Cervical Ripening and Induction/Augmentation of Labor

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Cervical Ripening and Induction/Augmentation of Labor

December 8, 2020 Omaha, Nebraska

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•Remember the oxygen pathway

Oxygen Pathway

- **Environment**
  - Lungs
  - Heart
  - Vasculature
  - Uterus
  - Placenta
  - The umbilical cord

Adapted with permission from Dr. David Miller's presentation *Safer and Easier Establishing a Shared Mental Model in EFM.*(2013). 14th Annual National Conference on Fetal Monitoring Maternal-Fetal Assessment and Interventions

- **The fetus**
  - **Miller,** Miller, & Cypher (2017, p. 11)

Always consider the entire clinical picture…

Legal Implications

- One of the leading cause of obstetrical liability claims and payout is:
  - **Oxytocin** administration with or without cervical ripening agents

Legal Allegations May Include:

- Failure to properly administer oxytocin
- Failure to reduce and/or discontinue uterine stimulants when there is a nonreassuring fetal heart rate tracing
- Excessive dosages of oxytocin resulting in abnormal uterine activity
- Communication failures between nurse and obstetric provider

Legal Implications

- Problem:
  - Incomplete and/or inaccurate documentation of care and communication

Objectives

Identify the nurse's role in providing care during cervical ripening and induction/augmentation of labor

Explore the induction of labor to include: methods, definitions, indications and contraindications, risks, informed consent and assessments prior to induction

Describe the physiology of uterine contractions

Review the pharmacological properties of prostaglandins and oxytocin

Compare/contrast methods used for cervical ripening

Explain the procedures for administration of oxytocin for augmentation/induction

Institute for Safe Medication Practices

- The Institute for Safe Medication Practices (ISMP) designates IV oxytocin as a **high-alert medication**
- High alert medications carry a heightened risk of causing significant patient harm when they are used in error
- Require special safeguards to reduce risk of error
- https://www.ismp.org/recommendations/high-alert-medications-acute-list

Proper administration and monitoring of any patient receiving prostaglandins/pitocin is important!!

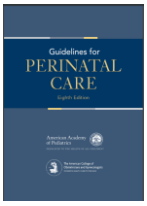
Role of the Nurse

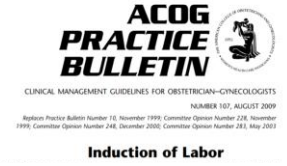
- To provide care to women undergoing an induction of labor
- To be familiar with professional standards/guidelines
- To be familiar with hospital policies/procedures
- To be knowledgeable about induction agents to include: indications, administration, assessment and monitoring, and side effects
- To document care provided
- To communicate with provider and team

Patient Care

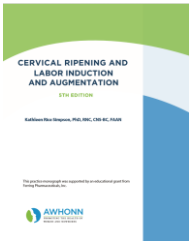
- Refer to handout "Providing Care During Oxytocin Administration"

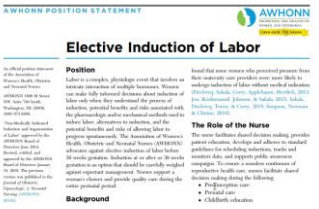
•Professional Standards and Guidelines Related to Induction/Augmentation of Labor: Refer to handout





AWHONN Documents





Additional resources listed in reference list..

Institutional Policy/Procedure Recommendations

- •Develop a single, standard, unit policy or protocol for each pharmacologic agent
- •Recommend an interdisciplinary approach to develop policy/protocol

Checklist Protocols

- Some hospitals such as HCA (Hospital Corporation of America) are using checklist protocols
  - Misoprostol
  - Oxytocin
- Examples of these will be presented when misoprostol and pitocin are reviewed
- Use of checklist protocols may help reduce obstetric litigation
  - Clark, Belfort, Dildy, & Meyers (2008)

Institutional Policy/Procedure

- Be familiar with your hospital policy/procedure
- If your hospital policy/procedure is not updated or is incomplete
  - Work with the appropriate colleagues to fix it

Cervical Ripening, Induction and Augmentation

What's the Difference??

Definitions

- Cervical ripening
  - Process of effecting physical softening, thinning, and dilating of the cervix in preparation for labor and birth
- Induction
  - Use of pharmacologic and/or mechanical methods to initiate labor
- Augmentation
  - Use of pharmacologic methods or artificial rupture of membranes to increase frequency and/or strength of contractions following the onset of spontaneous labor or spontaneous rupture of membranes
    - ACOG, 2014; Simpson, 2020

Induction or Augmentation?

- Which usually requires less oxytocin?
  - Augmentation or Induction?

Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - Indications for induction
  - Risk-benefit analysis
  - Informed consent
  - Assessment/requirements prior to initiation
  - Knowledge of cervical ripening and induction methods/agents

Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - **Indications for induction**
  - Risk-benefit analysis
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Indications for Induction

- Indications for induction of labor are not absolute
- Must take into consideration
  - Maternal conditions
  - Fetal conditions
  - Gestational age
  - Cervical status
  - Other factors
    - ACOG, 2009, p. 4

Indications for Induction

- Abruptio placentae
- Chorioamnionitis
- Fetal demise
- Preeclampsia, eclampsia
- Premature rupture of membranes
- Postterm pregnancy
- Maternal medical conditions
- Fetal compromise (eg. severe IUGR)
  - ACOG, 2009, p. 4

Indications for Induction

- If labor is induced for logistic reasons
  - distance from hospital, risk of rapid labor, or psychosocial indications
    - Must confirm term gestation
    - At least one of the criteria should be met or fetal lung maturity should be established
      - What are the criteria?

Confirmation of Term Gestation

- Ultrasound measurement at less than 20 weeks of gestation supports gestational age of 39 weeks or greater
- FHT's have been documented as present for 30 weeks by Doppler ultrasonography
- It has been 36 weeks since a positive serum or urine human chorionic gonadotropin pregnancy test result
  - ACOG, 2009, p. 4

ACOG 2009 and 2019

- "A mature fetal lung test result before 39 weeks of gestation, in the absence of clinical circumstances, is not an indication for induction."
  - 2009, p. 4
- "Because nonrespiratory morbidities also are increased in early-term deliveries, documentation of fetal pulmonary maturity does not justify an early nonmedically indicated delivery"
  - 2019

Induction/Augmentation of Labor for Vaginal Birth After Cesarean

- Remains an option for trial of labor after cesarean (TOLAC)
- The potential increased risk of uterine rupture associated with induction should be considered…
- Oxytocin augmentation may be used in women attempting TOLAC
  - ACOG, 2019, Practice Bulletin: Vaginal Birth After Cesarean Delivery, Interim Update.

What About Suspected Fetal Macrosomia?

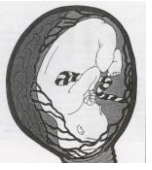
- ACOG (2020)
  - Suspected fetal macrosomia or LGA fetus is not an indication for induction of labor before 39 0/7 weeks
    - There is insufficient evidence benefits of reducing shoulder dystocia outweigh the harms of early deliver
    - Level B evidence
      - recommendations based on limited or inconsistent scientific evidence
      - American College of Obstetricians and Gynecologists (2020). Fetal macrosomia. Practice Bulletin #216, January.

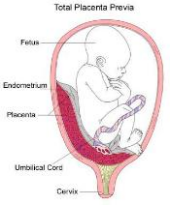
Documentation of the Indication For Induction

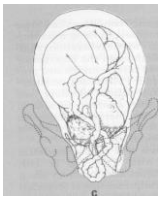
- Provider's responsibility to document indication for induction in medical record

Contraindications to Induction

- Vasa previa or complete placenta previa
- Transverse fetal lie
- Umbilical cord prolapse
- Previous classical cesarean delivery
- Active genital herpes infection
- Previous myomectomy entering the endometrial cavity
  - ACOG, 2009, p. 4







Misoprostol at Term and TOLAC

- Misoprostol should **not** be used for cervical ripening or labor induction in patients **at term** who have had a cesarean delivery or major uterine surgery
  - ACOG, 2019

What about elective (non-medical) induction of labor?

ACOG Definitions

- Early term
  - 37 0/7 weeks of through 38 6/7 weeks of gestation
- Full term
  - 39 0/7 weeks through 40 6/7 weeks of gestation
- Late term
  - 41 0/7 weeks through 41 6/7 weeks of gestation
- Postterm
  - 42 0/7 weeks of gestation and beyond
    - ACOG Definition of Term Pregnancy (2013; reaffirmed 2019)

Why The Classifications of Term?

