Mississippi Perinatal Quality Collaborative

Maternal Hypertension & Heart Toolkit

A Collaborative Quality Improvement Initiative with the Alliance for Innovation in Maternal Health

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ALLIANCE FOR INNOVATION ON MATERNAL HEALTH AIM

MSPQC

INTRODUCTION

Severe maternal hypertension and complications from cardiovascular disease are the leading causes of pregnancy-related death in Mississippi. Mississippi mothers are at increased risk of both

intrapartum complications from hypertension as well as short and long-term consequences of preeclampsia, chronic hypertension, cardiomyopathy and heart disease. Several investigators have demonstrated that maternal deaths from severe maternal hypertension are often associated with modifiable provider and systems level factors including gaps in communication, delays in care and ineffective treatment strategies. While many adverse events are neither predictable nor preventable, the application of standardized, evidence-based and team-based care across the hospital setting can effectively reduce maternal injury and death. Due to numerous factors, Mississippi has a disproportionately high pregnancy-related mortality rate with 22.1 pregnancy- related deaths per 100,000 live births[1] compared to 18 for the United States as a whole[2]. Improving maternal outcomes in Mississippi and the US will require focused, system-wide efforts that maximize the use of evidence based strategies.

Following the call of the National Partnership for Maternal Safety[3], the Mississippi Perinatal Quality Collaborative (MSPQC) aims to support the use of Patient Safety Bundles which address systematic, optimal management of severe maternal hypertension, venous thromboembolism and obstetric hemorrhage in every birthing facility in Mississippi. Patient Safety Bundles are small, straightforward sets of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes.[4] The bundles are not prescriptive; each facility is encouraged to select the tools that best suit its own needs and resources. MSPQC will be working with The Alliance for Innovation in Maternal Healthcare (AIM) to implement the Hypertension & Heart Initiative throughout Mississippi. AIM was formed to support statewide perinatal quality efforts to effectively implement improvement strategies that can help reduce maternal morbidity and mortality.

The overall goals of the MSPQC Maternal Hypertension and Heart (H&H) Initiative are: 1. To reduce severe maternal morbidity and mortality related to severe maternal hypertension and cardiovascular disease among women who give birth in Mississippi. 2. To guide and support obstetric care providers and birthing facilities in Mississippi in implementing evidence-based, collaborative, patient-centered practices to prevent and manage severe maternal hypertension and cardiac complications in pregnancy. 3. To improve postpartum evaluation, follow-up and treatment of postpartum women with and at risk for hypertension and cardiovascular disease.

Participation with the MSPQC H&H Initiative is voluntary. Participating hospitals will receive expert guidance, tools and resources all free of charge through a grant from AIM and the CDC with MSPQC.

Participating hospitals will be asked to:

- Establish a team to lead the hypertension and heart bundle implementation. -
Engage in regular monthly calls for education, feedback and collaboration.
- Actively work to implement the hypertension and heart bundle during the project period. -
Submit process and structure measures to the AIM data portal on a monthly basis. - Attend in-person, regional and annual meetings and Learning Sessions

HOW TO USE THIS TOOLKIT

This toolkit is organized according to the 4-R's of the AIM Severe Maternal Hypertension Safety Bundle: **R**eadiness, **R**ecognition & Prevention, **R**esponse and **R**eporting/Systems Learning. There are additional resources for cardiovascular disease outside of the AIM Bundle. The MSPQC Hypertension and Heart Advisory Team has selected key resources from existing toolkits that may be adopted and adapted by

each facility. This is not an exhaustive compilation of tools; it does, however, provide the core components needed for a facility to successfully implement the hypertension bundle and meet the goals of the MSPQC H&H Initiative. We fully encourage providers and hospitals to review and utilize the resources from the following organizations in addition to the MSPQC, as they each offer valuable tools and guidance for addressing maternal hypertension and cardiovascular conditions.

- Key references for this toolkit include:

AIM: https://safehealthcareforeverywoman.org/aim-program/

- **California Maternal Quality Care Collaborative**-
  - Preeclampsia Toolkit: https://www.cmqcc.org/qi-initiatives/preeclampsia
  - Cardiovascular Disease Toolkit: https://www.cmqcc.org/resources toolkits/toolkits/improving-health-care-response-cardiovascular-disease pregnancy-and

- **American Congress of Obstetricians and Gynecologists, District II, Safe Motherhood Initiative** Hypertension Toolkit. https://www.acog.org/About-ACOG/ACOG-Districts/District II/SMI-Severe-Hypertension?IsMobileSet=false

Illinois Perinatal Quality Collaborative Maternal Hypertension Toolkit: http://ilpqc.org/?q=Hypertension

THIS TOOLKIT CONTAINS :
• PowerPoint slide decks with specific implementation guidance • Visual aids for the obstetric unit • Risk assessment guidelines • Management algorithms & checklists • Medication guidelines • Debriefing forms • Sample hospital policies and protocols • Sample simulation scenarios • Support tools for patients, families and staff

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE

safe health care for every woman

PATIENT SAFETY BUNDLE

Hypertension

READINESS

Every Unit

- Standards for early warning signs, diagnostic criteria, monitoring and treatment of severe preeclampsia/eclampsia (include order sets and algorithms)
- Unit education on protocols, unit-based drills (with post-drill debriefs)
- Process for timely triage and evaluation of pregnant and postpartum women with hypertension including ED and outpatient areas
- Rapid access to medications used for severe hypertension/eclampsia: Medications should be stocked and immediately available on L&D and in other areas where patients may be treated. Include brief guide for administration and dosage.
- System plan for escalation, obtaining appropriate consultation, and maternal transport, as needed

RECOGNITION & PREVENTION

Every Patient

- Standard protocol for measurement and assessment of BP and urine protein for all pregnant and postpartum women
- Standard response to maternal early warning signs including listening to and investigating patient symptoms and assessment of labs (e.g. CBC with platelets, AST and ALT)
- Facility-wide standards for educating prenatal and postpartum women on signs and symptoms of hypertension and preeclampsia

May 2015

WHAT IS AIM?

The Alliance for Innovation on Maternal Health (AIM) is a national partnership of organizations poised to reduce severe maternal morbidity by 100,000 events and maternal mortality by 1,000 deaths by 2018. The AIM program is funded through a cooperative agreement with the Maternal and Child Health Bureau/Health Resource Services Administration.

• AIM aligns national, state, and hospital level efforts to improve maternal health andsafety • AIM develops maternal safety bundles and promotes their implementation in all birth facilities to ensure consistent maternity care

- Obstetric Hemorrhage
- Severe Hypertension/Preeclampsia
- Maternal Prevention of Venous Thromboembolism
- Safe Reduction of Primary C/S | Support for Intended Vaginal Birth
- Reduction of Peripartum Racial Disparities
- Postpartum Care Basics for Maternal Safety
- Patient, Family, and Staff Support after a Severe Maternal Event

• AIM facilitates multidisciplinary and interagency collaboration between states and hospitals • AIM supports harmonized data-driven continuous quality improvement processes • AIM provides evidence-based implementation resources to streamline bundle implementation

Core AIM Partners Include:

American College of Nurse Midwives

The American College of Obstetricians and Gynecologists

Association of Maternal & Child Health Programs

American Society for Healthcare Risk Management

Association of State and Territorial Health Officials

Association of Women's Health Obstetric and Neonatal Nurses

California Maternal Quality Care Collaborative

HRSA Maternal and Child Health Bureau

Society for Maternal Fetal Medicine

Joint Commission Standards for Maternal Safety

"Effective July 1, 2020, 13 new elements of performance (EPs) will be applicable to Joint Commission-accredited hospitals. These new requirements are within the Provision of Care, Treatment, and Services (PC) chapter at PC.06.01.01 and PC.06.01.03 and are designed to improve the quality and safety of care provided to women during all stages of pregnancy and postpartum. The United States ranks 65th among industrialized nations in terms of maternal death. Because of worsening maternal morbidity and mortality, The Joint Commission evaluated expert literature to determine what areas held the most potential impact. The literature review revealed that prevention, early recognition, and timely treatment for maternal hemorrhage and severe hypertension/preeclampsia had the highest impact in states working on decreasing maternal complications. This approach was supported by a technical advisory panel assembled by The Joint Commission, resulting in the development of EPs that focus on these complications."

MSPQC will work to support hospitals in meeting the requirements of the Joint Commission maternal safety standards. The protocols and procedures referenced within this toolkit can serve as guides for hospital development of acceptable protocols and procedures.

• Link to Joint Commission Standards:
Joint Commission Provision of Care, Treatment and Service Standards for Maternal Safety

The standards are available in the Appendix

[1] Mississippi Maternal Mortality Review Committee Report, 2013-2016, www.msdh.gov; April, 2019
[2] Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Trends in Pregnancy- Related Mortality in the United States 1987-2012. www.cdc.gov/reproductivehealth/maternalinfanthealth/; accessed 10/18/2016 [3] D'Alton, Mary, Main, E., Menard, K., Levy, B. The National Partnership of Maternal Safety. Obstetrics & Gynecology, Vol. 123, No. 5, May 2014
[4] Institute for Healthcare Improvement.

Checklist for OB Teams to Complete MSPQC Maternal Hypertension Initiative

□ Create a leadership team to facilitate implementation of Quality changes including: OB Physician, Labor and Delivery Nurse, Postpartum Nurse, Emergency Medicine Physician/Nurse, Anesthesiologist

□ Facilitate completion of education with all providers and nurses (options include: AIM e-modules, MSPQC webinar, Grand Rounds) □ Submit data each month from January 2020 through December 2020 on the 1st of each month in AIM Database, including: ✔ AIM Structure Measures

✔ AIM Process Measures

✔ Monthly chart audit of time to treatment

□ Review time to treatment data with your team

✔ Goal: 80% time to treatment

□Establish a maternal hypertension evaluation, treatment and follow up protocol to meet guidelines established by The Joint Commission by July of 2020.

□Secure and distribute patient education and support resources.

□Plan and hold at least one obstetric drill relating to severe hypertension by July of 2020

All teams that (1) submit <u>all data</u> through September 2020 by **October 15, 2020**, and (2) meet or exceed the 80% time to treatment goal **by October 2020** will receive a certificate of QI Achievement for the MSPQC Maternal Hypertension Initiative, a press release acknowledging the achievement and a letter sent to their hospital leadership acknowledging their achievement.

