

MANAGEMENT OF PREECLAMPSIA & HELLP

FLAME LECTURE: 105

BURNS/SISTO/STELLER 10.12.25

LEARNING OBJECTIVES

- ▶ Explain the management of a patient with preeclampsia
- ▶ List the maternal and fetal complications associated with preeclampsia
- ▶ See also:
 - ▶ FLAME 27 – CHRONIC HTN IN PREGNANCY
 - ▶ FLAME 104 – DIAGNOSING PREECLAMPSIA
 - ▶ FLAME 106 – ECLAMPSIA

PRE-E W/O SEVERE FEATURES (SF)

(Previously known as Mild Preeclampsia)

- ▶ Pre-E is only “cured” via delivery of placenta, but delivery timing must balance the risk of fetal prematurity with expedited delivery vs. risk to mother/fetus with waiting while pre-E may worsen
 - ▶ ≥ 37 weeks irrespective of severe features = Delivery!
 - ▶ Not a contraindication to labor induction and/or vaginal delivery
 - ▶ < 37 weeks pre-E w/o SF = Expectant management
 - ▶ Evidence to support both inpatient or close outpatient mgmt; decision should be individualized based on risk factors for escalation to severe features
 - ▶ sFlt-1 / PIGF ratio is a novel approach to determining risk of development of preE w/ SF within one week
 - ▶ *Blood pressures*: consider oral meds to keep BPs $< 140/90$; if BPs $> 160/110$, consider pre-E w/ SF
 - ▶ *Seizure prophylaxis*: no universal recommendation if BPs $< 160/110$
 - ▶ *Labs*: CBC & CMP weekly, OR PRN sooner worsening pressures/symptoms
 - ▶ Note, no need to recheck urine protein, because we do not make delivery decisions or escalate to a diagnosis of severe features based off this parameter any longer
 - ▶ *Antepartum measures*: Daily NSTs, BMZ given to promote fetal lung maturity

PRE-E W/ SEVERE FEATURES

(Previously known as Severe Preeclampsia)

- ▶ Pre-E w/ SF is preeclampsia with signs of end organ damage OR if blood pressures escalate to $>160/110$ (twice greater than 4 hours apart)
 - ▶ ≥ 34 weeks + preE w/ SF = Mag + Delivery
 - ▶ Not a contraindication to labor induction and/or vaginal delivery, UNLESS rapidly worsening status for which the risks of waiting for induction are deemed to outweigh the risks of outright cesarean section
 - ▶ < 34 weeks + SF and NO COMPLICATIONS (next slide) = Expectant management
 - ▶ Inpatient until delivery
 - ▶ *Blood pressures*: Target 130-140 / 80-90; oral and/or IV meds to achieve this goal
 - ▶ *Seizure prophylaxis*: magnesium sulfate x 24 hours upon admission AND/OR during delivery and postpartum
 - ▶ *Labs*: CBC & CMP daily OR PRN sooner for worsening pressures/symptoms
 - ▶ *Antepartum measures*: Daily NSTs, BMZ given to promote fetal lung maturity

