Measuring BP in Pregnancy
Preparation

**Necessary equipment?**

- **Sphygmomanometer**
  - (don’t use an automatic BP machine, e.g. dynamap, as these are inaccurate in pregnancy)

- **Stethoscope**

- **Pillow and flat surface (e.g. table)**

- **Check equipment**
  - e.g. stethoscope set to diaphragm not bell
Preparation

Introduce yourself

- Establish a rapport with the patient

- Try to reduce “white coat” effect
  - (in some patients BP rises in presence of doctor)
Preparation

Indication

- To detect pre-eclampsia early
- Pre-eclampsia often asymptomatic
Privacy

- May need to take off garments to expose upper arm
Permission to do the test

- Is any pain in the arm?
- Is there is a reason a particular arm should not be used?
  - e.g. mastectomy and axillary clearance, a.v. fistula for dialysis
- Have you been resting for 10 mins?
- Have you had large amounts of tea or coffee?
Preparation

Procedure

- Explain what you are going to do

What will the patient experience?

- Tight feeling
- Minor discomfort perhaps
- Pins and needles in fingers
Preparation

Position

- What could happen to a pregnant lady’s BP if she were lying supine?
  - Gravid uterus compresses Inferior Vena Cava
  - Venous return decreases
  - Filling pressure decreases
  - Cardiac output falls
  - BP drops and pt may faint
- If patient cannot sit up, lie her on left side and document this
- Arm should be at heart level (pillow on desk)
  - Dropping arm by side may increase systolic by 10mmHg
Preparation

**Light**

- Ensure you have enough light to see the manometer
- Ensure eye is level with manometer to eliminate parallax error
Preparation

- Parallax

Dead on to the sphyg -98mmHg

At an angle –94mmHg
Preparation

**Exposure**

- Expose the upper arm
- If sleeve is tight when rolled up ask pt to remove outer garment


Procedure

Size the cuff

- Find the bladder (thick rubber bit in cuff)
- Length of the bladder should be >2/3 of and <1 x circumference of arm.

- If <2/3 – get larger cuff
- If >1 – cuff liable to rip off when inflated – get smaller cuff


Procedure

- Size the cuff

Length of bladder
Procedure

Position the cuff

- Centre of the length of the bladder should be positioned over brachial artery (medial to biceps tendon)

- Do not rely on position of tubing – varies between cuffs

- Do not rely on arrows – not all cuffs have them

- Leave about 2 finger breadths above arm crease
Procedure

**Palpatory method**

- Palpate the radial or brachial pulse
- Turn the valve on the pump clockwise to close it (not too tight otherwise difficult to open later)
- Inflate the cuff by squeezing pump
  - Can inflate briskly to 60mmHg but then slow down
  - Point at which pulse disappears = rough systolic BP
- Let the cuff down
Clockwise to close valve and inflate cuff

Anti-clockwise to release valve and deflate

Squeeze pump with these fingers
Procedure

Auscultatory method

- Place diaphragm of stethoscope over brachial artery
- Inflate to 30mmHg above rough systolic
- Undo valve carefully (turn anticlockwise)
- Adjust valve to lower cuff pressure by 2mmHg per second or per heart beat (which ever is slower)
Korotkoff Sounds

This is called the auscultatory gap.

In some patients, the sounds disappear completely in phase 2.
**Procedure**

**Auscultatory method**

**SYSTOLIC**
- Pressure where sounds appear
  - Korotkoff I

**DIASTOLIC**
- Pressure where sounds muffle
  - Korotkoff IV
  - or
- Pressure where sounds disappear
  - Korotkoff V
Procedure

Korotkoff Sounds

- Korotkoff V is a more accurate measure of diastolic pressure than IV

- In some pregnant women (more than in the general population) the sounds don’t disappear (i.e. no Korotkoff V)

- Therefore use Korotkoff IV in these patients

- For all patients – document K4 and K5 if present to nearest 2mmHg
  - e.g. 120/K4=80 K5=76mmHg
Summary

- **Necessary equipment**
  - Introduce yourself
  - Permission
    - ask relevant questions
  - Privacy
  - Procedure
    - explain to patient
  - Position
    - arm at heart level
    - sitting or lying on L side
  - Light
    - eliminate parallax
  - Exposure
    - remove tight clothing

- **Size cuff**
  - bladder length >2/3 arm circ

- **Position cuff**
  - centre of bladder over art.

- **Palpatory method**

- **Auscultatory method**
  - down at 2mmHg/sec

- **Document**
  - systolic, K4 and K5
  - to nearest 2mmHg

- **Dipstick urine**

- **Explain results**
Physiology

- BP = CO x SVR  CO = HR x SV
- BP = HR x SV x SVR

- SVR falls in early pregnancy
- Leads to fall in BP

- Later rise in plasma volume, cardiac output and heart rate which compensates

- By the beginning of 3\textsuperscript{rd} trimester BP back to pre-pregnancy level
- May rise above pre-pregnancy level before term
Further work

- Watch Dr. D. Williams’ lecture on Hypertension in pregnancy
  - [http://ichelix1.cc.ic.ac.uk/ramgen/fom/int/yr5/OG/hypertension-DW.rm](http://ichelix1.cc.ic.ac.uk/ramgen/fom/int/yr5/OG/hypertension-DW.rm)

- Watch Prof Steer’s presentation on measuring BP during pregnancy
  - [http://imperiallectures.com/example10/player.html](http://imperiallectures.com/example10/player.html)

- Go to Antenatal clinic and practice!