



HEALTHY MOTHERS,
HEALTHY BABIES

Coalition of Georgia

2019 Annual Meeting & Conference

.....
OCTOBER 28-29, 2019
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Healthy Mothers, Healthy Babies. In That Order.

Centering Mother's Voices in Maternal Care.

Update on Hypertension in Pregnancy

Emphasis on 2013 Task
force Recommendations

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Hypertension in Pregnancy: Executive Summary

- Obstetrics & Gynecology: November 2013
- Volume 122 - Issue 5 - p 1122-1131

Objectives:

- Identify and discuss changes in the diagnostic criteria for Preeclampsia
- Outline new treatment protocols for management of hypertension in pregnancy
- Review some of the scientific evidence behind the recommended changes

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HYPERTENSION IN PREGNANCY



The American College of
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WOMEN'S HEALTH CARE PHYSICIANS

Case Presentation

24 yo G2P0101 with a history of a 35 week delivery for preeclampsia, presented at 32 weeks by LMP and first trimester ultrasound with c/o Headaches, blurry vision and decreased fetal movement, no leaking or bleeding or contractions.

Further evaluation....

Case Presentation

Her BP is 140/100, She has RUQ tenderness,
AST/ALT 45/52, platelet count 121. FHT's
Category 1, no contractions

Further evaluation/treatment....

Case Presentation

- She is started on Magnesium Sulfate 4 g bolus/2 g/hour, and given BMZ 12 mg IM, to be repeated in 24 hours

Case Presentation

- The next morning, Her platelet count is 110,000, AST/ALT 65/55, BP is 130/80. She continues to have a severe headache unrelieved with opioids.
- U/S EFW 1200 g, 9th percentile
- Her cervix is 2 cm/80% effaced/cephalic presentation
- Further management.....

Case Presentation

- Her labor is induced with pitocin, and 15 hours later she delivers a viable female infant with Apgars 8/9 weighing 1300 g.
- She is continued on Magnesium sulfate for 24 hours postpartum, her headache resolves and BP's normalize by PPD# 1
- She is discharged on PPD# 2
- Management for the next pregnancy.....

Background

- Affects 8-10% of all pregnancies and rising
- Leading cause of maternal (and fetal) mortality (1:50,000-1:60,000)
- Disease of the Placenta
 - Serum markers
 - Protean Effects on Maternal and Fetal units
- Strong risk Factor for future cardiovascular disease

Hypertension in Pregnancy: Executive Summary

- Obstetrics & Gynecology: [November 2013 - Volume 122 - Issue 5 - p 1122-1131](#)

Background

Hypertensive Disorders 10% Pregnancies Worldwide

- 25% increase in Preeclampsia in the U.S.
- increased understanding of Preeclampsia Pathophysiology but
 - Etiology Unclear
 - Not improved Clinical Practices
 - Multisystem disease Under recognized

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Historical Context

- Eclampsia 1619 Varandaeus
- 1700s, eclampsia differentiated from epilepsy, organism is trying to get free from the body
- 1849, Dr. William Smith, “toxemia” , build up of toxic chemicals
 - Rx: blood letting
- 1983, the Hydatosi Iualba (parasitic worm) theory of preeclampsia (found that talc from gloves and abberant staining techniques caused “findings”)

Classification

- Preeclampsia-Eclampsia
- Chronic Hypertension
- Chronic hypertension with Superimposed Preeclampsia
- Gestational Hypertension

Clinical Features

- Emphasis on Multisystem
- No longer reliant on Proteinuria
- Low Platelet Count (<100k)
- New Onset Cerebral or Visual Symptoms (scotomata, headaches, seizures)
- Liver(x 2)
- Creatinine doubles or greater than 1.1 (renal dysfunction)
- Proteinuria- timed and Extrapolated (not always present)
- Massive proteinuria No longer Considered Severe
- IUGR No longer Criteria but may be present
- Other associated findings (severe edema—no longer in criteria, pulmonary edema)

Screening for Preeclampsia Biomarkers

- Angiogenesis in response to abnormal placentation and hypoxia in the placenta
- AntiAngiogenic
 - s Flt-1 (Soluble FMS like tyrosine Kinase)
 - Soluble Endoglin
- Pro Angiogenic
 - Placental Growth Factor (PlGF)
 - VEGF
- PlGF Earlier than s flt -1

Risk Factors For Preeclampsia

- Nulliparity (most commonly identified risk factor), New partner
- Previous preeclampsia (up to 7X)
- CHTN or chronic renal disease
- Thrombophilia
- Multifetal pregnancy
- IVF
- FMH Preeclampsia (2-4 times), male partner
FMH (mom, previous pregnancy), patient was SGA

Risk Factors For Preeclampsia

- DM
- Obesity
- SLE, APA
- Age > 40 or < 18
- Black Race
- Hydrops Fetalis
- Unexplained IUGR
- IUGR, abruption, IUFD in previous pregnancy
- Prolonged interpregnancy interval
- Hydatidiform Mole
- Susceptibility Genes

Uterine Artery Doppler

- Predictive of early-onset preeclampsia
- No randomized trials have shown improvement in maternal or fetal outcomes
- Possible utility in knowing for purposes of screening and follow up
- Executive Summary does not endorse routine screening

