A California Toolkit to Transform Maternity Care

Improving Health Care Response to Preeclampsia: A California Quality Improvement Toolkit

THIS COLLABORATIVE PROJECT WAS DEVELOPED BY:
The Preeclampsia Task Force
California Maternal Quality Care Collaborative
Maternal, Child and Adolescent Health Division; Center for Family Health
California Department of Public Health
Learning Objectives

- To review key elements of the CMQCC preeclampsia-hypertensive disorders of pregnancy toolkit.
- Highlight how the use of these recommendations will reduce maternal mortality and morbidity.
- Highlight barriers that Illinois will likely encounter as they move forward with standardizing maternal care in cases of severe BP elevations.
Maternal Mortality USA

Mortality per 100,000 Births


9.9 9.9 12.1 15.1 12.7 15.5 19.3 22.0
Selected Maternal Mortality Rates 2010-2013

Source: www.smfm.org/data/mortality-map
Critical Pathways to Poor Outcome

Maternal Death

Near Miss ICU Admission

Serious Morbidity

- Clinical Symptoms Recognized
- Delayed Diagnosis
- Delayed Treatment
- Assumption Delivery Fixes Problem
- Discharge without timely Follow-up
Maternal Mortality Rate, California Residents: 1970-2010

Maternal Deaths per 100,000 Live Births

- California Rate
- United States Rate

Key Events:
- Maternal Health Taskforce
- Hemorrhage Toolkit
- PreE Taskforce
- PreE Toolkit

Year:
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013

Maternal Mortality Rate:
- 7.7
- 9.9
- 10.9
- 9.9
- 10.0
- 12.1
- 14.6
- 13.1
- 11.8
- 11.7
- 15.1
- 13.3
- 16.9
- 14.0
- 15.5
- 14.0
- 16.6
- 16.9
- 19.3
- 19.9
- 22.0

PreE:
- 7.7
- 9.2
- 7.4
- 6.2
- 7.3
Good To Strong Chance to Alter the Outcome:

- Cardiovascular disease (n=48): 29%
- Preeclampsia or eclampsia (n=35): 60%
- Obstetric hemorrhage (n=20): 70%
- Venous thromboembolism (n=20): 50%
- Amniotic fluid embolism (n=18):
- Other (n=64): 39%
- All deaths (n=205): 41%
CA Maternal Mortality Rate: Early v. Late

Early Maternal Deaths ≤42 days postpartum (standard MMR calculation)

Early and Late Maternal Deaths up to one year postpartum

HP 2020 Objective – 11.4 Deaths per 100,000 Live Births
CA Maternal Mortality Rate: Early v. Late

- **Early Maternal Deaths ≤42 days postpartum (standard MMR calculation)**
- **Early and Late Maternal Deaths up to one year postpartum**

**HP 2020 Objective** – 11.4 Deaths per 100,000 Live Births
Impact of Hypertension CA-PAMR Cohort 2002-2004

- Cohort of pregnancy-related deaths, N=145
- 17% were “Preeclampsia/Eclampsia”
- 39% of all pregnancy-related deaths had HTN
Classification:
1) GHTN
2) PE
3) Severe PE
4) CHTN
5) CHTN+PE
Management:

1) Recognize Symptoms
2) BP control
3) Seizure prevention
4) Delivery- 34 wks, 37wks.
5) Postpartum surveillance


<table>
<thead>
<tr>
<th>Contributing Factors to Maternal Death</th>
<th>Preeclampsia</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>HEALTHCARE PROFESSIONALS</td>
<td>96%</td>
<td>79%</td>
</tr>
<tr>
<td>Delay in Diagnosis</td>
<td>92% 1.7x</td>
<td>54%</td>
</tr>
<tr>
<td>Use of Ineffective Treatment</td>
<td>79% 1.6x</td>
<td>42%</td>
</tr>
<tr>
<td>Misdiagnosis</td>
<td>54% 1.7x</td>
<td>31%</td>
</tr>
<tr>
<td>HEALTHCARE FACILITY</td>
<td>12 (48%)</td>
<td>72 (50%)</td>
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### Where are the gaps?

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<tr>
<td>Delay or Failure to Seek Care</td>
<td>63%</td>
<td>26%</td>
</tr>
<tr>
<td>Lack of Understanding of the Importance of Health Event</td>
<td>56%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td><strong>64%</strong></td>
<td><strong>72%</strong></td>
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CA-PAMR 2002-2004
Maternal Recognition Improves Outcomes

“*The best way to diagnose preeclampsia is to listen to your patients.*”

~ Dr. Baha Sibai

(c) 2015 Preeclampsia Foundation
Did Comprehension Lead to Action?

