Obstetrical Safety Strategies

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Disclosure

• Bridge-Tech Asia
• BARNEV Inc.
MCIC VERMONT

- MCIC Vermont
  - Columbia
  - Cornell
  - Johns Hopkins
  - University of Rochester
  - Yale
Principles & Strategies of OB Safety Program

• Implement & promote patient safety practices that decrease the probability of patient injury & thereby reduce liability risk.

• Share best practices & lessons learned.

• Demonstrate improvements in patient safety culture.
Principles & Strategies of OB Safety Program

• Base patient safety improvement initiatives upon obstetrical claim data.

• Consistent policies, procedures & clinical practices in all MCIC obstetrical departments in accordance with recognized national standards & best practices.

• Standardized EFM language employed by all physicians, midwives & nurses caring for obstetrical patients.
Tactics – Status Update

I. Advance patient safety, share best practices and learn from unanticipated adverse outcomes.

• Semiannual OB Leadership Meetings – sharing experiences
• Quarterly Pt Safety Nurse Meetings & scheduled conference calls
• Collaborative Work Groups (i.e. Claims, Documentation, Publication)
• OB List Serve
• Administrative Safety Walk
Hyperstimulation

Does elevated uterine activity increase the risk of fetal acidosis at birth?

• Umbilical arterial pH 7.11 or less is associated with more uterine activity in the first and second stage of labor.

Hyperstimulation

• Contraction frequency (per 10 min)

  – 4.8 or fewer first stage       -  pH  ≥  7.12
  – 5.2 or fewer second stage     -  pH  ≥  7.12
  – 5.0 or more first stage       -  pH  ≤  7.11
  – 5.5 or more second stage      -  pH  ≤  7.11

Reducing Uterine Hyperstimulation

• KEY ELEMENTS OF MCIC OBSTETRICAL CARE INITIATIVE:
  – Adopted nationally recognized nomenclature for interpretation of all electronic fetal monitoring (National Institute of Child Health & Human Development (NICHD) nomenclature).
  – Required certificate of added specialty in electronic fetal monitoring for all obstetrical physicians, nurse midwives & nurses utilizing the National Certification Corporation (NCC) examination.
  – Adopted consistent protocols for safe use of oxytocin for induction & augmentation of labor.
  – Initiated regular chart reviews of oxytocin & management as a monitoring mechanism.
Reducing Uterine Hyperstimulation

• DEFINITION - Uterine Hyperstimulation
  – More than five contractions in ten minutes, each lasting for more than 45 seconds for 30 minutes.
  – A pattern of contractions with duration of 120 seconds or longer for 30 minutes.
  – Contractions of normal duration occurring within one minute of each other (less than one minute between the end of the first & the beginning of the second contraction) for 30 minutes.
  – Insufficient return of uterine resting tone to baseline between contractions by manual palpation, or intrauterine pressure above 25 mmHg between contractions recorded by IUPC for 30 minutes.
Oxytocin Related Hyperstimulation

% Charts with Hyperstimulation

- 2001: 28%
- 2003: 29%
- 2005: 14%
- 2006: 16%
MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOR

1.0 POLICY

1.1 Instituted in patients for augmentation or induction of labor.
2.0 INDICATIONS

2.1 Indications for induction of labor may include, but are not limited to, the following situations:

2.1.1 Pregnancy-induced hypertension
2.1.2 Premature rupture of membranes
2.1.3 Chorioamnionitis
2.1.4 Suspected fetal jeopardy, as evidenced by biochemical or biophysical indications (e.g., fetal growth retardation, post-term gestation, isoimmunization)
2.1.5 Maternal medical problems (e.g., diabetes mellitus, renal disease, chronic obstructive pulmonary disease)
2.1.6 Fetal demise
2.1.7 Logistic factors (e.g. risk rapid labor, distance from hospital)
2.2 Contraindications include, but are not limited to, the following factors:

2.2.1 Placenta or vasa previa
2.2.2 Abnormal fetal lie
2.2.3 Cord presentation
2.2.4 Prior classical uterine incision
2.2.5 Active genital herpes infection
2.2.6 Pelvic structural deformities
2.2.7 Invasive cervical carcinoma
2.2.8 Previous myomectomy that contraindicates labor
3.0 RESPONSIBILITIES

3.1 Oxytocin infusion will not be initiated or will be discontinued if appropriate nursing and medical personnel are not readily available/accessible to observe patient and her fetus.

