10 Clinical Diamonds for Preventing Maternal Death

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7 Habits of the Highly Successful Obstetrician

• Read and study College publications
“The available evidence suggests benefit of X for women with Y”
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“Do X in women with Y!”
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• Read and study College publications – then change practice if necessary.
ACOG PRACTICE BULLETIN – Sept 2008: FETAL LUNG MATURITY

Reiterates standard initially set 20 + years ago by ACOG/AAP
OBSTETRICS

Neonatal and maternal outcomes associated with elective term delivery

Steven L. Clark, MD; Darla D. Miller, BSN, RNC; Michael A. Belfort, MD, PhD; Gary A. Dildy, MD; Donna K. Frye, RN, MN; Janet A. Meyers, RN

OBJECTIVE: To quantify adverse neonatal and maternal outcomes associated with elective term delivery at less than 39 completed weeks of gestation.

STUDY DESIGN: Prospective observational study conducted in 27 hospitals over the course of 3 months in 2007.

RESULTS: Of 17,794 deliveries, 14,955 (84%) occurred at 37 weeks or greater. Of term deliveries, 6562 (44%) were planned, rather than spontaneous. Among the planned deliveries, 4645 (71%) were purely elective: 17.8% of infants delivered electively without medical indication at 37-38 weeks and 8% of those delivered electively at 38-39 weeks required admission to a newborn special care unit for an average of 4.5 days, compared with 4.6% of infants delivered at 39 weeks or beyond ($P < .001$). Cesarean delivery rate in women undergoing induction of labor was not influenced by gestational age but was highly influenced by initial cervical dilatation and parity, ranging from 0% for parous women induced at 5 cm or greater to 50% for nulliparous women at 0 cm.

CONCLUSION: Elective delivery before 39 weeks' gestation is associated with significant neonatal morbidity. Initial cervical dilatation is highly correlated with cesarean delivery among women undergoing induction of labor in both nulliparous and parous women. Elective delivery before 39 completed weeks' gestation is inappropriate. Women contemplating elective induction at or beyond 39 weeks' gestation with an unfavorable cervix should be counseled regarding an increased rate of cesarean delivery.

Key words: elective delivery, induction of labor, repeat cesarean delivery

Getting on the pre-39 week bandwagon/juggernaut

- ACOG
- SMFM
- March of Dimes
- Major Insurers
- NQF
- Leapfrog
- CMS
- Legislative bodies
“Insurers, policy makers, and regulatory groups have been piling onto the quality-improvement wagon. But few of these quality enthusiasts are actually caring for patients”

# Indications for Delivery at <39 weeks

<table>
<thead>
<tr>
<th>Placental and uterine issues</th>
<th>Gestational age* for delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Placenta previa**</td>
<td>36-37 weeks</td>
</tr>
<tr>
<td>• Placenta accreta/increta/percreta**</td>
<td>34-35 weeks</td>
</tr>
<tr>
<td>• Prior classical cesarean (upper segment uterine incision)**</td>
<td>36-37 weeks</td>
</tr>
<tr>
<td>• Prior myomectomy necessitating cesarean delivery**</td>
<td>37-38 weeks</td>
</tr>
<tr>
<td>(may require earlier delivery, similar to prior classical cesarean, in situations with more extensive or complicated myomectomy)</td>
<td></td>
</tr>
<tr>
<td>• Prior uterine rupture**</td>
<td>36-37 weeks</td>
</tr>
</tbody>
</table>
Indications for Delivery at <39 weeks

Fetal issues

- Fetal growth restriction—singleton

38-39 weeks:
  - Otherwise uncomplicated, no concurrent findings

34-37 weeks:
  - Concurrent conditions (oligohydramnios, abnormal Doppler studies, maternal risk factors, co-morbidity)

Expeditious delivery regardless of gestational age

- Persistent abnormal fetal surveillance suggesting imminent fetal jeopardy
Indications for Delivery at <39 weeks

Fetal issues

- Fetal growth restriction-twin gestation

**36-37 weeks:**
  - Dichorionic-diamniotic twins with isolated fetal growth restriction

**32-34 weeks:**
  - Monochorionic-diamniotic twins with isolated fetal growth restriction
  - Concurrent conditions (oligohydramnios, abnormal Doppler studies, maternal risk factors, co-morbidity)

**Expeditious delivery regardless of gestational age**

- Persistent abnormal fetal surveillance suggesting imminent fetal jeopardy
Indications for Delivery at <39 weeks

Fetal issues

- Fetal congenital malformations**

34-39 weeks:

- Suspected worsening of fetal organ damage
- Potential for fetal intracranial hemorrhage (e.g., Vein of Galen aneurysm, Neonatal alloimmune thrombocytopenia)
- When delivery prior to labor is preferred (e.g., EXIT procedure)
- Previous fetal intervention
- Concurrent maternal disease (e.g., preeclampsia, chronic hypertension)
- Potential for adverse maternal effect from fetal condition

