The Hormonal Physiology of Childbearing

Photo courtesy of Rick Diemand Photography

Mommpotamus.com

#2015.AWHONN
Objectives

• Define principles of the hormonal physiology of childbearing

• Describe impacts of common maternity care interventions on hormonal physiology (scheduled birth, synthetic oxytocin, epidural, early separation of mom and baby)

• Discuss nursing care and management that promotes healthy hormonal function of the mom and baby dyad for selected cases
What is the hormonal physiology of childbearing?
Neurohormones

- Produced by specialized nervous tissue rather than endocrine glands
- Sent to target organ through the circulation
- Examples—hormones of childbearing such as oxytocin
- Research on neurohormones has linked our mind and emotions with physiological effects
- **Pregnancy, labor, birth, postpartum are a continuous physiologic process mediated by neurohormones**

Dixon, Skinner & Foureur, 2013

The Hormonal Physiology of Childbearing

- “Hormonal physiology of childbearing involves complex interconnected beneficial processes.
- **Hormonal actions of one phase anticipate and prepare for subsequent phases.**
- In healthy pregnancies, these processes foster efficient labor, safety for mother and infant, successful breastfeeding, and optimal mother-newborn bonding.”

Hormonal Physiology of Childbearing: Evidence and Implications for Women, Babies, and Maternity Care (2015)
Hormonal systems promote and inhibit each others’ activities.

Example—oxytocin increases in second stage are promoted by high levels of prolactin, this assists with pushing
Evidence Summary on Hormonal Physiology of Childbearing

- Evolutionary origins
- Mother-baby dyad
- Beneficial hormonal physiology pathway
- Inter-orchestration among hormone systems
- Cascade of intervention
- Concern about long term impacts

Buckley, 2015

Oxytocin

- Rhythmic uterine contractions, the late-labor oxytocin surge benefits pushing (Ferguson reflex)
- Calming and analgesic effects in mothers and babies, labor through the postpartum period
- Postpartum maternal adaptations reduce stress, increase sociability, and prime reward centers, imprint pleasure with infant contact and care, promote longer-term infant survival

Artificial oxytocin can block effects of endogenous oxytocin.

Buckley, 2015

Pinterest
Oxytocin in the Golden Hour

- “Stronger contractions, likely reducing postpartum hemorrhage risk
- Natural warming for the newborn through vasodilation of mothers’ chest
- Activation of hormonally-mediated maternal-infant biologic bonding
- Facilitation of breastfeeding initiation, including by reducing maternal and newborn stress”

Buckley, 2015

Beta-endorphins

- Endogenous analgesia
- Altered state of consciousness
- Fetal neuroprotection from hypoxia
- Maternal euphoria after birth
- Reward and reinforcement of breastfeeding (mom and baby)
- Support of newborn with postpartum transition—endorphins in colostrum

Endogenous opioid-like substances, many repro and non-repro functions

Buckley, 2015
Catecholamines

• Fight or flight if not feeling safe
• Promotion of “healthy stress”
• Alertness, promotion of labor progress
• Promotion of second stage urge to push
• For baby-critical adaptations to labor hypoxia
• Facilitation of newborn transition

Buckley, 2015

Non-repro functions: CV, wound healing, metabolism

Prolactin

• Stress reduction throughout pregnancy—mom and fetus
• Maternal adaptation
• Caregiving hormone—not just mom
• Milk production
• Decreased stress and muscular tension during breastfeeding

www.health.mil

Non-repro functions related to homeostasis—weight, appetite

Buckley, 2015
Why promote the hormonal physiology of childbearing?

Evolutionary Perspective

• “Human birth has evolved over millions of years to optimize reproductive success for mothers and offspring, and for our species as a whole.”

• “Processes that promote lactation and maternal-infant attachment have therefore evolved to be intertwined and continuous with the biologic processes of birth.”

Buckley, 2015
The Precautionary Principle

General Framework

• No action taken if risk of harm and uncertainty of effects

• Proponents of an action must prove efficacy and minimal risk

• Consider and evaluate feasible alternatives

• Increased participation in decisionmaking by those involved or potentially at risk

Applied to Maternal/Infant Health

• Verify benefits prior to intervening

• Only routine interventions are those proven to benefit healthy mom/baby

• Use less invasive practices first if problems arise

• Involve women in decisions and provide adequate information

Goldstein, 2001

Buckley, 2015

Texas has highest maternal mortality rate in developed world, study finds

As the Republican-led state legislature has slashed funding to reproductive health care clinics, the maternal mortality rate doubled over just a two-year period.

More than three times as many black women die from childbirth, and the gap is widening

Percentage of pregnancy-related deaths by race

| Year | Black Women (%) | White Women (%)
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<thead>
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<tr>
<td>2011</td>
<td>34%</td>
<td>11.8</td>
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<tr>
<td>2011</td>
<td>42.8%</td>
<td>12.5</td>
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SOURCE: CDC Pregnancy Mortality Surveillance System

CREED: Sarah Darnellson
Trends in Maternal Morbidity and Mortality, U.S.

