HYPERTENSION IN PREGNANCY, PRE-ECLAMPSIA AND ECLAMPSIA GUIDELINE

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CHANGE RECORD			
Date	**Author**	**Nature of Change**	**Reference**
August 2012	Sue Sallis	Minor Template Changes and update	V2
November 2012	Sue Sallis	Changes to section 5	V3
November 2013	Sue Sallis	Changes and update	V4
May 2014	Obstetric Guidelines Group	Amendment to monitoring form – frequency of audit	V4.1

CONTENTS

HYPERTENSION IN PREGNANCY, PRE-ECLAMPSIA AND ECLAMPSIA GUIDELINE

1 INTRODUCTION

Hypertensive disorders during pregnancy carry risks for the woman and the baby and is one of the leading causes of maternal death in the UK. In the last reported triennium of *Saving Mothers' Lives* 19 maternal deaths were the result of eclampsia or pre-eclampsia (CMACE 2011). The risks to the baby are higher rates of perinatal mortality, preterm labour and low birth weight.

Most hypertensive disorders that occur during pregnancy develop for the first time in the second half of pregnancy. New hypertension can occur without significant proteinuria (gestational hypertension) or with significant proteinuria (pre-eclampsia). Hypertensive disorders can occur in women with chronic hypertension (pre-existing hypertension) (NICE 2010).

Pre-eclampsia is a multi-systemic disorder unique to pregnancy which is usually associated with hypertension and proteinuria. It rarely presents before 20 weeks.

Eclampsia: One or more generalised seizures in association with pre-eclampsia. It can occur even if the blood pressure is normal.

Gestational hypertension (previously Pregnancy Induced Hypertension) a new onset of raised blood pressure without maternal or fetal signs of pre-eclampsia

Pre-existing hypertension (chronic hypertension) present at booking or before 20 weeks. Can be primary or secondary aetiology.

Degrees of Hypertension

Mild	Diastolic blood pressure **90-99mmHg**, systolic blood pressure **140-149mmHg**
Moderate	Diastolic blood pressure **100-109mmHg**, systolic blood pressure **150-159mmHg**
Severe	Diastolic blood pressure **≥110mmHg**, systolic blood pressure **≥160mmHg**

2 PURPOSE

All women with hypertension in pregnancy, pre-eclampsia and eclampsia will be managed as per this guideline.

3 SCOPE

This guideline applies to all midwives and medical staff employed by the Hull and East Yorkshire NHS Trust who care for women with hypertension in pregnancy, pre-eclampsia and eclampsia

4 DUTIES

The following section details staff duties and responsibilities for the implementation of this guideline. The following list is a guide only and is not exhaustive:

4.1 Obstetric Consultant

- Clinical lead for the management of women with hypertension, pre-eclampsia/eclampsia throughout pregnancy and birth
- Develops a management care plan which is documented in the woman's hospital maternity records and/or the handheld records
- Attend in person in the event of the clinical situation of eclampsia

4.2 Obstetric Registrar

- Supports the Consultant Obstetrician with the woman's management plan
- Is the lead for each maternity episode in the absence of the Consultant Obstetrician

4.3 Senior House Officer

- Provides medical review of women presenting with hypertension and pre-eclampsia
- Refers to the Obstetric Registrar to discuss the woman's management plan

4.4 Consultant Anaesthetist

Will be available to assist at the request of obstetric and midwifery staff

4.5 Labour Ward Coordinator

Responsible to coordinate the management and communication between the multidisciplinary team

4.6 Midwife

- Refers to a Consultant Obstetrician all woman identified in the antenatal period with a hypertension disorder
- Refers to a Consultant Obstetrician/Obstetric Registrar if women present with a hypertension disorder in labour
- Coordinates and supports the woman with a multidisciplinary care plan including communication and documentation of discussions in the maternity hospital or/and the woman's handheld records

4.7 Porters

Responsible for the expedited collection and delivery of blood samples for biochemistry, and assist with the transfer of the woman on a bed/trolley and the equipment to HDU / ICU.

4.8 Identified Scribe

Responsible for documenting all events and management decisions as they occur in cases of eclampsia.

5 CONTENT

Severe Pre-Eclampsia and Eclampsia

5.1 Risks Factors

Some women are more at risk of developing pre-eclampsia. Factors indicating moderate risk are:

- First pregnancy
- Age 40 years or older
- Pregnancy interval of more than 10 years
- Body mass index (BMI) of 35 or more at first visit
- Family history of pre-eclampsia
- Multiple pregnancy

Factors indicating high risk are:

- Hypertensive disease during previous pregnancy
- Chronic kidney disease
- Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- Type 1 or Type 2 diabetes
- Chronic hypertension

Midwife/Obstetrician to advise women with two moderate or one high risk factors for pre-eclampsia to take 75 mg of aspirin* daily from 12 weeks (or at booking if later) until delivery. Importance of attending antenatal reviews to monitor for hypertension disorders will be discussed by the community midwife. See Appendix 2 for GP referral letter.

