Health Canada Santé Canada

Canada

Perinatal Complications

Hypertensive Disorders in Pregnancy

FNIHB Ontario Region

2016

YOUR HEALTH AND SAFETY... OUR PRIORITY.

TRUE OR FALSE

1. Hypertensive disorders of pregnancy remain a leading cause of maternal and perinatal morbidity and mortality. **T OR F**

2. All pregnant women should be screened for proteinuria. **T OR F**

3. Epigastric pain is one of the cardinal symptom (and could be the only) for preeclampsia. **T OR F**

4. A urine dipstick of ≥ 1+ is highly suspicious of proteinuria **T OR F**

Hypertension in pregnancy

BP Measurement

Blood pressure should be measured :

- Woman in the sitting position with the arm at the level of the heart.
- An appropriately sized cuff (i.e., length 1.5 times the circumference of the arm) should be used.
- If blood pressure is consistently higher in one arm, the arm with the higher values should be used for all blood pressure measurements.
- Blood pressure can be measured using a mercury sphygmomanometer, a calibrated aneroid device, or an automated blood pressure machine that has been validated for use in preeclampsia.
- All BP monitoring devices (home or clinic) should be checked regularly against calibrated devices.

Hypertension in pregnancy

Diagnosis of Hypertension:

- The diagnosis of hypertension should be based on office or in-hospital blood pressure measurements.

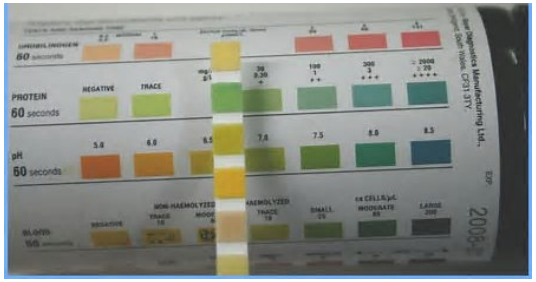
- Hypertension in pregnancy should be defined as an office (or in-hospital) systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg, based on the average of *at least* 2 measurements taken at least 15 minutes apart, using the same arm.

- Severe hypertension should be defined, in any setting, as a systolic blood pressure of ≥ 160 mmHg or a diastolic blood pressure of ≥ 110 mmHg based on the average of *at least* 2 measurements, taken at least 15 minutes apart, using the same arm.

- Women with systolic blood pressures over 140 mmHg should be followed closely for development of diastolic hypertension .

Hypertension in Pregnancy

Measurement of Proteinuria



- **All pregnant women should be assessed for proteinuria.**
- Urinary dipstick testing (by visual or automated testing) is used for **screening** for proteinuria when the suspicion of preeclampsia is low.
- Significant proteinuria should be suspected when urinary dipstick proteinuria is ≥ 1+ (30mg/dL).
- When significant proteinuria is suspected, more definitive testing for proteinuria may be indicated. Such test include 24-hr urine collection or protein: creatinine ration. (≥ 0.3g protein in a complete 24-hour urine collection, or a random protein: creatinine ration >0.3mg/mg) (30mg/mmol).
- There is insufficient information to make a recommendation about the accuracy of the urinary albumin: creatinine ratio.

Hypertension in Pregnancy

Classification of Hypertensive Disorders of Pregnancy:

- **Pre-existing hypertension**

This form of hypertension exists pre-pregnancy, or at < 20+0 weeks' gestation

- **Gestational hypertension**

This is a form of hypertension appears for the first time ≥ 20+0 weeks' gestation

- **Preeclampsia**

It is defined as new onset of hypertension with one or more of the following:

  - New-onset proteinuria or end organ dysfunction

- **Other hypertensive effects**

  - Transient hypertensive effects, white coat hypertensive effects, masked hypertensive effects.

Hypertension in Pregnancy

Pre-Existing Hypertension

- Pre-conceptual counselling for women with pre-existing hypertension is important.
- The following antihypertensive drugs are all acceptable for use in the first trimester of pregnancy: methyldopa, labetalol, and nifedipine.
- Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should be discontinued when planning pregnancy, or as soon as pregnancy is diagnosed.
- Atenolol should be discontinued when pregnancy is diagnosed.

