Polycystic Ovary Syndrome (PCOS) & It's Relationship to Metabolic Risk Factors (Obesity, Diabetes, Hair growth and more)

Polycystic ovary syndrome (PCOS) is a health condition that affects 1 in 10 women of childbearing age. Women with PCOS have a hormonal imbalance and metabolism problems that may lead to obesity, cardiovascular disease, type 2 diabetes, infertility, endometrial cancer and more.

buy mounjaro online https://bristolrehabclinic.ca/wp-content/uploads/2025/03/jpg/mounjaro.html no prescription pharmacy

In the absence of a complete cure, efficient management of the condition gains importance and information is the key.

buy periactin online https://bristolrehabclinic.ca/wp-content/uploads/2025/03/jpg/periactin.html no prescription pharmacy

We are talking to a panel of PCOS experts from the University of Pennsylvania to understand the condition, available treatments, and best ways to manage symptoms.

buy fildena online https://bristolrehabclinic.ca/wp-content/uploads/2025/03/jpg/fildena.html no prescription pharmacy

The discussion will also touch upon the details of the PCOS-COMET study being conducted by Penn PCOS Center to compare the effects of medications on metabolic risk factors such as weight, blood pressure, glucose, and cholesterol levels in overweight/obese women with Dr. Anuja Dokras, Director PCOS Center, and principal investigator of study.

buy paxil online https://rxxbuynoprescriptiononline.com/buy-paxil.html no prescription pharmacy

Dr. Anastassia Amaro and Dr. Kelly Costello Allison from the Center for Weight and Eating Disorder of University of Pennsylvania will help us take a deep dive to understand the nuances of weight, nutrition, psychology and related effects on PCOS and its management.

buy hydroxychloroquine online https://rxxbuynoprescriptiononline.com/buy-hydroxychloroquine.html no prescription pharmacy

Full Transcript:

Priya Menon: Good morning everyone and welcome to Cure Talks. I'm Priya Menon, your host and today we are discussing Polycystic Ovary Syndrome with a very eminent panel of experts from the University of Pennsylvania. We welcome to Cure Talks Dr Anuja Dokras, Director of Penn PCOS Center, Dr Anastassia

Amaro, Endocrinologist from Penn Metabolic Medicine and Dr Kelly Alison, psychiatrist from Penn Center for Weight and Eating disorders. Welcome to Cure Talks, doctors. The patient advocate on our panel is Valerie Landis. Valerie has been working in the women's healthcare care field for the last decade. Valerie merged her medical career and fertility passion when she created and founded the educational website, eggsperience.com about egg freezing and fertility podcasts, Eggology Club. We also have with us the Pelagia Papathomas, Peggy is a nurse at the children's Hospital of Philadelphia and was part of the PCOS-COMET study and is here with us to share her experience. Welcome to Cure Talks, Valerie and Peggy. And a very warm welcome to the audience. We will be addressing your questions towards the end of the discussion and we have received many questions both via email and on our website. So thank you all for all the wonderful questions, we hope we can incorporate into our discussion today and based on availability of time, we will try to answer as much as possible. So getting on with the discussion, Dr Dokras, we'll begin with you. And we started with some very basic information for our listeners to lay out the background so that they get an idea of what we're discussing. So it'd be great if you could talk about the basic stuff PCOS and why diagnosis is difficult and probably touch upon the new international guidelines for PCOS diagnosis as well.

Dr Anuja Dokras: Good morning Priya, thank you so much for inviting us and organizing this podcast. So let me start with saying that PCOS is the commonest endocrine condition in young women, in reproductive age women and about 6-8 or even up to 10% of women in this age group are known to have PCOS. So it's an important condition because it's so common. The international guidelines we'll publish this year because we know that women with PCOS are very unhappy with their experience with the diagnosis of PCOS. There are studies that tell us that some women take one or two years before their diagnosis is confirmed. Sometimes they have seen two, three, four physicians before the diagnosis is confirmed. So it's a really good thing that now there will be uniform guidelines that are going to be used internationally. A number of medical societies have approved these guidelines, a number of international experts were involved in putting these guidelines together. And that's what all physicians as well as patients can now refer to as the diagnosis is made. So just briefly to give the background as to what is the diagnosis based on the most common symptom that women with PCOS have is irregular periods. And so this is like patients with usually say to me they get two periods or three periods a year. But it can be mild, it can be up to eight or nine periods a year as well. The second criteria is signs of high male hormone levels. So they may complain of increased hair growth and the hair growth is usually in the middle of the body, like the upper lip, the chin, and the middle of the chest, the inner thighs, it's those areas. It's not like the eyebrows or the underarm area. And then the third criteria is if we were to do an ultrasound, these ovaries have a very typical appearance with lots of eggs, the follicles within them. So having any two out of these three will qualify for the diagnosis of PCOS.

Priya: So three symptoms that you mentioned. Dr Amaro, I like to bring you into the discussion now. Dr just mentioned excess hormones, probably dig a little more deeper. Can you just explain to our listeners what is going on hormonally within the body if I have PCOS?

