PURPOSE:

To provide guidelines for measurement of blood pressure and the management of preeclampsia / eclampsia
POLICY:

Inpatient and outpatient obstetric patients, which include women during pregnancy and through six week postpartum, should be assessed for hypertensive disorders in pregnancy, specifically preeclampsia when presenting for care.

Proper measurement of blood pressure (BP) is essential for diagnosis and treatment in obstetric patients.

Obstetric patients experiencing a hypertensive emergency should be evaluated in-person by a provider within 30 minutes and will also receive prompt antihypertensive therapy as soon as possible (preferably within 60 minutes of verification). Activate chain of command per Problem Solving – Chain of Command for HealthCare Professionals policy M15 00 736 (HPMC only: May also escalate to OB Hospitalist).

Obstetric patients presenting for care with vague symptoms, such as headache, abdominal pain, shortness of breath, “I just don’t feel right,” or generalized swelling should be evaluated for atypical presentation of preeclampsia or “severe” features.

When acute-onset, severe hypertension is diagnosed in the office setting, the patient should be expeditiously sent to the hospital for evaluation and treatment.

DEFINITIONS:

Obstetric (OB) Patients - are defined as pregnant women thru 6 weeks after birth

Hypertension in OB patients - is diagnosed with 2 determinations of either systolic BP (SBP) ≥ 140 or diastolic BP (DBP) ≥ 90 mm Hg or both, taken at least 4 hours apart.

American College of Obstetricians and Gynecologists’ (ACOG) classification system for Hypertensive Disorders in Pregnancy (HIP) include:

A. **Chronic Hypertension**- hypertension (SBP ≥ 140 or DBP ≥90) presenting before 20 weeks gestation

B. **Gestational Hypertension**- hypertension (SBP > 140 or DBP >90) presenting after 20 weeks gestation without proteinuria or other manifestations

C. **Preeclampsia- Eclampsia**:

1. Hypertension (SBP ≥ 140 or DBP ≥90) presenting after 20 weeks gestation with proteinuria and is further classified as with or without severe features (note: proteinuria is not required for diagnosis of preeclampsia/ eclampsia and can be a late sign). Severe feature of preeclampsia include:
   a) SBP ≥ 160 or DBP ≥ 110 on 2 occasions, 4 hours apart
   b) Persistent oliguria < 500 mL/24-hours
   c) Progressive renal insufficiency (Cr > 1.1) or doubling of the serum creatinine concentration in the absence of renal disease
d) Unremitting headache/visual disturbances

e) Pulmonary edema

f) Epigastric / RUQ pain

g) Liver function tests (LFTs) twice normal range

h) Platelets < 100,000

i) HELPP syndrome

j) Note: 5 grams of proteinuria is no longer a criterion for severe preeclampsia.

2. Eclampsia – seizure in the presence of eclampsia

D. **Chronic Hypertension with superimposed preeclampsia** – diagnosed when either (1) the patient with previously controlled BP presents with either increase in BP or increased requirements of antihypertensive medications; (2) new onset of proteinuria or increase in known proteinuria levels, or (3) other symptoms or signs develop, such as decrease in platelets to < 100,000/µL; pulmonary congestion or edema, elevation in liver enzymes, etc.

E. **Hypertensive Emergency** - is defined by repeated blood pressures > 160 systolic or > 110 diastolic, taken at least 15 minutes apart.

**PROCEDURE FOR BP ASSESSMENT**

A. Obstetric patients should have their BP assessed when presenting for care. For inpatients, two BP readings taken 15 minute apart should be done as part of the admission process. Additional assessment frequency is based on patient’s condition.

B. Gather Equipment

1. Use a validated automatic or manual blood pressure cuff and have a full range of cuffs available.

2. Check cuff for any defects

3. Obtain correct size cuffs: length of cuff 80% of arm circumference and width of cuff 40% of arm circumference (length to width ratio 2:1). Note: Tronco-conial cuffs or forearm methods of measurement are acceptable alternatives for morbidly obese patients.

C. Prepare the patient

1. Patient to be sitting or in a semi-recumbent position (semi-fowlers position).

2. Patient should be sitting quietly for 10 minutes with minimal distractions, whenever possible.

3. Cuff should be at the level of the heart. If sitting, feet should be flat on the floor, not dangling and legs uncrossed.
4. Assess any recent consumption of caffeine or nicotine. If BP levels are within treatment range, do not delay antihypertensive therapy.

