# Management of High Order Multiple Gestation

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Valley Perinatal Services
Phoenix, Az

## Incidence of HOM Gestation*

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twins</td>
<td>104,137 (2.6%)</td>
<td>125,134 (3.1%)</td>
</tr>
<tr>
<td>Triplets</td>
<td>6,148 (.2%)</td>
<td>6,898 (.2%)</td>
</tr>
<tr>
<td>Quads</td>
<td>510 (.01%)</td>
<td>434 (.01%)</td>
</tr>
<tr>
<td>Quints</td>
<td>79 (.001%)</td>
<td>69 (.001%)</td>
</tr>
</tbody>
</table>

*National Vital and Health Statistics Report

## Incidence of Multifetal Gestation

<table>
<thead>
<tr>
<th></th>
<th>Spontaneous</th>
<th>USA (2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twins</td>
<td>1:83 (1.2%)</td>
<td>125,134 (3.1%)</td>
</tr>
<tr>
<td>Triplets</td>
<td>1:6889 (.014%)</td>
<td>6,898 (.2%)</td>
</tr>
<tr>
<td>Quads</td>
<td>1:571,787 (.0002%)</td>
<td>434 (.01%)</td>
</tr>
<tr>
<td>Quints</td>
<td>1:57x10⁶</td>
<td>69 (.001%)</td>
</tr>
</tbody>
</table>
Problems With HOM Gestation

Mortality

<table>
<thead>
<tr>
<th></th>
<th>Neonatal Deaths (birth to day 28)</th>
<th>Infant Deaths (birth to 1 yr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singleton</td>
<td>7.8/1000</td>
<td>11.2/1000</td>
</tr>
<tr>
<td>Twins</td>
<td>55.9/1000</td>
<td>66.4/1000</td>
</tr>
<tr>
<td>Triplets</td>
<td>168/1000</td>
<td>190.4/1000</td>
</tr>
</tbody>
</table>

*1998 US Vital Statistics

Problems With HOM Gestation

Morbidity

<table>
<thead>
<tr>
<th></th>
<th>per baby</th>
<th>per pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singleton</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Twin</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>Triplet</td>
<td>9%</td>
<td>22%</td>
</tr>
<tr>
<td>Quads/Quints</td>
<td>11%</td>
<td>50%</td>
</tr>
</tbody>
</table>

*From Yokoyama, et al. 1995

Factors affecting outcome in HOM

- Maternal height
- Parity
- Placentation
- Number of “live” fetuses
Maternal Height

- Blickstein, et al. reported in triplets women > 165 cm (5'5'') had heavier babies and dec. risk of VLBW infants.
- Phoenix Experience – height > 5’3’’ associated with greater G.A.at delivery

Parity

<table>
<thead>
<tr>
<th>Author</th>
<th>GA diff parous-nulliparous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ron-EI, et al. (1981)</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Gonen, et al. (1990)</td>
<td>2 weeks</td>
</tr>
<tr>
<td>McKeowin, et al (1952)</td>
<td>1 week</td>
</tr>
<tr>
<td>Elliott, et al. (1992)</td>
<td>1.4 weeks</td>
</tr>
</tbody>
</table>

Placentation

Monochorionic placentation

Incidence
- Spontaneous - .4%
- IVF - 2%
* Blastocyst transfer – 17%

*Boostanfam, R USC PCS Meeting - 2000
Monochorionic placentation adds the risk of TTTS (15%) to the underlying risks of HOM gestation.

The G.A. at delivery is related to the number of “live” fetuses:

- Singleton: 40 weeks
- Twins – Spont.: 36½ weeks
- Twins – Reduced: 35½ weeks
- Triplets: 33 weeks
- Quads: 29½ weeks
- Quints: 27 ½ weeks

Garite, et al. (2004) established in a large number of babies (51,388) from the RDS database of Pediatrix that gestational age specific mortality and survival with sig. morbidity are similar for singletons, twins, and triplets.
Thus the determining factor for outcome is PREMATURITY.

Management strategies must be directed at delaying the inevitable P.T.D.