5.2 Assessment and diagnosis of pre-eclampsia and eclampsia

5.2.1 Assessment and diagnosis of pre-eclampsia
Assessment by Community Midwives or GP

During any appointment or presentation at the GP or with a community midwife with a gestation greater than 16 weeks the following assessment and action is required:

<table>
<tr><th>Blood Pressure</th><th>Proteinuria / Symptoms</th><th>Investigation</th><th colspan="2">Management/Treatment</th></tr>
<tr><td>Systolic ≥150
Diastolic ≥100</td><td>+ or - Proteinuria
or *Symptoms</td><td>→</td><td colspan="2">Refer to ADU</td></tr>
<tr><td>No hypertension</td><td>> 1+ Proteinuria
and symptoms</td><td>→</td><td colspan="2">Refer to ADU</td></tr>
<tr><td>No hypertension</td><td>2+ Proteinuria
No symptoms</td><td>MSU</td><td colspan="2">Refer to ADU in 48hrs</td></tr>
<tr><td>No hypertension</td><td>1+ Proteinuria
No symptoms</td><td>MSU</td><td colspan="2">CMW see once weekly</td></tr>
<tr><td rowspan="2">Systolic
140-149
Dyastolic
90-99</td><td rowspan="2">No Proteinuria
and
No Symptoms</td><td rowspan="2">Full blood count
&
Biochemical profile

Results actioned in 3 days</td><td>Results normal</td><td>CMW see once weekly
If no further symptoms or ↑BP bloods not to be repeated</td></tr>
<tr><td>Platelets <100
and or
ALT ≥ 45</td><td>ADU referral within 24hrs</td></tr>
</table>

If less than 16 weeks and the BP is uncontrollable following a GP review. Refer to the multidisciplinary team.

* Epigastric pain, vomiting, headache, visual disturbances, reduced fetal movements, small for gestational age fetus

Criteria for Antenatal Day Unit Assessment and Management

During any appointment or presentation at the Antenatal Day Unit the following assessment and action is required:

<table>
<tr><th>Blood Pressure after x 3 BP</th><th>Proteinuria/Symptoms</th><th>Investigation</th><th colspan="2">Management/Treatment</th></tr>
<tr><td>>150
>100</td><td>+ or - Proteinuria or Symptoms</td><td rowspan="3">• FBC
• BCP
• MSSU
• PCR
• <36 weeks Liquor Volume & Doppler</td><td colspan="2">Medical review- Re treatment with Labetalol</td></tr>
<tr><td><150
<100</td><td>>1+ Proteinuria or Symptoms</td><td colspan="2">Reg review to discuss with Consultant on call if woman requires admission</td></tr>
<tr><td rowspan="2"><150
<100</td><td rowspan="2">≤1+ Proteinuria
Not symptomatic</td><td>Normal Results</td><td>MW's Discharge home weekly review</td></tr>
<tr><td>Abnormal results</td><td>Discuss with on call SpR</td></tr>
</table>

Assessment of proteinuria in pre eclampsia

- **1+ protein and above on dipstick - send MSU to exclude UTI and a urinary Protein Creatinine Ratio (PCR) to estimate proteinuria**
- **Diagnose significant proteinuria if urinary Protein Creatinine Ratio (PCR) > 30 mg/mmol**

<u>Once significant proteinuria diagnosed NO NEED to repeat PCR , just monitor renal function with BCP (creatinine, potassium, albumin)</u>

As part of all antenatal reviews, the midwife/obstetrician will assess for pre-eclampsia.

Severe pre-eclampsia is identified by severe hypertension with proteinuria or mild or moderate hypertension with proteinuria with at least one of the following:

- **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 > 70iu/litre)**

As part of the assessment where **pre-eclampsia** is suspected **basic blood investigations** are undertaken by obtaining a Full Blood Count (FBC) and a Biochemical Profile (BCP) which will include kidney function, full blood count, electrolytes, transaminases, bilirubin (NICE 2010). The frequency of blood investigations are in relation to the defined blood pressure recording as follows:-

NICE (2010) Blood pressure definition	Frequency of FBC and BCP obtained
Mild hypertension- BP 140/90-149/99 mmHg	x 2 weekly
Moderate hypertension -BP 150/100-159/109 mmHg	x3 a weekly
Severe hypertension - BP > 160/110mmHg	x 3 times a weekly unless on the Critical Care Pathway

A diagnosis of pre-eclampsia will be ascertained by the results of the above assessment

Blood tests are repeated more frequently if abnormal. All results will be recorded on the results flow chart within the woman's maternity hospital records unless on the Critical Care Pathway where they will be recorded on the Intensive Care Protocol document.

5.2.2 Assessment and Diagnosis of Eclampsia
All seizures in pregnancy/pueperium are to be treated as Eclampsia until proven otherwise. Further assessments to ensure accurate diagnosis would be basic blood investigations and clinical assessment as required for pre-eclampsia.

5.3 Communication between Professionals

5.3.1 Pre-eclampsia
Where a woman has severe pre-eclampsia the midwife caring for the woman will inform the labour ward coordinator who will liaise with the Obstetric Registrar.

The Obstetric Registrar will assess the woman and decide if commencement of the Critical Care Pathway is required.

