

Thanks to our speaker!



Dr. Jessica Tangren

Nephrologist, Massachusetts General Hospital

- Research in women's health with a particular focus on pregnancy in women with kidney disease
- 2017 AKF CSN fellowship recipient

Reproductive Health, Pregnancy and Chronic Kidney Disease

Jessica Sheehan Tangren, MD

Pregnancy and CKD

- Having a child is a life goal for many women – this does not change for women with chronic kidney disease (CKD)
- Women with CKD are at higher risk for complications including:
 - Preeclampsia
 - Restricted growth of fetus
 - Early delivery
 - Worsening of CKD

Pregnancy and CKD

- Women with CKD face difficult emotional decisions about pregnancy
 - Perceived risks to own health
 - Perceived risks to baby
 - Burden on family members

Women's Perspectives

- *“I was diagnosed with CKD stage 3 from ADPKD two years after I got married. If my husband had known I may not be able to have children, I wonder if he would still have married me.”*
- *“I remember overhearing my pediatrician tell my mother that I should never have children. This feeling of emptiness has been with me my whole life. I don’t think he realized the impact that those words have had on me all these years.”*

Women's Perspectives







- *“Am I selfish to want a baby? If something is wrong with the baby, it will be my fault. I’m not sure if I can live with that.”*
- *“The doctors think I’m crazy to want to have another child after all of the complications during pregnancy with my daughter. I know my life is going to be shorter because of my kidney disease. I want my daughter to have a sibling to lean on. I don’t want her and my husband to be all alone when I am gone.”*

Objectives

- Fertility across the spectrum of CKD
- Pregnancy Risk Assessment and Counseling
 - How does pregnancy affect kidney disease?
 - How does CKD affect pregnancy?
- Special considerations
 - Diabetic kidney disease, lupus, kidney transplant

Definitions

- CKD Classification
 - Stage 1-5
 - Early vs. Advanced Stage
- CKD Progression
 - Increasing CKD Stage

STAGES OF CHRONIC KIDNEY DISEASE		GFR*	% OF KIDNEY FUNCTION
Stage 1	Kidney damage with normal kidney function	90 or higher	 90–100%
Stage 2	Kidney damage with mild loss of kidney function	89 to 60	 89–60%
Stage 3a	Mild to moderate loss of kidney function	59 to 45	 59–45%
Stage 3b	Moderate to severe loss of kidney function	44 to 30	 44–30%
Stage 4	Severe loss of kidney function	29 to 15	 29–15%
Stage 5	Kidney failure	Less than 15	 Less than 15%

