Key Elements for the Management of Hypertensive Crisis In Pregnancy (In-Patient)

Purpose

This document reflects emerging clinical, scientific and patient safety advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. While the components of a particular protocol and/or checklist may be adapted to local resources, standardization of protocols and checklists within an institution is strongly encouraged.

ACOG Definition

Clearly explain the purpose of the protocol. The protocol should reflect current criteria used to define and diagnose hypertensive disorders in pregnancy.

References:

- The American College of Obstetricians and Gynecologists. "Chronic Hypertension in Pregnancy." ACOG Practice Bulletin 125. Reaffirmed 2012, replaces Practice Bulletin 29.
- The American College of Obstetricians and Gynecologists. "Diagnosis and Management of Preeclampsia and Eclampsia." ACOG Practice Bulletin 33. Reaffirmed 2010.

Criteria for Diagnosis of Chronic Hypertension in Pregnancy

Mild:	Systolic blood pressure 140-159 mm Hg *or* Diastolic blood pressure 90-109 mmHg	Use of antihypertensive medications before pregnancy Onset of hypertension before 20th week of gestation
Severe:	Systolic blood pressure ≥ 160 mmHg Diastolic blood pressure > 110 mmHg	Persistence of hypertension > 12 weeks postpartum period

Criteria for Diagnosis of Preeclampsia

The National Institute of Health (NIH) working group on hypertension in pregnancy has classified hypertensive disorders of pregnancy in four main categories:

1. **chronic hypertension**
   Systolic blood pressure > 140 mmHg
   Diastolic blood pressure > 90 mmHg
   occurs prior to pregnancy or prior to the 20th week of gestation

2. **preeclampsia and eclampsia**
   Systolic blood pressure > 140 mmHg
   Diastolic blood pressure > 90 mmHg
   with proteinuria

3. **preeclampsia superimposed on chronic hypertension**
   recognized to impart a more severe course and higher incidence of maternal and fetal complications than preeclampsia alone.

4. **Severe preeclampsia** is confirmed when any of the following criteria are present:
   - Systolic blood pressure > 160 mmHg
   - Diastolic blood pressure > 110 mmHg (on two occasions at least 6 hours apart while the patient is on bed rest)
   - Proteinuria of 5000mg (5g) or higher on a 24-hour urine collection or at least 3+ on two random urine samples collected at least 4 hours apart
   - Oliguria < 500 mL urine output in 24 hours
   - Cerebral or visual functional disturbances (cns irritability)
   - Pulmonary edema or cyanosis (not due to excessive intravenous volume replacement)
   - Epigastric or right-upper quadrant abdominal pain
   - Impaired liver function on laboratory analysis (elevated AST/SGOT, ALT/SGPT, or LDH)
   - Thrombocytopenia (platelet count < 150,000/uL)
   - Fetal growth restriction

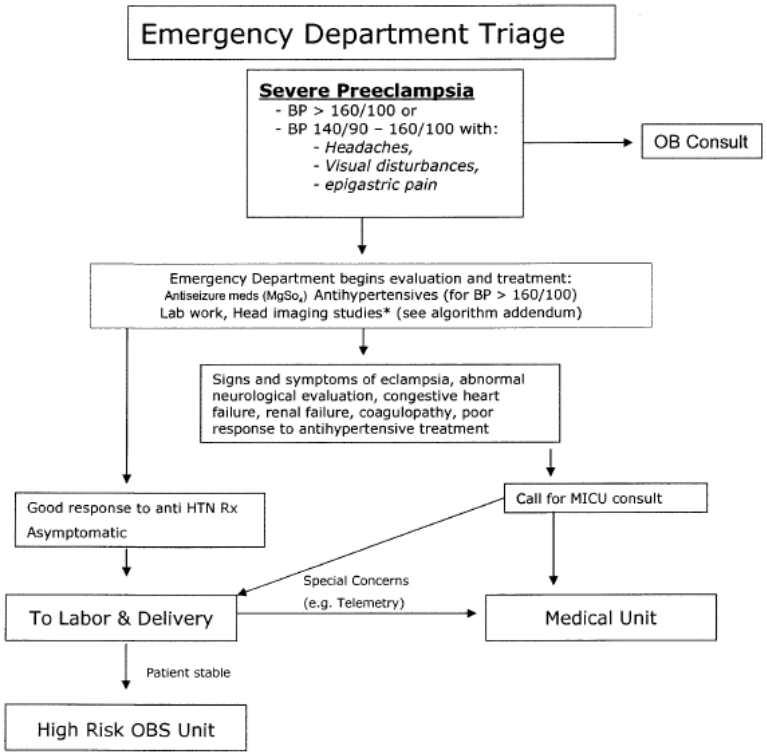
5. **gestational hypertension**
   occurs when blood pressure is elevated in the third trimester with no prior history of hypertension and proteinuria is absent.

