Improving Health Care Response to Preeclampsia

June 12, 2014

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Medical Director Perinatal Safety
Dignity Health

Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
Learning Objectives

✓ To review the impact of hypertensive disorders of pregnancy and highlight the lack of progress in reducing maternal morbidity and mortality

✓ To review guidelines for care of hypertensive disorders of pregnancy from ACOG and the California Preeclampsia Task Force (PTF) of CMQCC

✓ To present some of the preliminary results from the California Preeclampsia Collaborative.
California Births

- 550,000 births in 350 hospitals

Comparisons:

- France: 830,900
- Germany: 679,981
- Great Britain: 648,516
- Italy: 505,757
- Canada: 354,148
- Texas: 385,963
- Washington: 82,592
- Catholic HSW: ~70,000 --> 1/10 births

2005 birth data

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Maternal Mortality Rate, California Residents; 1970-2010


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### Key Steps of California Pregnancy-Associated Mortality Review (CA-PAMR) Methodology

**STEP 1:** Hospital discharge data linked to birth, death certificates
Identifies women who died within one year postpartum from any cause
*(Pregnancy-Associated Cohort)*

**STEP 2:** Additional data gathered for each death
Coroner Reports, Medical Records (office and hospital), Autopsy Results,

**STEP 3:** Cases selected for CA-PAMR Committee review
Documented (ICD-10 obstetric (“O”) code) and suspected pregnancy-related deaths are prioritized for review

**STEP 4:** Records abstracted and summarized

**STEP 5:** Cases reviewed by CA-PAMR Committee
Committee determines whether the death was pregnancy-related, the cause of death, contributing factors and quality improvement opportunities

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California Pregnancy-Associated Mortality Review (CA-PAMR) Quality Improvement Review Cycle

1. Identification of cases

2. Information collection, review by multidisciplinary committee

3. Cause of Death, Contributing Factors and Quality Improvement (QI) Opportunities identified

4. Strategies to improve care and reduce morbidity and mortality

5. Evaluation and Implementation of QI strategies and tools

Toolkits:
- Hemorrhage
- Preeclampsia

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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>

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


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**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>.25</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></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>

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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


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### Gestational Age Groups of CA-PAMR Deaths, 2002 to 2004

<table>
<thead>
<tr>
<th>GESTATIONAL AGE GROUPS</th>
<th>CA-PAMR PREECLAMPSIA DEATHS</th>
<th>CA-PAMR NON-PREECLAMPSIA DEATHS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>&lt;24 weeks</td>
<td>0 (0)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>24-31w6d</td>
<td>2 (8%)</td>
<td>13 (11%)</td>
</tr>
<tr>
<td>32-36w6d</td>
<td>12 (48%)</td>
<td>29 (24%)</td>
</tr>
<tr>
<td>≥37 weeks</td>
<td>11 (44%)</td>
<td>76 (63%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>25</td>
<td>120</td>
</tr>
</tbody>
</table>

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Maternal Morbidity and Mortality: Preeclampsia

Preeclampsia Related Mortalities in CA

Near Misses: 400/yr (ICU admissions)

40-50x

400-500x

Serious Morbidity 3400/year

Source: 2007 All-California Rapid Cycle Maternal/Infant Database for CA Births: CMQCC
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### Factors Contributing to Pregnancy-Related Deaths, CA-PAMR 2002-2004

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th>Preeclampsia N (%)</th>
<th>TOTAL N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERALL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PATIENT FACTORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underlying significant medical conditions</td>
<td>8 (50%)</td>
<td>40 (39%)</td>
</tr>
<tr>
<td>Delay or failure to seek care</td>
<td>10 (63%)</td>
<td>27 (26%)</td>
</tr>
<tr>
<td>Lack of understanding the importance of a health event</td>
<td>9 (56%)</td>
<td>16 (15%)</td>
</tr>
<tr>
<td><strong>HEALTHCARE PROFESSIONALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay in diagnosis</td>
<td>22 (92%)</td>
<td>62 (54%)</td>
</tr>
<tr>
<td>Use of ineffective treatment</td>
<td>19 (79%)</td>
<td>48 (42%)</td>
</tr>
<tr>
<td>Misdiagnosis</td>
<td>13 (54%)</td>
<td>36 (31%)</td>
</tr>
<tr>
<td>Failure to refer or seek consultation</td>
<td>6 (25%)</td>
<td>26 (23%)</td>
</tr>
<tr>
<td><strong>HEALTHCARE FACILITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 (48%)</td>
<td>72 (50%)</td>
</tr>
</tbody>
</table>