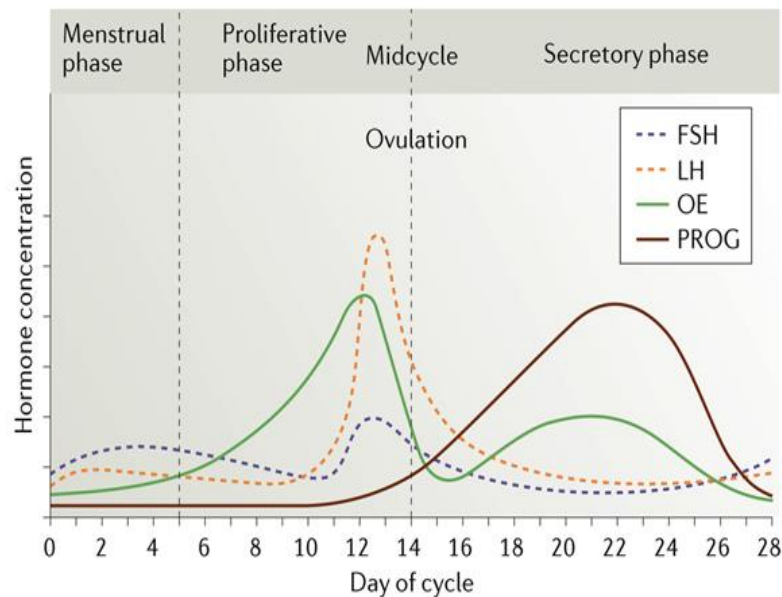
Fertility in Chronic Kidney Disease

Fertility in CKD

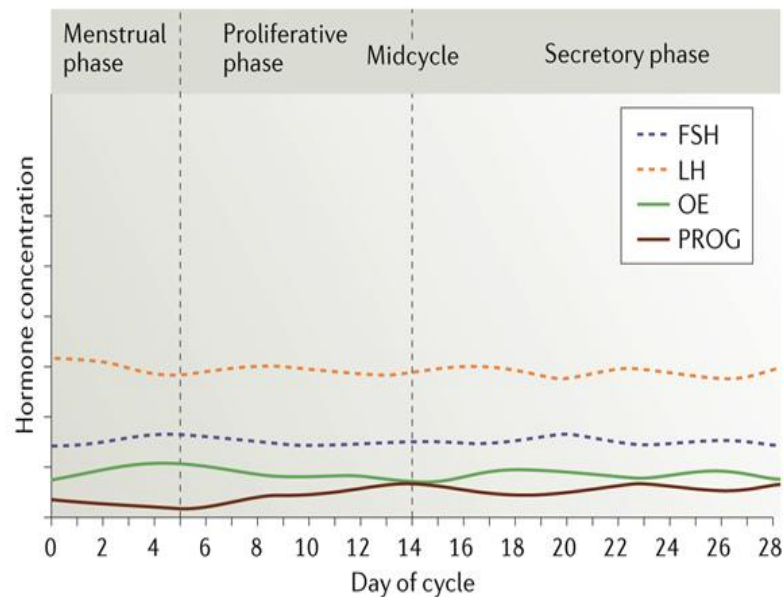
- Fertility declines in advanced chronic kidney disease
 - Menstrual irregularities when $GFR < 15$
 - Many women on dialysis no longer have normal periods or have “anovulatory” cycles
 - Elevated BUN, reduced clearance of certain hormones (prolactin), low levels of estrogen and progesterone

Fertility in CKD

a Physiological menstrual cycle



b Menstrual cycle in end-stage CKD



Fertility in CKD

- Pregnancy *can occur* at all CKD stages and in kidney transplant recipients
 - Kidney transplantation
 - Intensified hemodialysis
- Birth control important to prevent unplanned pregnancies
 - Teratogenic medications (post-transplant, glomerular disease treatment)
 - IUD and progesterone-only pill safest methods

How will a pregnancy impact my kidneys?

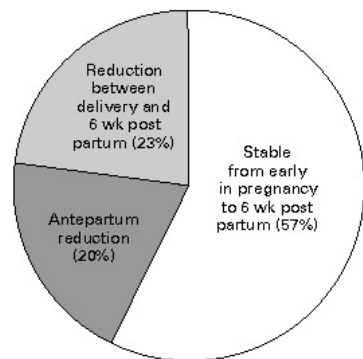
Kidney Function in Pregnancy

- Kidneys play an important role in adapting to normal pregnancy
 - GFR increases by 50%
 - Size increases
 - Increased production of kidney-derived hormones that control red blood cell counts and vitamin D levels

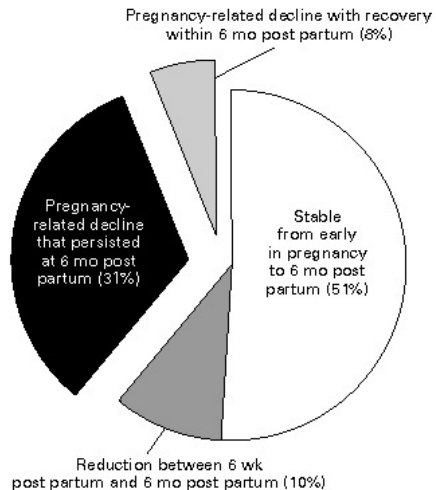
Risk of CKD Progression in Pregnancy

- Risk of “shift” in CKD stage or progression to ESRD
 - 504 pregnancies from two large Italian centers