Is promoting healthy hormonal function our choice or our responsibility?
“Spontaneous labour in a normal woman is an event marked by a number of processes so complicated and so perfectly attuned to each other that any interference will only detract from the optimal character. The only thing required from the bystanders is that they show respect for this awe-inspiring process by complying with the first rule of medicine—nil nocere [Do no harm].”

G. Kloosterman
Dutch professor of obstetrics, 1982

Quality Patient Care in Labor and Delivery: A Call to Action

• "Pregnancy and birth are physiologic processes, unique for each woman, that usually proceed normally. Most women have normal conception, fetal growth, labor, and birth and require minimal-to-no intervention in the process."

AWHONN Position Statement on Induction/Augmentation

“The Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) maintains that labor is a complex physiologic event involving the intricate interaction of multiple hormones that should not be initiated or altered without a medical indication.”

“Administering exogenous hormones and performing mechanical interventions to a vulnerable population (pregnant women and their fetuses) is not advisable unless the benefits of these interventions have been shown to outweigh the risks.”

AWHONN, 2014

Clinician’s Responsibilities to Promote Physiologic Birth

- Education, knowledge, competence, skill, and confidence in supporting physiologic labor and birth, including helping women cope with pain;

- Commitment to working with women through education to enhance their confidence in birth and diminish their fear of the process;

- Commitment to shared decision making; and

- Working within an infrastructure supportive of normal physiologic birth.

ACNM, MANA, NACPM, 2012
Is the hospital birth environment consistent with the goal of promoting healthy hormonal function?

Does your hospital birth setting include:

- One to one nursing care for women who desire low intervention?
- Support for and collaboration with trained labor support companions (doulas)?
- Quiet, respectful, private environment that woman can alter?
- Encouragement to wear own clothes, not hospital gown?
- Fluids and food?
- Options for being out of bed?
- Telemetry for fetal monitoring?
- Pain relief options—water? Nitrous?
- Options to facilitate second stage?
- Skin to skin at birth?

Care practices in red relate to AWHONN Quality Measures
The Environment of Birth Matters

What can block the hormonal cascade?

What can disturb labor and birth?
• Stress
• Unneeded interventions
Potential Impacts of Synthetic Oxytocin

- Uterine hyperstimulation, potential fetal hypoxia
- Stronger contractions, increased pain
- Synthetic oxytocin overexposure causing desensitization of oxytocin receptors, contributing to
  - reduced contractility,
  - prolonged pushing,
  - instrumental birth
  - postpartum hemorrhage
- Disruption of newborn breastfeeding behaviors, reduced maternal oxytocin release with breastfeeding, and possible reduced breastfeeding duration

Buckley, 2015

Cascade of Intervention: Induction of Labor

- More analgesia and anesthesia use
- More continuous EFM
- Limits on movement in labor
- Higher cesarean rates
- More neo resuscitation

Zhang et al, 2010; Goer & Romano, 2012
Cascade of Intervention: Epidural Anesthesia

- Epidural anesthesia
- Decreased response to endogenous oxytocin
- Use of synthetic oxytocin
- Endogenous oxytocin receptors are desensitized
- Increased risk for PPH

Buckley, 2015

Potential Impact of Early Separation of Mom and Baby

- Stress of separation may mean catecholamines are not reduced
- Oxytocin not elevated through skin to skin contact and mutual interactions-this can lead to increased newborn stress, hypoglycemia and hypothermia
- Disruption of breastfeeding initiation
- Interference with reward center activation for both mom and baby; can have long term effects for newborn's pain sensitivity

Buckley, 2015
When, where and how can we promote the hormonal physiology of childbearing?

Factors that Influence a Woman’s Childbirth Experience

- Health status
- Views on autonomy and self-determination in childbirth
- Personal knowledge and confidence about birth
- Cultural beliefs, norms and practices about physiologic birth
- Access to informed and shared decision making
- Access to health care settings and clinicians who are skilled in supporting physiologic birth

ACNM, MANA & NACPM, 2012
During Pregnancy

• Provide prenatal care that reduces stress and anxiety in pregnant women.

• Address the whole person during prenatal care

• Mobilizing support during pregnancy--Centering

• Foster the physiologic onset of labor at term
  – Only medically-indicated inductions/augmentations

Buckley, 2015

In Labor

• With hospital birth, encourage admission in active labor.

• Support privacy and reduce anxiety and stress in labor.

• Make nonpharmacologic comfort measures for pain relief routinely available, and use analgesic medications sparingly.

• Make nonpharmacologic methods of fostering labor progress routinely available, and use pharmacologic methods sparingly.

• Promote continuous support during labor.

Buckley, 2015
Birth and Postpartum

- Foster spontaneous vaginal birth, and avoid unneeded cesareans.

- Support early and unrestricted skin-to-skin contact after birth between mother and newborn.

- Support early, frequent, and ongoing breastfeeding after birth.

- Postpartum support that promotes healing on all levels

Buckley, 2015

Essential Care Components

- Safe Care
- Respectful Care
- Emotionally Supportive Care
- Shared Decision making
- Physically Supportive Care

Buckley, 2015; ACNM, MANA NACPM, 2012

Image credit: breastfeedingstl.blogspot.com
Safe Care

“Every pregnant women needs to know that labor and birth are simply and beautifully designed. In order to keep labor and birth as safe as possible, and to minimize the risk of complications, it is essential to respect the simple, natural, physiologic process of labor and birth and not interfere in any way, unless there is a clear medical indication.”