Hypertension in Pregnancy

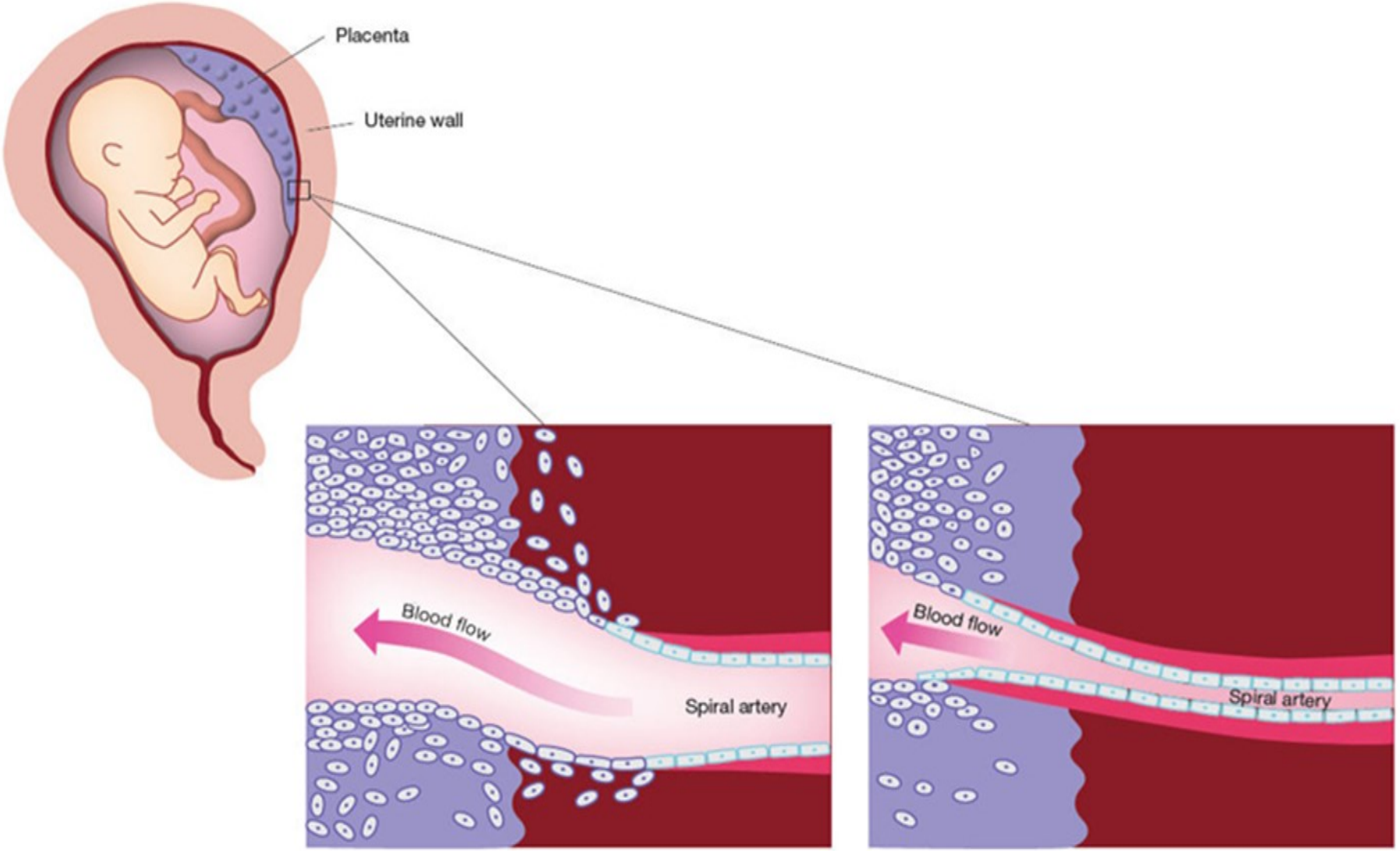
Investigations for pre-existing hypertension

In addition to routine prenatal labs, the following should be performed in early pregnancy (MD/NP order):

- Serum creatinine
- Fasting blood sugar
- Electrolytes (e.g. serum potassium)
- Urinalysis
- EKG
- Other additional baseline laboratory testing, as deemed important by the MD/NP.

