HYPERTENSIVE DISORDERS IN PREGNANCY: Gestational Hypertension and Preeclampsia

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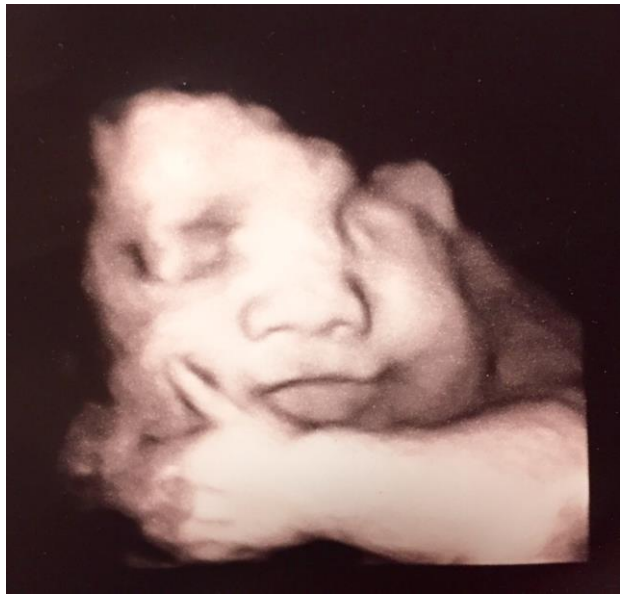
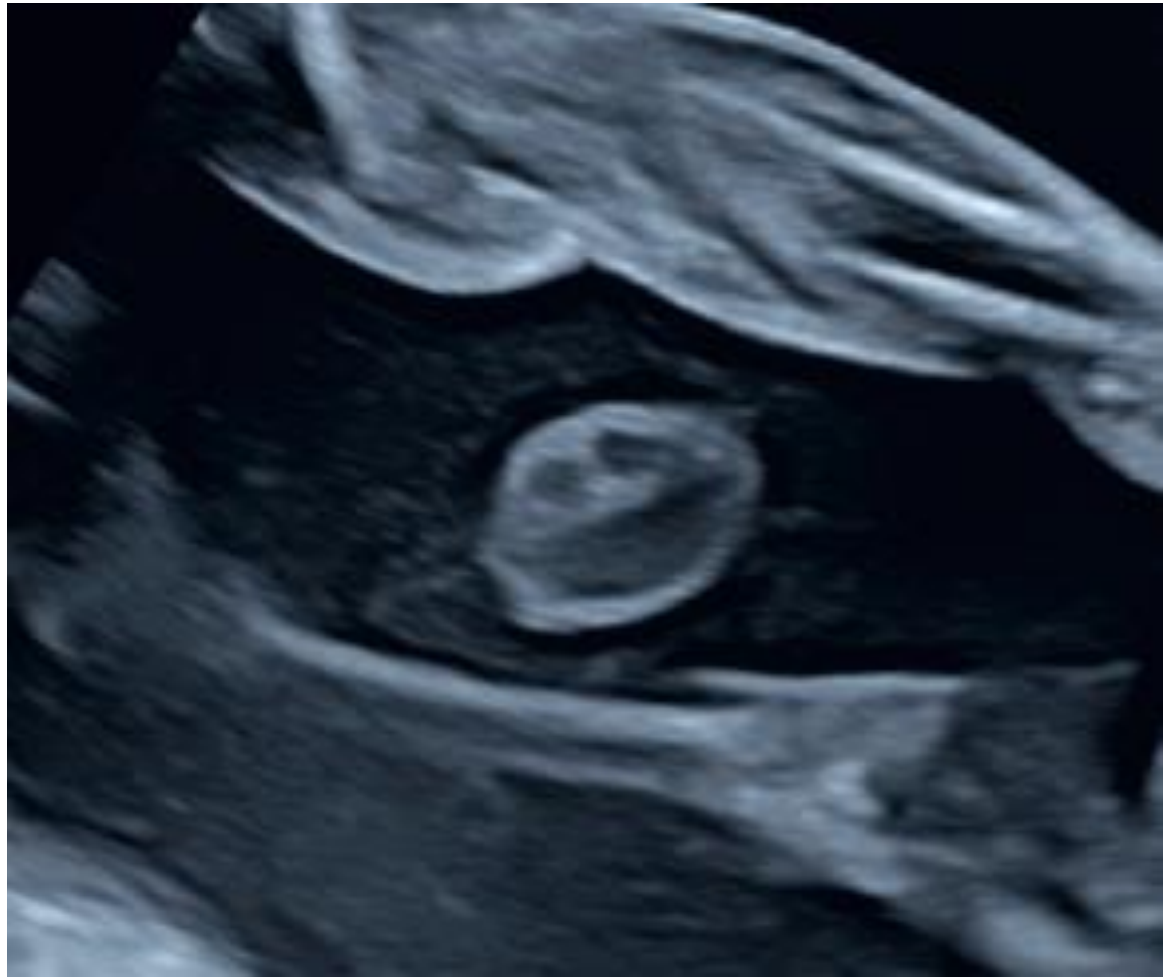


Objectives

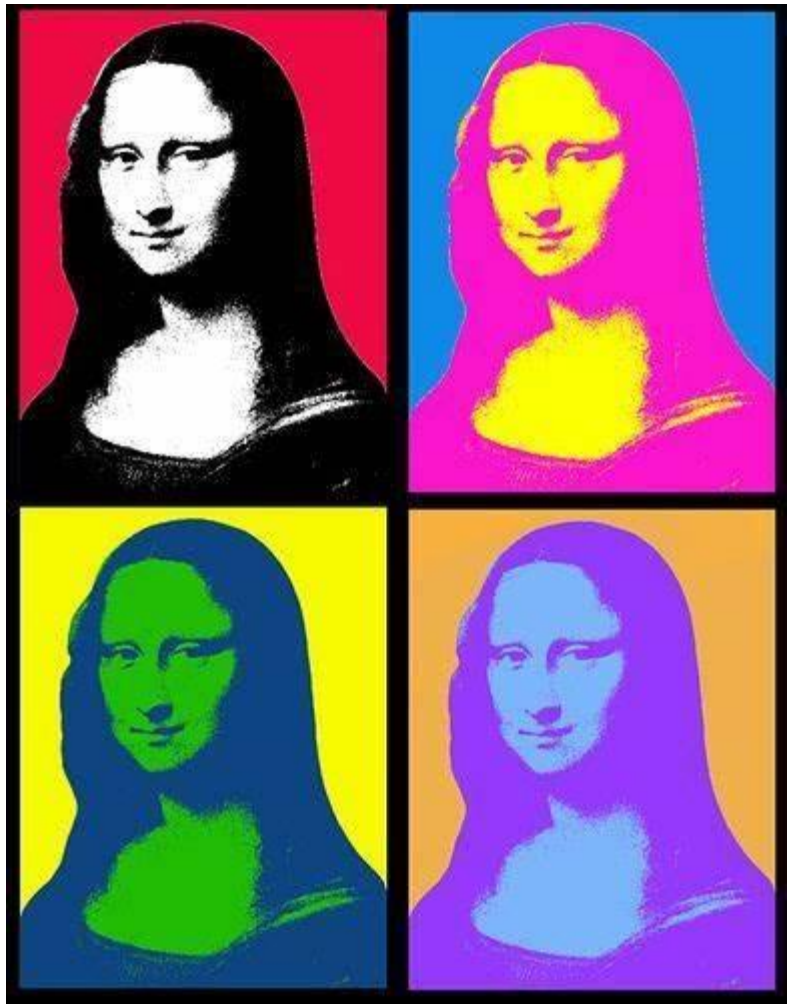
1. Review the spectrum, risk factors, and presumed etiologies of hypertensive disorders of pregnancy.
2. Review the diagnostic criteria for hypertensive disorders of pregnancy.
3. Discuss management and treatment strategies for hypertensive disorders of pregnancy.

Disclosures

- I have no conflicts of interest to disclose.

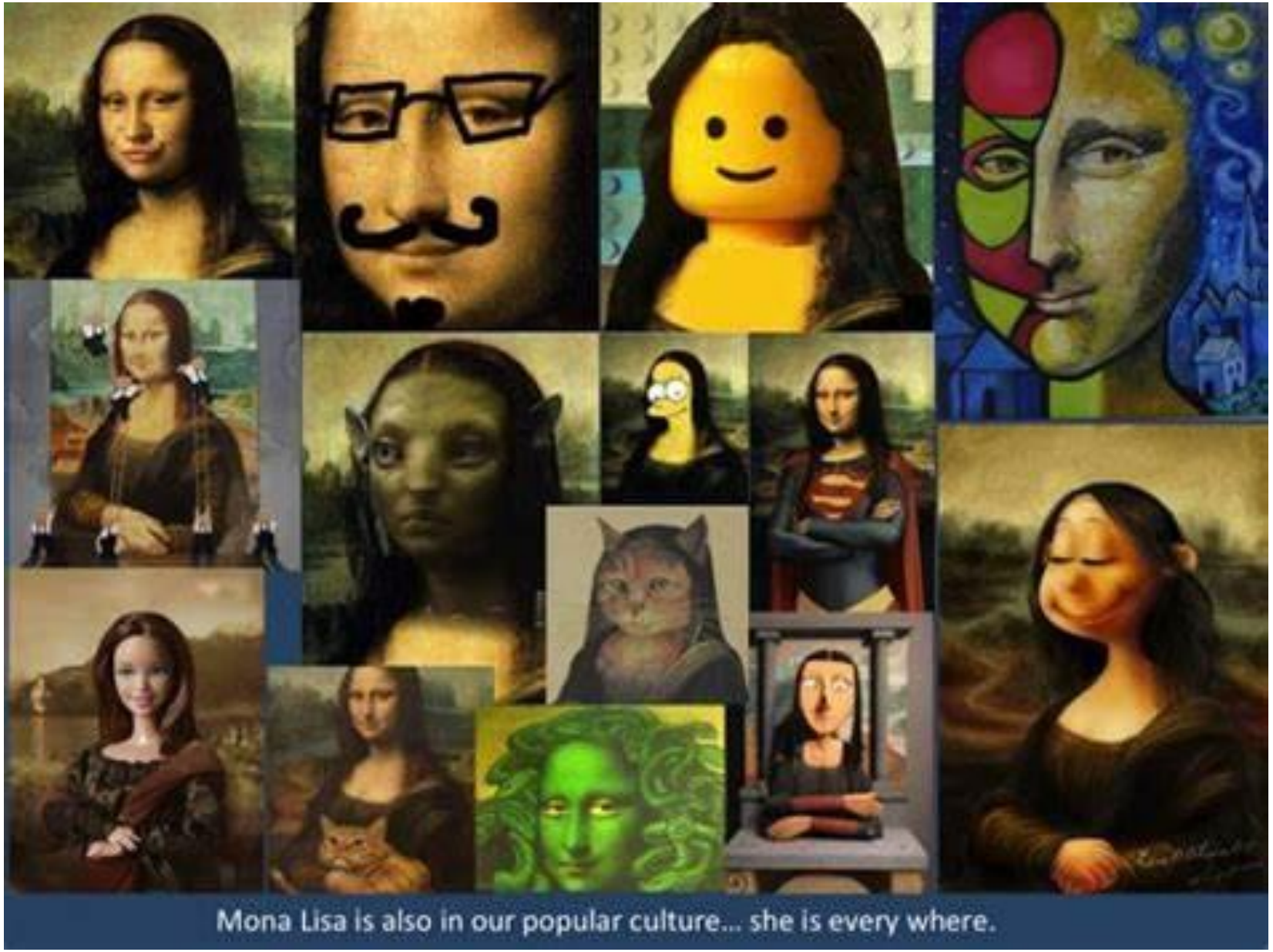


Most Important Thing To Remember:




2014
2015
9GAG Turkey
2016
2017

Things Evolve.



It’s ok not to know everything:
We can figure things out together.