Dr Anastassia Amaro: Hi Priya. Thank you again for organizing and thank you for inviting me to be part of this important discussion. I am an endocrinologist and happy to speak about the hormones. As Dr Dokras already mentioned, one of the symptoms is resulting from excessive male hormone production by the ovaries. Overall PCOS is a complex syndrome, so several things that are happening simultaneously and we sometimes don't even know what leads to what, but what we see is one, first of all, we see excessive male hormone production and they are produced by the ovaries. Second thing that we see is signs of insulin resistance. So insulin is a hormone that is needed by many tissues and many organs and it does slightly different things in tissues. So different tissues may develop resistance to insulin, and that can cause different manifestations, different symptoms. For example, insulin resistance in the liver can result in accumulation of the fats in the liver and slightly higher blood sugar in the morning because liver can be making the sugar overnight – resistant liver can be making the sugar overnight. Ovaries can also be insulin resistant and ovaries can be exposed to higher levels of insulin in insulin resistance individuals. So it is possible that from that they are slightly might malfunctioning and begin producing excessive androgens, androgens are male hormones, and that's why women may notice irregular periods and excessive hair growth. Insulin resistance is also associated with excessive weight. In fact, people who gained weight may develop insulin resistance.

On the other hand, people who are born with predisposition to insulin resistance, are more likely to gain weight. So that is why women with PCOS oftentimes have excess weight. And that's what we try to do in medicine, would try to help with nonsurgical weight management. Another feature, another symptom of insulin resistance can potentially be diabetes or abnormalities in glucose metabolism, pre-diabetes or diabetes. And we also know that lowering the weight can improve some of the hormonal disturbances, losing weight can improve insulin resistance and postpone the development of diabetes and weight loss can also improve secretion of hormones by the ovaries.

Priya: Interesting actually, when hormones play up like this, it's often like a massive assault on a woman's femininity and Dr Allison, how do women cope up with this emotionally and what are some of the common psychiatric issues that you've seen in women with PCOS?

Dr Kelly Allison: Yes. Thanks also for having me on with my colleague Dr Dokras and Dr Amaro, it often does take a team effort because of all of these symptoms that we're talking about. So on the psychology side, we often do see that women with PCOS can have a higher risk for depression symptoms, anxiety symptoms, as well as eating disorder symptoms, we think this is likely related to several of the manifestations of PCOS have just been discussed. So you can imagine that these hormonal differences from other women can influence mood swings which may be a contributing factor to the depression and anxiety, increased insulin resistance, which is related to the increased weight. We know that weight gain can also influence mood and anxiety, as well as excess hair growth. So this is a tough symptom to have to deal with. It's visible as weight is, and we know that appearing different can really be at a detriment to one's self esteem and create poor body image. And so those seem to be moderating factors for these increased symptoms of depression and anxiety that we see. And then finally, with the increased weight gain, sometimes it does seem more difficult to lose weight given the hormonal irregularities for women with PCOS and with that, because it becomes so difficult, we think that women PCOS maybe more at risk for developing disordered eating types of behaviors like they maybe engage in more extreme types of weight control behaviors like fasting or inappropriate compensatory behaviors. So those are all things that we have to be mindful about and if it's significant enough, treated in conjunction with the metabolic treatment of the disorder.

Priya: Thank you. Dr Allison. At this point, I'll bring in Peggy, as I was mentioning was part of the PCOS-COMET study and we like to hear from her. Peggy, how did you know that you had PCOS?

Pelagia Papathomas (Peggy): Hi, thanks for having me on the show. So I was actually first diagnosed by accident. I was rushed to the ER for presumed appendicitis and they found golf ball sized ovarian cyst instead. But because I was in my teenage years they thought that perhaps it was a fluke and there wasn't really a whole lot of research being done in my area the time. So they did nothing. They didn't recommend for a central or anything. It just played a wait and see approach. But when I entered college my symptoms actually got quite a bit worse. So I had some sudden onset acne, stubborn weight gain even with diet and exercise, I wasn't getting my period accepted mood swings with depressive features and all of these things together prompted me to go to an endocrinologist and get formally diagnosed. And so some of the things that my endocrinologist did, to try to find a diagnosis for me was really testing a lot of glucose tolerance testing. And of course, testing my testosterone and female hormone levels.

Priya: Did you get, were you put on any medication for managing your symptoms?

Peggy: So once a lot of the tests results had come back, we found that my testosterone was consistently elevated and that there was no issue with my thyroid or really my blood glucose, but we had heard about metformin. So I had tried metformin for a few months from college with almost phenomenal effect. It brought my periods back almost immediately. I lost 10 pounds within the first month or two of taking it. It really worked, just phenomenal. But because I was in college at the time and I couldn't commit to taking it properly, especially with the presumed risks that sometimes exists on it, I switched to a third generation birth control, like a generic, which also seems to keep symptoms at bay just in a different way.

Priya: Thank you Peggy so much for sharing that because it kind of resonates with so many of our questions because we've been trying to get a feeling of exasperation by some of them. So Dr Dokras we had this question from the audience saying that I've just been diagnosed and I'm overwhelmed, where do I begin? And we just heard Peggy say she was diagnosed accidentally. So can we talk a bit about what is the first step in diagnosis and treatment then we suspect that someone has PCOS and would be great also if you could comment on some of the tests that are used for diagnosis and the first line of treatment?