Hypertensive Disorders in Pregnancy

SEVERE HYPERTENSION, PREECLAMPSIA AND ECLAMPSIA



Healthy Placenta

Preeclampsia Placenta

Preeclampsia

The presence or absence of preeclampsia must be ascertained, given its clear association with more adverse maternal and perinatal outcomes.

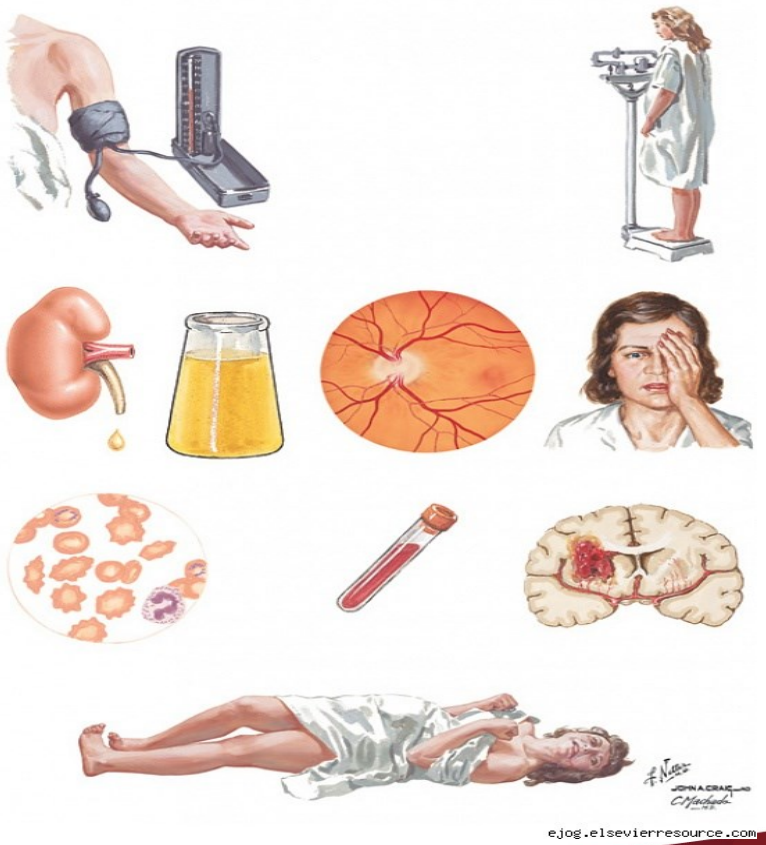
- **Severe hypertension** is a BP of > 160 mmHg systolic or a BP of ≥ 110 mmHg diastolic

- In women with **pre-existing hypertension**, preeclampsia should be defined as (one or more of the following):
  - Resistant hypertension, or new *or* worsening proteinuria, or one or more adverse conditions, or one or more severe complications (See table 1).

