

بنام خداوند بخشنده  
مهربان

# Women in dialysis

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# Fertility

- while women on dialysis may have **erratic and/or absent menstrual cycles**, pregnancy still occurs ranges from 0.3 to 2.2 percent per year
- The pregnancy rate may be increasing among dialysis patients: achievement of higher dialysis dose and improved treatment of anemia because of **erythropoiesis-stimulating agents** (ESAs) leading to improved libido
- Patients receiving **nocturnal hemodialysis** appear to have higher pregnancy rates
- A dose response between **dialysis intensity and pregnancy** was shown, with live birth rates of 48 percent in women dialyzed  $\leq 20$  hours per week and 85 percent in women dialyzed  $> 36$  hours per week.

# ***OBSTETRIC OUTCOMES***

- Maternal :
  - uncontrolled hypertension
  - preeclampsia; superimposed preeclampsia in nearly 20 percent of women
  - HELLP
  - Transfusions were required by approximately 20 percent
  - High frequent can be difficult; screening for depression and emotional support
- Fetal:
  - Urea has been shown to be directly proportional to fetal mortality
  - neonatal death/stillbirth; live birth rate of 86 /kidney transplants reported a 73.5
  - preterm birth
  - and low birth weight.
  - Longer duration of dialysis (>36 hours/week) was associated with an increased live birth rate

# PRECONCEPTION CARE

- Patients should be informed that pregnancy in dialysis patients is considered **high risk** and will require a **multidisciplinary effort**
- Pregnancy outcomes
- Contraceptive methods
- Management of medications before, during, and after pregnancy
- Management of dialysis during pregnancy
- **Surrogacy**
- transplant recipients have a **higher incidence of successful** pregnancies, fewer complications, and fewer birth abnormalities
- the **prolonged waiting time** for a deceased-donor kidney and the progressive reduction in fertility with increasing age.
- For women who are unable or choose not to delay conception for transplant, we discuss the need for more frequent dialysis during pregnancy (ie, near daily) and that they may have an increased risk of allosensitization after pregnancy

# Contraception

- The decision to proceed with or delay conception is highly individualized and is impacted by **the baseline health of the woman**, the woman's **age**, and the anticipated **wait time for a donor kidney**, if applicable.
- In general, pregnancy outcomes are better **early in the course of CKD** compared with advanced CKD or ESRD.
- **LARC methods** include copper intrauterine devices (IUDs), levonorgestrel-releasing IUDs, and the etonogestrel implant.
- Diagnosis of pregnancy; Beta-hCG is excreted by the kidneys, and serum levels may be increased in women with ESRD in the absence of pregnancy

# Baseline evaluation

- Assessment of the patient's medication discontinue and/or substitute medications that have been identified to be potentially teratogenic or fetotoxic; (ACE) ;Diuretics — We do not use diuretics.
- Vaccination – Patients should receive standard vaccinations included in obstetric
- Assessment of blood pressure
- Measurement of serum urea, bicarbonate, and electrolytes, urea reduction ratio, Liver function tests, Complete blood count and iron studies , serum calcium, phosphorus, and parathyroid hormone, Measurement of serum albumin and assessment of nutritional status,FBS,HbA1C
- In (SLE), measurement of antiphospholipid antibodies [lupus anticoagulant (LA), immunoglobulin G (IgG) and IgM anticardiolipin (aCL) antibodies, and IgG and IgM anti-beta2-glycoprotein (GP) I antibodies] and antibodies that can impact the fetus (anti-Ro/SSA, anti-La/SSB)

# ACE inhibitors and ARBs

- Angiotensin-converting enzyme (ACE) inhibitors should not be used during pregnancy, since they are associated with fetal abnormalities ; cardiovascular anomalies
- renal tubular dysgenesis
- oligohydramnios during pregnancy (amniotic fluid is largely derived from the fetal kidneys)
- anuria and renal failure after delivery , Hypotension: 30 (16 percent)
  
- Pulmonary hypoplasia: 17 (9 percent)
  
- Respiratory distress syndrome: 41 (22 percent)
  
- Persistent patent ductus
  
- Postnatal exposure from breast milk — ACE inhibitors are transferred into breast milk, but have very low levels in the mil



# MANAGEMENT DURING PREGNANCY

- Fetal;trisomy screening
- Nutrition;
  - Daily protein intake of 1.5 to 1.8 g/kg per day
  - Double doses of water-soluble vitamins and folic acid supplementation of 5 mg/day
  - Liberalization of dietary phosphate
  - Assessment of dry weight;
  - women should gain 2 to 4 pounds during the first three months and 1 pound per week thereafter
  - Calorie intake of 35kcal/kg/ pregnant weight/day +300kcal/day
- A detailed ultrasound to assess fetal anatomy and cervical length is typically performed between 18 to 20 weeks-et al growth is assessed every three to four weeks



