Intrapartum management
Key problems and solutions – an obstetricians view.

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Royal Victoria Infirmary
Newcastle Upon Tyne
What’s new clinically?

• Who will arrive on DS for delivery?
• How should we be controlling Blood Pressure?
• Who should receive Magnesium? (and why?)
• When should we deliver?
• When will we / you see this group of women again?
What’s new practically?

• Will PBR make a difference ??
• Will networks make a difference ??
• Will clinical trials make a difference ??
• Will guidance or regulation from NICE / RCOG / NHSLA make a difference ??
What’s new?

• Who will arrive on DS for delivery?
• How should we be controlling Blood Pressure?
• Who should receive Magnesium? (and why?)
• When should we deliver?
• When will we see this group of women again?
Demographic

• Every risk factor for Pre-eclampsia is increasing in the female population
  • Obesity
  • Age
  • Diabetes
  • Hypertension
  • Family History
  • Multiple pregnancy
Top 10 pre-eclamptics

1. CKD 5 : Dialysis from 23/40
2. CF / IDDM / Hypertension / Nephropathy
3. Renal transplant : SCr – 159
4. BMI 62 / term breech
5. APS : early onset disease 22/40
6. Chronic hypertension : 3 increasing to 5 antihypertensives
7. Moderate mitral stenosis
8. Mafans
9. Ascending cholangitis / liver cysts
10. PE at 13 weeks / fully anticoagulated
Top 10 pre-eclamptics

1. CKD 5 : Dialysis from 23/40 – CS(4) - spinal
2. CF / IDDM / Hypertension / Nephropathy – Epidural CS(2)
4. BMI 62 / term breech – CS(3) - spinal
5. APS : early onset disease 22/40 – CS(1) - GA
6. Chronic hypertension : 3 increasing to 5 antihypertensives – Epidural SVD
7. Moderate mitral stenosis – CS(4) CSE
9. Ascending cholangitis / liver cysts – Epidural SVD
10. PE at 13 weeks / fully anticoagulated – CS(4) spinal
Definition of preeclampsia

**De novo hypertension**
(≥ 140 &/or ≥ 90 mm Hg [K5])

**Proteinuria**
(≥ 300 mg/dy or spot Pr/Cr ≥ 30 mg/mmol)

Renal insufficiency
(Cr ≥ 90 μmol/L or oliguria)

Liver disease
(Elevated transaminases or RUQ/epigastric pain)

Neurological problems
Eclampsia, hypereflexia + clonus
Severe headaches with hyperreflexia
Persistent visual disturbance (scotoma)

Haematological disturbances
Thrombocytopenia, DIC, haemolysis

Fetal growth restriction

ASSHP (Brown et al. Aust NZ J Obs & Gyn 2000)
NCCWCH Guideline: Hypertension in Pregnancy

Assessment of proteinuria

- Use an automated reagent-strip reading device to estimate proteinuria
- If strip ≥ 1+, use a spot urinary protein:creatinine ratio (>30 mg/mmol) OR 24-h urine collection (300 mg) to diagnose proteinuria
- Where using 24-h collection, use a recognised method of evaluating completeness of collection
- Do not repeat quantitation of proteinuria

### Point-of-care dipstick analysis (Waugh et al. 2004)

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive Predictive Value</th>
<th>Negative Predictive Value</th>
<th>LR+</th>
<th>LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual (6 studies n=1738)</td>
<td>55%</td>
<td>82%</td>
<td>72%</td>
<td>30%</td>
<td>3.48</td>
<td>0.6</td>
</tr>
<tr>
<td>Automated (1 study n=171)</td>
<td>83.6 (77.5–89.7)%</td>
<td>81%</td>
<td>77.7%</td>
<td>15.6%</td>
<td>4.27</td>
<td>0.22</td>
</tr>
</tbody>
</table>

### Spot Pr/Cr ratio (Cate et al. 2008)

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive Predictive Value</th>
<th>Negative Predictive Value</th>
<th>LR+</th>
<th>LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual (6 studies n=1738)</td>
<td>83.6 (77.5–89.7)%</td>
<td>76.3 (72.6–80.0)%</td>
<td>3.53 (2.83–4.49)</td>
<td>0.21 (0.13–0.31)</td>
<td>3.48</td>
<td>0.21</td>
</tr>
</tbody>
</table>

**Question**

Should spot Pr/Cr or Alb/Cr ratio replace 24 h urine protein measurement in assessment of proteinuria in pregnancy.

