CMQCC Preeclampsia Tool Kit: Hypertensive Disorders Across the Lifespan

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New!

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

CMQCC PREECLAMPSIA TOOLKIT/PREECLAMPSIA CARE GUIDELINES CDPH-MCAH Approved: 12/20/13

Available online at www.cmqcc.org
### Grouped Cause of Death 2002-2004 (N=145)

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

<table>
<thead>
<tr>
<th>Grouped Cause of Death</th>
<th>Chance to Alter Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strong /Good (%)</td>
</tr>
<tr>
<td>Obstetric hemorrhage</td>
<td>69</td>
</tr>
<tr>
<td>Deep vein thrombosis/pulmonary embolism</td>
<td>53</td>
</tr>
<tr>
<td>Sepsis/infection</td>
<td>50</td>
</tr>
<tr>
<td><strong>Preeclampsia/eclampsia</strong></td>
<td><strong>50</strong></td>
</tr>
<tr>
<td>Cardiomyopathy &amp; other cardiovascular causes</td>
<td>25</td>
</tr>
<tr>
<td>Cerebral vascular accident</td>
<td>22</td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
<td>0</td>
</tr>
<tr>
<td>All other causes of death</td>
<td>46</td>
</tr>
</tbody>
</table>
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</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>

Why is it important?
❖ Complicates 10% pregnancies worldwide
❖ One of the greatest causes of maternal & perinatal morbidity and mortality
❖ ≈ 50,000 – 60,000 preeclampsia –related deaths per year worldwide
❖ In the US:
  ➢ Incidence has increased 25% in US during past 20 yrs
  ➢ For every death from preeclampsia, 50 – 100 women have “near miss” events, significant health risks and costs
Preeclampsia-Eclampsia

Advances for Rapid Response

❖ New Protocols for Antihypertensive Drugs
❖ New Rescue Antihypertensive Agent

ACOG Hypertensive Emergency Treatment Guidelines, CO #514

New 2011

The American College of Obstetricians and Gynecologists
Women's Health One Physicians

COMMITTEE OPINION

Number 514 • December 2011
Committee on Obstetric Practice
This document reflects emerging clinical and scientific 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.

Emergent Therapy for Acute-Onset, Severe Hypertension With Preeclampsia or Eclampsia

ABSTRACT: Acute-onset, persistent lasting 15 minutes or more, severe systolic (greater than or equal to 180 mm Hg) or severe diastolic hypertension (greater than or equal to 110 mm Hg) or both in pregnant or postpartum women with preeclampsia or eclampsia constitutes a hypertensive emergency. Severe systolic hypertension may be the most important predictor of cerebral hemorrhage and infection in these patients and if not treated expeditiously can result in maternal death. Intravenous labetalol and hydralazine are both considered first-line drugs for the management of acute, severe hypertension in this clinical setting. Close maternal and fetal monitoring by the physician and nursing staff are advised. Order sets for the use of labetalol and hydralazine for the initial management of acute, severe hypertension in pregnant or postpartum women with preeclampsia or eclampsia have been developed.
“Acute-onset, severe hypertension that is accurately measured using standard techniques and is persistent for 15 minutes or more is considered a hypertensive emergency.”

Hypertensive Emergency

- Acute-onset
- Severe Hypertension
  - Systolic ≥160 mm Hg, OR
  - Diastolic ≥110 mm Hg,
  - OR Both
- Accurately measured using standard techniques and
- Persistent for ≥15 minutes [is considered] a hypertensive emergency.

Emergent Therapy for Acute-Onset, Severe Hypertension With Preeclampsia or Eclampsia

- Intravenous labetalol and hydralazine* are both considered first-line drugs for the management of acute, severe hypertension in this clinical setting.
- Close maternal and fetal monitoring by the physician and nursing staff are advised.
- Order sets for the use of labetalol and hydralazine for the initial management of acute, severe hypertension in pregnant or postpartum women with preeclampsia or eclampsia have been developed.

http://journals.lww.com/greenjournal/Citation/2011/12000/Committee_Opinion_No__514__Emergent_Therapy_for.53.aspx
Hypertensive Crisis Algorithm

**Labetalol 1st Line**
- Systolic > 160 OR Diastolic > 110
  - Labetalol 20 mg IV
  - BP > Threshold?
    - Yes: Repeat BP
    - No: Labetalol 40 mg IV
  - BP > Threshold?
    - Yes: Labetalol 80 mg IV
    - No: Hydralazine 10 mg IV
  - BP > Threshold?
    - Yes: Hydralazine 10 mg IV
    - No: Labetalol 20 mg IV

**Hydralazine 1st Line**
- When BP < threshold, repeat BP:
  - every 10 min x 1 hour
  - then every 15 min x 1 hour
  - then every 30 min x 1 hour
  - then every hour for 4 hours

When BP < threshold, repeat BP:
- every 10 min x 1 hour
- then every 15 min x 1 hour
- then every 30 min x 1 hour
- then every hour for 4 hours

Institute additional BP timing per specific order.

