Elective Induction of Labor

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Financial Relationships

- No relationship to any aspect of private industry
- Funded by:
  - NICHD – WRHR
  - AHRQ – Elective Induction of Labor
  - RWJ – Mode of Delivery: Outcomes, Preferences and Costs

Elective IOL

- What?
  - No Medical Indication
- Why?
  - Patients
  - MDs
  - Systems
- Who?
  - Elective vs. Selective vs. Preventive

Elective IOL

- Why study Elective IOL?
- Postterm pregnancy
  - What should definition be?
- How can we prevent complications in term pregnancies?
  - Antenatal testing
  - Encourage spontaneous labor
    - Membrane stripping
    - Sex
    - Accupuncture?
  - Induction of labor
Elective IOL – What?

- 24 yo G1P0 at 39 weeks GA with A2GDM
- 36 yo G4P0 at 39 wks GA s/p IVF
- 28 yo G2P1 at 39 wks GA, 3 cms, no ctxns
- 32 yo G1P0 at 39 wks with gestational HTN

Medical Indication for IOL

- Preeclampsia / Gest HTN
- Diabetes Mellitus (A1GDM?)
- Postterm (41 wks vs. 42 wks)
- Intrauterine Growth Restriction
- Nonreassuring fetal testing

Elective IOL – What?

- Not an indication for IOL
  - Impending macrosomia
  - Increased risk for developing:
    - Preeclampsia
    - IUGR (e.g. EFW 19%ile)
  - Favorable cervix

Elective IOL

Why?

- Patients
  - Control schedule/timing
  - Prevent future complications
- MDs
  - Prevent future complications
  - Control schedule/timing
- Systems
  - Prevent future complications
  - Control schedule/timing
Elective IOL

**Why Not?**
- Patients
  - Increases cesareans (does it really?)
  - Increases iatrogenesis
- MDs
  - Increases cesareans (are we sure of this?)
  - Longer labors
- Systems
  - Unclear health outcome differences
  - Increases costs

**Yes**
- neonatal comps ↓
- maternal prefs ↑
- md prefs ↑
- cesareans ↑
- maternal comps ↑
- costs ↑

Elective IOL - CS

**Does IOL increase cesarean delivery?**
- Cohort and case-control data
  - IOL increases cesareans
- Prospective RCTs
  - 41 weeks GA – decreases cesareans
  - <41 weeks GA – ?

Induction of Labor

**Comparison of IOL vs. ANT**
- Hannah et al, NEJM, 1992
- **1701 IOL @ 41 wks vs. 1706 ANT @ 41 wks**
  - C/S higher in ANT group (24.5% vs. 21.2%)
  - C/S for FD higher as well (8.3% vs. 5.7%)
  - Higher rate of meconium in ANT group
  - No difference noted in neonatal morbidity
  - Apgars, pH
  - Resuscitation, NICU admit, vent, O2
  - Seizures, sepsis, polycythemia
**Induction of Labor**

- **IOL vs. Expt Mgmt 41 wks and beyond**
  - Sanchez-Ramos et al, OB Gyn, 2003
  - Meta-analysis, 16 prospective RCTs
- **Mode of delivery**
  - IOL vs. Expt Mgmt
    - OR 95% CI
      - CS: 20.1% vs. 22.0%
      - Mec*: 22% vs. 27%
      - PMR: 0.09% vs. 0.33%
  - PMR = perinatal mortality rate

**IOL < 41 wks GA**

- Cole, Howie, McNaughton – Lancet, 1975
- Prospective RCT
  - 111 elective IOL, 117 expt mgmt
- Elective IOL Expt Mgmt
  - CS: 4.5% vs. 7.7%
  - Mec*: 0.9% vs. 11.1%
  - Bwt*: 3.3 kgs vs. 3.4 kgs
- Also not stat sig was RDS, IUGR, Apgars

**IOL < 41 weeks GA**

- Cochrane DB – Gülmezoglu AM et al, 2006
- IOL < 41 weeks had lower CS rate
- RR 0.58; 95% CI 0.34 to 0.99

**Induction of Labor - CS**

- Retrospective studies - more CS with IOL
- Prospective studies – fewer CS or no diff
- What are the groups being compared?
- IOL at 39 weeks vs. Spont labor at 39 weeks
- However, in RCT:
  - IOL at 39 weeks GA vs.
  - Patients beyond 39 weeks GA
**Induction of Labor < 41 wks GA**

<table>
<thead>
<tr>
<th>IOL</th>
<th>38</th>
<th>39</th>
<th>40</th>
<th>41</th>
<th>42</th>
</tr>
</thead>
<tbody>
<tr>
<td>No IOL</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>41</td>
<td>42</td>
</tr>
</tbody>
</table>

A. Comparison by week of gestation

<table>
<thead>
<tr>
<th>IOL</th>
<th>38</th>
</tr>
</thead>
<tbody>
<tr>
<td>No IOL</td>
<td>38</td>
</tr>
</tbody>
</table>

B. Comparison of IOL and Expectant Management

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**Induction of Labor - CS**

<table>
<thead>
<tr>
<th>Week of Induction</th>
<th>IOL CD</th>
<th>Expt mgmt CD</th>
<th>AOR* (95% CI)</th>
<th>Spont. Labor CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 weeks</td>
<td>11.9%</td>
<td>13.3%</td>
<td>1.28 (1.29-2.53)</td>
<td>7.0%</td>
</tr>
<tr>
<td>39 weeks</td>
<td>14.3%</td>
<td>15.0%</td>
<td>1.27 (1.08-1.60)</td>
<td>9.1%</td>
</tr>
<tr>
<td>40 weeks</td>
<td>20.4%</td>
<td>19.0%</td>
<td>1.24 (1.27-1.62)</td>
<td>10.9%</td>
</tr>
<tr>
<td>41 weeks</td>
<td>24.3%</td>
<td>25.0%</td>
<td>1.26 (0.99-1.61)</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

*controlling for method of induction, maternal age, parity, education, BMI, race/ethnicity, and epidural.