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### CA-PAMR: Chance to Alter Outcome

**Grouped Cause of Death; 2002-2004 (N=145)**

<table>
<thead>
<tr>
<th>Grouped Cause of Death</th>
<th>Chance to Alter Outcome</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strong / Good (%)</td>
<td>Some (%)</td>
<td>None (%)</td>
<td>Total N (%)</td>
<td></td>
</tr>
<tr>
<td>Obstetric hemorrhage</td>
<td>69</td>
<td>25</td>
<td>6</td>
<td>16 (11)</td>
<td></td>
</tr>
<tr>
<td>Deep vein thrombosis/</td>
<td>53</td>
<td>40</td>
<td>7</td>
<td>15 (10)</td>
<td></td>
</tr>
<tr>
<td>pulmonary embolism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis/infection</td>
<td>50</td>
<td>40</td>
<td>10</td>
<td>10 (7)</td>
<td></td>
</tr>
<tr>
<td><strong>Preeclampsia/eclampsia</strong></td>
<td><strong>50</strong></td>
<td><strong>50</strong></td>
<td><strong>0</strong></td>
<td><strong>25 (17)</strong></td>
<td></td>
</tr>
<tr>
<td>Cardiomyopathy and other cardiovascular causes</td>
<td>25</td>
<td>61</td>
<td>14</td>
<td>28 (19)</td>
<td></td>
</tr>
<tr>
<td>Cerebral vascular accident</td>
<td>22</td>
<td>0</td>
<td>78</td>
<td>9 (6)</td>
<td></td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
<td>0</td>
<td>87</td>
<td>13</td>
<td>15 (10)</td>
<td></td>
</tr>
<tr>
<td>All other causes of death</td>
<td>46</td>
<td>46</td>
<td>8</td>
<td>26 (18)</td>
<td></td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td><strong>40</strong></td>
<td><strong>48</strong></td>
<td><strong>12</strong></td>
<td><strong>145</strong></td>
<td></td>
</tr>
</tbody>
</table>
Spectrum of Preeclampsia

Gestational Hypertension

Proteinuria

Eclampsia

PRES

Preeclampsia

CHTN

Superimposed Preeclampsia

Severe Preeclampsia

Atypical Preeclampsia

HELLP Syndrome

Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
ACOG Executive Summary on Hypertension In Pregnancy,

1. The term “mild” preeclampsia is discouraged terminology:
   a. “preeclampsia without severe features” (*mild*)
   b. “preeclampsia with severe features” (*severe*)

2. Proteinuria is not a requirement to diagnose preeclampsia with new onset hypertension.

3. The total amount of proteinuria > 5g in 24 hours has been eliminated from the diagnosis of severe preeclampsia.

4. Early treatment of severe hypertension is mandatory at the threshold levels of 160 mm Hg systolic or 110 mm Hg diastolic.

Nov 2013

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Key Clinical Pearl

Forty percent of new onset hypertension or new onset proteinuria will develop classic preeclampsia.


Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
This Practice Bulletin was developed by the ACOG Committee on Practice Bulletins—Obstetrics with the assistance of Larry C. Gilstrap III, MD.

Summary 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.

Diagnosis and Management of Preeclampsia and Eclampsia

Reaffirmed 2012

Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
Preeclampsia Task Force Members

Maurice Druzin, MD – Stanford
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Development of the California Toolkit ‘Improving Health Care Response to Preeclampsia’ was funded by the California Department of Public Health (CDPH), Center for Family Health, Maternal Child and Adolescent Health (MCAH) Division, using federal Title V MCH funds.

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2560 downloads
All 50 states
Calif. (60%) of hospitals
70 other countries

4/22/14

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Rocket Science?

Classification: 1) PE  
2) CHT  
3) CHT+PE  
4) GHTN  

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

Brain Surgery?

Only ~ 4 things

Only 5 things

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Key Clinical Pearl

Patients with vague symptoms of:

- headache
- abdominal pain
- shortness of breath
- generalized swelling
- complaints of “I just don’t feel right”

Need to be evaluated for atypical presentations of preeclampsia or “severe features”


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Do Patients Recognize Symptoms?