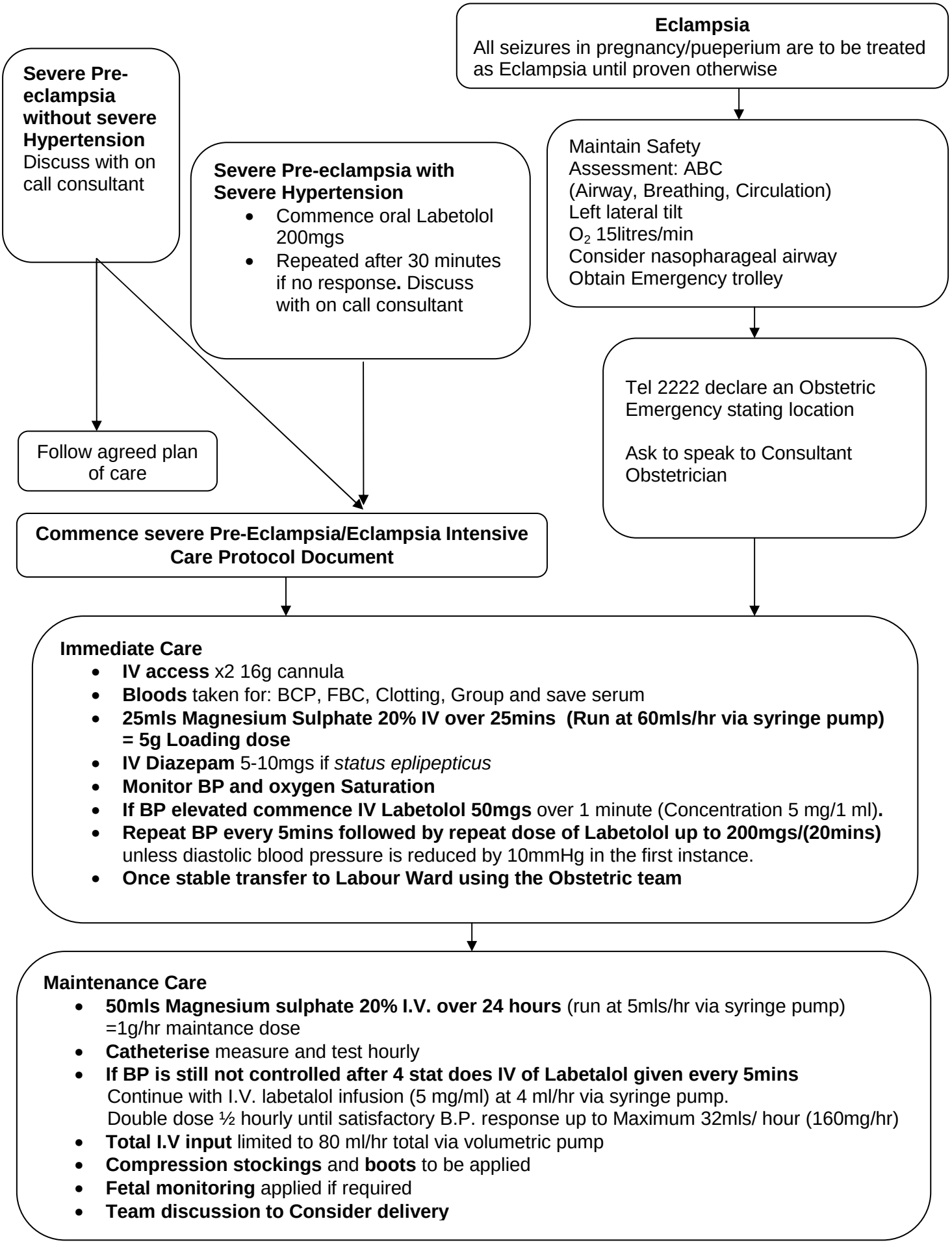
The Obstetric Registrar or an allocated member of the team will contact the Consultant Obstetrician and the Consultant Anaesthetist to discuss commencement of the Critical Care Pathway

Where delivery is required the Registrar / Obstetric Consultant will contact the on call Paediatrician to discuss optimum timing of the delivery to improve best possible outcome

Documentation of these discussions will be in the Intensive Care Protocol document or antenatal care plan.

5.3.2 Eclampsia
The communication plan to be followed for eclampsia is detailed at Appendix 4.

5.4 Critical Care Pathway of severe Pre-eclampsia & Eclampsia



5.5 Inpatient Management – Antenatal, Labour and Postnatal Wards

Monitoring on the Antenatal / Postnatal Ward- Mild to Moderate Pre-Eclampsia

- **BP/Pulse 15-minute intervals until stabilised/reviewed on the ANC, then 4 times a day unless scoring red on the MEOWS chart**
- Initially check BP manually with the **CORRECT SIZE CUFF** on both arms and act on higher reading, compare to automated readings, (as there can be a difference between the two, when using an automated machine ensure this is documented and trends noted)
- Urinalysis daily
- **Bloods** if not taken in the ANC - **Full blood count, Biochemical Profile, Group and save, Clotting**(PT, KCCT + fibrinogen, FDP`s) only if platelets <100,
- **Fetal Well-being –** CTG, Doppler, liquor volume as clinically indicated
- **Daily obstetric review Inc. Deep Tendon reflexes,**
- **Accurate fluid Balance totalled daily**

All results will be recorded on the results flowchart within the woman's maternity hospital records. Abnormal results/findings to be discussed with the on call SpR/Consultant

