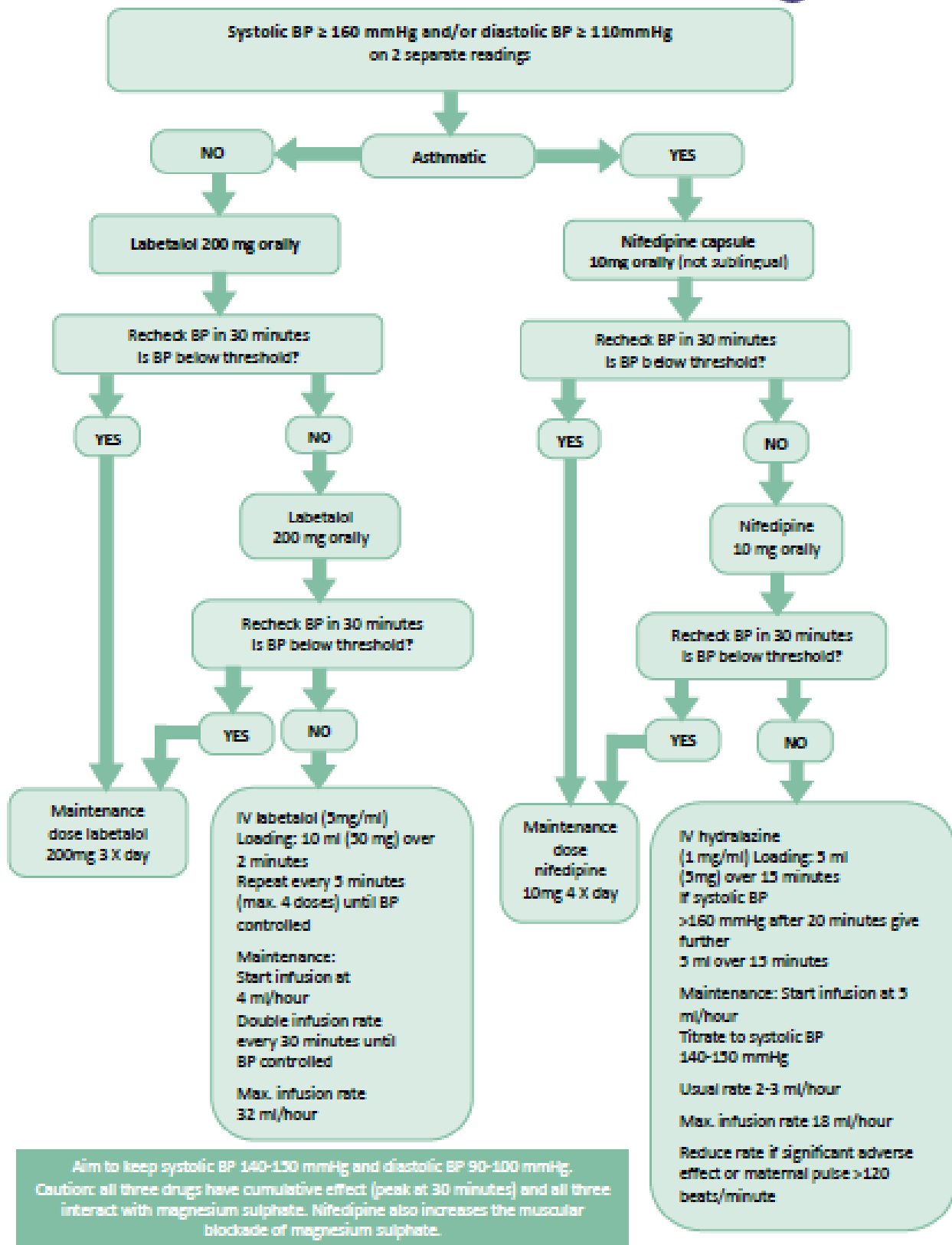




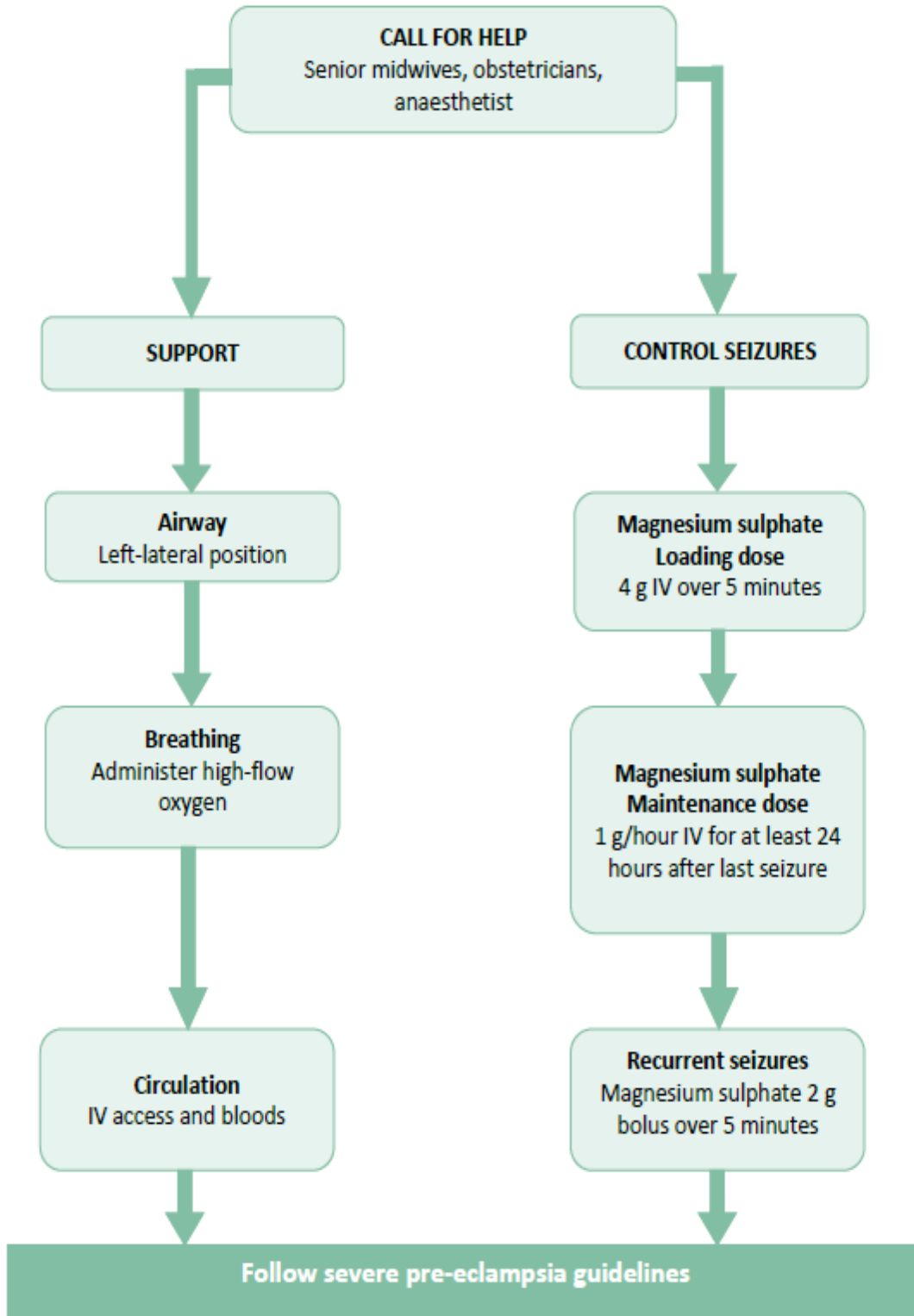
Standard Operational Procedure for the Management of Pre-Eclampsia, Severe Hypertension and Eclampsia

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Severe Hypertension Algorithm



Management of Eclampsia Algorithm



1. Background:

Pre-eclampsia is the most common medical complication of pregnancy and is associated with substantial morbidity and mortality for both mother and baby. The only definitive “cure” is delivery. The U.K. incidence of severe pre-eclampsia is 5/1000 maternities. Eclampsia occurs in 5/10,000 pregnancies with a case fatality rate reported as 1.8%. Most eclamptic fits occur postnatally.