PRE-E W/ SF + COMPLICATIONS

<34 weeks + pre-E w/ SF + ONE OF THE BELOW = GET BMZ ON BOARD (x48H) → THEN PROCEED WITH DELIVERY

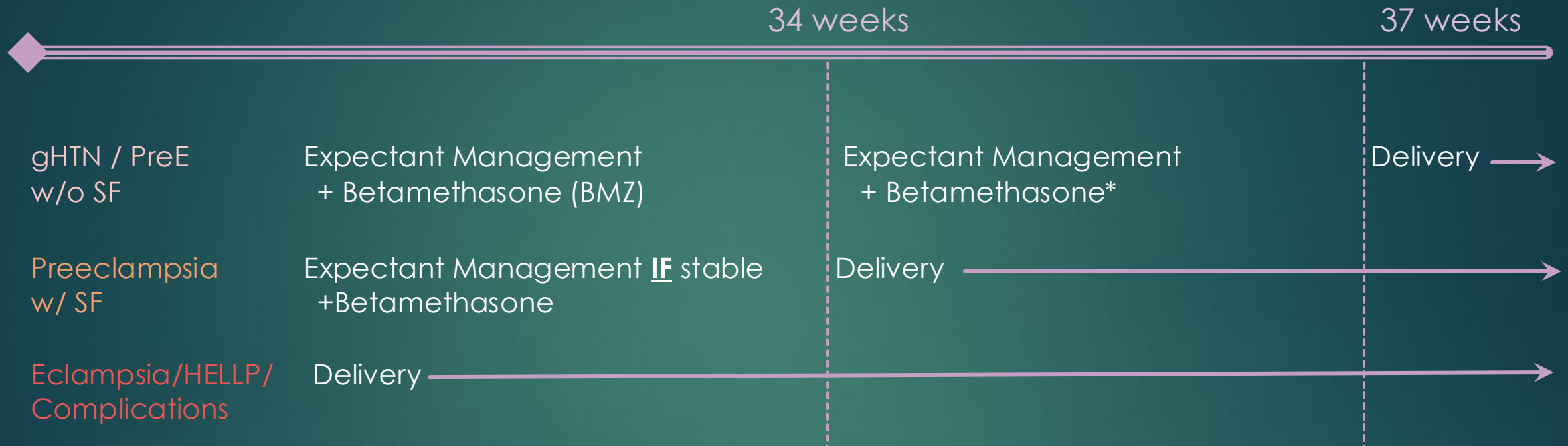
- ▶ PPROM
- ▶ *Fetal Growth Restriction (FGR) <5th %ile*
- ▶ Abnormal Umbilical Artery Dopplers (specifically, REDF)
- ▶ Oligohydramnios (AFI < 5cm)
- ▶ Platelets <100K
- ▶ LFTs >2X normal
- ▶ New Cr >1.1 or Cr 2X baseline

<34 weeks + pre-E w/ SF + SCARY STUFF BELOW = GIVE BMZ BUT DELIVER NOW!!

- ▶ Uncontrollable severe HTN
- ▶ Eclampsia
- ▶ Pulmonary Edema
- ▶ Placental Abruptio
- ▶ DIC
- ▶ NRFHRT
- ▶ IUFD

Pre-E w/ SF before viability or with severe anomalies not expected to survive w/ PTD = NO EXPECTANT MGMT

QUICK OVERVIEW OF TREATMENT



- ▶ These thresholds assume that the following:
 - ▶ HA/RUQ pain are NOT persistent or worsening
 - ▶ There are no new neurologic or respiratory symptoms developing
 - ▶ There is not vaginal bleeding concerning for abruption

- ▶ HELLP labs are not worsening
- ▶ BPs are not acutely worsening
- ▶ Antepartum testing is reassuring
- ▶ Preterm labor / PPROM are not present
- ▶ If FGR, there is normal fluid and UA Dopplers

*Should be offered if no contraindications to BMZ (Gyamfi-Bannerman 2016)

ANTEPARTUM MANAGEMENT

- ▶ In patients being expectantly managed:
 - ▶ Expectant management usually occurs in the hospital, even for patients without severe features, because severity can change rapidly
 - ▶ Regular monitoring includes:

Daily	Twice Weekly	Weekly	Every 3-4 weeks
Vitals	Labs Q72H <ul style="list-style-type: none"> ▪ CBC ▪ CMP 	AFI	Fetal ultrasound to assess fetal growth
NST	Uterine Artery Doppler if FGR		

- ▶ **BMZ** given if patient is <37 weeks to accelerate fetal lung maturity unless they have contraindications like DM (would still give if <34w)
- ▶ Consider NICU Consultation to discuss risks of prematurity with parents

OUTPATIENT MANAGEMENT

- ▶ In patients being expectantly managed for preE w/o SF, outpatient management can rarely be considered if meeting:
 - ▶ Patients who are compliant with visits (below), compliant with home BP monitoring, understand the risks and precautions, and have no other complicating medical concerns (i.e., FGR, GDM/DM, etc)
 - ▶ Have an appropriately-sized BP cuff (1.5x upper arm circumference) and they are counseled to take it periodically in an upright position after resting for 10m

