Diagnosis & Management of Hypertension-Preeclampsia

Summary of the ACOG Hypertension in Pregnancy Task Force

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Disclosures

- **None**

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Changes in New Guidelines

- Diagnosis of preeclampsia
- Preeclampsia with severe features
- Superimposed preeclampsia
- Superimposed with severe features
- Target BP to treat
  - Before delivery/Postpartum
- Indications for Magnesium Sulfate
- Postpartum HTN-preeclampsia
- Prediction, prevention, follow-up
- Patient education

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Classification of Hypertensive Disorders

- Gestational Hypertension
- Preeclampsia
- **Preeclampsia with severe features**
- Chronic Hypertension
- Superimposed preeclampsia
- Superimposed preeclampsia with severe features
- HELLP
- Eclampsia

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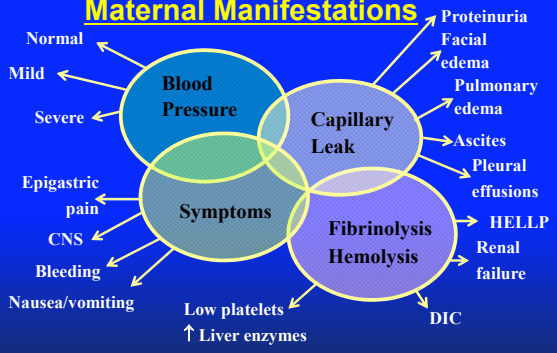
Maternal Manifestations



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Diganosis of GHTN-Preeclampsia

Recommendation	GHTN	Preeclampsia
HTN > 20 wks	YES	YES
Previously normotensive	YES	YES
SBP: 140-159 mmHg	YES	YES
DBP: 90-109 mmHg	YES	YES
Persistent for 4 hrs	YES	YES
Presence of sxs	NO	NO
Normal blood tests	YES	YES
Proteinuria: ≥ 300mg/24h P: C ratio ≥ 0.3 Dip stick : ≥ 1+	NO	YES

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Preeclampsia with Severe Features

preeclampsia & any one of the following

- SBP ≥ 160 or DBP ≥ 110 mmHg
  - Two BP values 4 hrs apart on bed rest
  - Once if anti-hypertensives are used
- Persistent Cerebral / Visual disturbances
- Pulmonary edema
- Severe persistent RUQ/epigastric pain unresponsive to RX
- Low platelets <100, 000
- Elevated liver enzymes(>2x normal)
- Serum creatinine >1.1 mg/dl

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Removed from criteria for Severe

- **Amount of proteinuria**
  - 3-5 g / 24 hour
  - ≥ 3+ on dipstick
- **Oliguria**
  - < 30 cc /hour
  - < 500 cc / 24 hour
- **FGR / SGA**
  - < 10th %
  - < 5th %

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Proteinuria in Preeclampsia
Does the amount matter?

- No differences in outcomes (< 5 vs ≥ 5 g)
  - Renal function
  - Latency
- Similar outcomes (< 5, 5-9.99, ≥ 10 g/24h)

- **Delivery decision should not be based on:**
  - Amount of proteinuria
  - Change in amount of proteinuria

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DX. Of Superimposed Preeclampsia

- New onset proteinuria
- Sudden ↑ in pre-existing proteinuria
  - Substantial ?
  - Sustained ?
- Sudden ↑ in blood pressure if
  - Previously well controlled
    or
  - Escalation of BP medications
- SBP < 160 and DBP < 110 mm Hg

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Superimposed Preeclampsia with Severe Features

- Severe hypertension despite treatment
  - SBP> 160 or DBP > 110 mm Hg
- Cerebral / visual symptoms
- Pulmonary edema
- Low platelets < 100,000
- Elevated liver enzymes (> 2x upper normal)
- Persistent RUQ/epigastric pain unresponsive to RX
- Serum creatinine >1.1mg (new onset)

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HELLP Syndrome ?

LP ?

EL ?

ELLP ?

HEL ?