Purpose

- To ensure the early detection and treatment of pre-eclampsia
- To facilitate the best possible maternal and neonatal outcome.
- Ensure the rapid initiation of appropriate treatment for eclampsia.

Definitions

Hypertension: 2 readings of >140/90 at least 4 hours apart.

Severe Hypertension: Diastolic blood pressure \geq 110 mmHg or systolic blood pressure \geq 160 mmHg on two occasions.

Pre-eclampsia: Hypertension new to pregnancy, manifesting after 20 weeks gestation associated with proteinuria (>0.3g in 24hrs)

Severe Pre-eclampsia: Pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical/haematological impairment

Eclampsia: Occurrence of one or more convulsions in association with pre-eclampsia

2. Scope:

This document is for use by all obstetricians and midwives and it applies to all women cared for by St Mary's Hospital Maternity Services.

3. Responsibilities

It is the responsibility of all Midwifery Nursing and medical staff to:

- Access read understand and apply this guidance
- Attend any mandatory training pertaining to the guidance
- It is the responsibility of the department to:
- Ensure the guideline is reviewed as required in line with trust and national recommendations
- Ensure the guideline is accessible to all relevant staff

4. Procedure:

4.1 Risk factors for pre-eclampsia

Women at high risk of developing pre eclampsia are those with any of the following:

- Pre-eclampsia in a previous pregnancy.
- Pre existing hypertension or booking diastolic BP ≥ 90 mmHg.
- Pre existing renal disease or booking proteinuria $\geq 1+$.
- Antiphospholipid syndrome or SLE
- Type I or type 2 diabetes

Women at moderate risk of developing pre eclampsia are those with any of the following:

- first pregnancy
- age ≥ 40
- BMI ≥ 35
- mother or sister with pre-eclampsia
- pregnancy interval > 10 years.
- Multiple pregnancy

Women identified as having one high risk factor or two moderate risk factors should be referred to the consultant antenatal clinic for further management.

NICE guidance advises that these women should take 75mg aspirin daily from 12 weeks until delivery.

4.2 Thresholds for further action in the community after 20 weeks

Blood pressure and urinalysis must be checked at every antenatal visit

1. No proteinuria

Blood pressure	Action
BP 140/90 – 149/99	measure BP and test for proteinuria weekly.
BP 150/100 – 159/109	refer to MATU within 48hrs to check PET bloods and start anti-hypertensives.
BP \geq 160/110	Admit to hospital

2. Proteinuria \geq 1+

Blood Pressure	Action
BP > 140/90	Admit to hospital
BP < 140/90	Check PCR and if raised refer to MATU within 48hrs

4.3 Assessment of women referred to the ward

Women referred to the ward should have the following:

- Serial blood pressure readings, at least 4 hourly.
- Blood tests: full blood count (FBC), liver function tests (LFT), urea and electrolytes (U+E), creatinine and urate (clotting studies are only necessary if severe pre eclampsia or platelets are below 100)
- Quantification of proteinuria with either protein creatinine ratio (PCR) or 24hr urine collection. Significant proteinuria is diagnosed if the PCR > 30mg/mmol or a 24-hour urine collection is > 300mg. Once significant proteinuria is diagnosed, further assessment of proteinuria is not necessary.
- Cardiotocograph (CTG)

- Consider ultrasound for estimated fetal weight, liquor volume and doppler studies.

Women must be reviewed, with the test results, by the registrar/consultant and a decision made for further management. This plan of care must be clearly documented in the notes.

