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Investigating the Link Between PCOS & CV Risk Factors During Delivery

**Dr. Chapa:**
Polycystic ovarian syndrome, or PCOS for short, affects approximately 5–13% of women in the general population, and although previous research has shown its link to adverse cardiovascular risks later in life, a new study has revealed that PCOS can increase the risk of cardiovascular complications during childbirth. So what do these findings mean when it comes to caring for pregnant patients with PCOS?

Welcome to *Heart Matters* on ReachMD. I'm Dr. Hector Chapa. And joining me today to discuss these new findings is returning guest Dr. Erin Michos, who's the Director of Women's Cardiovascular Health and Associate Professor of Medicine at Johns Hopkins School of Medicine. She's also the lead author of this brand new study, which was published in the *Journal of the American Heart Association*.

Dr. Michos, it's good to have you again, so welcome back to the program.

**Dr. Michos:**
Oh, thank you again for having me back on your show.

**Dr. Chapa:**
Very, very important topic, of course, in gynecology, but now it's made its way into obstetrics. So let's start with some background. Dr. Michos, can you tell us why this study was designed?

**Dr. Michos:**
Yes. So as you know, polycystic ovarian syndrome is associated with a number of cardiometabolic abnormalities, such as hyperandrogenism, insulin resistance, dyslipidemia, elevated blood pressure, and elevated body mass index, and this has been associated with long-term cardiovascular complications. And it had been known that PCOS is also associated with gestational diabetes, but it really wasn't clear whether it was associated with acute cardiovascular complications at delivery and peripartum, and so that's what we investigated in this study.

So we used national data from the national inpatient sample. This is a data set that's managed by the Agency for Healthcare Research and Quality through a Federal-State-Industry partnership called the Healthcare Cost and Utilization Project, so this data is weighted to be nationally representative of the U.S. population. And we used data from 2002–2019, so that's 17 years, and we used ICD codes to identify hospitalizations associated with delivery and that had a PCOS diagnosis. And we identified over 71 million delivery hospitalizations over the 17 years, and about .3% of these women had diagnosis of PCOS, which is about 200,000 women.

And so what we showed is that over the 17-year period, both PCOS and obesity prevalence was increasing. As may not be surprising, women with PCOS had more cardiometabolic abnormalities such as diabetes, obesity, and dyslipidemia. And we also confirmed that even after we adjusted for age, race, ethnicity, other comorbidities, health problems, insurance, socioeconomic status, and a number of co-variants, we found that PCOS was an independent predictor of many cardiovascular complications. So it was associated with preeclampsia.

That had been shown before, but we also showed that it was associated with a 79% increased risk of peripartum cardiomyopathy; it

was associated with an 80% increased risk for heart failure and about an 80% increased risk for venous thromboembolism compared to women without PCOS. And we also showed that PCOS was associated with acute cardiovascular complications during this delivery hospitalization even independent of preeclampsia risk. So even women who didn't develop preeclampsia, having a history of PCOS was still associated with some of these bad outcomes.

**Dr. Chapa:**
You touched on something that I really do want to go over again, especially for those like me, an OB/GYN, because, as you've already stated, we've already had the link between PCOS and cardiovascular risk factors later in life, and we've known that PCOS can affect antepartum care with issues like you've discussed, gestational diabetes and hypertensive disorders, but what exactly did the study find between PCOS and these cardiovascular complications intrapartum during childbirth itself?

**Dr. Michos:**
I think a lot of women with PCOS are concerned with sort of the immediate, more complications like acne, hirsutism, weight gain, and infertility, and they can have difficulty becoming pregnant because of the anovulatory effects of PCOS and the hyperandrogenism, but once they become pregnant, it's important to note that they're also at increased risk of these cardiovascular complications during their delivery, and so this would imply that these patients need particular closer attention during pregnancy and delivery. But also what's really important I think is the handoff, what happens after delivery, the handoff of care between OB and primary care and potentially cardiology because these women do have increased risk of future cardiovascular disease, and so the risk doesn't really just end at delivery, and it's important that they get follow-up, screening, and treatment for the risk factors. About half of women with PCOS end up developing type 2 diabetes, so it's important that their glucose is monitored postpartum.