Dr Anuja Dokras: Yeah. I think this is a very important question and the diagnosis of PCOS is really not difficult. It can be done by your Ob Gyn, your internist, the family doctor, and of course endocrinologist and then reproductive endocrinologists like myself. So if you think about the three criteria that we use to make the diagnosis. So if our patients talk about having irregular periods, like Peggy mentioned, she wasn't getting her period, then we need to make sure that no other endocrine hormones are abnormal and they are not the reason for the irregular periods. So one of the tests that we do is a thyroid test to make sure that those hormones are normal, there's another hormone which is made by a gland in the brain, it's called prolactin, which can make periods irregular so we check that and then we check the sort of the female hormones that Peggy was referring to, to make sure it's not somebody who is like in premature menopause. So we're trying to exclude other reasons for the irregular periods. So it's a set of blood work that will give us the answers for the first criteria. Then the second criteria can be the excessive hair growth, less common acne beyond the teenage years and then the least common is hair loss, sort of in that order. One test that we would do with that is the male hormone level and the male hormone here is called testosterone. So your doctor might either do the total or the free testosterone level in the free is the more sensitive one. So that's also just part of that same blood tests. So one blood draw can give us the answer for the first and the second criteria, and then the third one is an ultrasound and on the ultrasound, what we're looking for is a slightly bigger ovary. So we have cutoffs for that and the ovarian volume gets measured and then we count the number of follicles. So it's very unfortunate that about 80 years ago the syndrome was named as polycystic ovary syndrome.

So the impression is that there are a lot of cysts within the ovaries, but really it's real tiny follicles. They are between two, three, four millimeters up to nine millimeters in size and that's what we are measuring the number of these follicles and it's really a part of a woman's ovarian reserve or their fertility. So the more number of follicles that's good news, that's really not bad news and that's one of the criteria for PCOS is increased number of follicles. And if a patient has new or more of these criteria, then they meet the diagnosis. So it's one blood test and one ultrasound currently can get us the diagnosis of PCOS.

Priya: So are there any specific challenges regarding the diagnosis based on the age of the patient, the dollars spent, probably the menopausal women?

Dr Anuja Dokras: Yeah, that's a very good question because,PCOS looks different in different patients. It looks different based on age, so in a teenager and as you get older it also looks different depending on where in the world you are and your ethnicity. It looks different based on your weight. So this is really an important question. So if we talk about in young girls and in teenagers when you first start getting your period, it's very common for periods to be irregular and so we cannot use that first criteria of PCOS in a young teenager, especially in the first few years when they just started getting their periods. The recommendations from the international guidelines are to wait at least two years or a little longer to see if the body resets and the periods get regular and not to rush into making the diagnoses that early on. Even for the second criteria, it's hard and teenagers, because acne is a common symptom and it's not necessarily related to PCOS, but just related to going through puberty. A lot of teenagers will have acne and so if they have that combination of irregular periods and acne, one should not rush into making the diagnosis of PCOS at that time and I typically say to the young girls that I see, let's keep them menstrual calendar. Of course we manage the acne or symptoms that they may have, but don't label them with the diagnoses of PCOS because they get very concerned, parents get concerned and it is okay to wait a little bit before you could confirm the diagnosis in that age group. The other age group you asked me about is the women who are more like in their forties or fifties, getting towards menopause.

And nowadays given the increased awareness of PCOS, we do have a number of patients who have come in and say, I think I had PCOS when I was younger, I don't have the symptoms now, but what is the management? So it becomes hard in a 45 year old or a 50 year old to look back and make the diagnoses. And the reason for that is, as a woman with PCOS gets older, her periods will become regular, this is not often shared or discussed with the patient, so they are not aware that some of the symptoms that you have, actually get better with age. So in the forties it's hard for me to make a diagnosis because now my patient has regular periods every month and if I was to draw her testosterone level, those would also be in the normal range because those levels start dropping with age and one then has to base the diagnoses on what the history that the patient is giving you and they may not recollect it in detail or if they have records from earlier on, that could be useful. But those are the two challenging time points when one has to be careful of not over calling the syndrome, and making sure that the diagnosis is correct.

Priya: Thank you doctor for explaining that. So, I believe Penn is conducting the COMET-PCOS study and it'd be great if you could talk about what the trial is about and what you're planning to achieve through it?

Dr Anuja Dokras: Yeah. Thank you for giving us this opportunity to discuss. This is a really important study that is funded by the National Institute of Health in the US. It's called COMET-PCOS, we'll come a little bit I think later in your podcast to talk about the treatments for PCOS, but like the first line of treatment is a birth control pill and the reason being that they make the periods regular as well as they drop the male hormone levels and hence one treatment helps with both symptoms of PCOS. However we and other researchers have shown that birth control pills may not be suitable first line for all patients. For example, women who have a way to shoot, women who might be overweight or obese, birth control pills could increase the blood pressure and they could make their cholesterol levels abnormal and there could be side effects that are not desirable. So another treatment of choice is Metformin. And you heard Peggy talk about that. So the reason Metformin can be a good treatment is because it helps with weight management. Even though it's not a weight loss medication, it helps a number of patients manage their weight better. It also helps as you heard Dr Amaro, talk about insulin resistance, so it improves the insulin sensitivity and hence the cholesterol numbers might look better in these patients, the glucose or the sugar levels might be better.