D. Take measurement

1. Instruct the patient not to talk during the reading.
2. Support patient arm at heart level.
3. Utilize standard method for blood pressure machine or manual measurement and proper placement of cuff.
4. For auscultatory measurement: locate the brachial pulse and place diaphragm of stethoscope over brachial artery. Use the first audible sound (Kortokoff I) as systolic pressure and the disappearance of sound (Kortokoff V) as diastolic pressure. Read to nearest 2 mm Hg.
5. **Do not reposition the patient to either side to obtain a lower blood pressure. This action will give you a falsely low reading.**

6. If the blood pressure is >140 DBP or >90 SBP), take another blood pressure within 15 minutes and use the highest BP reading. (Note: All inpatients should have 2 BPs taken 15 minute apart as part of the admission process). If still elevated, notify provider to initiate evaluation for preeclampsia and initiate OB Hypertensive Management Order Set (FM #3902) or Pre-eclampsia/Hypertensive Disorders in Pregnancy Admission Order Set (FM #3249).

E. Document: BPs, patient position, and any interventions.

**PROCEDURE FOR EVALUATION OF PREECLAMPSIA & MANAGEMENT:**

*Follow Appendix A for recommended Assessment Frequency*

A. Assess for absence or presence of:* 

1. Headache
2. Visual changes
3. Right upper quadrant or epigastric pain
4. Nausea/vomiting
5. General malaise

B. Assess upper or lower deep tendon reflexes*

C. Auscultate lung sounds, noting any presence of rales, rhonchi, wheezing, etc.*

D. Assess for generalized edema and significant, rapid weight gain*

E. Assess blood pressure (Follow Procedures for BP Assessment Section)*
F. Apply external fetal monitor (if viable fetus)*

G. Obtain IV access. Consider 2nd IV line. Prepare to send labs as ordered by provider, such as CBC, PT/PTT, Fibrinogen, CMP, Uric Acid, LFTs, Type & Screen), urine protein, urine drug screen (to assess for amphetamine and cocaine use)

H. Refer to PERT (Appendix B) tool for level of severity and suggested management. Notify provider for worsening level of severity.

I. Prepare to administer medication to lower BP and prevent seizure activity

1. Antihypertensive therapy should be considered when SBP > 150 or DBP > 105, per provider order. The goal of therapy is not to normalize BP, but to achieve a range of 140 – 150 / 90 – 100 or 10-15% decrease. (Note: Treatment with patient with chronic cocaine/amphetamine abuse may cause an exaggerated decrease in BP and the hypotension may be difficult to treat).

2. Hydralazine (Apresoline) and Labetalol (Normodyne) IV administration guidelines include (also see algorithm in Appendix C):
   a) Monitor BP, P, R immediately before administration
   b) For Labetalol (Normodyne): Recommended dosing is to start at 20 mg and repeat dosing of 40 mg then 80 mg every 10 minutes until threshold achieved. Maximum cumulative dose is 220 mg in 24 hours. Monitor BP, P, R, q 10 minutes X 1 hour after each dose, then q 15 minutes for 1 hour, then q hour X 3 hours or more frequent as ordered or as warranted per patient condition.
   c) For Hydralazine (Apresoline): Recommended dosing is to start at 5-10 mg, and then 10 mg every 20 minutes until threshold achieved. Maximum cumulative IV administered doses should not exceed 25 mg in 24 hours. Monitor BP, P, R, q 10 minutes X 1 hour after each dose, then q 15 minutes for 1 hour, then q hour X 3 hours or more frequent as ordered or as warranted per patient condition.
   d) Give prescribed dose slow IV push over 2 minutes
   e) Second and subsequent doses must be in/on Labor and Delivery, High Risk Antepartum units, Emergency room, or Intensive Care units (ICU) or with the co-management of the MET team and/or labor nurse while arrangements are made for transfer (note: do not delay treatment of the BP while awaiting transfer).
   f) Nurse should stay with the patient during the 20 minutes following IV push administration unless the patient is in the ICU.

3. Magnesium therapy should be administered for seizure prophylaxis in preeclampsia with severe features, per OB provider order. It can also be considered in patients with preeclampsia without severe feature. IV route is preferred but 10 grams of 50% solution IM (5 grams in each buttock) can be used
if no IV access. Follow Magnesium Sulfate Administration – Obstetrics policy M03 09 551.

