AKI in pregnancy

At the bedside

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Time for a case

Mrs L is a 36 F, P2+0 with a history of AKI who came to see you for pre-pregnancy counselling.

Overall, she doesn't know the exact cause of her AKI, but it was following an admission to hospital two years ago with ruptured appendix for which she was taken to OR, and treated with prolonged antibiotics course. She is not sure about the severity of her AKI, but she has not required RRT.

Other medical/surgical History: none

FH: HTN in both parents, otherwise noncontributory.

- Active Medications: None

- Physical Examination:

Weight: 57 kg
BP 100/69 mmHg
HR: 92 bpm

Otherwise, noncontributory

Current laboratory results:

- Most recent creatinine: 54 umol/L
- Serum Biochemistry: Na+ 143. mmol/L, K+ 4.3 mmol/L
- Albumin: 43. g/L
- Hematology: Hb 136. g/L, WBC 5.2 x 10*9/L, Plts 206. x 10*9/L

How would you counsel her ?

Counselling

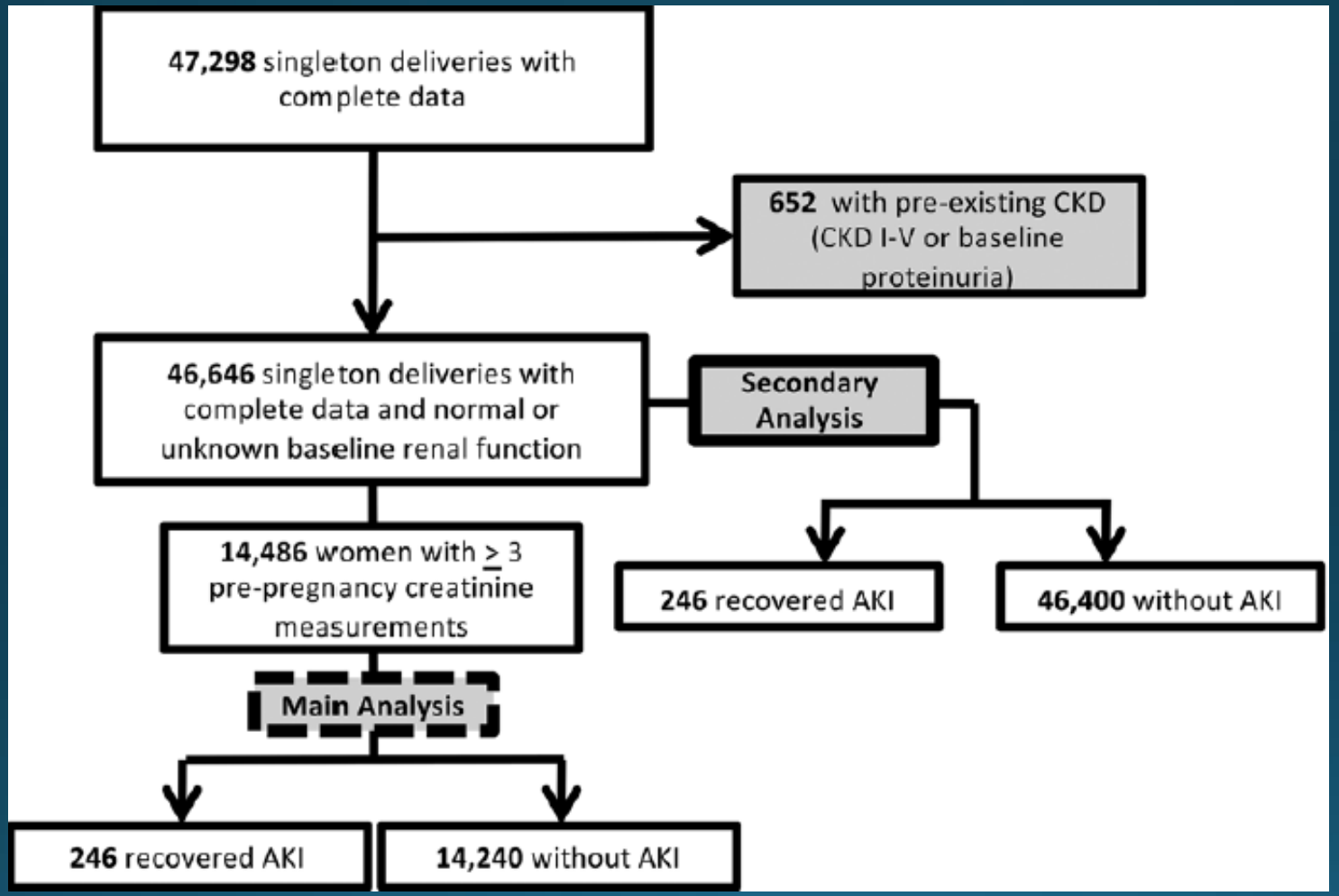
1. Yes you can proceed! Your kidney injury history has no effect on this pregnancy or other future pregnancies.