**Key outcome** = maternal (or fetal) morbidity
Whats new?

• Who will arrive on DS for delivery?
• **How should we be controlling Blood Pressure?**
• Who should receive Magnesium? (and why?)
• When should we deliver?
• When will we see this group of women again?
Mechanism of cerebral injury

Principles of antihypertensive management

Cerebral autoregulation

**Acute arterial hypertension**

Forced overdistension cerebral vasculature

Damage to blood-brain barrier

Extravasation fluid into parenchyma (vasogenic oedema)

**Cerebral haemorrhage**

**Cerebral infarction**
## Management of BP in women with pre-eclampsia

<table>
<thead>
<tr>
<th>Degree of hypertension</th>
<th>Mild hypertension (140/90 to 149/99 mmHg)</th>
<th>Moderate hypertension (150/100 to 159/109 mmHg)</th>
<th>Severe hypertension (160/110 mmHg or higher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admit to hospital</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
| Treat                  | No                                       | With oral labetalol\(^\d\) as first-line treatment to keep:  
  * diastolic blood pressure between 80–100 mmHg  
  * systolic blood pressure less than 150 mmHg  
|                        |                                          | With oral labetalol\(^\d\) as first-line treatment to keep:  
  * diastolic blood pressure between 80–100 mmHg  
  * systolic blood pressure less than 150 mmHg  
| Measure blood pressure | At least four times a day                 | At least four times a day                       | More than four times a day, depending on clinical circumstances |
| Test for proteinuria   | Do not repeat quantification of proteinuria | Do not repeat quantification of proteinuria     | Do not repeat quantification of proteinuria |
| Blood tests            | Monitor using the following tests twice a week: kidney function, electrolytes, full blood count, transaminases, bilirubin | Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin | Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin |

NICE Clinical Guideline 107, RCOG 2010
Management of severe hypertension

- **Hydralazine**
  5 mg IV bolus (repeated at intervals of 20-30 min)

- **Labetolol**
  40 mg IV bolus (repeated at intervals of 10-15 min at increasing dose up to max. 300 mg)

- **Nifedipine**
  10 mg PO (repeated @ 30 min)

NICE Clinical Guideline 107, RCOG 2010
Hydralazine for treatment of severe hypertension in pregnancy

Maternal outcomes

- Persistent severe HT: Trend to lower rates vs labetolol, (0 v 5%, RR 0.29 [0.08-1.04])
- Hypotension: 10 v 0%, RR 3.29 [1.5-7.2]
- Abruption: 18 v 0%, RR 4.17 [1.2-14.3]
- Oliguria (3): 17 v 0%, RR 4.00 [1.22-12.5]

Maternal side effects

- Headache: 29 v 0, RR 1.61 [1.06-2.4]

Fetal outcomes

- Adverse effect on FHR: 11 v 0, RR 2.0 [1.3-3.2]
- Low 1 min Apgar: 67 v 15, RR 2.7 [1.3-5.9]

Figures are median event rate

Magee et al. BMJ 2003

MAP (mm Hg)

Pre 20 min post

Hydralazine bolus

1 (n=109) 2 (n=41) 3 (n=14)

Δ MAP
-12 (-14, -10)
-9 (-12, -6.5)
-5 (-10, -1)

Patterson-Brown et al.
Whats new?