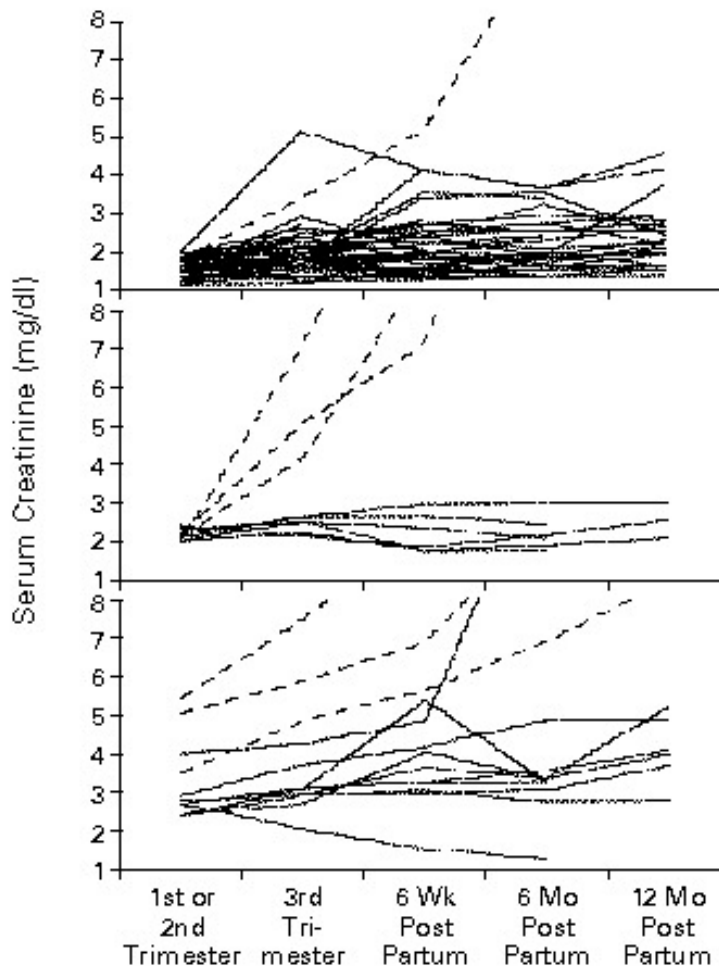
	Stage 1 CKD	Stage 2 CKD	Stage 3 CKD	Stage 4-5 CKD
N	28/370	1/87	2/37	2/10
%	8%	13%	16%	20%



Glomerular Filtration Rate during Pregnancy



Glomerular Filtration Rate 6 mo Post Partum



Cr < 2.0

Cr 2.0-2.4

Cr > 2.5

Limitations of Studies

- Small, usually from single center
- Ethnic minorities under-represented
- Planned versus unplanned pregnancy
- All causes of CKD lumped together
- Other important factors such as levels of protein in the urine and high blood pressure not considered

“Three Strikes” Rule

- Elevated serum creatinine (>1.4)
- Proteinuria (cut-off depends on cause)
- Hypertension ($>140/90$)

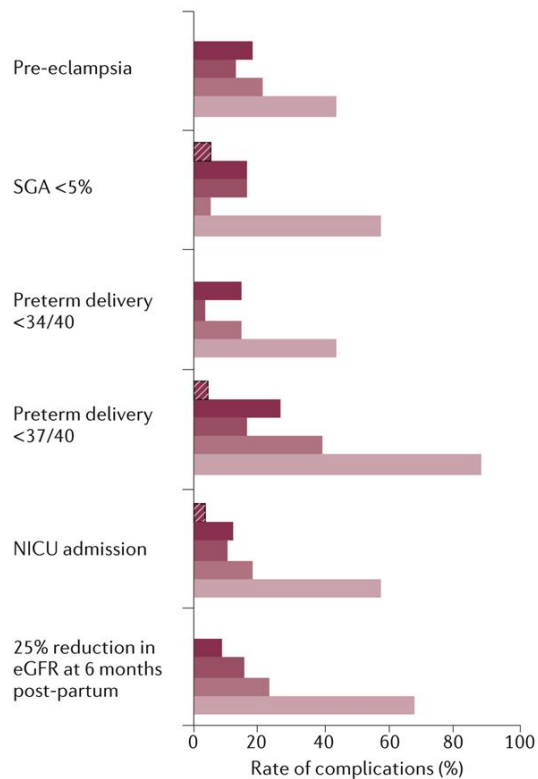
-Michelle Hladunewich, MD – Toronto

Will CKD impact my pregnancy?

