Hypertension in pregnancy

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Definition

- Normal pregnancy is characterised by a drop in BP- rising towards pre conception levels by term
- HT in pregnancy defined as
  - Systolic ≥ 140 mmHg and /or
  - Diastolic ≥ 90 mmHg
  - Rise in BP from booking > 30/15 mmHg
- Severe HT ≥ 160/110 mmHg- needs urgent treatment
  - Risk of cerebral haemorrhage, PRES

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Measurement

- Measurements should be confirmed by repeated readings over several hours
- Sitting position
- appropriate cuff size
- Both arms at initial visit

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Classification of hypertensive disorders

- Preeclampsia
- Gestational HT
- Chronic HT
  - Essential
  - Secondary
    - CKD, renal artery stenosis, DM, SLE, phaeochromocytoma, Cushing's, coarctation
  - White coat (needs 24hr ambulatory monitoring to avoid inappropriate intervention)
- Preeclampsia superimposed on chronic HT

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Gestational HT

- New onset HT after 20/40 with no features of preeclampsia
- Return of BP to normal within 3/12 post-partum
- Investigations- 25% will develop PE
  - Urine PCR
  - FBC
  - EUC, LFT
  - US assessment of fetal growth, AFI, dopplers
- Assess for proteinuria 1-2x week
- PE bloods weekly

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Predictive Value of the sFlt-1:PlGF Ratio

- The ratio of soluble fms-like tyrosine kinase 1 (sFlt-1) to placental growth factor (PlGF) is elevated in pregnant women before the clinical onset of preeclampsia
- <38 continue routine outpatient care
- 38-110-> discharge and re assess in 1-2 weeks
- >100-200-> admission
- >200 delivery likely within 48 hours

    - PROGNOSIS (Prediction of Short-Term Outcome in Pregnant Women with Suspected Preeclampsia Study) NEJM 2016

Surveillance in Chronic HT

- Assess for proteinuria each visit
- PE bloods if sudden increase in BP or new proteinuria
- Poor control of HT in first trimester is associated with increased fetal and maternal morbidity and mortality- up to 3x PNMR
- Target BP to <140/90 to reduce adverse pregnancy outcomes with no increase in SGA
  - Chronic Hypertension and Pregnancy (CHAP) trial, NEJM 2022

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Treatment

- Methyldopa
  - 250-750mg TDS
  - Side effects: dry mouth, sedation, depression
  - Contraindication: depression
- Labetolol
  - 100-400mg TDS
  - Side effects: bradycardia, bronchospasm, nausea, scalp tingling (resolves)
  - Contraindications: asthma
- Nifedipine
  - 20-60mg SR BD
  - Side effects: headache, flushing, tachycardia, constipation
  - Contraindications: aortic stenosis

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Treatment

- ACE I and ARB are contraindicated in pregnancy
- Use in 3rd trimester has been associated with fetal death and neonatal renal failure
- Breast feeding
  - Methyldopa
  - Labetolol
  - Nifedipine
  - Enalopril, captopril, quinapril
- Commonly swap to enalapril for easier dosing regime

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Pre-eclampsia

HT arises after 20 weeks gestation + one or more other organ system

- Renal
  - Urine PCR ≥ 30mg/mmol
  - Cr > 90
  - Oliguria < 20mL/hr
- Haematological
  - Plt < 100 000
  - Haemolysis on blood film, raised bilirubin or LDH, decreased haptoglobin
- Liver
  - Raised transaminases
  - Severe epigastric or RUQ pain
- Neurological
  - Hyperreflexia with sustained clonus
  - Persistent headache, visual disturbance
- Pulmonary oedema
- IUGR
  - Abnormal UAD or oligohydramnios

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HELLP syndrome

- Subset of women with severe PE
- **H**aemolysis, **E**levated **L**iver enzymes, **L**ow **P**latelets
- Expectant management is harmful with a 6.3% incidence of maternal death and an increased risk of placental abruption

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Risk Factors for Preeclampsia

• Previous PE	RR 7
• Chronic HT	RR 7
• APLS	RR 9.7
• Type 1 or 2 DM	RR 3.5
• Multiple pregnancy	RR 2.9
• Nulliparity	RR 2.9
• FamHx PE	RR 2.9
• Maternal age ≥ 40	RR 1.9

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Risk factors for Preeclampsia

- BMI 25-30 RR 1.7
- BMI > 30 RR 2.7
- BMI > 40 RR 4

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BMI > 30

- Preconception folic acid 5mg
- 5-9kg weight gain for whole pregnancy
- Regular moderate exercise 30-60 mins daily
- Early OGTT (16/40)
- Low dose aspirin
- Consider thromboprophylaxis

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Protective factors

- Smoking
- High fruit intake
- > 12 months to conceive

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Pre-eclampsia screening

- PAPP-A < 0.4
- Ask for uterine artery dopplers at NT scan and morphology
  - Raised PI >95th centile or notching
- Commence aspirin
- Growth surveillance