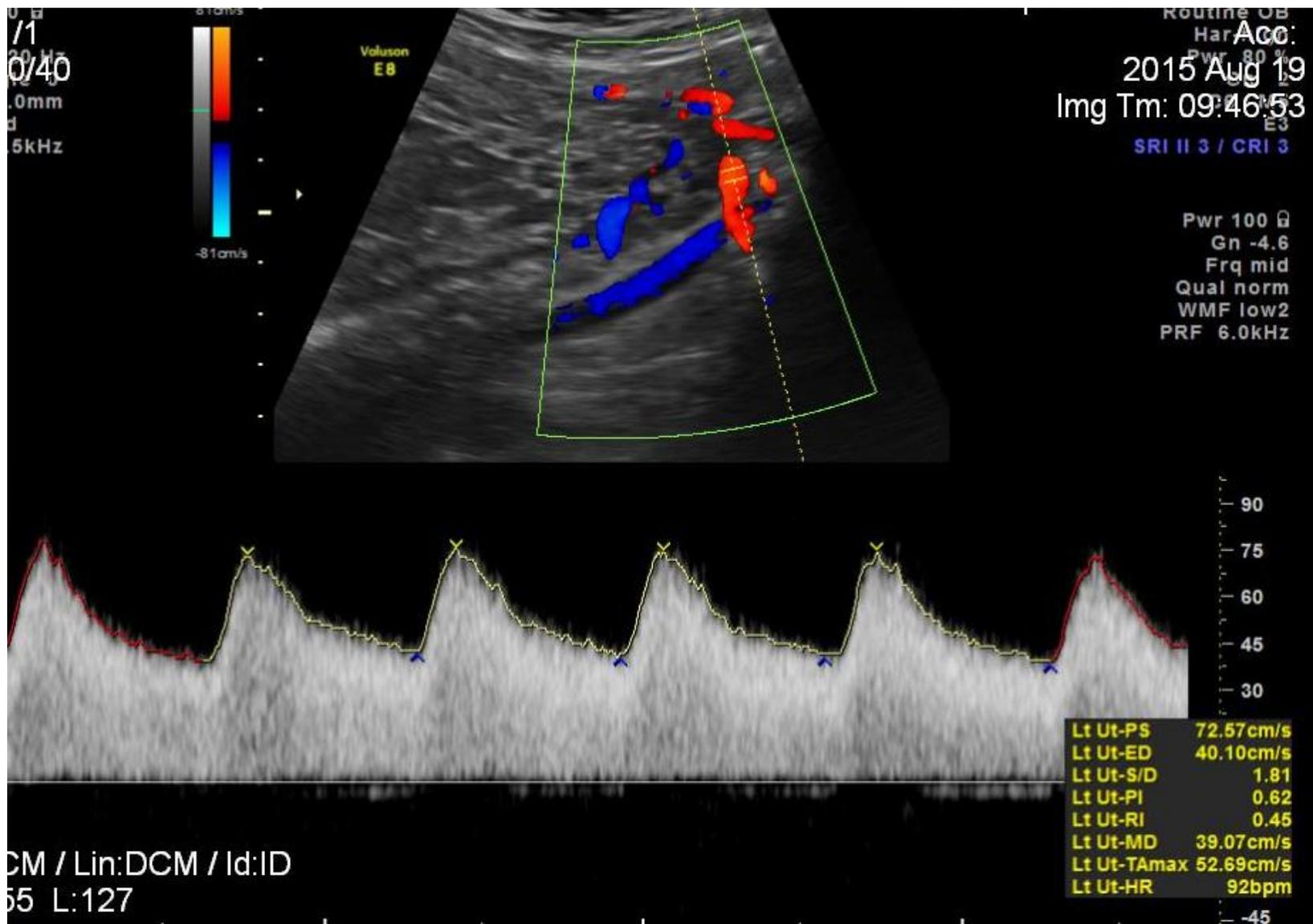


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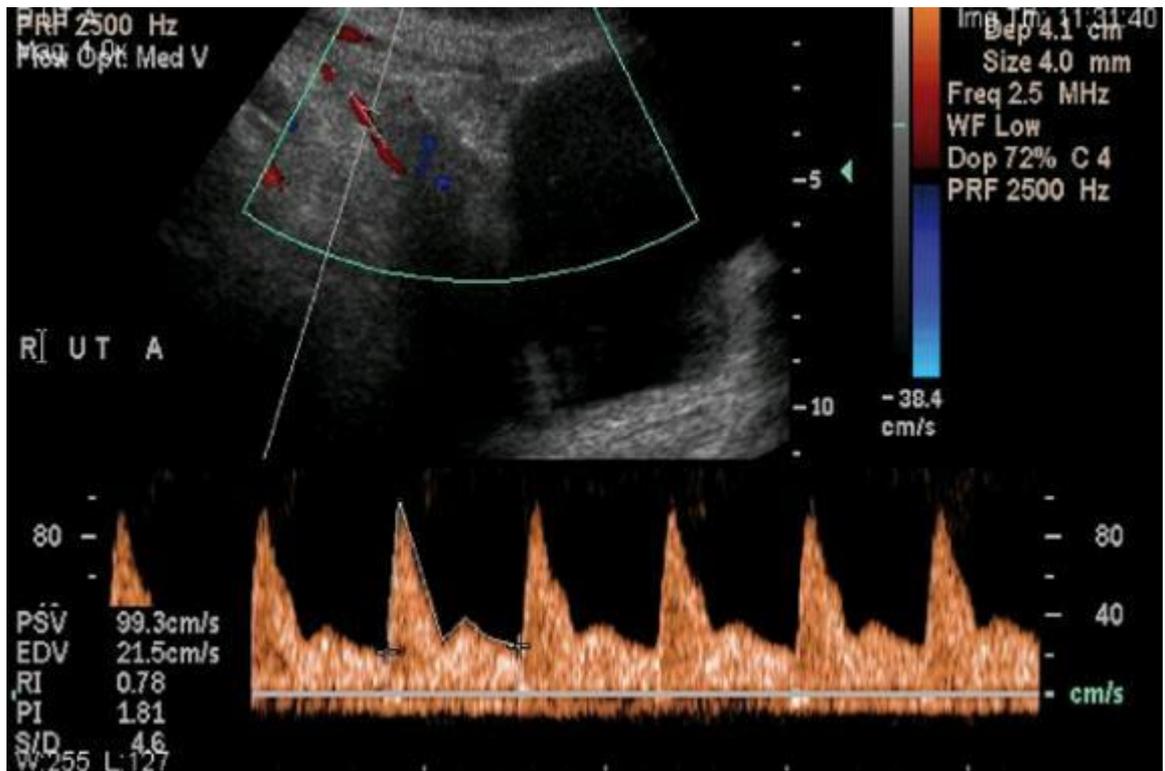


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BP Criteria > 20 weeks

- Unchanged
- 140/90 diastolic times 2
- 160/110 times one

Proteinuria

- May be helpful for establishing diagnosis
 - 1+ urine dip
 - >300 mg/24 hour
 - >0.3 protein/creatinine spot ratio
- Not important for the course of disease and progress

Preferred Nomenclature

- With or without Severe Features
- Avoid the terms “mild” and “severe”

Preeclampsia Diagnosis

Severe Features:

- BP > 160/110
- Symptoms (cerebral, epigastric, visual)
- Signs (hypoxia, abnormal FHT, IUGR)
- Labs (Cr > 1.1, AST > 2X, Plt < 100k)

Without Severe Features

- BP >140/90, > 300 mg proteinuria/24 hours

Gestational HTN

- BP > 140/90, no proteinuria or severe features

Atypical Presentation

- Onset < 20 weeks
 - Molar pregnancy
 - Rule out other etiologies-TTP, HUS, SLE, APS, AFLP
- HTN or proteinuria but not both
 - 15-25% GHTN will eventually have PE
- Delayed postpartum onset or exacerbation
 - > 2 days < 6 weeks after delivery

Prevention Of Preeclampsia

- ASA
- Antioxidants (Vitamin C and E)
- Calcium Supplementation
- Bed rest/activity restriction

Large Scale Trials

STUDY	ASA DOSE	# PATIENTS	ASA PE %	PLACEB O PE%	P
Italian 1993	50 mg	1106	15.2	19.3	NS
CLASP 1994	60	9364	7.8	7.8	NS
NICHD 1998	60	1998	18	20	NS

Table by D. P. Eller, M.D.

