

Postterm pregnancy

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Objectives

1. Define, classify and describe the epidemiology of postterm pregnancy
2. Correctly establish gestational age (GA) and diagnose postterm pregnancy
3. Describe the risk factors for postterm pregnancy
4. Understand the maternal, fetal and neonatal risks/complications of postterm pregnancy
5. Outline and rationalize the approaches to appropriate management of postterm pregnancy

Definition

- Post-term pregnancy a pregnancy that has extended to or beyond
 - 42 completed weeks (42 0/7 weeks or 294 days) of gestation from the first day of the last normal menstrual period (WHO, ACOG, FIGO)
 - 40 completed weeks (40 0/7 weeks or 280 days) of gestation from the date of conception
- Other terminologies
 - Prolonged pregnancy-nonspecific, any pregnancy >40 weeks
 - Postdates/postdatism-old non-specific, not recommended
 - Postmature-fetal syndrome, infant has recognizable clinical features of a pathologically prolonged pregnancy

Correctly classifying pregnancies by GA

- Postterm: $\geq 42 \frac{0}{7}$ weeks
- Late term : $41 \frac{0}{7}$ and $41 \frac{6}{7}$ weeks
- Full term: $39 \frac{0}{7}$ - $40 \frac{6}{7}$ weeks
- Early term: $37 \frac{0}{7}$ weeks and $38 \frac{6}{7}$ weeks
- Preterm: $< 37 \frac{0}{7}$ weeks
 - Late preterm: 34 to <37
 - Moderate preterm: 32 to <34 weeks
 - Very preterm: 28 to <32 weeks
 - Extremely preterm: <28 weeks

Estimating GA

- Gestational age (GA)
 - the length of pregnancy in weeks and days after the first day of the last menstrual period (LMP)
 - also called menstrual age
 - estimated as 280 days
- Conceptional age (CA)
 - the length of pregnancy from the time of conception
 - is the true fetal age
 - estimated as 266 days
 - also referred to as ovulatory or fertilization age

Estimating GA-approaches

- Commonly used Nägele rule
 - An approximate rule
 - Estimated due date= $(1^{\text{st}} \text{ day of LNMP} - 3 \text{ months}) + 7 \text{ days}$ or $(1^{\text{st}} \text{ day of LNMP} + 9 \text{ months}) + 7 \text{ days}$
 - Assumptions :
 - normal GA is 280 days (but primiparous average 282 to 283 days)
 - menstrual cycles are 28-days
 - regular cycles preconception
 - ovulation at the midpoint of the cycle
 - fertilization on the middle day of the cycle
 - correct recall of the onset of the LNMP
 - no contraceptives for several months preconception

Estimating GA-approaches

- History
 - Preconception menstrual cycles
 - Contraception
 - Early pregnancy bleeding
 - Urine pregnancy test
 - Serum β hCG
 - Early pregnancy symptoms
 - Date of conception
 - IVF and implantation
 - Quickening
- Physical examination
 - Uterine size
- Ultrasound
 - CRL, BPD, HC, AC, FL

Epidemiology/overview

- The incidence of postterm pregnancies vary by population
 - 5.6% in USA in 2012, 0.4% in Austria, 7% in Denmark and Sweden.
 - Based on differences in management beyond the EDD and dating criteria
- Accurate determination of GA is essential to accurate diagnosis and appropriate management of late-term and postterm pregnancies.

Etiology

- Unknown
- Parturition results from complex interplay of the mother, fetus & placenta
- Gestation and timing of birth is under the control of hypothalamic-pituitary-adrenal (HPA) axis
- In sheep
 - hypothalamus-releases corticotropin-releasing hormone (CRH)-results in secretion of adrenocorticotrophic hormone (ACTH) from the pituitary gland and cortisol from the adrenal gland
 - net effect is increase prostaglandin and estrogens and a fall in progesterone which then triggers uterine myometrium
 - disruption of HPA for example in hypophysectomized sheep, prolongs pregnancy
- In human fetus, HPA dysregulation may prolong pregnancies

Etiology

- Risk factors include
 - Nulliparity/primigravidity
 - Prior postterm pregnancy
 - Male fetus
 - Maternal obesity-prepregnancy BMI ≥ 25
 - Genetic predisposition-family history (maternal, not paternal genetic factors)
 - Fetal disorders
 - Anencephaly
 - Adrenal hypoplasia
 - X-linked placental sulfatase deficiency-an X-linked recessive disorder associated with abnormally low estriol levels

Fetal and neonatal risks

- **Increased risk of perinatal morbidity and mortality**

- Meconium aspiration syndrome
- 5-minute APGAR score <4
- Neonatal convulsions
- NICU admissions

