Hypertensive and renal disorders in pregnancy

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Overview – Hypertension and CKD in pregnancy

- Pathophysiology in pregnancy & pitfalls
- Management of hypertension
- Management of CKD
- Special cases
  - Pregnancy in renal transplant recipient
  - Pregnancy in CKD 5
- Conclusion
## Pathophysiology during pregnancy

### Changes
- ↑renal size, dilation of pelvicalyceal system
- ↑renal plasma flow – max by 2T – then falls to 50% above prePregnancy - 3T
- GFR changes Creat/urea Fall
- Proteinuria common but usually < 300mg / day

### Pitfalls
- eGFR not validated in pregnancy
- Focus: creatinine
- “Creatinine critique”
- Beware : creatinine little or no fall in pregnancy!
Medical management pregnant pts with chronic hypertension and/or CKD

- Ideal: counsel preP
- MDT Obstet + Physician
  - antihyperT review

- Review early in
  - BP
  - Check renal biochem, fbc
  - Dipstick : prot >= 1+
    - Protein: creatinine ratio

- Review BP Rx
- Consider aspirin
- Monitor monthly

Focus: Awareness of risk

- Hypertension (PET)
- Renal function
- Foetal growth

- Stage 4-5 CKD, or transplant – “Special”
  Expert joint care with nephrology team
Terminology

- Chronic hypertension – known pre-pregnancy or detected before 20/40
- Gestational hypert – new HyperT > 20/40
- PET – new hypertension with proteinuria > 20/40
- Elampsia – convulsion with PET

Reduce risk hypertensive disorder in pregnancy

Recognise increased risk

- Chronic hypertension
- HyperT in prev Preg PET in 25-50% if previously severe
- CKD
- SLE, DM

Risks

- Mother: death
- Foetus: death, pre-term, low Birth Weight
Management of hypertension in pregnancy 2

Chronic hypertension

- Preconception counsel + review antihypertensives
- Avoid ACEI, ARB, diuretics
- Any antihyper used on basis benefit outweighs risk
- Counsel: risks mother and foetus
- Aspirin 75mg daily (& other high risk categories)
- Aim BP < 150/100 (avoid DBP < 80)

Antihypertensives Rx

- 1st line Labetolol
- 2nd Methyldopa
- 3rd Nifedipine (used widely – but recommend avoid < 20/40)
- Atenolol – used widely in past – not recommended
Management of women with chronic kidney disease (CKD) in pregnancy

• Multidisciplinary team key
• Outcome relates to
  – Pre-pregnancy level of renal function
  – Degree of proteinuria
  – Hypertension
• Women RRT/ renal transplant – special group
<table>
<thead>
<tr>
<th></th>
<th>Mild Cr &lt; 125 umol/l</th>
<th>Moderate Cr 125-220</th>
<th>Severe Cr &gt;220</th>
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<tbody>
<tr>
<td>Hypertension</td>
<td>20</td>
<td>62</td>
<td>82</td>
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<tr>
<td>PET</td>
<td>20</td>
<td>58</td>
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<tr>
<td>Foetal growth restriction</td>
<td>4</td>
<td>35</td>
<td>43</td>
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<tr>
<td>Pre-term delivery</td>
<td>5</td>
<td>30</td>
<td>86</td>
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<td>Live birth rate</td>
<td>98</td>
<td>88</td>
<td>64</td>
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<tr>
<td>Mother: Loss renal function</td>
<td>5</td>
<td>50</td>
<td>75</td>
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<tr>
<td>Mother: ESRF</td>
<td>0</td>
<td>23</td>
<td>40</td>
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Kapoor et al, The O&G 2009; 11: 185-191
Medical management pts with CKD

• Ideal: counsel preP
• MDT

• Review early
  – BP
  – Check renal biochem, fbc
  – Dipstick :prot >= 1+
    • Protein: creatinine ratio

• Review BP Rx
• Consider aspirin
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Focus of management

• Hypertension
• Renal function
• [Foetal growth]

• Advanced CKD
  Anaemia
  Dialysis
    – Biochemistry/acidosis
    – Hyperkalaemia
    – CCF / pulmonary oedema
Pre-pregnancy counselling CKD

- MDT obstet + nephrol
- Fertility (CKD)
- Pregnancy outcome
- Risks to long term health
  - Major influence: pre-preg renal impairment

Discussion to include:
- PET
- Growth restriction
- Pre-term birth
- Foetal loss
- Risk (mother) decline renal function post Preg
Renal Transplant