• What will arrive on DS for delivery?
• How should we be controlling Blood Pressure?
• Who should receive Magnesium? (and why?)
• When should we deliver?
• When will we see this group of women again?
Magnesium sulphate in eclampsia
Overview of randomised trials vs. other anticonvulsant

• Compared to phenytoin, diazepam, lytic cocktail:

Magnesium sulphate associated with:

• Lower rate recurrent seizures RR 0.41 (0.32-0.51)
• Lower rate maternal death RR 0.62 (0.39-0.99)

• Only 1 trial multicentre with adequate sample size
  (Eclampsia Collaborative Group 1995)
Magnesium sulphate in preeclampsia

Relative risk (95% CI) | Number of events
----------------------|-------------------
Magnesium sulphate     | Placebo

Severe PE

<table>
<thead>
<tr>
<th>Event</th>
<th>Magnesium sulphate</th>
<th>Placebo</th>
<th>Relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe pre-eclampsia</td>
<td>0.42 (0.29–0.60)</td>
<td>0.42</td>
<td>0.42 (0.23–0.76)</td>
</tr>
<tr>
<td>Not severe pre-eclampsia</td>
<td>0.42 (0.26–0.67)</td>
<td>0.40</td>
<td>0.40 (0.27–0.59)</td>
</tr>
<tr>
<td>Randomised before delivery</td>
<td>0.54 (0.28–1.06)</td>
<td>0.35</td>
<td>0.35 (0.22–0.57)</td>
</tr>
<tr>
<td>&lt;34 weeks</td>
<td>0.54 (0.16–1.80)</td>
<td>0.54</td>
<td>0.54 (0.16–1.80)</td>
</tr>
<tr>
<td>=&gt;34 weeks</td>
<td>0.54 (0.16–1.80)</td>
<td>0.54</td>
<td>0.54 (0.16–1.80)</td>
</tr>
<tr>
<td>Randomised after delivery</td>
<td>0.34 (0.23–1.05)</td>
<td>0.34</td>
<td>0.34 (0.23–1.05)</td>
</tr>
<tr>
<td>Anticonvulsant before trial*</td>
<td>1.24 (0.49–3.11)</td>
<td>1.24</td>
<td>1.24 (0.49–3.11)</td>
</tr>
<tr>
<td>No anticonvulsant before trial*</td>
<td>0.34 (0.23–0.51)</td>
<td>0.34</td>
<td>0.34 (0.23–0.51)</td>
</tr>
<tr>
<td>Imminent eclampsia</td>
<td>0.26 (0.12–0.57)</td>
<td>0.26</td>
<td>0.26 (0.12–0.57)</td>
</tr>
<tr>
<td>No imminent eclampsia</td>
<td>0.49 (0.32–0.75)</td>
<td>0.49</td>
<td>0.49 (0.32–0.75)</td>
</tr>
<tr>
<td>High PMR country</td>
<td>0.34 (0.21–0.56)</td>
<td>0.34</td>
<td>0.34 (0.21–0.56)</td>
</tr>
<tr>
<td>Middle PMR country</td>
<td>0.54 (0.28–1.03)</td>
<td>0.54</td>
<td>0.54 (0.28–1.03)</td>
</tr>
<tr>
<td>Low PMR country</td>
<td>0.67 (0.19–3.27)</td>
<td>0.67</td>
<td>0.67 (0.19–3.27)</td>
</tr>
</tbody>
</table>

All women

<table>
<thead>
<tr>
<th>Event</th>
<th>Magnesium sulphate</th>
<th>Placebo</th>
<th>Relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imminent eclampsia</td>
<td>0.42 (0.29–0.60)</td>
<td>0.42</td>
<td>0.42 (0.29–0.60)</td>
</tr>
</tbody>
</table>

NNT

<table>
<thead>
<tr>
<th>Event</th>
<th>Magnesium sulphate</th>
<th>Placebo</th>
<th>Number of events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe PE</td>
<td>36</td>
<td>63</td>
<td>109</td>
</tr>
<tr>
<td>Moderate PE</td>
<td>109</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Mild PE</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>
Pre-eclampsia

Anticonvulsants

- Give intravenous magnesium sulphate* if woman with severe hypertension or severe pre-eclampsia has or previously had eclamptic fit.
- Consider giving intravenous magnesium sulphate* if birth planned within 24 hours in woman with severe pre-eclampsia.
- Do not use diazepam, phenytoin or lytic cocktail as alternatives to magnesium sulphate* in women with eclampsia.