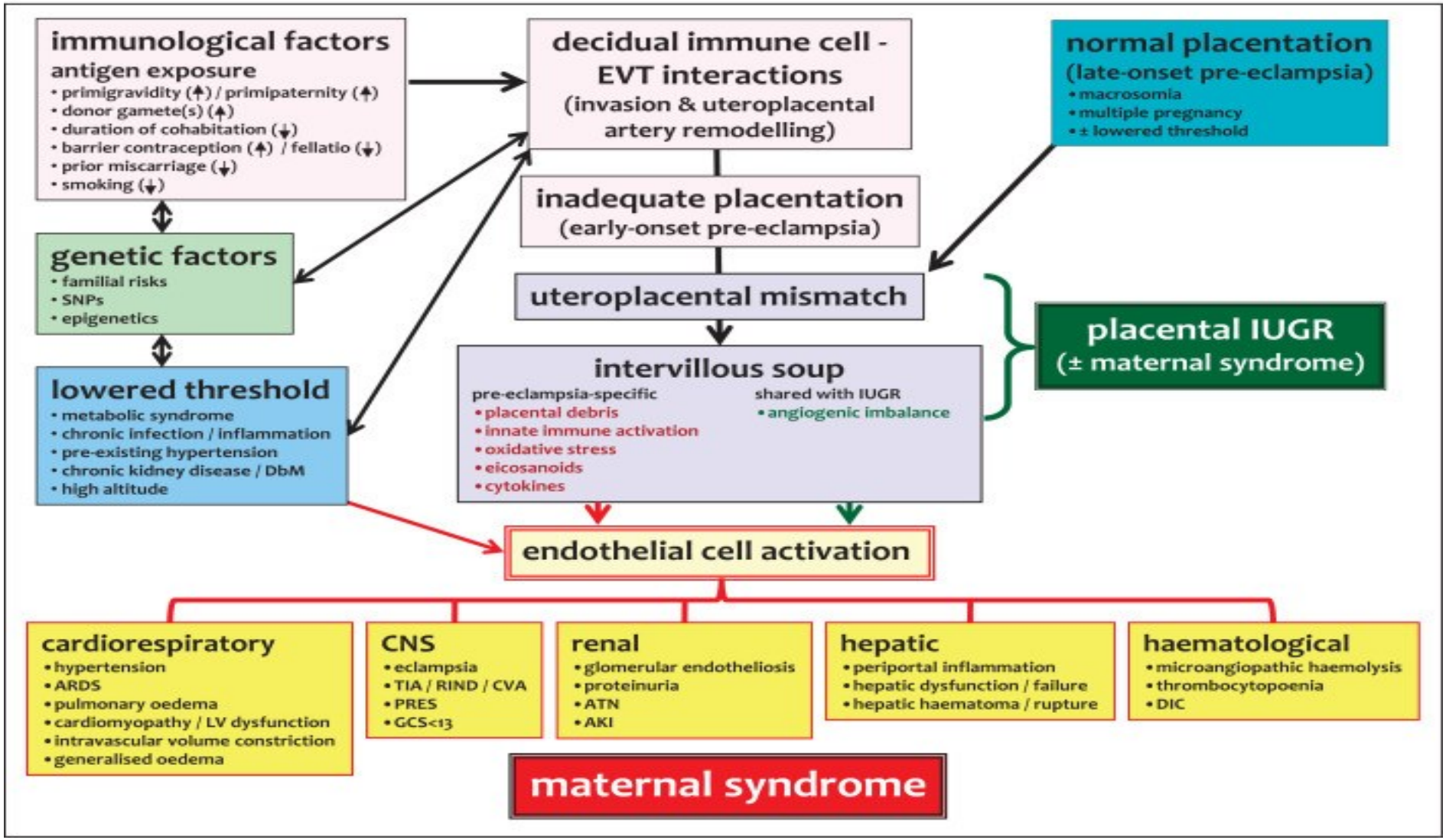
- In women with **gestational hypertension**, preeclampsia should be defined as (one or more of the following):
  - new-onset proteinuria, or one or more adverse conditions, or one or more severe complications (See table 1).