2. Better not to proceed! it's likely high risk and you already have two kids.

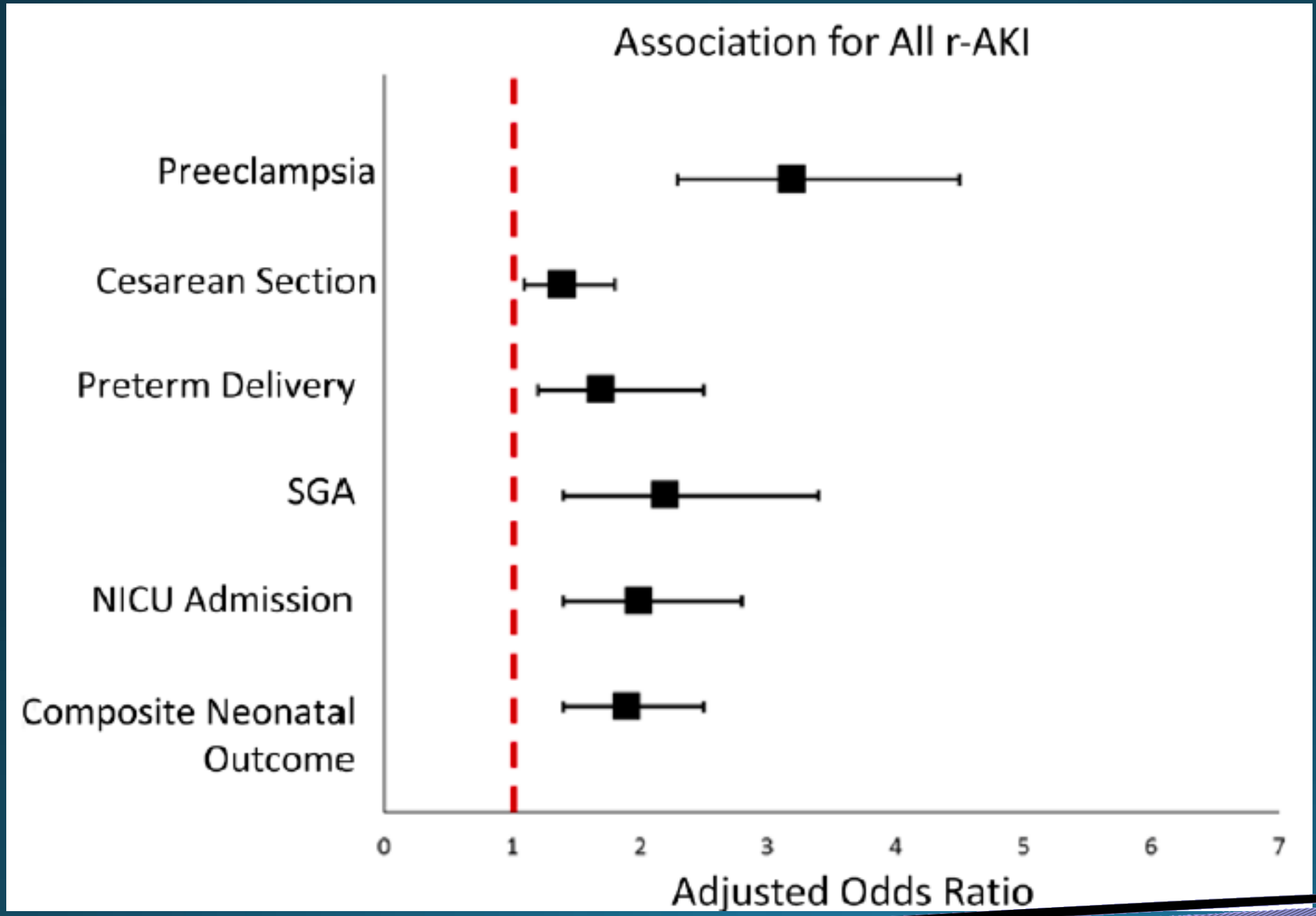
3. Yes you can procced! close follow up is recommended as there are associated risks.