- **Increased incidence of macrosomia and risk of**

- Operative vaginal delivery
- Cesarean delivery
- Shoulder dystocia

- **Oligohydramnios & increased risk of**

- FHR abnormalities-prolonged decelerations
- Umbilical cord compression
- Meconium staining of amniotic fluid (MSAF)
- Umbilical cord artery blood pH < 7
- Lower APGAR scores

- **Increased incidence of FGR**

- Higher rate of still birth if postterm and growth restricted

Fetal and neonatal risks

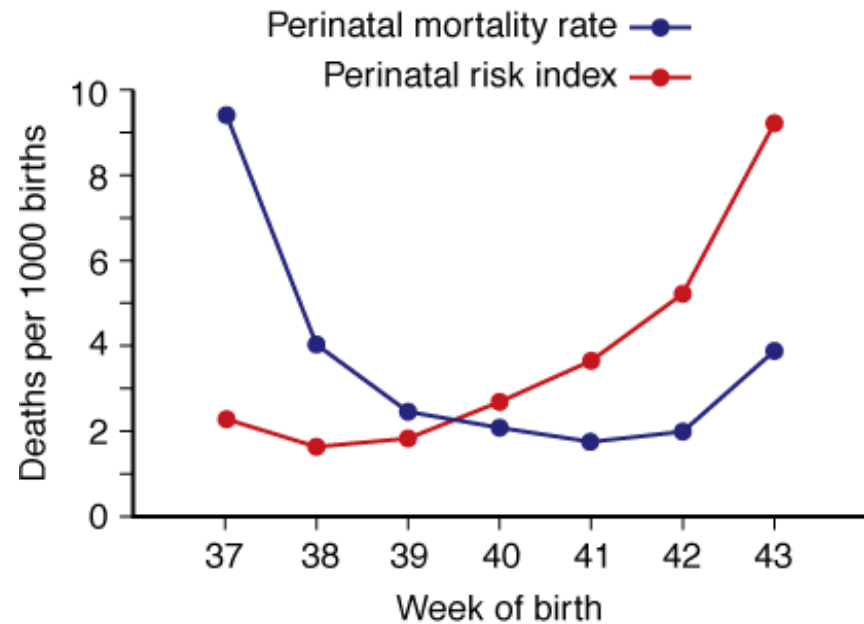
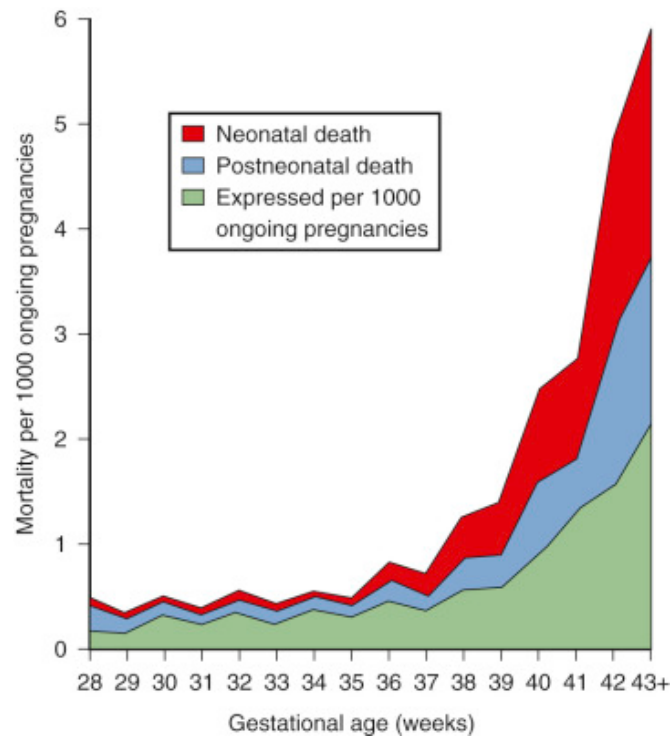
- Postmaturity syndrome
 - 10–20% of postterm pregnancies
 - Decreased subcutaneous fat
 - Lack vernix and lanugo
 - Meconium staining of : amniotic fluid (MSAF), skin, membranes, and umbilical cord
 - MAS-results in decreased lung compliance, abnormal production of surfactant, chemical pneumonitis, high morbidity/mortality



Source: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY: *Williams Obstetrics, 23rd Edition*: <http://www.accessmedicine.com>
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Thick, viscous meconium coated the desquamating skin.
Note the long, thin appearance and wrinkling of the hands.