- 1:5 recalled information and understood it!
- 75% v. 6% acted if they had symptoms

J Mat-Fet Neo Medicine 2013
What is it?

Preeclampsia is a serious disease related to high blood pressure. It can happen to any pregnant woman.

Why should you care?

- Seizures
- Stroke
- Organ damage
- Death
- Premature birth
- Death

What should you pay attention to?

- Stomach pain
- Headaches
- Feeling nauseous; throwing up
- Seeing spots
- Swelling in your hands and face
- Gaining more than 5 pounds in a week

What should you do if you have any of the signs?

Call your doctor right away. Finding preeclampsia early is important for you and your baby.

More information go to www.preeclampsia.org

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Preeclampsia Awareness
2014 Survey Results Show:

High overall awareness of preeclampsia among expectant and new mothers*

83% had heard of preeclampsia

Most are also aware that this serious condition related to high blood pressure requires immediate medical evaluation

99% knew preeclampsia is serious, even life-threatening, for mother and baby

88% knew high blood pressure is a sign of preeclampsia

96% would call their doctor or midwife if they experienced symptoms

Yet despite high overall awareness, there is less knowledge of the symptoms

More than half of respondents did not associate many known symptoms with preeclampsia

Other important aspects of preeclampsia are also less known

44% didn’t know that preeclampsia can occur up to six weeks after delivery

46% didn’t know that women with preeclampsia are at greater risk for future health problems

*Survey conducted among visitors to the BabyCenter website from January 17 to January 20, 2014. Total of 1,591 respondents completed the survey; qualified respondents defined as female U.S. residents, 18 years or older, who are pregnant or have at least one child three years of age or younger.

Survey by BabyCenter®
Design by rEVO Biologics Inc.
Key Clinical Pearl

Patients with vague symptoms of:
- headache
- abdominal pain (possibly “referred” pain to neck, shoulder, back)
- shortness of breath
- generalized swelling, extreme weight gain
- complaints of “I just don’t feel right”
- Visual disturbances

Need to be evaluated for atypical presentations of preeclampsia with “severe features”
24 yo G1P0 at 34 weeks

- Presented to hospital at 11pm
- Reports decreased fetal movement and headache
- BP 165/105
- No proteinuria
- Patient to left side
- BP now 155/100
- Reactive NST
- Given vicodin for HA → better
- DC home
24 yo G1P0 at 34 weeks

- Presented to hospital at 11 pm
- Reports decreased fetal movement and headache
- BP 165/105
- No proteinuria $\rightarrow$ No preeclampsia
- Patient to left side $\rightarrow$ Inappropriate BP assessment
- Reactive NST
- BP now 155/100
- Given vicodin for HA $\rightarrow$ better $\rightarrow$ Ignored Sx
- DC home
24 yo G1P0 at 34.2 weeks

- Presents with HA
- BP 175/105, 2+ protein
- NST NR
- Labs sent: plts=55K, Cr=1.6, AST/ALT=320/150, Fibrinogen=175, INR=1.4
- No BP meds
- Mag started with a seizure mid-dose
- C-section for fetal decels
- Postpartum Hemorrhage with DIC
24 yo G1P0 at 34.2 weeks

- Presents with HA
- BP 175/105, 2+ protein → Has preeclampsia
- NST NR
- Labs sent: plts=55K, Cr=1.6, AST/ALT=320/150
- No BP meds → Diastolic BP <110
- Mag started with a seizure mid-dose → Too late
- C-section for fetal decels
- Postpartum Hemorrhage with DIC → Preventable
Historically How Well Do We Treat BP?

Treating if diastolic pressure >110
Treating BP with magnesium
Not treating if there is no proteinuria
Waiting for 6 hours
Summarized of Recommendations

The following recommendations are based on good and consistent scientific evidence (Level A):

- Magnesium sulfate should be used for the prevention and treatment of seizures in women with severe preeclampsia or eclampsia.

- Expectant management should be considered for women remote from term who have mild preeclampsia.