754 - Self selected women on the Preeclampsia Foundation website

317 - 42% recalled information regarding PE education

169 - 53% understood the information

75% v. 6% acted if they had symptoms

J Mat-FetNeo Medicine 2013

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### 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**
Hypertensive Medication Administration
Oral versus IV

First line therapy recommendations for treatment of critically elevated BP are with either IV labetalol or hydralazine.

Treatment is needed in a patient without IV access oral nifedipine may be used (10 mg)

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


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### Hypertensive Medication Administration

**Oral v. IV**

<table>
<thead>
<tr>
<th></th>
<th>IV Labetalol</th>
<th>IV Hydralazine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Onset: 2-5 min</td>
<td>Onset: 5-20 min</td>
</tr>
<tr>
<td></td>
<td>Peak: 5 min</td>
<td>Peak: 15-30 min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PO Labetalol:</th>
<th>PO Nifedipine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Onset: 20 min-2 hrs</td>
<td>Onset: 5-20 min*</td>
</tr>
<tr>
<td></td>
<td>Peak: 1-4 hrs</td>
<td>Peak: 30-60 min</td>
</tr>
</tbody>
</table>

*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/](http://www.uspharmacist.com/content/d/feature/i/1444/c/27112/)

**Current Cardiovascular Drugs, 4th edition 2005 pg. 2-186**

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Protocol for Labetalol Treatment

LABETALOL:

Threshold Blood Pressure:
Systolic 160 OR Diastolic 105-110

- If BP above threshold:
  - Give 20 mg IV over 2 minutes.
  - Repeat BP in 10 minutes

- BP above threshold after 10 min:
  - 40 mg IV over 2 minutes. Repeat BP in 10 minutes

- If BP above threshold after 10 min:
  - 80 mg IV over 2 minutes. Repeat BP in 10 minutes

- BP above threshold: repeat 80mg over 10 minutes to maximum dose of 220 mg

Target Blood Pressure:
140-150 - 90-100

- If No IV Access:
  - Give Oral Labetalol 200 mg
  - Check BP in 30 minutes; if above threshold, labetalol 200 mg dose

- If No IV access:
  - Give PO Nifedipine 10 mg
  - Check BP in 30 minutes; if above threshold, repeat PO nifedipine 10 mg

- Seek Consultation
  - (Maternal-Fetal Medicine, Critical Care, Anesthesia, Internal Medicine)

- Switch TO:
  - Hydralazine: 10mg over 2 minutes

Adapted from ACOG Committee Opinion #514; (1) MFM, Critical 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.
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.
### Emergency Medication Box for Severe Preeclampsia and Eclampsia

<table>
<thead>
<tr>
<th>Item</th>
<th>Instructions</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):</td>
</tr>
<tr>
<td></td>
<td><em>Initial (Loading Dose):</em> 4-6 g (100 ml – 150 ml) over 20 minutes</td>
</tr>
<tr>
<td></td>
<td><em>Maintenance Dose:</em> 1-2 g/hour (25 ml/hr – 50 ml/hr) continuous infusion</td>
</tr>
<tr>
<td>Labetalol 100mg/20ml vial</td>
<td><em>Initial: Draw 4 ml from the vial.</em></td>
</tr>
<tr>
<td></td>
<td>20 mg (4 ml) IV bolus followed by 40 mg (8 ml) if not effective within 10 minutes; then</td>
</tr>
<tr>
<td></td>
<td>80 mg (16 ml) every 10 minutes (maximum total dose of 300 mg/60ml)</td>
</tr>
<tr>
<td>Hydralazine 20mg/ml vial</td>
<td><em>Initial: Draw 0.25 ml from the vial.</em></td>
</tr>
<tr>
<td></td>
<td>5-10 mg (0.25-0.5 ml) doses IV every 15-20 minutes</td>
</tr>
<tr>
<td>Esmolol 100mg/10ml vial</td>
<td>1-2 mg/kg (0.1-0.2 ml/kg) IV over 1 minute</td>
</tr>
<tr>
<td>(By Anesthesiologists ONLY)</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>
</tr>
<tr>
<td>Calcium gluconate 1000 mg/10ml vial</td>
<td>1000 mg/10 ml IV over 2-5 minutes</td>
</tr>
<tr>
<td>Labetalol 200 mg tablets</td>
<td>200 mg PO and repeated in 30 minutes if needed</td>
</tr>
<tr>
<td>Nifedipine 10 mg PO</td>
<td>10 mg PO and repeated in 30 minutes if needed</td>
</tr>
<tr>
<td>Supply contents</td>
<td>3 ml, 10 ml, and 20 ml syringes, appropriate needles and appropriate tubing sets</td>
</tr>
</tbody>
</table>