# Maternal complications

- **Hypertensive disorders** ; Preeclampsia is a multi-system progressive disorder characterized by the new onset of hypertension and proteinuria, or hypertension and significant end-organ dysfunction with or without proteinuria, in the last half of pregnancy or postpartum

- **Infection**

- **Anemia**

For women who are at high risk of developing preeclampsia, establishing gestational age, baseline blood pressure, and baseline laboratory values, including platelet count, creatinine concentration, liver function tests, and 24-hour urinary protein estimation early in pregnancy can be helpful later in gestation in distinguishing preeclampsia from underlying disorders associated with similar clinical and laboratory findings

# Prevention & prediction of preeclampsia

- Patients with ESRD on dialysis are considered to be at high risk for preeclampsia
- pregnancy-associated plasma protein A
- Uterine artery Doppler velocimetry; high resistance or pulsatility index, systolic/diastolic ratio
- Serum uric acid
- Interventions to reduce risk ; avoiding prepregnancy obesity and excessive weight gain
- Low-dose aspirin is the only drug for which there is proven evidence of benefit in reducing the risk of preeclampsia when administered throughout the second and third trimesters in patients at high risk
- Angiogenic modulators — is important in the pathogenesis of diffuse endothelial injury and increased capillary permeability, which are the pathophysiologic hallmarks of preeclampsia. include vascular endothelial growth factor (VEGF) and placental growth factor (PIGF), as well as two anti-angiogenic proteins, soluble endoglin (sEng) and the truncated form of the full-length VEGF receptor type-1 (Flt-1), known as soluble fms-like tyrosine kinase 1 (sFlt-1)

# Use of magnesium sulfate

- prevent seizures in preeclampsia or to reduce the risk of cerebral palsy before preterm birth of an infant <32 weeks
- Magnesium is renally excreted, and toxicity is potentially life threatening due to respiratory depression, arrhythmias, and central nervous system (CNS) depression.
- 4 to 6 g loading dose over 20 to 30 minutes, followed by 1 g/hour continuous infusion for at least 24 hours after delivery (ACOG 202 2019). Per the manufacturer, do not exceed 20 grams during a 48-hour period. Note: Frequent monitoring of magnesium levels is important to avoid adverse effects in patients with renal impairment (ACOG 202 2019)

# Delivery

- delivered at or **just beyond 37** weeks if they have not already been delivered for obstetric or medical indications.. Further, delivery needs to be timed as Most women can safely undergo induction of labor and vaginal delivery
- cesarean delivery is performed for standard obstetric indications.
- Preterm delivery may be necessary in the presence of severe preeclampsia, fetal growth restriction, or nonreassuring fetal testing
- Sixty-three percent were ultimately delivered by cesarean.
- Seventy-four percent of the women underwent induction of labor for indications ;hypertension, preeclampsia, and fetal growth restriction.



# Management of ESRD during pregnancy

- Preferred modality — We suggest that women who are trying to conceive and all pregnant dialysis patients be treated with hemodialysis
- Intensive dialysis – Providing more frequent and/or longer dialysis decreases the risk of polyhydramnios, helps control hypertension, increases birth weight and gestational age, improves maternal nutrition, and increases the chances of live birth . Most clinicians would increase the frequency of hemodialysis to five or six times per week.
- The specific dose varies depending on the residual renal function. Among patients without residual renal function, we provide  $\geq 36$  hours of dialysis per week

# dialysis in pregnancy

- **Avoid intradialytic hypotension**
- **Anticoagulation** – Heparin is considered safe to use for anticoagulation in pregnancy
- Weekly assessment of volume status
- Consider to Potassium, Calcium, Phosphate
- **Hypertension** ; diastolic blood pressure treatment targets of 85 or 100 mmHg
- **Metabolic bone disease**; We generally do not need to use phosphate binders during pregnancy Phosphate binders may reduce the absorption of fat-soluble vitamins and folic acid.
- Dialysis unit **head nurse should assign a core group of highly trained senior nurses** to dialyse the pregnant woman to ensure continuity and advanced care is achieved

# Treatment of anemia

- The treatment of anemia among pregnant dialysis patients is the same as for nonpregnant patients
- Pregnant women often require higher doses of ESAs to maintain an adequate red cell mass since the physiologic changes and demands of pregnancy may result in worsening of anemia
- ESAs do not cross the placenta because of their large molecular weight