- Antihypertensive therapy (with either hydralazine or labetalol) should be used for treatment of diastolic blood pressure levels of 105–110 mm Hg or higher.
Cause of U.S. Maternal Mortality

- CDC Review of 14 years of coded data: 1979-1992
- 4024 maternal deaths 790 (19.6%) from preeclampsia

Table 2. Specific Causes of Death Among Women Who Died of Preeclampsia or Eclampsia

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Percent of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preeclampsia</td>
</tr>
<tr>
<td>Cerebrovascular events</td>
<td>17.3</td>
</tr>
<tr>
<td>Cerebrovascular hemorrhage</td>
<td>15.8</td>
</tr>
<tr>
<td>Cerebral edema</td>
<td>1.1</td>
</tr>
<tr>
<td>Cerebral embolus</td>
<td>0.4</td>
</tr>
<tr>
<td>Renal or hepatic failure</td>
<td>7.2</td>
</tr>
<tr>
<td>HELLP syndrome</td>
<td>4.8</td>
</tr>
<tr>
<td>Other complications of hypertension</td>
<td>13.9</td>
</tr>
<tr>
<td>Not specified hypertension</td>
<td>7.6</td>
</tr>
<tr>
<td>Preeclampsia and eclampsia</td>
<td>50.8</td>
</tr>
</tbody>
</table>

HELP = hemolysis, elevated liver enzymes, and low platelet count syndrome.

## How Do Women Die of Preeclampsia in CA?

CA-PAMR Final Cause of Death Among Preeclampsia Cases, 2002-2004 (n=25)

<table>
<thead>
<tr>
<th>Final Cause of Death</th>
<th>Number</th>
<th>%</th>
<th>Rate/100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>16</td>
<td>64%</td>
<td>1.0</td>
</tr>
<tr>
<td>Hemorrhagic</td>
<td>14</td>
<td>-87.5%</td>
<td></td>
</tr>
<tr>
<td>Thrombotic</td>
<td>2</td>
<td>-12.5%</td>
<td></td>
</tr>
<tr>
<td>Hepatic (liver) Failure</td>
<td>4</td>
<td>16.0%</td>
<td>.25</td>
</tr>
<tr>
<td>Cardiac Failure</td>
<td>2</td>
<td>8.0%</td>
<td></td>
</tr>
<tr>
<td>Hemorrhage/DIC</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
<tr>
<td>Multi-organ failure</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
<tr>
<td>ARDS</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
</tbody>
</table>

→ 17%
BP Associated Major Morbidity

- Stroke
- Placental Abruption
- Eclampsia
- Cerebral Edema/PRES
- Retinal Detachment
- Liver Hematoma/Rupture
- Renal Failure
- Hemorrhage/DIC
- Pulmonary Edema
- Ascites/pleural effusion
Blood Pressure Control and Stroke

- 23/24 (95.8%) women with systolic BP > 160 mm Hg
- 24/24 (100%) had a BP ≥ 155 mm Hg
- 3/24 (12.5%) women with diastolic BP > 110 mm Hg
- 5/28 (20.8%) women with diastolic BP > 105 mm Hg

## Preeclampsia Toolkit BP Treatment Recommendations

<table>
<thead>
<tr>
<th>Systolic</th>
<th>Diastolic</th>
<th>Repeat BP and Treat Within 60 minutes (ideally ASAP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 160</td>
<td>≥ 110</td>
<td></td>
</tr>
<tr>
<td>≥ 155</td>
<td>≥ 105-110</td>
<td>Alternative triggers*</td>
</tr>
</tbody>
</table>

Recommendations apply to all forms of hypertension:

Gestational HTN = Preeclampsia = Severe Preeclampsia
Preeclampsia Collaborative Participants

Northern CA
- Alta Bates Summit
- Contra Costa Regional Med Ctr
- Doctor’s Hospital of Modesto
- John Muir Medical Center
- Kaiser Hayward
- Kaiser Oakland
- Kaiser Roseville
- Kaiser Santa Clara
- Mercy San Juan Med Center
- NorthBay Medical Center
- Salinas Valley Memorial
- Sonora Regional Med Center
- Sutter Medical Center

Southern CA
- Arrowhead Regional Med Ctr
- Cedars Sinai Med Center
- Citrus Valley Med Center
- Henry Mayo Newhall Memorial
- Kaiser San Diego
- Kaiser West LA
- Long Beach Miller
- Riverside County Regional Med Ctr
- St. Jude Medical Center
- Saddleback Memorial
- UCLA
- St Bernardine Medical Center
- Maricopa (Phoenix, AZ)

Represents ~ 82,000 births in 2011 (1:6)
Dignity Health

- 29 Hospitals with OB services
- 680 OB or FP physician
- 1200 nurses
- 60,000 deliveries – 5,000/month
Timely Treatment of BP

CMQCC

Dignity Health

Timely Treatment of BP

CMQCC

Dignity Health

*
CMQCC Preeclampsia Toolkit

- **First line therapy:** treatment of critically elevated BP with either *IV labetalol or hydralazine.*

- Patients without IV access *oral nifedipine may be used* (10 mg)

- *Oral labetalol* would be expected to be less effective due to its’ slower onset to peak and thus should be used only if nifedipine is not available in a patient without IV access.