Expeditious delivery regardless of gestational age

- When intervention is expected to be beneficial
- Fetal complications develop (abnormal fetal surveillance, new onset hydrops fetalis, progressive/new onset organ injury)
- Maternal complications develop (mirror syndrome)
Indications for Delivery at <39 weeks

Fetal issues

- Multiple gestations: Dichorionic/Diamniotic** 38 weeks
- Multiple gestations: Monochorionic/Diamniotic** 34-37 weeks
- Multiple gestations: Di/Di or Mono/Di with single fetal death** If occurs at or after 34 weeks, consider delivery (recommendation limited to pregnancies at or after 34 weeks. If occurs before 34 weeks, individualize based on concurrent maternal/fetal conditions)
- Multiple gestations: Monochorionic/ Monoamniotic** 32-34 weeks
- Multiple gestations: Monochorionic/ Monoamniotic with single fetal death** When the demise of one fetus is identified (recommendation limited to pregnancies at or after 34 weeks. If occurs before 34 weeks, individualize based on concurrent maternal/fetal conditions)
Indications for Delivery at <39 weeks

Fetal issues

- Oligohydramnios – isolated and persistent** 36-37 weeks
# Indications for Delivery at <39 weeks

## Maternal issues

<table>
<thead>
<tr>
<th>Condition</th>
<th>Recommended Gestational Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic hypertension – no medications**</td>
<td>38-39 weeks</td>
</tr>
<tr>
<td>Chronic hypertension – controlled on medication**</td>
<td>37-39 weeks</td>
</tr>
<tr>
<td>Chronic hypertension – difficult to control (requiring frequent medication adjustments)**</td>
<td>36-37 weeks</td>
</tr>
<tr>
<td>Gestational hypertension***</td>
<td>37-38 weeks</td>
</tr>
<tr>
<td>Preeclampsia – severe**</td>
<td>At diagnosis (recommendation limited to pregnancies at or after 34 weeks)</td>
</tr>
<tr>
<td>Preeclampsia – mild**</td>
<td>37 weeks</td>
</tr>
</tbody>
</table>
Indications for Delivery at <39 weeks

Maternal issues

- Diabetes – pregestational well controlled**
  LPTB/ETB not recommended

- Diabetes – pregestational with vascular disease**
  37-39 weeks

- Diabetes – pregestational, poorly controlled**
  34-39 weeks (individualized to situation)

- Diabetes – gestational well controlled on diet**
  LPTB/ETB not recommended

- Diabetes – gestational well controlled on medication**
  LPTB/ETB not recommended

- Diabetes – gestational poorly controlled on medication**
  34-39 weeks (individualized to situation)
## Indications for Delivery at <39 weeks

### Obstetrical issues

- **Prior stillbirth-unexplained**
  - LPTB/ETB not recommended
  - Consider amniocentesis for fetal pulmonary maturity if delivered at 37-38 weeks

- **Spontaneous Preterm Birth: Preterm Premature Rupture Of Membranes (PROM)**
  - 34 weeks (recommendation limited to pregnancies at or after 34 weeks)

- **Spontaneous Preterm Birth: Active preterm labor**
  - Delivery if progressive labor or additional maternal/fetal indication
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- Standardize institutional practice for high-risk situations.
Oxytocin Guidelines (AGOG 2009)

• “Any of the low or high dose oxytocin regimens outlined in table 2 are appropriate” (0.5 – 6 mU/min q 15-40 min)
• “Each hospital’s OBGYN department should develop guidelines for preparation and administration of oxytocin”
• “The uterine contractions and fetal heart rate should be monitored closely”
Obstetrics – High Error Rate

- Abnormal fetal heart rate tracing
- Oxytocin
- Misoprostol
- VBAC
- Forceps/Vacuum
- Shoulder dystocia
- Prolonged second stage labor
- Outpatient management of hypertension
There may be many appropriate ways to treat a condition. When using a team approach, let’s pick one and get real good at it.
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• Read and study College publications – then change practice if necessary.
• Standardize institutional practice for high-risk situations.
• Integrate the “10 clinical diamonds” for preventing maternal death into your practice.
The death of a mother during or after childbirth is one of the most tragic events in medicine. We have identified 10 specific recurrent errors that account for a disproportionate share of maternal deaths, primarily related to pulmonary embolism, severe preeclampsia, cardiac disease, and postpartum hemorrhage. Attention to these principles and the development and adoption of local or regional clinical protocols that address these issues will help reduce the likelihood and effect of error and of maternal mortality.