Caughey et al, AJOG 2006;195:700

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**Elective IOL - CS**

- National data, 2003

<table>
<thead>
<tr>
<th>Week of Induction</th>
<th>IOL CD</th>
<th>Expt mgmt CD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 weeks</td>
<td>21.1%</td>
<td>23.3%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>39 weeks</td>
<td>22.3%</td>
<td>23.6%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>40 weeks</td>
<td>24.2%</td>
<td>25.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>41 weeks</td>
<td>27.0%</td>
<td>24.7%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**Elective IOL - CS**

- Prospective RCT at 41 wks – lower CS
- Prospective RCTs < 41 wks – lower CS
- Multiple retrospective studies – higher CS
- Appropriate retrospective studies – lower CS
- Research protocols vs. Actual practice
**Elective IOL**

- **Who?**
  - Elective vs. Selective vs. Preventive
  - Selective
    - Pts with favorable cvx
    - Pts with impending complications
  - Preventive
    - Pts with higher risk of CS with pregnancy progression

**Induction of Labor**

- **AMOR-IPAT – (Nicholson, AJOG, 2004)**
  - Active mgmt of risk in pregnancy at term
  - Considers risk of:
    - CPD
    - IU pierced / Fetal intolerance of labor
    - Earlier induction for higher risk patients

**AMOR-IPAT**

- **CPD**
  - BMI >29
  - Ht < 62”
  - Wt gain > 30 lbs
  - GDM
  - DM
  - H/o macrosomia
- **UPI**
  - Htn
  - GDM
  - DM
  - MSAFP
  - Cigarettes
  - AMA
- **Add up risk factors and subtract from 41 weeks GA**

Nicholson et al, AJOG, 2004;191:1516-28
**AMOR IPAT - RCT**

<table>
<thead>
<tr>
<th>Cesarean Delivery</th>
<th>Assisted Vaginal</th>
<th>NICU Admission</th>
<th>APGAR 1min &lt; 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed Group</td>
<td>10.3%*</td>
<td>5.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Control Group</td>
<td>14.9%**</td>
<td>7.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Odds ratio</td>
<td>0.61</td>
<td>0.69</td>
<td>0.21</td>
</tr>
<tr>
<td>p-value</td>
<td>0.20</td>
<td>0.43</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*AMOR IPAT Prospective RCT. Nicholson J et al. AJOG abs, In Press, 2007*

**Elective IOL - Costs**

- Induction of labor associated with higher costs
  - Bost, AJOG - 2003
  - Allen, AJOG - 2005
  - Allen, OB Gyn - 2006

**Elective IOL – Cost effectiveness**

- Cost-effectiveness
  - Not cheapest plan
  - Cost per outcome “worth it”
  - Threshold - $100,000/QALY
- IOL at 41 wks - $6,938 per QALY*
- IOL at 40 wks - $71,735 per QALY**
  - Least cost-effective with favorable cvx

*Kaimal et al. AJOG, 2006 abs
**Kaimal et al. AJOG, 2007 abs, in press*

**Case Presentations**

1 - 34 yo G2P1 at 41 2/7 declining IOL
  - Normal ANT

2 - 27 yo G1P0 at 40 1/7 requesting IOL
  - Normal pregnancy
**Case #1**

- 34 yo G2P1 at 41 2/7 declining IOL
  - Normal ANT
- Expt Mgmt & ANT vs. IOL
  - Neonatal outcomes
  - Maternal outcomes
  - Cesarean Delivery
- What is the pt’s understanding of R/B

**Induction of Labor**

- Even w/ unfavorable cvx, @ 41 wks IOL:
  - Lower cesarean delivery rate
  - Lower meconium-stained fluid
  - Lower perinatal mortality rate (small diff)

**Back to Case**

- 34 yo G2P1 at 41 2/7 declining IOL
- Biggest concern is that her pregnancies are supposed to go longer
- Another concern is labor pain similar to first IOL
- Plan:
  - Extensive counseling re: R&B
  - Strip membranes
  - ANTC at 41 4/7
  - Plan IOL at 42 0/7

**Case #2**

- 27 yo G1P0 at 40 1/7 requesting IOL
  - Normal pregnancy
- Expt Mgmt & ANT vs. IOL
  - Neonatal outcomes
  - Maternal outcomes
  - Cesarean Delivery
- What is the pt’s understanding of R/B
**Back to Case #2**

- 27 yo G1P0 at 40 1/7 requesting IOL
  - Normal pregnancy
  - 5’ 5”, BMI 23, No AMOR-IPAT RFs
  - Tired of being pregnant
  - Based on evidence:
    - IOL at 40 weeks GA as compared to ANT
      - From recent Cochrane meta – lower CS rate
      - No demonstrated perinatal mortality difference
      - Not standard of care

**Plan:**
- Sweep / Strip Cervix
- ANT at 40 3/7
- IOL at 41 0/7

**Future Considerations**

- How should we manage term, > 39 weeks?
  - Expectant management?
  - Stripping of the membranes?
  - ANT?
  - IOL?
- What about subgroups?
  - Multips w/ favorable cervix
  - “High-risk”
- Future prospective studies are needed!
  - AMOR IPAT multi-center
  - Elective IOL at 40 wks GA