Monitoring on the Labour Ward – severe pre-eclampsia

- **Temperature** 4 hourly
- **Continuous pulse oximetry** recorded hourly (If less than 95% ® medical review).
- **BP/Pulse 15-minute intervals for a minimum of 4 hours until stabilised then every 30 minutes**. Initially check BP as above
- **Respiration rate** 1 hourly.
- **Indwelling catheter** -urine measured and tested hourly.
- **Accurate input** (includes all IV fluids and drug diluent)
- **C.V.P**. if sited measured continuously and charted every hour
- **Fetal well-being and CTG**. (Liquor Volume + Doppler as indicated)

This will be documented on the Intensive Care Chart

Monitoring specific to Magnesium Sulphate* Infusion

This infusion requires intensive care and the following close observations to prevent Magnesium Sulphate Toxicity :-

Observations

- Continuous pulse oximetry (If less than 95% ® medical review).
- Urine output is more than 80mls in previous 4 hours.
- Hourly respiratory rate >12
- Deep tendon reflexes, after the first hour, then 4 hourly (Biceps if epidural in situ) and before each syringe is changed.
- **If the above criteria are not met then further administration of magnesium sulphate should be withheld.**

Every 4 hours and prior to starting a new syringe the following observations should be made: General review by the Obstetric staff including

- Biceps reflex is present
- Respiration rate is more than 12/min.
- Urine output is more than 80mls in previous 4 hours. (Beware of pulmonary oedema)

The Antidote to Magnesium Sulphate Toxicity is 10ml 10% calcium gluconate given slowly intravenously over 1 minute.

97% of magnesium is excreted in the urine and therefore the presence of oliguria can lead to toxic levels. If the above criteria are not met then further administration of magnesium sulphate should be withheld. Magnesium should be re-introduced if urine output improves.

Side Effects:- Motor paralysis, absent tendon reflexes, respiratory depression and cardiac arrhythmia (increased conduction time), respiratory/cardiac arrest, can all occur but will be at a minimum if Magnesium is administered slowly and the patient observed as above.

THERE IS NO NEED TO MEASURE MAGNESIUM LEVELS WITH THE ABOVE

To be recorded on the Intensive Care Chart

* The medical staff are responsible for the assessment of the women and the decision to commence and discontinue magnesium sulphate administration.

5.6 Prevention of Eclamptic seizures using Magnesium Sulphate on Pre-Eclampsia/Eclampsia Intensive Care Protocol:

- Discussion between Consultant Obstetrician and Consultant Anaesthetist may elect for preventative therapy.
- Magnesium sulphate (MgSO4) Protocol-pre diluted 20% vials
- Magnesium sulphate is given as a loading dose followed by a continuous infusion for 24 hours or until 24 hours after delivery - whichever is the later.
- Each syringe should last 10 hours. This regime administers 1g/hour
- Monitoring on the Labour Ward see point 5.5
- Fetal well-being and CTG. (Biophysical + Doppler as indicated) referring to the Hull And East Yorkshire Hospitals NHS Trust guideline for intrapartum assessment of fetal wellbeing available at: http://intranet/guidelines/guidelines/180.pdf

5.7 Management of Recurrent Seizures

- Consider repeating the loading dose of Magnesium Sulphate
- Increase infusion of magnesium sulphate to 1.5 g/hr.
- Continue observations and consider the need for ventilation. (If the woman is known to have epileptic fits, refer to guideline, The management of pregnancy in women with epilepsy, available at: http://intranet/guidelines/guidelines/155.pdf
- IV Diazepam 5-10mgs slowly

5.8 Blood Pressure Control

The following flowchart on page 10 describes the procedure for management and treatment of blood pressure.

Blood Pressure Control (BP)

Note. BP ≥ 150/100mmHg requires prompt medical treatment

Eclampsia

Pre-eclampsia

NO Pre-eclampsia
Gestational Hypertension / Essential Hypertension

Labetalol 200 mgs orally (Where Labetolol is contraindicated see **NB** below)

Repeat Labetalol 200mgs orally after 30 minutes If no response Inform the Consultant Obstetrician on duty after a further 30 minutes

If BP elevated/unresponsive transfer to labour ward and commence **Intensive Care Chart (Option 2 for hypertension)**

Commence IV Labetalol **bolus** 50mgs (concentration 5mgs/1ml) over 1 minute
If **NO response with in 5min repeat up to a max of 200mgs**
Monitor BP before each dose increase.

Commence a IV infusion of Labetalol (5mg /ml) at 4ml/hr via syringe pump.
Double the dose every ½ hourly until Maximum of 32mls /hour (160mg/hr.)
or a satisfactory BP response ≤140/90.

If Antenatal continuous CTG monitoring >26weeks during IV Labetalol infusion

Responsive **Responsive** **Unresponsive**

Once Blood pressure has reduced and stabilised for 2 hours.
Decrease the infusion by ½ once every 30 minutes

Once complete, commence oral antihypertensive and discontinue ICU chart

Blood pressure to be taken 4 times a day whist in hospital and daily urinalysis as a minimum

If still no response**, OPTION 1** consider **SECOND LINE** antihypertensive, **Nifedipine 10mgs** orally (not a slow release tablet) or **OPTION 2** commence IV Labetalol
Commence CTG monitoring.
Choice of treatment, option 1 or option 2 will be on Consultant Obstetrician decision.

