weight based on the findings in similar subjects whose evaluation was complete, and the total number of PCOS cases arising from these individuals was calculated i. The cumulative prevalence of PCOS in our population was 6. These data from a large representative unselected population support the concept that PCOS is the most common endocrine abnormality of reproductive-aged women in the United States. PCOS appears to be associated with an increased risk of metabolic aberrations, including insulin resistance and hyperinsulinism, type 2 diabetes mellitus, dyslipidemia, cardiovascular disease, and endometrial carcinoma 3 â€" 6. The conference concluded that PCOS should be defined by the following in order of importance: Notwithstanding its significant public health impact and associated reproductive, endocrine, and metabolic implications, estimates regarding the prevalence of PCOS are limited and unclear. We previously reported a prevalence of 4. Studying random women recruited through the offer of a free medical examination on the island of Lesbos, Greece, Diamanti-Kandarakis et al. In this study, women who were receiving hormonal medications were excluded. Among White women in Madrid, Spain reporting spontaneously for blood donation, 6. The recruitment process of the study population can significantly impact the characteristics and prevalence of the disorder under study 12 â€" Unfortunately, two of the four currently available studies determining the prevalence of PCOS based their estimates on subjects recruited through the promise of a health evaluation 9 , 10 , potentially biasing the population toward disease-carrying individuals. The objective of the present study was to determine the prevalence of PCOS in a well-defined population of unselected reproductive-aged women in the United States, aiming to evaluate a large number of subjects and perform a complete phenotyping of the women involved. Secondarily, the impact of race Black vs. White on the prevalence of the disorder was determined. Subjects and Methods Subjects All prospective employees of the University of Alabama at Birmingham UAB , from resident staff to environmental workers, undergo an entrance medical evaluation that includes a brief history and physical and blood sampling. It should be noted that UAB is the single largest employer in the city of Birmingham and the third-largest employer in the state of Alabama, and its employees represent a cross-section of the population. Between July 1, and October 31, , all consecutive premenopausal females, ages 18â€"45 yr, who were to undergo a preemployment physical examination were asked to participate. None of the subjects in the present study have been previously reported on because our previous report included women recruited between March 1, and July 30, 8. To minimize treatment bias, we included all women regardless of hormonal therapy, including oral contraceptive pills or continuous progestin, glucocorticoid, or insulin sensitizer therapy. This is particularly important because PCOS may predispose patients to the use of hormonal therapy. We excluded women younger than 18 yr of age or older than 45 yr of age, menopausal women, women who have undergone a previous hysterectomy or bilateral oophorectomy, and women who were pregnant at the time of the evaluation. Women with a diagnosis of hypothyroidism who

were receiving adequate thyroid hormone replacement were included in the study. Study protocol A standardized history form was completed, with emphasis on menstrual dating and regularity, hirsutism and acne, gynecological history, medications, and family history. Patients on hormonal therapy were questioned regarding their menstrual cyclicity before they started the medications. The amount of excess terminal hair growth was first assessed using a previously described modified Ferriman-Gallwey mF-G method, scoring the presence of terminal hairs over nine body areas i. To maximize the accuracy of hirsutism scoring, subjects with an initial mF-G score more than 3 per the study nurse were reexamined by a single physician E. The presence of acne was also recorded, although no specific scoring system was applied. Blood was obtained for subsequent hormonal analysis. For evaluation purposes, subjects were subdivided according to the presence or absence of menstrual dysfunction and hirsutism into four groups: The evaluation in each of these groups was planned as follows: We should note that androgen levels were not assessed in subjects receiving hormonal therapy. Specifically, the individual criterion are as follows: Clinical hyperandrogenism was diagnosed by the presence of hirsutism i. After initial examination and reexamination and hormonal analysis, all subjects who potentially had PCOS i. Serum TSH levels were not checked systematically in all subjects unless the subject had clinical symptoms suggestive of thyroid dysfunction or was currently on thyroid replacement. Twenty-four-hour urine free cortisol levels were measured if the subject had possible clinical features of hypercortisolemia. Confirmed PCOS was established in those individuals whose evaluation was complete and met the criteria described above. Possible PCOS was defined when the evaluation was not complete or was unavailable, but the clinical phenotype was otherwise suggestive of the disorder. The individual probability of PCOS in women with possible PCOS was assigned a weight based on the findings in similar subjects whose evaluation was complete i. The total number of PCOS cases arising from these individuals was then calculated i. Total T was measured by an in-house RIA method after serum extraction, as previously described Samples were batched at regular intervals for analysis to minimize the impact of interassay variability while providing study subjects with timely information. Data analysis was performed using the SPSS 9. Results Study population characteristics Between July 1, and October 31, , unselected consecutive premenopausal women at ages 18â€"45 yr seeking a preemployment physical at the UAB were invited to participate. Prevalence of menstrual dysfunction, hirsutism, and PCOS The overall prevalence of menstrual dysfunction and hirsutism was The prevalence rates of menstrual dysfunction in Black and White women were Hirsutism was found in 8. Two of the women included in the study were found to have undiagnosed hypothyroidism, and nine were already receiving thyroid hormone replacement for a total prevalence of hypothyroidism diagnosed and undiagnosed of 2. None of the patients had features suggestive of hypercortisolemia or were diagnosed with NCAH or hyperprolactinemia. A total of Number of individuals with PCOS among unselected women of reproductive age Initial presentation1.