4.4 Timing of delivery following diagnosis of pre-eclampsia

Before 34 weeks

If severe hypertension resistant to treatment or deterioration in maternal or fetal condition recommend delivery following discussion with NICU and completion of course of corticosteroids

34-37 weeks

Recommend delivery for women diagnosed with pre-eclampsia 34 – 37weeks when blood pressure controlled and course of corticosteroids completed.

After 37 weeks

Recommend delivery within 24-48hrs

4.5 Management of Severe Pre Eclampsia

Communication

The registrar or the labour ward co-ordinator must inform the on call consultant obstetrician about any woman thought to have severe pre-eclampsia.

The on call anaesthetist and the consultant anaesthetist must also be informed.

The labour ward co-ordinator must be informed of all decisions.

In cases of prematurity < 35 weeks, NICU must be informed.

Monitoring

Women should be cared for on a one to one basis by an experienced midwife in the high dependency area of labour ward. (Level 2 critical care).

- A maternity intensive therapy chart should be used to record all observations and investigation results.
- BP at least every 15mins.

- Catheterise and record urine output hourly.
- Continuous oxygen saturation monitoring.
- CTG should be commenced to assess fetal well being.
- Assess maternal tendon reflexes and for presence of clonus.

Investigations

- FBC, U+E, creatinine LFT and urate.
- Coagulation screen, including fibrinogen degradation products.

Blood Pressure Management

Blood pressure > 160/110 on two separate occasions must be treated. Initial management should be with oral labetalol (or oral nifedipene if asthmatic). Intravenous therapy should be commenced if oral therapy does not lower blood pressure below threshold of 150/100. See flow chart for further detail

4.6 PREPARATION OF INFUSIONS

LABETALOL

Bolus 50 mg IV over 1-2 minutes
(Maximum 4 doses) Use 10mls of a 100mg/ 20ml ampoule
Repeat every 5 minutes (max 4 doses) until BP controlled

Maintenance dose Use one 100mg/ 20ml ampoule
Start infusion at 4mls/hr (20mg/hr)
Double the rate every 30 mins until BP controlled
Maximum rate = 32mls/hr (160mg/hr)

HYDRALAZINE

Loading dose Dilute 20 mg ampoule in 20ml N saline (1mg/ml)
(Maximum 2 doses) Give 5ml (5mg) over 15 minutes
If Systolic > 160mmHG after 20 minutes give a further 5mls over 15 minutes

Maintenance dose Dilute 40mg hydralazine in 40mls normal saline
Start at 5mls/hr (5mg/hr)

Follow algorithm

4.7 Magnesium Sulphate for prevention of convulsions

Magnesium sulphate should be considered for women with pre-eclampsia for whom there is a concern about the risk of eclampsia. It should not be used unless a decision to deliver has been made. All women should be reviewed by the on call consultant obstetrician prior to starting magnesium sulphate. It should be continued for 24 hours following delivery or 24 hours after the last seizure, whichever is the later.

Loading dose

- 4g over 5 minutes
- Draw up 20mls of 20% magnesium sulphate in a 20ml syringe
- Give manually as IV bolus over 5 minutes

Maintenance dose

- Commence remaining 30mls of 20% magnesium sulphate in 50ml syringe
- Administer via a syringe driver at 5ml/hr

Magnesium toxicity

Toxicity can occur if serum magnesium > 4 mmols/L and respiratory depression at >6mmols/L. The infusion should be stopped and magnesium levels checked if any of the following occur

- Loss of patellar reflex
- Respiratory rate <15 per minute
- Oxygen saturation < 94%

If signs of toxicity and magnesium level is high, administer 10mls calcium gluconate 10% I.V. over 3 minutes.

Delivery

- The decision to deliver should be made once the woman is stable and with the on call consultant obstetrician present.
- If the gestation is less than 34 weeks and delivery can be deferred, corticosteroids should be given, although after 24 hours the benefits of conservative management should be reassessed.
- Conservative management at very early gestations may improve the perinatal outcome but must be carefully balanced with maternal well being.
- The mode of delivery should be determined after considering the presentation and condition of the baby, together with the likelihood of success of induction of labour after assessment of the cervix.

