Evidence-Based Use of Oxytocin for Labor

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AWHONN
Association of Women's Health, Obstetric and Neonatal Nurses

Objectives

- Outline patient factors to consider prior to the use of oxytocin for induction or augmentation.
- Identify evidence based oxytocin practices for induction or augmentation of labor.
- Discuss the rationale for maternal and fetal assessment every 15 minutes when using oxytocin in labor.
- List the components of a complete, every 15 minute maternal and fetal assessment, when oxytocin is in use.

Who gets oxytocin in labor?

- Women with induced labor
  - Elective
  - Medically indicated
    - Maternal or fetal indication
- Augmentation of Labor
  - First stage
  - Second stage

Current Statistics

- Data suggest more than 23% of labor is induced (NCVHS, 2012). The number may be under-reported
- More than 50% of women may receive oxytocin during labor

Induction Demographics

- More common in the South
- More common in community rather than university medical centers
- Women who choose induction are usually
  - White
  - Well-educated
  - Insured
  - Have had good prenatal care
  - Have had procedure suggested by their providers

Oxytocin: A High Alert Drug

"Bearing a heightened risk of harm when they are used in error"
And may "*require special safeguards to reduce the risk of error"*

ISMP, 2012

ACOG & AAP Recommendations

- Guidelines for Perinatal Care (7th Ed)
  - Women receiving oxytocin are high risk
  - Fetal and maternal status should be assessed every 15 minutes
- Institute for Safe Medication Practices (ISMP) designated oxytocin as a high alert drug in 2007

AWHONN Staffing Guidelines for oxytocin administration

- Women receiving oxytocin for labor induction or augmentation should receive 1:1 nursing care in order for maternal and fetal status to be assessed every 15 minutes
- If effects of oxytocin administration cannot be assessed at least every 15 minutes, the infusion should be stopped until that level of care can be provided

AWHONN Staffing Guidelines for oxytocin administration

- Elective procedures should be deferred until there are adequate nurses to safely meet the needs of patients and service

Risks of oxytocin

- Uterine tachysystole
- Increased risk of fetal compromise
- No standard response to standard dose
  - Difficult to determine optimal dose

Liability risks related to oxytocin use

- Excessive doses of oxytocin resulting in uterine tachsystole, with or without the presence of non-reassuring fetal heart rate pattern
- Failure to accurately assess maternal-fetal status during induction or augmentation

Perinatal Nursing, 3rd ed, 2007

What's our goal with oxytocin?

- Uterine activity effective enough to result in cervical change and fetal descent while avoiding uterine hyperstimulation and fetal compromise

ACOG, 2003

Endogenous (natural) oxytocin

- During the 1st stage of spontaneous labor, average concentration of endogenous oxytocin is ~ 2-4 mU/min
- The fetus secretes oxytocin at ~ 3mU/min during active labor
- In active labor, the average plasma concentration of oxytocin is ~ 4-6 mU/min

Seitchek et al, 1984

Endogenous Oxytocin

- Stretching of cervix and vagina stimulates oxytocin release from the posterior pituitary
- Oxytocin is maintained by both tonic baseline action and pulsatile release action that increases as labor progresses

Exogenous (chemical) oxytocin

- Half-life of oxytocin is 7-15 minutes
- 3-4 half-lives are needed to reach steady state of plasma concentration
- Once steady state of plasma concentration has been reached, uterus responds within 3-5 minutes

Dawood, 1995

Exogenous oxytocin

- Uterine activity increases in phases of increased contraction strength and intensity, followed by a stable period
- A 40 minute or > interval between oxytocin increases allows for full uterine effect and minimizes the need for excessive oxytocin
- Once the stable contraction period has been reached, additional dose increases will not lead to further normal changes in contractions

Dawood, 1995

Factors affecting maternal response to oxytocin

- Maternal body surface area
- Gestational age
- Parity
- Cervical status
- Individual bioassay-individual response
  - No standard response to standard dose
- At full-term, most women could have successful labor induction with oxytocin rates at 6mU or less

Dawood, 1995

Fetal Response to Uterine Activity

- Fetal O2 sats decrease with uterine activity with the greatest decrease 90 seconds after the contraction
- An additional 90 seconds are required for complete recovery
- Recovery incomplete with contractions more frequent than 2 minutes

Safe Oxytocin Practices

- Documentation of informed consent
- Use of bundles or an administration checklist
- Use of a standard administration protocol
  - Use of the smallest dose possible, for the shortest amount of time
- Use of a titration protocol or algorithm

Evidenced Based Oxytocin Protocol

- Start at 1Mu/min
- Increase by 1 to 2 Mu/min no more frequently than every 30 minutes
- Titrate based on maternal and fetal response
- Discontinue oxytocin once active labor is established

Oxytocin bundles

- All elements present before oxytocin is started:
  - Confirmation of gestational age (or estimated fetal weight for augmentation)
  - Cervical Exam
    - Including a Bishop Score
  - Reassuring fetal status
  - Appropriate intervention for tachysystole

The Bishop Score

Factor Score	Dilation(cm)	Effacement(%)	Station*	Consistency	Position of cervix
0	Closed	0 – 30	-3	Firm	Posterior
1	1 – 2	40 – 50	-2	Medium	Mid-position
2	3 – 4	60 – 70	-1, 0	Soft	Anterior
3	5 – 6	≥ 80	+1, +2	-	-

*Station reflects a -3 to +3
From Bishop, 1964

Why is the Bishop Score important?