And after delivery, we know that lifestyle management is a really important part of modifying cardiovascular risk associated with PCOS. It's important to screen for cardiovascular risk factors and treat if they're present and implement healthy lifestyle changes, which include diet and physical activity. But after delivery and after lactation is done, there's other emerging therapies; like GLP-1 receptor agonists may be also really helpful in this population because of the insulin resistance, so it's important that these women get particular attention not only before conception because we want to optimize women's cardiovascular health before, during, and after pregnancy to prevent these cardiovascular complications.

**Dr. Chapa:**
Well, what a great review and great summary of the clinical implications of PCOS.

For those just joining us, you're listening to *Heart Matters* on ReachMD. I'm Dr. Hector Chapa, and I'm speaking with Dr. Erin Michos discussing new clinical findings on PCOS-related cardiovascular complications during delivery.

Now, Dr. Michos, what strategies should we be using across our related specialties of cardiology, cardio-obstetrics and, of course, maternal-fetal medicine to optimize outcomes for our patients during pregnancy and delivery affected by PCOS?

**Dr. Michos:**
So our study stresses the importance of optimizing cardiovascular health in women with PCOS before, during, and after pregnancy to prevent these adverse cardiovascular complications. As I mentioned earlier, both PCOS and obesity prevalence are on the rise over the 17-year period. This reflects other national trends of declining cardiovascular health of young adults, including reproductive-age women, so there's much work that needs to be done at the individual healthcare societal level to really revamp how prevention efforts are delivered in the U.S. to really reverse these worrisome trends.

As you know, one of the biggest risk factors for having an adverse pregnancy outcome like preeclampsia is to start pregnancy with cardiometabolic risk factors, like obesity, diabetes or chronic hypertension, so we really want to optimize these women's health before pregnancy. But then during pregnancy, to monitor them closely because of the increased risk for gestational diabetes and preeclampsia, we give aspirin for preeclampsia prevention in women that are at high risk for preeclampsia or multiple risk factors. It's not been established whether this applies to PCOS directly or not, but many women with PCOS do have many of these other risk factors for preeclampsia, so aspirin might be a consideration during pregnancy for preeclampsia prevention.

And then we talked about the handoff, which is so important for their long-term complications down the line. The underpinning of PCOS

we really think is insulin resistance, so it's really important that women patients are given the support to be able to implement these lifestyle changes.

**Dr. Chapa:**
And now that we come to a close, Dr. Michos, are there any other insights that you'd like to share with our audience today?

**Dr. Michos:**
So around the same time as I published this study, we did publish another study in the *Journal of Women's Health*. It was a meta-analysis of women with PCOS, not pregnant but looking at the association with coronary artery calcium, which is a marker of atherosclerosis, and this meta-analysis included over 2,000 participants. We showed that women with PCOS were about a 2-fold increased risk of having both prevalent and incident coronary artery calcium. So again, this is a marker suggesting that compared to other BMI-matched control women, women with PCOS are more likely to have atherosclerosis. And as a cardiologist or as a primary care doctor, when we are thinking of seeing these patients in our clinic later in life after the age of 40, coronary artery calcium scores may be a helpful marker to identify women who might be at increased risk, who might benefit from other preventive therapies, such as statins.

**Dr. Chapa:**
Well, those are all certainly very important findings and good clinical insights for our patients with PCOS affecting obstetrics, not simply gynecology and women's health. And I want to thank my guest, Dr. Erin Michos, for sharing these findings and their implications. Dr. Michos, it's always a pleasure speaking with you.

**Dr. Michos:**
Thank you again for having me on your show today.

**Dr. Chapa:**
Important research, so, no, thank you. For ReachMD, I'm Dr. Hector Chapa. To access this and other episodes in our series, visit ReachMD.com/HeartMatters where you can Be Part of the Knowledge. Thanks for listening.