So the question then is, in our patients who have higher risks, like the ones who are overweight and obese and unfortunately a number of women with PCOS do struggle with weight, what is the real treatment? Which medication should we use them and believe it or not, we really did not have an answer to this question and that is why we got funded to do this study where one group of women will get birth control pills, one group of women will get Metformin and one group will get both. And the question we are trying to ask is what is the first line of treatment when a patient is not trying to get pregnant, but is just interested in their general health and what do these medications do to blood pressure, cholesterol, body fat. So we do these studies where we look at where the fat is distributed, is it in the middle of the body or all over and what will happen by the end of treatment to the fat distribution. So we're excited because we're going to get a lot of information to help guide us as to the first line treatment in overweight and obese women with PCOS.

Priya: Thank you. Dr. Dokras, we can hear from Peggy. She has been part of the trial and I think she completed it in September 2018?

Peggy: Yes. That's correct.

Priya: Yes. So, please, tell us how are you feeling now?

Peggy: Now that I've completed the study, I'm actually feeling quite a bit better. I definitely feel empowered having been part of it because I feel as though I have this real grasp of where my numbers are, how my body responds to certain interventions. The trial involves me taking two medications each night. One was most likely a placebo and the other was a true medication, but I didn't know which was which. So I was told that I'm either taking birth control, metformin or both, but because I don't know, I need to take both every night. And so I was randomized into one of those groups and every two to four weeks I would follow up with a research coordinator. And since being a part of that study, I've actually lost a significant amount of weight.

I'm feeling more in power of the PCOS and kind of figuring out a game plan going forward.

Priya: Great to hear Peggy. I'm going to ask you this question, we have got a couple of questions on fatigue being a part of PCOS. So I'd like to know how active you were feeling physically in terms of doing normal activities during the trial, when you were a part of the trial? Did you feel an increase in your energy levels or was it a decrease? I'd like to know that because we've got a couple of questions asking about fatigue and PCOS.

Peggy: Oh absolutely. So I actually always thought, growing up and in my early twenties to college, I thought that being excessively fatigued and exhausted was just my baseline. I really just thought that's how I operated. No matter how much sleep I got, it always felt like I was running on sleep and I have seen it and it's not the best feeling. But on the metformin that I think I was on, I don't know for sure, but just my guess, that brought my energy level up to what I imagined a normal person's energy level was. I was able to sleep through the night I woke up. I didn't need coffee. I didn't feel excessively tired. I was able to get through the day without caffeine or energy drinks. I really saw like a significant improvement in my energy level as my numbers trended towards normal.

Priya: Thank you so much Peggy for sharing that. So as of now you don't have any PCOS symptoms or have they been considerably reduced? What'd you think?

Peggy: My periods are definitely more regulated now that I'm on a third generation birth control, which is what me and my reproductive endocrinologist decided was the best option for me at this point in my life. So my periods are normal, my acne is subsiding. My lab values are looking better. I still think that some of the symptoms of PCOS per se, it is harder to lose weight. I definitely have seen that I did when I was younger, but I definitely see things going in the right direction and I don't know that they would have been, had I not participated in the trial and really gotten some information.

Priya: Thank you. Thank you very much Peggy for joining us and sharing the experience with us. I'm sure many of our listeners would have really loved to hear from you. So moving on Dr Amaro and Dr Allison, this is for both of you, PCOS signs and symptoms as we just heard from Peggy and Dr Dokras are typically a little bit more severe if you are obese and can lead to complications. So how do you both go about treating a patient who is overweight and has PCOS? We'll start with Dr Amaro and then Dr Allison you can jump in with your comments.

Dr Anastassia Amaro: Sure. Thank you. I am extremely happy to hear about Peggy's experience with metformin. Because in the world over metabolism, we do consider metformin as a first line therapy to not only manage weight but mostly to improve insulin sensitivity and improvement in insulin sensitivity, helps women manage their weight, but it also helps with carbohydrate metabolism. There are some small pilot studies in the past that also suggested that improving insulin resistance with Metformin helped see a decrease in the male hormones as well. So we do try to use Metformin as a first line, but not everybody can tolerate Metformin. Not everybody can take metformin. So we were fortunate now that we have other medications to help people, have the medications to offer to women with excessive weight. In the last decade, FDA has approved five medications for non-surgical weight management. Women with PCOS typically were not excluded from the studies. Even though the studies were not specifically designed for women with PCOS, women with PCOS or part of the studies of those medications. So we feel quite comfortable prescribing some of them and monitoring women closely. So there are medications that we believe are not simply appetite suppressants because it's not just the appetite that drives the weight up, it's the whole hormonal imbalance that leads to difficulty losing weight even when women introduce healthier lifestyle. So with the help of medications, what we're seeing that the set point for the weight is brought down. So it is easier to achieve weight loss with proper diet and exercise. So that's what we do in metabolic medicine, when we see our mutual patients there; we prescribe weight loss medication, provide dietary counselling, and monitor patients for side effects and interactions with other medications.

Priya: Dr Allison, would you like to add something more to what Dr Amaro was just explaining?