Monitoring ***Permission to utilize sample protocol language obtained from:*** **University of Rochester Medical Center**: Protocol for Antihypertensive Therapy (2009) **Montefiore Medical Center**; **The University Hospital for the Albert Einstein College of Medicine**: Preeclamptic Woman, Nursing Care Standard for the Antepartal (2008)	The following list is an example of protocol language for monitoring patients. It is to serve as recommendations, not rigid criteria. ***Protocol language may include (but is not limited to):*** ➢ It is highly recommended that proteinuria testing be considered as a priority area for identification and management of hypertensive disorders in pregnancy. ➢ Continuous fetal monitoring should be initiated immediately upon admission. o Monitor vital signs including Fetal Heart Rate (FHR) every 4 hours, however if diastolic BP is > 100, then monitor vital signs including FHR at least every 2 hours. ➢ Automated blood pressure monitoring, using the appropriate cuff size, should be performed. Blood pressures should be evaluated at least every 5-10 minutes during the first 30 minutes following administration of the antihypertensive agent and then at least every hour or as ordered thereafter. ➢ The patient should continue to be monitored for vital signs, comfort status, edema, visual disturbances, headache, epigastric pain, proteinuria, fetal assessment if appropriate, and metal status. ➢ The patient should be monitored for any side effects from medication and the care provider notified immediately. ➢ Monitor intake and output at least every 8 hours.
Criteria to Treat ***Permission to utilize sample protocol language obtained from:*** **Winthrop University Hospital**: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	Refer to the American College of Obstetricians and Gynecologists, *"Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia"* ACOG Committee Opinion 514 (December 2011). Hypertensive Emergency defined as: ➢ BP ≥ 160 systolic or 110 diastolic ➢ Seizures ➢ Cardiac Compromise ➢ Abnormal maternal rhythm ➢ Change in Patient Status ➢ Respiratory Arrest ➢ Unresponsive Patient ➢ Staff concerned or worried
Medications ***Awaiting permission to utilize sample protocol language obtained from:*** **Crouse Hospital**: Pregnancy-Related Hypertension (2010) **NY Methodist Hospital**: Hypertensive Disorders of Pregnancy (interdisciplinary Guidelines) (2007)	There are different antihypertensive drug regimens used for treating the obstetrical patient with severe hypertension. The protocol should include medication descriptions, dosage, adverse effects, contraindications and precautions. ***Commonly used antihypertensives are the following:*** ➢ Labetalol (Normodyne ®; Trandate ®) ➢ Hydralazine (Apresoline ®) ➢ Nifedepine (Adalat ®; Procardia ®) Refer to the American College of Obstetricians and Gynecologists, *"Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia"* ACOG Committee Opinion 514 (December 2011).
Eclampsia ***Permission to utilize sample protocol language obtained from:***	A rare, life threatening obstetrical emergency (1/2000 deliveries) characterized by the onset of convulsions or seizure activity that cannot be attributed to other causes in women with clinical presentation consistent with preeclampsia. Eclampsia may develop antepartum (38-53%), Intrapartum (18-36%) or post-partum (11-44%).