Preeclampsia

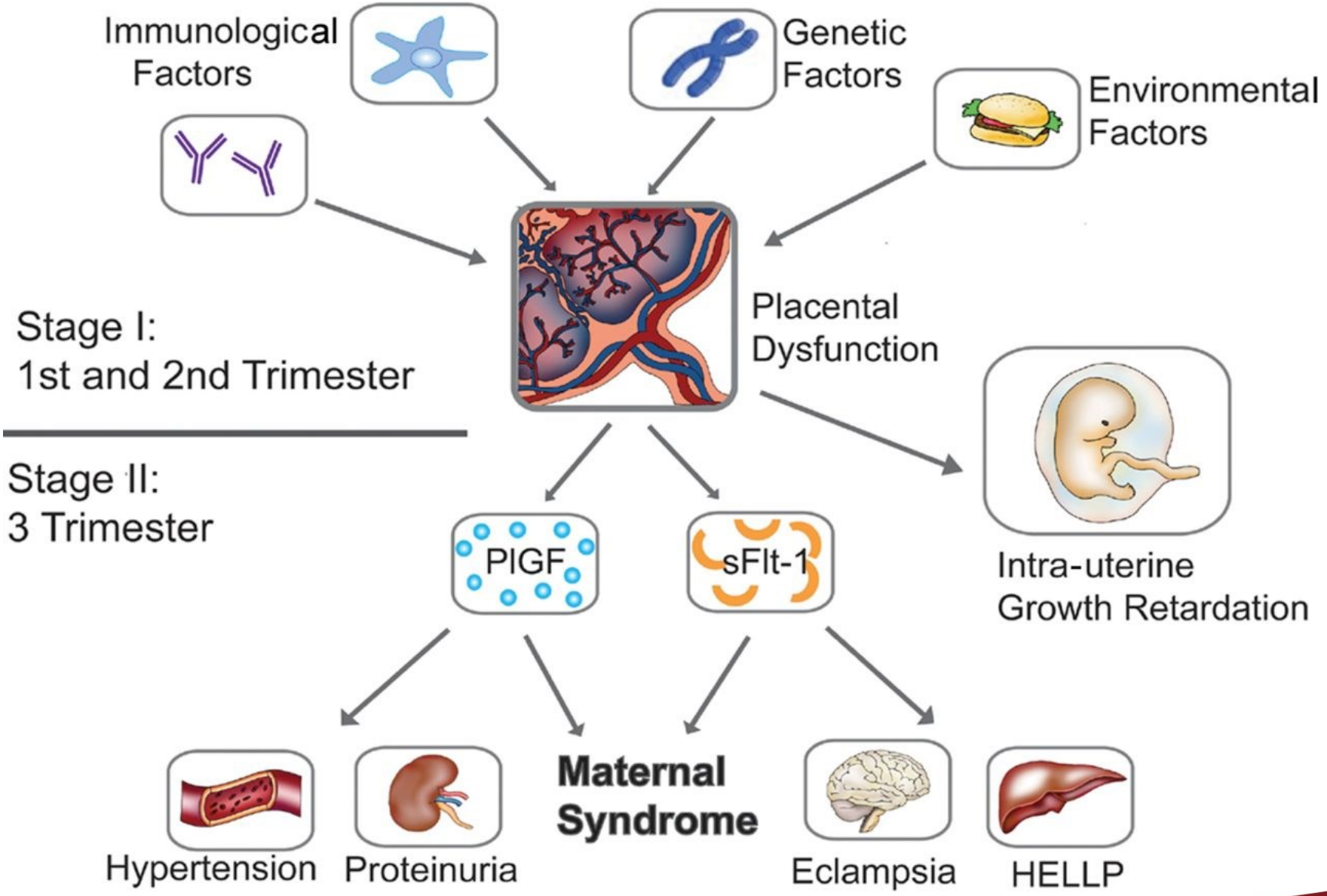
- **Severe preeclampsia** is defined as preeclampsia with one or more severe complications (serious end-organ involvement and/or fetal compromise, see table 1) e.g:
  - TIA
  - Acute kidney injury
  - Hepatic hematoma or rupture
  - Nausea or vomiting
  - Pulmonary edema
  - Placental abruption



The origins and consequences of preeclampsia



SOGC Clinical Practice Guideline, 2014


Immunological Factors
Genetic Factors
Environmental Factors
Stage I:
1st and 2nd Trimester
Placental Dysfunction
Stage II:
3 Trimester
PlGF
sFlt-1
Intra-uterine Growth Retardation
Hypertension
Proteinuria
Maternal Syndrome
Eclampsia
HELLP

Adverse conditions and severe complications of preeclampsia (Table 1: *Please complete prior to teleconference*)

Organ system affected	Adverse conditions (that increase the risk of severe complications)	Severe complications (that warrant delivery)
Central Nervous System	Eg. headache	Eclampsia
Cardiorespiratory system		
Haematological		
Renal		
Hepatic		
Feto-placental		

Risk Factors for Preeclampsia

Demographics and Family History

- Maternal age ≥ 40 years
- Family history of preeclampsia (mother or sister)
- Family history of early-onset cardiovascular disease

Past Medical or Obstetric History

- Previous preeclampsia
- Anti-phospholipid antibody syndrome
- Previous miscarriage at ≤ 10 weeks with same partner
- Cocaine and methamphetamine use
- Pre-existing medical conditions
  - Hypertension
  - Renal disease or proteinuria
  - Diabetes mellitus

Risk Factors for Preeclampsia Cont.