Dr Kelly Allison: Sure. So weight management, as Peggy was saying, and as some of the questions coming in, are indicating can be very frustrating I think in general because our food environment is very challenging. There's all kinds of sights and smells of food everywhere we go it seems. So that's just challenging for the general population. And then with PCOS you're layering on these extra complications of the hormones that may drive up one's weight and make it more challenging as Peggy was describing, like almost weight resistant, really a little bit tougher to lose weight. You see this in patients with diabetes sometimes too. So in our behavioral treatments, we generally do the same type of treatment. We do what we know works, and can apply it to women with a patients who have PCOS and that would be the best predictor of weight loss is monitoring one's intake. And I know it's a pain to do, it certainly is, but it really is effective in really trying to figure out how much you're eating and if you are paying attention to calories and other macronutrients such as carbohydrates and protein, it will give you the best information. It's not perfect, but it certainly gives you more information to work on, if you are seeing a counselor to manage your weight or if you're just doing it on your own, it's going to give you much more information to say this is working, this isn't. Now I know that sometimes people become very obsessed with monitoring what they're eating. And sometimes this can lead to disordered eating types of behaviors, and again, that would be something we would watch out for. We would want to work with the patient and say, if you're becoming too obsessed with this monitoring and it's leading to unhealthy eating and compensatory behaviors, then we would change that approach and say, nope, you can't monitor, how can we help with some other tools like cognitive behavioral therapy, to help you be able to manage your anxiety about the weight, help you have some weight acceptance and adopt healthy behaviors without focusing so much on the number on the scale, which also can be helpful in managing symptoms. So it really can be an individual approach. Some people can do standardized weight management programs and do quite fine, but other folks who maybe have more complex symptoms with depression, anxiety or disordered eating, really need a more nuanced approach, which, then we would suggest something like a cognitive behavioral therapy to address all of that more comprehensively because eating doesn't happen in isolation. It can be influenced by mood, by the environment, by lots of different factors and we wouldn't want to neglect those and somebody who's struggling to manage their weight.

Priya: Absolutely. While we are discussing weight management Dr Amaro, is bariatric weight loss surgery effective in lowering the weight of women with PCOS? And does it improve the symptoms at all?

Dr Anastassia Amaro: Very good question. Just recently, Cleveland Clinic published a review of cases when women with PCOS have undergone bariatric surgery. So they described, I believe over 40 women with PCOS had bariatric surgery in the five year period – observation period of time that they were reporting and women with PCOS lost on average 20% of their weight after the surgery. And their hormonal profiles did improve, male hormones came down, insulin resistance improved and cholesterol profile more specifically, triglycerides and good cholesterol have changed in a favourable way. Again, bariatric weight loss studies were not designed specifically for women with PCOS, but women with PCOS did undergo bariatric surgery and their data were analysed.

Priya: So we have a question from the audience. So they want to know how much weight do you actually need to lose in order to improve your symptoms or even increase your fertility?

Dr Anastassia Amaro: Very good and very important question. From multiple studies in different conditions, including PCOS, we know that the benefits of weight loss usually begins around 5%. So between 5 and 10% of weight loss usually results in some metabolic improvements. It could be improvements in ovulation or ovarian function could be improvement in insulin sensitivity and glucose metabolism. It could be improvement in blood pressure and people can go off medication. So between 5 and 10% is usually the weight loss we target in the first 6 to 12 months when we work with the patients. Anything extra is excellent. But even if women achieve just 5 to 10%, that is already clinically significant.

Priya: Okay. So I just have a couple of more questions before I hand over to Valerie for her to bring in the patient perspective. Dr Allison, I was reading up doing a little bit of research for this show. I came upon a couple of papers, most of them discussing mental distress and I know you did touch upon low self esteem

and depression. So we have a question from our audience who wants to know, can you talk about the link between PCOS and depression?

Dr Kelly Allison: Sure. So we do, as I mentioned, the increased risk of depression with this and there are different pathways to it and often when I see somebody in therapy who has PCOS, the things that we would focus on would be increasing self esteem, dealing with the symptoms. And so some of that will be acceptance, some of that will be collaborating with Dr Amaro and Dr Dokras for hair removal services and appropriate treatments to help kind of comprehensively manage the symptoms. But on the psychological side, we would try to use techniques such as what we call cognitive restructuring. So really trying to understand how a woman thinks about herself and her body and the world as well as just dealing with the burden of depressive symptoms which can make you feel fatigued on top of the fatigue you may already feel with PCOS that may feel, make you feel less engaged from others, not feel like you want to go out and do things and spend time with your friends or family. And so we really tried to understand the thought processes that people have, their emotions that they're experiencing and how those thoughts and emotions end up influencing whether or not they go out or whether or not they engage with others or maybe if they eat in response to their stressors because that's comforting to them. And then we try to figure out ways collaboratively for patients to deal with those thoughts in a different way so they have more positive outcomes such as pushing themselves to go out and having a new experience which then actually will activate their mood and make them feel better. So we really try to meet the patient where they are if they are having these symptoms and engage them with some of these techniques so that they can have more positive ways of handling their stress and dealing with the thoughts that are generated that leads to depression.

Priya: Thank you Dr Allison. Dr Dokras, how much does genes play a role in PCOS?

Dr Anuja Dokras: So this is a really good question. Researchers have been trying to identify genes that might be abnormal in PCOS to try and find that link. And there are a number of large studies both in the White Caucasian population in America and in Europe as well as in the Chinese population and PCOS is a little bit like diabetes where there's not going to be just one gene that's abnormal, but a number of areas that we call them our hips or targets that might be responsible for the syndrome. So, we do believe that genes play a role. It's very often when I see patients, they'll say their mother has similar symptoms or their sister or cousin might have similar symptoms. And as we described PCOS is not just one type, it's varied, there can be different symptoms and that's why a relative may not have all the symptoms but just part of it.