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Recommended Criteria for HELLP Syndrome

- **Hemolysis (at least two of these)**
  - Peripheral smear (schistocytes, burr cells)
  - Serum bilirubin (≥ 1.2 mg/dl)
  - Low serum haptoglobin
  - Severe Anemia, unrelated to blood loss
- **Elevated liver enzymes**
  - AST or ALT ≥ 2x upper level normal
  - LDH ≥ twice upper level normal*
- **Low platelets :<100,000/mm³**

** Also elevated in severe hemolysis*

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Antepartum Management of Mild GHTN-Preeclampsia

Recommendation	GHTN	Preeclampsia
Best Rest	No	No
Outpatient anti hypertensive	No	No
Daily monitoring of Sxs	YES	YES
BP check	2x / wk.	2x / wk.
Protein check / wk	Yes	No
NST and AFI	1x / wk	2x / wk
EFW every	3 wk.	3 wk.
CBC, Liver enzymes, Cr	1x / wk	1x / wk
Delivery at 37 wk.	Yes	Yes

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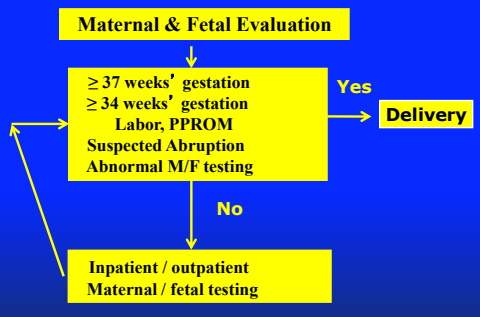
Management of Mild GHTH - Preeclampsia



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HYPITAT Randomized Trial
Maternal Outcome (%)

	Induction n=377	Expectant n=379	RR (95% C.I.)
Composite adverse outcome	31	44	0.71 (0.59-0.86)
Severe systolic HTN	15	23	0.63 (0.46-0.86)
• HELLP	1	3	
• Pulmonary edema	0	1	
• Abruptio	0	0	
• Eclampsia	0	0	
• Maternal ICU	2	4	
Cesarean section	14	19	0.75 (0.55-1.04)

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HYPITAT Randomized Trial
Neonatal Outcome

	Induction #(%)	Expectant #(%)
Composite adverse outcome	24 (6%)	32 (8%)
• Perinatal deaths	0	0
• Apgar <7 at 5'	7 (2)	9 (2)
• Cord PH <7.05	9 (3)	19 (6)
• NICU admission	10 (3)	8 (2)
• RDS	1 (0.25)	1 (0.25)

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Management of Preeclampsia with Severe Features

- ≥ 34 wk or <23 wk
  - –Delivery
- < 34 wk
  - –Individualize

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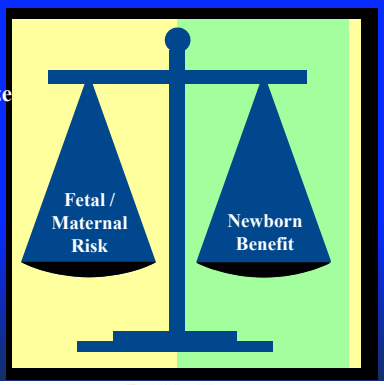
< 34 wk
Individualize
Counsel



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What to Expect from Expectant Management?

- Pregnancy prolongation for fetal benefit
  - 48-72 hrs (steroids)
  - At least 1 wk (< 28 wks)
  - > 1 wk (> 28 wks)
- Definite risks to mother
- Potential risks to fetus

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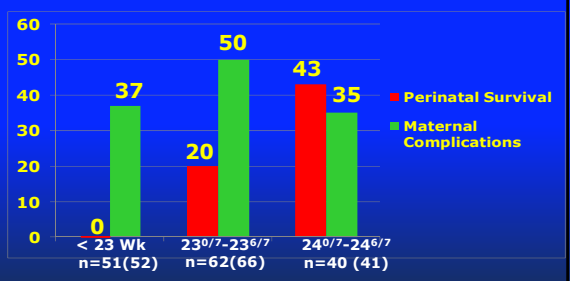
Perinatal Survival & Maternal Complications in Expectant Management at < 25 $^{0/7}$ Wks



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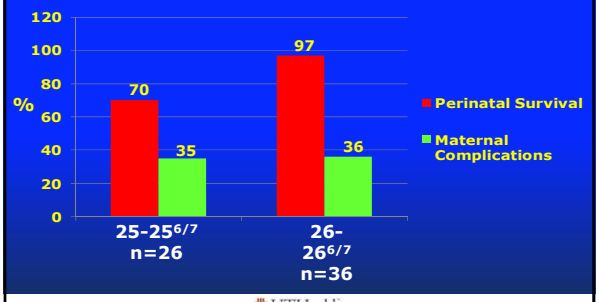
Maternal & Perinatal Outcome by GA at Expectant Management



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Preeclampsia with severe features < 34 wks

- Admit to L&D 24-48 hrs.
- Corticosteroids, MgSO4 prophylaxis, antihypertensives
- Ultrasound, FHR monitoring, symptoms, laboratory tests

Contraindications to continued expectant management?