J. Prepare to monitor intake and output. Intrapartum fluid administration should be carefully monitored and should generally not exceed 80-100 ml/hour for patients with severe features.

K. Prepare to administer antenatal corticosteroids if < 34 weeks gestation.

L. Maintaining activity as ordered by provider.

M. Notify provider for:

1. New onset hypertension (SBP ≥ 140 or DBP ≥ 90) repeated, taken at least 15 minutes apart.

2. Repeated blood pressures ≥ 150 systolic or ≥ 105 diastolic, taken at least 15 minutes apart.

3. New or worsening complaints of any of the following:
   a) Headache
   b) Visual Changes
   c) Right Upper Quadrant Pain (RUQ) or epigastric pain
   d) Nausea/vomiting
   e) Shortness of breath
   f) Rales/Rhonchi
   g) Generalized malaise
   h) Generalized swelling

4. Abnormal lab values

N. Hypertensive Emergency

1. Follow Appendix C for recommended management

2. A provider should evaluate patient in-person within 30 minutes of identification of a hypertensive emergency.

3. Monitor BP, P, R Q 10 minutes during the hypertensive emergency until BP thresholds are achieved. Then repeat BP q 10 minutes for 1 hour, q 15 minutes for 1 hour, q 30 minutes for 1 hour, Q 1 h for 4 hours, then q 4 hours.

O. Emergency Department: Refer to Appendix D Diagnosis Algorithm for Emergency Department for the assessment and care of preeclampsia.

PROCEDURE FOR ECLAMPSIA MANAGEMENT

A. Call a MET Team and notify attending provider and anesthesiologist immediately.
B. Position patient on side
C. Protect from injury
D. Refer to Appendix E for recommended management
E. Apply pulse oximetry
F. Secure IV access
G. Give oxygen by non-rebreather mask at 10 liters per minute
H. Have suction available
I. Prepare to administer magnesium sulfate
J. Anticipate obtaining lab tests (magnesium level, liver enzymes, kidney function, etc.).
K. Following seizure
   1. Suction mouth
   2. Maintain oxygen by non-rebreather mask at 10 liters per minute
   3. Provide ventilator support as needed.
   4. Assess blood pressure, pulse, and respirations every 5 minutes until next line of treatment established (i.e. magnesium, antihypertensive, etc.).
   5. Assess oxygen saturation, level of consciousness, and neurological status (neuro check) every 15 minutes until return to baseline and stable for a minimum of one hour (or as ordered by provider).
   6. Monitor fetal heart rate and uterine activity continuously if viable fetus is present
   7. Observe for signs and symptoms of placental abruption or impending delivery
   8. Obtain order for indwelling catheter.
   9. Prepare for neuroradiologic imaging, as ordered by provider.
L. Documentation: Document assessment findings, interventions, medications, patient response in the EHR and Medical Emergency Team Record (Form # 3590).

Discharge Planning

A. Patients should not be discharged until BP is well controlled for at least 24 hours.
B. Nonsteroidal anti-inflammatory agents (NSAIDS) may increase blood pressure in some patients and should be avoided in women with elevated BPs.

C. Prior to discharge, all obstetric patients should be educated on the importance of reporting new onset or worsening symptoms to provider right away, such as stomach pain, headaches, nausea, vision changes, swelling in hands and face, sudden weight gain (greater than 2 or more pounds in 1 day) and it will be documented in the EHR.

D. Prior to discharge, all women with HIP will be educated on the following topics, as appropriate, and it will be documented in the EHR:

1. Antihypertensive medications, as appropriate.
2. Self- BP monitoring, as requested by provider
3. Where / when to receive follow-up care.
   a) Women receiving an antihypertensive medication will be instructed to obtain follow-up BP monitoring by their provider within 3-5 days and again in 7-10 days or earlier if persistent symptoms.
   b) Women who were not placed on antihypertensive should be seen within 7-10 days of discharge or earlier if persistent symptoms.