Meta Analysis

- Large meta analysis demonstrated 0.90 RR (0.84-0.97) in favor of ASA
- Estimated 17% reduction in preeclampsia risk in a high risk population
- 2007 Cochrane Review
- Conclusion: May be helpful 60-80 mg at the end of the first trimester for high risk patients

Other Prevention Measures

- Antioxidants
 - Vitamin C and E no benefit, RR 0.73 CI 0.51-1.06
- Calcium Supplementation
 - RR 0.94 (0.76-1.16)
- Low salt diet
 - No benefit RR 1.11 CI 0.46-2.66

Course of Disease

- Progressive Disease-usually in late pregnancy with gradual worsening until delivery over days to weeks
- Eclampsia in 2%
- Sequelae-highest risk with end-organ dysfunction-Chest pain, dyspnea, TCP
 - Abruptio
 - Liver hematoma or rupture
 - DIC
 - Stroke
 - Need for ventilation, transfusion, dialysis

Course of Disease

- Delivery of Placenta leads to resolution
 - Hours-HA
 - 48 hours-diuresis
 - May take months-severe proteinuria
 - HTN may temporarily worsen—usually improves within 4 weeks but may take up to 12 weeks
 - May have delayed postpartum onset or exacerbation of disease

Features by Organ System

- Cardiopulmonary
 - HTN-usually, but not always gradual and late in pregnancy
 - Reduced intravascular volume and edema (facial, > 5# in 1 week)
 - Increased afterload, EF usually normal, troponins normal, natriuretic peptides 4X normal
 - Pulmonary edema multifactorial
 - may be increased PA pressures, low COP
 - Other-capillary leak, LVF, volume overload

Features by Organ System

- Renal
 - Organ most likely to manifest endothelial injury
 - Proteinuria
 - GFR decreases 30-40%, RPF lesser degree, Cr up slightly, decreased UO
 - Uric acid may predict adverse perinatal (but not maternal) outcome
 - Glomerular endotheliosis

Features by Organ System

- Hematologic
 - Consumptive (due to endothelial injury and activation) and immune TCP
 - PT, APTT and fibrinogen usually not affected
 - Microangiopathic hemolysis
 - Hemoconcentration

Features by Organ System

- Hepatic
 - Periportal and sinusoidal fibrin deposition
 - Ischemia and hemorrhage
 - Epigastric pain may be the only symptom on presentation-thought to be from stretching of Glisson's capsule from swelling or bleeding
 - Occasional DI from hepatic dysfunction

Features by Organ System

- CNS
 - HA
 - temporal, frontal, occipital or diffuse
 - Throbbing or piercing
 - Can be severe (“worst HA of my life”) and persistent despite analgesics
 - Visual changes
 - Retinal arterial spasm
 - Blurred, flashing lights, scotomata, amaurosis fugax, cortical blindness
 - Hyperreflexia, clonus

Features by Organ System

- CNS (Continued)
 - Seizures 1:400 without, 1:50 with severe features
 - Hemorrhage, petechiae, cerebral edema, vasculopathy, ischemic brain damage, fibrinoid necrosis
 - Poorly understood-possibly endothelial damage, loss of autoregulation similar to PRES
 - Hemorrhagic Stroke-36% of pregnancy associated stroke
 - Treating BP MAY reduce risk (timing of treatment unclear)

Features by Organ System

- Other Maternal manifestations
 - pancreatitis
- Fetus and Placenta
 - IUGR, oligohydramnios
 - IUFD
 - Does NOT accelerate fetal maturation
 - Abruptio 1% without, 3% with severe features
 - Abnormal dopplers
 - Hydrops-mirror or Ballantyne syndrome

Initial Evaluation

- CBC, Cr, AST/ALT, uric acid, LDH, 24 hour urine or spot protein
- Clinical history
- Ultrasound for EFW, AFI BPP/NST and/or Umbilical artery dopplers