Winthrop University Hospital: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	Atypical cases of eclampsia are those that develop either before 20 weeks, while the patient receives adequate doses of magnesium sulfate, or beyond 48 hours postpartum. **Management of Eclampsia:** ➢ Control seizures and provide patient safety ➢ Correction of hypoxia and acidosis ➢ Control severe hypertension ➢ Assess neurologic status ➢ If antepartum, delivery after maternal stabilization **Anticonvulsant Therapy:** Initiate and maintain magnesium sulfate ($MgSO_4$) infusion for seizure prevention when severe preeclampsia or eclampsia is suspected. **Magnesium Sulfate:** a) Dosage: 4 to 6 grams IV loading dose over 20 minutes, followed by 2gm/hour as a continuous intravenous infusion via pump. b) 10% of eclamptic women will have a second convulsion after receiving magnesium sulfates. Give another IV bolus of 2 g magnesium sulfate. c) For recurrent seizures (occurrence) - may give Lorazepam 0.02 to 0.03 mg/kg IV. If seizures continue, additional doses of Lorazepam may be given (up to a cumulative dose of 0.1 mg/kg) IV at a maximum rate of 2 mg/minute for acute treatment. d) If seizures continue, paralyze and intubate. Obtain radiographic imaging. Eclamptic patients may require admission to the ICU. e) Consider an alternative method for preventing seizures in women who have preeclampsia when Magnesium is contraindicated.
Warning Signs of Deterioration in Patient Status ***Permission to utilize sample protocol language obtained from:*** **University of Rochester Medical Center**: Protocol for Antihypertensive Therapy (2009) & Standard of Care for the Patient with Gestational Hypertension (2009)	The care provider should be notified if the patient: ➢ Exhibits any side effects from the antihypertensive. ➢ Shows a sudden drop in blood pressure. ➢ Complains of shortness of breath, a drop in her 0_2 saturation or adventitious breath sounds. ➢ Complains of chest discomfort, tachycardia, bradycardia, or cardiac arrhythmia. ➢ Sudden onset of abdominal/back pain, vaginal bleeding, leaking of fluid or contractile activity. ➢ Complains of severe headache, visual changes or a generalized feeling of disorientation or confusion. ➢ Decrease in urinary output (<25 cc/hr.). Fetal signs: ➢ Tachy- or bradycardia ➢ Late decelerations ➢ Decreased long term variability
Defined Care Team Escalation ***Permission to utilize sample protocol language obtained from:*** **Winthrop University Hospital**: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	An obstetrical emergency response team should be formed and activated based on established criteria to enhance quality of care and patient outcomes. The care team can be activated by any member of the health team to bring multiple obstetrical and medical health care providers to the bedside at once. A specific plan of care should be developed based upon patient assessment; team members who are not essential may be dismissed by the physician in charge. The patient should be co-managed by members of the obstetrical team and hospital rapid response team.

	Members of an ***Obstetrical Crisis Team*** may include: ➢ Obstetric chief resident ➢ Ob in-house obstetrical attending physician ➢ Labor & Delivery charge nurse
Postpartum Surveillance ***References:*** Sibai, Bahah M. MD. "Etiology and Management of postpartum hypertension-preeclampsia," *American Journal of Gynecology* (AJOG), 2011. Berks, Durk. "Resolution of hypertension and proteinuria after preeclampsia," *Obstetrics and Gynecology*, 2009.	After delivery, the patient's vital signs, fluid intake and output, and symptoms should be closely monitored for at least 24- 48 hours. Close monitoring of blood pressure is essential during the immediate postpartum period and closely after discharge from the hospital. Many preeclamptics or women with PIH will exhibit an initial decrease in blood pressure within 48 hours of delivery, but the blood pressure will rise in most between 3 and 6 days postpartum. A well designed Dutch study reported on ~200 preeclamptic patients at several intervals postpartum and found that 78 % still had elevated blood pressures at the time of discharge. At 6 weeks, 54 % and at 3 months 39 % manifested high blood pressure. Resolution time was directly related to maximal systolic and diastolic B/P values at the time of initial diagnosis. Resolution time also increased directly with the interval between diagnosis and delivery. Most studies have shown that maternal prognosis worsens with delayed diagnosis of persistent or de novo postpartum preeclampsia, especially so with inadequate control of persistent severe hypertension. The following approach is suggested .**Immediate postpartum in hospital** ➢ Expect initial drop in B/P followed by a rise beyond 24 hours postpartum ➢ Keep magnesium sulfate 24 hours postpartum ➢ Initiate antihypertensive therapy if greater than 150 mmHg and /or diastolic greater than 100. Consider Labetolol (alpha /beta blocker) or Nifedipine (calcium channel blocker) orally .[**see prior guideline on dosage**] ➢ IV therapy with Labetolol or Hydralazine if systolic B/P >/ 160 and /or diastolic >/ 110. The goal is to keep B/P < 150/100 .Transition to oral therapy Discharge planning: ➢ Patients with persistent hypertension requiring meds should be on home B/P monitoring. Include visiting nurse if possible. ➢ Follow up visit to be scheduled no later than 1 week later and serially thereafter based on B/P response to antihypertensives. May need several visits and internal medicine co-management. ➢ Many suggest discontinuing antihypertensives if blood pressure is below normal for > 48 hours.
Emergency Department Postpartum Preeclampsia ***Awaiting permission to utilize sample protocol language obtained from:*** **North Shore University Hospital:** Management of Postpartum Preeclampsia Guidelines (2010)	Effective interdepartmental collaboration and communication of healthcare delivery among care team members for complex conditions, such as hypertension in pregnancy is essential for successful management of patient care. Postpartum hypertension can be related to persistent gestational hypertension or preeclampsia or chronic hypertension. If the patient's blood pressure is elevated, assess for the following symptoms of preeclampsia in the pregnant or postpartum patient and report findings to the physician. ➢ Headache, abdominal pain, right upper quadrant tenderness, visual disturbances, elevated BP, nausea, vomiting, edema, neck pain, malaise, speech difficulties, lateralizing (only one side of the body) neurological signs ➢ If any of the above symptoms are offered or observed, a bedside evaluation is warranted. Telephone orders are not appropriate. Follow the chain of command as necessary.