Features of severe pre-eclampsia
Severe hypertension and proteinuria or Mild or moderate hypertension and proteinuria with at least one of:
- severe headache
- problems with vision such as blurring or flashing
- severe pain just below ribs or vomiting
- papilloedema
- signs of clonus (≥ 3 beats)
- liver tenderness
- HELLP syndrome
- platelet count falls to < 100 x 10^9/litre
- abnormal liver enzymes (ALT or AST rises to > 70 iu/litre).

Regimen for magnesium sulphate**
- Loading dose of 4 g given intravenously over 5 minutes, followed by infusion of 1 g/hour for 24 hours.
- Further dose of 2–4 g given over 5 minutes if recurrent seizures.

NICE Clinical Guideline 107
RCOG 2010
Magnesium sulphate for neuroprotection

- 4 trials recruited women likely to give birth, 1 trial recruited women with PE

<table>
<thead>
<tr>
<th>Study</th>
<th>Gestation</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mittendorf (2002)</td>
<td>25 - 33 wk</td>
<td>NP 4g bolus, Tocolysis 4g bolus, 2-3 g/h</td>
</tr>
<tr>
<td>Crowther (2003)</td>
<td>&lt; 30 wk</td>
<td>4 g load, 1 g / h</td>
</tr>
<tr>
<td>Marret (2006)</td>
<td>&lt; 33 wk</td>
<td>4 g load</td>
</tr>
<tr>
<td>Rouse (2008)</td>
<td>24 – 31 wk</td>
<td>6 g load, 2 g / h</td>
</tr>
</tbody>
</table>

- 3 meta-analyses of same 5 trials – same conclusions i.e. Mg associated with:
  - reduced risk of CP (3.9% vs 5.6% - RR 0.69 [0.55-0.88])
  - reduced risk of gross motor dysfunction (RR 0.64 [0.43-0.83])
  - no difference in risk of mortality (15.1% vs 14.8% - RR 1.01 [0.89-1.14])

- Low statistical heterogeneity among trials
- No evidence of publication or related biases
- NNT (to prevent one case of CP (5% rate) 52 [31-154]
  - ≤ 28 wk (6.2%)
  - > 28 wk (1.3%)

What's new?

• Who will arrive on DS for delivery?
• How should we be controlling Blood Pressure?
• Who should receive Magnesium? (and why?)
• When should we deliver?
• When will we see this group of women again?
NCCWCH Guideline: Hypertension in Pregnancy

Fetal Monitoring

- Fetal growth, AFV, UA Doppler at diagnosis
  - If results are normal do not repeat CTG more than weekly.
- CTG at diagnosis
  - Repeat if change in FM, bleeding, pain, change in maternal condition

![Graph showing fetal distress (Cumulative %) vs. days from AEDV]
NCCWCH Guideline: Hypertension in Pregnancy

Timing of birth

Before 34 weeks
Manage conservatively
Corticosteroids
- unless acute fetal compromise
Offer birth if
- severe refractory hypertension
- maternal/fetal indication develops
  (as defined in consultant care plan)

<table>
<thead>
<tr>
<th>GA (wk)</th>
<th>OR [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1.35 [1.03-1.78]</td>
</tr>
<tr>
<td>&lt; 32 wk</td>
<td>1.93 [1.28-2.91]</td>
</tr>
<tr>
<td>≥32 wk</td>
<td>0.92 [0.62-1.37]</td>
</tr>
</tbody>
</table>

Logistic regression to control for confounders

Chang et al. 2004
Expectant management of severe PE < 34 wk
Perinatal complications

Abruption

Non-reassuring fetal testing

SGA

Perinatal death

1 Odendaal, 2 Sibai, 3 Olah, 4 Visser & Wallenburg, 5 Hall
6 Vigil-DeGracia, 7 Chammas, 8 Haddad, 9 Oettle, 10 Shear

Adapted from Sibai & Barton 2007
Expectant management of severe PE < 34 wk
Maternal complications

- **HELLP syndrome**: 11.1%
- **Renal failure**: 2.0%
- **Pulmonary oedema**: 2.5%
- **Eclampsia**: 1.1%