Chapter 3 : Androgen Excess Disorders in Women : Ricardo Azziz :

Polycystic ovary syndrome (PCOS) is a heterogeneous disorder of functional androgen excess, although its definition remains fluid and controversial. PCOS is characterized by clinical and/or biochemical hyperandrogenism and is frequently accompanied by ovulatory dysfunction and polycystic ovaries.

Abstract PCOS appears to be an ancient disorder, which persisted in human evolution despite reduced fecundity because of benefits to affected women such as greater sturdiness and improved energy utilization, a rearing advantage for their children and kin, and a reduction in the risk of perinatal mortality. This raises the possibility that gene variants eventually found to be associated with PCOS will be similar across ethnic groups and races. And all the days of Methuselah were nine hundred sixty and nine years: Or is it a disorder of recent development, the consequence of rising metabolic stress in an increasingly obese society? And if it is ancient, why has it persisted despite its reproductive disadvantage? And can the antiquity and evolutionary history of PCOS inform our efforts to unravel its genetic makeup? Ancient medical records While there is little in the Egyptian papyri Kahun, Edwin Smith, and Ebers regarding the antiquity of PCOS, an examination of later ancient medical records provides clues. Soranus of Ephesus c. It is natural too in persons whose bodies are of a masculine type Epidemirum VI, 8 3. These statements made over a period of more than two millennia describe a combination of signs, including menstrual irregularity, masculine habitus, sub-infertility, and possible obesity, suggestive of PCOS. While many populations remain to be studied and most of the subjects in these reports were Whites of European descent, the African-American 6 and Mexican 10 women included also demonstrated similar prevalences. Consequently, considering that humans migrated from Africa by 50, years ago 11 , the PCOS genotype s appears to have emerged earlier than the onset of racial diversity. Is the prevalence of PCOS affected by the increasing rates of obesity? The prevalence of PCOS appears to be only minimally affected by the increasing rates of obesity and the excessive consumption of Western-type food. For example, the prevalence of PCOS is relatively similar across countries with different rates of obesity e. Spain or Mexico 5 , 6 , Likewise, we have been unable to detect significant differences in the dietary intake or composition of women with PCOS compared to matched controls In a study of over unselected women from the general population, the prevalence of PCOS increased minimally and non-significantly with increasing body mass In contrast, the average body mass of over women with PCOS diagnosed over a year interval increased linearly and in concert with the increasing obesity of the surrounding population Taken together, these data suggest that the epidemics of excess caloric intake and overweightness play a limited role in the development of PCOS. But why should a disorder that reduces reproductive potential thrive and persist across millennia? If so, such a thrifty genotype may have enhanced survival during times of food deprivation, with reduced postprandial thermogenesis from insulin resistance diminishing energy expenditure as an additional evolutionary advantage Moreover, in a study of over women with PCOS, those women treated with placebo ovulated approximately one-third the expected monthly frequency 21 ; thus, PCOS women are able to conceive, albeit at a rate lower than normal. Considering the reproductive benefits of coitus initiation at an early age, a higher coital frequency, the absence of effective contraceptives, and the absence of widespread obesity, it is quite possible that the pregnancy rates of ancient PCOS women would have been significantly higher than at present, particularly if relative insulin resistance was able to divert circulating glucose as dietary energy for ovulatory function during low energy conditions In addition, among nomadic hunters it would have been advantageous and even necessary for women to space childbirth, as they could generally carry and care for only one young child at a time Childbirth-related complications were an important cause of mortality in reproductive-aged women in antiquity and in present-day Africa , and a lower parity may have reduced the death rate of these women and the risk of progeny abandonment. The lower fecundity of PCOS women could also have created a rearing advantage for their progeny, with their fewer children receiving a greater amount of the available food and protection. And these progeny, both as a result of their inherited genotype, and

possibly the effect of their intrauterine environment, would have also been more able to survive periodic deprivation. It could also be argued that PCOS favored the survival of those family units containing these women, as females with PCOS and few, if any, children of their own could have served as allo-mothers to their kin With aging, PCOS women may have attained significant nurturing skills, given their wisdom and strength to survive a physically demanding environment, creating a source of capable child rearing labor not focused on or threatened by pregnancy. Finally, in such a physically demanding environment, the greater lean muscle mass and bone mineral density of PCOS women 25 - 28 would have also been advantageous to their own survival and that of their progeny. Thus, the disease susceptibility alleles for PCOS may have been ideally adapted to the need for high physical strength and activity, the erratic and often low nutrient availability, and the lower fecundity advantageous to the hunter-gatherer. Thus, patients with PCOS should be considered subfertile, not infertile. In our model, the persistent reproductive capacity of PCOS women in antiquity does not rely on a shifting of the BMI-fecundity curve, but on:

Chapter 4 : Polycystic ovary syndrome â€" Northwestern Scholars

Polycystic ovary syndrome (PCOS) is a heterogeneous disorder, and its definition remains fluid and controversial. PCOS is characterized by clinical and/or biochemical hyperandrogenism, and is frequently accompanied by ovulatory dysfunction and polycystic ovaries.

Models are additionally adjusted for age at year 16, OC use at year 2, and OC use at year In additional sensitivity analyses, we considered finer categories of SES; however, the results yielded the same trends, and, thus, to ensure adequate power, we present the main findings. After adjusting for age, race, BMI, waist circumference, and OC use, this group was over twice as likely to have PCOS as women with both high parental and high personal education. Although other childhood factors were not available in this dataset, we explored some of the potential adverse health behaviors that may have influenced the development of PCOS, including diet total caloric intake, fat and carbohydrate intake , weight change, smoking, and physical activity, as measured at the CARDIA year 2 follow-up data not shown. Although adjusting for these factors did not change the relationship between low SES and PCOS, it is possible that these measures did not adequately reflect prepubescent exposures that would most influence the development of PCOS. Several studies have shown that obesity exacerbates insulin resistance and hyperandrogenism, and there is evidence suggesting that obese women with PCOS are more insulin resistant then their lean counterparts. This is also consistent with epigenetic studies that have suggested that genetic predisposition for PCOS can be influenced by environmental factors, 39 , 40 including diet and exercise. Our findings with regard to obesity could indicate that the principal driver of low parental education on PCOS is through development of poor nutritional habits and the subsequent development of obesity. We speculate that this may be the result of how PCOS was determined in this study. Aside from measuring T levels, PCOS was primarily determined based on self-reported information about menstrual cycles, hair growth, and OC use. It is possible that those with higher education were more likely to recall and report past and current health conditions and that those women might be more likely to use the healthcare system and, thus, have a diagnosis. Moreover, women with higher education may be more likely to complain of hirsutism or use OC to regulate menstrual cycles. Consequently, the group with the most risk associated with poorer childhood conditions and more ability to recall because of higher attained education might indeed be at greater risk of being assigned as having PCOS in this study. This hypothesis is supported by the fact that the one measure that did not show this effect was high T, a measure that did not require recall information. Those results show that low parental education is clearly a more influential factor in its association with high T, although low personal education confers some risk as well. Notwithstanding these concerns with the self-reported elements of our PCOS measure, our results suggest an additional hypothesis that might explain why the risk of PCOS associated with low parental education is limited to women with higher education. It is possible that women who achieve a higher level of education distinct from their parents i. The present study has a number of strengths, including the use of a diverse, young, population-based sample, but there are some limitations. The outcome measure we used to identify PCOS was primarily determined via self-reported menstrual irregularities, OC use, and excessive hair growth. Aside from the fact that the validity of recalled information about menstrual cycle length and variability may be differential by SES, studies have also shown that self-reports may be somewhat unreliable. The exclusion of these missing data potentially dilutes our findings. Conclusions This study points to an association between low childhood SES and PCOS, particularly among those who later achieve high personal education and especially for obese women in this category. Our findings suggest that future research is warranted to explore early life exposures related to low SES and possibly to upward mobility, including intrauterine and postnatal nutrition and growth, and how they may influence the development of PCOS. These studies should strive to include validated measures of PCOS symptoms to avoid any self-reported bias that might be associated with social factors. Disclosure Statement The authors have no competing financial interests. Prospective study of

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Chapter 5 : Socioeconomic Status and Polycystic Ovary Syndrome

Polycystic ovary syndrome (PCOS) is a classic female infertility problem affecting an estimated % of all women and many of whom are unaware of the problem. PCOS is the single most common endocrinologic abnormality that affects women.

Chapter 6 : POLYCYSTIC OVARY SYNDROME: AN ANCIENT DISORDER?

INTRODUCTION. Polycystic ovary syndrome (PCOS), a heterogeneous, complex genetic trait of unclear etiology, is an important cause of ovulatory and menstrual irregularity, subfertility and infertility, clinically evident hyperandrogenism, and metabolic dysfunction in women.