OPTION 1
BP should be taken every 10mins in the first ½hr after treatment as there can be a marked drop in BP following Nifedipine

OPTION 1
If unresponsive follow flow chart for IV Labetolol

Reduction in blood pressure to ≤140/90
Consider an oral maintenance dose

Blood pressure to be taken 4 times a day whilst in hospital and daily urinalysis

If responsive it should be repeated 6hrly.

Postnatally then changed to a slow release tablet which last 12 hourly

If 2 antihypertensive required to control BP. Consultant review required within 24 hours

NB If Labetalol fails to control BP once the maximum dose achieved **OR** if labetolol is contraindicated the Second Choice is Nifedipine 10mgs orally as above
*(**not** slow or modified release)*
Consider *Hydralazine* if no response to labetolol or Nifedipine

Blood Pressure control of pre-eclampsia / eclampsia, gestational hypertension / pre-existing hypertension is to treat hypertension (and especially systolic hypertension) quickly and effectively

NOTE. BP ≥ 150/100mmHg requires prompt medical treatment

As a guide with Pre-eclampsia/ Eclampsia in the Antepartum / Intrapartum period Management for stabilization of BP is to reduce diastolic BP by 10mmHg in the first instance and maintain the blood pressure between 130/80 and 140/90

Blood pressure to be monitored 4 times a day whilst in hospital and daily urinalysis as a minimum

5.9 Fluid Balance For Pre-Eclampsia and Eclampsia

Careful fluid balance is aimed at avoiding fluid overload. The procedure for avoiding fluid overload antenatally is the following:

- Total IV input limited to 80 ml/hr total.
- If syntocinon is used it should be at high concentration and the volume of fluid included in the total input.
- Oliguria - no action except encourage early delivery.
- Oral fluids should be limited.

Postnatal woman should be fluid restricted in order to wait for the natural diuresis which occurs sometime around 36-48 hours post-delivery.

- Total 80 ml I.V. fluid hourly.
- After delivery oral fluids can be given in a relatively unrestricted way.
- Urine output hourly - Each four-hour block should be totalled and charted. Aim for at least 80 ml in 4 hours (refer to YOCCG 24 hour high dependency chart).
- If 2 x 4 hour blocks less than 80 mls each then there are two possible courses of action:

Action 1 – If the total INPUT LESS than TOTAL (output +750mls) the following action to be taken:

- Px Gelofusine 250 mls. over 20 minutes.
- Watch output over 4 hours
- If less than 80 mls px 20 mgs I.V. furosemide
- If greater than 250 mls in 1 hour after the Frusemide, then give extra 250 mls Gelofusine on top of baseline fluids

Action 2 – If the total INPUT GREATER than Total (OUTPUT + 750mls) the following action to be taken:

- Px IV Frusemide 20mgs
- Watch output over the next 4 hours
- If greater than 250ml in 1 hour after the Frusemide then give extra 250mls of Gelofusine on top of the baseline fluids

See Appendix 5 for examples.

Points to consider for management

- Persisting oliguria requiring fluid challenge or furosemide requires the electrolytes to be assessed and checked six-hourly.

- Concern over a rising creatinine and or potassium will be discussed with a Consultant.
- Reduction in oxygen saturation is most likely due to fluid overload. Input and output should be assessed together with either clinical or invasive assessment of the fluid balance. The most appropriate treatment is likely to be furosemide and oxygen.
- If no diuresis and the oxygen saturation does not increase referral to the medical renal team will be considered.
- Large volumes of colloid such as fresh frozen plasma, blood or platelets can lead to fluid overload.
- Significant haemorrhage or HELLP will be managed by a Consultant Obstetrician and Anaesthetist

5.10 Thromboprophylaxis

All women should have compression stockings and boots whilst **immobile**, in the antenatal, Intrapartum and postnatal period if a Low Molecular Weight Heparin (LMWH) is not prescribed.

If a (LMWH) is to be given with an epidural or spinal already in-situ, discuss with anaesthetist on call. The same consideration is to be given after spinal or general anaesthesia (Ref guideline for Thromboprophylaxsis) http://intranet/guidelines/guidelines/111.pdf Any woman on LMWH in the Antenatal period cannot have regional analgesia 12 hour from the last does of prophylactic heparin, or 24 hours from the last does of therapeutic LMWH.

AN EPIDURAL CATHETER SHOULD BE LEFT IN PLACE UNTIL 12 HOURS AFTER LOW MOLECULAR WEIGHT HEPARIN HAS BEEN GIVEN

In the case of severe pre-eclampsia where the platelet levels are less than 50-109/l and coagulation screen abnormal;

- Increase D Dimer
- Fibrinogen below 2g unit
- PT and APPT abnormal

Prophylactic thromboprophylaxis should be provided with compression stockings and compression boots. FRAGMIN SHOULD BE WITHHELD

The coagulation screen including FBC/PT/APTT should be assessed on a daily basis and once the platelets are stable above 50 with PT and APTT within normal limits and fibrinogen more than 2g prophylactic Fragmin can be initiate.

5.11 Fetal assessment and delivery planning

During the assessment for pre-eclampsia and eclampsia an assessment of the fetus will also take place via ultrasound and/or CTG monitoring where gestation is over 26 weeks. If results of any fetal monitoring abnormal the consultant obstetrician will be informed.