Current Pregnancy

- **First Trimester**
  - Multiple pregnancy
  - Overweight/ obesity
  - New partner or short duration of sexual relationship with current partner
  - Reproductive technologies
  - Vaginal bleeding in early pregnancy
  - Booking (initial perinatal) visit sBP ≥ 130mmHg, or dBP ≥ 80mmHg

- **Second or Third Trimester**
  - Gestational hypertension
  - Excessive weight gain in pregnancy
  - Infections during pregnancy (e.g. UTI, periodontal disease)
  - IUGR

Laboratory Testing for Suspected Preeclampsia (may repeat as indicated)

Diagnostic testing as per MD/NP orders

Maternal Testing

- Urine testing
- Oxygen saturation (pulse oximetry)
- CBC and blood film
- Test of coagulation (INR and APTT, fibrinogen)
- Serum chemistry
  - Serum creatinine, uric acid and glucose
  - AST or ALT, LDH, Bilirubin
  - Albumin

Fetal Testing

- Ultrasonographic assessment of fetal growth
- Fetal testing (fetal monitoring, uterine artery doppler, umbilical artery doppler etc.)

When preeclampsia is suspected, interpretation relies on findings of multiple abnormalities

Consultation/ Referral

- All CHNs (general class) should consult with a physician or NP immediately for any suspected cases, or women with clinical markers of increased risk for preeclampsia.

- Consideration should be given to women with a history of previous preeclampsia or other strong clinical markers of increased risk (e.g. multiple pregnancy, significant proteinuria at first perinatal visit, pre-existing chronic condition).

- The NP or MD may consider consultation with an obstetrician, if necessary.

Preventing Preeclampsia and/or Associated Complications

- Preventative interventions may be best started before 16 weeks' gestation when most of the physiologic transformation of uterine spiral arteries occurs.

- Early intervention has the greatest potential to decrease early forms of preeclampsia

Prevention Recommendations (Low risk patients)

- Calcium supplementation of at least 1 g/d, orally, is recommended for women with low dietary intake of calcium (< 600 mg/d).
- Other established beneficial effects in pregnancy: abstention from alcohol for prevention of fetal alcohol effects, exercise for maintenance of fitness.
- Smoking cessation for prevention of low birth weight and preterm birth.
- Periconceptual and ongoing use of a folate-containing multivitamin for prevention of neural tube defects and other benefits.

Prevention Recommendations (Increased risk patients)

- Women are most commonly identified by a personal or family history of an HDP, chronic medical conditions, and/or uterine artery abnormality.

- Combining clinical, biochemical and/or ultrasonographic risk markers may better identify women at increased preeclampsia risk.

Prevention Recommendations (Increased risk patients)

Recommendations Includes:

- Interventions as discussed for women at low risk of preeclampsia.

- Low-dose ASA (75-162mg/d), and calcium supplementation (of at least 1g/d) for women with low calcium intake.

- Consideration of prophylactic doses of low-molecular- in women with previous placental complications (including preeclampsia).

- The following may be useful:
  - Increased rest at home in the third trimester and reduction of workload or stress.
  - L- arginine
  - Prostaglandin precursors, magnesium supplementation to prevent other pregnancy complications
  - Heparin to prevent venous thromboembolic disease.

Eclampsia

- Development of grand mal seizures in a woman with preeclampsia.

- It is the convulsive manifestation of preeclampsia and one of several clinical manifestations at the severe end of the preeclampsia spectrum.