Key Driver Diagram: MSPQC Maternal Hypertension Initi

GOAL: To reduce maternal hypertension related morbidity and mortality in Miss**Interventio**

AIM: By December 2021, to reduce the rate of severe morbidities in women with preeclampsia, eclampsia, or preeclampsia superimposed on pre existing hypertension by 20%

<u>Key Drivers</u>

Readiness:
Implementation of standard processes for optimal care of severe maternal hypertension in pregnancy

Recognition: Screening and early diagnosis of severe maternal hypertension in pregnancy

Response: Care management for every pregnant or postpartum woman with new onset severe hypertension

Reporting/Systems Learning: Foster a culture of safety and improvement for care of women with new onset severe hypertension

❑ Implement standard order sets and/or algorithmcriteria, timely triage, monitoring and treatment ❑ Ensure rapid access to medications used for seveadministration and dosage
❑ Implement system plan for escalation, obtaining transport
❑ Perform regular simulation drills of severe hypertdebriefs
❑ Integrate severe hypertension processes (e.g. or

❑ Standardize protocol for measurement and assesprotein for all pregnant and postpartum women ❑ Standardize response to early warning signs inclusymptoms and assessment of labs
❑ Implement facility-wide standards for patient-cefamilies on signs and symptoms of severe hypert❑ Educate OB, ED, and anesthesiology physicians, and diagnosis of severe hypertension that includhypertension bundle and/or unit standard proto

❑ Execute facility-wide standard protocols for appr60 minutes
❑ Create and ensure understanding of communicatimplementing a rapid response team through the❑ Develop OB-specific resources and protocols to smajor complications
❑ Provide patient-centered discharge education mpostpartum preeclampsia
❑ Implement patient protocols to ensure follow-upsevere hypertension and 72 hours for all women

❑ Establish a system to perform regular debriefs afcases
❑ Establish a process in your hospital to perform mon all severe hypertension cases admitted to ICU ❑ Continuously monitor, disseminate, and discuss ystaff/administrative meetings
❑ Add maternal hypertension assessment and treaprovider and staff orientations, and annual comp

Key Driver Diagram: MSPQC Maternal Heart

Initia GOAL: To reduce cardiac maternal morbidity and mortality in Mississippi

Interventio

Key Drivers

❑ Implement standard order sets and/or algorithm

AIM: By December 2021, to reduce cardiac maternal mortality by 20%

Recognition: Screening and early diagnosis of high risk cardiopulmonary conditions (pulmonary edema, cardiomyopathy, acute MI, PE)

Response: Care management for every pregnant or postpartum woman with new onset or persistent shortness of breath or chest pain

Reporting/Systems Learning: Foster a culture of safety and improvement for care of women with new onset severe hypertension criteria, timely triage, monitoring and treatment ❑ Ensure access to emergent chest x-ray and echocpostpartum women
❑ Implement standard staff education of OB, ED Anmidwife staff on risks, management of cardiac ar❑ Perform regular simulation/drills of cardiac arres

❑ Standardize protocol for evaluation of shortness women including pulse oximetry, chest –ray and❑ Implement facility-wide standards for patient-cefamilies on critical postpartum warning signs

❑ Execute facility-wide standard protocols for apprmanagement (Rapid response, Code Blue, Bipap❑ Implement patient protocols to ensure follow-upcardiopulmonary conditions and 72 hours for all ❑ Implement protocols to ensure appropriate folloclinician (cardiologist, internal medicine, family

❑ Establish a system to perform regular debriefs afevents.
❑ Establish a process in your hospital to perform mon all cardiac related ICU admissions or deaths ❑ Add maternal cardiac assessment and treatmentand staff orientations, and annual competency a

$^{1}_{0}$

Readiness: Implementation of standard processes for optimal care acute cardiac conditions (pulmonary edema, cardiac arrest)

CMQCC AIM HTN Bundle 101: Key Steps for Implementation - Nancy Peterson
http://bit.ly/1XMQazE

30-60-90 Day Plans: (Form in Appendix)

30/60/90-day cycles
Adapted from Resource Written by the ACT Academy for their Quality, Service Improvement and Redesign suite of programmes.
https://improvement.nhs.uk/documents/2083/30-60-90-day-cycles.pdf

What is it?
The 30/60/90-day cycle tool is a way of helping you to identify, prioritize and implement actions to take your improvement program forward.

When to use it
Using 30/60/90-day cycles of change will enable you to break actions down into manageable chunks. It will allow you to maintain flexibility, work on key themes and multiple processes in parallel and help to maintain project momentum and the energy of those involved.

How to use it
Instead of working on linear project plans, the main unit of your planning horizon becomes the next 30 (or 60 or 90) days and you focus your decision-making around these. Each cycle you define should include a clear and specific objective and a clear timescale (choose between 30/60/90 days).
You should also think ahead on decisions about what will happen next... so if you are successful you will do X and if you are not successful you will do Y. It is important to spend time purposefully thinking about and anticipating what you will do next so that you don't lose any of the momentum you have created by adopting a 30/60/90-day cycle approach.

Plan Do Study Act Cycles
Institute for Health Care Improvement

http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx

Steps in the PDSA Cycle:

Step 1: Plan
Plan the test or observation, including a plan for collecting data.
• State the objective of the test.
• Make predictions about what will happen and why.
• Develop a plan to test the change. (Who? What? When? Where? What data need to be collected?)

Step 2: Do
Try out the test on a small scale. (One patient, One Doctor, One Nurse)
• Carry out the test.
• Document problems and unexpected observations.
• Begin analysis of the data.

Step 3: Study
Set aside time to analyze the data and study the results.
• Complete the analysis of the data.
• Compare the data to your predictions.
• Summarize and reflect on what was learned.

Step 4: Act
Refine the change, based on what was learned from the test.
• Determine what modifications should be made.
• Prepare a plan for the next test.

Blank PDSA Worksheet in Appenix

Example of a Test of Change (Plan-Do-Study-Act Cycle)

Depending on their aim, teams choose promising changes and use Plan-Do Study-Act (PDSA) cycles to test a change quickly on a small scale, see how it works, and refine the change as necessary before implementing it on a broader scale. The following example shows how a team started with a small-scale test.

Patient Education: Provide Preeclampsia handout at discharge

• **Plan:** Provide Preeclampsia brochure to patients being discharged today

• **Do:** Brochures are placed on unit and nurses include in discharge packets

• **Study:** Verbal feedback of nurses to charge nurse: Some nurses forgot to add brochure to discharge packet. Some confusion if need to discuss or just hand out.

• **Act:** Unit Secretary will add brochures to all packets. Nurses will discuss key concepts with each patient.

There are 3 key elements of the Hypertension and Heart Maternal Safety Bundle Readiness domain. Education should include unit protocols and drills for recognizing, responding to, and treating hypertensive and cardiac crises. Every unit should have approved medications for the treatment of severe hypertension readily available and an established algorithm to guide dose escalation and monitoring. Simulation training is a critical component of team readiness. Simulations should be performed both as part of team education and as in-situ drills to test both knowledge and system level factors.

Implementation Focus Areas:

1. **Education**
   - **All staff receive education on severe maternal hypertension and the hypertension protocol at least every 2 years.**
   - **All staff receive education on maternal heart failure and cardiac arrest.**
   - **Education should include both Obstetric, Anesthesiology and Emergency Medicine Teams at a minimum. Collaboration with Cardiology is strongly advised.**

2. **Medication Access**
   - **Rapid access to medications used for severe hypertension/eclampsia:**
   - **Medications should be stocked and immediately available on L&D and in other areas where patients may be treated including emergency departments. Include brief guide for administration and dosage**.

3. **Drills/Simulation**
   - **Perform simulation and drills related to severe hypertension, eclampsia and/or maternal cardiac arrest at least twice annually.**

Links and Examples of Readiness Resources:

Education

AIM eModule | Severe Hypertension: Readiness
https://safehealthcareforeverywoman.org/eModules/eModule-3-Readiness/presentation_html5.html

AIM eModule | Maternal Early Warning Signs:
https://safehealthcareforeverywoman.org/eModules/eModule-MEWS 1/presentation_html5.html

MSPQC Severe Maternal Hypertension Webinar Series
https://mspqc.org/project/obstetrics-severe-maternal-hypertension/

ACOG District II Safe Motherhood Initiative Slide Deck:
https://www.acog.org/About-ACOG/ACOG-Districts/District-II/SMI-Severe Hypertension?IsMobileSet=false

Example Checklists

• Hypertensive Disorders During Pregnancy Checklist: Hypertensive Emergency (ACOG District II) • Hypertensive Disorders During Pregnancy Checklist: Eclampsia (ACOG District II) • Hypertensive Disorders During Pregnancy Checklist: ED Postpartum Preeclampsia

Medication Access

CMQCC: Antihypertensive Agents in Preeclampsia
https://www.cmqcc.org/resource/antihypertensive-agents-preeclampsia-toolkit-pdf

ILPQC ACOG Sample Order Set Pocket Guide:
http://ilpqc.org/docs/htn/ACOGsamplesets.pdf

Simulation/Drills

CMQCC Simulation Resources from Preeclampsia Toolkit

Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: General Information
Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Learning Objectives
Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Patient Background Information
Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Equipment/Materials List Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Program Algorithm & GUI Notes Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Debriefing Objectives
Severe Preeclampsia/Eclampsia in LDR v2.0 SimMan 3G: Debriefing Guide/Evaluation
Simulation Scenario: Hypertension in Pregnancy, HELLP with Seizure

Severe Hypertension in Pregna

REVISED APRIL 2018

Disclaimer: The following material is an exaand not meant to be prescriptive. ACOG accliability for the content or for the consequeactions taken on the basis of the informatio

KEY ELEMENTS

READINESS & RESPONSE

- Complications & Escalatio
- Further Evaluation
- Change of Status
- Postpartum Surveillance

RISK ASSESSMENT & PREVENTION • Diagnostic Criteria

- When to Treat
- Agents to Use
- Monitoring

TYPES OF HYPERTENSION

Chronic Hypertension
- SBP ≥ 140 **or** DBP ≥ 90
- Pre-pregnancy or <20 weeks

Gestational Hypertension
- SBP ≥ 140 **or** DBP ≥ 90

eclampsia seizure in setti

Preeclampsia – Eclampsia

Chronic Hypertension & Superimposed Preeclampsia

Preeclampsia with severe features *(ACOG Executive Summary on Hypertension in Pregnancy, October 2013)*

- > 20 weeks
- Absence of proteinuria or systemic signs/symptoms
- SBP ≥ 140 **or** DBP ≥ 90
- Proteinuria with or without signs/symptoms ○ Presentation of signs/symptoms/lab abnormalities but no pr**Proteinuria not required for diagnosis*
- Systolic BP of 160 mm Hg or higher, or diastolic BP of 110 at least 4 hours apart while the patient is on bed rest (unlinitiated before this time)
- Thrombocytopenia (platelet count less than 100,000/micr○ Impaired liver function as indicated by abnormally elevateenzymes (to twice normal concentration), severe persisteepigastric pain unresponsive to medication and not accoudiagnoses, or both
- Progressive renal insufficiency (serum creatinine concentra doubling of the serum creatinine concentration in the ab○ Pulmonary edema
- New-onset cerebral or visual disturbances

DEFINITIONS

SEVERE HYPERTENSION

- Systolic blood pressure ≥ 160 mm Hg **or**
- Diastolic blood pressure ≥ 110 mm Hg

HYPERTENSIVE EMERGENCY

- Persistent, severe hypertension that can occur antepartum, intrapa- Defined as:
  - Two severe BP values (≥ 160/110) taken 15-60 minutes apart - Severe values do not need to be consecutive

WHEN TO TREAT

SEVERE HYPERTENSION

SBP ≥ 160 **or** DBP ≥ 110

- Repeat BP every 5 min for 15 min
- Notify physician after one severe BP value is obtained

HYPERTENSIVE EMERGENCY

Persistent, severe hypertension that can occur antepartum, intrapartum, or Two severe BP values (≥ 160/110) taken 15-60 minutes apart Severe values do not need to be consecutive

- If severe BP elevations persist for 15 min or more, beginASAP. **Preferably within 60 min of the second elevated**

- If two severe BPs are obtained *within* 15 min, treatment[20] initiated if clinically indicated

FIRST LINE THERAPIES

- Intravenous labetalol
- Intravenous hydralazine
- Oral nifedipine

Magnesium sulfate not recommended as antihypertensive agent ▪ Should be used for: seizure prophylaxis and controlling seizures in eclampsia ▪ IV bolus of 4-6 grams in 100 ml over 20 minutes, followed by IV infusion of 1-2 grams**hours postpartum**

▪ If no IV access, 10 grams of 50% solution IM (5 g in each buttock) ▪ Contraindications: pulmonary edema, renal failure, myasthenia gravis

Anticonvulsants(for recurrent seizures or when magnesium is C/I)**:**

- **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 min if no response. may cause cardiac arrhythmias.
- **Keppra**: 500 mg IV or orally, may repeat in 12 hours. Dose adjustment needed if ren[21]

**There may be adverse effects and additional contraindications. Clinical judgement shoul*

[22]
[23]
[24]

ADDITIONAL THERAPY RECOMMENDATI

IF NO IV ACCESS AVAILABLE:

- Initiate algorithm for oral nifedipine, or
- Oral labetalol, 200 mg *Repeat in 30 min if SBP remains ≥ 160 or DBP ≥ 110 and

SECOND LINE THERAPIES (if patient fails to respond to first line tx): Recommend emergency consult with:

- Maternal Fetal Medicine
- Internal Medicine
- Anesthesiology
- Critical Care
- Emergency Medicine

May also consider:

✔ Labetalol or nicardipine via infusion pump

[2][5]

✔ Sodium nitroprusside for extreme emergencies *Use for shortest amount ocyanide/thiocyanate toxicity

MONITORING BLOOD PRESSU

MATERNAL

- Once BP is controlled (<160/110), measure ✔ Every 10 minutes for 1 hour
✔ Every 15 minutes for next hour
✔ Every 30 minutes for next hour
✔ Every hour for 4 hours

- Obtain baseline labs:

✔ CBC
✔ Platelets
✔ LDH
✔ Liver Function Tests
✔ Electrolytes

FETAL

- Fetal monitoriappropriate fo

✔ BUN creatinine

✔ Urine protein

COMPLICATIONS & ESCALATION

PRMATERNAL (pregnant or postpartum) FETAL

- CNS (seizure, unremitting headache, visual disturbance) • Pulmonary edema or cyanosis
- Epigastric or right upper quadrant pain • Impaired liver function
- Thrombocytopenia
- Hemolysis
- Coagulopathy
- Oliguria **<30 ml/hr for 2 consecutive hours*
- Abnorma• IUGR

Prompt evaluation and communication: If undeli

[27]

MONITORING CHANGE OF STAT *Once*

patient is stabilized, consider:

SEIZURE PROPHYLAXIS

○ Magnesium sulfate (if not already initiated)

TIMING & ROUTE OF DELIVERY ○

Eclampsia → Delivery after stabilization

○ **HELLP/Severe preeclampsia/ Chronic hypertension + superimposed preeclampsia** → Vaginal delivery, if attainable in reasonable amount of time

○ **≥ 34 weeks** → Deliver

MATERNAL BP

○ Continue control with oral agents ○

Target range of 140-150/90-100 [28]

IF PRETERM (<34 WKS) & EXPEC○

Antenatal corticosteroids ○

Subsequent pharmacotherapy

○ **HELLP (Gestational age of fetal vi**✔

Delay delivery for 24-48 hourscondition remains stable

✔ Contraindications to delay in dof corticosteroids:

• Uncontrolled hypertension • Eclampsia
• Pulmonary edema
• Suspected abruption placenta • Disseminated intravascular coa• Nonreassuring fetal status • Intrauterine fetal demise

GUIDELINES FOR DOCUMENTATION

✔ **Complete history**

✔ **Complete physical exam + preeclampsia symptoms:**
- Unremitting headaches
- Visual changes
- Epigastric pain
- Fetal activity
- Vaginal bleeding

✔ **Baseline BPs throughout pregnancy**

✔ **Meds/drugs throughout pregnancy** (illicit & OTC)

✔ **Current vital signs**, inc. O2 saturation

✔ **Current and past fetal assessment:**

✔ **Indicate diagnosis of p**○ If no dx, indicate stepreeclampsia

✔ **Antihypertensives tak**○ Specific medications○ Dose, route, freque○ Current fetal status

✔ **Magnesium sulfate** (if iprophylaxis)
- Dose, route, duratio

✔ Delivery assessment ○ If indicated, note: ti○ If not indicated, deswarrant delivery

✔ Antenatal corticosteroi
- FHR monitoring results

$^{2}_{9}$

- Est. fetal weight
- BPP, as appropriate

gestation

NOTE: *Continue ongoing docuntil patient stabilized at < S*

POSTPARTUM SURVEILLANC

Necessary to prevent additional morbidity as preeclampsia/eclampsia c hours

INPATIENT

• Measure BP every 4 hours after delivery until stable

• Do not use NSAIDs for women with elevated BP

• Do not discharge patient until BP is well controlled for at least 24

ANTIHYPERTENSIVE THERAPY OUTPATIEN

• For pts with pnurse evaluati

✔ Within 3-5 da

✔ Again in 7-10 (earlier if pers

- Recommended for persistent postpartum HTN: SBP ≥ 150 or DBP ≥ occasions at least 4 hours apart
- Persistent SBP ≥ 160 or DBP ≥ 110 should be treated within 1 hour

DISCHARGE PLANNING

All patients receive information on preeclampsia: ✔ Signs and symptoms

✔ Importance of reporting information to health care provider as soon✔ Culturally-competent, patient-friendly language

All new nursing and physician staff receive information on hypregnancy and postpartum

FOR PATIENTS WITH PREECLAMPSIA

✔ BP monitoring recommended 72 hours after delivery ✔

Outpatient surveillance (visiting nurse evaluation) recommended: ○ Within 3-5 days

- ○ Again in 7-10 days after delivery (earlier if persistent symptoms

POST-DISCHARGE EVALUATION

ELEVATED BP AT HOME, OFFICE, TRIAG

Postpartum triggers:

- SBP ≥ 160 or DBP ≥ 110 or
- SBP ≥ 140-159 or DBP ≥ 90-109 with unremitting headaches, visual disturbances, or epig

- Emergency Department treatment (OB /MICU consult as needed)
- AntiHTN therapy suggested if persistent **SBP ≥ 150 or DBP ≥ 100** on at least two occasion• Persistent **SBP ≥ 160 or DBP ≥ 110** should be treated within 1 hour

Signs and symptoms of

Good response to antiHTN treatment and asymptomatic neurological evaluation, confailure,

coagulopathy antihypertensi

(L&D, ICU, unit with telemetry)

Admit for further observation and management

$^{3}_{2}$

Recommend emergency evaluation (MFM, intanesthesiology,

CONCLUSION

- **Systolic BP ≥ 160 or diastolic BP ≥ 110** warrant:
  - ✔ Prompt evaluation at bedside
  - ✔ Treatment to decrease maternal morbidity and mortality

- Risk reduction and successful clinical outcomes require avoidaof severe systolic and diastolic hypertension in women with: ✔ Preeclampsia
  - ✔ Eclampsia
  - ✔ Chronic hypertension + superimposed preeclampsia

- Increasing evidence indicates that standardization of care impoutcomes

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Organizatio

Example

Hypertensive Emergency Checklist

Hypertensive Emergency:

- Two severe BP values (≥160/110) taken 15-60 minutes apart. Values do not need to be consecutive. • May treat within 15 minutes if clnically indicated

Call for Assistance

Designate:

Team leader

Checklist reader/recorder

Primary RN

Ensure side rails up

Ensure medications appropriate given patient history

Administer seizure prophylaxis (magnesium sulfate first line agent, unless contraindi cated)

Antihypertensive therapy within 1 hour for persistent severe range BP

Place IV; Draw preeclampsia labs

Antenatal corticosteroids (if <34 weeks of gestation)

Re-address VTE prophylaxis

requirement Place indwelling urinary

catheter

Brain imaging if unremitting headache or neurological symptoms

Debrief patient, family, and obstetric team

† "Active asthma" is defined as:

- symptoms at least once a week, or
- use of an inhaler, corticosteroids for asthma during the pregnancy, or
- any history of intubation or hospitalization for asthma.

Revised January 2019

Contraindications: Myasthenia gravis; avoid with pulmonary edema, use caution with renal failure

IV access:

Load 4-6 grams 10% magnesium sulfate in 100 mL solution over 20 min

Label magnesium sulfate; Connect to labeled infusion pump

Magnesium sulfate maintenance 1-2 grams/hour **No IV access:**

10 grams of 50% solution IM (5 g in each buttock)

For SBP ≥ 160 or DBP ≥ 110
(See SMI algorithms for complete management when necessary to move to another agent after 2 doses.)

Labetalol (initial dose: 20mg); **Avoid parenteral labetalol with active asthma, heart disease, or congestive heart failure; use with caution with history of asthma**

Hydralazine (5-10 mg IV* over 2 min); **May increase risk of maternal hypotension**

Oral Nifedipine (10 mg capsules); Capsules should be administered orally, not punctured or otherwise administered sublingually

** Maximum cumulative IV-administered doses should not exceed 220 mg labetalol or 25 mg hydralazine in 24 hours*

***Note:** If first line agents unsuccessful, emergency consult with specialist (MFM, internal medicine, OB anesthesiology, critical care) is recommended*

For recurrent seizures or when magnesium sulfate contraindicated

Lorazepam (Ativan): 2-4 mg IV x 1, may repeat once after 10-15 min

Diazepam (Valium): 5-10 mg IV q 5-10 min to maximum dose 30 mg

Eclampsia Checklist Example

Call for Assistance

Designate

Team leader

Checklist reader/recorder

Primary RN

Ensure side rails up

Protect airway and improve oxygenation: Maternal pulse oximetry

Supplemental oxygen (100% non-rebreather) Lateral decubitis

position

Bag-mask ventilation available

Suction available

Continuous fetal monitoring

Place IV; Draw preeclampsia labs

Ensure medications appropriate given patient history

Administer magnesium sulfate

Administer antihypertensive therapy if appropriate

Develop delivery plan, if appropriate

Debrief patient, family, and obstetric team

† "Active asthma" is defined as:

- symptoms at least once a week, or
- use of an inhaler, corticosteroids for asthma during the pregnancy, or
- any history of intubation or hospitalization for asthma.

Revised January 2019

Contraindications: Myasthenia gravis; avoid with pulmonary edema, use caution with renal failure

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Oral Nifedipine (10 mg capsules); Capsules should be administered orally, not punctured or otherwise administered sublingually

** Maximum cumulative IV-administered doses should not exceed 220 mg labetalol or 25 mg hydralazine in 24 hours*

***Note:** If persistent seizures, consider anticonvulsant medica tions and additional workup*

For recurrent seizures or when magnesium sulfate contraindicated

Lorazepam (Ativan): 2-4 mg IV x 1, may repeat once after 10-15 min

Diazepam (Valium): 5-10 mg IV q 5-10 min to maximum dose 30 mg

Neuromuscular block and intubate

Obtain radiographic imaging

ICU admission

Consider anticonvulsant medications

Postpartum Preeclampsia Checklist If Patient <

6 Weeks Postpartum with:

- BP ≥ 160/110 or

• BP ≥ 140/90 with unremitting headache, visual disturbances, epigastric pain

Call for Assistance

Designate:
Team leader
Checklist reader/recorder
Primary RN

Ensure side rails up

Call obstetric consult; Document call

Place IV; Draw preeclampsia labs
CBC Chemistry Panel
PT Uric Acid
PTT Hepatic Function
Fibrinogen Type and Screen

Ensure medications appropriate given
patient history

Administer seizure prophylaxis

Administer antihypertensive therapy
Contact MFM or Critical Care for refractory blood pressure

Consider indwelling urinary catheter
Maintain strict I&O —
patient at risk for pulmonary edema

Brain imaging if unremitting headache or neurological symptoms

† "Active asthma" is defined as:
- symptoms at least once a week, or
- use of an inhaler, corticosteroids for asthma during the pregnancy, or
- any history of intubation or hospitalization for asthma.