Hypertensive Medication Administration ~ Oral v. IV

- **IV Labetalol**
  - Onset: 2-5 min
  - Peak: 5 min

- **PO Labetalol**
  - Onset: 20 min-2 hrs
  - Peak: 1-4 hrs

- **IV Hydralazine**
  - Onset: 5-20 min
  - Peak: 15-30 min

- **PO Nifedipine**
  - Onset: 5-20 min*
  - Peak: 30-60 min

*PO, (oral) not sublingual nifedipine, onset of action is 15-30 minutes depending on the reference source.
http://www.uspharmacist.com/content/d/feature/i/1444/c/27112/
Severe Hypertension Treatment Algorithm

SBP ≥ 155 and/or DBP ≥ 105
Provider Notified

Blood Pressure Triggers
SBP ≥ 160 and/or DBP ≥ 110
Repeat in 15 minutes.
Notify Provider and Proceed

IV Access
FHR monitoring
Labs per PIH Order Set
Pulse Oximeter

Seizure Prophylaxis

Magnesium Sulfate

IV Access

Bolus Dose: 4gm over 20 minutes
Maintenance Dose: 2gm per hour

PO Nifedipine
If no IV access
Initial Dose: 10 mg
May repeat dose at 20 minute intervals for a maximum of 5 doses.

IV Anti-Hypertension Meds
First Line Medications

IV Labetalol
20 mg (over 2 min)

Repeat BP in 10 min
If elevated, administer
IV Labetalol 40 mg

Repeat BP in 10-15 min
If elevated, administer
IV Labetalol 80 mg

Repeat BP in 20 min
If elevated, administer
IV Hydralazine 10 mg

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If elevated, administer
IV Hydralazine pre algorithm
anesthesia consult

Repeat BP in 10 min
If elevated, administer
IV Hydralazine 5 or 10mg (over 1-2 min)
Per physician’s order

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Key Clinical Pearl

Algorithms for acute treatment hypertension and eclampsia should be readily available or preferably posted in all clinical areas that may encounter pregnant women.
Magnesium Sulfate and Nifedipine

3029 received Nifedipine for BP treatment

1469 Magnesium

Hypotension

0.4%

1560 No Magnesium

Hypotension

0.3%

Magpie Trial: Lancet 2002; 359:1877
## Who Should Get Magnesium?

<table>
<thead>
<tr>
<th></th>
<th>Mild Preeclampsia</th>
<th>Severe Preeclampsia</th>
<th>Eclampsia</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACOG</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NICE</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SOGC</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>CMQCC</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>WHO</td>
<td></td>
<td></td>
<td>X</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
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<td></td>
<td>X</td>
<td>X</td>
</tr>
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<td>CMQCC</td>
<td></td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
</tr>
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<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SOGC</td>
<td>X*</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CMQCC</td>
<td>X*</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>WHO</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

* Should be considered: **NNT = 109 for mild, 63 for severe**

(NNT = number needed to treat)

# Not Universally”
Who Should Get Magnesium?

Which patient is safer on your OB unit:

- A patient receiving magnesium?
- A patient that is having a seizure?

\[ NNT = 109 \text{ for mild, } 63 \text{ for severe} \]

\( NNT = \text{number needed to treat} \)
Magpie Trial Collaboration Group.

Do women with pre-eclampsia, and their babies, benefit from magnesium sulfate?