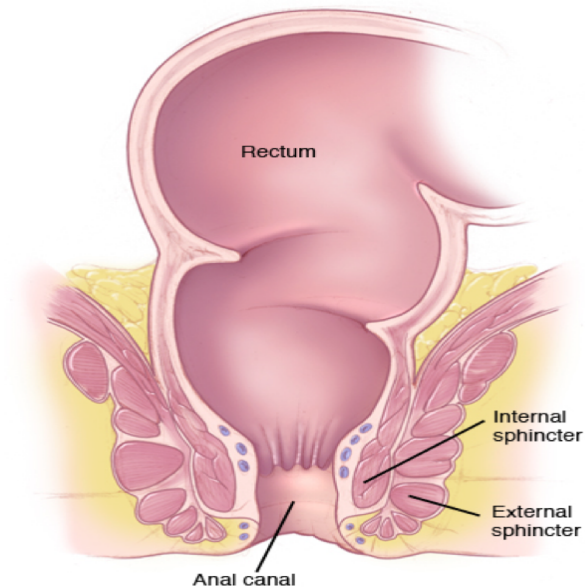
Perinatal mortality



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Maternal and obstetric complications

- Severe perineal laceration-also called obstetric anal sphincter injuries(OASIS)
 - 1st degree: perineal skin only
 - 2nd degree: perineal muscles but not anal sphincter
 - **3rd degree: anal sphincter complex**
 - 3a: <50% of external anal sphincter thickness
 - 3b: \geq 50% external anal sphincter thickness
 - 3c: Both external anal sphincter and internal anal sphincter
 - 4th degree: anal sphincter complex (external and internal anal sphincter) and anal epithelium



Other maternal and obstetric complications

- Infection
- Postpartum hemorrhage
- Cesarean delivery
- Maternal anxiety

How to decrease the incidence of late-term & postterm

- Accurately establish gestational age
 - LNMP alone is unreliable due to inaccurate maternal recall and variation in the timing of ovulation
 - Use firm clinical criteria for diagnosis
 - LNMP
 - Timing of intercourse
 - Date of conception
 - Early ultrasound-MSD, CRL, BPD, FL, HC, AC
 - Uterine size/fundal height
 - Quickening
 - Ability to detect fetal heart tones by Doppler auscultation
 - Contraceptive and menstrual history
 - Early PDT

How to decrease the incidence of late-term & postterm

- Obstetric ultrasound
 - superior to LNMP alone
 - EDD most accurate from 1ST trimester crown-rump length, error \pm 5 to 7 days
 - early confirmatory US can reduce the incidence and rates of postterm pregnancies from 9.5% to 1.5%
- Membrane sweeping
 - separation of the membranes from the lower uterine segment during pelvic examination when the cervix is dilated
 - reduces the number of pregnancies that progress beyond 41 weeks

Management

- **Induction of labor**

- Preferred option
- Between 41 and 42 weeks
- Recommended at 41 3/7 (40 +10 days)
- Reduces the high perinatal morbidity and mortality after 42 0/7 weeks
- NB:
 - Twins delivered earlier, by the 38th week

- **Antepartum fetal surveillance**

- Selected cases
- Between 41 and 42 weeks
- Prevents the high rates of stillbirth
- Options
 - Non stress test (NST)
 - Biophysical profile (BPP)
 - Modified BPP (NST & amniotic fluid)
 - Contraction stress test
 - Fetal movement counts

Induction of labor

- **Definition**

- Artificial/iatrogenic stimulation of uterine contractions before the onset of spontaneous labor to accomplish vaginal delivery
- **NOTE:**
- Augmentation of labor is increasing the frequency and intensity of existing uterine contractions to accomplish vaginal delivery in a patient who is already in labor but is not progressing adequately

Induction of labor: indications

- Post-term pregnancy (commonest)
- Others
 - PROM
 - FGR
 - Maternal medical conditions-DM, renal disease, preeclampsia, gestational HTN, chorioamnionitis
 - Abruption placentae
 - Fetal demise
 - Isoimmunization
 - Non-reassuring antepartum fetal testing
 - Elective induction of labor-initiation of labor for convenience at term without medical or obstetric indications

Induction of labor: contraindications

- Any contraindications to vaginal delivery e.g.
 - Previous myomectomy
 - Previous uterine rupture
 - Malpresentations e.g. breech
 - Abnormal lie-transverse or oblique lie
 - Placenta previa
 - Vasa previa
 - Invasive cervical cancer/genital warts
 - Active genital herpes
 - Previous classical or inverted T uterine incision
 - Multiple (≥ 2 or more CS scars)