Delivery planning will be as follows:

Timing of Delivery

- Delivery will be well planned, done on the best day, performed in the best place, by the best route and with the best support team.
- Once stabilised with antihypertensive drugs and magnesium sulphate a decision will be made. In the absence of convulsions, prolonging the pregnancy may be

possible to improve the outcome of a premature fetus. If mother unstable then delivery is inappropriate and increases risk.

- Achieve delivery particularly of premature infants, during normal working hours.
- If the pregnancy can be prolonged in excess of 48 hours, steroids help mature the fetal lungs.
- In all situations a planned elective delivery suiting all professionals is appropriate.
- Delivery is not necessarily by caesarean section but if gestation is under 32 weeks it is preferable. After 34 weeks vaginal delivery should be considered in a cephalic presentation.
- Delivery timing will be facilitated by Consultant level discussion between Obstetrician, Paediatrician and Anaesthetist.
- The mode of delivery should be discussed with the Consultant Obstetrician.

NB when a women is eclamptic a clinical decision may be made that will require delivery at an earlier opportunity.

Vaginal Delivery

- Vaginal prostaglandins will increase the chance of success.
- Anti-hypertensive treatment will be continued throughout assessment and labour.
- If vaginal delivery is planned then the second stage should be short with consideration given to elective operative vaginal delivery.
- An epidural is recommended

The third stage should be managed with 5 units of I.V. SYNTOCINON NOT Ergometrine or Syntometrine in any form.

- If a decision to deliver at another hospital, the Consultant Obstetrician will discuss and agree transfer with the Consultant Obstetrician at the receiving hospital
- Follow the guideline for transferring a woman to another unit Ref guidelines for transfer in to the Women & Children's Hospital http://intranet/guidelines/guidelines/128.pdf

Postnatal Management

Prior to discharge.

- BP to be routinely monitored or more frequently as clinically indicated until discharge.
- BP to be recorded on day of discharge.
- Antihypertensive medication to continue unless diastolic ≤ 80mmHg (as BP likely to rise again at 48 to 72 hours postnatal).

On discharge

Discharge requires an obstetric review, care will not be transferred to midwifery led. Take home antihypertensive medication will be given unless diastolic ≤ 80mmHg.

Blood Pressure	Blood results	Obstetric discharge management
<150/100	Normal	1. Discharge completed 2. Take-home antihypertensive medication given
≥150/100	1. Abnormal with an improving trend & 2. Asymptomatic	Discuss with SpR/Con re-discharge and antihypertensive take home medication

≥150/100	1. Abnormal remaining stable or deteriorating. 2. Symptomatic	For SpR/Con review Continue antihypertensive

5.12 Postnatal Follow-up

In all cases of severe pre-eclampsia or eclampsia and individualised follow-up plan will be communicated to the GP.

6 PROCESS FOR MONITORING COMPLIANCE

The monitoring of this policy is delivered by the methods as stated in the Monitoring Table contained at Appendix 1.

7 REFERENCES / ASSOCIATED DOCUMENTS

- NICE Guideline: Hypertension in Pregnancy 2010
- CMACE report 2006-2008 Saving Mothers Lives
- Douglas K A, Redman C W G. Eclampsia in the United Kingdom. Br Med J 1994, 309: 1395-1400 Eclampsia Trial Collaborative Group. Which anticonvulsant for women with eclampsia? Evidence from the Collaborative Eclampsia Trial. Lancet 1995, 345:1455-63.
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- Magnesium sulphate regimens for women with eclampsia: messages from the Collaborative Eclampsia Trial. Br J Obstet Gynaecol 1996, 103:103
- R.C.O.G. Guidelines No 10 November 1996 Regional Guidelines for Management of Severe Pre-eclampsia, September 2002.The Magpie Trial collaborative Group, Oxford Lancet Volume 359, No.9321 1st June 2002

8 APPENDICES

Appendix 1 – Monitoring Overview
Appendix 2 – Referral to GP
Appendix 3 – Guidelines for Anaesthetists
Appendix 4 – Lines of communication
Appendix 5 – Fluid balance

Appendix 1

MONITORING OVERVIEW

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements	Acting on recommendations and Lead(s)	Change in practice and lessons to be shared
a. assessment and diagnosis of severe pre-eclampsia/ eclampsia b. clear lines of communication between the consultant obstetrician, consultant anaesthetist, paediatrician and labour ward coordinator c. blood pressure control and fluid balance d. prevention and control of eclamptic seizures e. fetal assessment and delivery planning f. postnatal follow up	Multidisciplinary Team	All women with severe pre-eclampsia / eclampsia requiring Intensive Care will be reported through Datix	Once within the cycle of the guideline or as required following an identified reason from a risk management episode.	All cases of severe and confirmed eclampsia will be discussed at the MDT case review weekly meeting; any issues will be escalated to the obstetric and gynaecology risk management group This information to be reported on a 6 monthly basis to the Labour Ward Forum Cases of Eclamptic Fits are reported via the DATIX Web incident system Labour Ward Forum will receive reports from MDT meetings with regards to severe pre-eclampsia and confirmed eclampsia; action plans following these reports will be monitored via this forum and the integrated governance reports	The Gynaecology and Obstetric Risk Management Group will undertake subsequent recommendations with action planning on a monthly basis Report to the family and Women's Health Governance Group Significant risk issues raised by clinical director to the OGC committee	Required changes to practise will be identified and auctioned within the time frame through the Gynaecology and Obstetric Risk Management Group meeting and will be disseminated to the staff. A lead member of the team will be identified to take each change forward where appropriate. Lessons learned will be shared with all the relevant stake holders