RELATED POLICIES:

M02 04 568 Medical Emergency / Family Activated Safety Tea (MET/ FAST) – Adult

M03 09 551 Magnesium Sulfate Administration

M15 00 736 Problem Solving – Chain of Command for HealthCare Professionals

REFERENCES:


# Recommended Assessment Frequency for Preeclampsia^\n
<table>
<thead>
<tr>
<th></th>
<th>ANEPARTUM</th>
<th>INTRAPARTUM</th>
<th>POSTPARTUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Severe Features</td>
<td>With Severe Features</td>
<td>Without Severe Features</td>
</tr>
<tr>
<td>BP, P, R</td>
<td>Q4h</td>
<td>Q 1 h</td>
<td>Q 1 h</td>
</tr>
<tr>
<td>Lung Sounds</td>
<td>Q4h</td>
<td>Q 2 h</td>
<td>Q 4 h</td>
</tr>
<tr>
<td>DTR, Clonus, Edema, LOC, HA, visual disturbances, epigastric pain</td>
<td>Q8h</td>
<td>Q 4 h</td>
<td>Q 8 h</td>
</tr>
<tr>
<td>FHR/ Uterine Activity (if viable fetus)</td>
<td>NST q shift or as condition warrants</td>
<td>Continuously</td>
<td>Continuously</td>
</tr>
<tr>
<td>I &amp; O</td>
<td>Q4</td>
<td>Q1</td>
<td>Q4</td>
</tr>
</tbody>
</table>

DTR= Deep Tendon Reflexes  
LOC = Level of consciousness  
HA= Headache

Perform more frequent assessment and oxygen saturation as condition warrants and as ordered by provider. For patients on Magnesium Sulfate, follow Magnesium Sulfate Administration – Obstetrics policy M03 09 551.

^Adapted from Californian Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit. Retrieved from: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit
APPENDIX B

Preeclampsia Early Recognition Tool

Preeclampsia Early Recognition Tool (PERT)

<table>
<thead>
<tr>
<th>ASSESS</th>
<th>NORMAL (GREEN)</th>
<th>WORRISOME (YELLOW)</th>
<th>SEVERE (RED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Alert oriented</td>
<td>*Agitated/confused</td>
<td>*Unresponsive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Drowsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Difficulty speaking</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>None</td>
<td>*Mild headache</td>
<td>*Unrelieved headache</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Nausea, vomiting</td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td>None</td>
<td>*Blurred or impaired</td>
<td>*Temporary blindness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>100-136</td>
<td>140-156</td>
<td>&gt;160</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>50-89</td>
<td>90-105</td>
<td>&gt;105</td>
</tr>
<tr>
<td>HR</td>
<td>61-110</td>
<td>111-129</td>
<td>&gt;130</td>
</tr>
<tr>
<td>Respiration</td>
<td>11-24</td>
<td>25-30</td>
<td>&lt;10 or &gt;30</td>
</tr>
<tr>
<td>SGO</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>O2 Sat (%)</td>
<td>95</td>
<td>91-94</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

| Pain: Abdomen or Chest  | None           | *Nausea, vomiting   | *Nausea, vomiting|
|                         |                | *Chest pain         | *Chest pain     |
|                         |                | *Abdominal pain     | *Abdominal pain |
| Fetal Signs             | *Category I   | *Category II        | *Category III   |
|                         | *Reactive NST | *IUGR               |               |
|                         |                | *Non-reactive NST   |               |

| Urine Output (mL/hr)    | ≥50            | 30-49               | ≤30 (in 2 hrs) |
| Proteinuria (mg/dL)     | Trace          | *> 0.3**            |               |
|                         |                | *≥300mg/24 hours    |               |
| Platelets (x10^9/L)     | >100           | 50-100              | ≤50           |
| AST/ALT                 | <70            | >70                 | >75           |
| Creatinine (mg/dL)      | 0.8            | 0.9-1.1             | ≤12           |
| Magnesium Sulfate Toxicity | *DTR +1** | *Depression of patellar reflexes | *Respiration <12 |
|                         |                 |                     |               |

**Physician should be made aware of worsening or new-onset proteinuria**

YELLOW = WORRISOME
Increase assessment frequency

1. Notify provider
2. Notify change RN
3. In-person evaluation
4. Order labs/tests
5. Anesthesia consult
6. Consider magnesium sulfate
7. Supplemental oxygen

RED = SEVERE

Trigger: 1 of any type listed below

1. Immediate evaluation
2. Transfer to higher acuity level
3. 1:1 staff ratio

<table>
<thead>
<tr>
<th>Awareness</th>
<th>Headache</th>
<th>Visual</th>
<th>BP</th>
<th>Chest Pain</th>
<th>Respiration</th>
<th>SGO</th>
<th>O2 Sat</th>
<th>TO DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considers Neurology consult</td>
<td>CT Scan</td>
<td>Lab tests intracranial hemorrhage</td>
<td>Lab tests</td>
<td>CT</td>
<td>O2 at 10 L per rebreather mask</td>
<td>R/O pulmonary edema</td>
<td>Chest x-ray</td>
<td></td>
</tr>
</tbody>
</table>