Negative Pregnancy Outcomes

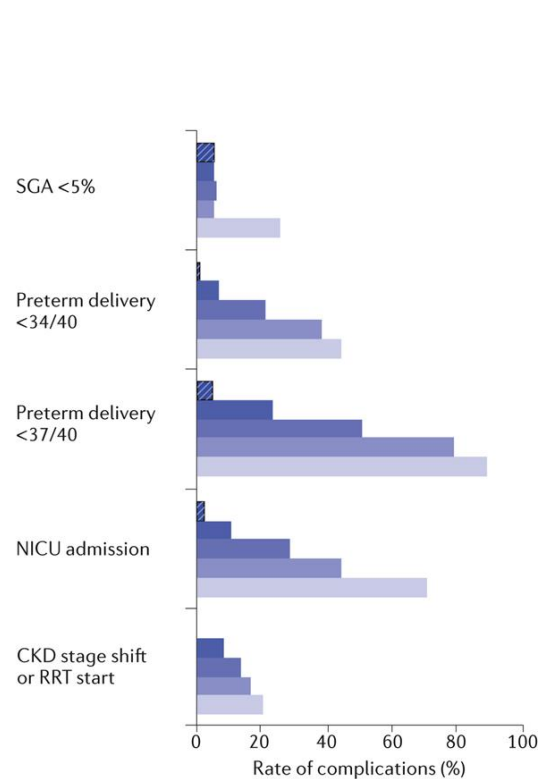
- Women with CKD have worse maternal and neonatal outcomes than women without CKD
 - 2x increased risk for cesarean section delivery
 - 5x increased risk for preterm delivery or small for gestational age infant
 - 6-10x increased risk for preeclampsia

a Bramham *et al.*⁷⁸



 Controls
 CKD stage 1
 CKD stage 2
 CKD stage 3
 CKD stage 4-5

b Piccoli *et al.*⁶⁰



 Controls
 CKD stage 1
 CKD stage 2
 CKD stage 3
 CKD stage 4-5

Preeclampsia

- Disorder unique to pregnancy – less than 5% of healthy women, greater than 20% in women with CKD
- Development of new-onset or worsening high blood pressure *and* new onset or worsening proteinuria after 20 weeks of pregnancy
- Very hard to distinguish from worsening CKD in pregnancy
- Only treatment is delivery of baby
 - Prematurity
- Low dose aspirin started early in pregnancy may reduce risk of preeclampsia

“Three Strikes” Rule

- Elevated serum creatinine (>1.4)
- Proteinuria (cut-off depends on cause)
- Hypertension ($>140/90$)

-Michelle Hladunewich, MD – Toronto

Special Considerations

Diabetic Kidney Disease

- Women with diabetes at increased risk for complications in pregnancy even without kidney involvement
- Good control of blood sugars before getting pregnant is essential
 - Elevated HbA1c at the time of pregnancy is associated with higher rates of fetal malformations
- Lisinopril (and other RAAS-blocking medications) must be stopped before or at first diagnosis of pregnancy

Lupus Nephritis

- Pregnancy outcomes improved when kidney disease is in remission prior to pregnancy
 - Recommend 6 months in remission from active kidney disease before getting pregnant
- Mycophenolate mofetil (MMF/Cellcept) teratogenic
 - Should be substituted with alternative medicine before getting pregnant

Kidney Transplant Recipients

- Fertility rapidly restored after transplantation
- Safe to proceed with pregnancy if:
 - > 1 year since transplant
 - Stable kidney transplant function ($\text{Cr} < 1.5$)
 - No episodes of rejection in the past year
 - No recent infections that could harm fetus (CMV)
 - Pregnancy-safe medicine regimen

What to expect...

- Pre-pregnancy
 - Meet with nephrologist to discuss timing of pregnancy, disease-specific risk of complications
 - Contraception advice if delaying pregnancy recommended
 - Fertility assessment if necessary
 - Optimize blood pressure control
 - Change to non-teratogenic medications

What to expect...

- During Pregnancy
 - Target blood pressure less than 140/90
 - Start aspirin
 - Repeated assessment of kidney function and protein in the urine
 - Frequent monitoring of the fetus – weekly or more frequently in second half of pregnancy

What to expect...

- **Delivery**
 - Delivery early if any medical issues for mother or baby
 - No pre-specified delivery date, although many OBGYNs may recommend delivery around 38 weeks
 - Vaginal delivery preferred
 - Steroids may be needed if
 - Delivery before 34 weeks to promote baby's lung maturity
 - Steroid use for mother during pregnancy to prevent adrenal crisis

What to expect...

- Postpartum
 - Breast feeding encouraged under most circumstances
 - Adjustment of blood pressure medicines
 - Can resume RAAS blockade (enalapril, captopril)
 - Any pregnancy-associated increases in creatinine or urine protein can take 6 weeks to resolve

Talk to your Nephrologist

- Planning pregnancy is a marathon not a sprint
- Pre-conception management important
 - Many disease require alterations to medications before conception
 - Nephrologist can help identify the best “window” in CKD course
 - Disease activity, CKD trajectory, maternal age
 - May recommend consultation with high risk OBGYN prior to pregnancy

Questions?