MANAGEMENT OF POSTPARTUM PREECLAMPSIA (<6wks PP)



Staff Education Regarding:
Management of Postpartum Pre-eclampsia Algorithm

- When contacting an OBS resident, a 2nd or 3rd year must be notified.
- Consider alternative seizure prophylaxis medication to magnesium sulfate when there are signs or symptoms of congestive heart failure (shortness of breath, tachypnea or abnormal physical exam), Keppra (see Medication Management). Call for MICU consult
- With signs and symptoms of altered mental status/seizure, lateralizing neurologic signs, call for MICU consult
- *Consider CT scan with Severe headache, focal signs and symptoms, lethargy, confusion, seizures, abnormal neurological evaluation, coagulopathy
- Labs to be drawn include: CBC, PT, APPT, Fibrinogen, CMP, Uric Acid, Hepatic function panel, type and screen.
- If there are no beds available in the MICU, MICU will arrange for patient assessment and monitoring at the bedside.
- If there is no response to treatment of hypertension within 60 minutes, IV antihypertensive drip may be required. See Medication Management Guidelines.
- The patient must be signed out to the admitting service attending, in the medical record.
- Prior to transfer to Labor and Delivery, the ED attending and OBS attending must discuss disposition and decide together.
- Regardless of the unit to which the patient is admitted, the patient must be seen at the bedside by the supervising attending and findings documented in the patient record.
- MICU Admission Criteria may include: Eclampsia, altered mental status, unable to stabilize within 60 minutes of first dose of antihypertensive agent, co-morbidities (renal failure, CHF, CAD) invasive monitoring, lateralizing neurological signs, or the need for continuous IV antihypertensive therapy.

Patient Education

Permission to utilize sample protocol language obtained from:

University of Rochester Medical Center: Standard of Care for the Patient with Gestational Hypertension (2009)

Encourage patients to verbalize concerns and questions and provide appropriate support and reassurance. Offer appropriate patient information (handouts) regarding high blood pressure or preeclampsia (see enclosed).

Patient education may include (but is not limited to):

- The medication and possible side effects of the drug to be administered
- Any effects on the fetus
- The necessity of consistent administration of the medication
- Explanation of the disease process of pregnancy induced hypertension/chronic hypertension

Montefiore Medical Center; **The University Hospital for the Albert Einstein College of Medicine**: Preeclamptic Woman, Nursing Care Standard for the Antepartal (2008)	➢ The impact of pregnancy induced hypertension/chronic hypertension on the fetus ➢ The need for continued compliance throughout the remainder of her pregnancy and postpartum period ➢ Arrange for home nursing and/or a dietary consultant follow-up as needed
Checklist	Checklists identify items that should be confirmed before or during the scheduling or the performance of a procedure, or facilitate documentation of what was accomplished or used during a procedure. A checklist is highly recommended for the management of hypertensive disorders in pregnancy. Refer to the enclosed ***Hypertension Disorders During Pregnancy Checklist***.