3.2 The registered nurses who have demonstrated competency in oxytocin administration may administer medication.

3.3 The physician/CNM will write an order for which dosing regimen to use as listed in Table I on the following preprinted order sheets:

   3.3.1 Oxytocin for Induction/Augmentation of Labor

* Only Choices
3.0 RESPONSIBILITIES (continued)

3.4 The physician/CNM will evaluate the patient’s labor progress.

3.5 The pharmacy will prepare the oxytocin administration infusion in 250 mL normal saline with 15 units of oxytocin unless otherwise noted by the physician/CNM order.
# MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOR

## TABLE 1- DOSAGE GUIDELINES FOR OXYTOCIN ADMINISTRATION

<table>
<thead>
<tr>
<th>Reference</th>
<th>Initial Dose (milliunits/minute)</th>
<th>Incremental Dose (milliunits/minute)</th>
<th>Incremented Time Interval (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seitchik, et al (1983)</td>
<td>0.5-1</td>
<td>1-2</td>
<td>40-60</td>
</tr>
<tr>
<td>Satin, et al (1991)</td>
<td>1 or 2</td>
<td>1 or 2</td>
<td>15</td>
</tr>
</tbody>
</table>
4.0 **ASSESSMENTS**

4.1 Prior to initiation of oxytocin induction or augmentation assess for the following baseline data:

4.1.1 Vaginal exam by physician/CNM.

4.1.2 Continuous fetal heart monitoring to include baseline fetal heart rate and variability X 20 minutes.

4.1.3 Maternal BP, T, P, R and pain level.

4.1.4 Contraction pattern to include frequency duration and intensity.

4.1.5 Hydration status and urinary output
4.2 Within 15 minutes after initiation of oxytocin, assess for the following:

   4.2.1 Deviations of baseline fetal heart rate to include variability – see EFM protocol.

   4.4.2 Maternal BP, pulse and pain level.

   4.4.3 Contraction pattern (frequency, duration and intensity)
4.3 Maternal and fetal assessment

4.3.1 Maternal and fetal assessment every 30 -60 minutes according to the protocol “Management of Patients during Labor and Birth.”

4.3.1.1 Montevideo Units (MVU) for patients with an internal uterine pressure catheter should be less than 395 MVU’s in 10-minute period and resting tone less than 25 mmHg.
4.3.2 Fetal assessments

4.3.2.1 Assess and document that the FHR has been reviewed as per EFM protocol prior to every dosage increase

4.3.2.2 Latent phase labor: Assess and document that the FHR has been reviewed per EFM protocol every 30-60 minutes

4.3.2.3 Active phase labor: Assess every 15 minutes and document summary of fetal status every 30 minutes

4.3.2.4 Second stage labor: Assess every 5 minutes and document that the FHR has been reviewed every 15 minutes per EFM protocol.

**NOTE:** Fetal status summarization should include but is not limited to FHR baseline, variability and presence/absence of accelerations, and/or pattern of later decelerations or of variable decelerations.
MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOR

4.4 Patent venous access
4.5 Pain level (0-10 rating) every hour
5.0 INTERVENTIONS

5.1 Establish an intravenous line for primary fluids.

5.2 The oxytocin will be administered according to dosage guidelines in Table I – Dosage Guidelines for Oxytocin Administration.

5.2.1 A 1:1 nurse-patient ratio is recommended during oxytocin dosing increments of 4 milliunits per minute at dosing intervals of every 15 minutes.

5.2.2 If a 1:1 nurse-patient ratio cannot be maintained as indicated in section 5.2.1, the charge nurse will consult with the attending physician to determine whether one of the other incremental dosing regimen is indicated as set forth in Table I – Dosage Guidelines for Oxytocin Administration.
MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOR

5.3 Piggyback oxytocin drip via controlled infusion device to primary line of IV site at port that is closest to skin insertion.

5.4 Administer oxytocin infusion according to the above dosage guidelines.

5.4.1 The RN may not exceed a maximum oxytocin infusion rate of 30 milliunits per minute. Infusion rates higher than 30 milliunits per minute will be regulated by a physician/CNM.

5.4.2 Initiate oxytocin infusion and increase oxytocin per guidelines in Table I until an adequate contraction pattern is achieved.

- Montevideo units (MVU) for patients with an internal uterine pressure catheter should be less than 395 MVU’s in 10-minute period and resting tone less than 25 mmHg. *Adequate labor in MVU is 200-250.*
5.5 Decrease the oxytocin to the previous dose and notify the physician/CNM for a persistent pattern of hyperstimulation:

5.5.1 Contractions lasting 2 minutes or more.

5.5.2 Contractions of normal duration (45-90 seconds) occurring within one minute of each other.

5.5.3 More than 5 contractions in a 10-minute period and each contraction lasting at least 45 seconds.

5.5.4 Inadequate return of uterine resting tone between contractions via palpation or intra-amniotic pressure above 25 mmHg between contractions via I UPC.