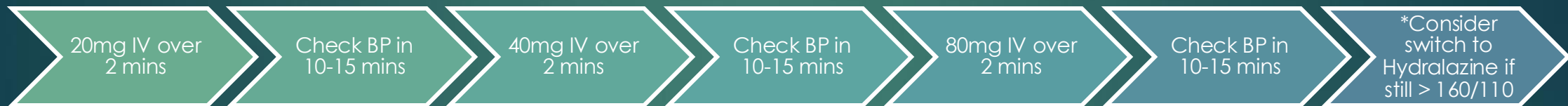
Daily	Twice Weekly	Weekly	Every 3-4 weeks
Home BP Checks 2X Daily	NST Formal BP Check	Labs Q7D <ul style="list-style-type: none"> ▪ CBC ▪ CMP AFI Uterine Artery Doppler if FGR	Fetal ultrasound to assess fetal growth

OUTPATIENT MANAGEMENT

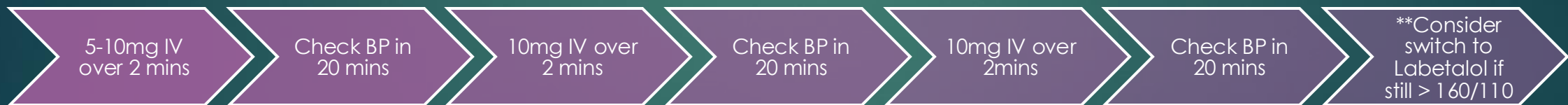
- ▶ sFLT : PIGF ratio? - PRAECIS Study
 - ▶ An sFlt-1:PIGF ratio of 40 pg/mL in 23-35-wkrs predicted the progression to preE with SF and greater risk of adverse outcomes within 2 weeks with 94% sensitivity, 65% PPV, & 96% NPV
 - ▶ <40 has a risk of preE with SF within 2 weeks of <5%
- ▶ ACOG Clinical Practice Update 2024
 - ▶ sFlt-1:PIGF ratio alone should NOT replace current clinical criteria for diagnosing preE or preE w/ SF, it should be a complementary risk-stratification screen to add to the workup
 - ▶ Pragmatically, this may be helpful when determining inpatient vs. outpatient mgmt of preE w/o SF
- ▶ However, the capability of running this lab is not yet available in most hospitals (*requires BRAHMS KRYPTOR immunoassay platform*)

BLOOD PRESSURE MANAGEMENT

- ▶ **No severe features:** No IV medications needed if BPs <160/110
 - ▶ Tight BP control does NOT affect the progression of preE, but DOES affect risk of stroke
- ▶ **Severe features:**
 - ▶ If > 160/110 --> recheck 15m → If > 160/110, initiate algorithm w/in 30-60m (ideally ASAP)
- ▶ Initial first line management with **Labetalol**:



- ▶ Initial first line management with **Hydralazine**:



- ▶ *Max dose of IV Labetalol is 300mg (20 + 40 + 80 + 80 + 80mg) in one setting
- ▶ **Max dose of hydralazine is 30mg in one setting
- ▶ Until IV is available, 10-20mg oral Nifedipine (not Extended Release) up to five doses can lower blood pressure as quickly as IV labetalol in hypertensive emergencies (Shekhar 2013)

SEIZURE PROPHYLAXIS

- ▶ **Magnesium sulfate** given for seizure prophylaxis as well as seizure control if eclampsia develops
 - ▶ **Expectant mgmt:** Give MgSO₄ x 24 hours upon admission + intrapartum through 12-24 hrs postpartum
 - ▶ **If admitting and delivering:** most pts will likely be on MgSO₄ from admission until 12-24 hrs postpartum
 - ▶ **Dosing:** 4-6g IV bolus dose followed 30m later by 1-2g/hr & titrated from there (BMI does affect levels)
 - ▶ 10g IM bolus followed by 5g IM q4h
 - ▶ Exact mechanism of seizure prevention is unknown, but MgSO₄ has been found superior to all other anticonvulsant medications for preeclampsia seizure prophylaxis

MgSO₄ effects at varying serum concentration (mg/dL)

4.8-9	Therapeutic dose
>9	Hyporeflexia
>12	Respiratory distress/paralysis
>15	AV block
>17	Coma
>30	Cardiac arrest