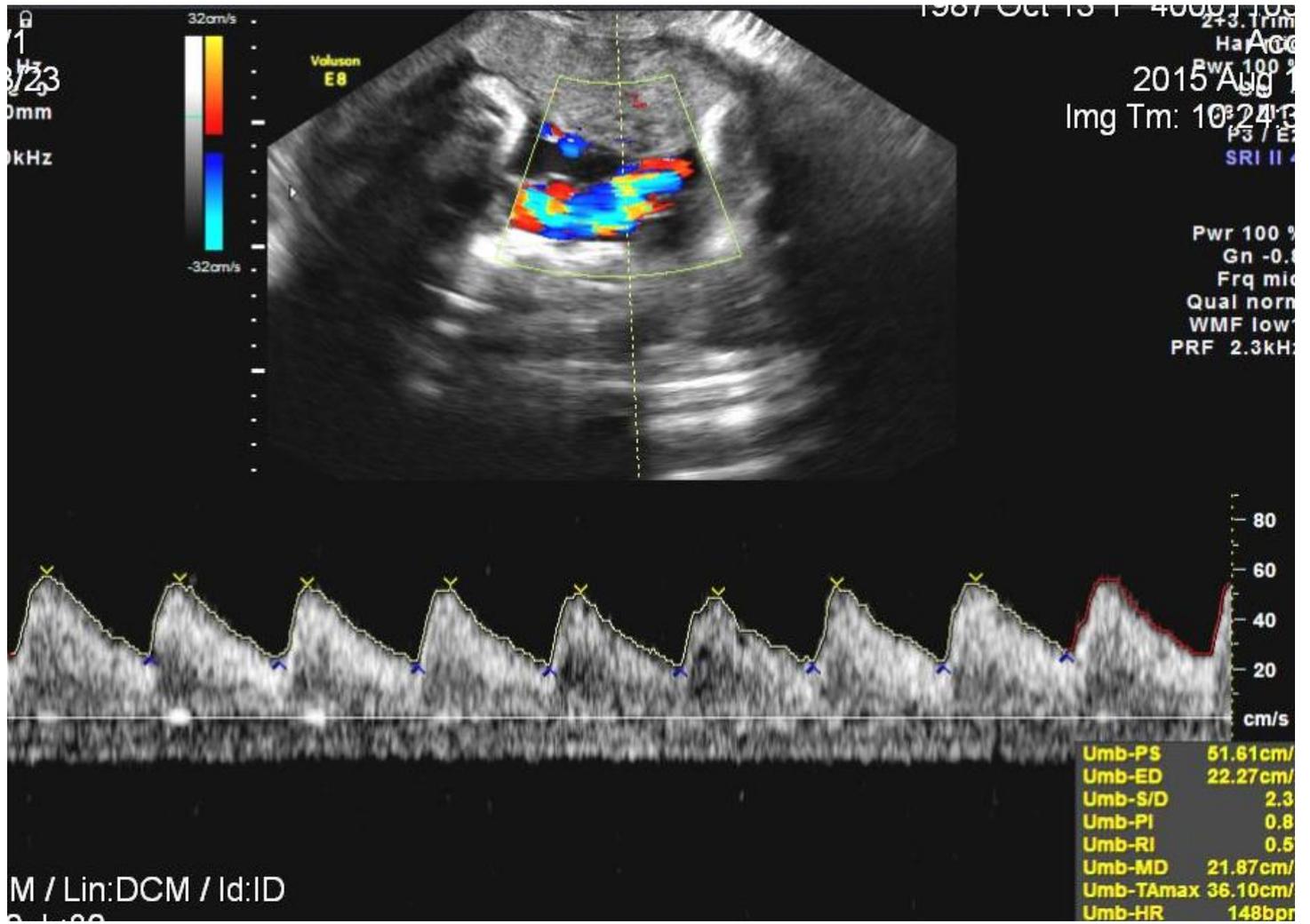


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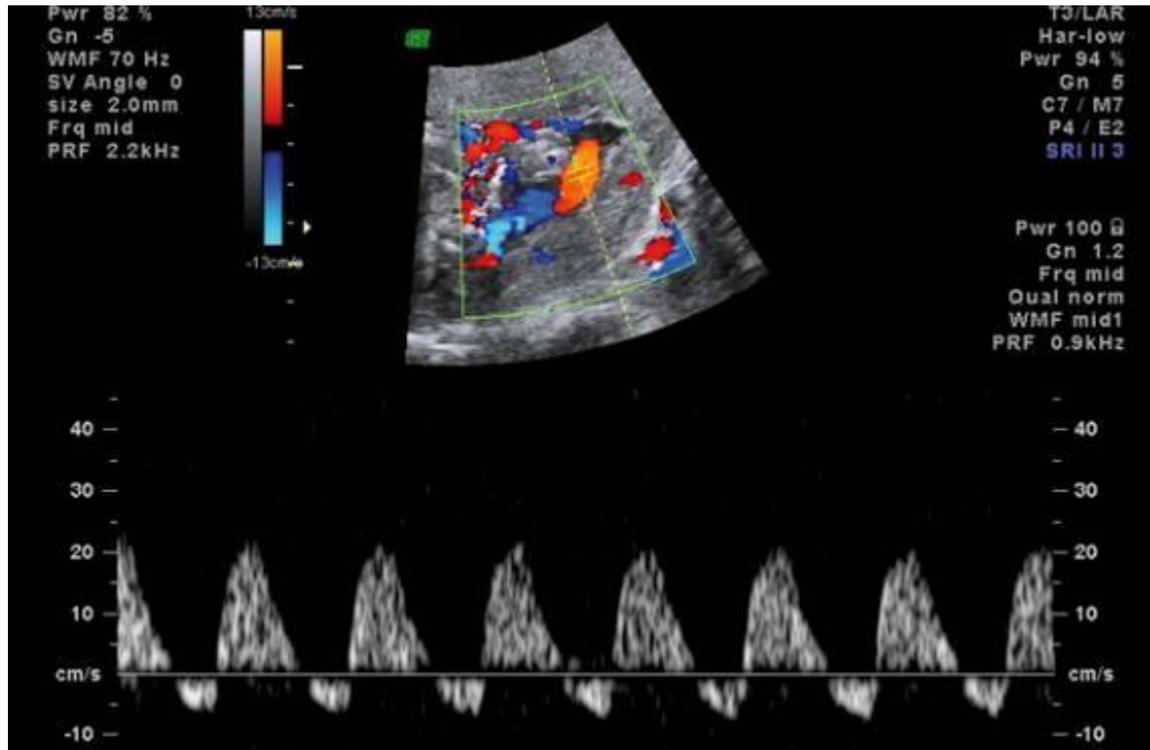


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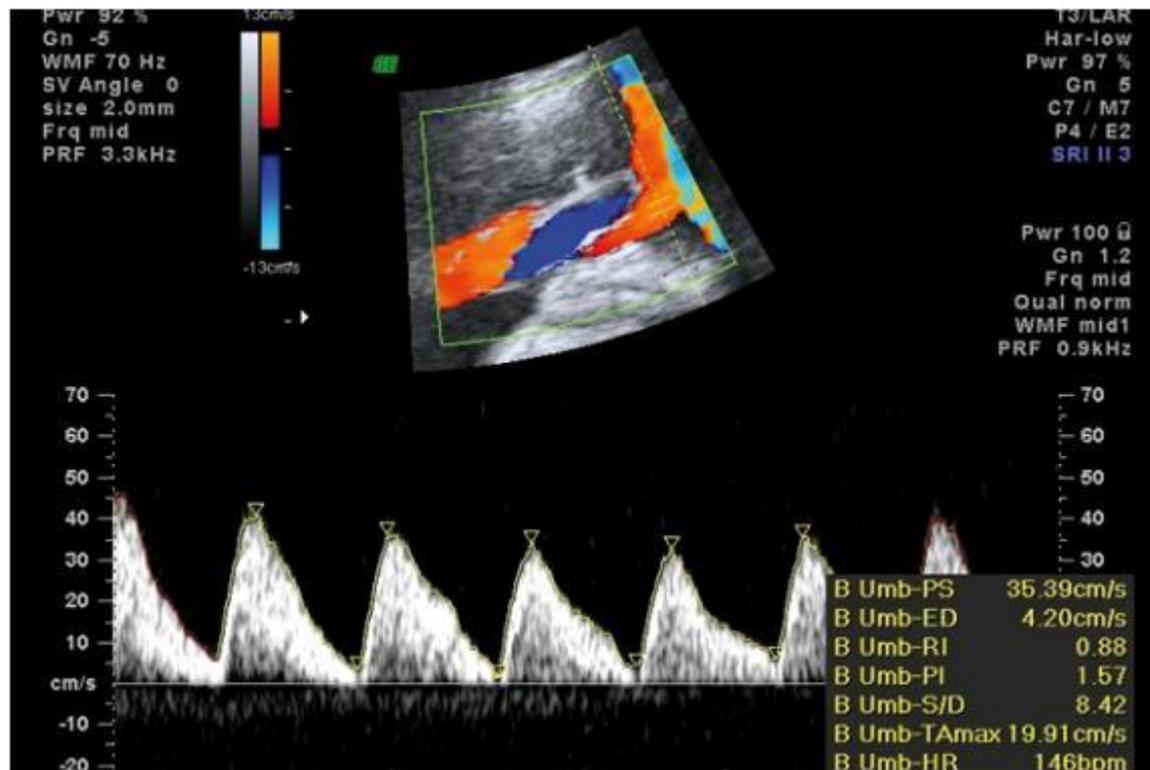