- Continuous CTG when in labour.
- The third stage should be managed with 10 units intramuscular Syntocinon. Ergometrine or Syntometrine should not be used routinely.
- After delivery, women with severe pre eclampsia should be kept under observation on labour ward for at least 24 hours, with careful monitoring of blood pressure, fluid balance, urine output and symptoms.
- Consider Enoxaparin for post partum thromboprophylaxis.

Fluid Balance

- Strict monitoring of fluid in and out should be recorded hourly.
- Fluid intake should be restricted to 80mls/hr (unless associated with maternal haemorrhage).
- Oliguria in the post partum period is common and rarely leads to renal failure
- Persistent oliguria (less than 30mls/hr>8hrs) must be discussed with a consultant.
- In the absence of maternal haemorrhage, fluid challenge should not exceed 500mls.
- Insertion of CVP line should be considered if oliguria persists for more than 24hrs post partum

4.8 MANAGEMENT OF ECLAMPSIA

The initial assessment, blood pressure control, fluid balance, lines of communication, fetal assessment and delivery planning is the same as for the management of severe pre eclampsia

- Call for help – **Ring 2222** stating **Obstetric emergency and location**
- Ensure that it is safe to approach the woman and aim to prevent maternal injury during the convulsion.
- Place the woman in a left lateral position. Assess and maintain airway and breathing. Give oxygen via a mask.
- Check pulse and blood pressure.

- Give Magnesium sulphate 4g IV over 5 minutes (as per anticonvulsant protocol.)
- If seizure continues or seizures re-occur, a second bolus of 2g magnesium sulphate IV given over 5-10mins can be given.
- If seizure continues despite a second bolus dose, the use of Diazemuls 10mg I.V. can be considered, however this **must only be given in the presence of an anaesthetist** as intubation may be required.
- If this has occurred in the antenatal period, plans for delivery must be made once the woman is stable.

Criteria for transfer to ITU

- Recurrent convulsions
- BP persistently > 160/110 and resistant to treatment
- Pulmonary oedema
- Oliguria >24 hrs and/or deterioration in renal function and more invasive monitoring of fluid balance required (e.g. CVP line insertion)
- Compromised myocardial function.

4.9 POST NATAL CARE AND FOLLOW UP

Discharge to community midwife care when

- BP less than 150/100.
- Blood tests stable or improving.
- No symptoms of pre-eclampsia.

If on antenatal anti hypertensive treatment, continue until BP falls to less than 140/90, where consideration can be given to reducing the dose.

Women whose pregnancies have been complicated by severe pre-eclampsia or eclampsia should be offered a 6-week postnatal review in the consultant clinic to discuss the events of the pregnancy.

Women who have had pre-eclampsia are at increased risk of developing it again in subsequent pregnancies and should be advised of this, ideally before conception. They should also be assessed for underlying chronic

hypertension and other medical conditions. Women should be reviewed in the consultant antenatal clinic at booking in subsequent pregnancies.

An audit of severe pre eclampsia and eclampsia is part of the ongoing audit programme. The departmental audit lead has responsibility for ensuring that this takes place on at least a two yearly basis.

The standards for audit are as follows: in at least 90% of cases the following should occur

1. blood pressure management in line with this guideline
2. fluid balance management in line with this guideline
3. use of magnesium sulphate for prevention and control of eclampsia in line with this guideline
4. use of antenatal CTG monitoring for fetal assessment and continuous CTG monitoring in labour
5. involvement of consultant obstetrician when planning delivery and the use of corticosteroids in gestation less than 34 completed weeks
6. presence of consultant obstetrician in cases of eclampsia

Multidisciplinary review

Results from the audit will be discussed at departmental audit meeting and the monthly labour ward meeting. They will also be circulated to all members of staff in the form of minutes of these meetings.