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Preventing preeclampsia

- Low dose aspirin
  - Pathophysiology of PE is an imbalance between prostaglandins, prostacyclin and thromboxane-> aspirin corrects this imbalance by inhibiting platelet aggregation and dilating blood vessels
  - Optimal dose is 150mg commenced before 16/40
  - Cease around 36/40
- Calcium 1.5g/day
  - Low Ca may increase BP by stimulating PTH or renin release ->increasing intracellular Ca in vascular smooth muscle -> vasoconstriction
  - Ca reduces smooth muscle contractility and affects uteroplacental blood flow by lowering resistance in uterine and umbilical arteries
  - Offer to those with low dietary Ca intake

Maternal Indications for delivery

- Gestation ≥ 37/40
- Uncontrollable HT
- Deteriorating platelets, LFT, renal function
- Abruption
- Focal neurological symptoms or eclampsia
- APO

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Fetal Indications for delivery

- Severe IUGR
- Non-reassuring fetal status
- abruption

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Postnatal thromboprophylaxis

- Pre-eclampsia AND
  - CS
  - Preterm delivery
  - Multiple pregnancy
  - Stillbirth
  - Instrumental delivery
  - Labour >24 hours
  - PPH >1L
- For 10 days postpartum

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Postpartum

- Bloods often worsen for the first 3 days before improving
- Avoid NSAIDs
- Most HT has settled by 2 weeks but may persist for 3/12
- Risk of recurrence in subsequent pregnancy

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Long term consequences of pre-eclampsia

- Increased risk of CVD
  - HT
  - IHD
  - Stroke
  - VTE
- Children born to a pregnancy complicated by PE also have increased CV risk

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Follow up

- Annual BP
- Lipids and blood glucose assessment at least every 5 years

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Summary

- BP 140/90 in pregnancy is not normal
- Surveillance for both mother and baby- increased maternal and fetal morbidity
- BP 160/110 requires urgent evaluation and treatment
- Aim for BP <140/90
- Delivery by 37/40 if PE develops
- Thromboprophylaxis
- Long term follow up for CVD
- Reducing risk of recurrence- aspirin, Ca

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Fetal Growth

- SGA
  - EFW < 10%
  - Symmetrically small baby
- LGA
  - EFW > 90%
- IUGR
  - EFW < 10%
  - Head sparing -> HC/AC discordance
  - Abnormal dopplers
  - Oligohydramnios
  - Serial US evidence of growth arrest

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Causes

- Incorrect dating
- Constitutionally small (customised growth charts)
- Genetic/chromosomal defects
- Infection (TORCH screen)
- Uteroplacental insufficiency

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Risk factors for IUGR

- Maternal age >40
- Smoking, cocaine, amphetamines, ETOH
- Socioeconomic and nutritional factors
- Daily vigorous exercise
- Chronic HT, DM, renal impairment, APLS
- Previous SGA, stillbirth, maternal or paternal SGA

- If high risk for IUGR start aspirin before 16/40

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Pregnancy developments that increase risk

- Antepartum haemorrhage
- Echogenic bowel
- Pre-eclampsia
- Low maternal weight gain
- PAPP-A <0.4MOM or HCG <0.5MOM

- Serial growth US

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Sequalae of IUGR

- Stillbirth
- Neurodevelopmental delays
- Increased risks of vascular disease and diabetes in adulthood

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Assessment

- SFH
  - Patient should be supine with legs extended, bladder empty
  - Measure from fundus to pubic symphysis along uterine axis
  - If SFH inaccurate due to BMI, fibroids -> arrange serial growth US

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If risk factors for IUGR

- Uterine artery doppler at NT or morphology US
- If Uterine artery doppler PI > 95% or notched -> serial growth US
- If Uterine artery doppler normal then growth US 28, 32 and 36 weeks

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Ultrasound

- Dating US 8-12 weeks
  - If >5 days discrepancy use EDC from US
- Growth scans no closer than 2 weeks apart
  - Review serial EFW and AC- assesses liver size and hence glycogen stores
  - Oligohydramnios
- AFI and dopplers can be done more frequently
  - UAD -> uteroplacental blood flow
  - Middle Cerebral Artery -> fetal anaemia (PSV), head sparing (PI)
  - Ductus Venosus

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Timing of delivery

- <30/40 with absent or reversed end diastolic flow- delivery indicated when DV becomes abnormal
- After 24/40 or >500g
- 30-32/40 with revered or absent EDF
- 34/40 with abnormal (increased resistance) UAD
- SGA with normal dopplers aim for 37-38/40
- Mode of delivery
  - Often small babies with abnormal dopplers will not tolerate labour
  - CS if AEDF or REDF
  - SEND THE PLACENTA

Summary

- Assess for risk factors
- Ask for uterine artery dopplers at morphology (and cervical length)
- Serial growth scans every 2-3 weeks
- Assess for parameters crossing growth curve centiles, AC or EFW <10%, abnormal dopplers, oligohydramnios

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