MFM (OBGYN) Truths:

- Things will either get better, stay the same, or get worse.
- You will never be faulted for caring too much or watching too closely or writing to many notes in the chart.
- Phone a Friend

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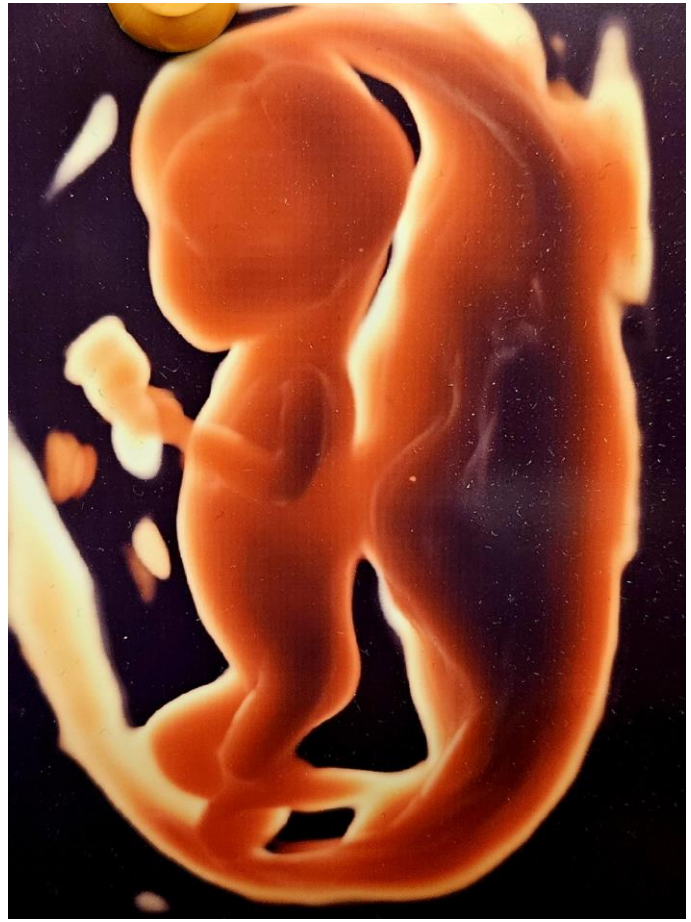
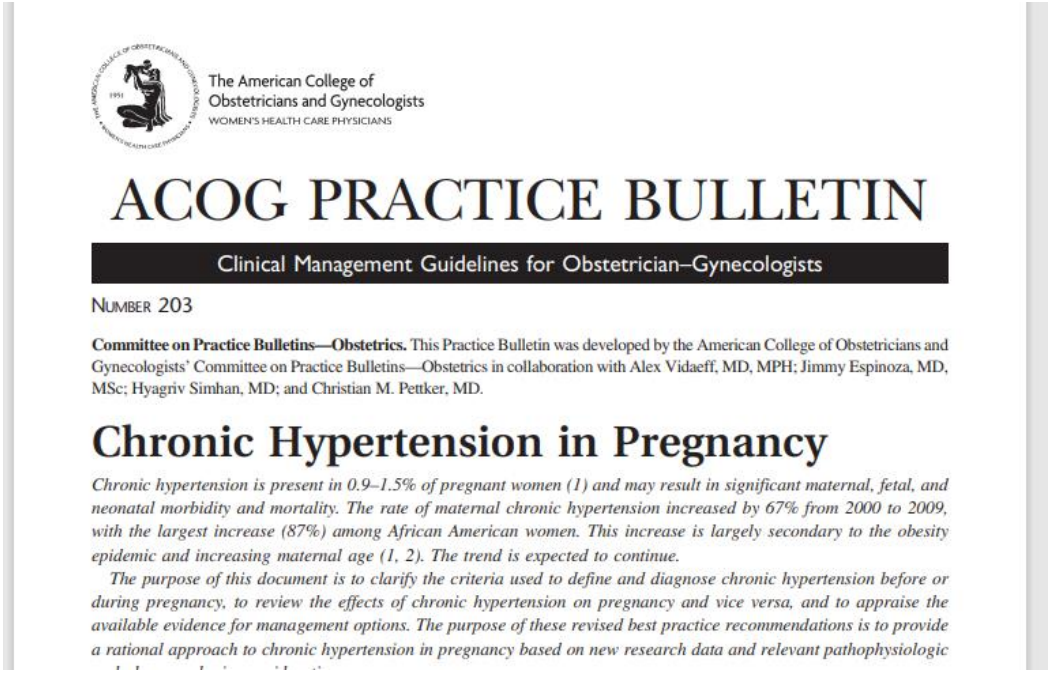


Main Sources of “Truth”
ACOG PB Number 222



The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

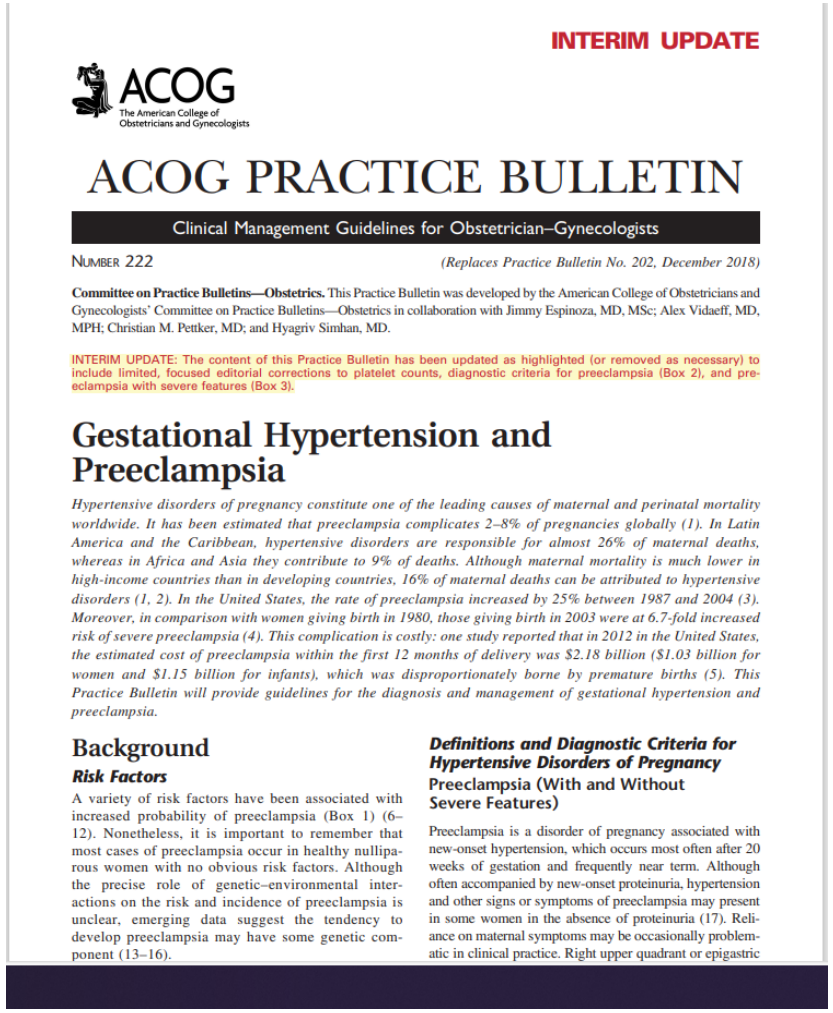
NUMBER 203

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics in collaboration with Alex Vidaeff, MD, MPH; Jimmy Espinoza, MD, MSc; Hyagriv Simhan, MD; and Christian M. Pettker, MD.

Chronic Hypertension in Pregnancy

Chronic hypertension is present in 0.9–1.5% of pregnant women (1) and may result in significant maternal, fetal, and neonatal morbidity and mortality. The rate of maternal chronic hypertension increased by 67% from 2000 to 2009, with the largest increase (87%) among African American women. This increase is largely secondary to the obesity epidemic and increasing maternal age (1, 2). The trend is expected to continue.

The purpose of this document is to clarify the criteria used to define and diagnose chronic hypertension before or during pregnancy, to review the effects of chronic hypertension on pregnancy and vice versa, and to appraise the available evidence for management options. The purpose of these revised best practice recommendations is to provide a rational approach to chronic hypertension in pregnancy based on new research data and relevant pathophysiologic



INTERIM UPDATE

ACOG
The American College of Obstetricians and Gynecologists

ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

NUMBER 222 *(Replaces Practice Bulletin No. 202, December 2018)*

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics in collaboration with Jimmy Espinoza, MD, MSc; Alex Vidaeff, MD, MPH; Christian M. Pettker, MD; and Hyagriv Simhan, MD.

INTERIM UPDATE: The content of this Practice Bulletin has been updated as highlighted (or removed as necessary) to include limited, focused editorial corrections to platelet counts, diagnostic criteria for preeclampsia (Box 2), and preeclampsia with severe features (Box 3).

Gestational Hypertension and Preeclampsia

Hypertensive disorders of pregnancy constitute one of the leading causes of maternal and perinatal mortality worldwide. It has been estimated that preeclampsia complicates 2–8% of pregnancies globally (1). In Latin America and the Caribbean, hypertensive disorders are responsible for almost 26% of maternal deaths, whereas in Africa and Asia they contribute to 9% of deaths. Although maternal mortality is much lower in high-income countries than in developing countries, 16% of maternal deaths can be attributed to hypertensive disorders (1, 2). In the United States, the rate of preeclampsia increased by 25% between 1987 and 2004 (3). Moreover, in comparison with women giving birth in 1980, those giving birth in 2003 were at 6.7-fold increased risk of severe preeclampsia (4). This complication is costly: one study reported that in 2012 in the United States, the estimated cost of preeclampsia within the first 12 months of delivery was $2.18 billion ($1.03 billion for women and $1.15 billion for infants), which was disproportionately borne by premature births (5). This Practice Bulletin will provide guidelines for the diagnosis and management of gestational hypertension and preeclampsia.

Background

Risk Factors

A variety of risk factors have been associated with increased probability of preeclampsia (Box 1) (6–12). Nonetheless, it is important to remember that most cases of preeclampsia occur in healthy nulliparous women with no obvious risk factors. Although the precise role of genetic–environmental interactions on the risk and incidence of preeclampsia is unclear, emerging data suggest the tendency to develop preeclampsia may have some genetic component (13–16).

Definitions and Diagnostic Criteria for Hypertensive Disorders of Pregnancy

Preeclampsia (With and Without Severe Features)

Preeclampsia is a disorder of pregnancy associated with new-onset hypertension, which occurs most often after 20 weeks of gestation and frequently near term. Although often accompanied by new-onset proteinuria, hypertension and other signs or symptoms of preeclampsia may present in some women in the absence of proteinuria (17). Reliance on maternal symptoms may be occasionally problematic in clinical practice. Right upper quadrant or epigastric

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ACOG COMMITTEE OPINION

Number 828

Committee on Obstetric Practice
Society for Maternal-Fetal Medicine

This Committee Opinion was developed by the Committee on Obstetric Practice in collaboration with committee members Rita Wesley Driggers, MD and Allison S. Bryant, MD, MPH and the Society for Maternal-Fetal Medicine in collaboration with Alessandro Ghidini, MD.

Indications for Outpatient Antenatal Fetal Surveillance

ABSTRACT: The purpose of this Committee Opinion is to offer guidance about indications for and timing and frequency of antenatal fetal surveillance in the outpatient setting. Antenatal fetal surveillance is performed to reduce the risk of stillbirth. However, because the pathway that results in increased risk of stillbirth for a given condition may not be known and antenatal fetal surveillance has not been shown to improve perinatal outcomes for all conditions associated with stillbirth, it is challenging to create a prescriptive list of all indications for which antenatal fetal surveillance should be considered. This Committee Opinion provides guidance on and suggests

INTERIM UPDATE

ACOG
The American College of Obstetricians and Gynecologists

Society for Maternal-Fetal Medicine

ACOG COMMITTEE OPINION

Number 831

(Replaces Committee Opinion Number 818, February 2021)

Committee on Obstetric Practice
Society for Maternal-Fetal Medicine

This Committee Opinion was developed by the Committee on Obstetric Practice in collaboration with Society for Maternal-Fetal Medicine liaison member Cynthia Gyamfi-Bannerman, MD, MS, committee members Angela B. Gantt, MD, MPH and Russell S. Miller, MD, and the Society for Maternal-Fetal Medicine.

INTERIM UPDATE: The content in this Committee Opinion has been updated as highlighted (or removed as necessary) to reflect a limited, focused change in delivery timing recommendations around preterm prelabor rupture of membranes.

Medically Indicated Late-Preterm and Early-Term Deliveries

ABSTRACT: The neonatal risks of late-preterm and early-term births are well established, and the potential neonatal complications associated with elective delivery at less than 39 0/7 weeks of gestation are well described. However, there are a number of maternal, fetal, and placental complications in which either a late-preterm or early-term delivery is warranted. The timing of delivery in such cases must balance the maternal and newborn risks of late-preterm and early-term delivery with the risks associated with further continuation of pregnancy. Deferring delivery to the 39th week is not recommended if there is a medical or obstetric indication for earlier delivery. If there is a clear indication for a late-preterm or early-term delivery for either maternal or newborn benefit, then delivery should occur regardless of the results of lung maturity testing. Conversely, if

Preeclampsia and Gestational Hypertension: Important disease slide

- One of leading causes of maternal and perinatal mortality worldwide
- Only in Humans
  - 2-8 % of pregnancies worldwide
  - Rate is increasing in US:
    - Rate of PEC increased by 25% between 1987 and 2004
    - Compared to 1980, delivering in 2003 were 6.7 times risk of severe PEC.
  - Maternal deaths:
    - Latin America and Caribbean: 26% of maternal deaths; Africa and Asia: 9% of deaths
    - High income countries: 16% of deaths

Spectrum of Disease

- Hypertensive disorders are on a continuum. General strategies for care and treatment will therefore be similar.

