Timing of an Induction of Labor: New Evidence

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Induction of Labor Timing: a few purposely provocative questions

- Would you induce a…?
  - 28 yo G1P0 @ 38wks with mild preeclampsia.
    - What if she has no proteinuria?
  - 28 yo G1P0 @ 38wks who wants to be delivered this week because her husband’s paternity leave starts now.
    - What if her cervix is already dilated 3cm?
  - 32 yo obese G1P0 @ 40wks with 4200g fetus on U/S.
    - What if she has GDMA1?
  - 36 yo G1P0 @ 41 wks with reassuring testing.
    - What if her cervix is closed and long?

Induction: A Balancing Act

- Consider…
  - Maternal health
    - Likelihood of spont labor
    - Risk of cesarean with IOL
  - Fetal health
    - Risks of premature delivery
    - Risk of IUFD
  - Maternal preferences
  - MD preferences?
  - Systems/ cost
  - The EVIDENCE

Objectives

- Background
  - Evidence for when to or not to induce?
    - Medical inductions for HTN, IUGR
    - Elective inductions before 39 wks
    - Selective/ preventive IOL
    - Inductions after 41 wks
- Further reading on updates of induction methods
**Background**

- Labor induced in 22% of gravid women in US
- Induction rate doubled from 1995 to 2006
- Medical Inductions
  - IUGR, Diabetes, Preeclampsia
- Elective Inductions: no medical indication
  - Rate increasing even more rapidly

**UCSF Timing for Common Medical Conditions**

- **Severe Preeclampsia:** 34 wks
  - Manage BPs to extend gestation to 34 wks
  - Before 34wks if medically unstable
- **Mild Preeclampsia:** 37 wks
- **Cholestasis:** 36 wks
- **Diabetes**
  - GDMA1: 40 wks
  - GDMA2 and Type 2, good control: 39 wks
  - Type 1: 37-38wks with amnio
  - Type 2, poor control: 38-39 wks with amnio

**IOL for Hypertension after 36 Weeks**

- **HYPITAT Trial:** RCT
  - Women with GHTN or mild PreE after 36 wks
  - Randomized to IOL vs. expectant monitoring
  - 756 pts: IOL(n=377), expectant (n=379)
  - Primary measure: poor maternal outcomes
    - Maternal mortality and morbidity (HELLP, abruption, eclampsia, severe PreE, PPH>1000cc)

**IOL for Hypertension after 36 Weeks**

- **HYPITAT Trial:** RCT
  - GA at delivery: IOL 38.7 vs exp 39.9
  - Poor maternal outcomes: 31%IOL vs 44% exp (RR=0.71 95%CI 0.59-0.86, p<0.0001)
  - Beneficial effect absent <37wks
  - No difference in composite adverse neonatal outcomes
  - Recommend IOL for GHTN or mild PreE at 37 wks
Induction for IUGR at Term

- **DIGITAT Trial: RCT**
  - Pregnant women with singleton pregnancy at >36wks with suspected IUGR
  - Randomized to IOL vs. expectant monitoring
  - 650 pts: IOL(n=321) vs. exp (n=329)
  - Primary measure: adverse neonatal outcomes
    - Neonatal death before discharge
    - NICU admission
    - 5min Apgar <7
    - UA pH < 7.05

Boers et al, BMJ 2010

Induction for IUGR at Term

- **DIGITAT Trial: RCT**
  - IOL in 95.6% in IOL vs 50.6% in exp
  - IOL delivered 10 days earlier (95%CI -11.3 to -8.6)
  - IOL weighed 130g less (95%CI -188g to -71g)
  - Adverse neonatal outcome IOL 5.3% vs exp 6.1%
  - Cesareans IOL 14.0% vs exp 13.7%
  - No important differences between IOL vs expectant monitoring. Rational to choose either.

Boers et al, BMJ 2010

Elective Induction before 39 Weeks

- ACOG strongly cautions against elective IOL before 39 weeks.
- Confirmation of gestational age by
  - Ultrasound measurement <20 weeks confirms 39 weeks or greater
  - Doppler confirmed fetal heart tones present for 30 weeks
  - 36 weeks since a positive urine or serum HCG pregnancy test

ACOG Practice Bulletin 107, August 2009

Elective Induction before 39 Weeks

Percent Change in Distribution of Birth by Gestational Age: US between 1990-2006

Elective Induction before 39 Weeks

- Early-term elective deliveries are quite common.
  - 17,794 deliveries
    - 44% of >37 week deliveries were planned, not spontaneous.
    - 71% of planned deliveries were elective.
  - 10% of all deliveries were elective inductions or cesareans between 37-39 wks.