Order Set for Severe Intrapartum or Postpartum Hypertension
Initial First-Line Management with Labetalol *

1. Notify physician if systolic ≥ 160 mm Hg or if diastolic ≥ 110 mm Hg.
2. Institute fetal surveillance if undelivered and fetus is viable.
3. Administer labetalol (20 mg IV over 2 minutes).
4. Repeat BP measurement in 10 minutes; record results.
5. If either BP > threshold, administer labetalol (40 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
6. Repeat BP measurement in 10 minutes and record results.
7. If either BP > threshold, administer labetalol (80 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
8. Repeat BP measurement in 20 minutes and record results.
9. If either BP > threshold, administer hydralazine (10 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
10. Repeat BP measurement in 20 minutes and record results.
11. If either BP > threshold, obtain emergency consultation from MFM, IM, anesthesia, or critical care specialists.
12. Give additional antihypertensive medication per specific order (Nicardipine).
13. Once the aforementioned BP thresholds are achieved, repeat 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.
14. Institute additional BP timing per specific order.
Hypertensive Crisis Algorithm

Labetalol 1st Line

When BP < threshold, repeat BP:
- every 10 min x 1 hour
- then every 15 min x 1 hour,
- then every 30 min x 1 hour,
- then every hour for 4 hours.
Institute additional BP timing per specific order.

Systolic > 160 OR Diastolic > 110

Labetalol 20 mg IV

BP > Threshold?

Labetalol 40 mg IV

BP > Threshold?

Labetalol 80 mg IV

BP > Threshold?

Apressoline 10 mg

Created from: ACOG, CO #514, Dec 2011
1. Notify physician if systolic BP is greater than or equal to 160 mm Hg or if diastolic BP is greater than or equal to 110 mm Hg.
2. Institute fetal surveillance if undelivered and fetus is viable.
3. Administer hydralazine (5 mg or 10 mg IV over 2 minutes).
4. Repeat BP measurement in 20 minutes and record results.
5. If either BP threshold is still exceeded, administer hydralazine (10 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
6. Repeat BP measurement in 20 minutes and record results.
7. If either BP threshold is still exceeded, administer labetalol (20 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
8. Repeat BP measurement in 10 minutes and record results.
9. If either BP threshold is still exceeded, administer labetalol (40 mg IV over 2 minutes) and obtain emergency consultation from MFM, IM, anesthesia, or critical care specialists.
10. Give additional antihypertensive medication per specific order.
11. Once the aforementioned BP thresholds are achieved, repeat 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.
12. Institute additional BP timing per specific order.
Hypertensive Crisis Algorithm

Systolic >160 OR Diastolic >110

Hydralazine 10 mg IV

BP > Threshold?

Hydralazine 10 mg IV

BP > Threshold?

Labetalol 20 mg IV

BP > Threshold?

Labetalol 40 mg IV

Yes

Repeat BP

10 min

No

When BP < threshold, repeat BP:
- every 10 min x 1 hour
- then every 15 min x 1 hour
- then every 30 min x 1 hour
- then every hour for 4 hours.
Institute additional BP timing per specific order.

2nd Line Therapy

❖ “Second line alternatives to consider include intravenous labetalol or nicardipine by infusion pump”

❖ Transplacentual passage and changes in umbilical artery Doppler velocimetry are minimal

Nicardipine HCL

- Nicardipine hydrochloride injection is a calcium ion influx inhibitor (slow channel blocker or calcium channel blocker).
- Nicardipine hydrochloride produces significant decreases in systemic vascular resistance.
- Is indicated for the short-term treatment of hypertension when oral therapy is not feasible or not desirable.
- Because the liver extensively metabolizes nicardipine, plasma concentrations are influenced by changes in hepatic function.
- Nicardipine hydrochloride injection is contraindicated in patients with advanced aortic stenosis because part of the reduced afterload.
  - Reduction of diastolic pressure in these patients may worsen rather than improve myocardial oxygen balance.
- Pregnancy Category C
Nicardipine – Rapid Onset and Peak Action

<table>
<thead>
<tr>
<th>Drug</th>
<th>Half Life (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labetalol</td>
<td>5.5 hours</td>
</tr>
<tr>
<td>Hydralazine</td>
<td>4 hours</td>
</tr>
<tr>
<td><strong>Nicardipine</strong></td>
<td><strong>2 to 5 minutes</strong></td>
</tr>
<tr>
<td>Nifedipine</td>
<td>2 to 5 hours</td>
</tr>
</tbody>
</table>

*Contraindications to the use of nicardipine are hypersensitivity to nicardipine, severe aortic stenosis, hypotension, and shock.