- Eclampsia
- < $23^{0/7}$ wks
- Pulmonary edema
- Abnormal fetal testing
- ARF, DIC
- Abruptio placentae

Yes → Delivery

No

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Preeclampsia with severe features < 34 wks

No contraindication

Offer continued expectant management

- Inpatient only, D/C MgSO4 after 12-24 hr.
- Daily maternal / fetal testing, sxs, BP, labs

Are there additional complications?

- Persistent symptoms
- HELLP / partial HELLP syndrome
- FGR< 5th percentile
- REDF (umbilical artery)
- Labor / PROM, $33^{0/7} – 33^{6/7}$

Yes → Deliver after 48 hrs

No → 24-32 wks Expectant Rx Deliver @ $33^{6/7}$

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"You got to know when to hold' em,
Know when to fold 'em,
Know when to walk away,
Know when to run."

From Kenny Rogers' "The Gambler"

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Anti-Hypertensive Therapy

Indications

- Before delivery
  - SBP ≥ 160 , irrespective of DBP
  - DBP ≥ 110 (GHTN), DBP > 105 (CHTN)
  - After 15-60 min (individualize)
- Postpartum
  - SBP ≥ 150 or DBP ≥ 100 (4-6 hrs. apart)
  - SBP ≥ 160 or DBP ≥ 110 (15-60 min.)

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Acute Control of Severe Hypertension

- Persistent SBP ≥ 160 (15-60 min) or
- Persistent DBP ≥ 110 mmHg
- IV labetalol
  - Bolus doses 20,40, 80, 80 mg q 10 min. (max 300)
  - Continuous IV infusion (1-2 mg/min)
- IV Hydralazine : bolus
  - 5, 10, 10 mg q 20 min (max 25 mg)
- Oral nifedipine
  - 10-20 mg q 20 min (max 60 mg)

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Magnesium Sulfate Prophylaxis

- Mild **hypertension-preeclampsia : No**
  - Close observation
    - BP
    - Sxs of preeclampsia
  - Use if severe features develop
- **Severe preeclampsia-eclampsia :Yes**
  - During labor & 24-hrs. postpartum
  - Do not stop during C/S
- Postpartum severe HTN / preeclampsia
  - With symptoms

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Prevention and RX. of Convulsions

- **Magnesium sulfate**

  Loading dose: 4 or 6 g IV over 20 min.

  Maintenance: 2 g IV per hr x 24 hr.

- **If convulsions develop or recur**

  2 g dose of magnesium sulfate

  short acting agents

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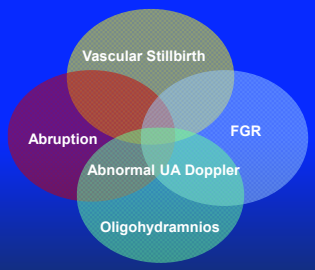
Fetal Manifestations in Preeclampsia



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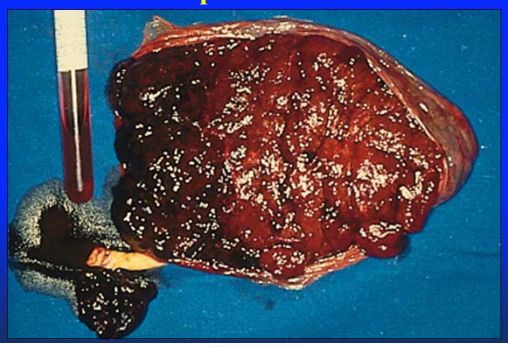
Abruptio Placentae