Revised January 2019

Contraindications: Myasthenia gravis; avoid with pulmonary edema, use caution with renal failure

IV access:

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congestive heart failure; use with caution with history of asthma

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** Maximum cumulative IV-administered doses should not exceed 220 mg labetalol or 25 mg hydralazine in 24 hours*

Note: If first line agents unsuccessful, emergency consult with specialist (MFM, internal medicine, OB anesthesiology, critical care) is recommended

For recurrent seizures or when magnesium sulfate contraindicated

Lorazepam (Ativan): 2-4 mg IV x 1, may repeat once after 10-15 min

Diazepam (Valium): 5-10 mg IV q 5-10 min 37

CDPH-MCAH Approved: 12/20/13 **ANTIHYPERTENSIVE AGENTS IN PREECLAMPSIA**

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BACKGROUND

Early treatment of hypertension has consistently been found to reduce the incidence of hypertensive crisis, and data from multiple case studies revealed increased rates of heart failure, pulmonary edema, stroke and death when antihypertensive medications were not used in women with severe gestational hypertension or severe preeclampsia.[1] According to ACOG, a hypertensive emergency is an acute-onset, severe hypertension that is persistent for 15 minutes or more.[2]

Treatment should be initiated for blood pressures that are ≥160 mm Hg systolic or 105- 110 mm Hg diastolic.[3] It should be noted that others have suggested that treatment should be initiated at a lower threshold of 155/105 if the primary goal is to reduce maternal intracranial hemorrhage, which remains the leading cause of death from preeclampsia.[4]

The goal of blood pressure control is not to return it to “normal” but rather to lower it to a range of 140-160/90-100 mm Hg, a level at which the risk of intracranial hemorrhage is reduced. Lowering the blood pressure below this range may reduce placental perfusion and harm the fetus.[4,5]

NOTE: Treatment of hypertension in the patient with chronic cocaine/amphetamine abuse may cause an exaggerated decrease in blood pressure. Hypotension may be difficult to treat due to altered vasopressor response and depleted endogenous catecholamine stores. Unexpected, severe hypotension may also occur after regional anesthesia or general anesthesia. (See Appendix T, pg.127.)

KEY LEARNING POINTS

1. Antihypertensive therapy is reserved for women with systolic blood pressure greater than 160 mm Hg or diastolic blood pressure greater than 105-110 mm Hg. Increasingly, risk of stroke is felt to be correlated with maximum systolic blood pressure.[3,6,7]

2. Hydralazine and labetalol are the two “first line” agents used for hypertension in preeclampsia. Hydralazine is an arteriolar dilator that reduces blood pressure but may cause tachycardia. Possible side effects are headache, risk of delayed maternal hypotension, which can be associated with fetal bradycardia, and rarely, upper abdominal (e.g., “epigastric”) pain, which may be confused with worsening preeclampsia. Labetalol is a combined alpha and beta-blocking agent, which reduces

blood pressure by dilating arterioles and decreasing heart rate. Labetalol should be administered intravenously for acute hypertensive emergencies.[2] Asthma, cocaine and amphetamine use (including methamphetamine) is a contra-indication for labetalol use. (See Appendix T, pg. 127.)

3. Oral nifedipine (calcium channel blocker), IV esmolol (beta blocker) and IV nicardipine (calcium channel blocker) are second line drugs. Esmolol, is a very short-acting agent, and can cause the baseline fetal heart rate to decrease, but often resolves rapidly when esmolol is stopped.

4. First line therapy recommendations for acute treatment of critically elevated BP in pregnant women (160/105-110 mm Hg) are either with IV labetalol or hydralazine (see algorithms in Medication section, pg. 50)[2,3] In the event that acute treatment is needed in a patient without IV access oral nifedipine may be used (10 mg) and may be repeated in 30 minutes.[8] PO nifedipine appears equally as efficacious as IV labetalol in correcting severe BP elevations.[9] Oral labetalol would be expected to be less effective in acutely lowering the BP due to the slower onset to peak and thus should be used only if nifedipine is not available in a patient without IV access.[9]

Hypertensive Medication Administration Oral versus IV	
IV Labetalol • Onset: 2-5 min • Peak: 5 min	IV Hydralazine • Onset: 5-20 min • Peak: 15-30 min
PO Labetalol: • Onset: 20 min-2 hrs	PO Nifedipine • Onset: 5-20 min*

• Peak: 1-4 hrs	• Peak: 30-60 min

*PO, not sublingual nifedipine onset of action is 15-30 minutes depending upon the source.[8,10,11]

5. Sodium nitroprusside is a very potent vasodilator that acts immediately and is rarely used. It must be used by experienced providers accompanied by invasive (e.g., an arterial line) blood pressure monitoring.

6. Consideration for consultation with anesthesiologists who are accustomed to the titration of vasoactive medications should be considered early for patients with uncontrolled blood pressure.

7. Placement of an arterial line may be helpful in women whose blood pressure is particularly difficult to control. There may also be cases where repeated blood studies

will be necessary, e.g., magnesium levels, platelet counts, etc., and where repeated venipunctures may be difficult.

8. Women with severe hypertension requiring antihypertensive medications need to be observed carefully for signs of pulmonary congestion such as agitation, low oxygen saturation, cough, or rales on lung exam suggesting pulmonary edema or heart failure. Careful monitoring should be implemented.

9. Proper lateral positioning should be employed for these patients, since aortocaval compression can exacerbate uteroplacental insufficiency due to preeclampsia itself.

10. One of the most common and severe complications is hypertensive encephalopathy or Posterior Reversible Encephalopathy Syndrome (PRES).

RECOMMENDATIONS FOR QUALITY IMPROVEMENT:

1. Timely initiation of medication for treating elevated blood pressure is critical. Initiation of therapy within 60 minutes is recommended. However, every attempt should be made to initiate therapy within 30 minutes after confirmation of severe range blood pressures if possible. Initial therapy should consist of labetalol 20 mg or hydralazine 5- 10 mg IV over 2 minutes. Hydralazine begins to have an effect within 5-20 minutes with its maximum effect occurring at 15-30 minutes. Labetalol onset is within 2-5 minutes and has its maximum effect after 5 minutes. (See Appendix X, pg. 137).

2. Implementation of a “Preeclampsia Box” (see Appendix S, pg. 126) will assist in the initiation of rapid delivery of medication.

3. Maximum cumulative IV administered doses should not exceed the following: hydralazine 25 mg; labetalol 220 mg in 24 hours.[3]

4. The goal for blood pressure control is 140-160/90-100. Do not try to lower the blood pressure to “normal.”

5. The anesthesiologist should be seen as a resource for invasive blood pressure monitoring (if required) and medication titration.

6. An arterial line can be useful for acquiring multiple blood samples as well as for arterial pressure measurement.

SAMPLE PREECLAMPSIA/ECLAMPSIA MEDICATION BOX

Each institution should prepare its own medication box specific to its protocols.

L&D Severe Preeclampsia & Eclampsia Box – Content and Dose Guideline	
Magnesium 20 grams/500 ml bag	**IV (Use Magnesium Sulfate Continuous Infusion under L&D protocol in Alaris Pump Library):** *Initial (Loading Dose):* 4-6 g (100 ml – 150 ml) over 20 minutes *Maintenance Dose:* 1-2 g/hour (25 ml/hr – 50 ml/hr) continuous infusion
Labetalol 100 mg/20 ml vial	***Initial: Draw 4 ml from the vial.*** **20 mg (4 ml)** IV bolus followed by **40 mg (8 ml)** if not effective within 10 minutes; then **80 mg (16 ml)** every 10 minutes (maximum total dose of 300 mg/60 ml)
Hydralazine 20 mg/ml vial	***Initial: Draw 0.25 ml from the vial.*** **5-10 mg (0.25-0.5 ml)** doses IV every 15-20 minutes
Esmolol 100 mg/10 ml vial **(By Anesthesiologists ONLY)**	**1-2 mg/kg (0.1-0.2 ml/kg)** IV over 1 minute
Propofol 10 mg/ml, 20 ml vial **(By Anesthesiologists ONLY)**	**30-40 mg (3-4 ml)** IV bolus
Calcium gluconate 1000 mg/10 ml vial	1000 mg/10 ml IV over 2-5 minutes
Labetalol 200 mg tablets	200 mg PO and repeated in 30 minutes if needed

Nifedipine 10 mg PO	10 mg PO in 30 minutes if needed
Supply contents	3 ml, 10 ml, and 20 ml syringes, appropriate needles and appropriate tubing sets

EVIDENCE GRADING

Level of Evidence: III-C

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APPENDIX W: LABETALOL AND HYDRALAZINE RECOMMENDATIONS

LABETALOL:

Threshold(Blood(Pressure:(
Systolic(160(OR(Diastolic(105>110(

Target(Blood(Pressure:(
140>150(>(90>100(

OR(

**(Maternal:Fetal'Medicine,'Cri4cal'
Care,'Anesthesia,'Internal'Medicine)'**

**Switch''
TO:'**

Seek'Consulta4on[(1)]'

Adapted(from(ACOG(CommiGee(Opinion(#514;((1)(MFM,(CriPcal(Care,(Anesthesia,(Internal(Medicine;((2)(Raheem(I,(Saaid(R,(Omar(S,(
Tan(P.(Oral(nifedipine(versus(intravenous(labetalol(for(acute(blood(pressure(control(in(hypertensive(emergencies(of(pregnancy:(a(
randomised(trial.(*BJOG.&*2012;119:78>85.((

HYDRALAZINE+

THRESHHOLD+BLOOD+PRESSURE+
Systolic+160+OR+Diastolic+105>110+

TARGET+BLOOD+PRESSURE+
140>160+OR+90>100+

ACOG+CommiDee+Opinion+#514,+2011;+ACOG+PracMce+BulleMn+#33.+Reaffirmed+2012.+

Sample Order Sets

- Labetalol
- Hydralazine
- Oral Nifedipine

Sample Order Sets Adapted from:
Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. Committee Opinion No. 692. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017:129:e90–5.

Sample Order Set for Severe Intrapartum or Postpartum Hypertension, Initial First-line Man agement With Labetalol*

• Notify physician if systolic blood pressure (BP) measurement is greater than or equal to 160 mm Hg or if diastolic BP measurement is greater than or equal to 110 mm Hg. • Institute fetal surveillance if undelivered and fetus is via- ble. • If severe BP elevations persist for 15 minutes or more, administer labetalol (20 mg intravenously [IV] for more than 2 minutes). • Repeat BP measurement in 10 minutes and record results. • If either BP threshold is still exceeded, administer labetalol (40 mg IV for more than 2 minutes). If BP is below thresh- old, continue to monitor BP closely. • Repeat BP measurement in 10 minutes and record results. • If either BP threshold is still exceeded, administer labetalol (80 mg IV for more than 2 minutes). If BP is below thresh- old, continue to monitor BP closely. • Repeat BP measurement in 10 minutes and record results. • If either BP threshold is still exceeded, administer hydral- azine (10 mg IV for more than 2

minutes). If BP is below threshold, continue to monitor BP closely. • Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, obtain consultation from maternal–fetal medicine, emergency internal med- icine, anesthesia, or critical care subspecialists. • Give additional antihypertensive medication per specific order. • Once the aforementioned BP thresholds are achieved, re- peat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours. • Institute additional BP timing per specific order. *Please note there may be adverse effects and contraindications.

Data from the National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved December 5, 2016.

Sample Order Set for Severe Intrapartum or Postpartum Hypertension Initial First-line Man agement With Hydralazine*

- Notify physician if systolic blood pressure (BP) is greater than or equal to 160 mm Hg or if diastolic BP is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is via ble.
- If severe BP elevations persist for 15 minutes or more, ad minister hydralazine (5 mg or 10 mg intravenously [IV] for more than 2 minutes).
- Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, administer hydral azine (10 mg IV for more than 2 minutes). If BP is below threshold, continue to monitor BP closely. • Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, administer labetalol (20 mg IV for more than 2 minutes). If BP is below thresh old, continue to monitor BP closely. • Repeat BP measurement in 10 minutes and record results. • If either BP threshold is still exceeded, administer labetalol (40 mg IV for more than 2 minutes) and obtain consultation from maternal–fetal medicine, emergency internal med- icine, anesthesia, or critical care subspecialists.
- Give additional antihypertensive medication per specific order.
- Once the aforementioned BP thresholds are achieved, re- peat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours. • Institute additional BP timing per specific order. *Please note there may be adverse effects

and contraindications. Data from the National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved December 5, 2016.[46]

Sample Order Set for Severe Intrapartum or Post partum Hypertension Initial First-line Manage ment With Immediate-Release Oral Nifedipine*†

- Notify physician if systolic blood pressure (BP) is greater than or equal to 160 mm Hg or if diastolic BP is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is via ble.
- If severe BP elevations persist for 15 minutes or more, ad minister nifedipine‡ (10 mg orally). • Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, administer nifedip ine capsules (20 mg orally). If BP is below threshold, con tinue to monitor BP closely. • Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, administer nifedip ine capsule (20 mg orally). If BP is below threshold, contin ue to monitor BP closely. • Repeat BP measurement in 20 minutes and record results. • If either BP threshold is still exceeded, administer labeta lol (40 mg intravenously over 2 minutes) and obtain emer gency consultation from maternal–fetal medicine, inter- nal medicine, anesthesia, or critical care subspecialists. • Give additional antihypertensive medication per specific order. • Once the aforementioned BP thresholds are achieved, re- peat BP measurement every 10 minutes for 1 hour, then
  every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours.
- Institute additional BP timing per specific order. *Please note there may be adverse effects and contraindications. †When used with magnesium sulfate, facilities should monitor maternal vital signs as described above in reference to blood pressure, with attention to normal heart rate and blood pressure.
‡Capsules should be administered orally and not punctured or otherwise adminis-

tered sublingually. Data from the National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection,

Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www. nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved December 5, 2016.

