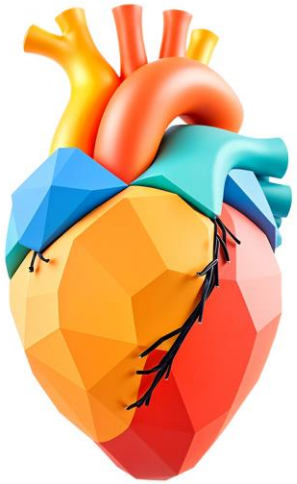

مرکز قلب تهران

دانشگاه علوم پزشکی و خدمات بهداشتی درمانی تهران

Critical Cardiovascular Care

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12th

Annual Tehran Heart Center Congress

7th CRITICAL CARDIOVASCULAR CARE

دوازدهمین کنگره سالیانه مرکز قلب تهران

2025

۲۵ و ۲۶ بهمن ماه ۱۴۰۳

13 & 14 February

Tehran Heart Center

Tehran, Iran

HTN in pregnancy

Homa Ghaderian.MD

ACHD

THC

Hypertensive disorder in pregnancy

chronic hypertension, and preeclampsia superimposed on chronic hypertension.1
Gestational hypertension
preeclampsia/eclampsia

- Defining hypertension in pregnancy as blood pressure (BP) ≥140/90 mmHg

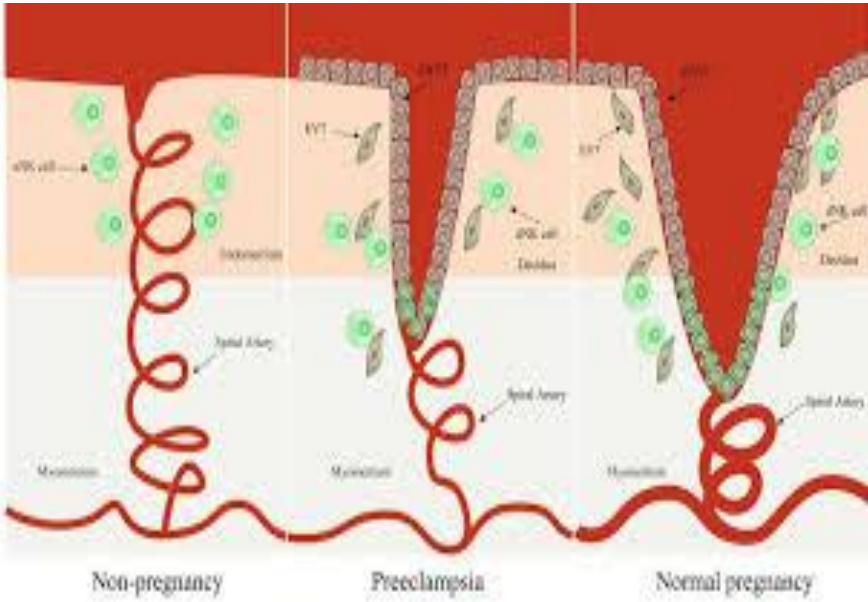
- uncertainty about treatment:maternal benefits of lowering BP and the potential fetal risks from medication-induced reductions in utero-placental circulation and in utero exposure to antihypertensive medications

- HDP continues to increase as a result of advanced age at first pregnancy and increased prevalence of obesity and other cardiometabolic risk factors.

- Pregnancy-related stroke hospitalizations increased >60% from 1994 to 2011, and HDP-associated stroke rates increased 2-fold compared with non–HDP-related stroke

Elevated systolic BPs throughout pregnancy, even below the diagnostic threshold for hypertension, also are associated with increased risk of preterm delivery and infants who are small for gestational age and have low birth weight

the uterine spiral arteries increases greatly during normal pregnancy as a result of remodeling of the endothelium and vascular smooth muscle, stimulated by release of proteases from endovascular trophoblast and uterine natural killer cells



Failure of spiral artery remodeling (ie, retention of smooth muscle) is a feature of preeclampsia and leads to decreased utero-placental perfusion, demonstrated by noninvasive blood flow and perfusion studies using Doppler ultrasound or magnetic resonance imaging.