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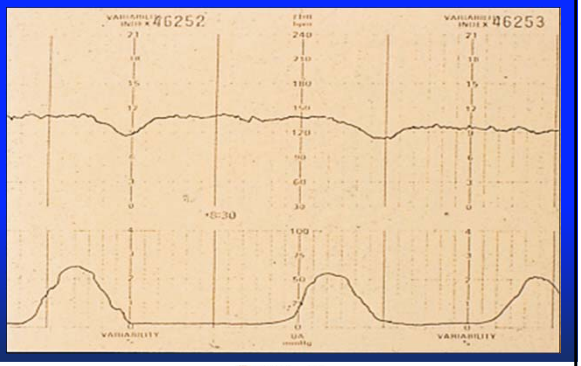

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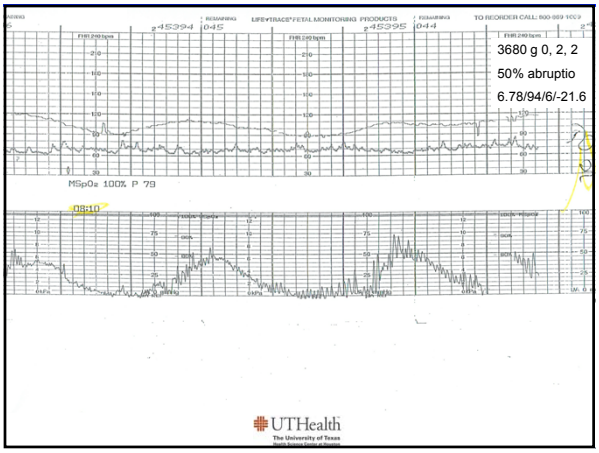

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preeclampsia with severe features

Fetal Guidelines for delivery

- Expedited delivery (within 72 hrs)
  - Fetal distress by FHR tracing
  - BPP ≤ 4 on repeat exam (4 hr.)
  - AFI < 5 cm on repeat exam
  - U/S- EFW < 5th percentile
  - Reverse umbilical artery diastolic flow
  - Labor/ROM
  - ≥ 34 weeks' gestation

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Expectant Rx in Preeclampsia & FGR< 34 wk

Authors	Findings
Chammas	Shorter prolongation :3.1 vs. 6.6 days
Ganzevoort	Similar prolongation :7 days in each Increased perinatal deaths in FGR :23 vs. 10%
Visser	Similar prolongation :10 days in each All fetal deaths with FGR at <30 wks
Shear	Increased maternal complications in FGR
Haddad	Similar days of prolongation Increased fetal death in FGR :7 vs. 1%
Belghiti	Zero survival < 25 wk. , 30% at 25 wk. in FGR

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Management of HELLP Syndrome

- Similar to preeclampsia with severe features
  - Corticosteroids for fetal benefit only < 34 wk.
  - Condition stable: delay delivery for 48 hrs.
- No dexamethasone for maternal benefit
  - Antepartum
  - Postpartum

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Acute Onset Maternal Syndrome

- 34 year old G_3P_2
- Same partner
- Active labor at 39 wks
  - Elevated BP, (-)protein, epigastric pain
- Vaginal delivery
- Postpartum BTL
  - Severe RUQ pain & N/V
  - Acute hypotension
  - HELLP + DIC
  - Liver hematoma

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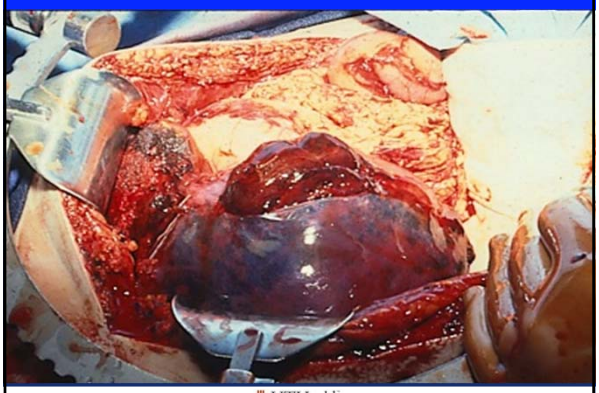

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Maternal & Fetal Syndrome

- 36 year old G_1 with infertility
- Pregnancy after IVF
- Mild GHT, (-) Protein, normal UA at 25 wk
- Severe HTN, Sxs at 26 wk
- HELLP syndrome with bleeding
- ICH with hemiplegia
- C/S → 560 g, FGR infant
- Mother & infant survive
  - No residual deficit