But we do believe that it is genetically controlled or modulated. In addition to the gene though, the environment, like you have heard, plays a role. So as the weight goes up, the severity will change. And as you heard even more encouragingly, as the weight comes down, a lot of the symptoms get better. So we know clearly from the bariatric surgery literature that as the weight comes down, the periods do become regular and the male hormone levels drop such that a number of the symptoms go away. Nowadays our patients might ask the question, is PCOS becoming more common, but what we think is that as the weight has gone up for our society in general, periods to do become slightly more irregular, the free testosterone levels come up. And so it seems there's a perception that PCOS is more common, but this is the environment in addition to the genes influencing the symptoms of PCOS.

Priya: Thank you. I'll now hand it over to Valerie for her questions, Valerie, you are on.

Valerie Landis: Yeah. So PCOS affects 1 in 10. We discussed and that's like over million cases in the US, which is pretty hard to diagnose though. And I'm just curious, what's the correlation if a patient wants to pursue like egg freezing or retrievals for IVF and fertility treatments, if they are diagnosed with PCOS, what can be their expected outcomes for those treatments?

Dr Anuja Dokras: Yeah. Thank you for bringing this up because we haven't talked about fertility at all. Let me go back Valerie and say that PCOS is really not hard to diagnose and that's what I was trying to elaborate on at the beginning of this talk, is that it's really a diagnosis based on these three criteria and if we

take a good history from all patients, do the blood work and an ultrasound, it is not a hard diagnosis to be made. But one needs to be diligent in and do the testing rather than just look at our patient or just review some of the symptoms and say maybe you fit into it without going into the details. So coming back to the fertility aspect, I spend a lot of time reassuring our patients that this condition is not going to result in them not being able to get pregnant. It is something that's always on their mind when the young girls come to see me. It's on the minds of the parents who come with them. And there's a lot of misconception out there that the diagnosis of PCOS is going to result in tremendous difficulty with fertility. In fact, when we look at these ovaries, there are a lot of eggs in there. So from a fertility specialist point of view, I am very pleased when I see these ultrasounds because my patients have excellent ovarian reserve or a high number of eggs and all I have to do is help them release these eggs.

So most of these patients don't even need IVF as a first line treatment if we give them medications that's just tablets by mouth; there are two medications currently available in the market. One is called clomid or clomiphene and the other is called Letrozole and both of these will help them ovulate. Weight loss will help the periods become regular and sometimes helps them ovulate. So large proportion of our patients will get pregnant with easy first line therapies for fertility. However, if somebody does come like you're asking for egg freezing because they don't have a partner yet, they're not ready to be pregnant, but they just want to freeze their eggs, then that is an option after we discuss all the pros and cons of egg freezing, like it would be for anybody, not just with PCOS. And then again, one has to be careful because since they have so many eggs in the ovaries, one has to stimulate them mildly. We do not want them to be at a risk of hyperstimulation. We don't want to use excessive hormones in this particular group. And most physicians who have the expertise in IVF will know to use milder protocols for women with PCOS. So again, I'm hopeful that the outcome should be good because in general we should be able to get more eggs for freezing if a woman with PCOS is interested in that option.

Valerie: Thank you doctor. That was a great explanation and could help anybody that is borderline or think maybe they might have it. I know personally I have had many follicles on my ultrasound and so, at times I've always wondered if I had PCOS myself. But since there's no cure for PCOS at the moment, can you talk about a couple of treatment or management tools maybe like a neutral natural supplements or I know there's some research being done currently, like looking at how they can help manage PCOS with more of a natural approach.

Dr Anuja Dokras: Yeah, I think, again, this is a good question because given how young our population is they don't always want to be on medications and there's no one size fits all for PCOS, so it depends on what the symptoms are. Not every patient with PCOS is going to have all the symptoms that we have been discussing and it's very important to engage the patient and say what is the symptom that bothers you the most and what would you like us to focus on in terms of treatments. And so the reason one would want to make the period more regular is if the patients that have one or two periods a year, there is an increase in the risk of cancer within the lining of the uterus as patients get older. So that becomes an important medical treatment because now we are talking about a risk of cancer over a longer period of time. Natural treatments that can help improve the periods, one of the most successful is weight loss because as the weight comes down, as Dr Amaro reviewed how the action of insulin will improve, the male hormone levels drop. And so any supplements or any other interventions that that'll help change weight and decrease weight can be useful. There are medications on the market that are insulin sensitizers but are not prescription medications. And a number of your listeners will know what I'm talking about. They fall in the inositol category like myo-inositol. And so these are supplements which are working along the same pathways that we have discussed here. And if they help with weight loss and they usually will help in addition to other things that our patients are doing, I don't think we can give any of these supplements credit by themselves.

Typically our patients are putting in the effort to count their calories, engage in exercise, etc. But that'll help with improvement in the menstrual regularity. The high male hormone levels will come down as a patient gets older. So when we say there's no cure, as these ovaries shrink because that's where the male hormones are coming from and as a woman gets closer to menopause, symptoms of PCOS do get better and the male hormones will decrease. So again, if there are symptoms related to the high male hormones,

one could manage it by just managing the acne or the hair growth by mechanical ways of removing it. If the patient does not want to take any hormonal treatment to drop the male hormone levels and one could certainly recommend just topical stuff for management as well. So, I do think there is a role for supplements or natural ways of managing PCOS. But it depends on what the symptoms are, how severe they are, and we do want to weigh the pros and cons of how effective these treatments can be.