Reported as HELLP OR deteriorating renal function

---

1 Odendaal, 2 Sibai, 3 Sibai, 4 Olah, 5 Hall, 6 Vigil-DeGracia
7 Chammas, 8 Haddad, 9 Oettle, 10 Shear

Adapted from Sibai & Barton 2007
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>PMR (%)</th>
<th>Normal Paed Outcome (%)</th>
<th>Maternal Complications (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sibai et al. (1990, USA)</td>
<td>15</td>
<td>93</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Moodley et al. (1993, SA)</td>
<td>10</td>
<td>100</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Visser &amp; Wallenburg (1995, Netherlands)</td>
<td>25</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withagen et al. (2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gauler-Senden et al (2006, Netherlands)</td>
<td>26</td>
<td>81</td>
<td>19</td>
<td>65</td>
</tr>
<tr>
<td>Hall et al. (2001, SA)</td>
<td>8</td>
<td>88</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Bunden et al. (2006, NZ)</td>
<td>31</td>
<td>71</td>
<td>12</td>
<td>71</td>
</tr>
<tr>
<td>Newcastle (1998-2007)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEDF</td>
<td>15</td>
<td>93</td>
<td>0</td>
<td>58</td>
</tr>
<tr>
<td>PEDF</td>
<td>9</td>
<td>66</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>
NCCWCH Guideline: Hypertension in Pregnancy

Timing of birth

**Before 34+0 weeks**
Manage conservatively
Corticosteroids
- unless acute fetal compromise

**Offer birth**
- severe refractory hypertension
- maternal/fetal indication develops
  (as defined in consultant care plan)

**34+0 – 36+6 weeks**
Severe hypertension, BP controlled and steroids completed
Mild / moderate hypertension depending on maternal and fetal condition,
  risk factors and availability of neonatal intensive care (offer birth)

**After 37+0 weeks**
Mild / moderate hypertension within 24-48 h
IOL vs. expectant monitoring for GH / mild PE after 36 wk gestation (HYPITAT Trial)

36⁰-41⁰ wk
DBP ≥ 95 mm Hg [6 h] – 65%
DBP ≥ 90 mm Hg [6h] + Proteinuria

1153 eligible

Koopmans et al. 2009
397 refused

756 randomised

IOL

0.79 (0.7-1.0)
38.7 (37.9-39.8)
366 (97%)

Expectant

Onset of labour (Dy)*

6.3 (3.7-10.9)
39.9 (38.9-40.4)
173 (46%)

GA delivery (wk)*

IOL*

366 (97%)

Adverse maternal outcome*

Severe HT: Systolic

15% 23% 0.63 (0.46-0.86)
Diastolic

16% 27% 0.61 (0.46-0.80)
IV antihypertensive

3% 10% 0.34 (0.18-0.62)
IV anticonvulsant

6% 12% 0.53 (0.33-0.84)
CS

14% 19% 0.75 (0.55-1.04)
Adverse neonatal outcome

6% 8% 0.75 (0.45-1.26)
Arterial pH < 7.05

3% 6% 0.46 (0.21-1.00)

* Mortality, morbidity (eclampsia, HELLP, pulmonary oedema, TED, abruption)
Whats new?

- What will arrive on DS for delivery?
- How should we be controlling Blood Pressure?
- Who should receive Magnesium? (and why?)
- When should we deliver?
- When will we see this group of women again?
Hypertension  
Dysmetabolic syndrome  
Diabetes  
Cardiovascular death

Pre-eclampsia  
Preterm delivery

Placenta-mediated disease

SGA  
Preterm delivery

Risk mortality after PE

626,272 births (1967-1992)
All-cause mortality

All causes  2.7 [2.0-3.7]
Cardiovascular  8.1 [4.3-15.3]
Stroke  5.1 [2.1-12.4]

Irgens et al. BMJ 2001
Figures are adjusted hazard ratio [95% CI]
### Long term risk of cardiovascular disease after preeclampsia

**Systematic review and meta-analysis**

**NOTE:** Weights are from random effects analysis

Overall  (I-squared = 80.4%, p = 0.000)