All hospitals should develop a process for the recognition and appropriate response to severe hypertension and any signs or symptoms of a patient's deteriorating cardiovascular condition. The MEWS Protocol is one example. Written diagnostic criteria describing early warning signs and intervention strategies should be readily available on units. When possible, warning signs should be built into the electronic medical record system.

Implementation Focus

1. Accurate Blood Pressure Measurement (Joint Commission)

- Standard training and protocol for measurement and assessment of BP and urine protein for all pregnant and postpartum women.

2. System for Maternal Early Warning Signs

- Standard response to maternal early warning signs including listening to and investigating patient symptoms and assessment of labs (e.g. CBC with platelets, AST and ALT)

3. Patient Education and Recognition of Symptoms (Joint Commission)

- Facility-wide standards for educating prenatal and postpartum women on signs and symptoms of hypertension and preeclampsia.
- Provide printed education to patients (and their families including the designated support person whenever possible). At a minimum, education includes:
  - Signs and symptoms of severe hypertension/preeclampsia during hospitalization that alert the patient to seek immediate care
  - Signs and symptoms of severe hypertension/preeclampsia after discharge that alert the patient to seek immediate care

Links and Examples of Recognition & Prevention Resources

Blood Pressure Assessment

CMQCC: Accurate Assessment of Blood Pressure
https://www.cmqcc.org/resource/accurate-blood-pressure-measurement-toolkit-pdf CMQCC Slides:

Accurate Blood Pressure Measurement: Strategies for Success - Nancy Peterson **Maternal**

Early Warning Systems

AIM eModule: Maternal Early Warning Systems
https://safehealthcareforeverywoman.org/eModules/eModule-MEWS-1/presentation_html5.html

Patient Education & Recognition

Association of Women's Health Obstetric & Neonatal Nurses POST BIRTH Toolkit and Resources
https://www.awhonn.org/page/POSTBIRTH

Preeclampsia Foundation- Mississippi Hospital Teams may request resources directly from MSPQC
https://m123store.com/Store/Site/Layout/Custom.aspx

ACCURATE BLOOD PRESSURE MEASUREMENT

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BACKGROUND

The current method used most often in the hospital setting for accurate measurement of blood pressure is the oscillatory method, or automated blood pressure machine, which tends to underestimate both systolic and diastolic readings by as much as 10 mm Hg[1,2] In the clinic setting and physician offices, blood pressure measurement is often used with the aneroid (mechanical type with a dial) sphygmomanometer. Refer to Table 1 for steps in obtaining accurate blood pressure measurement and Figure 1 for recommended cuff sizes.

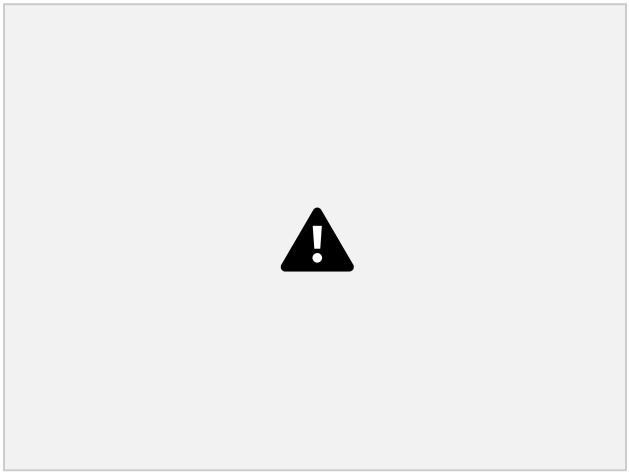
Table 1: Steps for Obtaining Accurate Blood Pressure Measurements[3]

Step 1: Prepare equipment	a. Mercury sphygmomanometer is gold standard, can use validated equivalent automated equipment b. Check cuff for any defaults c. Obtain correct size cuff: width of bladder 40% of circumference and encircle 80% of arm (See Figure 1)
Step 2: Prepare the patient: 	a. Use a sitting or semi-reclining position with back supported and arm at heart level b. Patient to sit quietly for 5 minutes prior to measurement c. Bare upper arm of any restrictive clothing d. Patients feet should be flat, not dangling from examination table or bed, and her legs uncrossed e. Assess any recent (within previous 30 minutes) consumption of caffeine or nicotine. If blood pressures are at the level that requires treatment, consumption of nicotine or caffeine should not lead to delays in instituting appropriate anti-hypertensive therapies
Step 3: Take measurement	a. Support patients arm at heart level, seated in semi-fowlers position b. For ausculatory measurement: use first audible sound (Kortokoff I) as systolic pressure and use disappearance of sound (Kortokoff V) as diastolic pressure c. Read to the nearest 2 mm Hg d. Instruct the patient not to talk e. At least one additional readings should be taken within 15 minutes f. Use the highest reading g. If greater than or equal to 140/90, repeat within 15 minutes and if still elevated, further evaluation for preeclampsia is warranted. **Do not reposition patient to either side to obtain a lower BP. This will give you a false reading.**
Step 4: Record Measurement	Document BP, patient position, and arm in which taken

Adapted from Peters RM (2008) High blood pressure in pregnancy. Nursing for Women's Health, Oct/Nov, pp. 410-422. Photo courtesy of and printed with permission by Kristi Gabel, RNC-OB, C-EFM, MSN, CNS, Sutter Roseville Medical Center 2013.

Figure 1: Recommended cuff sizes

Arm Circumference (cm)	Cuff Size
22-26	“Small Adult”: 12x22cm
27-34	“Adult”: 16x30cm
35-44	“Large Adult”: 16x36cm
45-52	“Adult Thigh”: 16x42cm



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Accurate blood pressure measurements in obese women can be quite challenging and it is extremely important to use an appropriate sized cuff. In women with an upper-arm circumference of more than 34cm, large adult cuffs or thigh cuffs can be used to improve blood pressure accuracy. For upper-arm measurements greater than 50cm, the American Heart Association recommends using a cuff on the forearm and feeling for the appearance of the radial pulse at the wrist to estimate systolic blood pressure. However, the accuracy of forearm measurement is not reliable.[4]

EVIDENCE GRADING
Level of Evidence: II and III

REFERENCES

1. Natarajan P, Shennan A, Penny J, Halligan A, de Swiet M, Anthony J. Comparison of auscultatory and oscillometric automated blood pressure monitors in the setting of preeclampsia. *American Journal of Obstetrics and Gynecology.* 1999;181 (5 Pt 1):1203-1210.

2. Ogedegbe G, Pickering T. Principles and techniques of blood pressure measurement. *Cardiology Clinics.* 2010;28(4):571-586.

3. Peters R. High blood pressure in pregnancy. *Nursing for Womens Health.* 2008;12(5410-421; quiz 422).

4. Pickering T, Hall J, Appel L, et al. Recommendations for blood pressure measurement in humans and experimental animals: part 1: blood pressure

Preeclampsia Early Recognition Tool (PERT)

NORMAL

SEVERE

WORRISOME (YELLOW)

ASSESS (GREEN)

·Agitated/confused

(RED)

·Drowsy
·Difficulty speaking

·Unresponsive

Awareness Alert/oriented

None	·Mild headache ·Nausea, vomiting

Headache ·Unrelieved headache **Vision** None ·Blurred or impaired ·Temporary blindness

Systolic BP (mm HG) 100-139 140-159 ≥160

Diastolic BP

50-89

(mm HG) ≥105 **HR** 61-110 111-129 ≥130

Respiration 11-24 25-30 <10 or >30

Absent	Present

SOB Present **O2 Sat (%)** ≥95 91-94 ≤90

NST

·Non-reactive NST
·Nausea, vomiting ·Chest pain
·Abdominal pain ·Category III

Pain: Abdomen or Chest None

Urine Output
·Nausea, vomiting ·Chest pain
·Abdominal pain ·Category II

Fetal Signs ·Category I ·Reactive ·IUGR

(ml/hr) ≥50 30-49 ≤30 (in 2 hrs)

Proteinuria
(Level of proteinuria is not an accurate predictor of pregnancy outcome)

Trace

>100

<70	>70
<0.8	0.9-1.1

Platelets <50 **AST/ALT** >70 **Creatinine** ≥1.2 **Magnesium Sulfate Toxicity** ·DTR +1

·Respiration 16-20 ·Depression of patellar reflexes ·Respiration <12

RED = SEVERE

OW = WORRISOME
rease assessment frequency

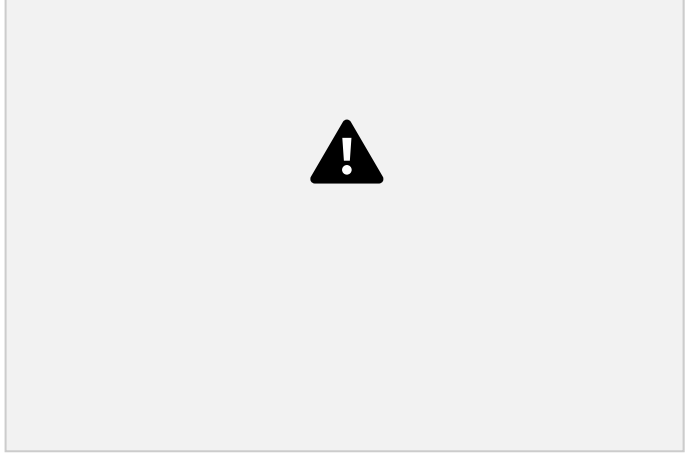
Trigger: 1 of any type listed below TO DO · Immediate evaluation

Triggers TO DO
1 ·Notify provider
≥2 ·Notify charge RN
·In-person evaluation
·Order labs/tests

·Anesthesia consult
·Consider magnesium sulfate
·Supplemental oxygen
1 of any type

Awareness Headache Visual

BP



1:1 staff ratio • Consider Neurology consult • CT Scan • R/O SAH/intracranial hemorrhage • Labetalol/hydralazine in 30 min • In-person evaluation

maintenance infusion

• Transfer to higher acuity level • with protocol **Physician should be made aware of worsening or new-onset proteinuria Respiration SOB

• Magnesium sulfate loading or Chest Pain • Consider CT angiogram O2 SAT • O2 at 10 L per rebreather mask • R/O pulmonary edema • Chest x-ray

GREEN = NORMAL Proceed

Maternal Early Warning Signs (MEWS) Protocol

1. Immediate action is required when any of the MEWS criteria are met (see table on page 2*)** Items that are not in the lower box should be confirmed, within 10 minutes, prior to calling the physician. ***Not applicable for BP systolic <90 when <=30 min post epidural and anesthesiologist present. **2. When immediate action is required:**

- If the attending physician is immediately available, he/she will provide bedside evaluation of the patient within 10 minutes. The in-house OB will be notified to provide bedside evaluation if the attending physician is not at the bedside within 5 minutes.
- If the attending physician is not immediately available, the RN will call the in-house OB to provide bedside evaluation of the patient within 10 minutes. The attending physician or CNM will also be notified of the patient's status. If the CNM is notified, he/she will notify the attending physician.
- If in-house OB is called but not immediately available, he/she will receive a verbal report and determine what further action is necessary.