  - Gestational Hypertension
  - Preeclampsia with and without severe features
  - Chronic Hypertension
  - Chronic Hypertension with Superimposed Preeclampsia

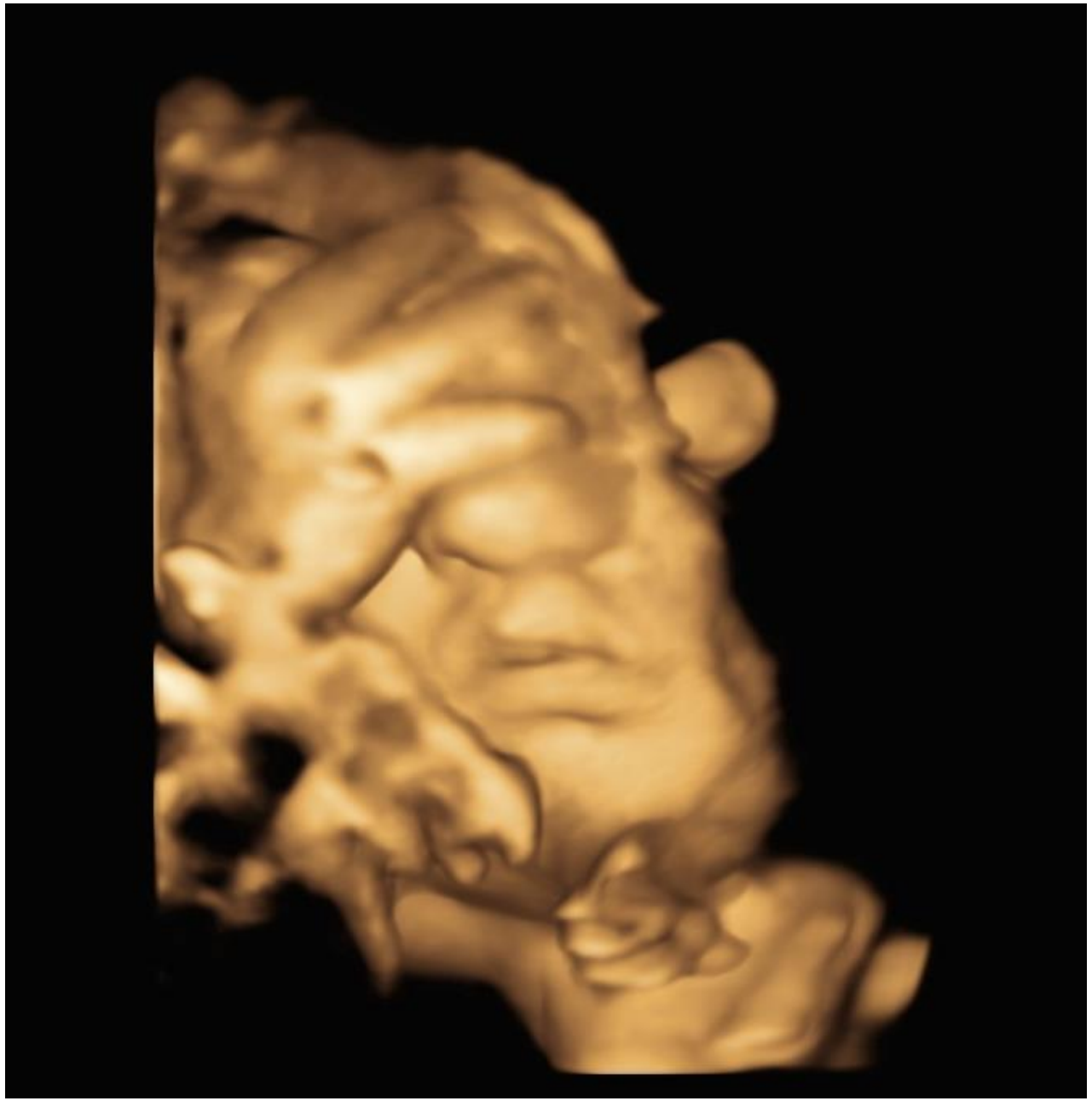
Long term health issues for MOM

- Women with history of preeclampsia are at a higher risk of cardiovascular disease (HTN, MI, CHF, stroke, peripheral artery disease)
- Double the odds compared to women without a history of PEC
- More severe PEC, the greater the risk
- Mechanisms are unclear
- Prevention: lifestyle modification, weight management, smoking cessation, vigilance.

Recurrence:

- Overall recurrence rate of PEC is 20%.
- The recurrence risk of pre-eclampsia is 5-7% if it was uncomplicated pre-eclampsia in the prior pregnancy.
- If it was pre-eclampsia with severe features in the prior pregnancy, the recurrence risk goes up to 30-65%.

Etiology



Gestational hypertension (GHTN) Preeclampsia (PEC)

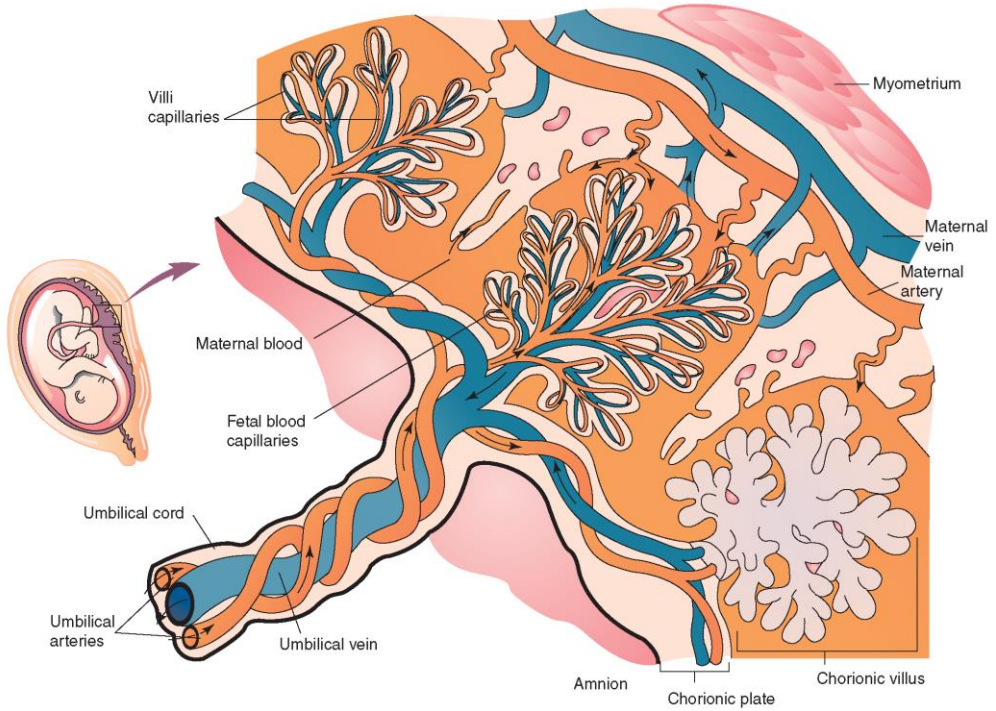
- We know the diseases has something to do with the placenta, since **delivery of the placenta** is the only way to cure GHTN/PEC

- Likely has to do with how the placental circulation is formed:
  - Secondary wave of trophoblast invasion to remodel the spiral arteries to create a high flow/low pressure system: This happens at around 16 weeks.
  - Prevention using low dose aspirin, 81 milligrams per day, is most effective when started BEFORE 16 weeks.
  - Multiple gestations are higher risk for PEC: more placenta, more chance of PEC

Etiology

- Also makes sense why disorders of the vasculature (CHTN, Diabetes, SLE, Kidney disease) are risk factors for PEC

  Less healthy blood vessels=higher risk for preeclampsia



Etiology

Uteroplacental ischemia may be central to the development of the disease.

The ischemia may result in production and release of toxins that enter the circulation and causes widespread endothelial dysfunction that causes imbalance in vasoconstrictors prostaglandin thromboxane A2 and vasodilator prostacyclin E2 production.

Risk Factors

Box 1.

Risk Factors for Preeclampsia

- Nulliparity
- Multifetal gestations
- Preeclampsia in a previous pregnancy
- Chronic hypertension
- Pregestational diabetes
- Gestational diabetes
- Thrombophilia
- Systemic lupus erythematosus
- Prepregnancy body mass index greater than 30
- Antiphospholipid antibody syndrome
- Maternal age 35 years or older
- Kidney disease
- Assisted reproductive technology
- Obstructive sleep apnea

If a patient has risk factors, get baseline labs.

- Complete blood count
  - (WBC, RBC, Platelets)
- Liver function testing
  - (ALT, AST)
- Renal function testing (BUN, Creatinine)
- Urine Protein evaluation
  - Urine protein/creatinine ratio
  - 24-hour urine collection.
  - Dipstick (if that's all you have)

- Gives us something to compare later in the pregnancy

- If patient had a recent UTI, interpret high protein levels with scrutiny

Prevention:
Low Dose Aspirin

-81 mg once per day
-Start after 12 weeks.
-Stop after delivery.

Table 1. Clinical Risk Factors and Aspirin Use*

Level of Risk	Risk Factors	Recommendation
High†	• History of preeclampsia, especially when accompanied by an adverse outcome • Multifetal gestation • Chronic hypertension • Type 1 or 2 diabetes • Renal disease • Autoimmune disease (ie, systemic lupus erythematosus, the antiphospholipid syndrome)	Recommend low-dose aspirin if the patient has one or more of these high-risk factors
Moderate‡	• Nulliparity • Obesity (body mass index greater than 30) • Family history of preeclampsia (mother or sister) • Sociodemographic characteristics (African American race, low socioeconomic status) • Age 35 years or older • Personal history factors (eg, low birth weight or small for gestational age, previous adverse pregnancy outcome, more than 10-year pregnancy interval)	Consider low-dose aspirin if the patient has more than one of these moderate-risk factors§
Low	• Previous uncomplicated full-term delivery	Do not recommend low-dose aspirin

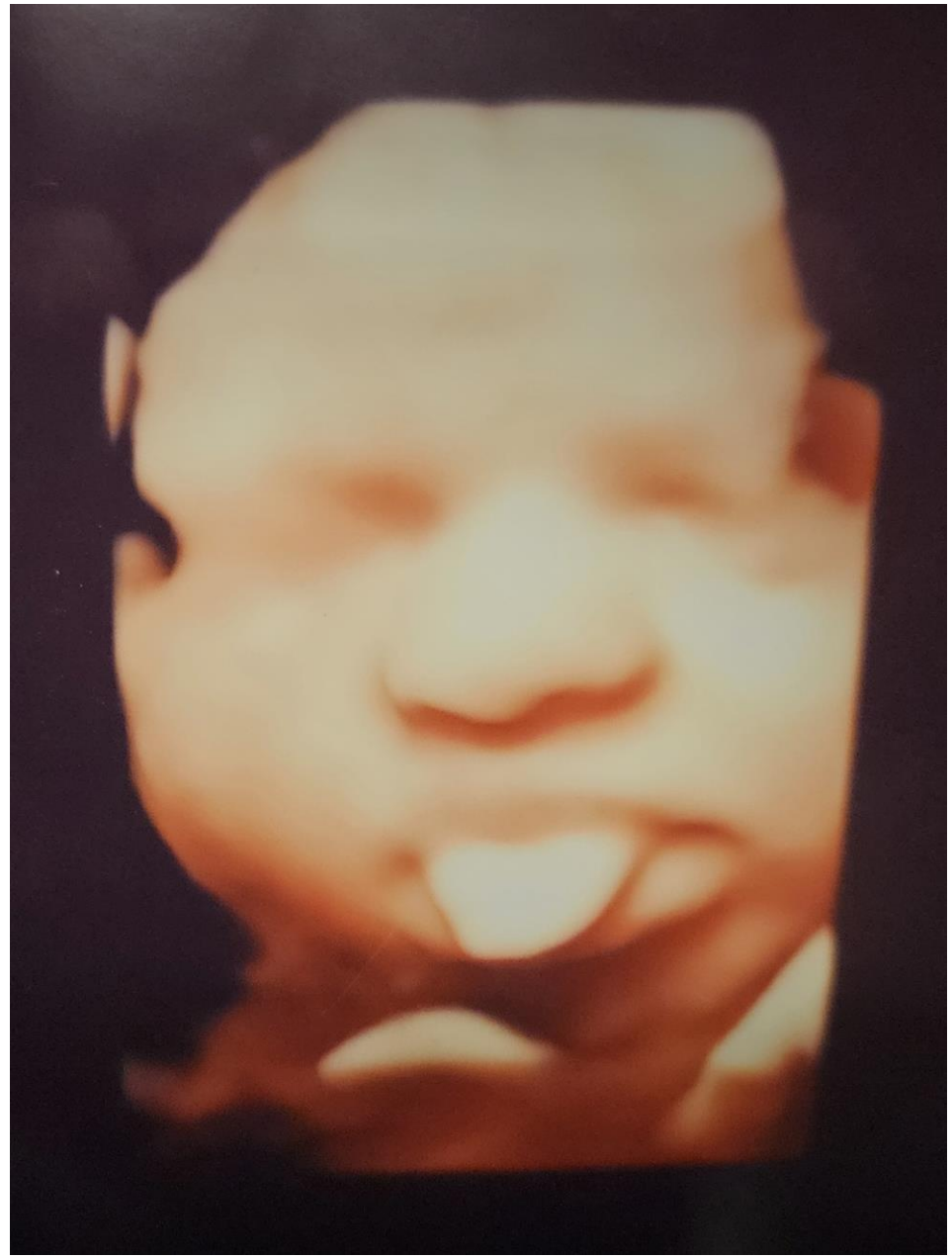
*Includes only risk factors that can be obtained from the patient's medical history. Clinical measures, such as uterine artery Doppler ultrasonography, are not included.

†Single risk factors that are consistently associated with the greatest risk of preeclampsia. The preeclampsia incidence rate would be approximately 8% or more in a pregnant woman with one or more of these risk factors.

‡A combination of multiple moderate-risk factors may be used by clinicians to identify women at high risk of preeclampsia. These risk factors are independently associated with moderate risk of preeclampsia, some more consistently than others.

§Moderate-risk factors vary in their association with increased risk of preeclampsia.

Modified from LeFevre, ML. U.S. Preventive Services Task Force. Low-dose aspirin use for the prevention of morbidity and mortality from preeclampsia: U.S. Preventive Services Task Force Recommendation Statement. Ann Intern Med 2014;161(11):819–26.



Diagnostic Criteria:

Without hypertension, a patient does not have preeclampsia.