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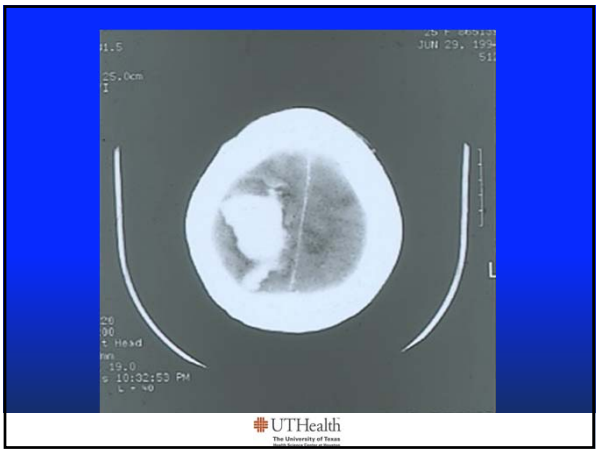

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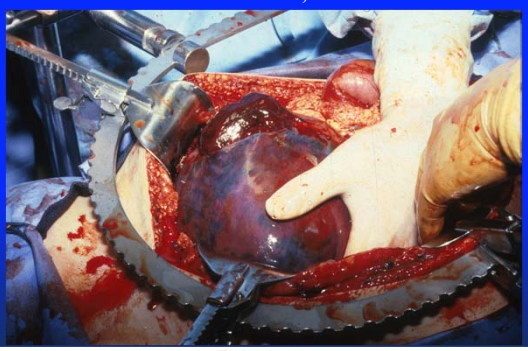
HELLP with SB at 23 wk , PP Hematoma



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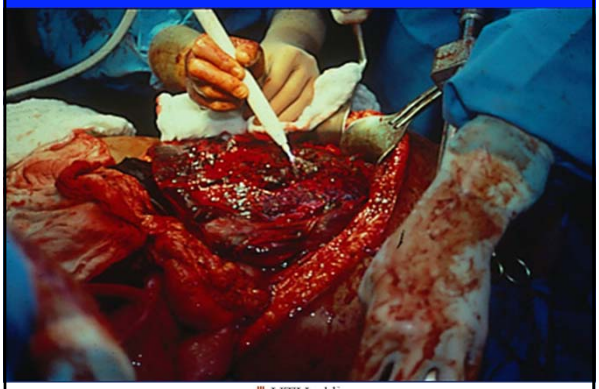

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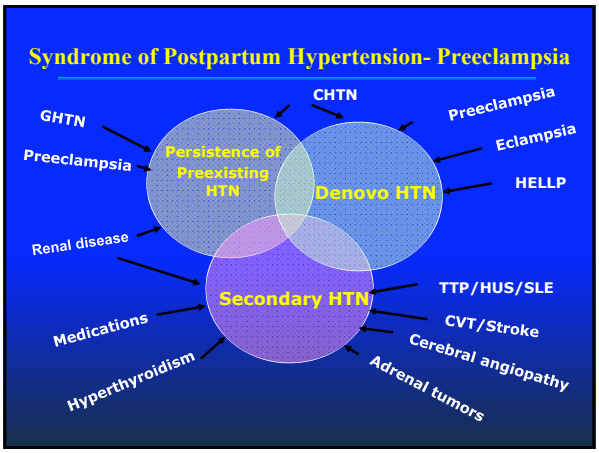
Syndrome of Postpartum Hypertension- Preeclampsia



Physiologic Adaptations PP that Predispose to Hypertension-Preeclampsia

- Fluid mobilization from interstitium
  - Volume load
  - Sodium load
- Reduced colloid oncotic pressure
- Withdrawal of vasodilating factors
  - PlGF, prostacyclin, NO
- Use of vasoactive medications
  - Non-steroidal anti-inflammatory agents
  - Methergine

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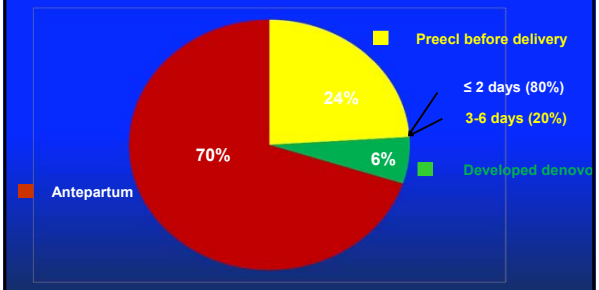
Onset of HELLP in Relation to Delivery (n=700)



