Preeclampsia

INTRODUCTION

- A multisystem progressive disorder characterized by the new onset of hypertension and significant end-organ dysfunction with or without proteinuria in the last half of pregnancy or postpartum
- have good maternal, fetal, and newborn outcomes.
- preterm, or extremely preterm birth.
- cardiovascular and renal disease.

 Approximately 90 percent of cases present in the late preterm (≥34 to <37) weeks), term (≥37 to <42 weeks), or postpartum (≥42 weeks) period and

• The remaining **10** percent of cases have an early presentation (<34 weeks) and carry the additional high risks associated with moderately preterm, very

Long-term, patients with preeclampsia are at increased risk for developing

- more of the following*:
 - Proteinuria ≥ 0.3 g in a 24-hour urine specimen or protein/creatinine ratio ≥ 0.3 (mg/mg) (30 mg/mmol) in a random urine specimen or dipstick ≥2+
 - Platelet count <100,000/microL</p>
 - Serum creatinine >1.1 mg/dL (97.2 micromol/L) or doubling of the creatinine **concentration** in the absence of other renal disease
 - Liver transaminases at least twice the upper limit of the normal concentrations for the local laboratory
 - Pulmonary edema
 - responding to usual doses of analgesics

• Visual symptoms (eg, blurred vision, flashing lights or sparks, scotomata暗點)

SBP ≥140 mmHg or DBP ≥90 mmHg on at least 2 occasions at least 4 hours apart after 20 weeks of gestation in a previously normotensive patient AND the new onset of 1 or

• New-onset and persistent headache not accounted for by alternative diagnoses and not

preeclampsia with severe features (formerly severe preeclampsia)

Severe blood pressure elevation

SBP ≥160 mmHg or DBP ≥110 mmHg on 2 occasions at least 4 hours apart while the patient is on bedrest

Symptoms of central nervous system dysfunction

- New-onset cerebral or visual disturbance, such as:
- 1. Photopsia 閃光, scotomata暗點, cortical blindness, retinal vasospasm 2. Severe headache or headache that persists and progresses

Serum transaminase concentration >2 times the upper limit of the normal range or severe persistent right upper quadrant or epigastric pain

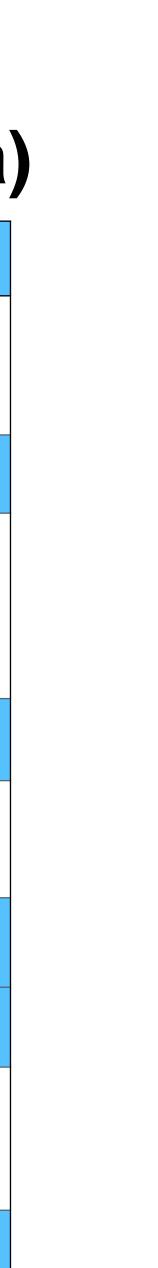
Renal abnormality

Renal insufficiency (serum creatinine >1.1 mg/dL [97.2 micromol/L] or a doubling of the serum creatinine concentration in the absence of other renal disease)

Pulmonary edema

Hepatic abnormality

Thrombocytopenia: <100,000 platelets/microL



Eclampsia & HELLP syndrome & chronic hypertension

- Eclampsia: the occurrence of a grand mal seizure in a patient with preeclampsia
- HELLP syndrome (hemolysis, elevated liver enzymes, low platelets): a type of preeclampsia with severe features
- Preeclampsia superimposed upon chronic hypertension:
 - Chronic hypertension: hypertension that precedes pregnancy or is present on at least two occasions before the 20th week of gestation or persists longer than 12th weeks postpartum
 - worsening or resistant hypertension (especially acutely), the new onset of proteinuria or a sudden increase in proteinuria, and/or significant new end-organ dysfunction after 20 weeks of gestation or postpartum in a patient with chronic hypertension



Gestational hypertension

- Hypertension **without** proteinuria or other signs/symptoms of preeclampsiarelated end-organ dysfunction that develops **after** 20 weeks of gestation.
- 10 to 25 percent of these patients may ultimately develop signs and symptoms of preeclampsia.
- True gestational hypertension should resolve by 12 weeks postpartum. If it persists beyond 12 weeks postpartum, the diagnosis is "revised" to chronic hypertension

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INCIDENCE & RISK FACTORS

Nulliparity	Multifetal gestation	Hydrops fetalis	Prolonged interpregnancy interval	
Chronic hypertension	Diabetes mellitus (or GDM)	Autoimmune disease (eg, APS, SLE)	Chronic renal disease	Poorly controlled hyperthyroidism
Vascular disease	Obesity	Obstructive sleep apnea	Elevated blood lead level	Posttraumatic stress disorder
Family history of preeclampsia	Past history of Preeclampsia	Woman herself was SGA	Past history of FGR, abruption placentae, or fetal demise	
Partner-related factors	Black population	Age >40 years or <18 years	Use of assisted reproductive technology (eg, in vitro fertilization)	

4.6 percent (95% CI 2.7-8.2) of pregnancies worldwide were complicated by

• Patients who smoke cigarettes have a **lower** risk of preeclampsia than nonsmokers



PATHOPHYSIOLOGY

Involve both maternal and fetal factors

- Shallow placentation and failure of the spiral arteries to remodel early in pregnancy (weeks to months before clinical manifestations)
- adversely affects villous angiogenesis.
- Widespread maternal vascular inflammation, endothelial dysfunction,
- —> hypertension, proteinuria, thrombocytopenia...end organ failure