Risk of AKI on future pregnancies!

In addition to the risks of AKI "during" pregnancy



Tangren et al, HTN 2018



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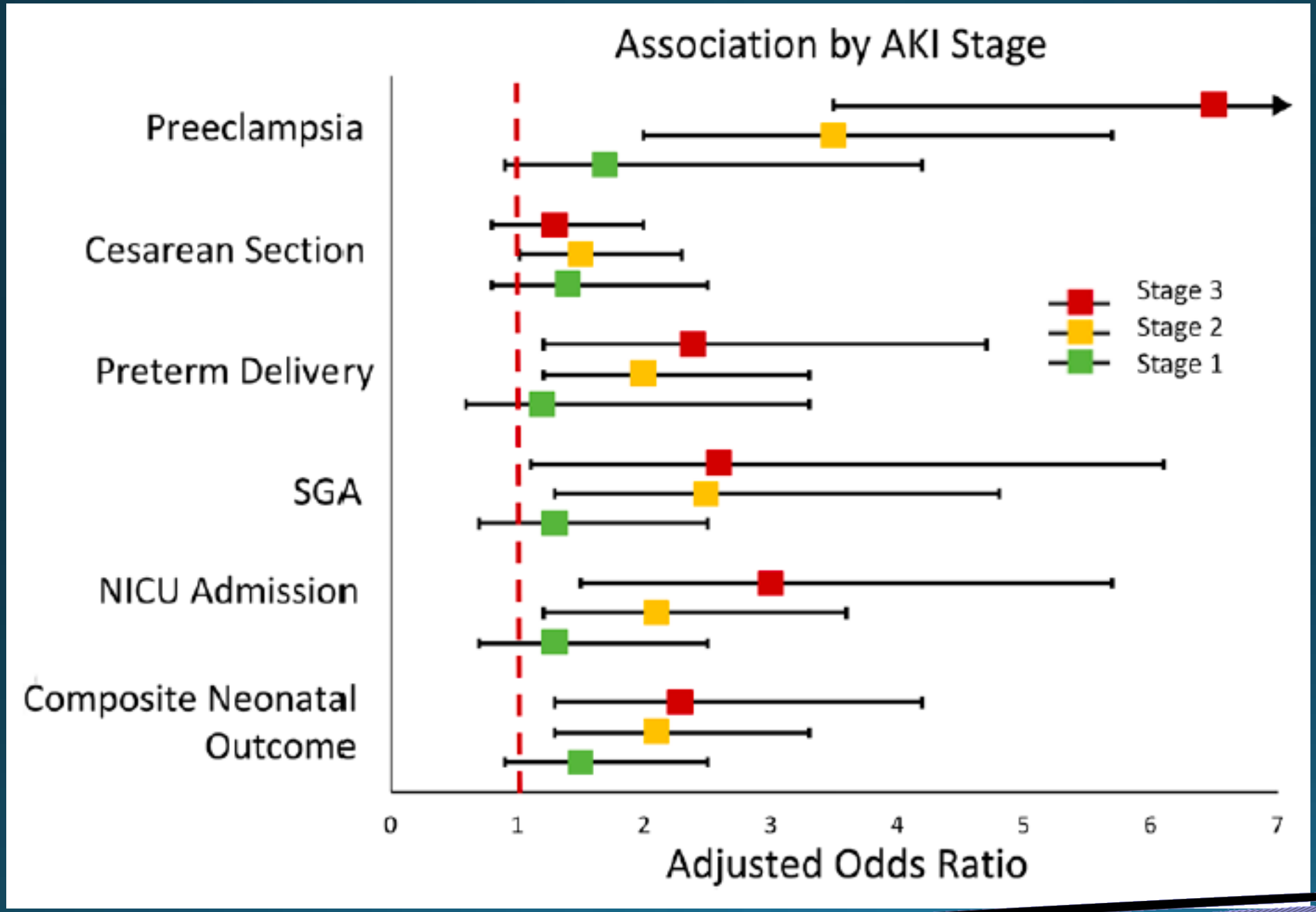