- Research has identified that neonatal outcomes, especially respiratory morbidity, vary depending upon the timing in this 5 week period
  - Adverse neonatal outcomes are lowest in uncomplicated pregnancies delivered between 39 0/7 weeks and 40 6/7 weeks of gestation
- To facilitate data reporting and research using a uniform approach
  - ACOG, 2013; Spong, 2013

Neonatal Morbidities Associated With Early-Term Delivery
37 0/7 weeks of through 38 6/7 weeks of gestation

- Respiratory distress syndrome
- Transient tachypnea of the newborn
- Ventilator use
- Pneumonia
- Respiratory failure
- NICU admission
- Hypoglycemia
- 5-minute Apgar less than 7
- Neonatal mortality

  - ACOG (2019). Avoidance of non-medically indicated early-term deliveries and associated neonatal morbidities. Committee Opinion Number 765.

Guidelines for Perinatal Care (2017)

"Elective inductions are not performed before 39 weeks of gestation" (p. 243)

- AAP & ACOG (2017)

ACOG & SMFM (2014)

- Before 41 0/7 weeks, inductions should generally be performed based on maternal and fetal indications
- Inductions at 41 0/7 weeks and beyond should be performed to reduce the risk of cesarean delivery and the risk of perinatal morbidity and mortality
- Cervical ripening methods should be used when labor is induced with an unfavorable cervix
  - P. 7

AWHONN (2019) Position Statement Elective Induction of Labor

- Advocates against elective induction of labor before 39 weeks gestation
- Induction at or after 39 weeks gestation is an option that should be carefully weighed against expectant management
- Nurses support a woman's choices and provide quality care during the entire perinatal period
- Recommend you read entire resource as there is much more information contained in the document

Risk of Cesarean

- Studies comparing nonmedical induction versus expectant management
  - **Arrive Trial**
    - Grobman, W. A., et al (2018). Labor induction compared with expectant management of low-risk nulliparous women. *The New England Journal of Medicine, 379(6),* pp. 513-523.
    - ACOG and CMQCC's response to the Arrive Trial was already presented

ARRIVE Trial

- Multicenter unmasked trial
- Randomly assigned **low-risk nulliparous** women who were at 38 weeks 0 days to 38 weeks 6 days of gestation **to either**
  - **Labor induction at 39 0/7 weeks to 39 4/7 weeks, or to**
  - **Expectant management**
    - Women were asked to fore go elective delivery before 40 weeks 5 days and to have delivery initiated no later than 42 2/7 weeks

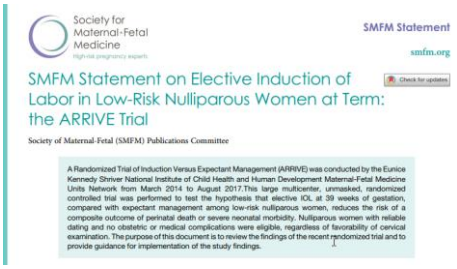
Arrive Trial

- **Primary outcome**
  - Perinatal death or severe neonatal complications
- **Secondary outcome**
  - Cesarean delivery

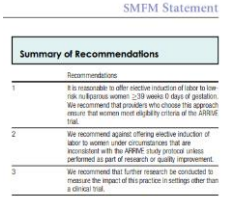
Arrive Trial Conclusions

- Compared to expectant management, induction of labor at 39 weeks in low-risk nulliparous women
  - Did NOT result in a significantly lower frequency of composite adverse perinatal outcomes
  - It DID result in a significantly lower frequency of cesarean delivery

Society for Maternal Fetal Medicine
SMFM



Society for Maternal Fetal Medicine
SMFM: ARRIVE Trial



CMQCC Response to Arrive Trial

Comments:

(1) The patient population in this study was both very low risk (mean age =24yrs, and all women with any medical complications were excluded) and quite interested in labor induction (fully 75% of eligible patients refused entry into the trial). Nonetheless, a cesarean rate of 18.6% following labor induction in nullips is quite an accomplishment.

(2) Most hospitals do not come anywhere near this rate. The rate of cesarean after labor induction in low-risk nullips among the 240 California hospitals averages 32% with rates as high as 60%.

(3) All hospitals in the Arrive trial used a common definition of failed induction (a cesarean for any reason following labor induction): **Cesarean delivery should not be undertaken during the latent phase prior to at least 15 hours after rupture of membranes have occurred with concurrent oxytocin administration.**[2] After that point, the decision to continue labor in latent phase was individualized. Once in Active Phase (6 centimeters dilation), ACOG/SMFM guidelines were followed for the diagnosis of labor arrest and descent disorders.

Bottom Line:

(1) There are currently no changes to the SMFM/ACOG guidelines for induction of labor. Specifically, induction of labor at less than 41 weeks 0 days with an unfavorable cervix should only be performed for medical indications.

(2) It needs to be repeated that the results in this study were obtained in university hospitals with strict labor guidelines and a strict definition of failed induction. **If a hospital's induction guidelines are to be changed to allow for elective inductions at 39 weeks, strict guidelines for defining failed induction (see above) and for management of active phase and fetal monitoring abnormalities need to be adopted simultaneously.**

(3) If labor guidelines and induction failure definitions are not adopted, the cesarean rates will likely rise significantly.

(4) Induction of labor with an unfavorable cervix takes a very long time to do following guidelines and will impact room availability and nursing hours.

[1] Grobman WA, etal. A randomized trial of elective induction of labor at 39 weeks compared with expectant management of low-risk nulliparous women. Am J Obstet Gynecol 2018; 218:S601.
[2] Grobman WA, etal. Defining failed induction of labor. Am J Obstet Gynecol. 2018; 218:122.e1-8

The Debate Continues…

Labor Induction: *Current Commentary*

Elective Induction at 39 Weeks of Gestation and the Implications of a Large, Multicenter, Randomized Controlled Trial

Caroline Marrs, MD, Mauricio La Rosa, MD, Aaron Caughey, MD, PhD, and George Saade, MD

Published in Obstetrics & Gynecology, 2019, 133(3), pp. 445-450.

Published in MCN, 2019, 44(1), pp. 59-60

Phillippi, J. C., & King, T. L. (2018). *Journal of Nurse Midwifery & Women's Health, 63*(6), 645-647.

ARRIVE Trial

- What does the future hold??? Time will tell….
- Let's move on…

Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - Indications for induction
  - **Risk-benefit analysis**
  - Informed consent
  - Assessment/requirements prior to initiation
  - Knowledge of cervical ripening and induction methods/agents

Risk-Benefit Analysis

- Provider performs this step
  - Considers gestational age of fetus
  - Potential risks to mother and fetus
  - Does the benefit outweigh the risk?

Risks of Induction

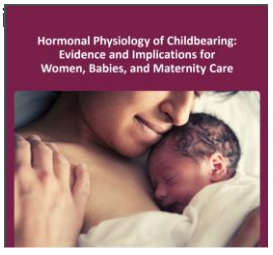
- Some studies show an increased risk of cesarean
  - particularly primips with an unfavorable cervix compared to primips in **spontaneous labor**
  - increased hospital pre-delivery time
  - increased costs
- (we already discussed the ARRIVE trial)

Risks of Induction

- Increased risk of infection to woman and baby
- Prolapsed or compressed umbilical cord
- Uterine hyperstimulation (now called tachysystole) with a nonreassuring fetal heart rate pattern (now recommend to avoid this general term)
- Longer labor if the cervix is not ripe
- Uterine rupture
- Placental abruption
- Some association with neonatal jaundice
- Iatrogenic prematurity

Hormonal Physiology

- Does induction of labor interfere with the normal hormonal physiology of chi



You can google and download PDF at no cost; written by Sarah Buckley

Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - Indications for induction
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Informed Consent

- Provider is responsible and should counsel patient regarding
  - Indication for induction
  - Agents and methods of labor stimulation
  - Possible need for repeat induction or cesarean delivery
    - ACOG, 2009, p. 4

What Women Need To Know

- Waiting for the onset of spontaneous labor is safe for healthy mothers and fetuses
- Women have the right to be fully informed of the various options for initiation of labor, including
  - Waiting for onset of spontaneous labor
  - Procedures to initiate labor artificially
  - Potential risks and benefits of artificial initiation of labor
- Information should be offered in language they can understand
- Adequate time should be provided for questions
  - AWHONN, 2020, p. s12

What Women Need To Know

- Induction of labor is recommended at 41 or more weeks
  - To minimize risk of adverse maternal and neonatal outcomes
- Elective induction of labor does not increase risk of cesarean birth for nulliparous women
  - If cervical ripening is used as needed, and
  - Labor management allows for adequate time to progress through the latent, active, first and second stages of labor
    - Per ACOG and SMFM, 2014 or used in ARRIVE trial, 2018