(But they may have eclampsia or HELLP)

140/90

Box 2.

Diagnostic Criteria for Preeclampsia

Blood pressure

- Systolic blood pressure of 140 mm Hg or more or diastolic blood pressure of 90 mm Hg or more on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure
- Systolic blood pressure of 160 mm Hg or more or diastolic blood pressure of 110 mm Hg or more. (Severe hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy).

and

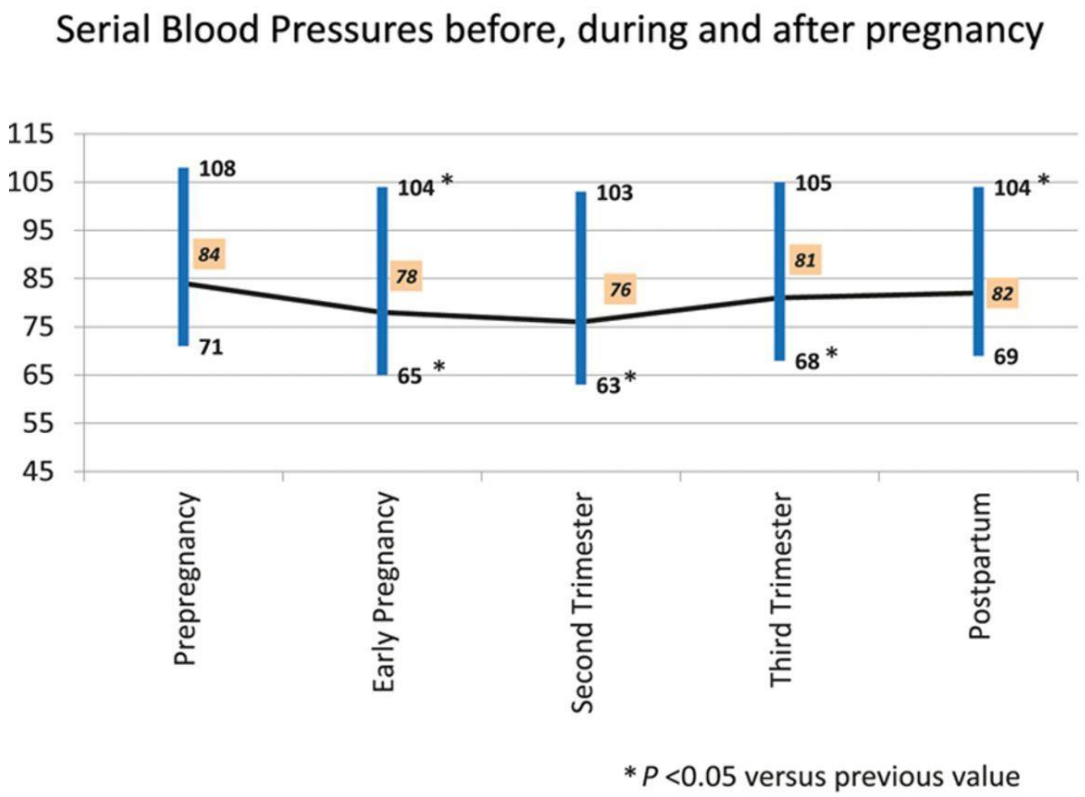
Proteinuria

- 300 mg or more per 24 hour urine collection (or this amount extrapolated from a timed collection) or
- Protein/creatinine ratio of 0.3 ~~mg/dL~~ or more or
- Dipstick reading of 2+ (used only if other quantitative methods not available)

Or in the absence of proteinuria, new-onset hypertension with the new onset of any of the following:

- Thrombocytopenia: Platelet count less than 100 ~~,000~~ × 10^{9}/L
- Renal insufficiency: Serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease
- Impaired liver function: Elevated blood concentrations of liver transaminases to twice normal concentration
- Pulmonary edema
- New-onset headache unresponsive to medication and not accounted for by alternative diagnoses or visual symptoms

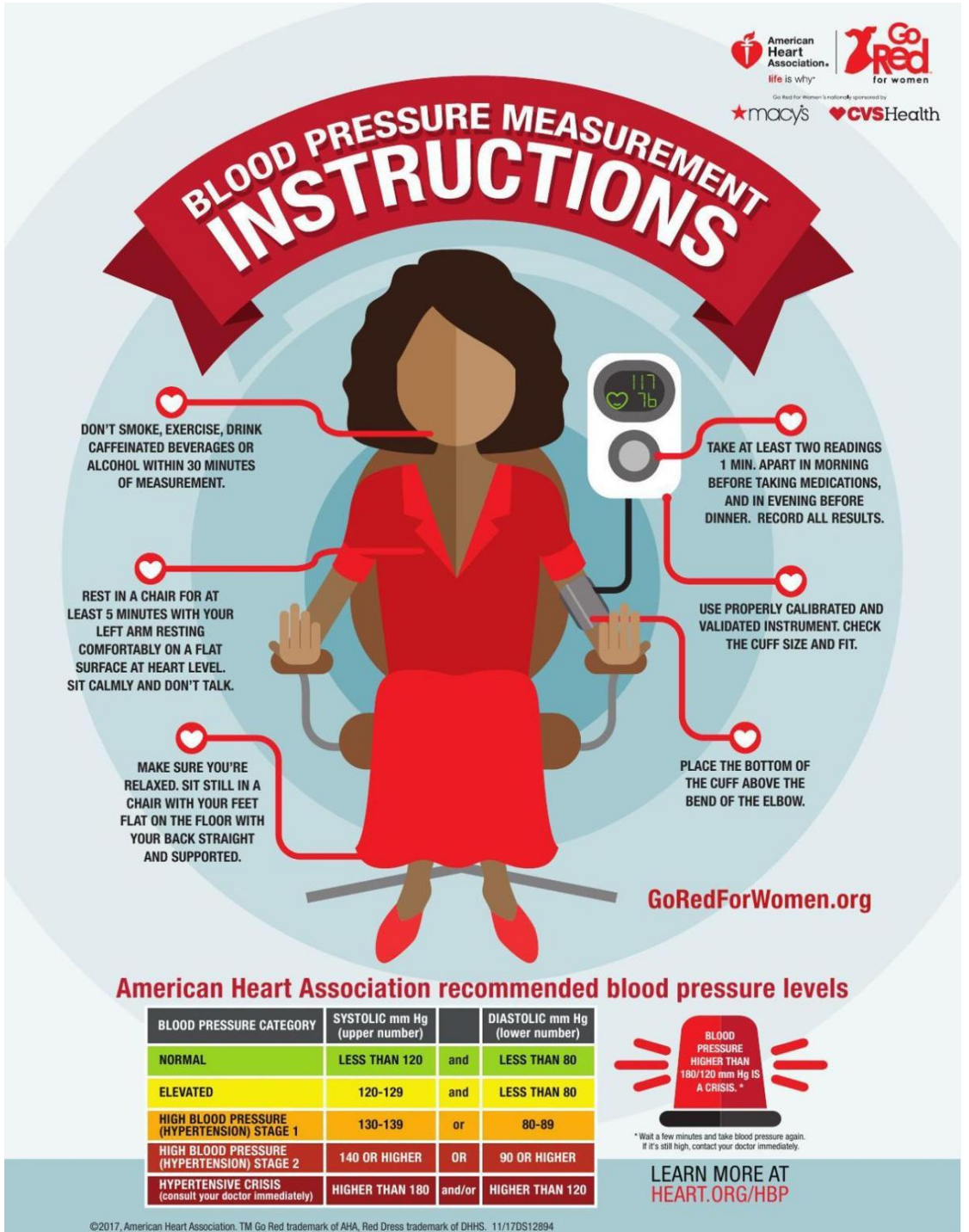
Blood Pressure: Natural history during pregnancy



[Blood pressure chart for pregnant - lasopacard (weebly.com)]

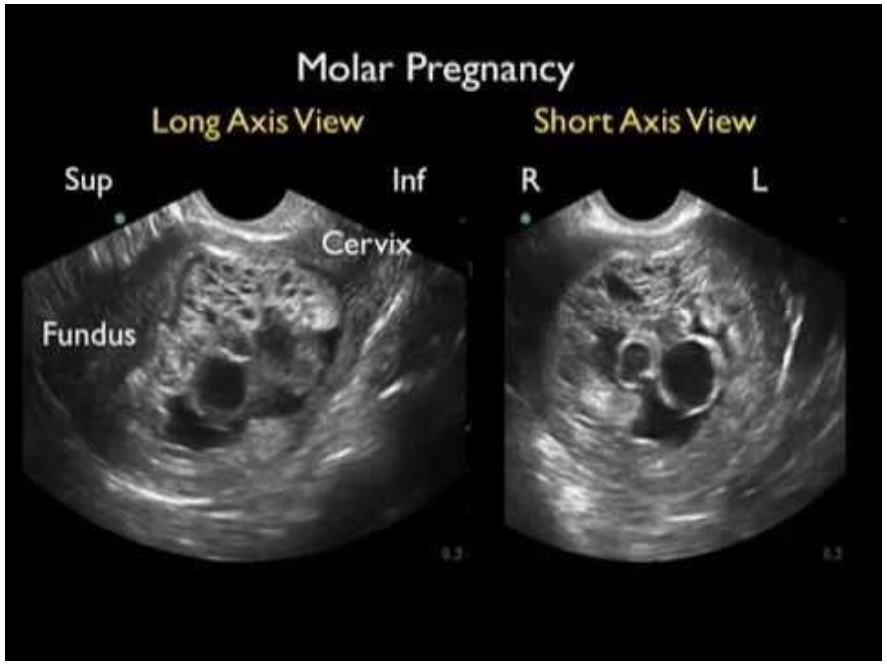
Proper BP measurement

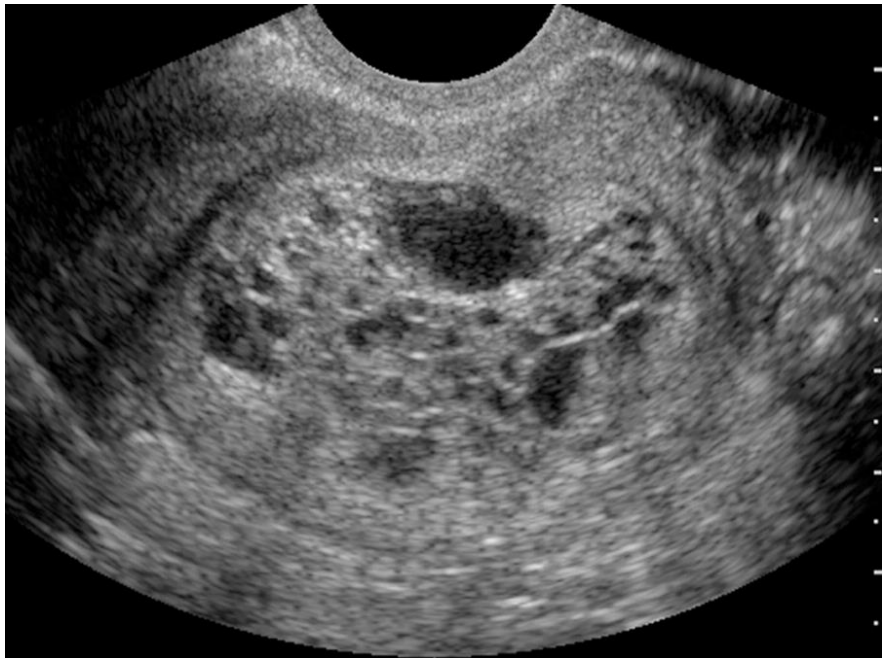
- No smoking, walking, or caffeine for 30 min
- Seated, arm resting at heart level for 5 minutes
- Feet flat on the floor
- Use proper size cuff