<table>
<thead>
<tr>
<th>Author</th>
<th>CVD cases/</th>
<th>OR (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson et al 2003</td>
<td>48/1043</td>
<td>0.96 (0.82, 1.49)</td>
<td>7.78</td>
</tr>
<tr>
<td>Kaaja et al 2005</td>
<td>10/397</td>
<td>3.24 (1.55, 6.80)</td>
<td>4.65</td>
</tr>
<tr>
<td>Lyke et al 2009</td>
<td>846/33826</td>
<td>1.92 (1.79, 2.06)</td>
<td>11.94</td>
</tr>
<tr>
<td>Mann et al 1976</td>
<td>21/43</td>
<td>3.13 (1.60, 6.14)</td>
<td>5.21</td>
</tr>
<tr>
<td>Rosenberg et al 1983</td>
<td>26/86</td>
<td>1.40 (0.87, 2.28)</td>
<td>7.19</td>
</tr>
<tr>
<td>Croft &amp; Hannaford 1989</td>
<td>39/93</td>
<td>2.39 (1.51, 3.79)</td>
<td>7.48</td>
</tr>
<tr>
<td>Haukkamaa et al 2004</td>
<td>29/32</td>
<td>8.29 (2.45, 28.05)</td>
<td>2.26</td>
</tr>
<tr>
<td>Haukkamaa et al 2009</td>
<td>2/35</td>
<td>0.96 (0.22, 4.21)</td>
<td>1.64</td>
</tr>
<tr>
<td>Smith et al 2001</td>
<td>12/22781</td>
<td>1.81 (0.93, 3.53)</td>
<td>5.26</td>
</tr>
<tr>
<td>Wikstrom</td>
<td>176/12533</td>
<td>2.35 (2.02, 2.74)</td>
<td>11.32</td>
</tr>
<tr>
<td>Hannaford et al 1997</td>
<td>69/3000</td>
<td>1.99 (1.51, 2.61)</td>
<td>9.93</td>
</tr>
<tr>
<td>Mongraw-Chaffin et al 2010</td>
<td>24/481</td>
<td>2.97 (1.93, 4.56)</td>
<td>7.86</td>
</tr>
<tr>
<td>Funai et al 2005</td>
<td>41/1055</td>
<td>5.50 (3.94, 7.68)</td>
<td>9.12</td>
</tr>
<tr>
<td>Irgens et al 2001</td>
<td>27/24155</td>
<td>2.07 (1.40, 3.07)</td>
<td>8.34</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td></td>
<td>2.28 (1.86, 2.79)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**NOTE:** Weights are from random effects analysis

### Cardiovascular disease

- **CVD cases/Non-complicated pregnancies**

Brown et al. 2011
(submitted)

Preterm delivery was not associated with an increased risk of future CV disease

RR 1.28 (0.82-1.99)
Long term management of women at increased risk of cardiovascular disease

**Diet**
- Diet rich in fruit and vegetables lowers BP (7.2/2.8 mm Hg)
- Effects of low fat / low salt diet additive (11.4/5.6 mm Hg)
- Effect of enhanced physical activity additive

**Antihypertensive therapy**
- High normal BP (130-139/85-89 mm Hg) - increased risk CVD (RR 2.33)
- In hypertensive subjects lowering BP reduces risk of CHD / Stroke (RR 0.79 for CHD, 0.54 for stroke for 10 mm fall in SBP or 5 mm fall in DBP)
- Greater the reduction, greater the reduction in risk
- Similar effect in men / women and those with / without H/O CVD

**Lipid-lowering therapy**
- Linear relationship between serum cholestrol and risk CHD
- In hypercholestrolaemic subjects statins reduce risk of CHD / Stroke (OR 0.70 for CHD, 0.81 for stroke)
- Similar effect in men / women and those with / without H/O CVD
NCCWCH Guideline: Hypertension in Pregnancy

**Postnatal management of preeclampsia**

- Measure BP at least 4x daily while in-patient, every 1-2 d for up to 2 w after discharge until off Rx and no HT.
- Consider reducing Rx when BP $<140/90$ mmHg, reduce when $<130/80$ mm Hg.
- Perform medical review at 6-8 w after birth – refer women who still require anti-HT Rx for specialist assessment.