3. When called to the bedside, the physician will document by writing a note which includes but is not limited to:

- Differential diagnosis (the RN will provide this protocol and a differential diagnosis list to the bedside).
- Planned frequency of monitoring and re-evaluation.
- Criteria for immediate physician notification.
- Any diagnostic or therapeutic interventions.
- “Huddle” participants and summary of management plan.

The physician will communicate the assessment and plan via a "huddle." Huddle participants include the Primary RN, the Charge RN, the Anesthesiologist, the attending physician if present, and the in house OB.

4. If MEWS conditions(s) persist after corrective measures undertaken, then MFM consult should be requested. Additionally, Intensivist consult &/or Rapid Response Team may be called.

5. Depending on the clinical evaluation, patient laboratory and diagnostic studies to consider include:

- ✔ Pulse oximeter
- ✔ CBC
- ✔ Type and screen or type and cross match if bleeding

✔ CMP
✔ Magnesium level
✔ EKG, particularly in the presence of tachycardia, bradycardia, or chest pain
✔ CT angiogram or perfusion scan in patients with acute chest pain
✔ CXR if the patient has SOB, particularly if pre-eclamptic
✔ Echocardiogram

6. If the primary RN and the charge nurse question any aspect of the patient's care and the issue is not resolved with the attending physician, another appropriate physician (MFM, Department Director or Associate Director, or the Chairman of the DQAIC committee) and a nurse in the Nursing Chain of Command (Nurse Manager, Clinical Practice Specialist, or Nursing Supervisor/AVP) will be notified.

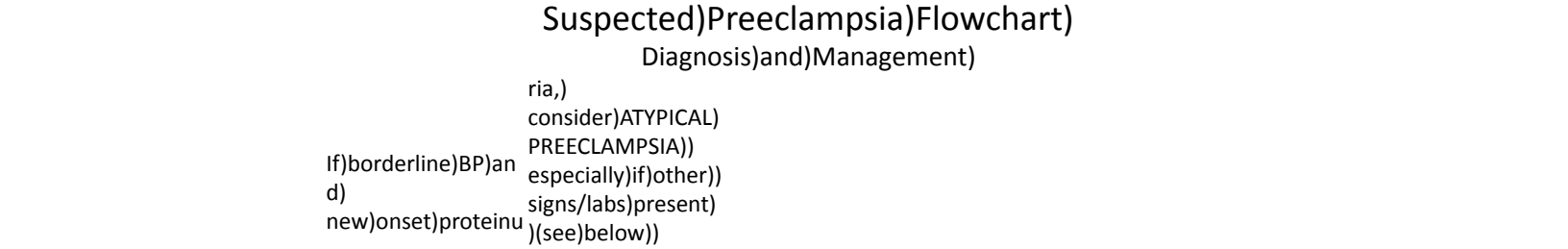
Immediate Action Required

- Systolic BP; mmHg <90 or >160
- Diastolic BP; mmHg >100
- Heart rate; bpm <50 or >120
- Respiratory rate; bpm <10 or >30
- Oxygen saturation; % <95
- Oliguria; ml/hr x 2h <35

✔ Maternal agitation, confusion, or unresponsiveness

✔ Patient with hypertension reporting a non- remitting headache or shortness of breath 54

APPENDIX C: SUSPECTED PREECLAMPSIA ALGORITHM: DIAGNOSIS AND MANAGEMENT



Gest)HTN)

NOTE:)There)are)
no)longer)real)
differences)in)
management)
between)
Preeclampsia)and)
GestaQonal)HTN)in)
)

NO)

New)Onset)
HTN?)
(>140/90))

BP)Management))
and)decision)to) deliver.))
TREAT)BP)
ACCORDINGLY)
and)DELIVER)for)
abnormal)labs)or) symptoms)

NO)

Deliver)
at)37)weeks)

V10.21.13)

New)Onset)
HTN?)
(>160/110))

New)Onset)
Proteinuria?) YES)

Preeclampsia)

New)Onset)
Proteinuria?)

NO)

Severe)

YES)

Severe)
Preeclampsia)

≥34)Weeks)
GestaQon?) YES) YES)

stent:)

s)

•)Abdominal)Pain) *OR#*
•)Thrombocytopenia)
•)Elevated)LFTs
•)CreaQnine)>1.2)
•)Elevated)LDH)
NO)

Strongly) Consider)
Transfer)to)
3°)Center)

Deliver) Now)

SAVE YOUR LIFE:

Get Care for These

POST-BIRTH Warning Signs

Most women who give birth recover without problems. **But any woman can**

have complications after giving birth. Learning to recognize these POST BIRTH warning signs and knowing what to do can save your life.

Call your healthcare provider

if you have:

(If you can't reach your healthcare provider, call 911 or go to an emergency room)

q **Pain in chest**

q **Obstructed breathing or shortness of breath**

q **Seizures**

q **Thoughts of hurting yourself or someone else**

q **Bleeding, soaking through one pad/hour, or blood clots, the size of an egg or bigger**

q **Incision that is not healing**

q **Red or swollen leg, that is painful or warm to touch**

q **Temperature of 100.4°F or higher**

q **Headache that does not get better, even after taking medicine, or bad headache with vision changes**

Tell 911

or your healthcare provider:

"I gave birth on _____ (Date) and I am having _____ (Specific warning signs)."

These post-birth warning signs can become life-threatening if you don't receive medical care right away because:

- **Pain in chest, obstructed breathing or shortness of breath** (trouble catching your breath) may mean you have a blood clot in your lung or a heart problem
- **Seizures** may mean you have a condition called eclampsia
- **Thoughts or feelings of wanting to hurt yourself or someone else** may mean you have postpartum depression
- **Bleeding (heavy)**, soaking more than one pad in an hour or passing an egg-sized clot or bigger may mean you have an obstetric hemorrhage
- **Incision that is not healing, increased redness or any pus** from episiotomy or C-section site may mean you have an infection
- **Redness, swelling, warmth, or pain** in the calf area of your leg may mean you have a blood clot
- **Temperature of 100.4°F or higher, bad smelling vaginal blood or discharge** may mean you have an infection
- **Headache (very painful), vision changes, or pain in the upper right area of your belly** may mean you have high blood pressure or post birth preeclampsia

GET HELP

My Healthcare Provider/Clinic:

_____ Phone Number:

_____ Hospital Closest To Me:

16004

This program is supported by funding from Merck, through Merck for Mothers, the company's 10-year, $500 million initiative to help create a world where no woman dies giving life. Merck for Mothers is known as MSD for Mothers outside the United States and Canada.

SALVE SU VIDA:

Busque atención médica para estas **señales de advertencia**

después del parto

La mayoría de las mujeres que dan a luz se recuperan sin problemas.

Pero cualquier mujer puede tener complicaciones después del nacimiento de un bebé. Aprender a reconocer estas señales de advertencia después del parto y saber qué hacer puede salvar su vida.

❑ **Respiración obstruida o dificultad para respirar**

❑ **Convulsiones**

❑ **Dolor en el pecho**

❑ **Pensamientos de dañarse a usted misma o a alguien más**

❑ **Sangrado que empapa una compresa higiénica en una hora, o coágulos de sangre del tamaño de un huevo o más grandes**

❑ **Incisión que no se cura**

❑ **Enrojecimiento o hinchazón en su pierna que es dolorosa o se encuentra caliente al tacto**

❑ **Temperatura de 100.4 °F o más**

❑ **Dolor de cabeza que no mejora incluso después de tomar medicamentos o dolor de cabeza intenso con cambios en la visión**

Llame a su proveedor de salud si tiene:

(Si no puede comunicarse con su proveedor de salud, llame al 911 o vaya a una sala de emergencias)

Dígale al 911 o a su proveedor de salud:

"Mi parto fue el _____ y **(Fecha)**

tengo _____ ".

(Señales de advertencia específicas)

Estas señales de advertencia después del parto pueden poner en riesgo su vida si no recibe atención médica de foma rápida porque:

- **El dolor en el pecho, la obstrucción de la respiración y la dificultad para respirar** (problemas para recuperar el aliento) pueden significar que tiene un coágulo de sangre en un pulmón o un problema cardíaco
- **Las convulsiones** pueden significar que tiene una afección llamada eclampsia • **Los pensamientos o deseos de dañarse a usted misma o a su bebé** pueden significar que tiene depresión posparto
- **Un sangrado (abundante)** que empapa más de una compresa higiénica en una hora o si expulsa un coágulo del tamaño de un huevo o más grande puede significar que tiene una hemorragia obstétrica
- **Una incisión que no se cura, un aumento en el enrojecimiento o pus** en el sitio de la episiotomía o de la cesárea puede significar que tiene una infección • **El enrojecimiento, hinchazón, calor o dolor** en el área de la pantorrilla de su pierna puede significar que tiene un coágulo de sangre
- **Tener temperatura de 100.4 °F o más, sangre o secreciones con olor feo de su vagina** puede significar que tiene una infección
- **Un dolor de cabeza (muy intenso), cambios en la visión o dolor en el área superior derecha de su vientre** puede significar que tiene presión arterial alta o preeclampsia después del parto

BUSQUE AYUDA

Mi proveedor de salud/clínica: _____

Número de teléfono:

_____ Hospital más cercano:_____

_____

Este programa es apoyado por Merck & Co. a través de Merck for Mothers, una contribución de $500 millones a lo largo de 10 años con el fin de crear un mundo donde ninguna madre muera durante el parto. Merck for Mothers es mejor conocido como MSD for Mothers afuera de Estados Unidos y Canada.

All hospitals should develop a process to ensure that sustained acute severe hypertension is diagnosed early and promptly treated within 60 minutes with appropriate antihypertensive medications and that women receive seizure prophylaxis.

Women demonstrating signs of cardiopulmonary compromise including shortness of breath, hypoxia or chest pain should be thoroughly evaluated for pulmonary edema and heart failure. A process should be in place to respond to cardiorespiratory failure and arrest during pregnancy including emergent bedside cesarean. Standardizing the response to severe hypertension is critical to eliminating disparities in optimal care received by women of different backgrounds.

Implementation Focus Areas:

1. Severe Hypertension Management Protocol Development (Joint Commission)

Develop written evidenced-based procedures for managing pregnant and postpartum patients with severe hypertension/preeclampsia that includes the following:

- The use of an evidence-based set of emergency response medications that are stocked and immediately available
- The use of seizure prophylaxis
- Guidance on when to consult additional experts and consider transfer to a higher level of care - Guidance on when to use continuous fetal monitoring
- Guidance on when to consider emergent delivery
- Criteria for when a team debrief is required

2. Cardiac Failure and Arrest in Pregnancy Management Protocol

Develop written evidenced-based procedures for managing pregnant women experiencing cardiac arrest or cardiac

failure including:

- Guidance for performing ACLS in pregnant women
- Guidance for performing emergent bedside/perimortem cesarean

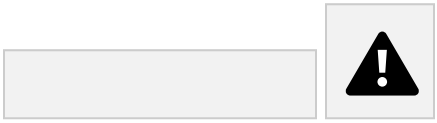
3. Early Postpartum Safety Check

Schedule and document the date and time of follow-up for women with preeclampsia/severe hypertension including:

- Within 7 days if no medications or severe complications
- Within 72 hours if discharged on medication

4. **Patient, Family & Staff Support**

Create a plan for patient, family and staff support after severe maternal complications, maternal or neonatal deaths and ICU admissions.