Eclampsia

History

- Grand mal seizure may have occurred before presentation
- Facial twitching rapidly progresses to body rigidity
- Generalized contraction and relaxation of body muscles follows
- Typically lasts for 60-75 seconds
- Coma follows the convulsion
- Client usually does not remember anything of the event
- Respiration absent during seizure
- Rapid and deep respiration usually begins after convulsion ends
- One-third of seizures occur prenatally, one-third occur during labour, and one-third occur within the first 24 hours postpartum

Physical Findings in Eclampsia

Physical Findings

- Physical findings in eclampsia extremely variable
- Physical findings in severe preeclampsia more consistent
- Blood pressure: ≥160 mm Hg systolic or ≥110 mm Hg diastolic or relative hypertension compared with previous readings (in 20% of eclampsia clients)
- Heart rate rapid
- Unexpected weight gain (1 kg/week) with or without edema (but excessive weight gain and/or edema are not required for diagnosis)
- Fetal heart rate variable
- Client in acute distress
- May be stuporous, unconscious or in convulsion
- Vomiting or retching may be present
- Abdominal tenderness in right upper quadrant, epigastric area or chest
- Deep tendon reflexes hyperreactive before seizure, may be depressed afterward
- Clonus may be present
- Urine: Significant proteinuria
- Upon auscultation of the lungs and heart, crackles and wheezing may be heard because of pulmonary edema

Complications of Eclampsia

Complications

- Maternal injury during seizure
- Repeated seizures
- Aspiration
- Fetal distress
- Preterm labour and delivery
- Abruptio placentae
- HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count)
- Disseminated intravascular coagulopathy
- Maternal death
- Fetal death

Management/Monitoring in the Station

Consult ASAP for medivac

- The stabilize the client (discuss with MD drug therapy that should be initiated at the station)
- Intubation and ventilation might become necessary if there is respiratory depression.
- Try to keep patient in a calm environment
- Oxygen as needed
- Start IV therapy to keep vein open
- Be cautious with IV fluids and oral intake- due to risk of pulmonary edema
- Bed rest with constant nursing care, quiet room
- Position client on her left side
- Nothing by mouth
- Protect airway (ensure that breathing and ventilation are adequate)
- Suction as needed
- If seizure occurs, document time, duration and type of seizure
- After seizure, assess uterine contractions, vaginal bleeding, uterine tenderness, abdominal pain and fetal heart rate
- Insert Foley catheter to monitor urine output

Stay with client at all times; do not leave her alone

Pharmacologic Interventions While Awaiting Transfer

- Magnesium sulphate is recommended for first line treatment of eclampsia.
- Magnesium sulphate is recommended as prophylaxis against eclampsia in women with severe preeclampsia
- Magnesium sulphate dose is usually 4 g IV loading dose, then infusion of 1g/hour.
- Magnesium sulphate is a cerebral depressant that reduces neuromuscular irritability. It can cause vasodilation and reduction in blood pressure.

- Monitor for symptoms of magnesium sulfate toxicity
  - respiratory depression or arrest
  - reduced or absent deep tendon reflexes
  - cardiac arrest
  - coma

- The antidote for Magnesium toxicity is **calcium gluconate 1g IV** (**Keep preloaded syringe of 10% calcium gluconate at bedside).**

- Phenytoin and benzodiazepine should not be used for eclampsia prophylaxis or treatment, unless Mg is contraindicated or ineffective.

Other Medications to Consider

- **Steroids-** If transport is delayed, premature delivery is imminent and gestational age <34 weeks.

Hypertensive Disorders in Pregnancy

MEDICATIONS

Treatment for Non-Severe Hypertension Without Comorbid Conditions.

- The choice of antihypertensive agent for initial treatment should be based on characteristics of the patient, contraindications to a particular drug, and physician and patient preference.

- Initial therapy in pregnancy can be with one of a variety of antihypertensive agents available in Canada: methyldopa, labetalol, other beta-blockers (acebutolol, metoprolol, pindolol, and propranolol), and calcium channel blockers (nifedipine).

- Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should not be used during pregnancy.

- Atenolol should be avoided, as it is associated with lower placental and fetal weight at delivery when used in early pregnancy.

Treatment for Non-Severe Hypertension (BP of 140-159/ 90-109 mmHg *With* Comorbid Conditions.

- Goal is to keep blood pressure at < 140mmHg and diastolic blood pressure at < 90mmHg.

- Initial therapy in pregnancy from the previous list for women without co-morbidities.

Treatment for Severe Hypertension

- **Medivac**
  - In- hospital care should be provided
  - Continuous fetal HR monitoring is advised

- Commonly used agents for blood pressure ≥ 160/110mmHg
  - IV/PO Labetalol, and IV Hydralazine

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