What Women Need To Know

- Elective induction of labor will likely take significantly longer than spontaneous labor
- Induction of labor will likely involve:
  - IV
  - Bedrest
  - Continuous EFM
  - Amniotomy
  - Significant discomfort
  - Use of epidural analgesia (frequently occurs)
    - AWHONN, 2020, p. s12

Informed Consent: Nurse's Role

- If a woman indicates that she is not informed as to why she is being induced or what the benefits/risks of induction are
  - Notify provider to speak to the woman via telephone or in person
    - Simpson (2020, p.s10)

Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - Indications for induction
  - Risk-benefit analysis
  - Informed consent
  - Assessment/requirements prior to initiation
  - Knowledge of cervical ripening and induction methods/agents

Assessments/Requirements Prior to Initiation

- Establish maternal well-being
- Establish fetal well-being
  - Baseline fetal monitoring
  - If fetal well-being is absent
    - Necessitates evaluation by a provider and documentation of plan

Assessments/Requirements Prior to Initiation

- Pelvic assessment
- Fetal presentation
- Fetal size
  - Estimated fetal weight
- Cervical status should be assessed and documented in the medical record
  - Bishop score
  - Presence or absence of uterine activity

Bishop Score

ACOG (2009, p. 2) Induction of Labor Station reflects -3 to +3 scale

SCORE	DILATION	EFFACE	STATION	CONSIST	POSITION
0	CLOSED	0 - 30	-3	FIRM	POSTERIOR
1	1 - 2	40 - 50	-2	MEDIUM	MID
2	3 - 4	60 - 70	-1 - 0	SOFT	ANTERIOR
3	5-6	80	+1 - +2		

Bishop score

- Score of 6 or less
  - Unfavorable cervix
- Score over 8 induction likely to be successful
  - approaches success rate of spontaneous labor

Bishop Score

- If induction is indicated and the cervix is unfavorable, cervical ripening agents may be used
  - ACOG, 2009, p. 2

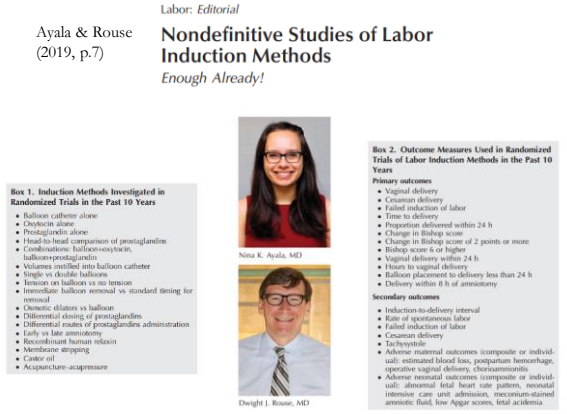
Preparation for Cervical Ripening, Induction, or Augmentation

- Topics to be covered:
  - Indications for induction
  - Risk-benefit analysis
  - Informed consent
  - Assessment/requirements prior to initiation
  - Knowledge of cervical ripening and induction methods/agents

What Is The Best Method for Induction?

- "…no single method for labor induction has proven to be reliably superior to any other…
  - Ayala & Rouse (2019, p.7)
- What is needed is at least one large, multicenter trial (adequately powered) to simultaneously assess mode of delivery, maternal morbidity, perinatal morbidity and mortality, maternal satisfaction, and costs.
  - Ayala & Rouse (2019, p.7)

Ayala & Rouse (2019, p.7)



Labor: *Editorial*

Nondefinitive Studies of Labor Induction Methods

Enough Already!

Box 1. Induction Methods Investigated in Randomized Trials in the Past 10 Years

- Balloon catheter alone
- Oxytocin alone
- Prostaglandin alone
- Head-to-head comparison of prostaglandins
- Combinations: balloon+oxytocin, balloon+prostaglandin
- Volumes instilled into balloon catheter
- Single vs double balloons
- Tension on balloon vs no tension
- Immediate balloon removal vs standard timing for removal
- Osmotic dilators vs balloon
- Differential dosing of prostaglandins
- Differential routes of prostaglandins administration
- Early vs late amniotomy
- Recombinant human relaxin
- Membrane stripping
- Castor oil
- Acupuncture–acupressure

Nina K. Ayala, MD

Dwight J. Rouse, MD

Box 2. Outcome Measures Used in Randomized Trials of Labor Induction Methods in the Past 10 Years

Primary outcomes

- Vaginal delivery
- Cesarean delivery
- Failed induction of labor
- Time to delivery
- Proportion delivered within 24 h
- Change in Bishop score
- Change in Bishop score of 2 points or more
- Bishop score 6 or higher
- Vaginal delivery within 24 h
- Hours to vaginal delivery
- Balloon placement to delivery less than 24 h
- Delivery within 8 h of amniotomy

Secondary outcomes

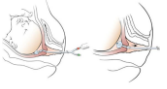
- Induction-to-delivery interval
- Rate of spontaneous labor
- Failed induction of labor
- Cesarean delivery
- Tachysystole
- Adverse maternal outcomes (composite or individual: estimated blood loss, postpartum hemorrhage, operative vaginal delivery, chorioamnionitis
- Adverse neonatal outcomes (composite or individual: abnormal fetal heart rate pattern, neonatal intensive care unit admission, meconium-stained amniotic fluid, low Apgar scores, fetal acidemia

Knowledge of Ripening and Induction/Augmentation Agents

- Be knowledgeable about
  - Indications/contraindications for ripening methods, prostaglandins, and pitocin
  - Actions of these drugs
  - Proper administration and monitoring
  - Potential risks and side effects

Mechanical and Other Methods of Ripening and Labor Induction

- Membrane Stripping
- Amniotomy
- Transcervical Balloon Catheters
- Hygroscopic/Osmotic Dilators
  - Laminaria (seaweed)
  - Lamicel and Dilapan
- Nipple stimulation
- Sexual intercourse



Mechanical an Other Methods of Ripening and Labor Induction

- Refer to table

PGE2
(Dinoprostone)
Cervidil (insert)
FDA approved

PGE1
(misoprostol)
Cytotec

Prostaglandin
Cervical Ripening Agents

Indications For Prostaglandins

- Ripening an unfavorable cervix
- Has also been used for induction
- IUFD
  - Will not be covered in this class
- Treatment of postpartum hemorrhage

Contraindications

- Misoprostol should not be used for **third trimester** cervical ripening or labor induction in patients who have had a cesarean delivery or major uterine surgery
  - ACOG, 2019

Cautions

- PGE2 (Cervidil)
  - Use with caution if the patient has
    - Glaucoma
    - Severe hepatic or renal function
    - Asthma
      - PGE2 is a bronchodilator
      - No reports of bronchoconstriction or significant BP changes after administration of low-dose gel
        - ACOG, 2009, p. 6

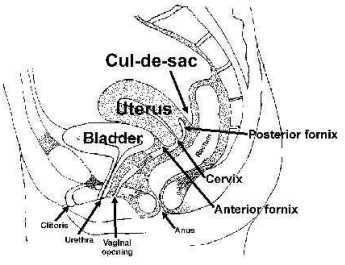
How Do They Work?

- Prostaglandins soften the cervix and relax cervical smooth muscle
  - Increase inflammatory mediators in the cervix
  - Remodel the cervical extracellular matrix through a decrease in collagen and cervical glycosaminoglycans
    - Chiossi et al (2012)
- May also produce uterine contractions

Administration, Monitoring, And Risks

Refer to the table entitled Comparison of Prostaglandin Cervical Ripening Agents…

Where is the Posterior Fornix?