Judith Lothian

Safe Care

• Hospitals can be alienating environments

• Institutional routines, lack of privacy can contribute to feelings of loss of control and disempowerment (Lock and Gibb 2003; Steele 1995)

• Feelings of control contribute to women’s childbirth experience and emotional well-being postpartum (Green et al., 1990; Simkin, 1992)

Respectful Care

“Respectful maternity care (RMC) is a universal human right that is due to every childbearing woman in every health system. Women’s experiences with maternity caregivers can empower and comfort them, or inflict lasting damage and emotional trauma.”

White Ribbon Alliance

Shared Decision Making

"Shared decision making is really a process between a woman and her healthcare provider. The provider gives information about the outcomes and uncertainties of available treatment and the woman expresses the values she brings to the decision and how she feels about the benefits and harms. Then together, they can reach agreement on the best strategy for her.”

Molly Beinfeld, Director of Independent Production at the Foundation for Informed Medical Decision Making
Support in Labor

- Cochrane analysis (Hodnett, 2011)
- 22 trials, 15,288 women
- For women with continuous support
  - More vaginal births (Spontaneous)
  - Less analgesia
  - Less likely to report dissatisfaction with birth experience
  - Shorter labors
  - Fewer cesareans/ operative vag birth
  - Less regional anesthesia
  - Fewer babies with low 5 minute Apgar scores
- Support most effective if support person was not hospital staff or part of woman's social network

Nursing Support of Laboring Women

AWHONN Position Statement (2011)

“The Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) asserts that continuously available labor support from a registered nurse (RN) is a critical component to achieve improved birth outcomes.

The RN assesses, develops, implements and evaluates an individualized plan of care based on each woman’s physical, psychological and socio-cultural needs, including the woman’s desires for and expectations of the laboring process.

Labor care and labor support are powerful nursing functions, and it is incumbent on health care facilities to provide an environment that encourages the unique patient-RN relationship during childbirth.”

http://www.jognn.org/article/S0884-2175(15)30584-0/fulltext
Physically Supportive Care

abcnews.com

Birthwithoutfearblog.com

www.birthtools.com

www.littleblessingsdoula.com

www.miseeharris.com

Ideas for Pain Relief in Labor

A - amen (pray)
B - birth ball
C - calm
D - dance
E - efflurage
F - fear release
G - grub
H - hula
I - intuition
J - jokes
K - kiss
L - lunge
M - music
N - nap
O - omm!
P - pace
Q - quiet
R - relaxation
S - sway
T - touch
U - urinate
V - vocalize
W - water
X - eXhale
Y - yawn
Z - zzz

pregnancy.about.com
Emotionally Supportive Care

“Nothing in life prepares a woman for labour. Your reassurance that contractions and emotions are all part of the normal process of giving birth is vital. Do you believe in her strength and ability to give birth normally? You may be the only constant anchor during woman’s labour to give her constant reassurance – be positive.”

http://www.rcmnormalbirth.org.uk/ten-top-tips/

“Each one of you built my confidence and did away with some part of the fears that I carried into this pregnancy.”

Comment from woman who had her baby at a Chicago hospital birth center
Patience

“The one single practice most likely to help a woman have a normal birth is patience. But in order to be able to let natural physiology take its own time, we have to be very confident of our own knowledge and experience. To do this, we need to be able to acquire more knowledge and experience of normal birth – and know when the time is right to take action.”

http://www.rcmnormalbirth.org.uk/ten-top-tips/
Hormonal Physiology of Childbearing Infographics

http://transform.childbirthconnection.org/reports/physiology/

Cases for Discussion
A first labor

• 17 yo G1P0 at 39.2 weeks
• Prenatal course uncomplicated
• c/o ctx for 2 hours, denies SROM, normal FM
• Cx 5/80/-1/ mid position/soft
• Coping well with ctx, family very supportive
• Admitted

*What’s your plan to facilitate healthy hormonal function and labor progress?*

Induction

• 36 yo G3 P2002 at 40. 2 weeks
• IOL for Cat 2 FHR
• h/o SVB x 2, 8 yo and 10 yo, in her native country
• In US x 2 years, non-English speaker
• BMI 40, GDMA1
• Tells you she is scared she’ll have a cesarean

*How can we promote healthy hormonal function during labor?*
Is promoting healthy hormonal function our choice or our responsibility?

Why promote healthy hormonal function in childbirth?

• Safe care
• Respectful care
• Decrease birth trauma
• Promote healthiest outcomes for women and babies
• Women can be empowered by birth
“A Healthy Baby Isn’t All that Matters”

“The truth is that in this day and age and place, a higher standard can and should exist: a healthy baby, a healthy mom, and a positive, respectful, family-centered birth experience for everyone.”

Pascucci, 2013; http://improvingbirth.org/2013/02/a-healthy-baby-isnt-enough/