Kindly used with permission of Stanford University Medical Center and Gillian Hilton, MD 2013

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Magnesium Sulfate in the management of Preeclampsia

**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

Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
# 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>X</td>
<td>X</td>
</tr>
<tr>
<td>NICE</td>
<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>

ACOG 33: there is no unanimity of opinion regarding the prophylactic use of magnesium sulfate for prevention of seizure in women with gestational hypertension or mild preeclampsia

* Should be considered: **NNT = 109 for mild, 63 for severe**
  
  *(NNT = number needed to treat)*

Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
Magnesium Sulfate

- 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>Mild Group</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>

Magnesium sulfate is **not antihypertensive** medication

Who should get Magnesium Sulfate?

Which patient is safer in your OB unit:

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

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

\( \text{NNT = number needed to treat} \)
Eclampsia: Maternal-Perinatal Outcome:
254 Consecutive Cases over 12 years

- 83,720 deliveries
- One in Five (19%) did not have proteinuria
- One in Four (23%) did not have hypertension


Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
Eclampsia: Maternal-Perinatal Outcome: 254 Consecutive Cases over 12 years

- 73 (29%) occurred postpartum.
- Of the postpartum cases, more than half (55%) were at >48 hours
- Half had normal BP but all had a headache or visual complaints

Am J Obstet Gynecol Sep 163(3):1049-1054;
Presented at Washington State Hospital Association Safe Table Webcast June 12, 2014
Magnesium Sulfate in the Management of Preeclampsia

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

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MANAGEMENT OF PREECLAMPSIA / ECLAMPSIA

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

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## Preeclampsia Collaborative Participants

<table>
<thead>
<tr>
<th>Northern CA</th>
<th>Southern CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alta Bates Summit</td>
<td>Arrowhead Regional Med Ctr</td>
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<tr>
<td>Contra Costa Regional Med Ctr</td>
<td>Cedars Sinai Med Center</td>
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<tr>
<td>Doctor’s Hospital of Modesto</td>
<td>Citrus Valley Med Center</td>
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<tr>
<td>John Muir Medical Center</td>
<td>Henry Mayo Newhall Memorial</td>
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<tr>
<td>Kaiser Hayward</td>
<td>Kaiser San Diego</td>
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<tr>
<td>Kaiser Oakland</td>
<td>Kaiser West LA</td>
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<td>Kaiser Roseville</td>
<td>Long Beach Miller</td>
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<tr>
<td>Kaiser Santa Clara</td>
<td>Riverside County Regional Med Ctr</td>
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<td>Mercy San Juan Med Center</td>
<td>St. Jude Medical Center</td>
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<tr>
<td>NorthBay Medical Center</td>
<td>Saddleback Memorial</td>
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<tr>
<td>Salinas Valley Memorial</td>
<td>UCLA</td>
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<tr>
<td>Sonora Regional Med Center</td>
<td>St Bernardine Medical Center</td>
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<tr>
<td>Sutter Medical Center</td>
<td>Maricopa (Phoenix, AZ)</td>
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</tbody>
</table>

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

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CMQCC Collaborative:

- Initiate toolkit
  - Treatment of BP >160/105 with in 30-60 min of verification

- Measured:
  - Treatment met time goal
  - Balance measure:
    - Diastolic BP 80 mmHg, FHR cat. change
  - Morbidity
  - Final assessment “devil in the details”
Recurrent Barriers To Timely Treatment

- Nursing unable to give IV HTN meds
- Physicians reluctant to use IV meds/no perceived “crisis”
- Reluctance to treat at 160/105 threshold – no orders
- Magnesium will lower the BP
- Fear of hypotension or will result in abnormal FHR
- Use of IV labetalol require cardiac monitor – telemetry nurse
- Moving patient to left lateral supine position
- Only one cuff size on maternity floor
- EMR use and response from pharmacy resulted in a time lag of >1 hour