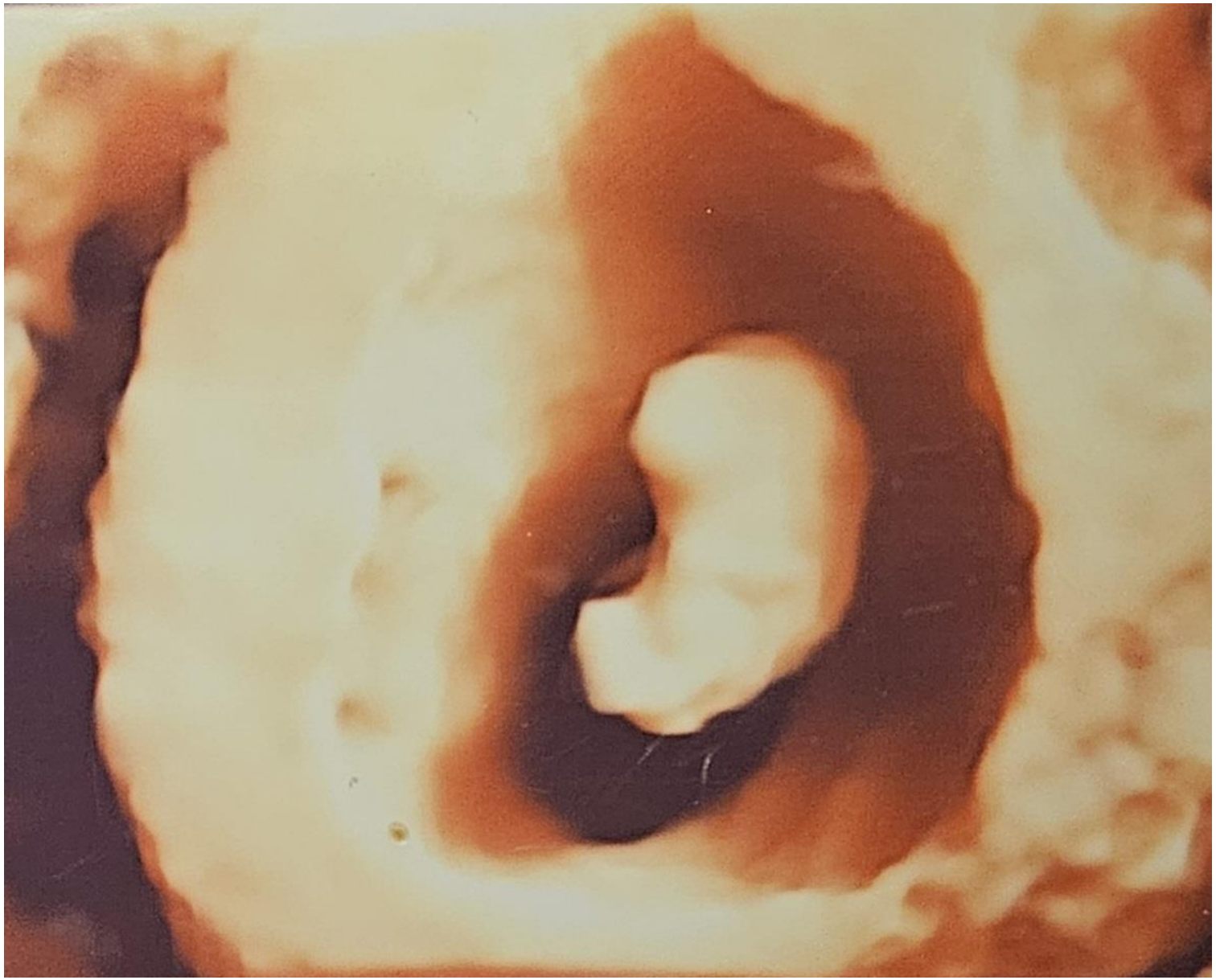
Diagnosis:

- Since GHTN/PEC are disorders of placental implantation, it makes sense that you can't really diagnose with these until after 20 weeks.
  - If presentation is prior to 20 weeks, CONFIRM DATES with US.
  - Then, think molar pregnancy, TTP, HUS, Autoimmune disease, Renal disease.



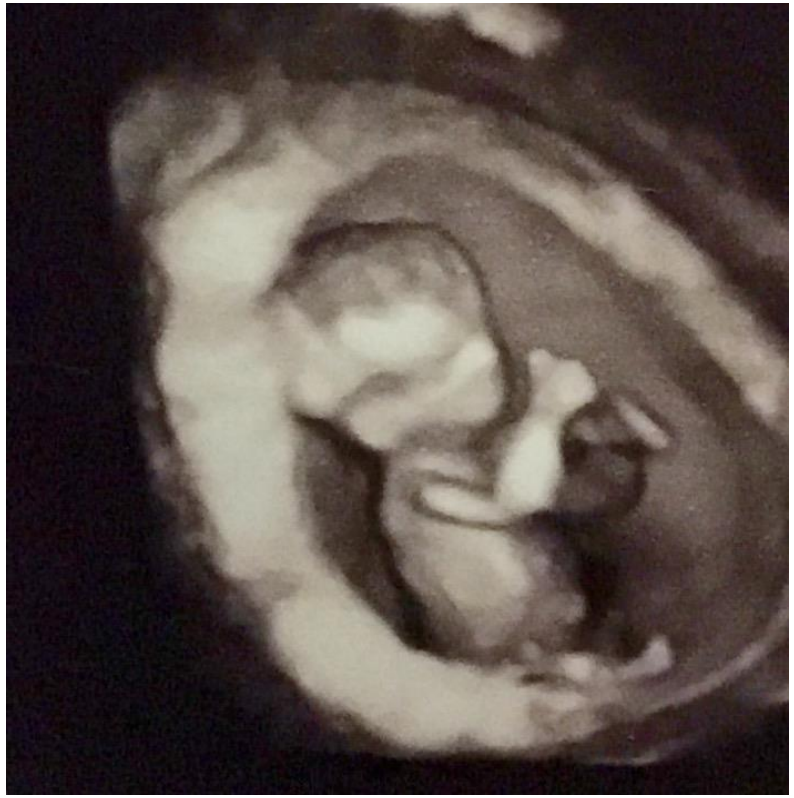


Does this patient have preeclampsia?

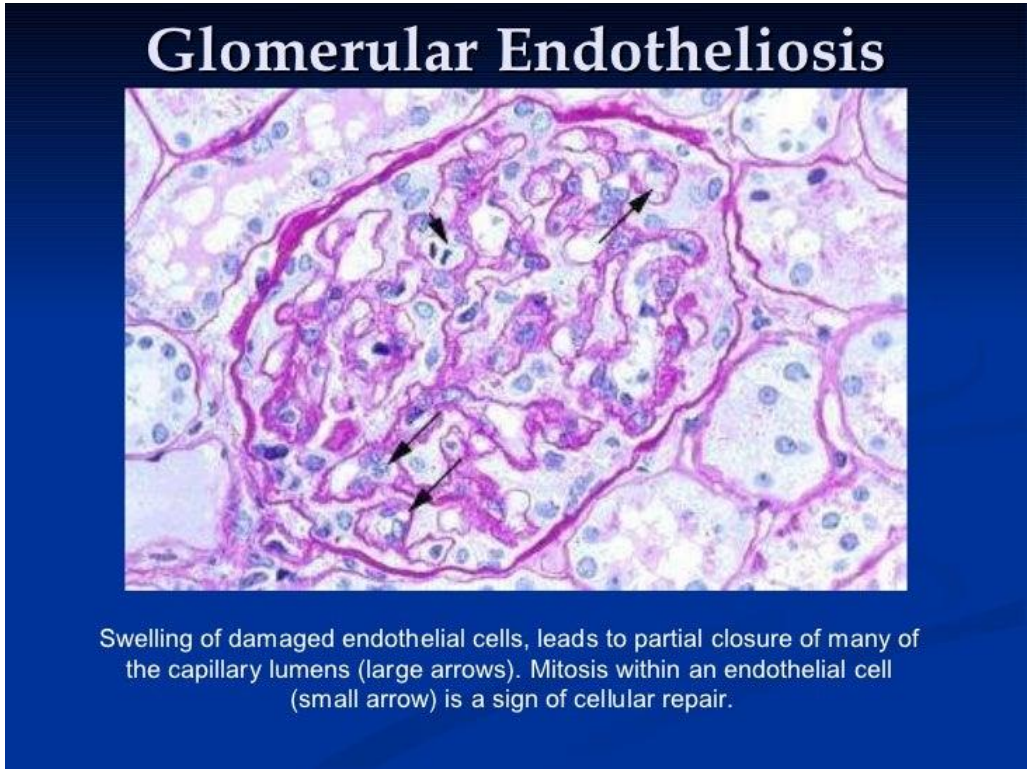


Pathophysiology

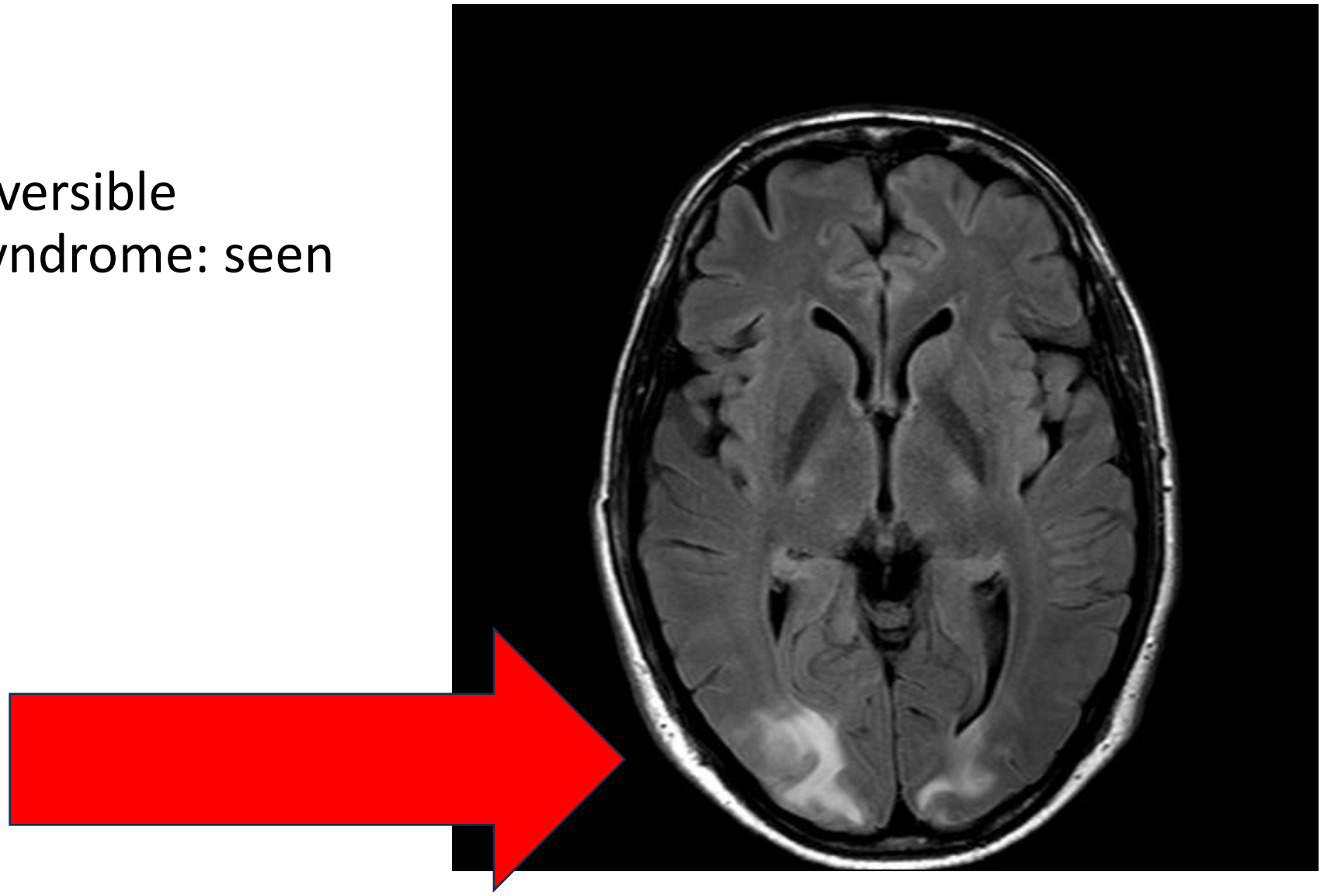
- The symptoms and lab abnormalities can be understood by understanding that PEC causes blood vessels to be:
  - Leaky (Kidneys can’t keep protein inside the glomerulus, brain swells causing a headache, pulmonary edema) (Endothelial Dysfunction)
  - Tight: hypertension, seizures, blurry vision, headaches, focal necrosis (Vasoconstriction)



- The typical renal lesion in preeclampsia is glomerular capillary endotheliosis.
- Hemorrhage and necrosis can occur in many organs secondary to arteriolar vasoconstriction

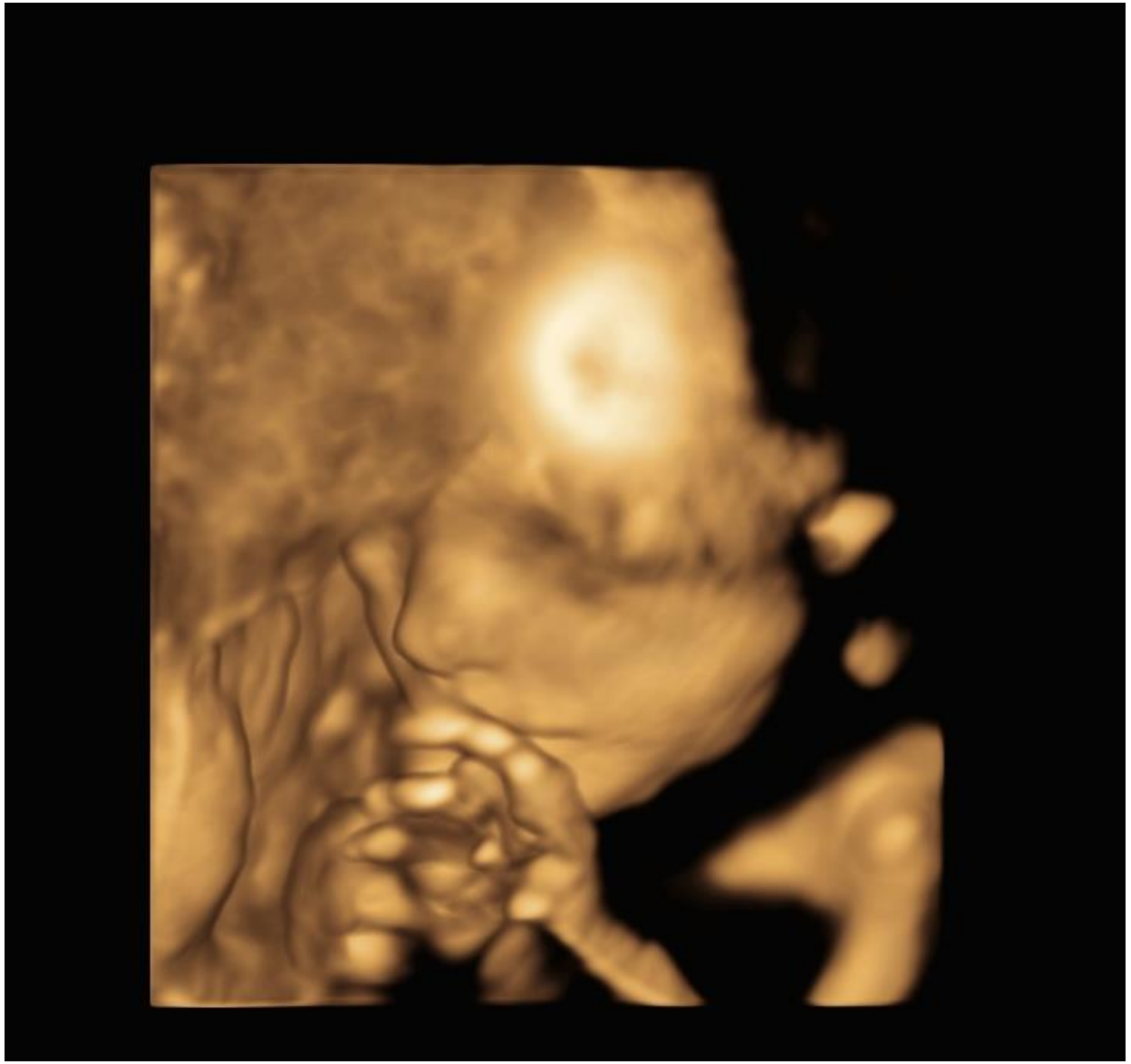


- PRES: Posterior Reversible Encephalopathy Syndrome: seen on imaging.