Misoprostol and Meconium Staining

- An increase in meconium-stained amniotic fluid has been reported with misoprostol use
  - ACOG (2009) **Induction of Labor Practice Bulletin**

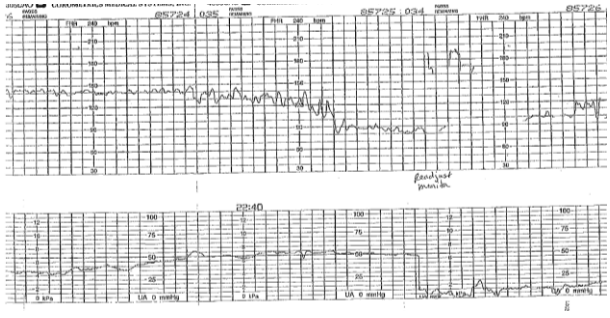
Misoprostol

- Routes of administration
  - Oral
    - Is starting to be used more for cervical ripening/induction
  - Sublingual
  - Intravaginal
    - Currently being used for cervical ripening/induction
  - Rectal
    - Currently being used to treat postpartum hemorrhage
    - 800-1000 mcg

Misoprostol: Oral Versus Intravaginal

Route	Onset	Peak	Half-Life	Duration
Oral	8 to 11 minutes	30 minutes	90 minutes	2 hours
Intravaginal	20 minutes	1 to 2 hours		4 hours; 4 to 6 hours in some women

Simpson, K. R. (2020)



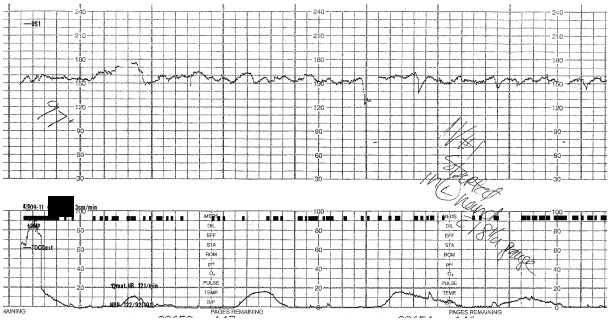
Misoprostol 200 micrograms oral given at 2228
This is the tracing 12 minutes later

Prostaglandin Ripening: Nursing Care*

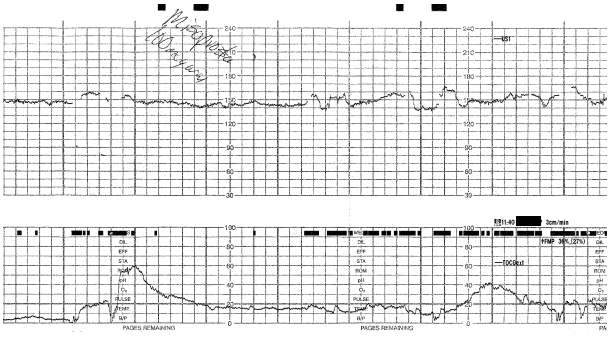
- Monitor maternal/fetal response
  - Contraction activity
  - Fetal heart rate
  - Maternal comfort level and/or pain level
- Monitor labor progress

Main Side Effect Of Any Prostaglandin

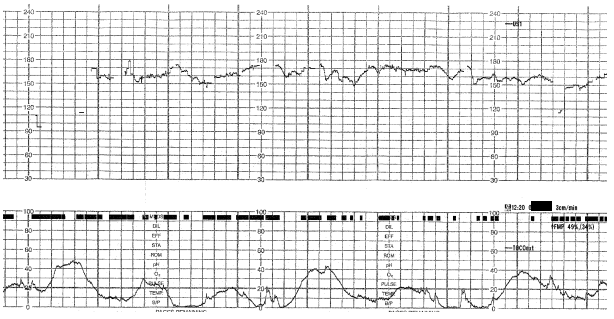
- Uterine tachysystole with or without fetal heart rate changes



0911: Admission
Gravida 1, para 0 at 37 weeks
induction for mild preeclampsia



1135: Cervical exam: closed, midposition, firm, ballotable, vertex presentation
Misoprostol 100mcg orally



1220:
45 minutes after misoprotol ingested
What do you think of this strip? Would you initiate any interventions at this time?

Contraction Activity

- In addition to contraction frequency, don't forget
  - Duration
  - Intensity
  - Resting tone
  - Relaxation time

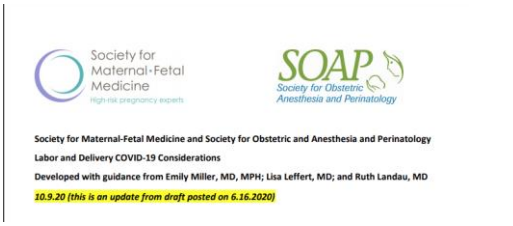
Nursing Care: Fetal Response

- Assess fetal heart rate using continuous electronic fetal monitoring
- Observe for evolving patterns over time
- FHR Patterns Associated With Acidemia
  - Be on the watch for these patterns
    - Absent variability with recurrent late decelerations
    - Absent variability with recurrent variable decelerations
    - Absent variability with fetal bradycardia

Interventions for Uterine Tachysystole and/or Fetal Heart Rate Concerns Related to Prostaglandins

- Reposition
- Assess hydration status and consider IV fluid bolus
- *Consider oxygen by face mask based on fetal response* Note: with the advent of COVID recommendations for the use of oxygen for intrauterine resuscitation were changed*
- Consider Terbutaline (Brethine) based on fetal response
  - 0.25 mg SQ
- If cervidil is in place, remove it
- Notify provider based upon maternal/fetal response

Oxygen for Intrauterine Resuscitation



Society for Maternal-Fetal Medicine
High-risk pregnancy experts

SOAP
Society for Obstetric Anesthesia and Perinatology

Society for Maternal-Fetal Medicine and Society for Obstetric and Anesthesia and Perinatology

Labor and Delivery COVID-19 Considerations

Developed with guidance from Emily Miller, MD, MPH; Lisa Leffert, MD; and Ruth Landau, MD

10.9.20 (this is an update from draft posted on 6.16.2020)

- Intrapartum oxygen: The use of oxygen for fetal indications is controversial, as there is no evidence of benefit and potential risk of fetal harm. As the use of high-flow nasal cannula or face mask oxygen may be aerosolizing procedures, the routine use for fetal indications should be suspended. Oxygen should be considered if maternal hypoxia is noted.

ACOG

Q: Should intrapartum oxygen continue to be used in the setting of COVID-19?

Last updated April 29, 2020 at 4:00 p.m. EST.

Oxygen should continue to be considered if maternal hypoxia is noted (Practice Bulletin 116). Based on limited data, high-flow oxygen use is not considered an aerosol-generating procedure (CDC). Still, there is insufficient evidence about the cleaning and filtering when using oxygen. As such, facilities should consider suspending routine use of intrapartum oxygen for indications where benefits of use are not well-established (eg., category II and III fetal heart rate tracings).

March 26, 2020 - AWHONN's Update on Oxygen Use for Fetal Resuscitation during the COVID-19 Pandemic

atal nurses routinely initiate interventions to maximize fetal oxygenation, including maternal position change, asing uterine activity by adjusting or administering medications as ordered, administering intravenous fluids, ing with amnioinfusion, and modifying pushing techniques. When some or all of these measures have not ed in improvement of the fetal heart rate pattern, maternal oxygen therapy has been suggested as an additic However, consensus on maternal oxygen administration as an intrauterine resuscitative measure is lacking. oxygen therapy may aerosolize COVID-19, consideration should be given to not initiating oxygen for fetal citation. Oxygen therapy should still be considered to improve maternal oxygen status, if needed.

Institutional Policies

- **Follow your institutional policy/procedures regarding care**
- **The HCA Pre- and In-Use checklist for Misoprostol can be found in the Clark, Belfort et al (2008) article…**

From Clark, Belfort, Byrum, et al (2008), p. 105e

FIGURE 1
Checklist-based protocol for administration of misoprostol in viable term fetuses

HCA

RECOMMENDED
PRE AND IN-USE CHECKLIST
MISOPROSTOL

"This check Pre and In Use Misoprostol Checklist represents a guideline for care: however, individualized medical care is directed by the physician."

Notes: for repeat doses of misoprostol, begin with #11
Adequate variability may be substituted in #13 for repeat doses.

Date and time completed_____

1. ☐ Physician or Midwife Order on chart
2. ☐ Physician with cesarean section privileges is aware and readily available
3. ☐ Patient understands risk (1-2%) of hyperstimulation
4. ☐ Prenatal record and history and physical on chart
5. ☐ Pelvis documented to be clinically adequate by the physician (should be on prenatal record)
6. ☐ Estimated fetal weight within past week (clinical or ultrasound) less than 4500grams, or less than 4250grams if diabetic
7. ☐ Gestational age documented
8. ☐ Indication for ripening/induction _____
9. ☐ No contraindications present
10. ☐ Fetus is vertex
11. ☐ Patient is not having regular contractions with cervical change since last dose (if applicable)
12. ☐ A minimum of 30 minutes of monitoring has been completed
13. ☐ At least 2 accelerations of 15 bpm x 15 sec in 30 minutes or Biophysical profile of 8 of 10 is present within the past 4 hours or variability is adequate.
14. ☐ No late decelerations are present
15. ☐ No more than 2 variable decelerations exceeding 60 seconds in duration and decreasing 60 bpm from baseline within the previous 30 minutes prior to misoprostol insertion.

This checklist must be completed prior to the administration of each dose.
Clark, Results of a new paradigm in patient safety. Am J Obstet Gynecol 2004.