Hypertension / Preeclampsia Care Guidelines
In Pregnancy
APPENDIX C

Recommended Management for Hypertensive Emergency


2. ACOG District II Safe Mother Initiative. Maternal Safety Bundle for Severe Hypertension in Pregnancy
APPENDIX D

Evaluation and Treatment of Antepartum and Postpartum Preeclampsia and Eclampsia in the Emergency Department

Female age 15-60 presents to ED Triage

Is the patient pregnant?
- Yes <20 wks
  - ED Treatment with OB consultation as needed for vaginal bleeding, hypertension, etc.
  - Transfer to L&D and Communicate: 1. Suspicion of Preeclampsia
  - 2. Symptoms
  - 3. VS including BP
  - 4. Any pertinent prenatal and past history
  - Consult OB for OB Medical Screening Exam in ED. Initiate transfer to higher level of care as needed

- Yes >20 yrs
  - L&D Transfer Protocol?
  - No
  - Delivered in last 6 weeks?
  - Yes
  - Immediate OB Consult 30 Min* for:
    - Headache, visual complaints, altered mental status, CVA, seizure
    - Abdominal pain especially RUQ, epigastric pain
    - Persistent nausea, vomiting
    - SOR, pulmonary edema
    - Hypertensive emergency: SBP >160 or DBP >110
  - Major Trauma
  - OB Consult <60 min
    - SBP >160 or DBP >105
    - Labs: CBC, AST, ALT, Urine dip for protein, UA, LDH & Uric acid
    - Serial BP q4h unless significant change in patient condition
    - If patient's BP increases to SBP >160 or DBP >110 then initiate anti-hypertensives and magnesium and notify OB if change in condition if not already present
    - Major Trauma
  - OB Consult <60 min
    - SEP 140-159 or DBP 90-105
    - Labs: CBC, AST, ALT, Urine dip for protein, UA, LDH & Uric acid
    - SerialBP q4h unless significant change in patient condition
    - If patient's BP increases to SBP >160 or DBP >110 then initiate anti-hypertensives and magnesium and notify OB if change in condition if not already present
  - OB Consult <60 min
    - SBP >160 or DBP >105
    - Labs: CBC, AST, ALT, Urine dip for protein, UA, LDH & Uric acid
    - Serial BP
    - OB Consult
    - Notify if changes
    - NOTE: If patient's BP increases to SBP >160 or DBP >110 then initiate anti-hypertensives and magnesium and notify OB if change in condition if not already present

- No
  - L&D Transfer Protocol?

Diagnosis

Symptoms?
- Headache, visual complaints, altered mental status, CVA, seizure
- Abdominal pain especially RUQ, epigastric pain
- Persistent nausea, vomiting
- SOR, pulmonary edema
- Measure BP

SBP >160 OR DBP >105 HYPERTENSIVE EMERGENCY

SEP 140-159 OR DBP 90-105 HYPERTENSION

Order LABS: CBC, AST, ALT, Urine dip for protein, UA, LDH & Uric acid

Immediate OB Consult

Initiate anti-hypertensives and magnesium immediately per treatment guidelines

LABS: CBC, AST, ALT, Urine dip for protein, UA, LDH & Uric acid

Serial BP

OB Consult

Notify if changes

NOTE: If patient's BP increases to SBP >160 or DBP >110 then initiate anti-hypertensives and magnesium and notify OB if change in condition if not already present

Recommended Management of Eclampsia Algorithm

If convulsions persist and the patient is already on magnesium then bolus 2 g over 3 to 5 minutes.

Other medications used to control seizures include:
- **Lorazepam**: 2 – 4 mg IV and repeat time one in 5-10 minutes
- **Diazepam**: 5-10 mg IV and repeat every 10-15 minutes (maximum dose 30 mg)
- **Phenytoin**: 15 – 20 mg/kg IV and repeat in 20 minutes (avoid in hypotension, watch for arrhythmias)

STOP

ONLY INTUBATE PATIENT IF:
1. Remains unconscious post-seizure
2. Non-terminating seizure
3. Signs of aspiration
4. Is hypoxic