- 58% reduction in seizures
- 45% reduction in maternal death*
- 33% reduction in placental abruption

Magpie Trial: Lancet 2002; 359:1877
CMQCC Collaborative:

Barriers to BP Treatment

- BP stabilized Prior to Treatment
- Did Not Know Treatment Recs
- MD Did Not Like BP Parameters
- Mag Will Treat BP
- Prefer Oral Med
- Difficulty Getting Med in <30 min
- RN Reluctant/Can Not Give IV Med
- Competing Priorities (US Mag, lab)
- MD Not Available
- Fear of Hypotension
**BP Normalized**

- BP taken in sitting or semi-fowlers
- Cuff size correct
- Nurse verifies cuff placed correctly
- Automated cuff calibrated
- Verification occurs within 15-20 min of abnormal value
“Did Not like The BP Parameters”

Blood Pressure and Severe Maternal Morbidity

TABLE 3
Antihypertensive treatment and severe maternal morbidity rates by increasing blood pressure severity in severely hypertensive women

<table>
<thead>
<tr>
<th>Categories of severe systolic blood pressure</th>
<th>Categories of Severe Diastolic Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment status</strong></td>
<td><strong>Pvalue</strong></td>
</tr>
<tr>
<td>Mildly severe (160–172)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Mildly severe (105–112)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>n = 1000</td>
<td>n = 564</td>
</tr>
<tr>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Treated</td>
<td>Treated</td>
</tr>
<tr>
<td>790 (79.0)</td>
<td>464 (82.3)</td>
</tr>
<tr>
<td>Severe maternal morbidity</td>
<td>Severe maternal morbidity</td>
</tr>
<tr>
<td>n = 1037</td>
<td>n = 577</td>
</tr>
<tr>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>SMM</td>
<td>SMM</td>
</tr>
<tr>
<td>91 (8.8)</td>
<td>47 (8.2)</td>
</tr>
</tbody>
</table>

SMM, severe maternal morbidity.

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP</td>
<td>160-172</td>
<td>173-192</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>105-112</td>
<td>113-122</td>
</tr>
</tbody>
</table>
Magnesium Sulfate is not an antihypertensive

- Primary effect is via CNS depression
- Improves blood flow to CNS via small vessel vasodilation
- Blood pressure after magnesium infusion:
  - 6 gm loading then 2 gm/hr.

<table>
<thead>
<tr>
<th></th>
<th>sBP 30 min</th>
<th>sBP 120 min</th>
<th>dBP 30 min</th>
<th>dBP 120 min</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild Group</strong></td>
<td>145 ±10</td>
<td>143 ±13</td>
<td>141 ±14</td>
<td>87 ±10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>79 ±9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>82 ±9</td>
</tr>
</tbody>
</table>

“Prefer Oral Medication”

Meeting treatment goal of <155/105

<table>
<thead>
<tr>
<th>Medication</th>
<th>n</th>
<th>Column %</th>
<th>Pretreatment SBP Mean (SD)</th>
<th>Pretreatment DBP Mean (SD)</th>
<th>Met treatment goal</th>
<th>n</th>
<th>Row %</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV hydralazine</td>
<td>611</td>
<td>33.9</td>
<td>177 (15)</td>
<td>102 (12)</td>
<td>418</td>
<td>68.4</td>
<td></td>
</tr>
<tr>
<td>IV labetalol</td>
<td>1057</td>
<td>58.6</td>
<td>175 (14)</td>
<td>102 (12)</td>
<td>748</td>
<td>70.8</td>
<td></td>
</tr>
<tr>
<td>PO nifedipine</td>
<td>38</td>
<td>2.1</td>
<td>174 (14)</td>
<td>100 (12)</td>
<td>31</td>
<td>81.6</td>
<td></td>
</tr>
<tr>
<td>PO labetolol</td>
<td>98</td>
<td>5.4</td>
<td>175 (15)</td>
<td>102 (10)</td>
<td>52</td>
<td>53.1</td>
<td></td>
</tr>
</tbody>
</table>

95% CI, 95% confidence limits; DBP, diastolic blood pressure; IV, intravenous; OR, odds ratio; PO, per os; SD, standard deviation.
“Can Not Get Medication <30-60 min”

- Work with pharmacy
- Stock on labor and delivery with emergency override
- Get *Pharmacy and Therapeutics Committee* to approve IV labetalol for use on OB floor
- Nursing and OB education for use
- Have emergency *medication box*
# Emergency Medication Box for Severe Preeclampsia and Eclampsia