AWHONN Staffing Recommendations

- Women receiving pharmacologic agents for cervical ripening such as Cervidil or Cytotec require continuous electronic fetal monitoring and a **minimum of 1 nurse to 2 women with assessment of maternal-fetal status at least every 30 minutes**
  - AWHONN (2010, p. 18); Simpson (2020, p. s8)

Questions?

- Any questions about the mechanical methods, nipple stimulation or prostaglandin agents?

Pitocin (oxytocin)

A High-Alert Medication

- Administrating oxytocin for labor augmentation/induction is both an art and a science
- Both will be addressed in this presentation

Oyxtocin (Pitocin)

- Topics to be covered:
  - Uses
  - Physiology/pharmacology
  - Dosage and rate increase intervals
    - High-dose versus lose-dose
  - Administration guidelines
  - Nursing responsibilities
  - Side effects

Oxytocin (Pitocin)

- Uses of oxytocin (Pitocin)
  - Induction
  - Augmentation
  - Postpartum hemorrhage prevention/treatment

•Now for some science….

Uterine Activity Before The Onset of Active Labor

- •Prepares uterus and cervix for labor
- •Two types of preparatory contractions described by Calderyo-Barcia and Poseiro (1960)
  - •Note: Freeman et al (2012) Fetal Monitoring Text describes these…

Uterine Activity Before The Onset of Active Labor

- Two types of preparatory contractions
  - Small, weak contractions of short duration that remain localized to a small area of the uterus
    - Occur at the rate of 1 per minute
    - Begin in early pregnancy and seem to disappear near term
  - Braxton-Hicks contractions
    - Higher intensity
    - Spread to larger area of the uterus
    - Have a low frequency which approaches 1 contraction per hour in the 30th week
      - Caldeyro-Barcia & Poseiro (1960)

Prelabor Contractions

- Braxton Hicks contractions
  - After the 30th week gradually increase in intensity and frequency
  - As 40th week approaches
    - Uterine activity increases more rapidly
    - Progressively acquires the characteristics of labor contractility
  - During prelabor, the cervix ripens as a possible consequence of increasing uterine contractions
    - Caldeyro-Barcia, & Poseiro, J. J. (1960). Physiology of the uterine contraction. *Clinic Obstetr Gynecology, 3: 386-408.*

Labor Contractions

- The transition into the regular contractions of labor may occur gradually or abruptly
  - Mechanism behind this is unknown

Pharmacology of Oxytocin

Two types of oxytocin:

- Endogenous oxytocin
  - Produced naturally in the body
- Exogenous oxytocin
  - Synthetic
    - Pitocin

Endogenous Oxytocin

- A peptide consisting of amino acids
- Produced in the hypothalamus
- Transported to the posterior pituitary
- Released into maternal circulation in response to
  - breast stimulation
  - sensory stimulation of the lower genital tract
  - cervical stretching
- Oxytocin that is released in response to vaginal and cervical stretching
  - results in uterine contractions

Endogenous Oxytocin

- Plasma clearance of oxytocin is through the maternal kidneys and liver by the enzyme oxytocinase

Endogenous Naturally Produced Oxytocin

- During the first stage of spontaneous labor, maternal circulating concentrations are approximately that which would be achieved with a continuous infusion of exogenous oxytocin at 2 to 4 mu/min
- During labor, fetus excretes approximately 3 mu/minute
- **So a spontaneous labor is achieved with approximately 5 to 7 mu/min of oxytocin**
  - Simpson (2020, p. s22)

Exogenous Oxytocin

- Known commonly as Pitocin
- Synthetically made
- Chemically and physiologically identical to endogenous oxytocin

Physiology of Oxytocin

- In order to understand how oxytocin works
  - Necessary to understand physiology of uterine contractions…..

Physiology of Uterine Contractions

- Variables that affect how effectively the smooth muscle of the uterus contracts
  - oxygenation status of the uterine muscle
  - availability of glucose for contraction activity
  - number of oxytocin receptors in the uterus

Physiology of Uterine Contractions

- Oxygen and glucose needed to support cellular mechanisms that provide energy for myometrial contraction
- If not available in adequate amounts, the contractile process will be inhibited no matter how much oxytocin is administered
  - prolonged labor
  - maternal disease that interferes with oxygenation

Oxytocin Physiology/Pharmacology

- Oxytocin acts via membrane bound receptors in the uterus to stimulate uterine contractions
- Oxytocin acts to increase myometrial contraction through **increasing the availability of intracellular calcium**

Oxytocin Receptors and Response

- Two types of oxytocin receptors in the uterus:
  - Myometrial
    - gradually increase later part of 3rd trimester
    - peak early in spontaneous labor
    - contribute to the initiation of labor
  - Decidual
    - increase during labor
    - reach peak levels at birth

Oxytocin Receptors

- **If there are inadequate receptor sites, oxytocin (no matter how high the dose) will be unsuccessful in stimulating contractions**

Oxytocin Receptors

- Keep in mind the gestational age
  - responsiveness to oxytocin begins at approximately 20 weeks gestation and dramatically increases at approximately 30 weeks gestation
  - This is followed by a plateau from 34 weeks until term, when sensitivity increases
    - (ACOG, 2009; Dudley, 1997)

Oxytocin Receptors

- If the receptor sites are saturated by pitocin being administered for augmentation or induction
  - further increases will be unsuccessful in stimulating contractions
  - Pitocin may need to be turned down or off in order to open up the receptor sites
- Robinson et al (2003) reported that clinical use of oxytocin infusion longer than 3 to 4 hours may be counterproductive to the augmentation of uterine contractions
  - Note: This study was performed in a lab

Physiology/Pharmacology of Oxytocin

- **Half life of oxytocin**
  - **Means the time at which 1/2 the drug is metabolized and out of the system**
    - **10 to 15 minutes**
- **Steady state (drug has achieved the full effect)**
  - **3 to 4 half-lives**
- **Uterine response to IV administration usually occurs within**
  - **3 to 5 minutes**
    - Simpson (2020, p. s22)

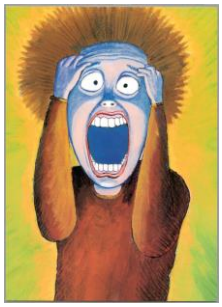
Other Factors That Influence Response to Oxytocin

- Maternal body surface area
- Cervical dilation, parity, gestational age

  (ACOG, 2009, p. 3)
- None of these factors, alone or in combination, predict dosage of oxytocin required to achieve delivery
- Individual responses to oxytocin

Oxytocin (Pitocin)

- Time for a Review…..



Question

- Oxytocin is produced in the
  - Hypothalamus
  - Kidneys
  - Posterior pituitary

Question

- Oxytocin acts to increase myometrial contraction through
  - Decreasing the availability of intracellular calcium
  - Decreasing receptor site sensitivity
  - Increasing the availability of intracellular calcium

Question

- Responsiveness to oxytocin begins at approximately
  - 10 weeks
  - 20 weeks
  - 30 weeks

Question

- A woman at 40 weeks gestation is being induced. Her pitocin was increased to 20 mu/minute approximately 30 minutes ago. Her contractions do not seem to be affected by the dosage increase. The most likely explanation for this is
  - An IV without pitocin was inadvertantly hung
  - The infusion pump is malfunctioning
  - The oxytocin receptor sites are saturated

Question

- The half-life of oxytocin is
  - 3-5 minutes
  - 10-15 minutes
  - 30-40 minutes

Oxytocin (Pitocin)

- Dilution, Dosage and Rate Increase Intervals

Oxytocin Dilution Variations

- Various dilution protocols
  - Use an **isotonic solution**
  - 10, 20, or 30 U in 500 or 1000 ml
  - **30 units of pitocin in 500 ml isotonic solution**
    - **= 1 ml/hr = 1 milliunit/min**
- **Regardless of the dilution, document the rate in milliunits/minute**

Oxytocin Dosage and Intervals

- Controversy exists about dosage and rate increase intervals when oxytocin used for induction of labor
- Available data supports a lower dosage of infusion
  - Simpson, 2020, p. s24
- Let's look at two different approaches…

Oxytocin
Dosage and Interval Regimens

- Two approaches:
  - Low-dose physiologic approach
  - High-dose pharmacologic approach

ACOG (2009, p. 7)
Examples of Low- and High-Dose Oxytocin Regimens

Regimen	Starting Dose (mU/min)	Incremental Increase (mU/min)	Dosage Interval (min)
Low-dose	0.5 – 2	1-2	15-40
High-dose	6	3-6*	15-40

*The incremental increase is reduced to 3 mU/min in presence of hyperstimulation and reduced to 1 mU/min with recurrent hyperstimulation

Rationale for Low-Dose*

- Based on physiologic principles of oxytocin
- Mimics the normal physiologic pattern of oxytocin release
  - 4 to 6 mu/minute
- Based upon pharmacologic half-life of 10-15 minutes and steady state of 40 minutes

Low-Dose Rationale

- The full effect of the uterine response to an increase in oxytocin cannot be evaluated until the steady state has been achieved.
- Increasing the infusion rate before steady state is achieved results in women receiving higher doses of oxytocin than necessary.