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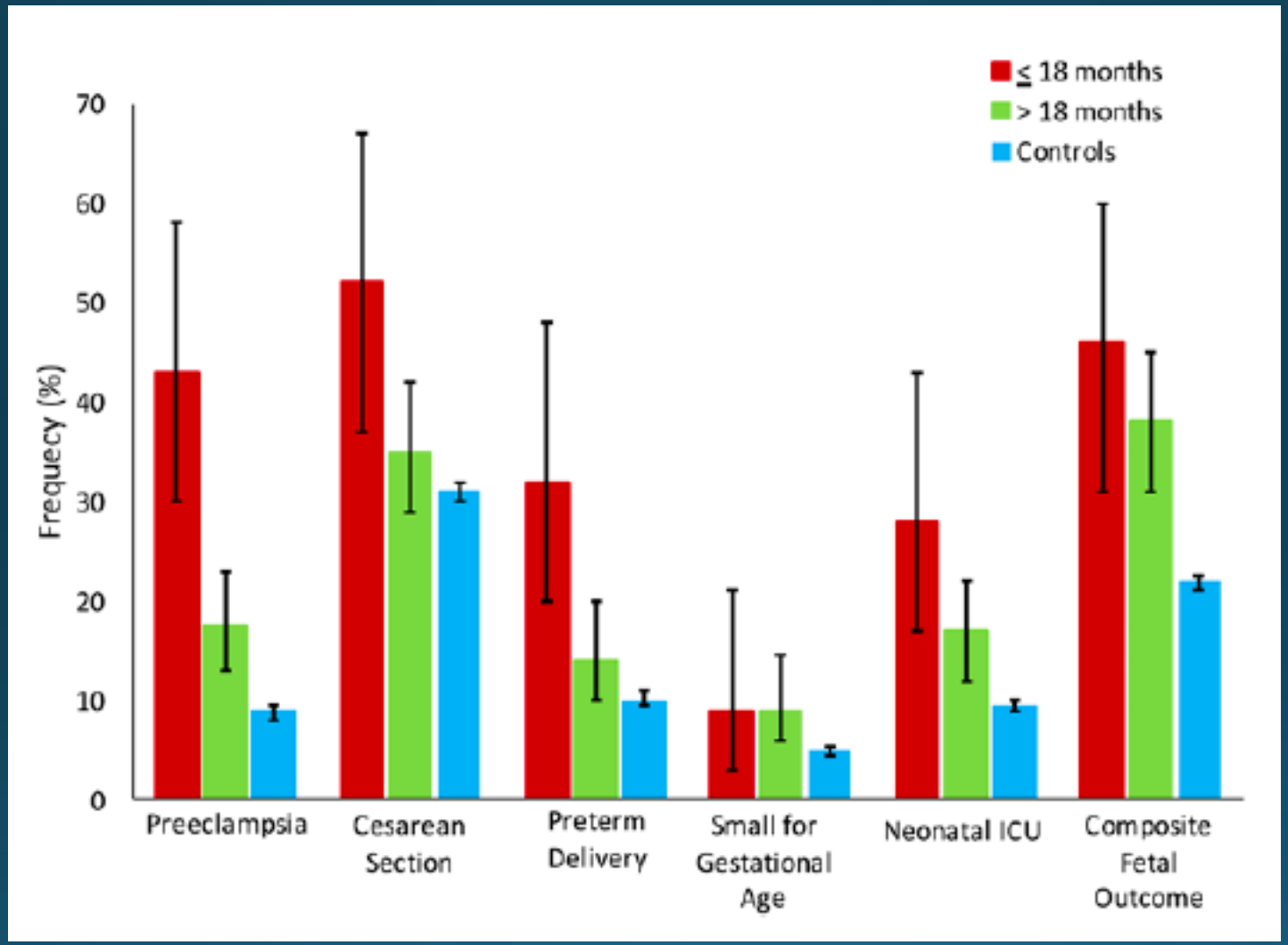


Tangren et al, HTN 2018

Anything to decrease my risk ?

Mrs. L is asking

1. Increasing water intake to 3 L per day.
2. Follow up in high risk pregnancy setting.
3. Aspirin to be administered prior to 16 weeks gestation.

? Role of ASA

Since the greatest risk is preeclampsia !

- USPSTF (Ann Int Med, 2014).
- ACOG (Obstet Gynecol, 2018).

Indications:

Previous pregnancy with PE

Multifetal gestation

HTN

DM

CKD

Autoimmune disease

Back to Mrs L

- At 28 weeks gestation her BP was noted to be 147/90 mmHg
- She has noticed increased lower limb edema
- Her serum creatinine was higher than usual at 110 Umol/L
- UA showed +++ protein

What's the likely etiology of her presentation ?

1. Pre-renal AKI.
2. Likely preeclampsia.
3. New onset glomerulonephritis.
4. I need more info.

In favor of GN

- The presence of extra-renal symptoms.
- Active urine sediment.
- Positive serology.