CASE PRESENTATION

SS 33 yo G₂ P₁ IUI, pergonal Quad/Quad

<table>
<thead>
<tr>
<th>G.A.(wks)</th>
<th>CX Exam</th>
<th>INTERVENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-4/7</td>
<td>1 cm 50%-2</td>
<td>MgSO₄ (3 gm/hr)</td>
</tr>
<tr>
<td>22-0/7</td>
<td>T pump added</td>
<td></td>
</tr>
<tr>
<td>23-0/7</td>
<td>1-2 cm 80%↑</td>
<td>MgSO₄ (4.25g/hr)</td>
</tr>
<tr>
<td>23-2/7</td>
<td>↑ ↑</td>
<td>↑ T pump basil 126 mg/hour bolus .32 mg q 3 hr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>add Motrin 600 mg q 6 hr</td>
</tr>
</tbody>
</table>

SS Continued

<table>
<thead>
<tr>
<th>G.A. (Wks)</th>
<th>CX Exam</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>23-5/7</td>
<td></td>
<td>H/H 9/1/27.5% TX 2 U PRBC</td>
</tr>
<tr>
<td>24-0/7</td>
<td></td>
<td>Betamethasone; epogen</td>
</tr>
<tr>
<td>24-6/7</td>
<td>4-5 CM 100% -1</td>
<td>H/H 11/32% Pessary placed</td>
</tr>
</tbody>
</table>
SS Continued

<table>
<thead>
<tr>
<th>G.A. (Wks)</th>
<th>CX Exam</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-3/7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27-2/7</td>
<td>5-6 cm/100%/0</td>
<td>Mg ↑ to 5 gm/hr</td>
</tr>
<tr>
<td>28-1/7</td>
<td>6 cm/100%/0</td>
<td>Mg ↑ to 5½ gm/hr</td>
</tr>
<tr>
<td>28-4/7</td>
<td>7-8 cm/100%/0</td>
<td>Nitropatch added</td>
</tr>
<tr>
<td>28-5/7</td>
<td>ROM Quad A</td>
<td>Mg 6 gm/hr (serum mg 10.2 mg/dl)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C-Section</td>
</tr>
</tbody>
</table>

SS Continued

<table>
<thead>
<tr>
<th>Baby</th>
<th>Sex</th>
<th>Weight (gm)</th>
<th>Apgar</th>
<th>Birth Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby A</td>
<td>M</td>
<td>1285</td>
<td>5/7</td>
<td></td>
</tr>
<tr>
<td>Baby B</td>
<td>M</td>
<td>1300</td>
<td>8/9</td>
<td></td>
</tr>
<tr>
<td>Baby C</td>
<td>M</td>
<td>1280</td>
<td>6/7</td>
<td></td>
</tr>
<tr>
<td>Baby D</td>
<td>M</td>
<td>1450</td>
<td>5/7</td>
<td></td>
</tr>
</tbody>
</table>

* All were discharged from the NICU intact.

Complications of Pregnancy

<table>
<thead>
<tr>
<th>Condition</th>
<th>Singleton</th>
<th>HOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTL</td>
<td>20%</td>
<td>76-90%</td>
</tr>
<tr>
<td>PIH</td>
<td>5-7%</td>
<td>35%/72%</td>
</tr>
<tr>
<td>PPROM</td>
<td>2%</td>
<td>20%</td>
</tr>
<tr>
<td>Anemia</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>GDM</td>
<td>2-3%</td>
<td>7%/19%</td>
</tr>
<tr>
<td>I.C.</td>
<td>.5%</td>
<td>14%</td>
</tr>
<tr>
<td>SGA (&lt;10%)</td>
<td>10%</td>
<td>37%</td>
</tr>
<tr>
<td>IUGR (&lt;3%)</td>
<td>3%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Interventions should attempt to reduce the complications of multiple gestation.

We advocate an aggressive proactive approach.

Management of HOM Gestation Nutrition
- High calorie - 2800 to 3200 k cal
- High protein > 1.5 g/kg
- Calcium 2-3 gm/day
- Magnesium 1.2 gm/day
- Zinc 45 mg/day
- FeSO₄ 325 mg bid to tid
- Folic Acid 1 mg/day
**Ideal Weight Gain in HOM**
- **Triplet**: 50 - 75 lbs
- **Quads**: 75 - 100 lbs
*75% by 24 wks

**Phoenix Quadruplet Experience**
- **Aggressive Nutrition**
  - Jan 1988 to July 1999
  - N = 32 sets of Quads
  - Presented at annual mtg of SMFM – 2001
  - 30 pts ≥ 20 wks w/ 4 living fetuses
  - Mean wt gain 66.3 ± 21 lbs
  - Mean BW (120 babies) = 1542.2 g ± 384 gm
  - SGA (< 10% = 10%); IUGR (< 3% = .8%)