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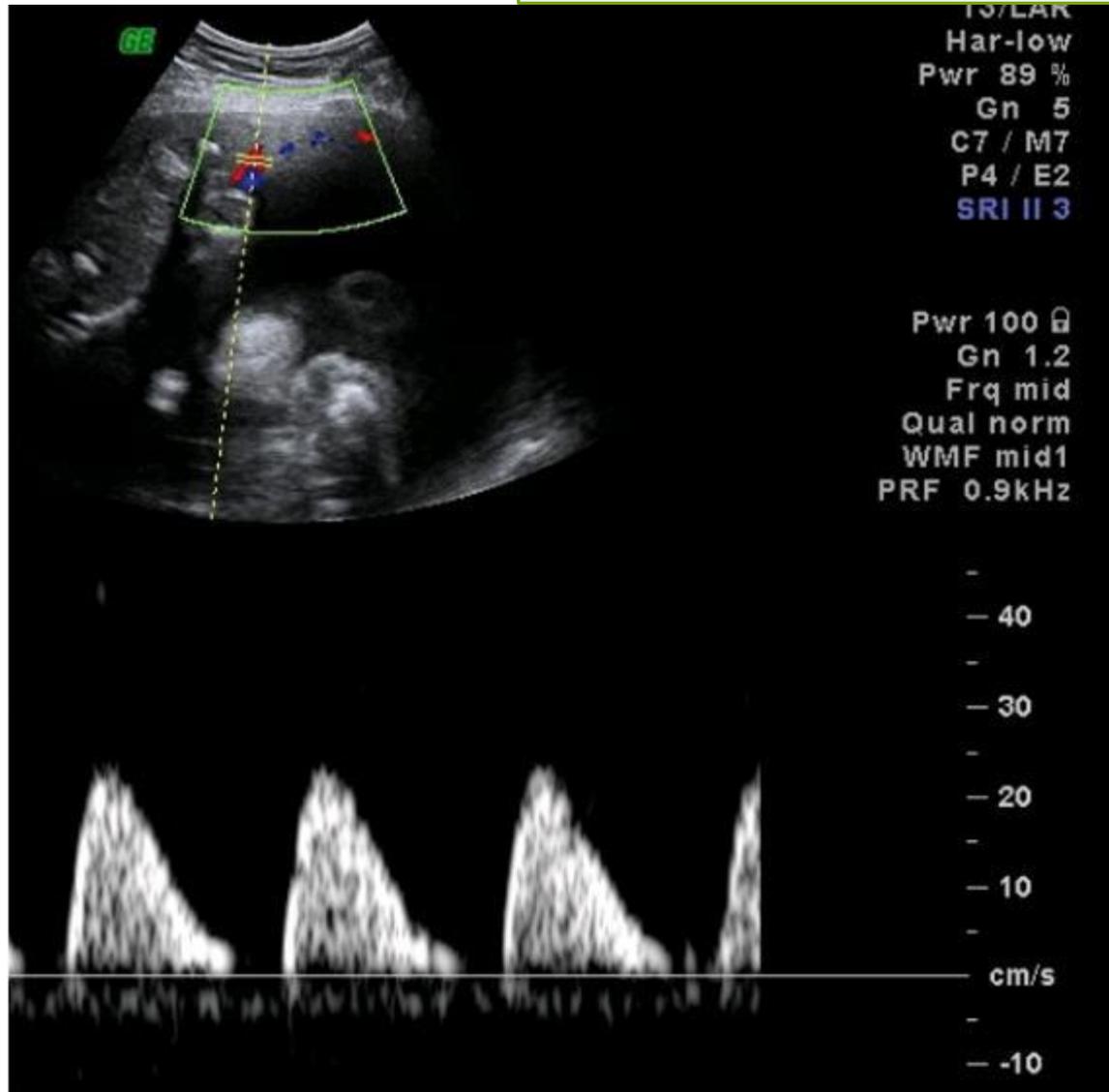


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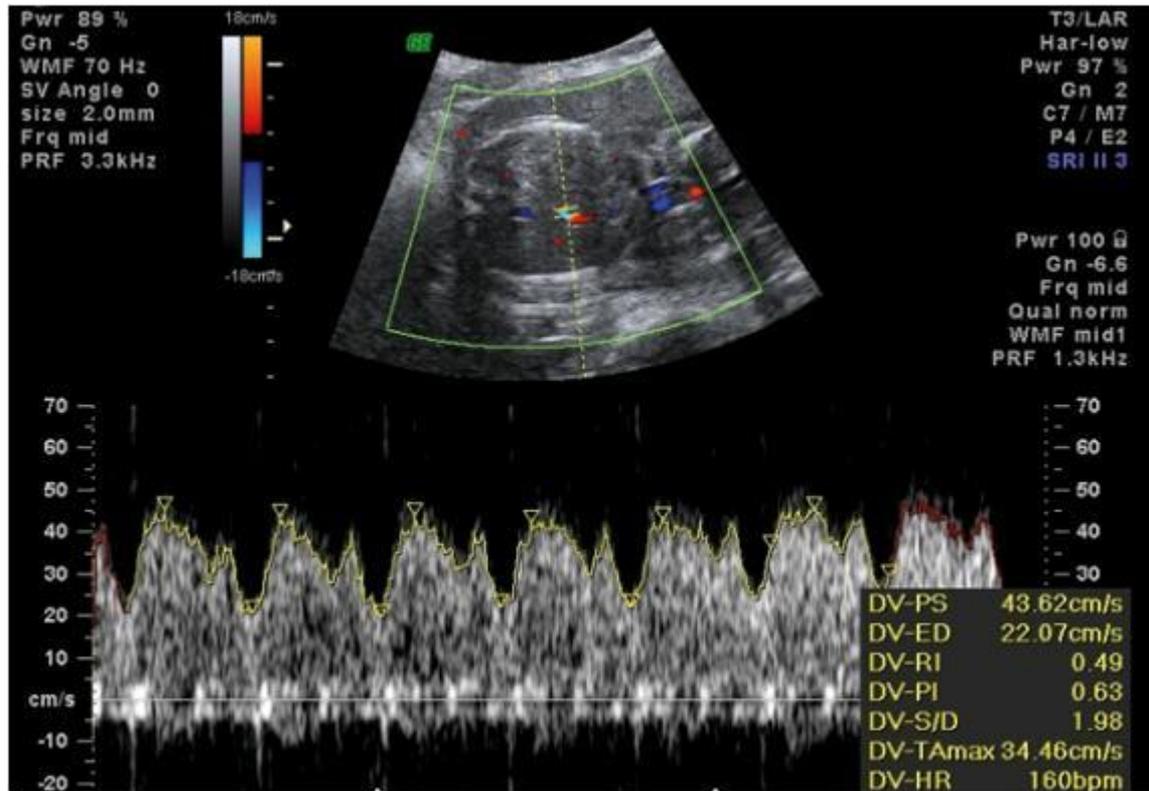