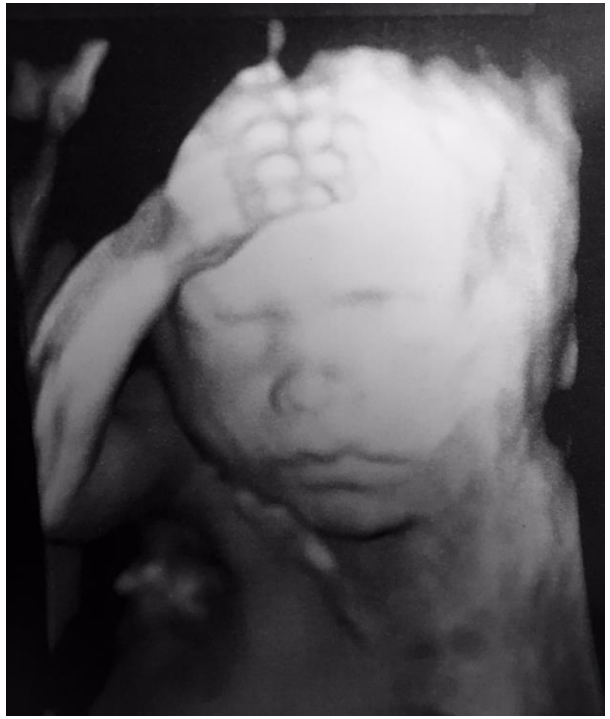


Posterior reversible encephalopathy syndrome (PRES) (diff.org)

Diagnosis



Diagnosis of PEC: HTN and something else



- HTN: Either, persistent Or SEVERE (160/110)

AND

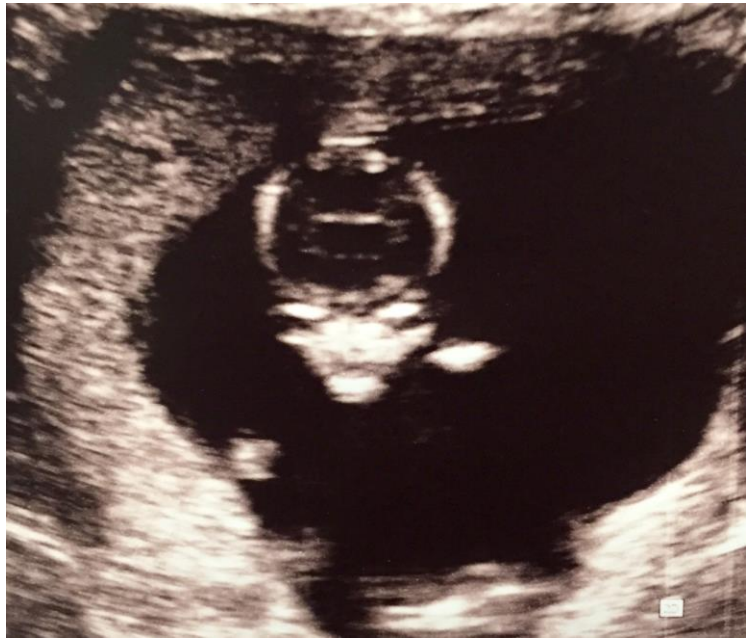
- Proteinuria (urine protein/creatinine ratio)
  (Does not have to be a 24-hour urine collection)

  - LFTS: to twice normal level
  - Pulmonary Edema
  - Renal insufficiency: Create greater than 1.1 mg/dl, or double of baseline
  - New onset headache unresponsive to treatment
  - Thrombocytopenia: platelets less than 100K

Gestational Hypertension

- New onset, persistent Hypertension: Greater than 140/90 on two occasions, at least four hours apart.
- Without signs, symptoms or lab abnormalities for PEC.

- If severe range BP (160/110) we treat the same as Preeclampsia with severe features.



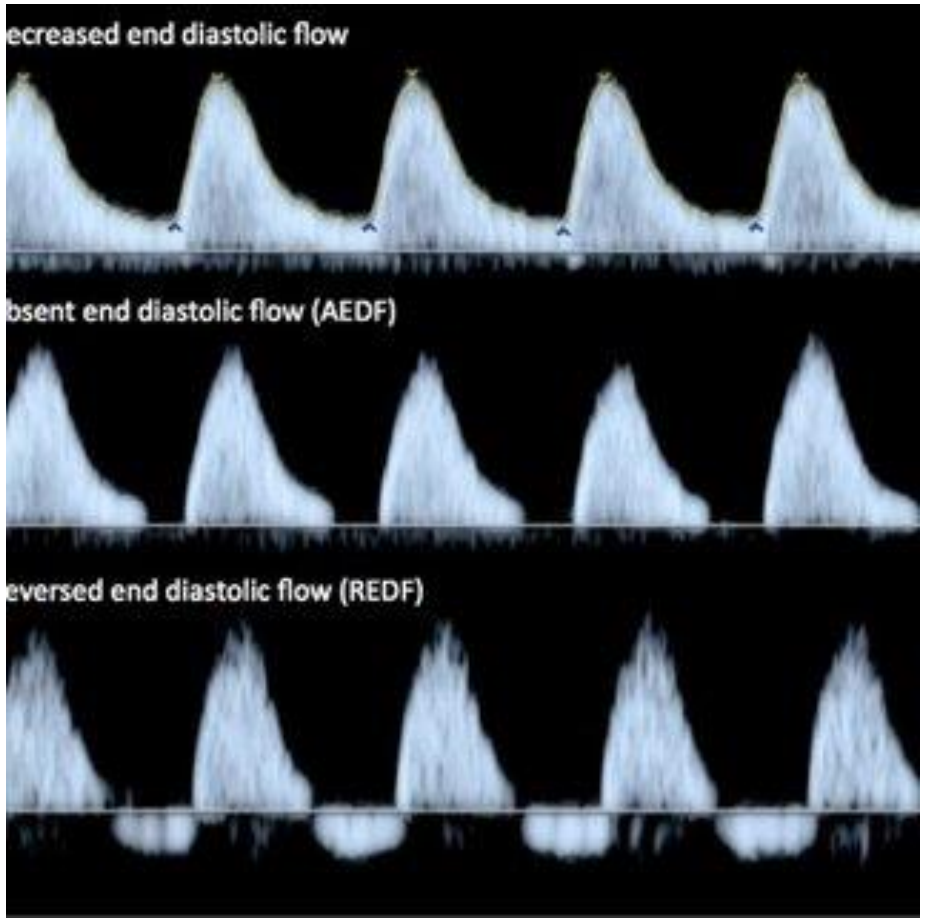
Severe Features

- Severe HTN: 160/110
- Thrombocytopenia: platelets less than 100K
- LFTS: to twice normal level
- Pulmonary Edema
- Renal insufficiency: Creatinine greater than 1.1 mg/dl, or double of baseline
- New onset headache unresponsive to treatment

What about Fetal Growth Restriction:

FGR is also a problem with how the placenta is functioning. If fetus has growth restriction, we follow general guidelines for FGR

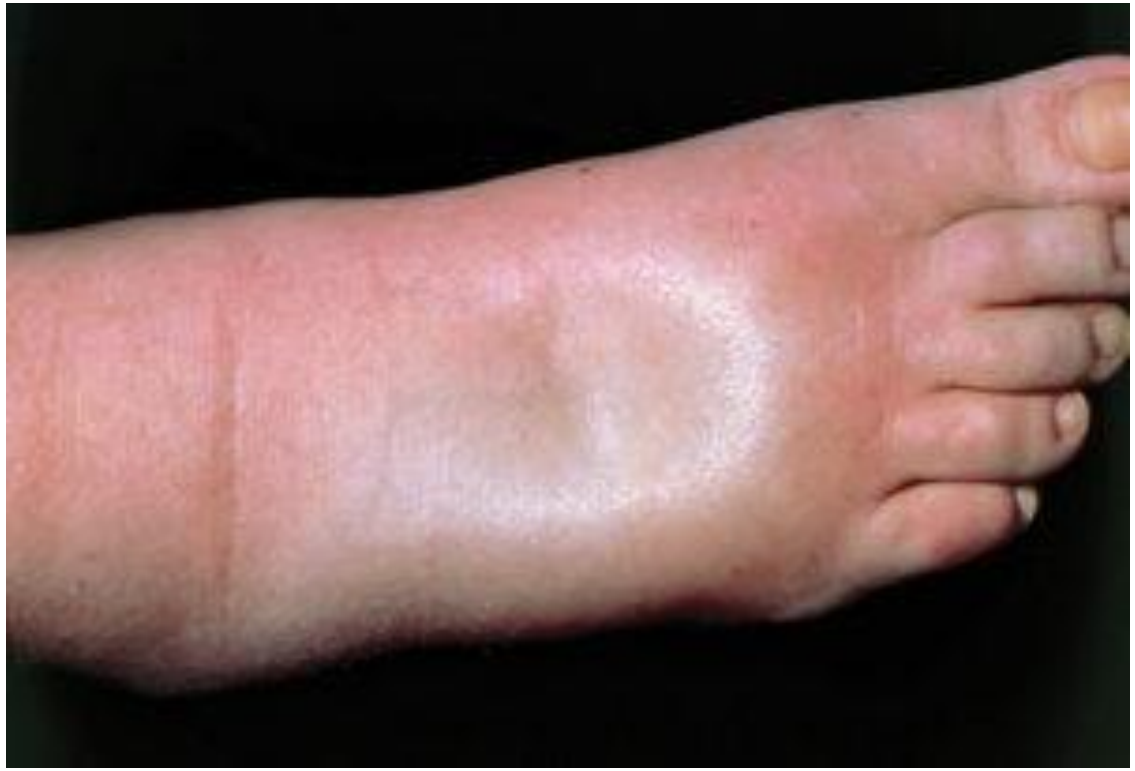
(Delivery timing is determined according to most concerning diagnosis for that patient in the current pregnancy.)