APPENDIX 2

REFERRAL TO GP FOLLOWING IDENTIFICATION OF RISK FACTORS

RE:

Addressograph

DATE

Dear Dr

The above patient of yours has booked for her antenatal care today. She has an increased risk of developing pre-eclampsia in this pregnancy as she has

One of the following high risk factors

(please tick)

- ☐ Hypertensive disease during previous pregnancy
- ☐ Chronic kidney disease
- ☐ Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- ☐ Type 1 or Type 2 diabetes
- ☐ Chronic hypertension

Two or more of the following moderate risk factors:

- ☐ First pregnancy
- ☐ Age 40 years or older
- ☐ Pregnancy interval of more than 10 years
- ☐ Body mass index (BMI) of 35 or more at first visit
- ☐ Family history of pre-eclampsia
- ☐ Multiple pregnancy

NICE clinical guideline 107 – Hypertension in pregnancy recommends **Asprin 75mgs** daily for her **from 12 weeks of pregnancy until the birth of the baby** to reduce the risk of developing pre-eclampsia.

I should be gratefully if you could kindly consider Asprin for her, subject to the usual contraindications.

Thank you

Midwife

APPENDIX 3

GUIDELINES FOR ANAESTHETISTS

Analgesia for Labour
Regional Anaesthesia is the preferred method of analgesia. However consultant advice is required if:

- Platelet count under 80 x 109/l
- Abnormal clotting (PTT or TT)

Opiate infusion or PCAS would need to be considered if epidural was contra-indicated.

Anaesthesia for caesarean section

- Epidural anaesthesia is the preferred method of anaesthesia if already in situ.
- Spinal anaesthesia should be used if no epidural in place or if epidural in labour has failed.
- General anaesthesia should only be used if regional block is impossible or contraindicated.

Management of General Anaesthesia
General anaesthesia can add to the risks of delivery since intubation and extubation can lead to increases in systolic and diastolic blood pressure, as well as heart rate, so should be avoided where possible.

In addition to standard procedures, alfentanil 2 mgm. and labetolol 15 mgm. should be given prior to intubation to obtund hypertensive reflexes.

DO NOT give a non-depolarising muscle relaxant until there is evidence or recovery from suxamethonium. Give only small doses of atracurium thereafter - for example, 5-10 mgm, with nerve stimulator control, if available, since the effect of muscle relaxants is usually prolonged in the presence of therapeutic levels of magnesium sulphate.

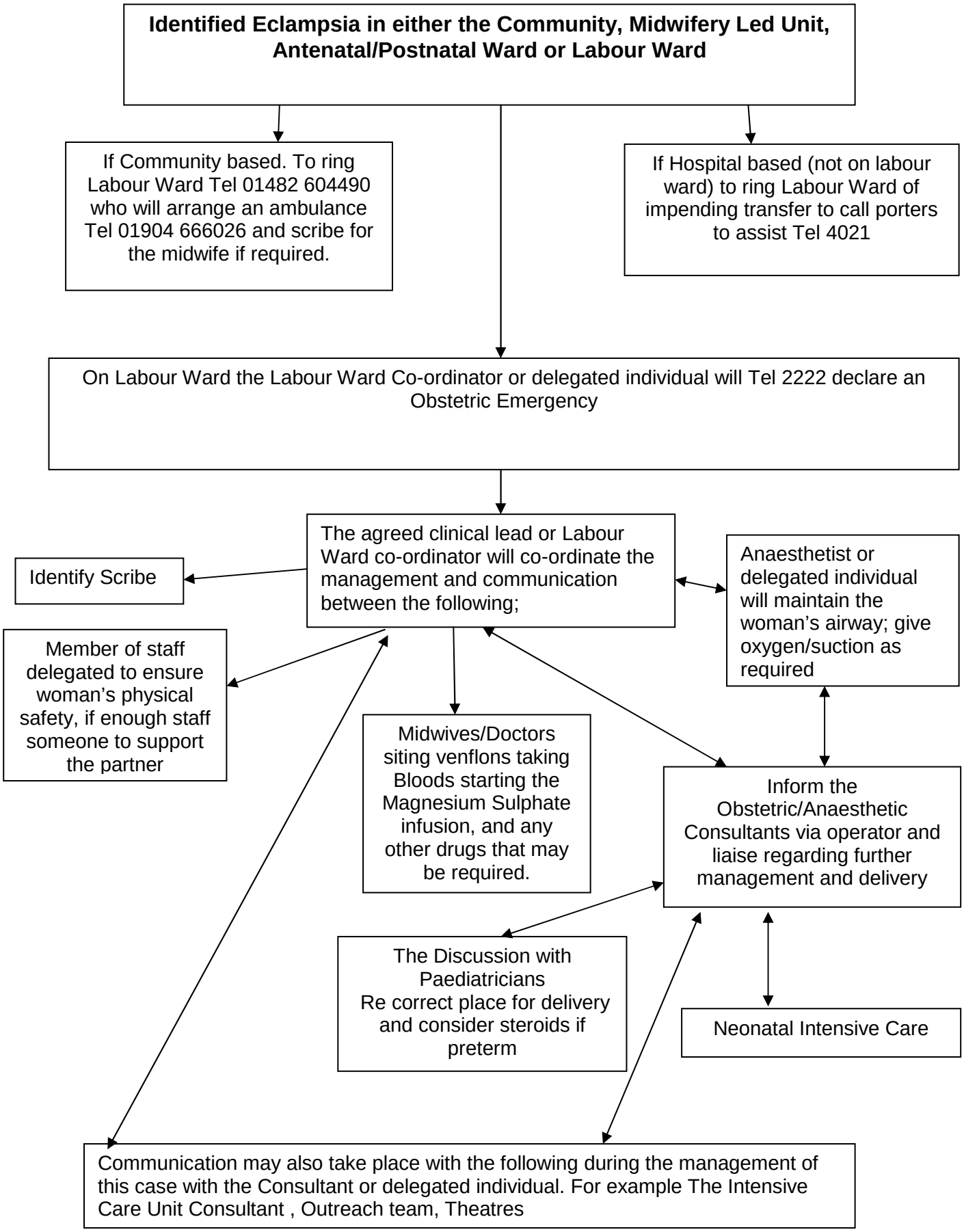
Regional blockage and fluids - Genuine pre-eclamptics tend to maintain their blood pressure, despite regional blockade. When this happens, fluid load is unnecessary and may complicate fluid balance. For this reason, fluid loading in pre-eclampsia should never be done prophylactically or routinely, and should always be considered and controlled. Vasopressors such as ephedrine, phenylephrine or metaraminol should not be given prophylactically. If hypotension does occur, a small dose of ephedrine is usually effective. In women with pre-eclampsia fluid requirements at caesarean section should be carefully considered and use of more than 500mls of fluid, unless to replace blood loss, should be exceptional.