Low-Dose

- Fewer episodes of excessive uterine activity
- Fewer operative vaginal births
- Higher rate of spontaneous vaginal birth
- A trend toward lower cesarean birth
  - Simpson, 2020, p. s24

Rationale for High-Dose*

- Based upon a pharmacologic approach
- Supporters believe higher doses are associated with
  - shorter labors
    - One study said 2 hours shorter
  - decreased incidence of chorioamnionitis
  - decreased cesarean for dystocia

Higher Doses of Oxytocin

- Other researchers noted that higher doses and shorter intervals between dose increases led to
  - More tachysystole and indeterminate or abnormal FHR patterns
  - No clinically significant decrease in length of labor
    - Simpson (2020, p. s24)

High-Dose Protocol

- High-dose pitocin ≠ AMOL
- AMOL is the active management of labor
- Users of high-dose pitocin often equate it to the active management of labor
- Although AMOL uses a high-dose protocol, it is more than just high-dose pitocin→

Active Management of Labor (AMOL)

- **Augmentation** protocol
  - Nullipara with singleton, vertex presentation at term
  - Patient education prior to admission
  - Not admitted until in labor
  - Immediately ruptured
  - 1:1 nursing care
  - decreased C/S
  - shorter labors

High-Dose

- Choose either low-dose or high-dose for **augmentation** of labor
  - Increase dose using a low-frequency approach to minimize the risk of tachysytole
    - Miller, Miller & Cypher (2017, p. 96)

Maximum Dose of Oxytocin

- The numeric value for the maximum dose of oxytocin has not been established
- Wen, et al. (2001) reported that in active management of labor, once pitocin exceeds 48 mu/min the risk of cesarean is more than 3-fold

Maximum Dose

- If the hospital policy has a maximum dose listed, the nurse should follow the policy
- Do you know the maximum dose listed in your protocol?
  - What if the provider wants to go above the maximum dose?

- Now for the art of administering pitocin….

Titration of Dosage

- Titrate according to:
  - Uterine activity
    - Goal is to attain adequate or normal uterine activity
  - Labor progress
    - use the least amount needed to affect cervical change
  - Maternal and fetal response

Titration

- Another recommendation
  - Base contraction goals on normal uterine activity
    - Refer to next slide ……

Normal Contraction Pattern:
Miller, Miller, & Cypher 2017, pp. 82, 87

Frequency	2-5 contractions in 10 minutes
Duration	45-80 seconds Not generally longer than 90 seconds
Intensity (peak minus resting tone)	25-80 mmHg with higher intensities seen with labor progression
Resting tone	Average is 10 mmHg (ranges from 8-12 mmHg) Generally not greater than 20-25 mmHg Soft if using palpation
Relaxation time	First stage: commonly 60 seconds or more Second stage: 45 seconds or more
MVU's	100-250 in first stage, may rise to 300-400 in 2nd stage

Titration

- If using internal monitoring
  - Titrate to establish uterine activity patterns reaching 200 to 250 Montevideo units (MVU's)
- If using external monitoring
  - Palpable contractions of normal duration every 2 ½ to 3 minutes
- If labor progress is not occurring with what appears to be adequate uterine activity to palpation
  - Consider an IUPC to more accurately assess uterine activity and **not** to increase the pitocin
    - Miller, Miller, & Cypher (2017, p. 96)

Pitting To Distress????

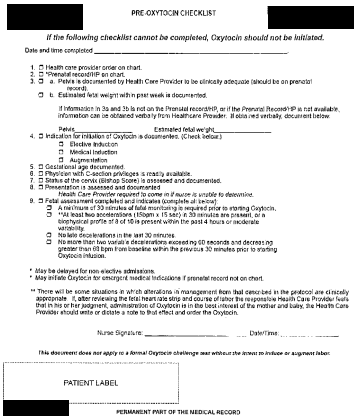
- There is no place in modern obstetric practice for "pitting to distress," "pitting through" a pattern of excessive uterine activity, or continuing to blindly increase the oxytocin dose until the 1-minute Apgar score is recorded.
  - Clark, Simpson, Knox, & Garite (2009)

Oxytocin Checklist Protocol

- Clark et al (2007) found that using these checklists
  - Reduced maximum infusion rates without lengthening labor or increasing operative intervention
  - Cesarean rate declined system-wide
  - Newborn outcome appears to be improved
- Review Clark, et al (2007)
  - Pre-oxytocin checklist and
  - Oxytocin In-use checklist

Oxytocin Checklist

- Clark et al (2015) reported that compliance with an in-use checklist for oxytocin monitoring is associated with a reduction in
  - Rate of NICU admission
  - Reduction in cesarean rate
- Sundin, C. et al (2018) also reported improved clinical outcomes using a checklist
  - Decreases in tachysystole, decreases in cesarean birth for fetal status, decreases in the length of the first stage of labor, decreases in maximum doses of oxytocin



[redacted] PRE-OXYTOCIN CHECKLIST [redacted]

If the following checklist cannot be completed, Oxytocin should not be initiated.

Date and time completed _____

1. ☐ Health care provider order on chart.
2. ☐ *Prenatal record/HP on chart.
3. ☐ a. Pelvis is documented by Health Care Provider to be clinically adequate (should be on prenatal record).
   ☐ b. Estimated fetal weight within past week is documented.

   If information in 3a and 3b is not on the Prenatal record/HP, or if the Prenatal Record/HP is not available, information can be obtained verbally from Healthcare Provider. If obtained verbally, document below.

   Pelvis _____ Estimated fetal weight _____
4. ☐ Indication for initiation of Oxytocin is documented. (Check below.)
   - ☐ Elective Induction
   - ☐ Medical Induction
   - ☐ Augmentation
5. ☐ Gestational age documented.
6. ☐ Physician with C-section privileges is readily available.
7. ☐ Status of the cervix (Bishop Score) is assessed and documented.
8. ☐ Presentation is assessed and documented

   Health Care Provider required to come in if cause is unable to determine.
9. ☐ Fetal assessment completed and indicates (complete all below)
   - ☐ A minimum of 30 minutes of fetal monitoring is required prior to starting Oxytocin.
   - ☐ **At least two accelerations (≥5bpm x 15 sec) in 30 minutes are present, or a biophysical profile of 8 of 10 is present within the past 4 hours or moderate variability.
   - ☐ No late decelerations in the last 30 minutes.
   - ☐ No more than two variable decelerations exceeding 60 seconds and decreasing greater than 60 bpm from baseline within the previous 30 minutes prior to starting Oxytocin infusion.

* May be delayed for non-elective admissions.
* May initiate Oxytocin for emergent medical indications if prenatal record not on chart.

** There will be some situations in which alterations in management from that described in the protocol are clinically appropriate. If, after reviewing the fetal heart rate strip and course of labor the responsible Health Care Provider feels that in his or her judgment, administration of Oxytocin is in the best interest of the mother and baby, the Health Care Provider should write or dictate a note to that effect and order the Oxytocin.

Nurse Signature: _____ Date/Time: _____

This document does not apply to a formal Oxytocin challenge test without the intent to induce or augment labor.

PATIENT LABEL

[redacted] PERMANENT PART OF THE MEDICAL RECORD

This Oxytocin "In Use" Checklist represents a guideline for care, however individualized medical care is directed by the healthcare provider.

Oxytocin "In Use" Checklist

Fetal assessment parameters
□ **Met**
□ **Not met**

Uterine contractions parameters
□ **Met**
□ **Not met**

Review checklist each time Oxytocin dosage rate is increased or at least every 30 minutes if the dosage remains unchanged. Oxytocin should be stopped or decreased if the following checklist cannot be completed.

☐ Fetal assessment indicates:
- ☐ At least one acceleration of 15 bpm x 15 seconds in 30 minutes or minimal to moderate variability for 10 of the previous 30 minutes.
- ☐ No more than one late deceleration occurred.
- ☐ No more than two variable decelerations exceeding 60 seconds in duration and decreasing greater than 60 bpm from the baseline within the previous 30 minutes.
- ☐ Absence of prolonged deceleration(s).