Suboptimal uteroplacental blood flow and relatively hypoxic trophoblast tissue

• An exaggerated state of oxidative stress develops in the placenta, which in turn

• The pathologic placenta increasingly secretes antiangiogenic factors (soluble fms-like tyrosine kinase-1 [sFlt-1] and endoglin) into the maternal circulation that bind vascular endothelial growth factor (VEGF) and placental growth factor (PIGF)

vascular injury—> vasospasm, capillary leaking, increased platelet turnover

PATIENT EVALUATION

Potential clinical findings: Alarming findings Persistent and/or severe headache ("worst headache of my life")

- hyperreflexia, seizure
- [rare])
- Epigastric, upper abdominal, or retrosternal pain
- New dyspnea, orthopnea: left heart failure, pulmonary edema
- Abruptio placentae (<1% of preeclampsia)

• Altered mental status (confusion, altered behavior [agitation]): stroke, generalized

• Visual abnormalities (scotomata, photophobia, blurred vision, or temporary blindness

Oliguria: preeclampsia: <100 mL over 4 hours/ severe :urine output <500 mL/24 hours

Others: peripheral edema (rapid weight gain (eg, >2.3 kg/week) and facial edema),



PATIENT EVALUATION

- Accurate assessment of blood pressure
- Peripheral blood smear: Schistocytes and helmet cells —> (microangiopathic) hemolysis)
- fetal weight)—> (oligohydramnios, FGR)
- doses of acetaminophen and initial routine management of preeclampsia.
- Measurement of angiogenic factors (not all countries available): sFlt-1, PIGF



 Laboratory tests: CBC (thrombocytopenia, hemoconcentration), creatinine, AST, ALT, bilirubin, urinary protein determination (P/C ratio or 24-hour urine total protein)

Assessment of fetal status: nonstress test or biophysical profile +/- Ultrasound (AFV,

 Neurology consultation: neurologic deficits/abnormal neurologic examination, ocular signs and symptoms, or a severe persistent headache that does not respond to repeat

PREVENTION **LOW-DOSE ASPIRIN**

Candidates:

We generally follow the USPSTF criteria and recommend low-dose aspirin for preeclampsia prevention to patients with two or more of the following moderate risk factors [21]:

- Nulliparity.
- Obesity (body mass index >30 kg/m²).
- Family history of preeclampsia in mother or sister.
- Age \geq 35 years.
- pregnancy outcome [eg, stillbirth], interval >10 years between pregnancies).
- In vitro conception
- Initiate prior to GA: 16 weeks, dose: 81 to 150 mg

• Sociodemographic characteristics (Black persons, lower income level [recognizing that these are not biological factors]).

• Personal risk factors (eg, previous pregnancy with low birth weight or small for gestational age infant, previous adverse



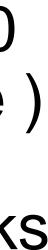
MANAGEMENT

PREECLAMPSIA WITHOUT FEATURES OF SEVERE DISEASE

- Term pregnancies: **Delivery** (GA >= **37**+0 wks)
- Preterm pregnancies: **Expectant management**—blood pressure, laboratory follow-up, patient education, assessment of fetal growth/ fetal well-being, antenatal corticosteroids, timing of delivery

PREECLAMPSIA WITH FEATURES OF SEVERE DISEASE

- General approach: **Delivery** (1. GA >=34+0 wks, 2. GA <24 wks, 3. GA <34+0 wks with preterm labor or PROM, maternal and/or fetal condition is unstable)
- Expectant management for stable maternal and fetal condition in GA 24-34 wks



MANAGEMENT

INTRAPARTUM MANAGEMENT • Route of delivery: 儘速生產,不一定要剖腹產 even in the setting of preeclampsia with features of severe disease, does not mandate immediate cesarean birth unless prolonged induction or inductions with a low likelihood of success

- with intravenous labetalol (avoid in patients with asthma or heart rate <50 **nifedipine** to prevent stroke.
- 的病人於產時和產後)
 - cardiac arrest (antidote: Calcium gluconate)
 - levetiracetam, valproic acid)

• Management of hypertension: should be treated promptly (within 30 to 60 minutes) beats/minute) or hydralazine or, less commonly, intravenous nicardipine or oral

Seizure prophylaxis: Magnesium sulfate (適用於preeclampsia with severe features)

• Side effects: loss of DTR, respiratory paralysis, altered cardiac conduction,

Contradictions: myasthenia gravis, pulmonary edema (Alternative:

MANAGEMENT

INTRAPARTUM MANAGEMENT

- platelet count <20,000/microL/ excessively bleeding or oozing
- Fluids:
 - (Input urine output) + estimated insensible losses (usually 30 to 50) mL/hour])
- Analgesia: neuraxial techniques

Management of thrombocytopenia: platelet transfused in patients whose

• Severe feature (pulmonary edema or significant third-spacing): maintenance infusion of a balanced salt or isotonic saline solution at 80 mL/hour

PROGNOSIS

- **Recurrence:**
 - 16 % developed recurrent preeclampsia and 20 % developed hypertension alone in a subsequent pregnancy.
 - 第一胎Early-onset, severe preeclampsia: 第二胎25 to 65 %
 - 第一胎preeclampsia without severe features: 第二胎5 to 7 %
 - 第一胎normotensive: 第二胎 < 1%



REFERENCE

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