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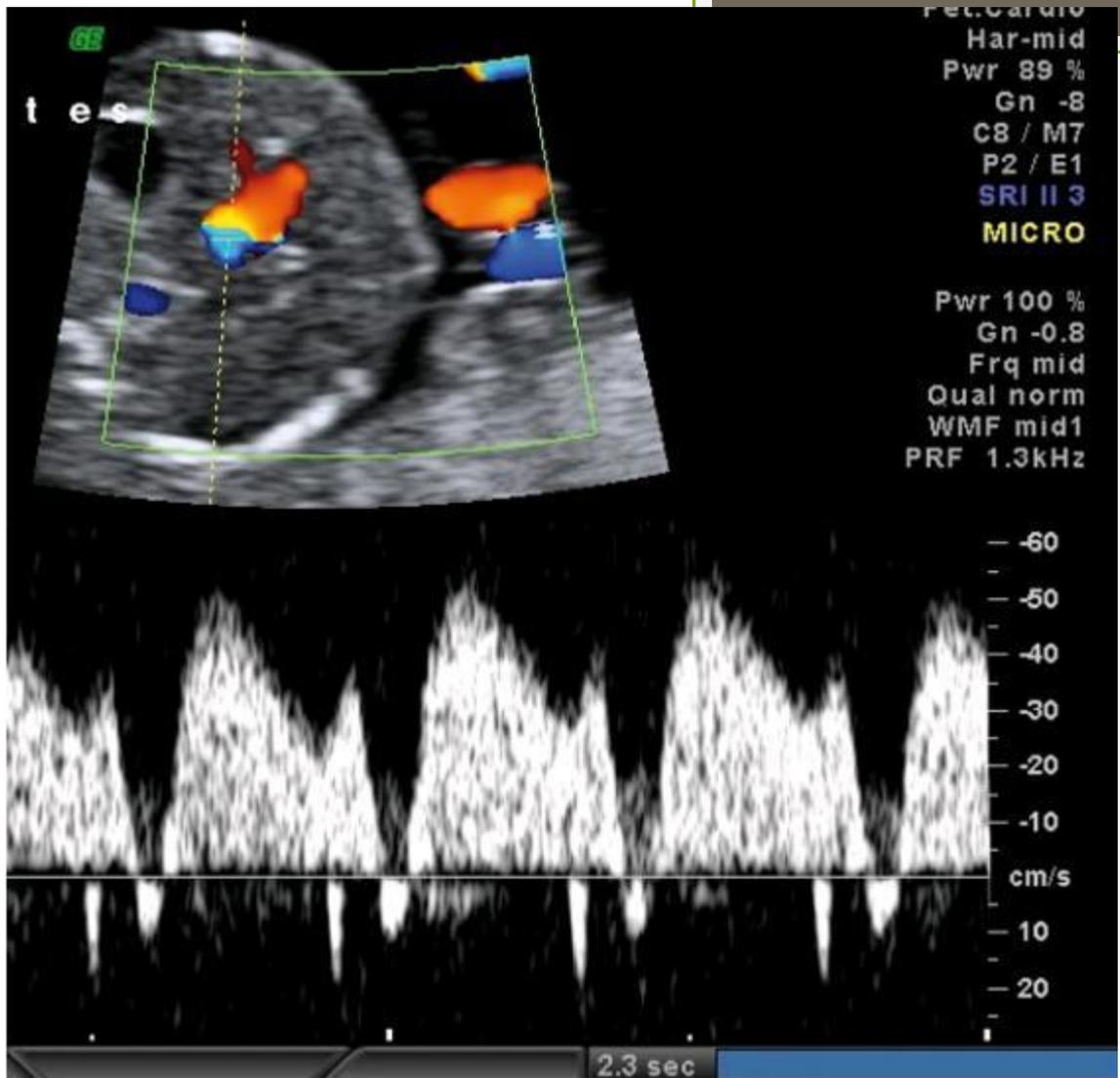


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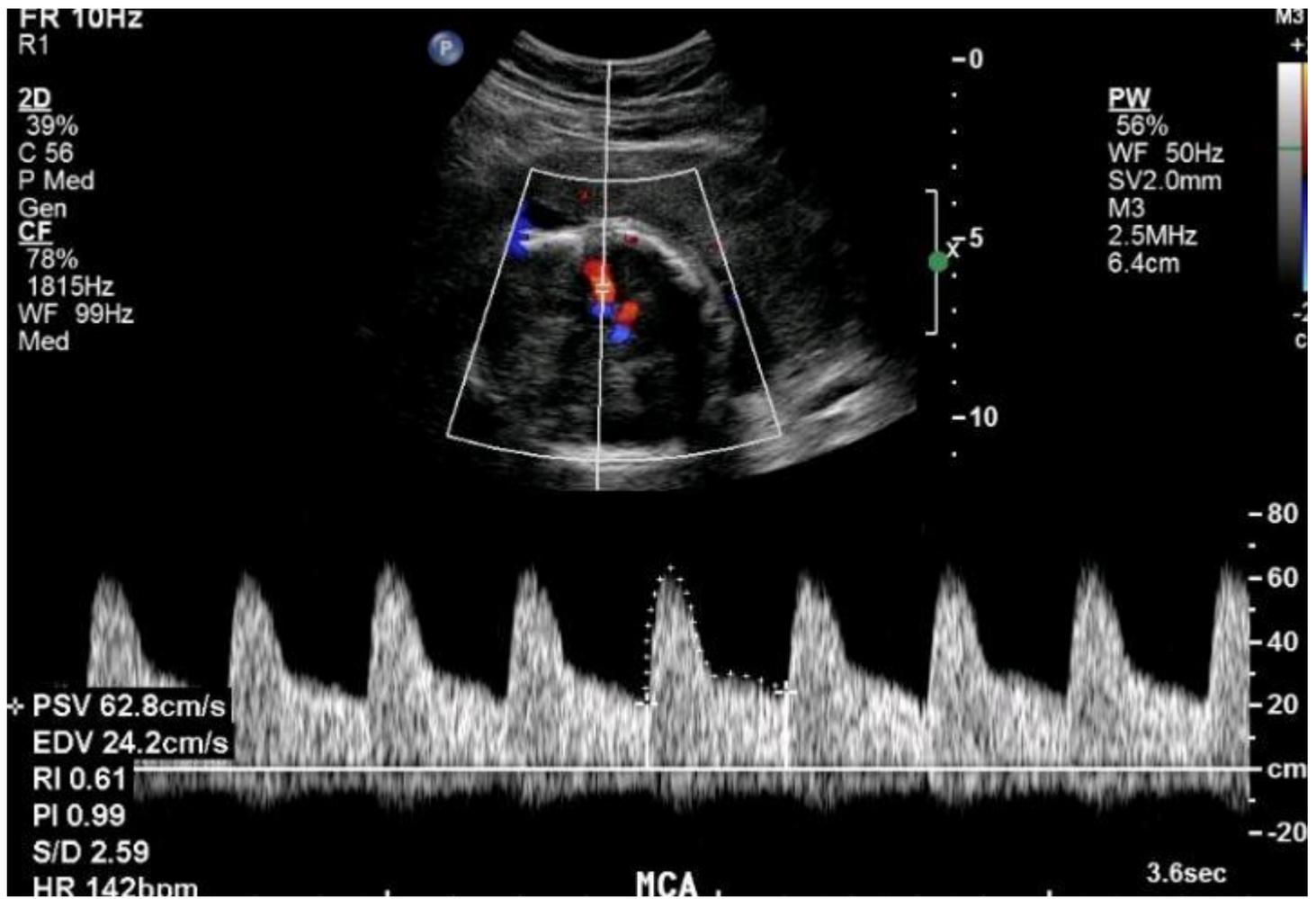