**Management options**

- **Life style advice** for those with modifiable factors (Diet (low GI), exercise, smoking).
- **Pharmacological intervention** in those with:
  - Hypertension
  - Hypercholestrolaemia

Screen for risk factors CVD (HT, proteinuria HDL-C, FBG)

Determine 10 year risk of CVD (QRISK2)

- FH CVD in 1º relative ($<60$ y)
- On antihypertensive Rx at review
  - Treatment stopped
  - Dose reduced
- BP $\geq 140/90$ mm Hg
- PCR $\geq 30$ mg/mmol
- Total-C $\geq 5.0$ mmol/L [$^{16.22}$ mmol/L]
- Total/ HDL-C ratio $\geq 4$
- TG $\geq 1.7$ mmol/L
- Median QRisk2 Risk [IQR]*
  - RR [IQR]

- **Hypercholestrolaemia**

* Risk of CVD (MI or CVA) in next 10 y – RR (personrisk/typical risk [matched for age/ethnicity])

RFs – Age, sex, ethnicity, UK postcode, smoking status, Angina / MI 1º relative $<60$ y, DM, CRD, AF, AF BP treatment, RA, Total/HDL-C ratio, systolic BP, BMI
**High risk**

- ≥ 1 High risk states
- Clinically manifest disease
- Coronary heart disease
- Cerebrovascular disease
- Peripheral vascular disease
- Abdominal aortic aneurysm
- ES/chronic kidney disease
- Diabetes mellitus
- 10-y CVD risk ≥ 10%

**At risk**

- ≥ 1 Major risk factors
- Cigarette smoking
- SBP ≥120, DBP ≥90 mmHg or treated hypertension
- Total-C ≥5.2 mmol/L, HDL-C ≤1.3 mmol/L or treated dyslipidemia
- Obesity (particularly central)
- Poor diet
- Physical inactivity
- FH CVD: 1º relative (<55 y in men or < 65 y in women)
- Metabolic syndrome
- Advanced subclinical atherosclerosis
- Poor exercise capacity
- Systemic A/I collagen VD
- H/O PE, Gestational diabetes or PIH

**Ideal CV health**

- All of these
- Total-C < 5.2 mmol/L untreated
- BP <120/<80 mm Hg untreated
- FBG <5.55 mmol/L
- BMI <25kg/m2
- Abstinence from smoking
- Physically active
  - ≥ 150min/wk mod intensity
  - ≥ 75 min/wk vigorous intensity or combination
- Healthy (DASH-like) diet

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**RFs with special contribution in women**

- Depression & other psycho-social risk factors
- A/I disease (SLE, RA)

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1. Coronary calcification, carotid plaque or thickened IMT
2. On treadmill test and/or abnormal heart rate recovery after stopping exercise
3. SLE or rheumatoid arthritis

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*Mosca et al.*
*Circulation 2011*
• Blood pressure
- Optimal BP (<120/80 mmHg) encouraged through lifestyle approaches (IB)
  (Weight control, increased PA, alcohol moderation, sodium restriction, ↑ fruit/veg/low-fat diary products)
- Pharmacotherapy when BP ≥ 140/90 (≥ 130/80 in CRD/DM) (IA)
  Thiazide diuretics should be part of regime (unless contraindication or indication for other agent.
  Initial treatment for women with acute coronary syndromes or MI should be with β-blocker &/or ACE/ARBs

• Lipids
- Optimal lipid levels (LDL-C < 2.59 mmol/L, HDL-C > 1.29 mmol/L, TG <1.71 mmol/L)
  encouraged through lifestyle approaches (IB)
- Pharmacotherapy for LDL-C lowering
  (a) High risk women (e.g. CHD) (IB)
  (b) At-risk women
    - if LDL-C ≥ 3.37 mmol/L, there are multiple RFs & 10 y risk 10-20% (IB)
    - if LDL-C ≥ 4.12 mmol/L and there are multiple RFs even if 10 y risk <10% (IB)
    - if LDL-C ≥ 4.90 mmol/L regardless of RFs (IB)
When seen again?

Either

pregnancy ± complications

Or

20-30 years later either in A and E or listed for a TKR with a dodgy ECG
Thank you