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Solutions – Obvious and Creative

- In-service sessions for nursing and CME for physicians
  - Preeclampsia “bingo” and “jeopardy” games for staff/physicians
- Changing pharmacy guidelines for who can use IV medications
- 1 hospital system developed regional care plans
- Algorithms/pocket guides posted outlining Pre-E symptoms, guidelines for treatment and medication information
- BP monitor kits (three cuff sizes, stethoscope, reflex hammer) follows patient throughout her stay
- Debriefs for continuous process improvement 0→20%
- Pre-E med boxes and pyxis override
Timely Treatment: within 60 minutes

Process 1: Timely Treatment for Severe Hypertension

Q1 2014 73%

Collaborative Baseline Average: 44.4%

66% Improvement

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Percentage of patients in 2013 treated within 60 minutes with Labetalol:
Monitor for diastolic BP <80 within 1 hour after treatment

Balance 1: Monitor for dPB <80 within 1h after antihypertensives given

Collaborative Baseline Average: 42.1%

Q1 2014: 26.9% - 29/108

Q3 2012: 44.2%
Q4 2012: 23%
Q1 2013: 30%
Q2 2013: 23%
Q3 2013: 30%
Q4 2013: 30%
Q1 2014: 26.9%

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Severe Morbidity (excluding hemorrhage/transfusions)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Rate</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 2013</td>
<td>2.5%</td>
<td>8/323</td>
</tr>
<tr>
<td>Q1 2014</td>
<td>6.2%</td>
<td>17/274</td>
</tr>
</tbody>
</table>

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Severe Morbidity (including hemorrhage/transfusions)

Outcome 1. Severe Morbidity with Pre/eclampsia

Q3 2013: 18.8%
Q4 2013 - 12.1% (39/323)
Q1 2014 – 13.9% (28/274)

Collaborative Baseline Average: 18.6%

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Dignity Health:
Blood Pressure Treated within 1 Hour of Verification

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Dignity Health:
Patients Given Follow-up in 3-7 or 7-14 days

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Magnesium in OR

- Yes
- No
- Sometimes

Labetalol Monitoring

- Pulse Ox
- Cardiac Monitor
- None

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Impression and Challenges:

- The number of facilities with significant barriers to timely treatment was surprising.

- Modest improvements in patient care and outcomes seem achievable in relatively short periods of time.
  - Physician education and buy-in → ACOG, CMQCC, results
  - Nursing education and change in patient assessment
  - Reconfiguring supplies and equipment
  - Improving rapid access to medications and restructuring who and where they can used

- Hospitals that have already worked on standardizing care will likely achieve results quicker.

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California Maternal Quality Care Collaborative

Preeclampsia Toolkit
Improving Health Care Response to Preeclampsia
A California Toolkit to Transform Maternity Care

The complete toolkit is available for free download HERE (Including Errata 5/13/14).
(a brief registration is required).

The Errata is as follows:
- On page 66 and 109 the flowchart “Part 1 of 2: Diagnosis, Management of Antepartum and Postpartum Preeclampsia and Eclampsia” in the OB consult should read “If patient’s BP increases to SBP > 160 or DBP > 110, start hypertensives and magnesium and notify OB of change.

- On page 70 and 115 the paragraph in the “Chapter 3: Antenatal Assessment and Treatment of Antepartum Preeclampsia, Preeclampsia, and Eclampsia in the Emergency Department” step 2 “Anti-Hypertensive the second dose of Labetalol is not available” should read “administer 40 mg IV.

Individual sections of the toolkit click below on the link you are interested in, they are available to individuals who have already download the toolkit.
1. Core guidelines (in checklist, flowchart or table chart formats) and a compendium of eighteen "best practice" articles
2. A slide set for professional education
3. Education and patient information

PLEASE SHARE THIS LINK WITH YOUR COLLEAGUES. CMQCC Preeclampsia TOOLKIT

The CMQCC Preeclampsia Task Force, a multidisciplinary committee of experts co-chaired by Mauricio Duran, MD, Laurence Shields, MD and Nancy Peterson, RNC, CNM has developed a Toolkit for health care providers who care for women during the prenatal, birth, and postpartum periods. The Toolkit was extensively researched and included peer review and consensus among experts from around the state on best practices for early recognition, treatment, and management of the condition.

https://www.cmqcc.org/preeclampsia_toolkit

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