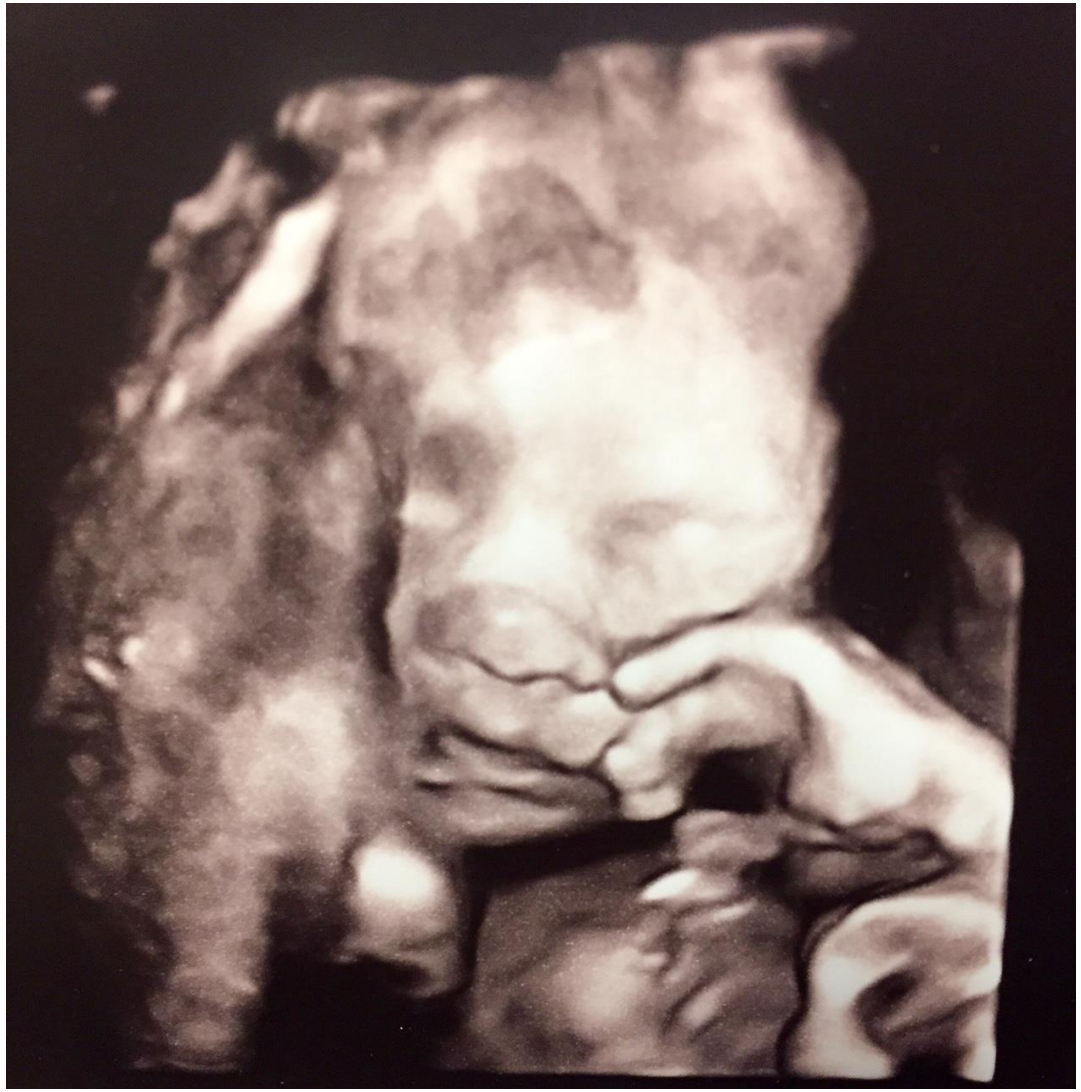
Researchgate.net

What about Edema? Uric Acid Levels?

- No longer part of diagnostic criteria for PEC.



Management



I have the diagnosis: Now what?

Everything always depends on the gestational age.

Remember, preeclampsia always gets worse until the placenta is delivered. The tempo may be different in every woman, but it will always get worse.

Most important questions to ask…

Can patient remain pregnant, or does she need to be delivered?

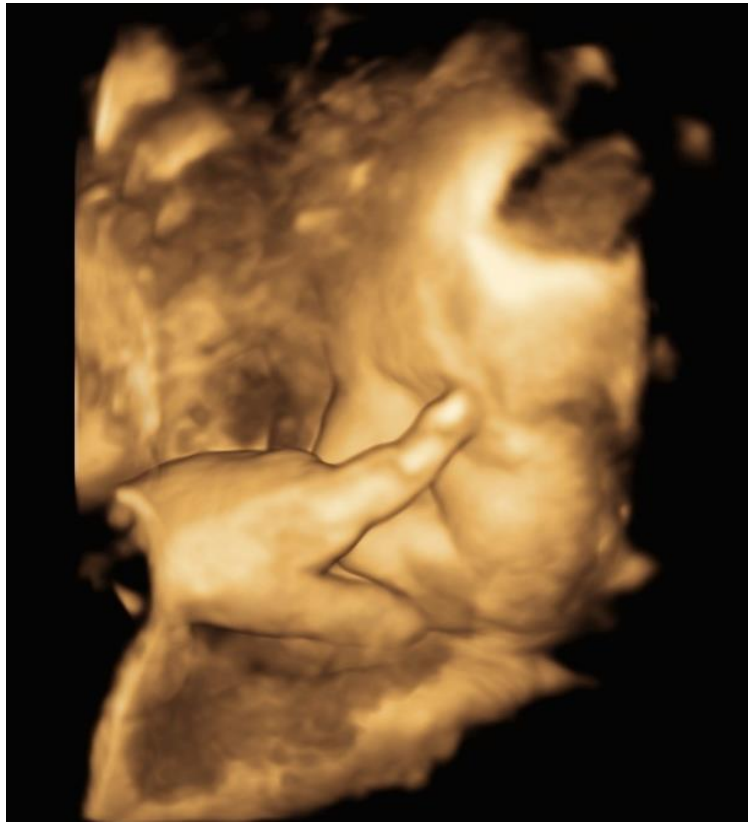
If she can stay pregnant, does she need to stay in hospital or can she go home?

Expectant Management: PEC without SF

- Without severe features, patient can stay pregnant until 37 weeks.
  - Manage blood pressure (labetalol or nifedipine)
  - Start regular antenatal testing to assess fetal well being
  - Get weekly blood work to see if things are worsening.
    - CBC
    - LDH
    - Platelet
    - LFTS (ALT tends to be higher than AST)
  - Patient can be managed as an outpatient (if she lives close, has transportation, etc)
  - Do NOT need to keep measuring protein in urine once patient has the diagnosis.

- We do NOT need to keep measuring protein in urine once patient has the diagnosis of preeclampsia.

- Increased amounts of protein will not change management plan or diagnosis.



Preeclampsia with Severe Features

With severe features, pt can stay pregnant until 34 weeks.

- May need to deliver before then. (We are looking for reasons to deliver her).
- May need to deliver before antenatal steroid course is completed.
- Inpatient management
  - Antenatal steroids
  - NICU consultation
  - Daily labs
  - Antenatal testing
  - Close monitoring of vitals, BP, symptoms
  - Anesthesia Consult

Expectant management ALWAYS depends on mom's decision to stay pregnant. (Shared Decision Making)

Box 4.

Conditions Precluding Expectant Management

Maternal

- Uncontrolled severe-range blood pressures (persistent systolic blood pressure 160 mm Hg or more or diastolic blood pressure 110 mm Hg or more not responsive to antihypertensive medication
- Persistent headaches, refractory to treatment
- Epigastric pain or right upper pain unresponsive to repeat analgesics
- Visual disturbances, motor deficit or altered sensorium
- Stroke
- Myocardial infarction
- HELLP syndrome
- New or worsening renal dysfunction (serum creatinine greater than 1.1 mg/dL or twice baseline)
- Pulmonary edema
- Eclampsia
- Suspected acute placental abruption or vaginal bleeding in the absence of placenta previa

Fetal

- Abnormal fetal testing
- Fetal death
- Fetus without expectation for survival at the time of maternal diagnosis (eg, lethal anomaly, extreme prematurity)
- Persistent reversed end-diastolic flow in the umbilical artery

Abbreviation: HELLP, hemolysis, elevated liver enzymes, and low platelet count.

In some cases, a course of antenatal steroids can be considered depending on gestational age and maternal severity of illness.

Data from Balogun OA, Sibai BM. Counseling, management, and outcome in women with severe preeclampsia at 23 to 28 weeks' gestation. Clin Obstet Gynecol 2017;60:183–9.

Seizure Prophylaxis

- Most benefit is for patients with **severe features**.
- During labor, delivery and for 24 hours after delivery
- Start at initial presentation if severe range BP. Turn off after 24 hours.
- Magnesium sulfate
  - Careful if patient has renal insufficiency: give loading dose and 1gm/hr

Table 2. Serum Magnesium Concentration and Toxicities

Serum Magnesium Concentration			
mmol/L	mEq/L	mg/dL	Effect
2–3.5	4–7	5–9	Therapeutic range
>3.5	>7	>9	Loss of patellar reflexes
>5	>10	>12	Respiratory paralysis
>12.5	>25	>30	Cardiac arrest

Data from Duley L. Magnesium sulphate regimens for women with eclampsia: messages from the Collaborative Eclampsia Trial. Br J Obstet Gynaecol 1996;103:103–5 *and* Lu JF, Nightingale CH. Magnesium sulfate in eclampsia and pre-eclampsia: pharmacokinetic principles. Clin Pharmacokinet 2000;38:305–14.

Severe Range Blood Pressure: TREAT!

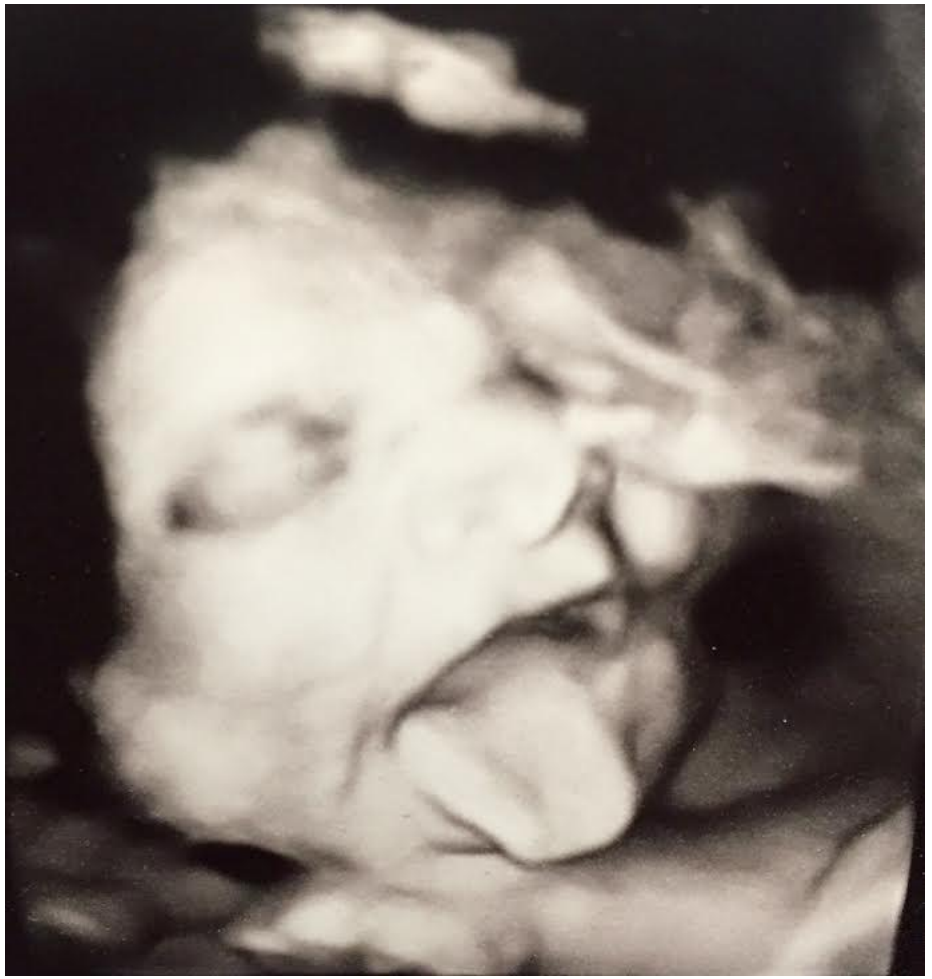
- Goal is to treat within 30-60 minutes.
- Treat ASAP. Don't wait.
- This can devolve quickly.
- Stroke, MI, Aortic dissection, abruption, etc.
- Have a protocol.

Table 3. Antihypertensive Agents Used for Urgent Blood Pressure Control in Pregnancy

Drug	Dose	Comments	Onset of Action
Labetalol	10–20 mg IV, then 20–80 mg every 10–30 minutes to a maximum cumulative dosage of 300 mg; or constant infusion 1–2 mg/min IV	Tachycardia is less common with fewer adverse effects. Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.	1–2 minutes
Hydralazine	5 mg IV or IM, then 5–10 mg IV every 20–40 minutes to a maximum cumulative dosage of 20 mg; or constant infusion of 0.5–10 mg/hr	Higher or frequent dosage associated with maternal hypotension, headaches, and abnormal fetal heart rate tracings; may be more common than other agents.	10–20 minutes
Nifedipine (immediate release)	10–20 mg orally, repeat in 20 minutes if needed; then 10–20 mg every 2–6 hours; maximum daily dose is 180 mg	May observe reflex tachycardia and headaches	5–10 minutes

Abbreviations: IM, intramuscularly; IV, intravenously.

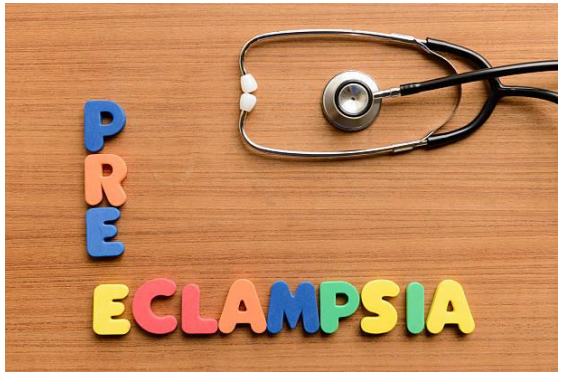
Special Subsets of Patients



Eclampsia

- New onset tonic clonic, focal, or multifocal seizures in the absence of other causative conditions.
- Self-limiting (5 minutes)
- Significant cause of maternal death, especially in low resource settings
  - Trauma, maternal hypoxia, aspiration pneumonia
  - Residual neurologic dysfunction is rare.
- Can occur before, during, or after labor (25-50-25%)
- 20-38 % do not have HTN or proteinuria before seizures.
- 78-83% of cases are preceded by premonitory signs of cerebral irritation
  - headache, blurred vision, mental status changes, photophobia

Eclampsia



- Eclampsia is a true obstetric emergency.
- Stabilize and deliver.
- Secure airway and give oxygen mask.
- Insert IV line for blood work and MgSO4 and fluid administration.
- Foley catheter for input and output charting.
- The best and safest drug for controlling seizures is magnesium sulfate

- After stabilization, delivery Is considered either by induction of labor or by Cesarian section.
- Prophylaxis against convulsion is continued after delivery for 24 hours.