Case Study Example

- 33 year old G1P0 at 34 weeks
- Benign prenatal course until 32 weeks, when “some elevated BP” noted in antepartum record. Sent home from office with instructions to re-check BP every 2 to 3 days.
- Presents to L&D with headache, c/o decreased fetal movement.
Blood pressures now:
- 166/116
- 170/108
- 166/115
- Over 15 minutes, history and physical done – benign until elevated BP
- No allergies, no chronic disease
- Repeat BPs: 170/104, 168/102, 168/98

… start Labetalol protocol/guideline
Case Study Example

❖ Blood pressures now:
  - 165/90
  - 164/86
  - 168/88
  - Over 15 minutes, history and physical done – benign until elevated BP
  - No allergies, no chronic disease
  - Repeat BPs: 168/88. 166/85

Case Study Example

❖ … start Labetalol protocol/guideline
Labetalol Algorithm

When BP < threshold, repeat BP:
- every 10 min x 1 hour
- then every 15 min x 1 hour,
- then every 30 min x 1 hour,
- then every hour for 4 hours.
  Institute additional BP timing per specific order.

Created from: ACOG, CO #514, Dec 2011

Question

What major discovery lead to change in BP parameters for severe preeclampsia (lowered from systolic BP 170-180 mmHg to systolic BP 160 mmHg)?

A. Patients had placental abruptions at systolic BPs of 160 – 170 mmHg.
B. Patients presented with IUFD with systolic BPs of 160 – 170 mmHg.
C. Patients had strokes with systolic BPs of 160 – 170 mmHg.
Four (4) Categories
1. Preeclampsia-eclampsia
2. Chronic hypertension (of any cause)
3. Chronic hypertension with superimposed preeclampsia
4. Gestational hypertension
Key Change: Proteinuria Not Required for Diagnosis of Preeclampsia

- Recognizes the syndromic nature of preeclampsia
- The disease affects all organ systems

Diagnosis of Preeclampsia

- Hypertension
  - Systolic BP of 140 mmHg or higher, OR
  - Diastolic BP of 90 mmHg or higher
- PLUS One of the Following:
  - Proteinuria [≥300 mg protein/24 urine collection*, or a protein/creatinine ratio of ≥0.3 (each measured by mg/dL)]
  - Thrombocytopenia (platelets <100,000/microliter)
  - Impaired liver function (increased serum liver transaminases to twice normal values)
  - Progressive renal insufficiency (new development/no prior renal disease; serum creatinine >1.1 mg/dL, or doubling of serum creatinine)
  - Pulmonary edema
  - New-onset cerebral or visual disturbances
Preeclampsia Diagnosis

❖ In the absence of proteinuria
  ◆ Thrombocytopenia
  ◆ Impaired liver function
  ◆ New development of renal insufficiency
  ◆ Pulmonary edema
  ◆ New-onset cerebral or visual disturbances

Severe* Features of Preeclampsia

❖ Hypertension
  ◆ Systolic BP of 160 mmHg or higher, or
  ◆ Diastolic BP of 110 mmHg or higher
❖ Thrombocytopenia (platelets <100,000/microliter)
❖ Impaired liver function (increased serum liver transaminases to twice normal values)
❖ Progressive renal insufficiency (new development/no prior renal disease; serum creatinine >1.1 mg/dL, or doubling of serum creatinine)
❖ Pulmonary edema
❖ New-onset cerebral or visual disturbances

*Proteinuria >5 grams/24 hours has been removed; fetal growth restriction has been removed as a finding – due to similar management independent of causation.
Chronic Hypertension

❖ “Hypertension that predates pregnancy”

Gestational Hypertension

❖ “Gestational hypertension is BP elevation after 20 weeks of gestation in the absence of proteinuria or the aforementioned systemic findings.”
Superimposed Preeclampsia

“Superimposed preeclampsia is chronic hypertension in association with preeclampsia.”

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Thank you, for your attention.

Carol Harvey