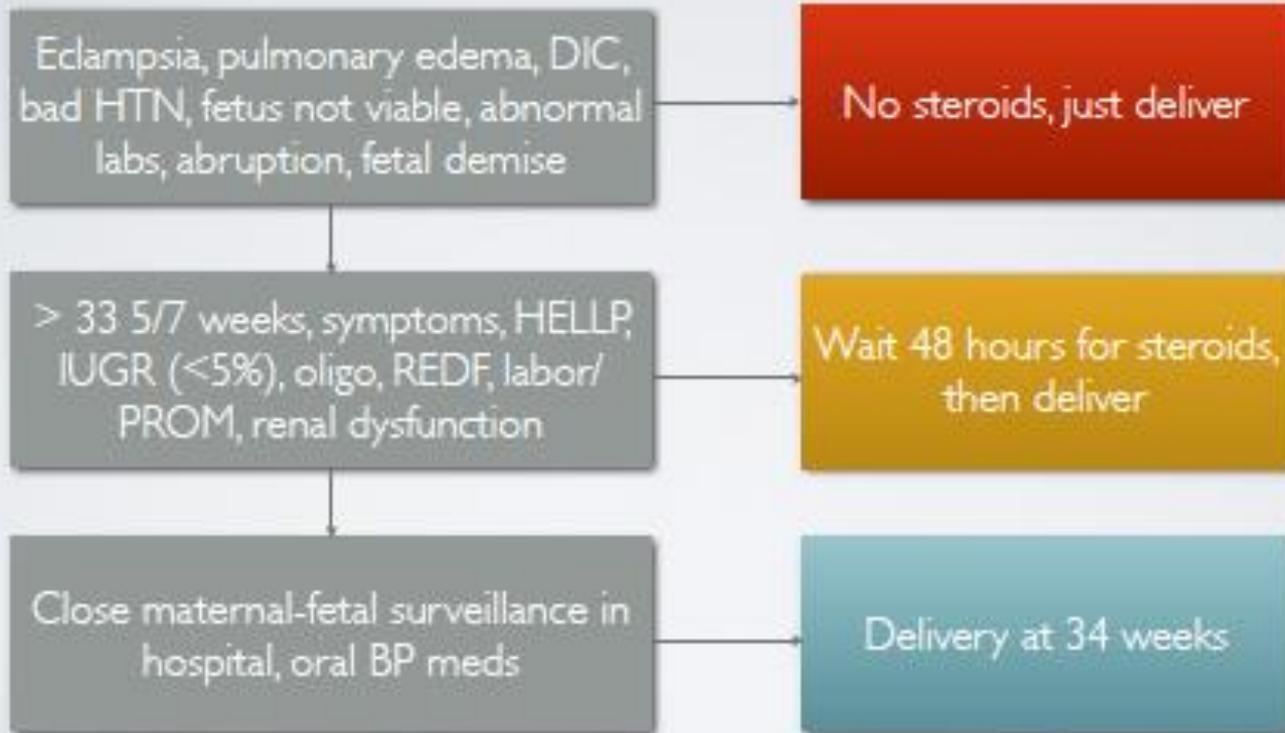
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Hospitalization

- REST?
- Ultrasound
- AFI weekly
- NST 1-2 times weekly
- Labs weekly
- Regular diet
- Regular assessment for worsening disease

Timing Of Delivery

CLINICAL FLOW SEVERE FEATURES



Multiple Guidelines/ Task Force

- ACOG: Task Force on Hypertension in Pregnancy
- National Institute for Health and Clinical Excellence 2010/2011
- Hypertensive Disorders in Pregnancy
New York State
- ESC

Antihypertensive Treatment Per Guidelines

- Goals:
 - to Prevent Maternal Stroke
 - To Prevent Severe Gestational Hypertension
- Per Review:
 - Prior Trials not designed to assess maternal and Perinatal Risks
 - Odds of Progression to Severe hypertension decreased
 - 160/110 Treatment of BP with meds and no Bed Rest

Drugs in Pregnancy

- GI motility
- Increased Gastric PH
- Increased Volume
- Increased GFR
- Hepatic metabolism

NICE

- Offer pregnant women with target-organ damage secondary to chronic hypertension (for example, kidney disease) treatment with the aim of keeping blood pressure lower than 140/90 mmHg.
- In pregnant women with uncomplicated chronic hypertension aim to keep blood pressure lower than 150/100 mmHg.

Practical Tips

- Labetalol-alpha primary and some Beta-blockade
 - AE-Fatigue, headache, Orthostatic Hypotension
- Nifedipine OK; especially late
- Enalapril OK For Breast Feeding
- In literature with Atenolol-IUGR more Common the longer treated
- methyldopa -depression, Fatigue, Headache

Thoughts on Treatment That Affected ACOG RECS

- No Evidence of Benefit in treatment of non Severe Hypertension
- More Marked Reduction of BP may be associated with IUGR, abnormal FHR
- Concerns With Severe Hypertension – Maternal Stroke
- No Atenolol
- Alpha Methyldopa, Labetalol preferred

Future Risk of Maternal Heart Disease

- Persistent Endothelial Dysfunction
- Insulin Resistance

Future Heart Disease

- Any Preeclampsia 2.2 Fold increase Risk
- Early or Severe Preeclampsia Up to 7 Fold Increase in Risk
- Risk both based on Propensity For traditional Risk Factors and Independent



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Objectives:

- Identify and discuss changes in the diagnostic criteria for Preeclampsia
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Figure 5. Prospective gestational changes in maternal serum levels of PIGF (A), sFlt-1 (B), sFlt-1:PIGF ratio (C), and sEng (D) in subjects who had normotensive pregnancies (NP) or who later developed gestational hypertension (GH), term preeclampsia (TP), or preterm preeclampsia (PP).