Links and Examples of Response Resources

Protocol Development

ACOG DII (New York) Key Elements for the Management of Hypertensive Crisis in Pregnancy

CMQCC Consultation Triggers in Severe Preeclampsia
CMQCC Proteinuria
CMQCC Nursing Assessment Frequency
CMQCC Sample Nursing Management Policy and Procedure

The Joint Commission Standards for Perinatal Safety (Includes Hemorrhage)
https://www.jointcommission.org/new_standards_for_perinatal_safety/

Cardiac Arrest in Pregnancy

Cardiac Arrest in Pregnancy A Scientific Statement from the American Heart Association (Exerpts Below)
https://ahajournals.org/doi/full/10.1161/cir.0000000000000300

Postpartum Safety Check & Follow Up

Postpartum Care Basics for Maternal Safety From Birth to the Comprehensive Postpartum Visit
https://safehealthcareforeverywoman.org/patient-safety-bundles/postpartum-care-basics-1/

Florida Perinatal Quality Collaborative Sample Discharge Sheet

Postpartum Discharge Phone Call Script

2013

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

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. ○ 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%). 61

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.[62]

	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

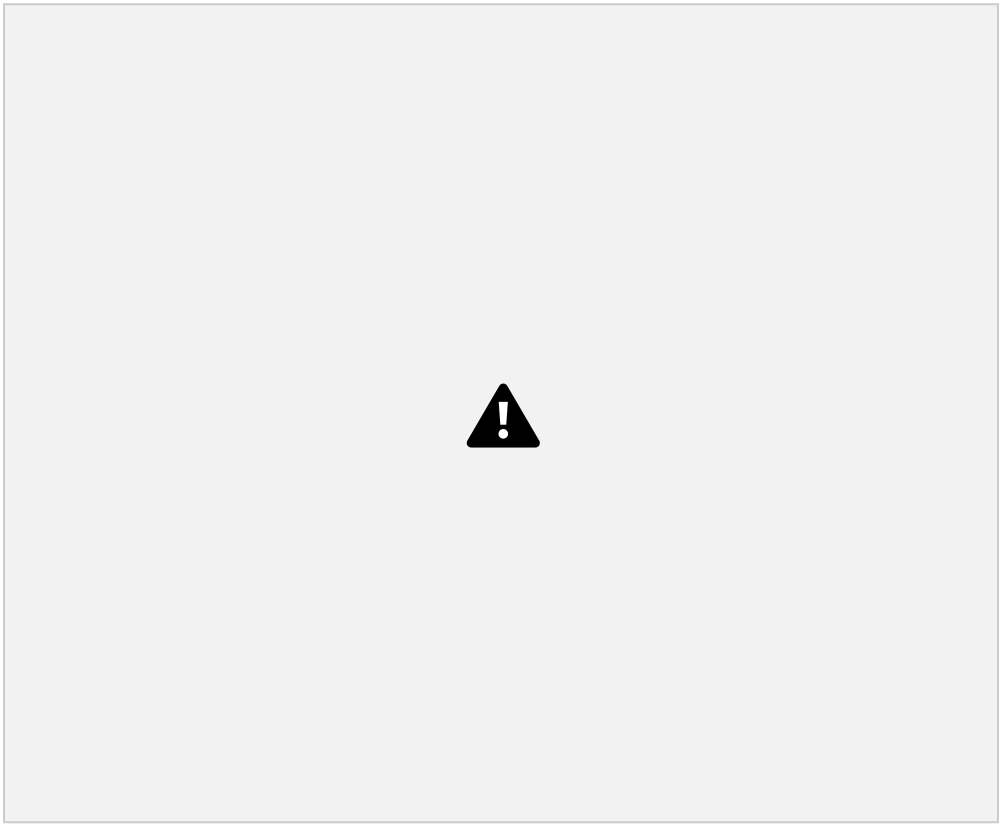
Awaiting permission to utilize sample protocol language obtained from:

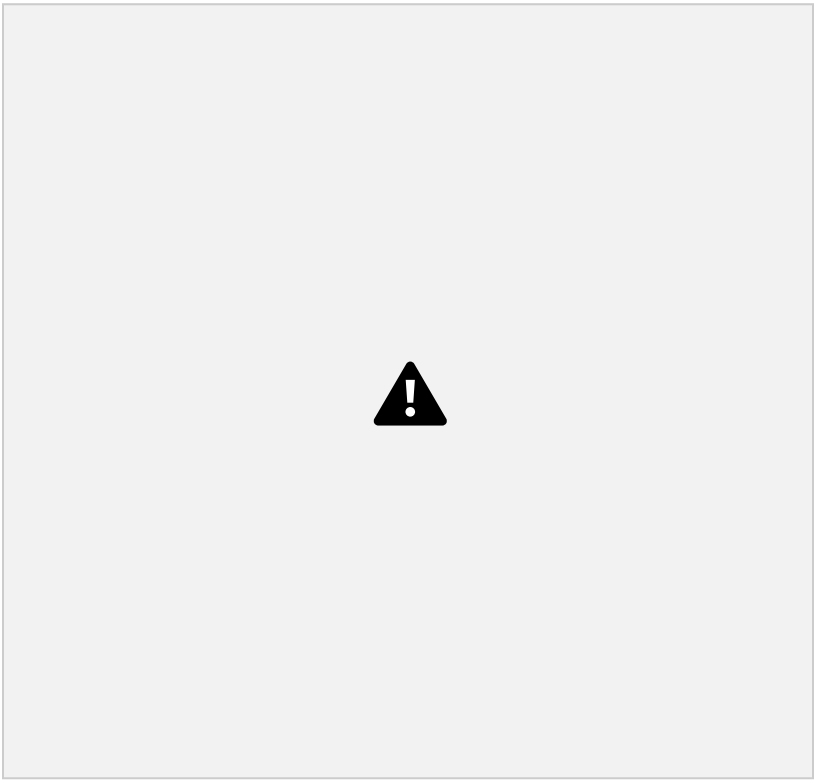
North Shore University Hospital: Management of Postpartum Preeclampsia Guidelines (2010)

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.





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[64]

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.
-
- 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.
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CDPH-MCAH Approved: 12/20/13 APPENDIX B: SAMPLE TREATMENT OF SEVERE PREECLAMPSIA ALGORITHM

Treatment(for(Severe(Preeclampsia

Systolic(BP(≥(160(mmHg(and/or(

Diastolic(BP(≥(110(mmHg

If(preeclampsia(

proceed(below(Inform(OB(team(

(either(chain(below)(

Magnesium((sulfate(

Seizure(Prophylaxis(

(((▪**(IV(access(((▪(Monitor(FHT**

((▪(Send(labs

IV(AnHhypertensive(

MedicaHon((

Labetalol 20(mg((

if(elevated(administer(

hydralazine(10(mg(

Repeat(BP(in(**10(mins(**
if(elevated(administer((

labetalol(40(mg((

1(C(2(g/hr(

Repeat(BP(in(**10(mins(**
if((elevated(administer((

labetalol(80(mg((

Check(serum((
magnesium(levels((
(if(indicated)(

Repeat(BP(in(**20(mins(**
if(elevated(adminster((

labetalol(20(mg(

Repeat(BP(in(**10(mins(**
if(elevated(administer(

hydralazine(10(mg

Repeat(BP(in(**10(mins((**
if(elevated(administer((

labetalol(40(mg(AND(
(obtain(anesthesia(consult(
bolus(dose(
4(C(6(g(((over(20(mins)(

See(reverse(side
(for(eclampsia(
management

Repeat(BP(in(**20(mins((**
if(remains(elevated(
obtain(
(anesthesia(consult(
Hydralazine((5C10(mg(

Magnesium(sulfate(
maintenance(dose(

Repeat(BP(in(**20(mins(**

Emergent(therapy(for(acute1onset,(severe(hypertension(with(preeclampsia(or(eclampsia.(Committee(Opinion(No.(514.(American(College(of(Obstetricians(and(Gynecologists.((Obstet(Gynecol(2011;118:1465–8(

CDPH-MCAH Approved: 12/20/13 Table 1. Nursing Assessment Frequency

A. Preeclampsia Without Severe Features (Mild)

	Preeclampsia without Severe Features (mild)		
	Antepartum*	Intrapartum*	Postpartum*
BP, Pulse, Respiration, SaO2	Every 4 hours	Every 60 min	Every 4 hours
Lung sounds	Every 4 hours	Every 4 hours	Every 4 hours
Deep consciousness Edema Assessment for headache, visual disturbances, epigastric pain	Every 8 hours	Every 8 hours	Every 8 hours
Fetal status and uterine activity	Every shift	Continuous	N/A
Temperature	Per facility protocol		
Intake and output	Every 1 hour with totals every 8 and 24 hours		

*This is the minimum frequency recommended for the patient NOT on magnesium sulfate.

B. Severe Preeclampsia Nursing Assessment Frequency

	Severe Preeclampsia Intrapartum and Postpartum for women on Magnesium Sulfate
BP, Pulse, Respiration, SaO2	• Every 5 mins during loading dose and q30 mins during maintenance of magnesium sulfate infusion • Can change to every 60 mins if any one or more of the following criteria are met: o Preeclampsia without severe features (mild) o BP stable without increases for a minimum of 2 hours o No antihypertensives within last 6 hours o Antepartum patient o Latent phase of labor • Continuous SaO2 during magnesium infusion for intrapartum. For postpartum patient, check with vital signs
Lung sounds	Every 2 hours

Deep tendon reflexes & clonus, Level of consciousness Edema Assessment for headache, visual disturbances, epigastric pain	Every 4 hours
Temperature	Per facility protocol
Intake and output	Intake: • IV solutions and medication drips should all be on a pump • Total hourly intake should be ≤ 125 ml/hr • NPO with ice chips or as permitted by practitioner Output: • Insert foley with urometer Calculate hourly, end of shift, and 24-hour totals
Fetal status and uterine activity	Continuous fetal monitoring

C. Post Eclamptic Seizure and Magnesium Sulfate Toxicity

Post Eclamptic Seizure and Magnesium Sulfate Toxicity for Ante, Intra and Postpartum	
BP, Pulse, Respiration	Every 5 min until stable
O2 Sat & LOC	Every 15 min for a minimum of 1 hour
Fetal Assessment and Uterine Activity	Continuous

D. Acute BP Treatment with IV Medication

Acute BP Treatment with IV Medication: Ante, Intra and Postpartum	
BP, Pulse, Respiration	Every 5-15 min until stable
SAO2 and LOC	Every 5-15 min for a minimum of 1 hour
Fetal assessment and uterine activity	Continuous

EVIDENCE GRADING
Level of Evidence: III-C

REFERENCES

1. Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. *Obstet Gynecol.* Jul 2003;102(1):181-192.
2. Turner J. Diagnosis and management of pre-eclampsia: an update. *International*

Journal of Women's Health. 2010;2:327-337.
3. The Joint Commission. Preventing Maternal Death. Sentinal Event Alert. Issue 44. 2010; http://www.jointcommission.org/sentinal_event_alert_issue_44_preventing_maternal_death. Accessed January 26, 2010.
4. Clark SL, Belfort MA, Dildy GA, Herbst MA, Meyers JA, Hankins GD. Maternal death in the 21st century: causes, prevention, and relationship to cesarean delivery. *Am J Obstet Gynecol.* Jul 2008;199(1):36 e31-35; discussion 91-32 e37- 11.
5. Perry I, Beevers D. The definition of preeclampsia. *Br J Obstet Gynaecol.* 1994;101(7).
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CDPH-MCAH Approved: 12/20/13

APPENDIX U: SAMPLE NURSING MANAGEMENT POLICY AND PROCEDURE Nursing Management of Preeclampsia

Sample Policy and Procedure

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PURPOSE:
To outline the nursing management of inpatients who have preeclampsia including special considerations for management of patients on magnesium sulfate, patients on antihypertensive medications and management of eclampsia.

BACKGROUND:
Preeclampsia is a hypertensive disorder of pregnancy characterized by vasospasm and endothelial damage, which may impact the cardiovascular, renal, hematological, neurologic, and hepatic systems as well as the uteroplacental unit. It is of unknown etiology. Preeclampsia is characterized by new onset of hypertension and proteinuria after 20 weeks gestation in a previously normotensive woman.