Hypertensive Disorders During Pregnancy Checklist

[For reference only, consult your institutional policy for preferred management]

- ☐ Document complete history and complete physical examination including any symptoms associated with pre-eclampsia (e.g. headache, visual changes, epigastric pain).
  - Key elements include any symptoms of headaches, vision changes, abdominal pain, fetal activity, contractions, loss of fluid, vaginal bleeding
  - Baseline blood pressures over the course of the pregnancy
  - Any medications/drugs taken during the pregnancy (including illicit and OTC ones)
  - Current vital signs, including oxygen saturation
  - Current physical examination
  - Current fetal assessment (including FHR monitoring results, estimated fetal weight, and BPP, as appropriate)
- ☐ In documentation of Assessment and Plan be sure to include:
  - Whether a diagnosis of preeclampsia has been made and if not what steps are being taken to exclude the diagnosis
  - Whether antihypertensive medications are required to control blood pressure and if so, medication, dose, route and frequency
  - Current fetal status
  - Whether magnesium sulfate is being initiated for seizure prophylaxis and if so, dosing, route, and duration of therapy
  - Whether delivery is indicated and if so, timing, method and route. If delivery not indicated, under what circumstances it would be indicated.
  - Consideration of antenatal corticosteroids if preterm.
- ☐ Obtain intravenous access
- ☐ Notify Anesthesia staff
- ☐ Notify Pediatric staff
- ☐ Labs to send: ☐ CBC ☐ PT/aPTT ☐ Fibrinogen ☐ Chem 7 ☐ Uric Acid ☐ LFTs ☐ LDH ☐ Type and screen
- ☐ Foley catheter with hourly I&O (Report output < 30 cc/hr), as appropriate (e.g., For patients on magnesium sulfate, severe preeclampsia)
- ☐ Magnesium sulfate, if ordered
  - If given intravenously, must use IV infusion pump
  - Magnesium sulfate dosing intravenously: 4-6 g IV loading dose over 20 min, followed by 2 g per hour via pump. For recurrent seizures consider another IV bolus of 2 g Magnesium sulfate (relative **contraindications**: pulmonary edema, renal or congestive heart failure, myasthenia gravis). Continue for 24 hours after delivery or last seizure episode.
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  - Be certain that the pump and the magnesium are marked to distinguish them from other fluids running intravenously.
  - Relative contraindications
    - Evidence of pulmonary edema or congestive heart failure
    - Evidence of renal failure or poor urinary output
    - Myasthenia gravis
  - If magnesium is contraindicated consider another anticonvulsant
- ☐ Seizure precautions
  - Oxygen (100% non-rebreather at the bedside)

- Bag-mask ventilation on the unit
- Appropriate benzodiazepine readily available on the unit

☐ Monitoring
- Vital signs, Oxygen saturation, level of consciousness and DTRs during loading of magnesium
- If undelivered, continuous fetal heart rate monitoring while on magnesium. If magnesium not indicated, monitor regularly as indicated.
- Consider continued checks every 15 minutes depending on patient's status
- Neuro checks every hour
- Assess for pulmonary edema (SOB, decreased oxygen saturation, etc.) and toxicity (DTRs, neuro checks, respiratory rate, etc.)
- If clinically indicated, check magnesium level at regular intervals as ordered.

☐ Calcium gluconate for magnesium toxicity readily available on the unit (10 ml of 10% solution). If indicated can be given IV push slowly over 1-2 minutes.

☐ Consider antihypertensive medications (see antihypertensive medication guidelines).
- Antihypertensive medications (repeat BP every 10 minutes during administration):
  - **Labetalol**-- (20, 40, 80 mg IV over 2 minutes, escalating doses, repeat every 10 minutes to maximum dose 220 mg, or 200 mg orally if no IV access) avoid in asthma or heart failure, can cause neonatal bradycardia
  - **Hydralazine**--(5-10 mg IV over 2 minutes, repeat in 20 minutes until target BP reached)

☐ Consider anticonvulsant medications (for recurrent seizures or when Magnesium is contraindicated):
- **Lorazepam** (2-4 mg IV x 1, may repeat x 1 after 10-15 min)
- **Diazepam** (5-10 mg IV every 5-10 min to max dose 30 mg)
- **Phenytoin** (15-20 mg/kg IV x 1, may repeat 10 mg/kg IV after 20 minutes if no response) avoid with hypotension, may cause cardiac arrhythmias

☐ Postpartum:
- Continue antihypertensive medications postpartum to maintain BP < 150/100
- Consider early follow up of blood pressure after discharge (either early office visit or home nurse visit)

References

1. ACOG District II Hypertensive Crisis Guidelines 2012
2. Diagnosis and Management of Preeclampsia and Eclampsia. ACOG Practice Bulletin No. 33. American College of Obstetricians and Gynecologists; 2012.
3. Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia. ACOG Committee Opinion No. 514. American College of Obstetricians and Gynecologists; 2011.