Indications for central venous pressure monitoring a CVP may be indicated:

- if excessive blood loss occurs
- if oliguria fails to respond to the measures described above
- if the patient becomes hypotensive

APPENDIX 4

LINES OF COMMUNICATION



APPENDIX 5

FLUID BALANCE

If 2 x 4 hour blocks less than 80 mls each then there are two possible courses of action:

Action 1 – WHEN INPUT IS LESS GIVE GELOFUSINE 250MLS

If the total INPUT LESS than TOTAL (output +750mls) see Box 1 for example

- Px Gelofusine 250 mls. over 20 minutes.
- Watch output over 4 hours
- If less than 80 mls px 20 mgs I.V. furosemide
- If greater than 250 mls in 1 hour after the Frusemide, then give extra 250 mls Gelofusine on top of baseline fluids

OUTPUT				**BOX 1**					
Urinalysis									
Hourly urine	**5**	**28**	**14**	**10**	**15**	**20**	**12**	**4**	
4hrly rolling total				**57**				**51**	
TOTAL OUTPUT		**33**	**47**	**57**	**72**	**92**	**104**	**108**	**+750 = 858**
INPUT									
IVI(1) Ringers Sol	**0**	**64**	**56**	**52**	**36**	**16**	**12**	**20**	
IVI(2) Mag Sulph	**30+7**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	
IVI(3) Labetolol	**2**	**4**	**12**	**16**	**32**	**32**	**16**	**8**	
CVP Line									
Oral									
Hourly Total	**79**	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	
TOTAL INPUT		**159.5**	**240**	**320.5**	**401**	**481.5**	**562**	**642.5**	**642.5**
DRUGS									
Labetolol Oral	**200+200**								
Labetolol IV	**50+50+50+50**								

Action 2 – WHEN INPUT IS GREATER GIVE IV FRUSEMIDE 20MGS

If the total INPUT GREATER than Total (OUTPUT + 750mls) see Box 2 for example

- Rx IV Frusemide 20mgs
- Watch output over the next 4 hours
- If greater than 250ml in 1 hour after the Frusemide then give extra 250mls of Gelofusine on top of the baseline fluids

OUTPUT				**BOX 2**					
Urinalysis									
Hourly urine	**18**	**21**	**12**	**19**	**6**	**8**	**24**	**10**	
4hrly rolling total				**70**				**48**	
TOTAL OUTPUT		**39**	**51**	**70**	**76**	**84**	**108**	**118**	**+750=868**
INPUT									
IVI(1) Ringers Sol	**80**	**80**	**260**	**64**	**44**	**4**	**64**	**64**	
IVI(2) Mag Sulph	**30+7**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	
IVI(3) Labetolol	**3**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	
CVP Line									
Oral	**200**	**150**			**20**	**40**			
Hourly Total	**359**	**246.5**	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	
TOTAL INPUT		**605.5**	**882**	**962.5**	**1043**	**1123.5**	**1204**	**1284.5**	**1284.5**
DRUGS									
Labetolol Oral	**200+200**								
Labetolol IV	**50+50+50+50**								

Failure to respond discuss with Consultant Obstetrician and Consultant Anaesthetist