- Decrease of proangiogenic factors such as placental growth factor and vascular endothelial growth factor, contribute to the hypertension and glomerulopathy characteristic of the maternal syndrome
- Measurements of angiogenic biomarkers have been incorporated into risk stratification in several innovative therapeutic trials for preeclampsia prevention

placental preeclampsia

- pronounced in women with early(<34 gestational weeks), severe preeclampsia because of the association between placental ischemia and adverse fetal outcomes (fetal growth restriction in particular).

maternal preeclampsia

- Preeclampsia occurring later in pregnancy has been associated with more pronounced maternal vascular dysfunction before pregnancy (secondary to hypertension, diabetes, or obesity), less pronounced placental pathology, and fewer fetal complications

PREVENTION OF PREECLAMPSIA AND ADVERSE MATERNAL AND FETAL OUTCOMES

- Preconception health
- Lifestyle changes before and during pregnancy may ameliorate both maternal and fetal risks
- all women without contraindication should be physically active during pregnancy
- Low-dose aspirin, starting between 12 and 16 weeks of gestation, reduces the risk of preeclampsia and related adverse outcomes

Risk Factors for Preeclampsia

High*
Prior preeclampsia
Chronic stage 2 hypertension† (≥140/90 mm Hg)
Pregestational diabetes
Multifetal pregnancy
Antiphospholipid syndrome
Systemic lupus erythematosus
Chronic kidney disease
Moderate*
Maternal age >35 y
Prepregnancy BMI >30 kg/m²
Family history (first-degree relative)
Race (Black)
Low socioeconomic status
Nulliparity
History of adverse pregnancy outcome:
Stillbirth
Placental abruption

Other
Chronic hypertension (130–134/80–84 mm Hg)
Chronic hypertension (135–139/85–90 mm Hg)
Severe hypertension
White coat hypertension
Prepregnancy BMI >25 kg/m²
Insulin resistance >75th centile
Gestational diabetes
Recovered acute kidney injury
Hyperthyroidism
Hydatidiform mole
Fetus with trisomy 13
Genetic susceptibility[88,89]
Assisted reproductive technology
Oocyte donation
New paternity
Pregnancy interval >4 y

- most trials using 81 to 150 mg daily
- metformin may reduce the odds of gestational hypertension in women with gestational diabetes and that it may prevent preeclampsia

BP MEASUREMENT IN PREGNANCY

- Most current guidelines recommend hypertension management based on office BP in pregnancy, for the general population, out-of-office BP measurements are widely endorsed as more accurate and better predictors of cardiovascular morbidity and mortality.
- The ACOG and the International Society for the Study of Hypertension in Pregnancy recommend the use of self-measured BP in women with chronic or gestational hypertension, particularly when uncontrolled.

According to 24-hour BP measurements, 32% of women with hypertension had white coat hypertension, but just 8% were diagnosed as such.

white coat hypertension reported increased risks of preeclampsia and Risks were lower compared with women with sustained chronic or gestational hypertension .

TREATMENT OF HYPERTENSION IN PREGNANCY

- Differences among societies
- The ACOG recommends antihypertensive therapy for women with preeclampsia and a sustained systolic BP ≥160 mmHg or diastolic BP ≥110 mmHg and with chronic hypertension at a systolic BP ≥160 mmHg or diastolic BP ≥110 mmHg
- With a treatment goal of 120 to 160/80 to 110 mmHg

- The majority of hypertension societies endorse a more aggressive approach for antihypertensive treatment, recommending therapy when BP is ≥140/90 mmHg

Antihypertensive Medications

- monotherapy with an accepted first-line drug: labetalol or methyldopa.
- nifedipine as an initial therapy
- alternative β-blockers such as metoprolol or oxprenolol
- nicardipine, clonidine, and furosemide
- diuretics may be used safely, although perhaps at lower doses

Case presentation

- A 21 y/o pregnant woman G2P1 presented with hypertension and proteinuria at 20 weeks of gestation.
- PMH : pre-eclampia in last pregnancy
- Blood pressure returned to normal post-partum and she received no further medical follow-up.

- At 20 weeks of gestation, blood pressure was found to be elevated at 145/100 mmHg during a routine antenatal clinic visit. Aside from a mild headache, she reported no other symptoms.
- P/E:HR:100/min(tachy cardia), BMI was 16.9

kg/m_2 and she had no cushingoid features, normal peripheral pulses.

- Lab test:
- Normal LFT/RFT
- urine protein indicated mild proteinuria with
- protein: creatinine ratio of 40.6 mg/mmol (normal range <30 mg/mmol in pregnancy).

What Were Our Differential Diagnoses?

- An important cause of hypertension that occurs during pregnancy is pre-eclampsia
- onset of raised blood pressure and proteinuria in late pregnancy, at or after 20 weeks of gestation .
- it may be associated with hyper uricaemia, deranged liver function, and signs of neurologic irritability such as headaches, hyper-reflexia, and seizures.

- In our case : HTN in 20-weeks of pregnancy, proteinuria observed in pre-eclampsia
- Remember:
- proteinuria could also reflect underlying renal damage due to chronic untreated hypertension so the possibility of pre-existing hypertension needed to be considered

differential diagnoses of chronic hypertension

- essential hypertension, primary hyperaldosteronism , Cushing's syndrome, phaeochromocytoma, renal artery stenosis,glomerulopathy, and coarctation of the aorta.
- Renal causes of hypertension were excluded based on normal serum creatinine and a bland urinalysis
- Doppler ultrasonography of renal arteries showed normal flow and no evidence of stenosis.