<table>
<thead>
<tr>
<th>Medication</th>
<th>Initial Dose</th>
<th>Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium 20 grams/500 ml bag</td>
<td>IV (Use Magnesium Sulfate Continuous Infusion under L&amp;D protocol in Alaris Pump Library): Initial (Loading Dose): 4-6 g (100 ml – 150 ml) over 20 minutes</td>
<td>Maintenance Dose: 1-2 g/hour (25 ml/hr – 50 ml/hr) continuous infusion</td>
</tr>
<tr>
<td>Labetalol 100mg/20ml vial</td>
<td>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/60ml)</td>
<td></td>
</tr>
<tr>
<td>Hydralazine 20mg/ml vial</td>
<td>Initial: Draw 0.25 ml from the vial. 5-10 mg (0.25-0.5 ml) doses IV every 15-20 minutes</td>
<td></td>
</tr>
<tr>
<td>Esmolol 100mg/10ml vial (By Anesthesiologists ONLY)</td>
<td>1-2 mg/kg (0.1-0.2 ml/kg) IV over 1 minute</td>
<td></td>
</tr>
<tr>
<td>Propofol 10mg/ml, 20ml vial (By Anesthesiologists ONLY)</td>
<td>30-40 mg (3-4 ml) IV bolus</td>
<td></td>
</tr>
<tr>
<td>Calcium gluconate 1000 mg/10ml vial</td>
<td>1000 mg/10 ml IV over 2-5 minutes</td>
<td></td>
</tr>
<tr>
<td>Labetalol 200 mg tablets</td>
<td>200 mg PO and repeated in 30 minutes if needed</td>
<td></td>
</tr>
<tr>
<td>Nifedipine 10 mg PO</td>
<td>10 mg PO and repeated in 30 minutes if needed</td>
<td></td>
</tr>
<tr>
<td>Supply contents</td>
<td>3 ml, 10 ml, and 20 ml syringes, appropriate needles and appropriate tubing sets</td>
<td></td>
</tr>
</tbody>
</table>

Kindly used with permission of Stanford University Medical Center and Gillian Hilton, MD 2013
“Competing Priorities”

- Verify BP
- IV access
- Labs collected
- Physician notified → chain of command
- Antihypertensive medication
- Magnesium sulfate started
- Labs sent
- Imaging or other diagnostics
91% had at least 1 prodromal symptom
52% had more than one prodromal symptom
100% had headache or visual symptoms
Only 33% (7/21) sought care for their symptoms

AUTHOR’S CONCLUSION: “...efforts should be directed to the education of the health care providers and patients regarding the importance of prompt reporting and evaluation of symptoms of preeclampsia during the postpartum period.”
Key Clinical Pearl

- Early follow-up for all patients with preeclampsia or eclampsia
  - within 3-7 days if medication was used during labor and delivery OR postpartum
  - within 7-14 days if no medication was used

- Discharge instructions include preeclampsia symptoms
Key Elements of CMQCC and Dignity Health Bundles for Hypertensive Patients

- Staff education and correct BP measurement
- Notify the physician if BP >155/105 mmHg*
- Standardized treatment of BP within 1 hr if >160/110 mmHg
- Uniform policy for use of MgSO$_4$ for Severe Preeclampsia and should be consider in patients with preeclampsia
- Early postpartum follow-up (3-14 days) if diagnosis of hypertension
- Standardized patient educational materials
Recipe for change:

“A lot of enthusiasm and a little data doesn’t hurt”

Bill Gates,
Steven Colbert Show 1/30/13
Severe Maternal Morbidity Pre- and Post-Toolkit Implementation

34% Reduction  
P<0.001

48% Reduction  
p=0.02

(n=817)

AJOG 2015;212:S69.
Dignity Health Rate of Eclampsia

Pre- and Post-Hypertension Bundle

31% reduction

P=0.02

Compliance Monitoring

N=162
81/yr

N=55

N=48

2012-13
2014
Jan-Oct '15
Post-"rollout of recommendations"

no monitoring:

- 52% met all parameters
- 38% missing 1 element
- 10 missing 2 elements
- None missing all elements

6 months with compliance monitoring and monthly release of data: >85% meeting metrics
Final Task Sustaining Results… monitoring and drift prevention

Severe Maternal Morbidity

Baseline 2011-12: 0.195
Collab 2013: 0.165 (P<0.01)
2014: 0.181
2015: 0.187

Participation Declines and collaboration stops
Making an Impact in the Management and Outcome for Patients with Preeclampsia

- Recognize and Don’t Ignore Clinical Signs
- Treat and Control Blood Pressure
- Magnesium for Seizure Prophylaxis
- Delivery – 34, 37 weeks
- Postpartum Surveillance/Treatment
Summary

- Improvement in care of hypertensive and preeclamptic patients will require detailed review of local issues.

- Physician buy-in should be significantly easier with ACOG, CMQCC, Counsel on Patient Safety.

- Nursing education on important triggers, patient education, and correct measurement techniques.

- *Within in a short period of time, patient outcomes improve!*