Pre-dialysis and Dialysis patients (CKD stage 5)
• Age 10: Diagnosis: Reflux Nephritis

• Age 16: Stage 5 CKD – CAPD planned
• New Years Day 1997 re-emptive Renal transplant QEH (Tacrolimus/Azathioprine)
• Tx year 1 – stormy- recurrent rejection
• Transplant failed 2/2002 (5years) > H/dialysis
• 2\textsuperscript{nd} Transplant November 02 (9 months h/d)
• Baseline cr 122 - 140

• ImmunoRx:
  – Tacrolimus
  – Prednisolone (5mg)
Ms CD

- Routine transplant Clinic Review

- Feeling sick
- No periods - 8 months
- Firm palpable mass suprapubically
- Same day u/s - live pregnancy 26+3 weeks

- Patient “shocked, but taken news well”
- Referral to joint renal/antenatal clinic
Ms CD

Joint antenatal clinic 30/40
BP: 134/92 (atenolol 50mg)
Proteinuria: 1+

Transplant function:
• Creatinine 114 (122-140)

Immunosuppression:
• Tacrolimus 1.2 (low)

“good progress”

33/40
• Labour – emergency c/s
• Foetus: systemic enterovirus sepsis
• Died 6/7 later
Mrs CD - creatinine
Ms CD

- July 2008 (5 months after death of “Angel”)
- Seeking pre-conception counselling: further pregnancy
- BMI 34
- 136/96 (atenolol 25mg)
- Creatinine 156, eGFR 36
- Pt and mother want referral for donor insemination (no male partner)
- Counselling advice?
Ms CD

- Counselling: risks of:
  - PET
  - Prematurity, IUGR
  - Foetal loss
  - Risk to transplant
- Wants pregnancy now!
  - Loose wgt, pt keen to stop atenolol

- Sept 2009
  - Obstetric review re donor insemination.
  - Special cases funding request to PCT
  - Referral: ethics committee assisted conception unit BWH
Ms CD

- March 2009
  - Ethics c’ttee: Required family review (mother) – sole carer in event of death of daughter. Care in the event of child disability.

- September 2009
  - Pregnant. Missed m/c
  - Not sub-fertile!

- December 2009
  - 11/40 pregnant
  - 160/110 labetolol
  - Creat 126
CD – creatinine
(successful delivery June 10)
Background:

March 2010

- Miscarriage – referred renal: cr 290 eGFR 17
- No history renal disease

Jan 2009 during pregnancy creatinine 96
- (creat 2005 60)

- U/S kidneys normal

- Renal biopsy: ESRF 23/26 glomeruli sclerosed
Mrs SO

- March 2011 - 11/40 pregnant G5P4

- Creatinine 400
  - eGFR 10
    (not on dialysis)

- BP normal (no Rx)

- Counselling:
  - 90% PET/Hypertension
  - 90% growth restriction
  - 90%+ pre-term
  - Less than 50% live birth rate

- ~100% loss of independent renal function
Mrs SO - principles managing pregnancy

- MDT review
- Monitor BP
- Correct anaemia
- Optimise uraemia
- BP Rx not required
- IV iron, EPO
- Start h/dialysis (early)
- 5 x week 20/40, then 6 x week
- Aim peak urea < 17
creatinine during pregnancy
control of uraemia
Case 2

• Successfully Delivered ~ 37/40

• Growth restricted

• No renal recovery (on h/d & plan transplant)
Pregnancy in dialysis patients
Hou S CJASN 2008

• Data collection improved: Registries
• Outcome transformed from 1980s
• Low conception rate 0.3 - 2.2%
• Infant survival 75% start RRT after conception, 50% if conceive on RRT

Problems:
• 2T loss, stillbirth – reduced by intense RRT (20hrs week+)
• Prematurity 82%, 18% before 28/40
Pregnancy in women on nocturnal haemodialysis

- Nocturnal h/d 36 hrs/wk
- Fertility 22%
- 7 pregnancies 5 women
  - 1 elect TOP
  - 6 successful (5 36wks+)
- (none diabetic)

Baura et al CJASN 2008 (3): 2; 392-396
Summary: Pregnancy in CKD

- CKD 1-4 Outcome depends on:
  - Renal impairment
  - Hypertension/proteinuria

- Organisation of care
  - Multidisciplinary team
  - Counselling (pre-conception)
  - Monitor/ intervention

- Renal transplant
  - Experience with most immuno-suppressives

- Stage 5 CKD
  - Outcomes transformed
  - Intensive dialysis
  - Pregnancy set to be more common with Nocturnal H/D