Valerie: Right. So if somebody is on birth control for an extended period of time, let's say over 10 or so years, is there any research or studies that that can detect if that will help with the management itself or if it just masks the symptoms?

Dr Anuja Dokras: Yeah, this is a good question. We have a lot of patients who believe that, right now as I described, birth control pills are first line treatments of PCOS and there is some frustration that this is masking this syndrome. So the way I explain it to my patients is, there are a couple of things that I want to make sure that we are helping treat and as I just described, one of them is I do want to decrease the risk of or any risk of cancer if the periods are irregular. If the periods are coming eight, nine, 10 times a year, that's not a concern. And we have patients keep a menstrual calendar. But if you could one period or two periods a year that is of concern and I think the physician then does need to treat them and the birth control pill becomes a nice way to treat it because a birth control pill has two hormones which are combined, so the patient doesn't have to take two separate pills and that is the reason it's chosen. It's not chosen because it's a contraceptive is chosen because it has these two hormones which help us protect the lining of the uterus. That's the progesterone hormone, and then the estrogen hormone helps decrease the male hormone levels. So now we have one medication that controls two symptoms. So again, it's not a matter of just masking it, but we're actually trying to prevent complications of PCOS when your physician is prescribing some of these medications, but they will always talk to you about lifestyle management, which we do also believe as first line treatments for PCOS and very often I have my patients stop the medication for a few months to see, now that you're older, maybe the periods are back. Now that you're older, maybe the male hormones have dropped and we don't need to be on these therapies, sort of lifelong, these are there for short periods of time and one can always reassess. I think it's a good idea to come off medications intermittently and see what the PCOS symptoms look like and what the need is. Of course patients come off these medications when they're interested in having a family and get pregnant as well, so there will be interruptions in these treatments and it's always a good idea to reassess the symptoms.

Valerie: Right. Do you think you could share what I often hear with a lot of the patient advocacy work that, in patients that come to me is that, they're confusing the difference between endometriosis and ovarian cysts and PCOS. Do you have any good differentiators or ways to explain these health conditions so people don't confuse these problems?

Dr Anuja Dokras: No. Again, these are such good questions that are coming up. So endometriosis is a condition where typically what we believe is when a woman gets a period each month, some of the blood instead of flowing out of the vagina may go backwards and flow out into the body through the fallopian tube, and then they can be an adverse reaction to this blood that's in the belly. In most women, it doesn't stay around and it gets absorbed over time. But in a small group of women can have a more severe reaction to it and it can stay around, there can be inflammation and we call that endometriosis. Endometriosis is associated with painful periods, painful sexual activity, and if it's the severe, even pain when a women urinates or has a bowel movement. So the symptoms are very different to that with PCOS. But interestingly, the treatment is very similar. Birth control pills do help and are first line treatment for endometriosis as well. Now, an ovarian cyst that a woman typically may double up in pain or go to an emergency room or have an ultrasound and get diagnosed with, is one follicle in the ovary that becomes large over time and then because it has stretched out and become large, causes pain. So a cyst in the ovary typically will be two, three, four, five centimeters or even bigger. Sometimes it can rupture and that causes the pain, so that's an ovarian cyst, typically one large growing or one or two large growing cysts in one or more ovaries. Again, the treatment for that is a birth control pill because we suppress those ovaries so they don't form cysts and then again to recap with PCOS, it's just little little follicles and because it's a genetic condition, we believe that women are just born with a higher number and then over time this number will decrease as they get to

menopause.

Interestingly, there's some data that women with PCOS who go through menopause later to the average American woman goes through menopause around the age of say 51 and there's data come that now says that because women with PCOS has a high follicle count, they may go through menopause maybe two or three years later than the average woman because these ovaries are shrinking on a different scale, timeline compared to somebody who doesn't have PCOS. So again PCOS ovaries should not cause any pain because these follicles are small. They're not large like an ovarian cyst. And they are usually picked up on an ultrasound and not picked up because somebody is complaining of pain in the ovary.

Valerie: Got it. Great. well, just real quick, I think we have time for maybe one more question, right? How can somebody start, so if they think they're suffering from PCOS, what's the good place for a patient to begin this process of getting diagnosed?

Dr Anuja Dokras: They need to reach out, as I said to the physicians and given that we now have this international consensus that the diagnosis is based on these three criteria, it should be possible that for the young girl, the pediatrician, as you get older, the internist or the family physician, the ob gyn should be able to make this diagnosis. Unfortunately, there aren't as many specialized PCOS centers all around the world or even in the US as we would like. But, the diagnosis has been simplified. And, in general, I would think that a large proportion of our patients should be able to get an accurate diagnoses using these criteria and not everybody has to reach out and seek out specialized centers.

Priya: Thank you Valerie. We'll now just jump into some questions from the audience now. So Dr. Allison and Dr Amaro, we have been receiving a lot of questions on the type of diet that you need to follow for PCOS and they've been asking about whether the people should follow a gluten free diet or should they be following a dairy free diet or whether it will help if it's a ketogenic diet, so what diet should women with PCOS follow?