Should we proceed with a biopsy?

1. YES
2. NO
3. NOT SURE

Renal biopsy during pregnancy

<32 Weeks (Based on Expert Opinion).

- Systematic Review

243 Bx (graft Bx excluded)

✓4/197 or 2% major complication rate

✓Median of 25 weeks gestation

✓5% minor complication rate

Bx in cases of GN vs PE changed the management in 66% of cases!

Piccolli et al. BJOG 2013

In favor of preeclampsia

Definition of preeclampsia

Diagnostic Criteria	Definition
Hypertension and Proteinuria	Systolic BP ≥140 mmHg or DBP≥90 mmHg after 20 wk of gestation on two occasions at least 4 h apart in a woman with a previously normal BP ≥300 mg/24 h (or this amount extrapolated from a timed collection), UPC≥0.3 mg/mg or ≥30 mg/mmol (38), or dipstick 1+ (used only if other quantitative methods are not available)
In the absence of proteinuria, new-onset hypertension with the new onset of any of the following	
Thrombocytopenia	Platelet count <100,000/μl
Renal insufficiency	Serum creatinine concentrations >1.1 mg/dl or a doubling of the serum creatinine concentrations in the absence of other renal disease
Impaired liver function	Elevated blood concentrations of liver transaminases to twice normal concentrations
Pulmonary edema	
Cerebral or visual symptoms	

ACOG; Gestational Hypertension and Preeclampsia. Obstet Gynecol 2019

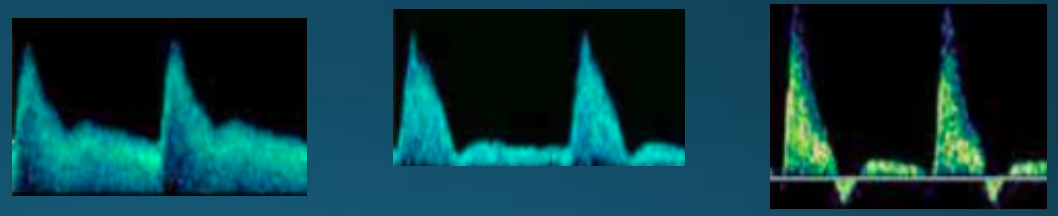
In favor of preeclampsia

Placental disease (failure to remodel the spiral arteries) >> inadequate uteroplacental blood flow >> Poor fetal growth !!

Anti-angiogenic (sflt-1) and angiogenic (PIGF) factors

Low sFlt-1/PIGF ratio - RULE OUT (Zeisler NEJM 2016)

Placental Doppler



Normal | Notching | Absent or reverse diastolic flow

Prevention of preeclampsia

Intervention	Evidence	Benefits	Comments
Low-salt diet (40)	Multicenter RCT (N=361)	None	No difference in hospitalization or obstetric outcomes
Diuretic use (195)	Meta-analysis of nine RCTs (N=7000)	None	Higher incidence of adverse events, including nausea and vomiting
Calcium supplementation (196)	Systematic review of 13 studies (N=15,730)	Small to moderate	Greatest benefit in women with low dietary calcium intake and women at high risk of preeclampsia
Vitamin C and E supplementation	Multicenter RCT involving 2410 women (197)	None	Therapy slightly increased rate of low birth weight babies
	Multicenter RCT of 1877 women (198)	None	No benefit to therapy
	Multicenter RCT of 1365 women (199)	None	Study performed in women with low early pregnancy weight
Aspirin (200)	Meta-analysis of 34 RCTs involving 11,348 women	Small	Routinely recommended in high-risk women; must be started before 16 wk of gestation
Heparin (201,202)	Meta-analysis of four RCTs involving 324 women; meta-analysis of six RCTs involving 848 women	Moderate benefit in women with prior preeclampsia, intrauterine growth restriction, or placental abruption	Potentially useful for prevention of recurrent placenta–mediated pregnancy complications in women with a history of adverse pregnancy outcomes

In favor of other etiologies

	Sx	HTN	Proteinuria	Hemolytic anemia	Thrombo-cytopenia	Transaminitis	Hypoglycemia
HELLP Syndrome	Headache, epigastric pain	Severe	Severe	Moderate	Moderate	Severe	Absent
AFLP	N/V, abdominal pain & jaundice	Moderate	Mild	Mild	Mild	Severe	Present

Management of AKI in pregnancy

Treatment of the underlying cause

? Indications to start RRT

Prescription of RRT

Questions ?

Thank you!