5.5.5 Internal uterine pressure catheter reading greater than 395 MVU’s in 10-minute period and a resting tone exceeding 25 mmHg.
MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOR

5.6 **Discontinue the oxytocin and notify the physician/CNM for:**

5.6.1 Uterine hyperstimulation contraction pattern that does not respond to decrease in oxytocin dose in 5.5. **NOTE:** If the physician/CNM is not at the bedside and response has not occurred in 10 minutes, notify the physician/CNM immediately and simultaneously discontinue the oxytocin.

5.6.2 Non-reassuring fetal heart rate pattern (See EFM protocol)
   - 5.6.2.1 Fetal bradycardia
   - 5.6.2.2 Repetitive late decelerations
   - 5.6.2.3 Severe variable decelerations with slow return to baseline

5.7 If the infusion is stopped temporarily (at least 15 minutes), a separate order is required to resume oxytocin infusion (See 3.3.2).

5.8 The physician/CNM will evaluate any patient for elective induction with intact membranes receiving oxytocin for 8 hours without a change in cervix. The evaluation must be written in the progress note.
MANAGEMENT OF THE PATIENT RECEIVING OXYTOCIN FOR
INDUCTION OR AUGMENTATION OF LABOR

6.0 REPORTABLE CONDITIONS

6.1 Non-reassuring fetal heart rate pattern (See EFM protocol). (* EFM Certification)

6.2 A persistent pattern of:

   6.2.1 Contractions lasting 2 minutes or more

   6.2.2 Contractions of normal duration (45 – 90 seconds) occurring within one minute of each other.

   6.2.3 More than 5 contractions in 10-minute period lasting at least 45 seconds.

   6.2.4 Inadequate return of uterine resting tone between contractions via palpation or intra-amniotic pressure above 25 mmHg between contractions via I UPC.

   6.2.5 Internal uterine pressure catheter reading greater than 395 MVU's in 10-minute period and a resting tone exceeding 25 mmHg.
7.0 DOCUMENTATION

7.1 Initial and ongoing maternal-fetal assessments according to "Management of Patient during Labor, Delivery and Immediate Postpartum" on flow sheet in the Q.S. Computer System. Includes but not limited to:

7.1.1 Indication for induction/augmentation

7.1.2 Vital signs
7.1 **DOCUMENTATION** (continued)

7.1.3 Fetal heart rate baseline; variability
7.1.4 Uterine activity
7.1.5 Vaginal exam
7.1.6 Membrane intact or ruptured
7.1.7 Pain level and relief

7.2 Any time oxytocin is decreased or discontinued and time it is restarted via physician order (on EFM tracing and L&D nursing intake and output flow sheet in QS system).

7.3 Document within 15 minutes after infusion initiated and/or restarted:

7.3.1 Notification of the physician/CNM of oxytocin initiation and/or restart dose.
7.3.2 Initial maternal-fetal assessments.

7.4 Document changes in oxytocin infusion rates in the QS Computer System on the fetal monitor tracing and the intake and output record.
Oxytocin Related Hyperstimulation

% Charts with Hyperstimulation

- 2001: 28%
- 2003: 29%
- 2005: 14%
- 2006: 16%
Tactics – Status Update

II. Fund, direct & coordinate perinatal patient safety nurses

- PSN role evolving & expanding in scope
- Communication & collaboration via List Serve; weekly at a minimum & often daily.
- Safety Skills Self – Assessment.
  - RCA participation, debriefing skills, developing effective obstetrical drills
Tactics – Status Update

II. Fund, direct & coordinate perinatal patient safety nurses (continued)

- Administration of EFM program & OB team development programs
- Published article on MCIC PSN role/activities in JOGNN, May 2006
- Poster presentation at AWHONN in Baltimore, June 2006
- Data collection
III. Teamwork and communication practices

• On-going team development continues, to varying degrees, at each hospital

• Most hospitals have adopted & continue to incorporate formal teamwork & communication practices
  • e.g. Daily or twice daily interdisciplinary patient care conferences on L&D

• SBAR*educational materials available on MCIC web site
  http://ps.mcicvermont.com

*The SBAR (Situation-Background-Assessment-Recommendation) technique is a framework for communication among health care team members.
TEAMWORK TRAINING

- Communication failure root cause in 63% of reported sentinel events

- Performance improves if crew members value input from other crew members and maintain awareness of problems and workloads of the team members