Dr Kelly Allison: Well, this is Dr. Allison there really, unfortunately there are not that many randomized controlled trials of women with PCOS to really answer these questions well and but we have studies of folks with diabetes and that may maybe the most similar comparison that we can make and in general we still believe that whatever diet somebody is able to follow on a longer term basis is probably the most effective for that person. And I think as we get further with precision medicine, we will come to understand if somebody loses weight better on something like a ketogenic diet versus just a low fat diet. We aren't quite there yet, but when I see my own patients, if somebody is more sensitive to eating carbohydrates and they do find it more difficult to lose weight, then I would work with them to say, okay, how can we, because maybe their cravings are stronger and maybe that leads to some binge episodes. Then we would say, okay, how can we either eat those in moderation or they wanted to do something as extreme as as ketogenic. I generally try to stay away from cutting out whole food groups or whole food types of diet. It's just too hard to maintain and then it leads to kind of black and white thinking and then when you get off of it, it's hard to keep up with weight management efforts. You feel like you've failed or your body is giving you all these cravings. But one size does not fit all, but I just don't think there's any definitive evidence to say don't eat dairy or don't eat gluten, in fact, most of the time we do try to get people to eat in moderation so that they can follow a program long term.

Dr Anastassia Amaro: I absolutely agree with Kelly. There is no one diet that fits all. Overall people with insulin resistance, there are some signals from the studies that maybe they more people will respond better to a low glycemic index food. It's not a specific diet. It's the process of selecting a more appropriate carbohydrate. So usually those are complex carbohydrates with lots of fiber. They are so called low glycemic index, so they induce less of an insulin spike. We as women with PCOS already have plenty of insulin on board. So any excessive insulin production can kind of contribute to this vicious cycle of being hungry, eating more, gaining weight, producing more insulin. And there is no evidence currently in favor of gluten free diet. In fact, sometimes I'm afraid we're seeing that people who decided to go on gluten free diet tend to select higher glycemic index carbohydrates, so that may not be that good. Gluten free diets are definitely indicated

for people who have gluten sensitivity or a true celiac disease. They may or may not have PCOS, but that's a separate condition.

Priya: Thank you doctor. Dr Dokras, we have just covered most of the questions and still couple remaining with regards to fertility. I just heard you say that if you have PCOS your fertility is not affected much. So, we have a question saying how can I manage my symptoms and still get pregnant? And she says, I was told the pill is the best way to control PCOS but I want to be pregnant.

Dr Anuja Dokras: Right. So usually, when our patients are ready to be pregnant, we then have them stop the birth control pill that has been prescribed as their first line therapy and if they don't get their periods, haven't come back in a good pattern, like they are not getting a period within six to eight weeks of having stopped the pill, then it means that we are going to need to help them ovulate. And as I mentioned, there are two medications that are available to help with that. So usually what we would do is before stopping the birth control pills, we counsel patients about weight management, make sure that their sugar and the glucose numbers of good and have them all ready for pregnancy. And then we would stop the birth control pill and not be without any treatment for months and months on end but actually have a plan that if the periods are not back and you're not ovulating on your own, then we are going to help with ovulation. On the other hand, a proportion of patients do have regular periods once they stop the pill and then we would teach them how to use the ovulation kits to detect ovulation and to time intercourse appropriately to help them get pregnant.

Priya: Thank you Dr Dokras. We are already over time. But I just have one last question now. The PCOS center at Penn is doing a lot of research on PCOS, so it would be great if you could just touch upon some of the other interesting research that's happening at the center.

Dr Anuja Dokras: Yeah. So we have the PCOS center, it's a multidisciplinary approach and that's why today we have both Dr Amaro and Dr Allison on the line because we believe that offering multidisciplinary approach to this condition is extremely important and that has led us to do studies in the field of understanding the risk of depression, anxiety, eating disorders, and then body image distress. So all of these four aspects, Dr Allison has been a collaborator with us and these are some of our ongoing studies to better understand the link between PCOS and these conditions. We have also engaged in conditions trying to research, trying to understand if losing weight prior to getting pregnant, is helpful or being on a birth control pill prior to getting pregnant is helpful and you heard some of those answers as to about a 5-7% weight loss will be important. And then we've been part of me to clinical trials to try and understand first line treatments for fertility that's Clomid or Letrozole. And currently again, we're in the process of submitting grants for first line treatment options being either Letrozole or in combination with Metformin. So again, I think in short, we do research studies both for fertility and non fertility issues for long term cardiovascular risk as well as mood, those are our main areas of interest here.

Priya: Thank you Dr Dokras. So we all heard polycystic ovary syndrome is a condition that affects one in 10 women of childbearing age and women with PCOS have a hormone imbalance and metabolism problems that may lead to obesity, cardiovascular disease, diabetes, infertility, endometrial cancer and more. So in the absence of a complete cure, efficient management of the condition gains importance and information is the key. Dr Dokras, Dr. Allison, Dr Amaro, thank you for all the great information that you shared with us today. Peggy and Valerie, thanks a lot for bringing in the patient perspective to this discussion and we also would like to thank the University of Pennsylvania and the wonderful audience with all the great questions that you've been sending in. I hope we have covered almost all of the questions that you've sent in, so thank you everyone. The talk will be made available on curetalks.com and CureTalks @Penn pages, so please visit our website for details on upcoming talks. Thank you everyone. Have a great day.