Clark et al. AJOG 2009. Included all deliveries in 27 hospitals in 14 states in a 3 month period in 2007

Elective Induction before 39 Weeks

- Early-term deliveries have increased morbidity.
  - Clark et al: 18% of 37 wk electively delivered infants went to the NICU.

Useful Resource: <39 Week Toolkit. CMQCC

Selective/Preventive IOL at Term

- AMOR-IPAT: Active Management of Risk in Pregnancy at Term
  - Goal: Each woman enters labor at a gestational age that optimizes her chance of a vaginal delivery
  - Considers risks of
    - CPD
      - BMI>29, Ht<62", Wt gain>30lbs, GDM
    - Uteroplacental insufficiency
      - HTN, GDM, DM, Smoker, AMA
  - Add up risk factors and subtract from 41wk for IOL date if no spont labor
  - No induction <38wks
  - Previous retrospective study with decreased cesareans and improved birth outcomes


Selective/Preventive IOL at Term

<table>
<thead>
<tr>
<th>AMOR-IPAT Protocol RCT</th>
<th>AMOR-IPAT N=136</th>
<th>Usual care N=134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction Rate*</td>
<td>58.1%</td>
<td>21.6%</td>
</tr>
<tr>
<td>Spont Labor Rate*</td>
<td>22.1%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Median GA at delivery*</td>
<td>39.1wks</td>
<td>40.0 wks</td>
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</tbody>
</table>

*(p<.001)

Nicholson et al, AJOG 2008
Selective/Preventive IOL at Term

AMOR-IPAT Protocol RCT

<table>
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<tr>
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<th>AMOR-IPAT</th>
<th>Usual Care</th>
<th>Risk Ratio, 95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean rate</td>
<td>10.3%</td>
<td>14.9%</td>
<td>0.69, 0.36-1.31</td>
</tr>
<tr>
<td>NICU Admission rate*</td>
<td>1.5%</td>
<td>6.7%</td>
<td>0.22, 0.05-0.99</td>
</tr>
<tr>
<td>Uncomplicated vaginal birth*</td>
<td>73.5%</td>
<td>62.8%</td>
<td></td>
</tr>
</tbody>
</table>

*(p<0.05)

Nicholson et al, AJOG 2008

Induction Timing: Post-term Pregnancy

- ACOG: defines postterm >42 wks
- Hannah RCT: 41 vs Expectant Management
  - 3407 women at 41 wks randomly assigned to IOL or expectant monitoring
    - Cesarean rate
      - 21.2% IOL group vs 24.5% Monitoring group (p<0.03)
      - More Cesareans in monitoring group for fetal distress
    - Perinatal Deaths: 2 stillbirths in monitoring group (p not significant)

Hannah et al. NEJM 1992

Induction Timing: Post-term Pregnancy

  - 19 studies, 7984 women (included Hannah)
  - 41 week induction was associated with...
    - Fewer all cause perinatal deaths RR 0.3 (95%CI 0.09-0.99)
    - No significant change in cesarean rate RR 0.92 vs 0.97 for 42 wks
  - Conclusion: A policy of IOL at 41 wks, is associated with fewer perinatal deaths. Women should be counseled about the relative and absolute risks of IOL at 41 wks.

Kaimal et al, AJOG 2011

Induction timing: Post-term pregnancy

- Cost Effectiveness of 41 wk IOL
  - Decision analytic model: 41 wk IOL vs expectant management to 42wks, then IOL
  - Assumed IUFD rate in 41st wk 0.12% and C/S rate 27% in 41wk IOL
  - 41 wk IOL associated with...
    - Incremental cost $10,945/QALY
    - Decreased adverse obstetric outcomes
Induction of Labor Timing

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Further Reading: Updates on Induction Methods

- Foley Bulb Mechanical Dilation RCT
  Comparison of 30 vs. 60cc Balloon Inflation
  - 192 women, vtx fetus Bishop score < 5
    - Higher proportion of women with 60cc balloon delivered within 12 hrs of placement (26% vs. 14%, p<0.04)
    - No difference in delivery rates by 24 hrs
    - Mean cervical dilation 4cm for 60cc, 3cm for 30cc (p<0.01)
    - No difference in cesareans, maternal morbidity or neonatal outcomes

- Cochrane reviews on various IOL Methods
  - Castor Oil
  - Acupuncture
  - Oral vs. vaginal misoprostol

Questions or comments?
Thank you.