- Hypertension: two blood pressure reading of > 140 systolic OR > 90 diastolic taken at least six hours apart
- Proteinuria: 0.3 gm of protein in a 24 hour urine collection

REPORTABLE CONDITIONS:
Notify provider for:

1. Repeated blood pressure greater than 160 systolic OR greater than 105-110 diastolic (taken at least 15 minutes apart).
2. New or worsening complaint of any of the following:
    a. Headache
    b. Visual changes
    c. Right Upper Quadrant (RUQ) or epigastric pain
3. Abnormal lab values

ADMISSION:

1. Assess for absence or presence of:
    a. Headache
    b. Visual changes
    c. Right upper quadrant or epigastric pain
    d. Nausea/vomiting
    e. General malaise.
2. Assess upper or lower deep tendon reflexes.
3. Auscultate for lung sounds, noting any presence of rales, rhonchi, wheezing, etc. 4. Assess for generalized edema and significant, rapid weight gain.
5. Assess blood pressure using an appropriately sized blood pressure cuff with patient sitting or in the upright position with the patient's arm at the level of the heart. Do not

reposition the patient to her left side and retake blood pressure. It will give a false lower reading.

6. Apply external fetal monitor (if viable fetus).
7. Prepare to obtain IV access as ordered by provider.
8. Prepare to administer medications to lower blood pressure and prevent seizure activity. 9. Prepare to monitor intake and output.
10. Maintain activity as ordered by provider. If on bedrest, maintain side-lying position as much as possible, avoiding supine position, and change position every two hours or more often as needed.
11. Provide emotional support and opportunity for patient family to verbalize questions, concerns and/or fears.
12. Assess maternal vital signs including: blood pressure as described above, respiratory rate, heart rate, temperature, and oxygen saturation.
13. Prepare to assess lab values as ordered.
14. Ensure oxygen and suction equipment are present and functioning. 15. Implement measures to decrease stress level, such as provision of a quiet environment and low lighting.
16. Monitor temperature per department protocol.
17. Assess intake and output (I&O) every 1 hour.

ANTEPARTUM ONGOING ASSESSMENT:

Goals of patient management are:

1. Early recognition of severe or worsening preeclampsia or development of eclampsia. 2. Prolongation of pregnancy to optimize fetal maturation must be weighed against risks of pregnancy continuation.

<u>Preeclampsia without severe features (mild):</u>

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 4 hours. 2.

Assess lung sounds every 4 hours.

3. Assess deep tendon reflexes (DTRs), Clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.

4. Obtain Non Stress Test (NST) or monitor Fetal Heart Rate (FHR) with uterine activity for 30 minutes every shift or as condition warrants.

5. Assess fetal movement every shift.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation hourly. 2. Assess lung sounds every 2 hours.

3. Assess deep tendon reflexes (DTR's), Clonus, edema, level of consciousness (LOC), Headache (HA) visual disturbances, epigastric pain every 4 hours.

4. Monitor FHR and uterine activity continuously.

INTRAPARTUM ONGOING ASSESSMENT:

Preeclampsia without severe features (mild):

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 60 minutes. 2. Assess lung sounds every 4 hours.

3. Assess deep tendon reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.

4. Monitor FHR and uterine activity continuously.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 30 minutes. 2. Assess lung sounds every 2 hours.

3. Assess Deep Tendon Reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 4 hours.

4. Monitor FHR and uterine activity continuously.

POSTPARTUM TO DISCHARGE ONGOING ASSESSMENT:

Preeclampsia without severe features (mild):

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 4 hours. 2. Assess lung sounds every 4 hours.

3. Assess deep tendon reflexes (DTRs), Clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 60 minutes for first 24 hours after delivery then every 4 hours.

2. Assess lung sounds every 2 hours for first 24 hours after delivery then every 4 hours. 3. Assess deep tendon reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 4 hours.

MAGNESIUM SULFATE:

Magnesium sulfate is administered as a first line drug to prevent maternal eclamptic seizures. (See Magnesium Sulfate chapter, pg. 50)

ANTIHYPERTENSIVES:

Background:

1. A sustained systolic blood pressure greater than 160 mm Hg OR greater than 105-110 mm Hg diastolic is treated with IV antihypertensive medication to protect the patient from cerebral vascular accident.
2. The goal is a diastolic pressure of 90-100 mm Hg to maintain perfusion. 3. Labetalol is a combined alpha and beta-blocker, resulting in decreased peripheral vascular resistance without altering heart rate or cardiac output. Its use is contraindicated in patients with bronchial asthma, heart block and severe bradycardia. 4. Hydralazine is a vasodilator and results in vasodilation of vascular smooth muscle.

Administration:

1. Ensure presence of mainline IV infusion.
2. Monitor the fetal heart rate continuously if a viable fetus is present. 3. Maintain bedrest during and for 3 hours following medication administration. Assess for postural hypotension prior to ambulation.
4. If unable to control blood pressure, contact physician regarding consideration of other medications and/or transfer to a higher level of care.
5. Hydralazine (Apresoline):
    a. Administer initial dose IV push over 1-2 minutes. (Usual dose range is 5-10 mg.)
    b. May repeat dose at 20-minute intervals until desired blood pressure is achieved or a cumulative dose of 30-40 mg is reached.
6. Labetalol:
    a. *IV Push:*

i. Administer initial dose IV push over 2 minutes. (Usual dose is 10-20 mg.)
ii. Repeat doses may be given at 10-minute intervals.

b. *Continuous IV:*
i. Consider collaborative care with intensive care unit.
ii. Initiation of continuous cardiac monitoring.
iii Infuse a continuous labetalol infusion pump until diastolic pressure is 90-100 mm Hg.

c. Maximum dose is 300 mg/24 hours.

CDPH-MCAH Approved: 12/20/13 Reportable Conditions:

1. Notify provider for:
   a. Diastolic blood pressure less than 80 or greater than 105-110 following medication administration.
   b. Category II or III fetal heart rate tracing following antihypertensive administration. c. Sustained maternal heart rate less than 50 bpm or greater than 120 bpm during or within 30 minutes following medication administration.

ECLAMPSIA MANAGEMENT:

Background:

• Eclampsia is characterized by convulsions and loss of consciousness, which can occur without warning during the antepartum, intrapartum or postpartum period. • The eclamptic patient is at risk for aspiration and cerebral hemorrhage. • Fetal bradycardia frequently occurs during and following an eclamptic seizure. • Best treatment for baby is maternal stabilization.

MANAGEMENT:

1. Notify charge nurse, attending provider, and anesthesiologist/CRNA immediately. Initiate emergency pager (if institution has instituted).
2. Position patient on side.
3. Protect from injury.
4. Prepare to administer magnesium sulfate.
5. Anticipate obtaining lab tests (magnesium level, blood for liver enzymes, kidney function, etc.).
6. Following seizure:
   a. Suction mouth.
   b. Give oxygen by non-rebreather mask at 10 liters per minute.
   c. Provide ventilatory support as needed.
   d. Assess blood pressure, pulse, and respirations every 5 minutes.
   e. Assess oxygen saturation and level of consciousness every 15 minutes until

stable for a minimum of one hour.
f. Monitor fetal heart rate and uterine activity continuously if viable fetus is present. g. Observe for signs and symptoms of placental abruption or impending delivery. h. Obtain order for indwelling catheter.

COUNCIL ON PATIENT SAFETY
IN WOMEN'S HEALTH CARE

safe health care for every woman

FROM BIRTH TO THE COMPREHENSIVE POSTPARTUM VISIT

Every woman

- Engages with her provider during prenatal care to develop a comprehensive personalized postpartum care plan that includes designation of a postpartum medical home, where the woman can access care and support during the period between birth and the comprehensive postpartum visit.
- Receives woman-centered counseling and anticipatory guidance regarding medical recommendations for breastfeeding in order to make an informed feeding decision.
- Receives woman-centered counseling regarding medical recommendations for birth spacing and the range of available contraceptive options.
- Identifies a postpartum care team, inclusive of friends and family, to provide medical, material, and social support in the weeks following birth.

Every provider

- Ensures that each woman has a documented postpartum care plan and care team identified in the prenatal period.
- Develops and maintains a working knowledge of evidence-based evaluation and management strategies of common issues facing the mother-infant dyad.

Every clinical setting

- Develops and optimizes models of woman-centered postpartum care and education, utilizing adult-learning principles when possible and embracing the diversity of family structures, cultural traditions, and parenting practices.
- Develops systems to connect families with community resources for medical follow up and social and material support.
- Optimizes counseling models, clinical protocols, and reimbursement options to enable timely access to desired contraception.
- Develops systems to ensure timely, relevant communication between inpatient and outpatient providers.
- Develops protocols for screening and treatment for postpartum concerns, including depression and substance abuse disorders, and establishes relationships with local specialists for co-management or referral.

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y

Postpartum Care Basics for Maternal Safety

COUNCIL ON PATIENT SAFETY
IN WOMEN'S HEALTH CARE

safe health care for every woman

Every woman

- Is respected as the expert in her own needs, and is empowered to trust her instincts and access care as early and frequently as needed in the weeks following birth.
- Reviews her postpartum care plan with her provider prior to discharge from maternity care, revising as needed. The care plan should include a list of warning signs and responses for life-threatening postpartum complications, a list of lactation support resources, a "first call" phone number for her postpartum medical home, including a contact for breastfeeding issues, and the time and date of postpartum visits.
- Attends a comprehensive postpartum visit, scheduled at an interval tailored to the needs of the mother-infant dyad.

Every clinical setting

- Determines guidelines for patient education, discharge from inpatient maternity care, and indications for early postpartum visits.
- Coordinates ongoing care between inpatient and outpatient settings and between the maternal and infant providers to facilitate the health and wellbeing of the dyad. This includes coordination for issues related to breastfeeding.
- Screens for and treats common morbidities, including mental health issues, smoking, and substance use, as well as concerns such as unstable housing and food insecurity.
- Ensures that each woman has identified a source of ongoing primary health care.

Every clinical setting

- Implements treatment protocols and either provides desired care or facilitates timely referral to an appropriate resource. Whenever feasible, a warm hand-off is provided, via a face-to-face introduction to the specialist to whom the patient is being referred.
- Maintains an up-to-date inventory of community resources to assist with unmet needs, such as 24-hour hotlines, food banks, diaper banks, lactation support groups, and home visiting programs.

Postpartum Care Basics for Maternal Safety

COUNCIL ON PATIENT SAFETY
IN WOMEN'S HEALTH CARE

safe health care for every woman

- Develops strategies to reach women who do not attend the comprehensive postpartum visit.

Every identified need

- Is assessed for its acuity using a tiered response.
  - If life-threatening, the identifying provider facilitates transportation to an appropriate facility for immediate care.
  - If non-acute, the need is addressed by the woman and her provider in a woman-centered, shared-decision making discussion, honoring each woman's self-sufficiency and autonomy.

Every health system

- Convenes inpatient and outpatient providers to share successful strategies and identify opportunities for improvement.
- Identifies and monitors postpartum quality measures, such as postpartum emergency room utilization and readmission rates.
- Works toward quality metrics that compare postpartum outcomes with prenatal intentions, such as receipt of intended contraception or attainment of desired breastfeeding duration.
- Conducts quality improvement projects to reduce preventable postpartum morbidity.
- Collaborates with the community to maintain a clearinghouse for resources that address the needs of women during the postpartum period.
- Ensures that reimbursement policies do not disincentivize postpartum visits.

Standardization of health care processes and reduced variation has been shown to improve outcomes and quality of care. The Council on Patient Safety in Women's Health Care disseminates patient safety bundles to help facilitate the standardization process. This bundle 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. Although the components of a particular bundle may be adapted to local resources, standardization within an institution is strongly encouraged. The Council on Patient Safety in Women's Health Care is a broad consortium of organizations across the spectrum of women's health for the promotion of safe health care for every woman.

For more information visit the Council's website at www.safehealthcareforeverywoman.org