- Higher the score, the greater the chance of successful induction of labor
- Higher scores:
  - Less length of stay
  - Decreased cost
  - Decreased risk of cesarean section

ACOG, 2009

Labor Progress Revisited

Cervical Dilation (cm)

From	To	Time Interval (hr)	Rate (cm/hr)
2	3	3.2(0.6, 15.0)	0.3 (0.1, 1.8)
3	4	2.7(0.6, 10.1)	0.4 (0.1, 1.8)
4	5	1.7(0.4, 6.6)	0.6 (0.2, 2.8)
5	6	0.8 (0.2, 3.1)	1.2 (0.3, 5.0)
6	7	0.6 (0.2, 2.2)	1.7 (0.5, 6.3)
7	8	0.5 (0.1, 1.5)	2.2 (0.7, 7.1)
8	9	0.4 (0.1, 1.3)	2.4 (0.8, 7.7)
9	10	0.4 (0.1, 1.4)	2.4 (0.7, 8.3)

Zhang, et al, 2002, taken from
Creasy and Resnick, 2004, p672

Elements of Informed Consent

- Before the procedure!
- Potential risks and benefits
- Methods/pharmacological agents to be used
- How long labor might last
- Options if labor is not successful

Complete Fetal Assessment

- Fetal Status
  - Fetal heart rate and variability
  - Presence or absence of accelerations
  - Presence or absence of decelerations
  - Evaluation of deceleration type
  - Evolution of pattern over time

Complete Maternal Assessment

- Maternal status:
  - Contractions
    - Frequency
    - Duration
    - **Strength**
  - Presence of tachysystole
  - Vital signs
  - Coping, comfort measures
  - Educational needs
  - Other clinical conditions

What can be missed without active assessment?

- Progressive decreases in FHR baseline and/or FHR variability
- Increasing uterine resting tone
- Subtle changes in maternal coping
- The ability to relate the overall clinical picture to a provider

Sample Assessment Tool

Evaluating Appropriate Responses to Clinical Situations based on AHRQ's (2003) *Failure to Rescue* Patient Safety Indicator (Adapted to Perinatal Care)

Rescue Process for Nonreassuring (Indeterminate / Abnormal) Fetal Heart Rate Patterns					
Rescue Process Components	**Yes**	**No**	**UTRD**	**NA**	**Comments/Additional Descriptions of Processes**
Expectations for careful monitoring					Includes characteristics of FHR patterns and uterine activity
For women/fetuses without identified risk factors					
Every 30 min during the active phase of first stage labor					% of 30 min time frames with assessment data
Every 15 min during the active pushing phase of second stage labor					% of 15 min time frames with assessment data
For women/fetuses with identified risk factors					
Every 15 min during the active phase of first stage labor					% of 15 min time frames with assessment data
Every 5 min during the active pushing phase of second stage labor					% of 5 min time frames with assessment data or summary notes q 15 min indicating continuous bedside attendance and assessment during pushing
Score	0		1		2
Timely identification					
Within the timeframe outlined in the expectations for careful monitoring (e.g. q 30 min, 15 min or 5 min based on identified risk factors)					Time:
Accurate interpretation and appreciation of the implications of the clinical data displayed (based on agreement between medical record documentation and fetal monitoring strip)					Time:
Nonreassuring (indeterminate/abnormal) characteristics of the FHR pattern	List characteristics:				
Score	0		1		2

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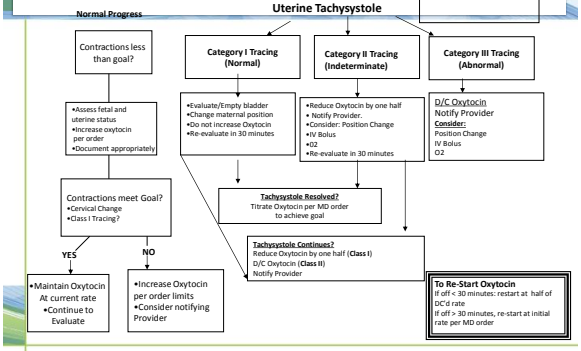
Oxytocin Algorithm

Goal: Uterine activity effective enough to result in cervical change without tachysystole or fetal compromise. ACOG, 2003

Tachysystole: > 5 contractions in 10 minutes, averaged over 30 minutes (NICHD, 2008)



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Questions