MgSO₄ toxicity treatment: Calcium Gluconate

SEIZURE PROPHYLAXIS

- ▶ If patients are on magnesium, clinical examinations and/or labs should be checked serially to prevent magnesium toxicity
 - ▶ If **clinical**: check DTRs, auscultate lungs, and measure I&Os q1-2 hours
 - ▶ If **labs**: check serum magnesium level q6 hours
 - ▶ Mag half-life is 5 hours
- ▶ If the serum levels exceed 9.6 mg/dL, stop mag and recheck levels at 2-hour intervals
- ▶ Restart the mag level at a lower rate than before when it decreases to less than 8.4 mg/dL
- ▶ If patients are experiencing respiratory depression:
 - ▶ 1) Anesthesia called to the room; consideration for advanced airway PRN
 - ▶ 2) Administer IV calcium gluconate 10% solution 10 mL over 3 minutes
 - ▶ 3) Administer IV furosemide 40mg to accelerate the rate of mag urinary excretion

DELIVERY ROUTE

- ▶ IOL is the recommend route of delivery for gHTN, preE w/o SF, for PreE w/ SF, and even after eclampsia
- ▶ This still remains true in the setting of FGR w/o AEDF/REDF
- ▶ The decision for CS should only be dictated by additional complications occurring (i.e., pulmonary edema), HELLP labs rapidly deteriorating, or standard OB indications (i.e., NRFHRT), GA, and bishop score
- ▶ Epidural/Spinal can still be considered when platelets are >70, however, comfort level is up to anesthesia
 - ▶ Risk of epidural hematoma at a level of 70 is 0.2%
 - ▶ Hypotension after spinal with preE w/ SF is higher, but easily treated

POSTPARTUM MANAGEMENT

- ▶ **Delivery of placenta is eventually curative for preE/eclampsia**
- ▶ While more rare, pre-E can worsen (or even present for the first time) still for up to 6 weeks postpartum
 - ▶ Continue BP monitoring in the hospital (or that of equivalent surveillance as an outpatient) for **at least 72 hours postpartum**
 - ▶ If blood pressure remains elevated $>140/90$, consider oral antihypertensive therapy
- ▶ **Be cautious with NSAIDs postpartum** until hypertension, oliguria, and renal function improve or resolve
 - ▶ But don't withhold them at the expense of needing opioids

POSTPARTUM DISCHARGE CHECKLIST

- ▶ **SMFM Postpartum Discharge Checklist – Follow up**
 - ▶ Ensure patient has access to BP cuff and how to use it
 - ▶ Discuss target BPs $<150/100$ and that BPs $> 160/110$ require prompt notification of medical team
 - ▶ Ensure you have patient's have contact info for office
 - ▶ Recommend office visit BP check within **72 hours** for any patient with preE with SF (and w/in 7-10 days for all preE)
 - ▶ Requires 3-wk follow up visit (in person or telehealth)
 - ▶ Evaluate and address barriers to care (i.e., childcare, transportation)

POSTPARTUM DISCHARGE CHECKLIST

- ▶ *SMFM* Postpartum Discharge Checklist - Patient Education
 - ▶ Provide all education in patient's own language
 - ▶ Review warning sx, when, and where to present for medical care
 - ▶ Discuss antihypertensive med dosing, side effects, hold parameters, and impact on breastfeeding
 - ▶ Discuss recurrence risk, ASA w/ future pregnancies
 - ▶ Discuss long-term CV risks, annual screening of BPs, and lifestyle modifications to reduce risk (diet, exercise, smoking cessation)

COMPLICATIONS

▶ Recurrence

- ▶ 20% of women have hypertension in subsequent pregnancy
- ▶ 16% have recurrent preeclampsia
 - ▶ Risk increases the earlier pre-E onset occurred or the more severe the symptoms

▶ Maternal Complications – more likely to later develop later in life:

- ▶ Peripartum Cardiomyopathy (PPCM)
 - ▶ 4-5% higher risk of developing PPCM in first 6 months postpartum
- ▶ Long-term CVD (Hypertension, Ischemic heart disease, Stroke, VTE)
 - ▶ 17.8% absolute risk of developing one of the above events (8.3% without preeclampsia)
 - ▶ 8-10x more likely to die of CV disease
- ▶ Diabetes mellitus
- ▶ ESRD – though renal function usually recovers fully initially after preeclampsia resolution

▶ Obstetric complications

- ▶ Placental abruption
- ▶ Labor induction, c-section delivery

▶ Fetal Complications

- ▶ Fetal Growth Restriction
- ▶ Prematurity 2/2 preterm birth
- ▶ Respiratory distress, Brain hemorrhage
- ▶ 30% had below normal/abnormal IQ (Pre-eclampsia Eclampsia Trial Amsterdam)

HELLP SYNDROME MGMT

- ▶ Recall: HELLP Syndrome (**Hemolysis, Elevated Liver, Low Platelets**) is a complication VERY CLOSELY RELATED to preeclampsia that can also occur independent of pre-E and is on the same spectrum
- ▶ Managed similarly to pre-E with SF
 - ▶ Closely monitor hemolytic status
 - ▶ *Before viability or > 34 weeks: delivery*
 - ▶ *Viability to 34 weeks: expectant management for 24-48 hours to give time for betamethasone to take effect unless worsening maternal/fetal status*
 - ▶ *Mother or fetus in unstable condition: delivery*
 - ▶ Give MgSO₄ from diagnosis until 24 hrs postpartum

FUTURE CONSIDERATIONS

▶ With future pregnancies

- ▶ Recommend **preconception counseling** and assessment for all women with a history of preeclampsia
- ▶ Recommend initiation of **ASA 81mg** from 11 weeks til 1 week prior to delivery to reduce recurrence risk of preE
 - ▶ Thought to help inhibit TXA2 and alter the angiogenic imbalance
- ▶ For women with a history of early-onset preE <32 weeks, consider work-up for **Antiphospholipid Antibody Syndrome (APAS)**

▶ Health Maintenance:

- ▶ In women who have had preE <37 weeks or recurrent preE, recommend **annual BP checks, lipids, fasting blood glucose, and BMI** with PCP
- ▶ They have an increased risk of **HTN (5X), MI, CHF, Stroke, PAD, and CV mortality** later in life; this is also related to disease severity of preE

WHO ELSE SHOULD BE OFFERED ASA?

LEVEL OF RISK	RISK FACTORS	RECOMMENDATION
HIGH	<ul style="list-style-type: none">- History of preE in previous preg- Multiple gestation- cHTN- Diabetes- Renal Dx- Autoimmune Dx (SLE, RA, APAS, etc)	Recommend low-dose ASA if the patient has 1 or more of these factors
MODERATE	<ul style="list-style-type: none">- Nulliparity- AMA- BMI > 30- FH of PreE in 1st degree relative- AA race- Low socioeconomic status- Personal hx of FGR / SGA as a baby- Hx of adverse pregnancy outcome or 10-yr pregnancy interval	Recommend low-dose ASA if the patient has 2 or more of these factors

REFERENCES & RESOURCES

- ▶ ACOG PB 222 – Gestational HTN & Preeclampsia. 2018.
- ▶ SMFM Special Statement – Checklists for Pre-eclampsia Risk Factor Screening to Guide Recommendations for Prophylactic Low-Dose ASA. 2020.
- ▶ With Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstet Gynecol*, Nov 2013; 122(5):1122-1131.
- ▶ SMFM Special Statement: A quality metric for evaluating timely treatment of severe hypertension. February 2022.
- ▶ Callahan, TL, Caughey, AB. *Blueprints Obstetrics & Gynecology*. Philadelphia: Wolters Kluwer Health/Lippincott William & Wilkins, 2009. 6th ed.
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- ▶ Kuć A, Kubik D, Kościelecka K, Szymanek W, Męcik-Kronenberg T. The Relationship Between Peripartum Cardiomyopathy and Preeclampsia - Pathogenesis, Diagnosis and Management. *J Multidiscip Healthc*. 2022 Apr 23;15:857-867. doi: 10.2147/JMDH.S357872. PMID: 35496718; PMCID: PMC9045831.