☐ Uterine contractions:
- ☐ No more than 5 uterine contractions in 10 minutes for any 30 minute interval.
- ☐ No more than one contraction lasting greater than 120 seconds duration.
- ☐ Uterus palpates soft between contractions.
- ☐ If IUPC is in place, MVU must calculate less than 300 mm Hg and the baseline resting tone must be less than 25 mm Hg.

Sample Oxytocin Checklist

For Example…

- A difficult situation/dilemma…
  - decreasing or discontinuing oxytocin for a fetal heart rate pattern with decelerations
- Pattern resolves and oxytocin restarted
- Abnormal pattern reappears
- Oxytocin decreased or discontinued
- Patient stops progressing in labor without oxytocin……..

Freeman et al (2012, p. 134)

- May be appropriate to continue the oxytocin despite the decelerations,
  - Especially if spontaneous or elicited accelerations are present
- **Written documentation of the plan by the provider explaining why the oxytocin was necessary and why it was appropriate to continue in this situation is important…**
  - **In otherwords, describing the use of clinical judgment and critical thinking….**

Nurse's Responsibility

- Collaborate with the provider regarding the situation
- If disagreement with the plan
  - initiate the chain-of-communication

If You Are Asked….

- How do you decide when to turn up pitocin?
- Your response:
  - I titrate the pitocin according to maternal-fetal response and labor progress

Get Into The Habit Of…

- Every time you turn pitocin up, down, or off ask yourself if you can explain to someone else why you are doing this…
- Patient safety is your first priority….

BEWARE!

- Use caution and clinical judgment when increasing pitocin right before a combined spinal/epidural or an epidural is inserted…
- Why??

Rapid Pain Relief

- Effective pain relief causes a significant decrease in maternal circulating catecholamines, especially epinephrine
- Tocolytic effect of epinephrine can be lost resulting in predominance of norepinephrine's uterotonic effect
  - May lead to hypertonus (elevated resting tone)
- More likely to happen with a combined spinal-epidural using opioids due to rapid pain relief
  - Notably in first 5 minutes of analgesia
    - Abrão, Francisco, et al (2009)

Labor Progress

- Keep your eye on the progress of labor…
- Keep in mind the phase and stage of labor….

Contraction Characteristics

• Latent phase	• Every 10-20 minutes lasting 15-20 seconds progressing to every 5-7 min lasting 30-40; moderate to palpation
• Active phase	• Every 2-3 minutes lasting 60 seconds; moderate to strong to palpation • Every 2 minutes lasting 60-90 seconds; strong to palpation
• Transition phase	

Labor Progress

Latent phase

- Allow 12-18 hours before diagnosing a failed induction
  - ACOG, 2009, p. 4
- If maternal and fetal status allow, avoid cesarean for a failed induction of labor by allowing longer duration of the latent phase
  - Up to 24 hours or longer and requiring that oxytocin be administered for at least 12 to 18 hours after membrane rupture before declaring the induction a failure
    - ACOG & SMFM (2014, p. 7)

Harper Research Study..

- Harper et al (2012) in a retrospective cohort study reported that the
  - Latent phase of labor (defined as less than 6 cm) is significantly longer in induced labor compared to spontaneous labor
  - Active phase of labor (greater than 6 cm) is similar between groups
  - Induced women had significantly longer time in labor (dilation from 4 to 10 cm)
    - Nulliparous women
      - Induced (median 5.5 hours) (95th percentile 16.8 hours)
      - Spontaneous labor (median 3.8 hours) (95th percentile 11.8 hours)
    - Multiparous women
      - Induced (median 4.4 hours) (95th percentile 16.2 hours)
      - Spontaneous (median 2.4 hours) (95th percentile 8.8 hours)
  - * Researchers adjusted for race, obesity, macrosomia, and Bishop score

Harper Study

- Concluded that a diagnosis of labor arrest prior to 6 cm in women being induced should be made with caution.
  - Harper (2012)

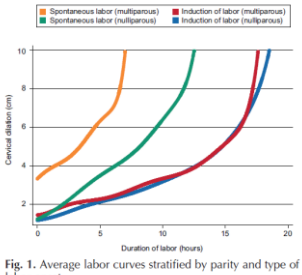


Fig. 1. Average labor curves stratified by parity and type of labor onset.
Harper. Normal Labor in Induction. Obstet Gynecol 2012.

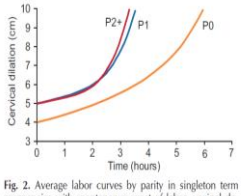


Fig. 2. Average labor curves by parity in singleton term pregnancies with spontaneous onset of labor, vaginal delivery, and normal neonatal outcomes. P0, nulliparous women; P1, women of parity 1; P2+, women of parity 2 or higher.
Zhang. Contemporary Labor Patterns. Obstet Gynecol 2010.

Dosage Changes in Active Phase

- When the patient enters the active phase of labor and is making adequate labor progress, the oxytocin may be decreased or discontinued
  - This may reduce risk of
    - Tachysystole
    - Abnormal FHR tracings
    - Cesarean birth
  - Use clinical judgment based upon each individual situation…
- Decreasing the dosage may help decrease the risk of postpartum hemorrhage

Dosage Changes in Active Phase

- The challenge may be
  - determining when active labor starts
- **Use your common sense and clinical judgment**
- **Once an adequate pattern of uterine activity is established**
  - **Wean the oxytocin to the lowest amount necessary to maintain adequate contractions**
    - **Miller, Miller, & Cypher, 2017, p. 96**
- Watch the progress of labor
  - Every time you turn the pitocin up, down, or off ask yourself if you could explain why you did to someone else…

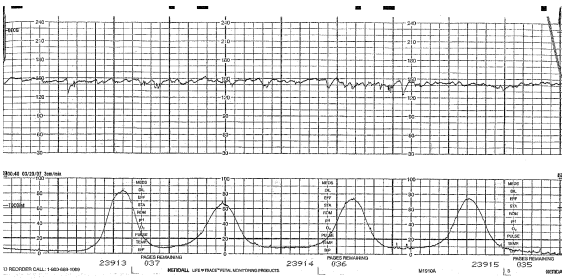
What If Labor Is Not Progressing?

- May need an IUPC in order to more accurately assess contraction activity
  - Calculate Montevideo units (MVU's)

Montevideo Units (MVU'S)

- Measures the quality and sum of contractions
- **Only obtainable with IUPC**
- Calculate by looking at the contractions in a 10 minute tracing
  - Subtract the resting tone from the peak for each contraction
  - Then add all of the sums together

Calculate the Montevideo Units



80-5=75 70-10=60 70-10=60 75-10=65

75 + 60 + 60 +65 = 260 MVU's

Montevideo Units

- In a retrospective report of induction of labor
  - 91% of women achieved 200-224 MVU's
  - 40% achieved at least 300 MVU's

Failed Induction

- If maternal/fetal status allow, cesareans for failed induction of labor can be avoided by
  - Allowing longer durations of the **latent phase**
    - Up to 24 hours or longer
    - And requiring that oxytocin be administered for at least 12-18 hours after membrane rupture before deeming the induction a failure
      - ACOG & SMFM (2014, p. 7) Recommendations for Safe Prevention of Primary Cesarean Delivery

Active Phase Disorders

- ACOG & SMFM (2014, p. 7) Recommendations for Safe Prevention of Primary Cesarean Delivery
  - Cervical dilation of 6 cm should be considered the threshold for the active phase for most women in labor
  - Cesarean delivery for active phase arrest should be reserved for women at or beyond 6 cm with ruptured membranes who fail to progress despite 4 hours of **adequate** uterine activity or at least 6 hours of oxytocin administration with **inadequate** uterine activity and no cervical change

What Defines Adequate Uterine Activity?

- Greater than 200 Montevideo units
  - ACOG & SMFM (2014, p. 8) Recommendations for Safe Prevention of Primary Cesarean Delivery
  - Spong et al (2012, p. 1185)

Labor Progress

- Review separate handout entitled “Labor Progress”

Fetal Descent

- Don’t forget about fetal descent…

Augmentation of Labor With Oxytocin

- Use of oxytocin to increase frequency and/or strength of contractions following the onset of spontaneous labor or spontaneous rupture of membranes
- Refer to Pre-oxytocin checklist on next slide

[redacted] PRE-OXYTOCIN CHECKLIST [redacted]

If the following checklist cannot be completed, Oxytocin should not be initiated.

Date and time completed: _____

1. ☐ Health care provider order on chart.
2. ☐ *Prenatal record/HP on chart.
3. ☐ a. Pelvis is documented by Health Care Provider to be clinically adequate (should be on prenatal record).
   ☐ b. Estimated fetal weight within past week is documented.

   If information in 3a and 3b is not on the Prenatal record/HP, or if the *Prenatal Record/HP is not available, information can be obtained verbally from Healthcare Provider. If data red verbally, document below.