**Management HOM Gestation**
- **Ultrasound Assessment**
  - Targeted anatomy scan – 18 weeks
  - Vag US Cx length q 1-2 wks 18-24 wks
  - Monochorionic placentation q 2 wks for size + AFV 16-24 wks
  - Growth US q 3-4 wks 22 wks – Delivery
  - BPP 2x q wk 32 wks – del (unless IUGR or PIH)
Management of HOM Gestation

Cervical Incompetence

- C.L. > 3 cm – repeat q 2 weeks
- C.L. 2.5-2.9 cm – repeat 4-7 d; assess for ctx
- C.L. 2.0-2.4 cm – assess for ctx; consider cerclage
- C.L. < 1.9 cm – assess for ctx; cerclage probably indicated
- Phoenix data – cerclage 12.5% of Quads

PTL PREVENTION

- Mean GA PTL Phx quads – 23.1 ± 6.9 wk
- Education of all pts about S&S of PTL cramping, dull lower back ache, pelvic pressure, change in discharge, spotting, pressure in the inner thigh, feeling things are not right.
- HUAM – 18 wks in quads and quintts. 20 weeks in triplets

Background contraction monitoring

- HUAM – Controversial
- In multiple gestation early identification of labor is vital to improve outcome
- Use HUAM to establish the intrinsic contractility of the uterus
  - One hour monitoring – bid
  - Ave: 14 or more hours – cont/hr/wk
- Concept of a contraction - Stat
Factors Affecting the Meter

- Gestational age
- Time of Day
- Stress
- Uterine Stretch
- Infection – UTI, Appy, Pyelo
- Mechanical stimulation – Physical activity
- Drugs – steroids
  - Pitocin, prostaglandin, Ergots
  - MgSO₄, terb, PSI, etc.
Threshold of Contractile Activity

- Nageotte, et al. established that the mean uterine activity 48 hr prior to onset of PTL = 3.5 ctx/hr and 24 hr prior = 5.3 ctx/hr
- Elliott and Radin established that steroids caused P.T.L. with ctx change and delivery when the background ctx were ≥ 3.5 ctx/hr.
- We arbitrarily try to keep uterine contractions < 3.5 ctx/hr.

Management of HOM Gestation

**Prevention of P.T.L.**
- Interventions that could decrease ctx.
  - Bed Rest – 20 wks
  - Biofeedback techniques
  - Tocolysis – Prophylactic
  - ? Role of progesterone
Management of HOM Gestation

Prophylactic Tocolysis

- Terbutaline pump – aggressive dosing to maintain ctx < 3.5 ctx/hr.
- Elliott, et al. reported PTL in 5/15 HOM preg using T-pump prophylaxis vs 75%-90% in the literature.
- Basal rates up to .15 mg/hr necessary with bolus dose up to .3 mg q 3 hr.

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da Fonseca et al, AJOG, 2003

<table>
<thead>
<tr>
<th>UC / hr</th>
<th>Progesterone</th>
<th>Placebo</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4</td>
<td>76.4%</td>
<td>45.7%</td>
<td>0.0001</td>
</tr>
<tr>
<td>4 - 5</td>
<td>4.1%</td>
<td>17.1%</td>
<td>0.0118</td>
</tr>
<tr>
<td>≥ 6</td>
<td>19.4%</td>
<td>37.2%</td>
<td>0.0190</td>
</tr>
</tbody>
</table>

Based on monitoring 1 hour per week

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Table IV. Mean contraction frequency for each gestational week between placebo and progesterone groups

<table>
<thead>
<tr>
<th>Gestational age (wks)</th>
<th>Placebo Mean ± SD</th>
<th>Progesterone Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>4.0 ± 3.0</td>
<td>1.0 ± 0.6</td>
<td>.00001</td>
</tr>
<tr>
<td>29</td>
<td>4.0 ± 2.1</td>
<td>1.0 ± 0.9</td>
<td>.00001</td>
</tr>
<tr>
<td>30</td>
<td>6.2 ± 3.0</td>
<td>2.8 ± 2.7</td>
<td>.00001</td>
</tr>
<tr>
<td>31</td>
<td>5.1 ± 2.5</td>
<td>3.2 ± 2.0</td>
<td>.0001</td>
</tr>
<tr>
<td>32</td>
<td>6.5 ± 3.1</td>
<td>2.5 ± 2.5</td>
<td>.01</td>
</tr>
<tr>
<td>33</td>
<td>7.0 ± 4.2</td>
<td>2.8 ± 2.4</td>
<td>.0001</td>
</tr>
<tr>
<td>34</td>
<td>6.5 ± 3.1</td>
<td>3.5 ± 2.0</td>
<td>.0001</td>
</tr>
</tbody>
</table>
Management of HOM Gestation