Monitoring of action plans

Action plans will be reviewed and monitored at the monthly labour ward meeting. Following any identified problems guidelines will be amended if necessary

5 Implementation/training/awareness

- This is a review of a current document and it formalises current practice.
- Once ratified it will be available in all clinical areas within the Maternity Unit and on the intranet.

- All new, reviewed and ratified documents are notified to staff via the monthly maternity newsletter

6. Auditable Standards

What aspects of compliance with the document will be monitored	What will be reviewed to evidence this	How and how often will this be done	Detail sample size (if applicable)	Who will coordinate findings	Which group or report will receive findings

7. Related Documents: Guidelines:

- Guideline for Caesarean Section
- Guideline for High Dependency Care within the maternity unit
- Guideline for the recovery of women following general or regional anaesthesia in the obstetric theatre
- Staffing on labour ward

8. References:

The management of severe pre-eclampsia/eclampsia RCOG guideline No 10 2006

Hypertension in pregnancy- NICE guideline 107 2011

9. Saving Mothers Lives, CEMACH 2007

The pre-eclampsia community guideline (PRECOG): how to screen for and detect onset of pre-eclampsia in the community Milne et al, *BMJ* 2005;330:576–80

9 DISCLAIMER

It is the responsibility of staff to check the Trust intranet to ensure that the most recent version/issue of this document is being referenced.

Document History

Version:	Date:	Author:	Status	Comment:	Review Date:
1.0	Dec 2006	Mr Kenney/ N Dawkins/ Y Harris	Ratified Feb 2007	New Document	Feb 2010
2.0	Oct 2008	Mr Kenney	Ratified Nov 2008	Re Formatted and ratified	Nov 2011
3.0	Feb 2011	Mr Kenney	Reviewed in line with NICE CG 107.	Maternity CSG	Feb 2014
4.0	August 2011	Mr Kenney	Reviewed and ratified.	Maternity CSG	August 2014
4.0	2 nd January 2012	Mr Kenney	Ratified	Slight amendments made to fit into template	
5.0	23 rd April 2012	Mr Kenney	Ratified	Amendments made to monitoring box to reflect CNST recommendations. Approved at Maternity CSG	23 rd April 2015
6.0	23 rd April 2013	Mr Kenney	Ratified	Updated to include chart	23 rd April 2016
6.0	4 th August 2014	Mr Kenney	Ratified	Minor changes due to pharmacy dose changes	23 rd April 2016
6.0	5 th February 2015	Mr Kenney	Ratified	Minor changes to section 6	23 rd April 2016
6.0	8 th April 2015	Mr Kenney	Ratified	Minor changes to fluid balance and criteria for ITU transfer following clinical incident	23 rd April 2016
7.0	24 th October 2016	N Dawkins	Ratified	Minor changes	April 2019
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Eclampsia Checklist

		Time	✓
Call for help	Emergency call bell		
	State the problem		
	Request eclampsia box		
Airway	Turn to left-lateral		
	Maintain airway		
Breathing	Check breathing		
	Administer high-flow oxygen		
Circulation	Insert IV cannula		
	Take baseline bloods		
Displacement	Ensure woman is on left side		
Treatment of eclampsia	4 g bolus of magnesium sulfate (MgSO ₄) IV over 5 minutes		
	Make up solution correctly		
Maintenance dose	1 g of MgSO ₄ – correct dose and infusion pump/syringe driver rate		
	Make up solution correctly		
Fluids	If IV fluids administered, use infusion pump (1 mL/kg/h)		
Monitoring	Blood pressure		
	Respirations and oxygen saturation		
	Urinary output		
	Use MOEWS chart or maternal critical care chart		
	Electronic fetal monitoring (after mother stabilised)		
	Vaginal examination (after mother stabilised)		
Treatment of hypertension	Oral/IV labetalol, oral nifedipine or IV hydralazine		
	Aim for target systolic BP of 150 mmHg		
Documentation	Timings of events		
	Medication administered		
	Persons present		