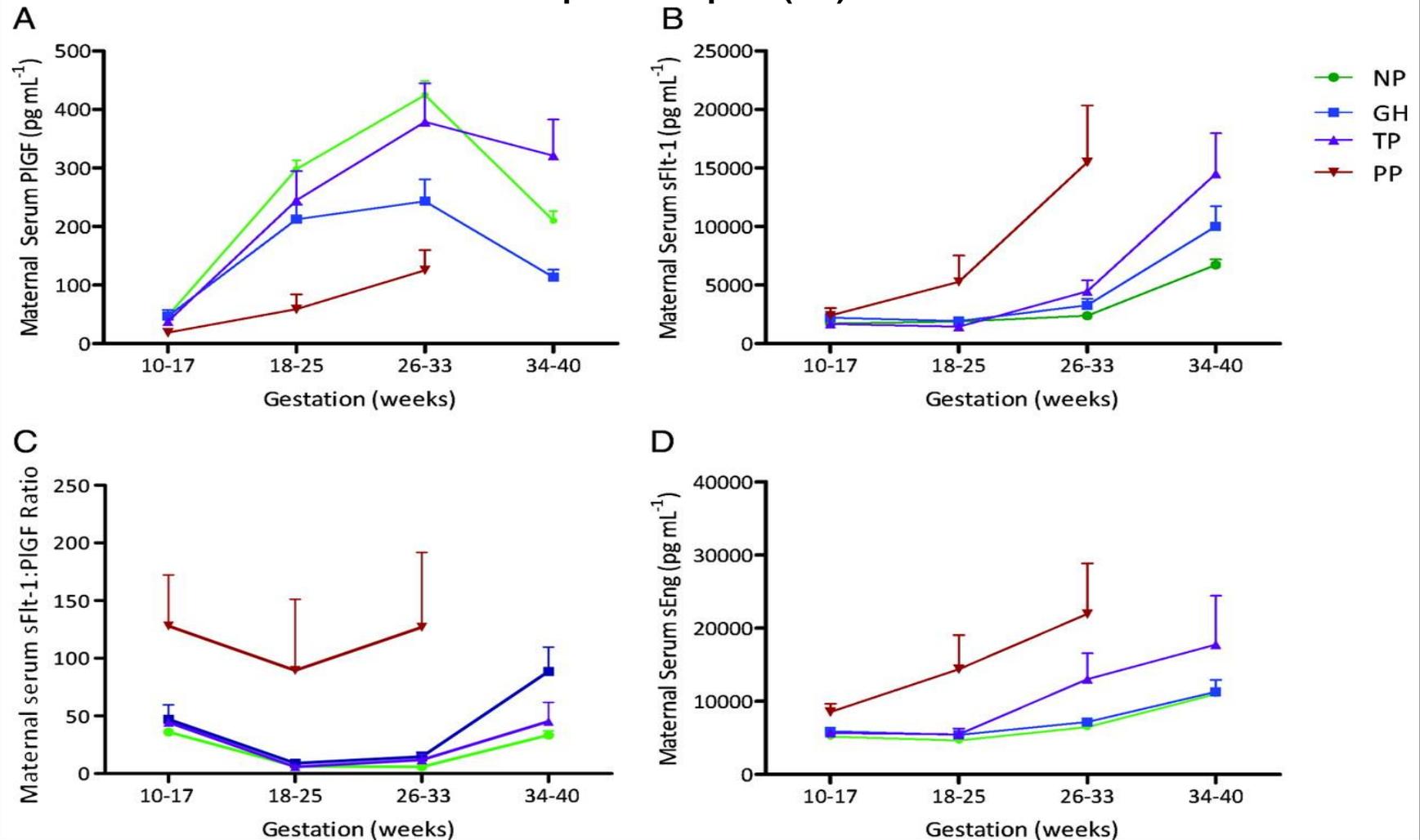
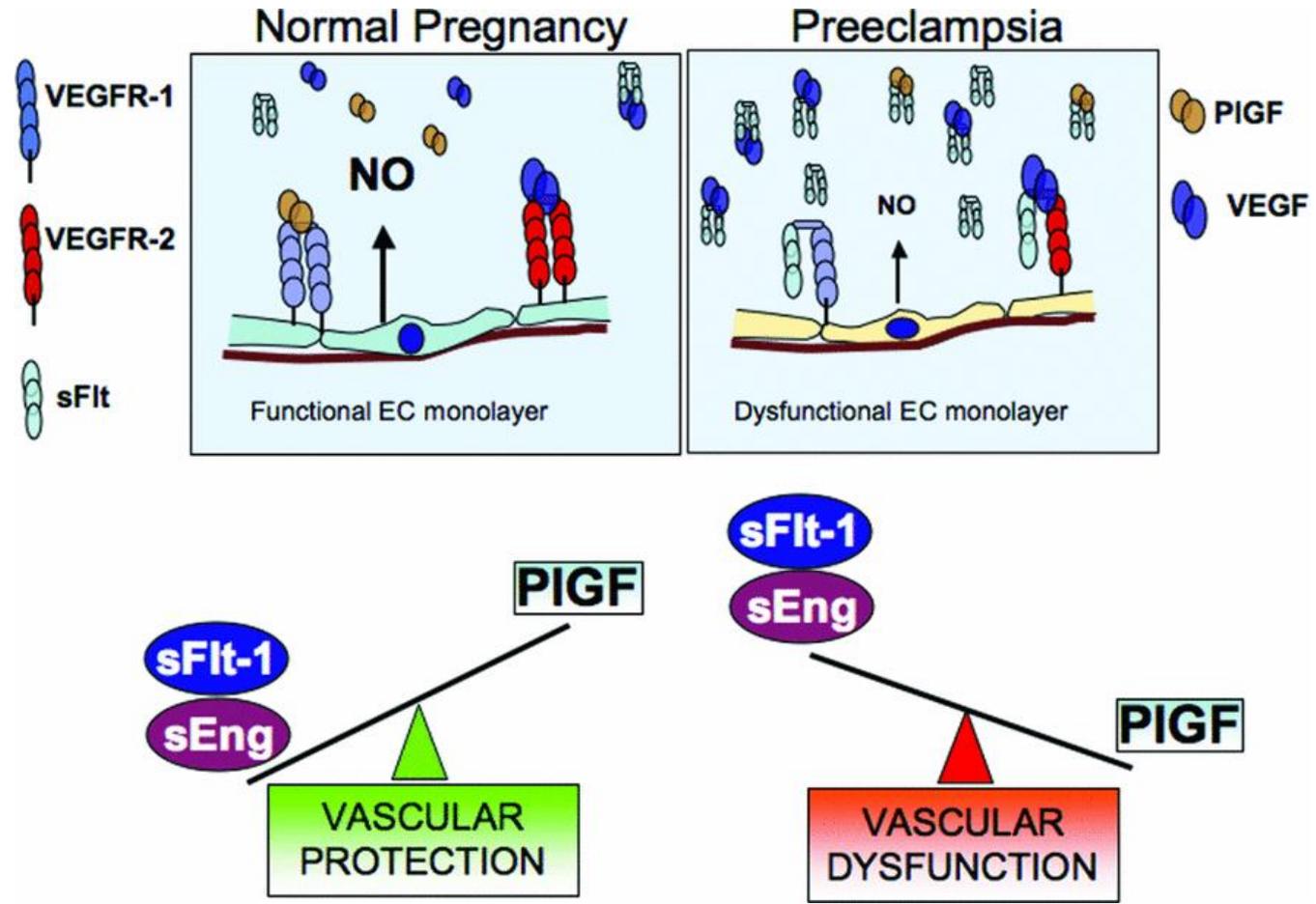


Figure 1 Vascular dysfunction in pre-eclampsia



Shoot for 140/90

- AMA
- Prior Preeclampsia –Especially Severe or Early
- obesity
- IR
- Diabetes
- Renal Disease
- IVF
- Lupus or Underlying Renal Disease

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