- Teamwork- Collaboration- Mutual respect
“MEDTEAMS” HIGHLIGHTS

• Staff education - Winter & Spring 05

• Implementation - Phased starting Summer 05 included:
  – Coordinating Team, ERT Team, Core Teams
  – Team concepts and communication skills
  – Debriefings

• Observation & coaching to reinforce skills
CLEAR COMMUNICATION FROM PROVIDER TO PROVIDER IS CRITICAL

• Use the “CUS” words to alert the receiver to the level of concern regarding the patient’s safety
  – C - I’m concerned
  – U – I’m uncomfortable
  – S – I’m scared

• Use “SBAR” Brief to focus communication
  – S - Situation - describe
  – B – Background - concise and focused
  – A – Assessment - concise and focused
  – R – Recommendations - what needs to happen
CLEAR COMMUNICATION FROM PROVIDER TO PROVIDER IS CRITICAL

• Close the loop - After communicating the patient/situation information, ask the provider:
  – What do you want done until you get here?
  – How long before you will be here?
  – “Should I call someone else?” or “I am going to call someone else because the situation / patient cannot safely wait that long.”
IMEPROVE TEAM SKILLS

• Do Event & Shift reviews (DEBRIEFINGS)
  – ? For each case

• Always ask as a team:
  – What did we do well?
  – What could we have done better?
  – What did we learn?
Tactics – Status Update

IV. Electronic fetal monitoring (EFM)

- 100% targeted physicians & nurses at all MCIC hospitals have taken the Electronic Fetal Monitoring Exam
- Hospital pass rates generally exceeded 90%. Pockets of nurse failures.
- Most individuals who failed typically passed on second attempt. (with exception of a few postpartum/antenatal staff)
SAFETY ATTITUDE QUESTIONNAIRE


• Measures the culture of safety on a unit

• Provides data on:
  – Job Satisfaction
  – Team Work
  – Safety Climate
  – Perceptions of Management

Decreased collaboration -> increased nursing turnover
Study 1 Results

$r = -.65$
Teamwork
JHH Obstetrics
Perceived quality of collaboration

Clin supp 22%
Envir  25%
NP  33%
Cler/PSC 44%
RN       45%
Resident 60%
MD Anes  60%
RN Mgt   60%
OB MD 82%
Target    80%
Max       100%
Teamwork Disconnect

• RN: Good teamwork means I am asked for my input

• MD: Good teamwork means the nurse does what I say
Physicians and RN Collaboration

% of respondents reporting above adequate teamwork

<table>
<thead>
<tr>
<th>Role</th>
<th>RN rates Physician</th>
<th>Physician rates RN</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&amp;D RN/MD</td>
<td>48%</td>
<td>83%</td>
</tr>
<tr>
<td>ICU RN/MD</td>
<td>48%</td>
<td>88%</td>
</tr>
<tr>
<td>OR RN/Surg</td>
<td>54%</td>
<td>90%</td>
</tr>
<tr>
<td>CRNA/Anesth</td>
<td>59%</td>
<td>93%</td>
</tr>
</tbody>
</table>
Teamwork Climate Across L&D Units

% of respondents reporting good teamwork climate

2004 2006 2007

JHH JHBMC
Safety Climate Across L&D Units

% of respondents reporting good safety climate

- 2004
- 2006
- 2007

JHBM
JHH
JHBMC
Job Satisfaction Across L&D Units

% of respondents reporting good job satisfaction

![Chart showing job satisfaction across L&D units across years](chart.png)

Legend:
- **2004**
- **2006**
- **2007**
Tactics – Status Update

VI. Obstetrical claim and event database

• Completed an in-depth review of OB claim files (5 years).

• Claim review designed to determine themes, departures & contributing factors prevalent in neonatal and maternal injury claims.

• Preliminary high level analysis completed.

• Plan is to use data & findings from claim database to establish & prioritize system wide & hospital specific patient safety initiatives (loss prevention programs).
OB Claim Review
2000-2006
Contributing Factors

Claims/Events | Loss Date: 1/1/00-12/31/05 | (n=229)

- Non-reass fetal stat not recog: 33%
- Technical complication: 20%
- Error in choice of tx or proc: 12%
- Mismgt of pre-natal care: 11%
- Complication of OB mgmt: 10%
- Diagnosis related: 10%
- Monitoring error: 7%
- Other: 6%
- Delay in prov OB care: 3%

Cases may have more than 1 contributing factor.
Standard of Care

Claims/Events Reviewed           Loss Date: 1/1/00-12/31/05
(n=229)