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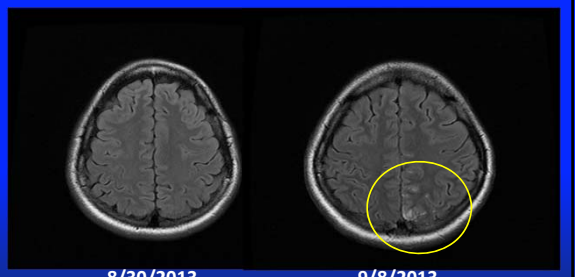
Rate of PP eclampsia in various series

Authors (Country)	# of cases	% PP	% Late PP
Conde-Agudelo, Columbia	164	31	12
Katz, USA	53	11	6
Mattar, USA	399	28	17
Chames, USA	89	33	26
Tuffnell, UK	82	32	2
Knight, UK	214	31	NR
Andersgaard, Scandinavia	210	31	4
Zwart, Netherland	213	28	NR
Shah, USA	40	54	32

B. Sibai, MD

10 days Postpartum eclampsia
PRES



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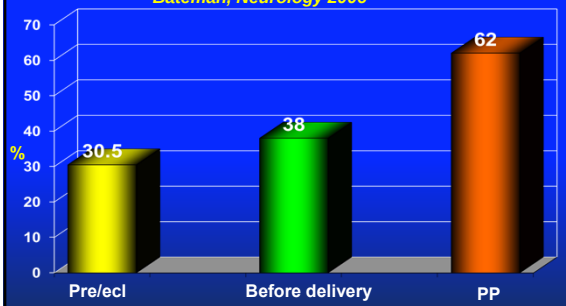
ICH in Pregnancy – PP in US Inpatient Hospitalization, (1993-2005) (n=423)

Bateman, Neurology 2006



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Postpartum HTN-Preeclampsia
Recommendations

- **All women with hypertensive disorders**
  - **BP check at 3 days (hospital, office or home)**
  - BP check again at 5-7 days
  - **Daily Sxs. of preeclampsia**
  - No non-steroidal anti-inflammatory agents
- **All women**
  - **Education about signs / symptoms**
    - **Symptoms to report**
    - **Office and L&D phone #**

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Prediction of Preeclampsia
ACOG HTP Task Force

A great deal of effort has been directed to predict early (**1st /2nd T**) **later development of preeclampsia**.

Although there are encouraging findings, **these tests are not yet ready for clinical use:**

-**Demographic Factors** -**Biophysical Findings**
-**Biochemical Analyses** -**Combination of Above**

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Prediction of Preeclampsia
ACOG HTP Task force

We recommend that clinicians not do screening to predict preeclampsia beyond taking a history to evaluate for risk factors.

- Quality of evidence: moderate
- Strength of recommendations: strong.

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Risk of Recurrent Preeclampsia

Author	# of Patients	Preeclampsia %
Makkonen et al (2000)	144	14.5
Hnat et al (2002)	598	17.9
Trogstad et al (2004)	19,960	14.1
Poston et al (2006)	546	22.7
Hjartardottir et al (2006)	151	13.2
Brown et al (2007)	383	14
Spinnato et al (2007)	338	11.5
Villar et al (2007)	422	27

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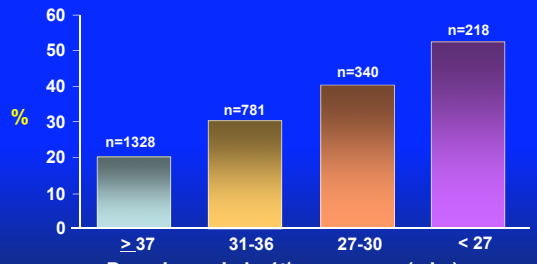
Preeclampsia in 2nd Pregnancy



Sibai et al, AJOG 1986,1991

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Primary Prevention of Preeclampsia

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Preeclampsia Pharmacopoeia

What works?

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Prevention of Recurrent Preeclampsia

- Prepregnancy
  - Weight loss to ideal BMI
  - Control of glucose in diabetes
  - Control of BP in CHTN (diet, exercise)
- Low dose aspirin (from 13 wks)
  - <34 wk
  - Reccurrent
- Not recommended
  - Vitamins C & E
  - Fish oil, Calcium
  - Dietary salt restriction
  - Anti-HTN therapy to prevent preeclampsia

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