- Fetal heart tracing will look BAD during seizure. Should improve after seizure resolves. If not better in 5 minutes, Consider Emergent delivery.

HELLP syndrome

- Hemolysis (CBC, LDH)
- Elevated Liver Enzymes
- Low Platelets

- Subset of preeclampsia, more severe form
- 30 percent of time it occurs postpartum
- 15% of patients lack HTN or Proteinuria (atypical)

Lab criteria:

- LDH greater than 600 IU/L
- AST/ALT twice upper limits of normal
- Platelets less than 100K.

- Main presenting symptoms are often malaise 90%, nausea and vomiting 50% cases.

Chronic Hypertension

Prior to 20 weeks gestation and/or persists 12 weeks post partum.

- Mostly essential hypertension but small percentage will have secondary hypertension due to renal vascular or endocrine causes.
- Taking anti hypertensive medications to keep blood pressure normal does not prevent patients from getting preeclampsia. Blood pressure medication reduces the morbidity of high blood pressure on maternal health.
- Medication can decrease chances of things worsening

Box 1. Risks of Chronic Hypertension in Pregnancy

Maternal

- Death
- Stroke
- Pulmonary edema
- Renal insufficiency and failure
- Myocardial infarction
- Preeclampsia
- Placental abruption
- Cesarean delivery
- Postpartum hemorrhage
- Gestational diabetes

Fetal and Neonatal

- Stillbirth or perinatal death
- Growth restriction
- Preterm birth
- Congenital anomalies (eg, heart defects, hypospadias, esophageal atresia)

Chronic HTN management in pregnancy

- Refer to MFM, if available.
- Baseline PEC labs
- EKG and eye exam if HTN greater than 10 years
- Daily home BP monitoring, validate pt's machine in office.
- Continue current meds, start meds if BP persistently greater than 140/90
- Detailed anatomy ultrasound, serial growth, antenatal testing after 32 weeks if on meds
- Delivery should be individualized based on blood pressure control and assessment of patient risk and is indicated as follows:

  -For those with stable blood pressures not on anti-hypertensive medications: Between 38 0/7 and 39 6/7 weeks

  -For those on anti-hypertensive medications: Between 37 0/7 and 39 6/7 weeks

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Chronic hypertension in pregnancy

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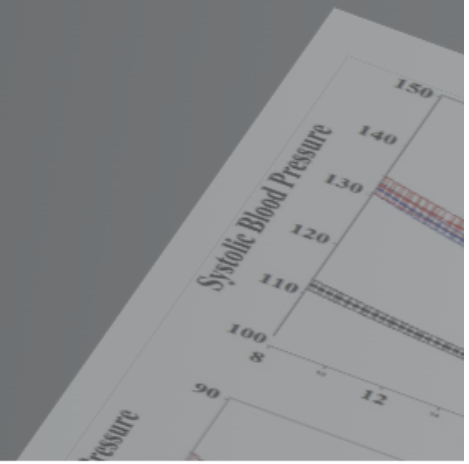

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Chronic hypertension and associated cardiovascular disease are among the leading causes of maternal and perinatal morbidity and death in the United States. Chronic hypertension in pregnancy is associated with a host of adverse outcomes that include preeclampsia, cesarean delivery, cerebrovascular accidents, fetal growth restriction, preterm birth, and maternal and perinatal death. There are several key issues related to the diagnosis and management of chronic hypertension in pregnancy where data are limited and further research is needed. These challenges and recent guidelines for the management of chronic hypertension are reviewed. Well-timed pregnancies are of utmost importance to reduce the risks of chronic hypertension; long-acting reversible contraceptive options are preferred. Research to determine optimal blood pressure thresholds for diagnosis and treatment to optimize short- and long-term maternal and perinatal outcomes should be prioritized along with interventions to reduce extant racial and ethnic disparities.

Chronic Hypertension and Pregnancy (CHAP) Study. (Batterbee, et al.)

- Open label, multi center randomized trial
- 61 centers
- 29,772 patients screened, 2,408 patients enrolled
- Pregnant with singleton and mild chronic hypertension

- Active treatment: meds initiated with BP at 140/90

- Control group: meds started with severe range hypertension (160/105)

CHAP study continued

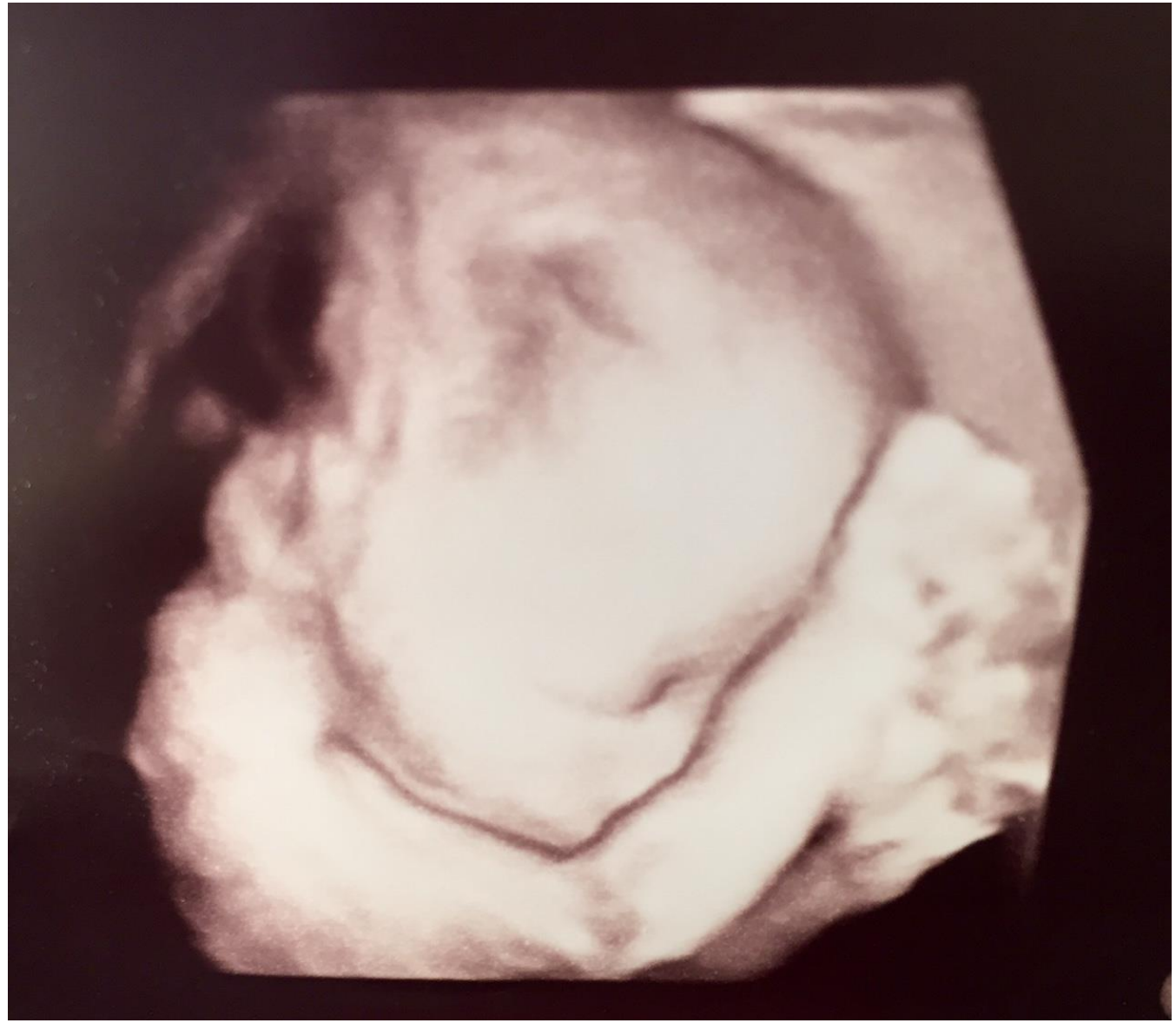
- Results: Reduced risk of primary composite outcome:
  - Preeclampsia with severe features, medically indicated preterm birth before 35 weeks, abruption, fetal death (30.2 vs 37%, RR 0.82; CI 0.74-0.92; P <.001
  - Birthweight less than 10th percentile was **similar** in both groups: 11.2% vs 10.2 % in control group, RR 1.04; p =.76

- **Similar** rates of serious maternal and neonatal complications. (not significant results)

- So, treating patients with BP of 140/90 demonstrates an improved outcome vs. waiting for things to worsen.

Take Home Points. Err on side of treatment.

- Use 140/90 as the threshold for starting medications.
- If patient is on meds at start of pregnancy, keep them on those meds (if they are safe in pregnancy.)
- Initiate or adjust antihypertensive medication if BP is 140/90 or greater on at least two occasions at least 4 hours apart. Titrate medication to maintain blood pressure in a goal range 120-140/70-90.
- Labetalol and nifedipine are safe options
  - 100 mg BID labetalol, 30mg nifedipine XL.



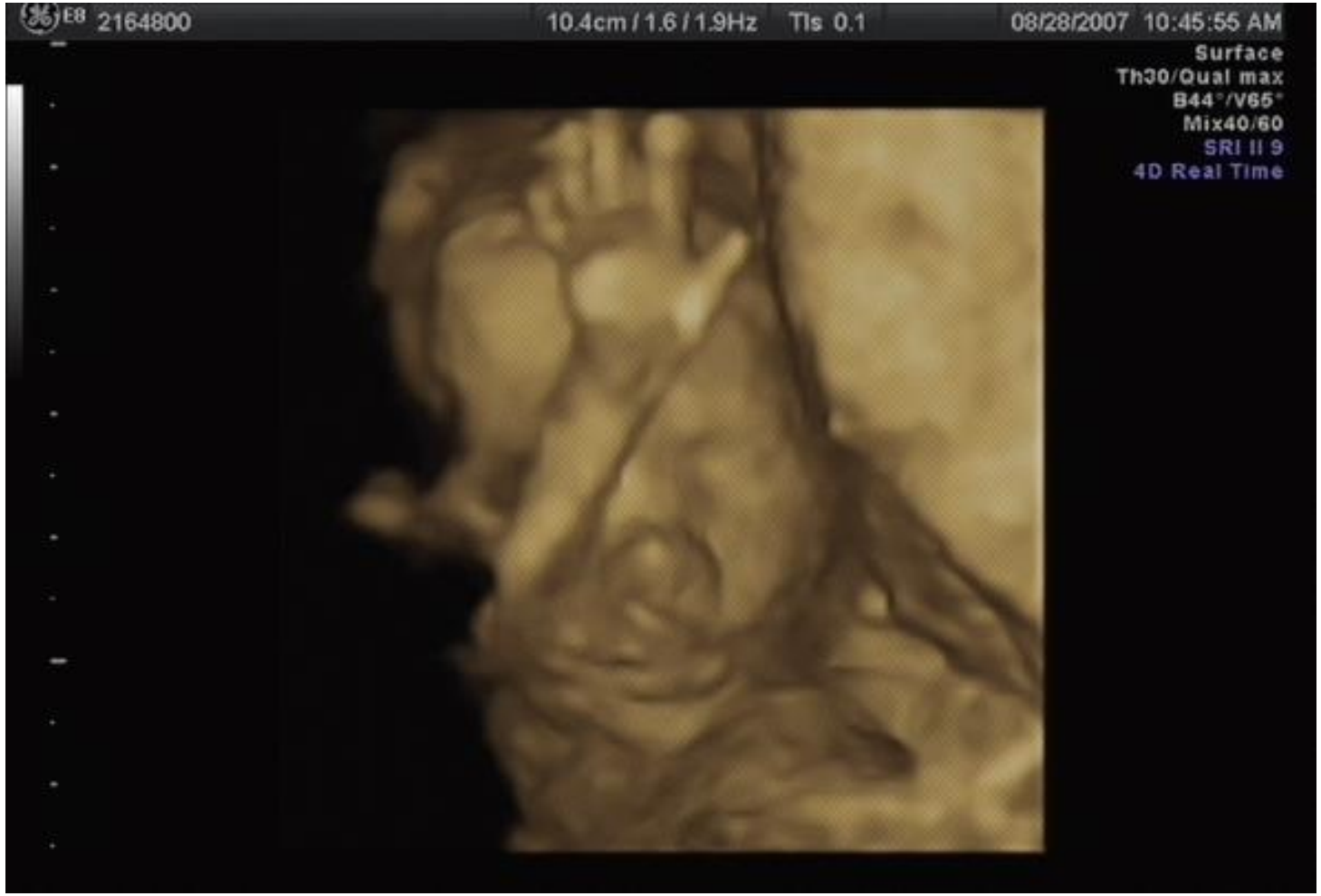
Chronic hypertension with superimposed preeclampsia.

- Diagnosed when the patient is known to have CHTN prior to pregnancy
- Usually carries a worse prognosis
- New proteinuria or sudden significant increases in B/P or proteinuria after 20 weeks of pregnancy.

Summary!

- You generally need HTN to have a hypertensive disorder of pregnancy.
- Patients don’t read the textbooks, so you need to have a wide-angle lens.
- MFM is here to help.
- Err on the side of treating BP in pregnancy
- If you are concerned, don’t send the patient home, gather more information over time and things generally become clearer.

Questions?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Thank You!

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