<table>
<thead>
<tr>
<th></th>
<th>% Occurrence</th>
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</thead>
<tbody>
<tr>
<td><strong>Claims (n=166)</strong></td>
<td></td>
</tr>
<tr>
<td>Standard of Care Met</td>
<td>26%</td>
</tr>
<tr>
<td>Standard of Care Not Met</td>
<td>24%</td>
</tr>
<tr>
<td>No Review Available</td>
<td>57%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>% Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Events (n=63)</strong></td>
<td></td>
</tr>
<tr>
<td>Standard of Care Met</td>
<td>29%</td>
</tr>
<tr>
<td>Standard of Care Not Met</td>
<td>17%</td>
</tr>
<tr>
<td>No Review Available</td>
<td>59%</td>
</tr>
</tbody>
</table>

(57%)
Maternal Age

Claims/Events Reviewed Loss Date: 1/1/00-12/31/05 (n=229)

- 30 to 39: 45%
- 20 to 29: 29%
- <20: 8%
- NA: 3%
- Not Determined: 8%
- 40 to 50: 7%
Body Mass Index

Claims/Events Reviewed (n=229) Loss Date: 1/1/00-12/31/05

- Information Unavailable, 55%
- 20 to 24.9, 4%
- 25 to 29.9, 12%
- 30 to 34.9, 14%
- 35 to 39.9, 7%
- 40 to 49.9, 6%
- >50, 2%

BMI of 30 or greater = 60%
Baby's Age at Injury for Fetal Injuries

Claims/Events Reviewed  Loss Date:  1/1/00 - 12/31/05

<table>
<thead>
<tr>
<th>Baby's Age at Injury</th>
<th>% Occurrences of Fetal Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Determined</td>
<td>15%</td>
</tr>
<tr>
<td>20 to 24 weeks</td>
<td>3%</td>
</tr>
<tr>
<td>25 to 29 weeks</td>
<td>8%</td>
</tr>
<tr>
<td>30 to 34 weeks</td>
<td>10%</td>
</tr>
<tr>
<td>35 to 39 weeks</td>
<td>35%</td>
</tr>
<tr>
<td>40 to 45 weeks</td>
<td>28%</td>
</tr>
</tbody>
</table>

MCIC Hospitals (n=156)
Babies' Weight for Shoulder Dystocia/Brachial Plexus Injuries

Claims/Events Reviewed - Loss Date: 1/1/00-12/31/05

(n=40)

Weight in grams

( - 65% - )  ( - 35% - )
Maternal BMI and Brachial Plexus Injuries
Claims/Events Reviewed    Loss Date: 1/100-12/31/05
(n=37)

<table>
<thead>
<tr>
<th>BMI Range</th>
<th># of Brachial Plexus Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 24.9</td>
<td>3</td>
</tr>
<tr>
<td>25 to 29.9</td>
<td>3</td>
</tr>
<tr>
<td>30 to 34.9</td>
<td>5</td>
</tr>
<tr>
<td>35 to 39.9</td>
<td>5</td>
</tr>
<tr>
<td>40 to 49.9</td>
<td>6</td>
</tr>
<tr>
<td>&gt;50</td>
<td>1</td>
</tr>
<tr>
<td>Not Determined</td>
<td>14</td>
</tr>
</tbody>
</table>

( - 73% - )
LABOR MANAGEMENT – “Stimulation 2”

- Cervidil
- Cytotec
- Foley
## Ripening Protocol Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Foley</th>
<th>Cytotec</th>
<th>Cervidil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior LTC C/S</td>
<td>OK</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Fetal death</td>
<td>NO</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>Asthma</td>
<td>OK</td>
<td>OK</td>
<td>NO</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>OK</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>OK</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Begin Pitocin</td>
<td>30 min after insertion (low dose)</td>
<td>At least 4 hrs after last dose</td>
<td>30-60 min after removal</td>
</tr>
<tr>
<td>Contraction frequency</td>
<td>OK</td>
<td>$\geq 1/10$ min first NO</td>
<td>Same as Cytotec</td>
</tr>
<tr>
<td></td>
<td>$\geq 3/10$ min second NO</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Take Home Points

- Talk to each other.
- Write legibly.
- Document! Document! Document!
- Be aware of increased risk in patients with an increased BMI.
- Realize that a normal range fetal weight does not eliminate the risk of complications of shoulder dystocia.
- Ask for Help
Summary

• Practice Good Medicine
• Document Clearly
• Communicate – we all practice good medicine – let everyone know what we are thinking -
• Seek support – ask questions – You do not need to do it all yourself
• Respond to calls
REFERENCES