(Obstet Gynecol 2012;119:360–4)
DOI: 10.1097/AOG.0b013e3182411907
10 Clinical Diamonds for preventing maternal death

- Chest pain → CT Angiogram
10 Clinical Diamonds for preventing maternal death

- Chest pain → CT Angiogram
- Pre-eclampsia and dyspnea → Chest X ray/O2
10 Clinical Diamonds for preventing maternal death

- Chest pain ➔ CT Angiogram
- Pre-eclampsia and dyspnea ➔ Chest X ray/O2
- BP > 160 (S) or >110 (D) ➔ Medication
10 Clinical Diamonds for preventing maternal death

• Chest pain ➔ CT Angiogram
• Pre-eclampsia and dyspnea ➔ Chest X ray/O2
• BP > 160 (S) or >110 (D) ➔ Medication
• Angiographic embolization is not for acute, massive hemorrhage
10 Clinical Diamonds for preventing maternal death

- Chest pain ➔ CT Angiogram
- Pre-eclampsia and dyspnea ➔ Chest X ray/O2
- BP > 160 (S) or >110 (D) ➔ Medication
- Angiographic embolization is not for acute, massive hemorrhage
- Maternal Cardiac Disease ➔ MFM Consult
10 Clinical Diamonds for preventing maternal death

• Atony medication x2 ➔ MD at bedside
10 Clinical Diamonds for preventing maternal death

- Atony medication x2 ➡️ MD at bedside
- Postpartum hemorrhage is not a diagnosis!
10 Clinical Diamonds for preventing maternal death

• Atony medication x2 ➔ MD at bedside
• Postpartum hemorrhage is not a diagnosis!
• Hemorrhage + Oliguria ✗ Lasix
10 Clinical Diamonds for preventing maternal death

- Atony medication x2 ➔ MD at bedside
- Postpartum hemorrhage is not a diagnosis!
- Hemorrhage + Oliguria ➔ Lasix
- Prior cesarean + Previa ➔ Tertiary Center
10 Clinical Diamonds for preventing maternal death

- Atony medication x2 → MD at bedside
- Postpartum hemorrhage is not a diagnosis!
- Hemorrhage + Oliguria → Lasix
- Prior cesarean + Previa → Tertiary Center
- Use a state of the art massive transfusion protocol
### Massive Transfusion Protocol in Obstetrics

<table>
<thead>
<tr>
<th></th>
<th>PRBC</th>
<th>FFP</th>
<th>Platelets</th>
<th>Cryoprecipitate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 1</td>
<td>6 units</td>
<td>6 units</td>
<td>6 units</td>
<td>10 units</td>
</tr>
<tr>
<td>Round 2</td>
<td>6 units</td>
<td>6 units</td>
<td></td>
<td>20 units</td>
</tr>
<tr>
<td>Round 3</td>
<td></td>
<td></td>
<td>Recombinant activated Factor VII (40 micrograms/kg)</td>
<td></td>
</tr>
<tr>
<td>Round 4</td>
<td>6 units</td>
<td>6 units</td>
<td>6 units</td>
<td>10 units</td>
</tr>
<tr>
<td>Round 5</td>
<td>6 units</td>
<td>6 units</td>
<td></td>
<td>10 units</td>
</tr>
<tr>
<td>Round 6</td>
<td></td>
<td></td>
<td>Recombinant activated Factor VII (40 micrograms/kg)</td>
<td></td>
</tr>
</tbody>
</table>

PRBC: packed red blood cells; FFP: fresh frozen plasma;

Consider activating the protocol when massive hemorrhage is expected and/or in patients with ongoing bleeding despite receiving 4 units of PRBCs within a short period of time (1-2 hours).

Once activated, blood bank personnel will continue preparing blood products until the protocol is inactivated by the surgical team. After round #6, if not inactivated, the protocol will start again from round #1.

Ref: Pacheco LD, Saade GR, Clark SL, Hankins GH; The Role of Transfusion Protocols in Obstetrics (in Press accepted for publication in the American Journal of Perinatology)
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• Remember your goal – healthy mother/healthy baby.
“Every woman deserves an easy vaginal birth, or an easy cesarean birth”
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• Treat nurses with respect.
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• Treat nurses with respect.
• Deal responsibly with sleep deprivation
Rats deprived of sleep die sooner than rats deprived of food
<table>
<thead>
<tr>
<th>Hours without sleep</th>
<th>Effective serum EtOH</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-19</td>
<td>0.05 %</td>
</tr>
<tr>
<td>19-21</td>
<td>0.08 %</td>
</tr>
<tr>
<td>&gt;24</td>
<td>0.10 %</td>
</tr>
</tbody>
</table>
Following 24 hours of sleep deprivation it takes 3 nights of uninterrupted 8 hour sleep to recover cognitive function.
Ongoing accrual of sleep debt is unavoidable

You can’t “get used to it”
Frequency Trends - HCA
Reported Claims per 10,000 Births

- HCA
- Reported Claims per 10,000 Births
OB LITIGATION CURRENTLY RANKS BEHIND “ACCIDENTS ON HOSPITAL GROUNDS” IN TERMS OF ECONOMIC COST TO HCA
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#7 ?