Cervical ripening

- Cervical remodeling to facilitate cervical softening, thinning, and dilation with resultant reduction in the rate of failed induction and induction to delivery time
- Characterized by
 - collagen breakdown & rearrangement
 - changes in the hyaluronic acid and glycosaminoglycans
 - increased production of interleukins, cytokines
 - white blood cell infiltration
- Status (ripe/unripe) determined by Bishop pelvic scoring system
- Can be achieved by pharmacological, mechanical or combined means

Cervical ripening: Bishops score

Parameter	0	1	2	3
Cervical Dilation (cm)	Closed	1-2	3-4	>4
Cervical Length (cm) (Effacement)	4 (0-30%)	2-4 (40 to 50%)	1-2 (60 to 70%)	< 1 cm (≥80%)
Cervical Consistency	Firm	Medium	Soft	
Cervical Position	Posterior	Middle	Anterior	
Station (presenting part relative to ischial spines)	-3	-2	-1,0	+1. +2

- ❖ ≥8 chances of vaginal delivery are good, the cervix is favorable or ripe
- ❖ ≤6 chances of having a vaginal delivery are low, cervix is unfavorable or unripe
- ❖ A simplified Bishop score: has only dilation, station, and effacement
 - ❖ if ≥5 has a similar predictive value as a classic Bishop score ≥8 for vaginal delivery

Cervical ripening: pharmacological

- Commonly used
 - Oxytocin
 - Synthetic prostaglandins
 - PGE2 (dinoprostone, Prepidil gel and Cervidil time-released vaginal insert)
 - PGE1 (misoprostol)
- Others
 - Estrogen
 - Relaxin
 - Hyaluronic acid
 - Progesterone receptor antagonists-mifepristone

Cervical ripening: mechanical

- Membrane stripping
- Amniotomy-artificial rupture of fetal membranes
- Mechanical hygroscopic/osmotic dilators
 - Laminaria tents/japonicum, dilapan, lamitel
- transcervical balloon catheters: with/without extraamniotic saline infusion
 - Foley catheters (14–26 F) with inflation volume of 30–80 mL
 - Double bulb catheter

Cervical ripening: other methods

- Combined mechanical and pharmacological
 - Foley and PGE1/E2
 - Foley and oxytocin
- Nipple stimulation

Cervical ripening/induction of labor: oxytocin

- Synthetic analogue to oxytocin, a polypeptide hormone produced in the hypothalamus and secreted from the posterior lobe of the pituitary gland
- More effective in augmentation than induction of labor
- Less effective for cervical ripening
- Response increases from 20 weeks due to increase in myometrial oxytocin binding sites
- Route:
 - IV and NOT PO-metabolized and inactivated by gastrointestinal enzymes.
 - Dilute 10 units in 1000 mL of normal saline (10 mU/mL.)
 - Administered by infusion pump or titrated against contractions
 - Can give high frequent dose or low dosages

Cervical ripening: prostaglandins

- Mechanism
 - dissolution of collagen bundles
 - increase in submucosal water content of the cervix.
- Administered orally, sublingually, local in the vagina or endocervix
- Side effects: fever, chills, vomiting, and diarrhea

Cervical ripening: prostaglandins

- Prostaglandin E2
 - relatively expensive
 - unstable at room temperature hence refrigerated
- Prostaglandin E1-Misoprostol
 - a synthetic PGE1 analogue in 100- μ g and 200- μ g tablets
 - Indicated for treatment and prevention of PUD from chronic NSAID use
 - safe and effective off-label use for IOL
 - inexpensive and stable at room temperature
 - Route: PO or PV, sublingual
 - Dose: 25 to 50- μ g, every 4 to 6 hours

Cervical ripening: mechanical

- Mechanism:
 - release of prostaglandin F2-alpha from the decidua and adjacent membranes or PGE2 from the cervix, physical gradual dilation with minimal discomfort to the patient.
- Advantages:
 - Low cost, low risk of tachysystole, and few systemic side effects
- Disadvantages:
 - Increased risk of infection, disruption of a low-lying placenta, maternal discomfort

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1. Which of the following is not postterm pregnancy ?
 - a) 40 weeks since IVF-ET
 - b) 41 weeks since LNMP
 - c) 41 weeks since date of conception
 - d) 40 weeks since date of conception
 - e) None of the above

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- The following are complications of postterm pregnancy except
 - a) FGR
 - b) Macrosomia
 - c) Meconium stained amniotic fluid
 - d) Oligohydramnios
 - e) Polyhydramnios

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