**PTL Treatment**
- MgSO₄ maintenance – 3-6 gm/hr (serum Mg 5.5 to 8.5 mg/dl)
- Increased renal clearance of the drug
- Combination of drugs – Mag and Motrin

**fFN**
- fFN samples q 2 wks 24-32 wk
  - Singleton
  - HOM (Del ≤ 2 wks)
  - (Del ≤ 2 wks)
- Negative ≤ 1 % ~ 6%
- Positive ~ 17% ~ 50%
- Pos fFN – give steroids, monitor carefully for PTL.

**HELLP Syndrome**
- Treat with dexamethasone → 50% resolution of HELLP syndrome
- Lung maturation dose (if not received before)
  - then 2 mg IV q 6 hr X 48 hr
  - 2 mg IV q 8 hr x 48 hr
  - 2 mg IV q 12 hr till del.
Management of HOM Gestation

Other Therapies
- Vaginal Pessary – Hodge pessary for low station
- Transfusion if Hct < 27% and labor unresponsive.
- Pulmonary edema ~ 5%
  
  Give Lasix, O₂ turn off Mg for 1-2 hr
  and lower dose if not contracting.
  Don’t have to stop the drug!

Phoenix Quad Experience
Jan 1988 - July 1999
N = 32

Mean G.A. @ del 32.1 ± 2.1 wks
Range 26.7 to 34.1 weeks
< 20 weeks - 2 (excluded)
24-30 weeks - 6 (20%)
30-32 weeks - 6 (20%)
33-34 weeks - 16 (60%)

Phoenix Quad Experience
N = 30
Reason for Delivery
PIH 40.3%
Elective (34 wks) 22.7%
PPROM w/PTL 16.8%
Refractory PTL 10.1%
Fetal Distress 10.1%
Phoenix Quad Experience
Maternal Morbidity
N = 32
Antepartum Hospitalization 100%
Hyperemesis Gravidarum 9.4%
TPN required 3.1%
A1 D.M. 18.8%
A2 D.M. 3.1%
Anemia (HCT < 30%) 40.6%
Transfusion required 15.6%

Phoenix Quad Experience
Maternal Morbidity - Cont
N = 32
Antepartum Bleeding 3.1%
Placenta Previa 0%
PIH 71.9%
HELLP Syndrome 12.5%
PPROM 18.8%
PTL 90.6%
TTTS 3.1%
Chorioamnionitis 6.3%

Phoenix Quad Experience
Neonatal Outcomes
N = 120 Babies
Del < 32 wks 48 babies
Antenatal steroids 100%
C-section delivery 100%
Birth WT (mean) 1542.2g ± 384
Sex M - 67 F - 53
NICU admission 91.7%
PMR 8.3/1000
Phoenix Quad Experience
Neonatal M & M

N = 120
Mortality 1 (.8%)
IUGR .8%
SGA 10%
Chromosomal abn. 0%
Cong. Mal 1.7%
RDS 32.5%
TTN 12.5%
Sepsis 7.5%

Management of HOM Gestation

DELIVERY
➢ We deliver by C-Section
➢ We do not determine FLM
➢ Triplets – 35 wks
➢ Quads - 34 wks
➢ Quints - 34 wks

Phoenix Quad Experience
Neonatal M & M - cont.

N = 120
NEC 1.7%
IVH (Gr III/IV) 0%
PVL .8%
GE Reflux 12.5%
ROP 6.6%
Seizures .8%
PUL. HTN 1.6%
Conclusion

- Good outcome with HOM gestations is not only possible, but it is probable.
- Aggressive proactive management appears most successful.
- Know your own outcome data.
- An experienced perinatologist should manage the HOM pregnancy.

Do not ever give up! Delivery should not occur unless the risks to the mother or babies inside are greater than the risk in the nursery.