- Cushing's syndrome was unlikely as she had no clinical features indicative of , such as moon face, buffalo hump.
- Plasma potassium concentration was normal, although normo kalaemia does not rule out primary hyperaldosteronism. Progesterone has anti-mineralocorticoid effects, and increased placental production of progesterone may mask hypokalaemia

- measurements of renin activity and aldosterone concentration are difficult to interpret as the renin-angiotensin aldosterone axis is typically stimulated in pregnancy.
- Phaeochromocytoma is a rare cause of hypertension in pregnancy that, if unrecognised, is associated with significant maternal and foetal morbidity and mortality.
- can be established by measuring levels of catecholamines (noradrenaline and adrenaline) and/or their metabolites (normetanephrine and metanephrine) in plasma or urine

- Catecholamine levels in 24-hour urine collections were found to be markedly raised. Urinary noradrenaline excretion was markedly elevated
- Pregnancy may induce mild elevation of catecholamine levels, but the marked elevation of urinary catecholamine observed was diagnostic of phaeochromocytoma.
- MRI of neck to pelvis, without gadolinium enhancement, was performed . It showed a 4.2 cm solid lesion in the mid-abdominal aorto-caval region.

case 2

- A 31-year-old female presents to clinic. She is actively trying for pregnancy and already stopped her birth control. Her medical history includes a 5-year history of chronic essential hypertension treated with an amlodipine 10mg daily.
- Her BP is 155/99 mmHg .
- Her BP is not controlled and she wants to be pregnant.

- weight management
- exercise
- healthy eating
- lowering the amount of salt in their diet.

- sustained systolic blood pressure of 140 mmHg or higher or
- sustained diastolic blood pressure of 90 mmHg or higher
- **Aim for a target blood pressure of 135/85 mmHg.**

- Labetolol
- Nifidipine
- Methyldopan
- Aspirin 75 mg to 150 mg once daily from 12 weeks.
- Offer placental growth factor (PLGF)-based testing to help rule out pre-eclampsia between 20 weeks and 36 weeks

- weekly appointments if hypertension is poorly controlled
- appointments every 2 to 4 weeks if hypertension is well-controlled.

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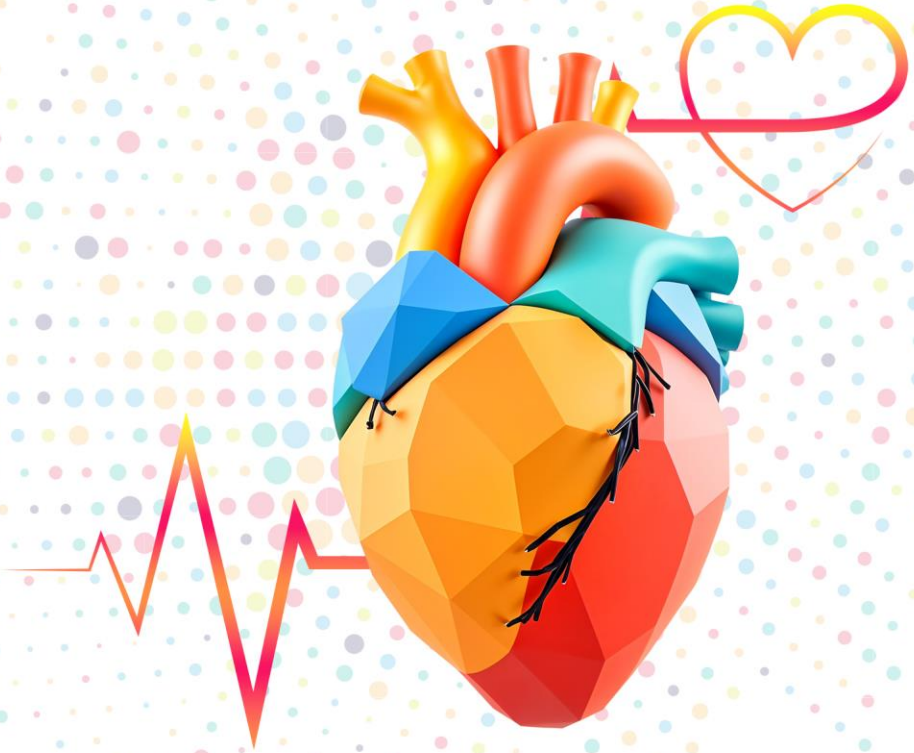

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