Aetiology and pathophysiology of pre-eclampsia
Principles

• Pre-eclampsia is the result of a “sick” placenta
• Pre-eclampsia is NOT primarily a hypertensive disease
• Pre-eclampsia affects all organ systems
• To assess pre-eclampsia all organ systems must be evaluated
• Pre-eclampsia is cured by removing the placenta
Primary aetiology

- Primary lesion – poor second wave trophoblast invasion of spiral arterioles
- Smooth muscle of spiral arterioles is not replaced by hyaline material.
- Vessels are still responsive to vasoactive substances.
- Areas of ischaemia in tertiary villi of placenta
- Microvilli from trophoblasts are shed into maternal vascular system
Diagram of the blood supply to the placenta in the third trimester. The spiral arteries (hatched) have been converted to uteroplacental arteries from their origins from the radial arteries.

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Diagram of the blood supply to the placenta in pre-eclampsia: the spiral arteries are either not converted to uteroplacental arteries (solid outlines) or, if they are, have been so converted only in their decidual segments (hatched outlines).

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Primary aetiology (Cont.)

- Microvilli are toxic to endothelial cells
- Damaged endothelial cells release vasoconstrictive agents
- Microvilli are normally filtered out by lungs
- If the lungs are overwhelmed by the microvilli, they get into the arterial system and endothelial cells throughout the arterial system are damaged
- Vasoconstrictive agents are released, and vasospasm results – i.e. hypertension occurs
Failure of second wave trophoblast invasion?

- Genetic predisposition
- Autoimmune factors
- Paternal influence
Secondary effects (pathology)

- CVS – hypertension
- Renal – raised uric acid, proteinuria
- Hepatic – raised liver enzymes
- CNS – cerebral oedema
- Respiratory – pulmonary oedema
- Heamatological – low platelets
- Placental – impaired fetal growth
Tertiary effects (pathology)

- Convulsions
- Cerebral haemorrhage
- Retinal detachment
- Pulmonary oedema
- DIC
- Renal cortical necrosis
- Hepatic rupture
- Abruptio placenta
- IUD
Management

• Primary prevention - ?

• Secondary prevention – delay in onset (delay appearance of secondary effects)
  – Calcium
  – Aspirin
  – Vitamin C and E

• Tertiary prevention – delay and prevention of complications
  – Timing of delivery (BIBO or *Vier B’s BBBB*)
    • Better in, better out or *Beter binne, beter buite*
  – Use magnesium sulphate etc. to prevent complications
Diagnosis of pre-eclampsia

• Investigate all organ systems
  – Clinical – CVS, CNS, Resp.
  – Haematological – Platelets, haematocrit
  – Renal – proteinuria, creatinamine, (uric acid)
  – Hepatic – AST
  – Placenta – Doppler U/S umbilical artery, fetal growth
Classification

• Australasian Classification of hypertension in pregnancy
  – Additional resources pack

• (Davey and MacGillvary Classification of hypertension in pregnancy (PEP)