   Pelvis: _____ Estimated fetal weight: _____
4. ☐ Indication for initiation of Oxytocin is documented. (Check below.)
   ☐ Elective Induction
   ☐ Medical Induction
   ☐ Augmentation
5. ☐ Gestational age documented.
6. ☐ Physician with C-section privileges is readily available.
7. ☐ Status of the cervix (Bishop Score) is assessed and documented.
8. ☐ Presentation is assessed and documented.
   Health Care Provider required to come in if nurse is unable to determine.
9. ☐ Fetal assessment completed and indicates (complete all / below)
   ☐ A minimum of 30 minutes of fetal monitoring is required prior to starting Oxytocin.
   ☐ **At least two accelerations (≥10bpm x 15 sec) in 30 minutes are present, or a biophysical profile of 8 of 10 is present within the past 4 hours or moderate variability.
   ☐ No late decelerations in the last 30 minutes.
   ☐ No more than two variable decelerations exceeding 60 seconds and decreasing greater than 60 bpm from baseline within the previous 30 minutes prior to starting Oxytocin infusion.

* May be delayed for non-elective admissions.
* May initiate Oxytocin for emergent medical indications if prenatal record not on chart.

** There will be some situations in which alterations in management from that described in the protocol are clinically appropriate. If, after reviewing the fetal heart rate strip and course of labor the responsible Health Care Provider feels that in his or her judgment, administration of Oxytocin is in the best interest of the mother and baby, the Health Care Provider should write or dictate a note to that effect and order the Oxytocin.

Nurse Signature: _____ Date/Time: _____

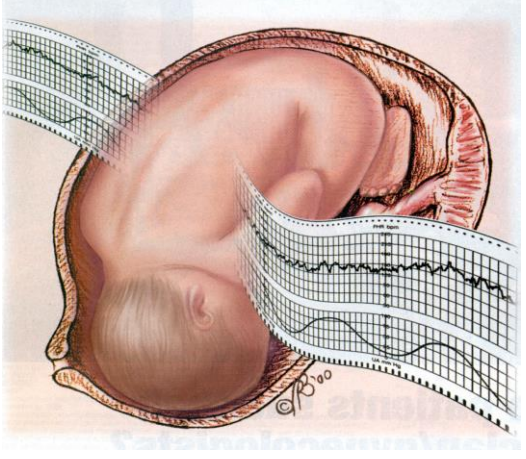
This document does not apply to a formal Oxytocin challenge test without the intent to induce or augment labor.

PATIENT LABEL

[redacted] PERMANENT PART OF THE MEDICAL RECORD

Estimated Fetal Weights

- Individual departments may
  - determine and define how and by whom EFW's will be determined
  - Define how documentation of EFW will occur
    - Ex: in grams or pounds and/or use of terminology such as SGA/AGA/LGA



Maternal-Fetal Assessments

- If you cannot assess the contraction pattern or fetal heart rate, do not run pitocin..

Maternal-Fetal Assessments

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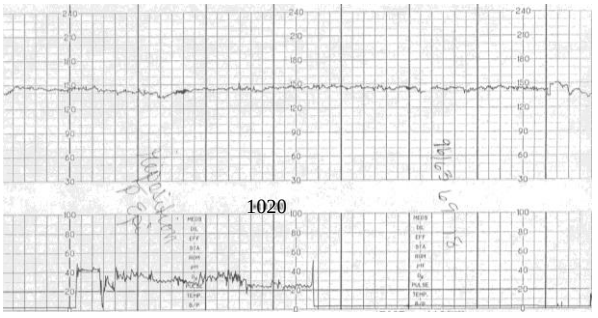
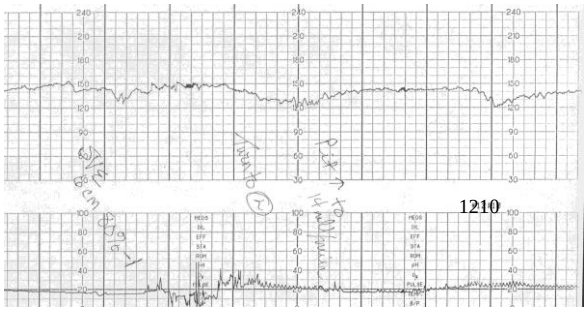


Pitocin is running here



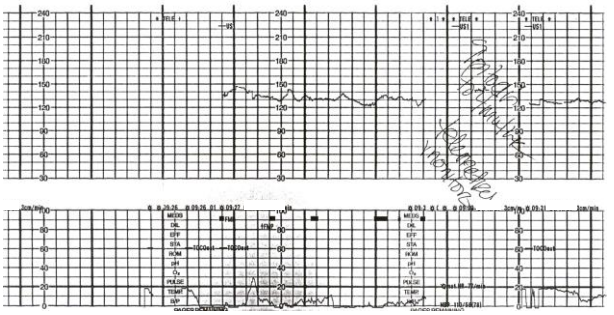
Cervix 6/80%/-1; Pitocin turned up to 14 mu/min

Maternal-Fetal Assessment

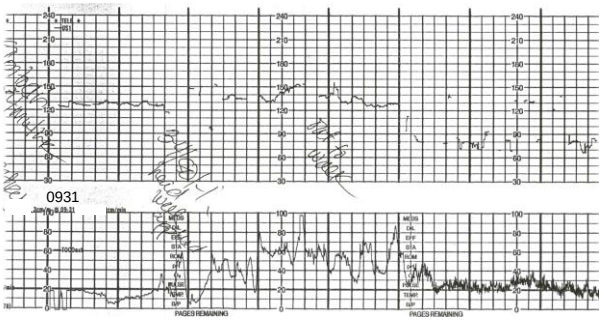
- If unable to assess contraction pattern with an external monitor
  - Notify provider to insert an IUPC if situation allows
    - Membranes ruptured or able to be ruptured
    - Cervical dilation permits
  - Or, palpate and mark beginning and end of contractions on the paper strip
- If unable to assess the fetal heart rate with an external monitor
  - Apply a spiral electrode if technically possible

Maternal-Fetal Assessment

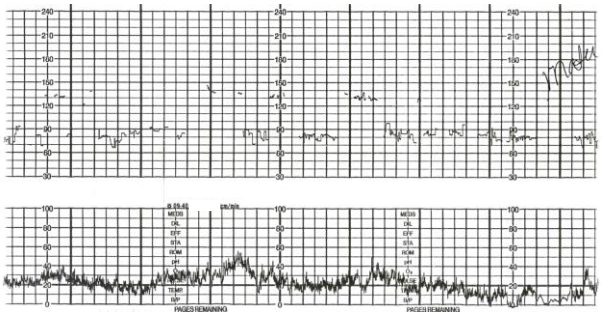
- What if you have her on telemetry and it is not adequately tracing the fetal heart rate?



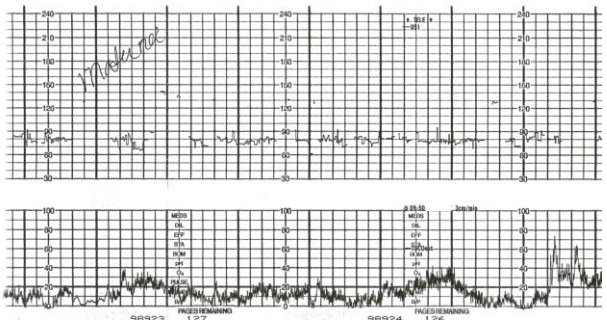
0930: pitocin increased to 4 mu/min;
contractions palpate mod to strong
telemetry applied;
BP 110/58



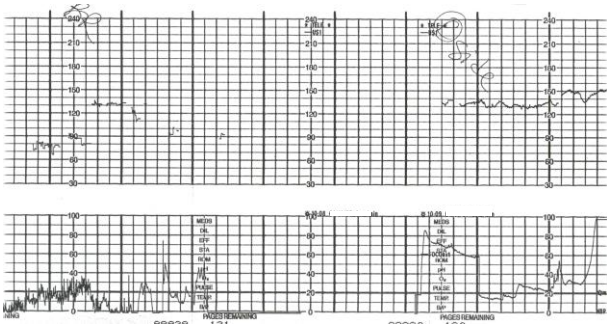
0932: 3-4 cm, 80%, -1; head well applied;
out to walk at 0935
Is she in active labor? How is active labor defined?
Why am I asking this question?



0940: walking with telemetry



0950: walking with telemetry



1009: Back to bed….

Maternal-Fetal Assessments

- If you cannot assess the contraction pattern or fetal heart rate, do not run pitocin..