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Prolong Pregnancy & Induction Of Labor

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Post-term Pregnancy

- (Syn:Post-dated Pregnancy or Post maturity Prolonged pregnancy)
- A pregnancy that has reached or surpassed 42 weeks (294 days) of gestation from the first day of the last menstrual period. (ACOG,WHO,FIGO)
- Incidence- Range 4-14%,Average incidence-10%

Etiology

- ✓ Mostly unknown.
- ✓ Error in menstrual dating (GA estimation).
 - poor recall by the patient or
 - physiologic variations in the duration of follicular phase(delayed ovulation).
- because there is no accurate method to identify the truly prolonged pregnancy, all those judged to be 42 completed wks should be managed as if abnormally prolonged
- U/S evaluation of gestational age during pregnancy can be used to add precision

Risk factors

- ✓ Pre-pregnancy BMI ≥ 25 & Primiparity, elderly multiparae
- ✓ Previous post term pregnancy
 - After one postterm pregnancy, the risk of recurrence in the subsequent birth is \uparrow ed 2 to 3-fold; 4 fold \uparrow after two prior postterm pregnancies
- ✓ Rare causes of post term pregnancy include
 - Anencephaly
 - Congenital primary fetal adrenal hypoplasia
 - Deficiency of placental sulfatase
 - Male fetal gender

- o Abnormal fetal hypothalamic-pituitary-adrenal and adrenal hypoplasia as in anencephaly — deficiency of dehydro-epiandrosterone — reduced fetal cortisol response.
- o Placental Sulphatase deficiency- this enzyme play a critical role in synthesis of placental estrogens which are necessary for the expression of oxytocin & PG receptors in myometrial cells

Changes associated with prolonged pregnancy

- o A series of changes occur in
 - amniotic fluid
 - placenta
 - fetus

Amniotic Fluid Changes

- o In Postdated Pregnancy quantitative & qualitative changes occur in Amniotic fluid

Quantitative Amniotic Fluid Changes

- o Amniotic fluid volume
 - 36wks ---1100ml
 - 38wks --- 1000ml
 - 40wks --- 800ml
 - 42wks --- 450ml
 - 43wks --- 250ml
 - 44wks --- 160ml
- o After 42wks there is 33% decrease in amniotic fluid volume/wk
- o A decrease in fetal renal blood flow is associated with oligohydromnios
- o Amniotic fluid less than 400ml is associated with fetal complications

Qualitative Changes in Amniotic fluid

- AF become milky and cloudy because of presence of abundant flakes of vernix caseosa.
- The Phospholipids composition changes due to presence of large number of lamellar bodies released from fetal lungs. Vernix raises the lecithin, Sphingomyelin ratio to 4: 1 & more
- The liquor may be meconium stained as a result of intrauterine hypoxia

Placental Changes

o USG findings:

- Indentation in chorionic plate become more marked, giving the appearance of cotyledons
- Increased confluency of the comma- like densities that become the inter cotyledonary septations
- Appearance of hemorrhagic infarct & Calcification

Fetal Changes

- o The fetus grow in utero after term - macrosomic which lead to fetopelvic disproportion , Prolonged labor ,Shoulder dystosia.
- o After term the fetus loses Vernix caseosa causing wrinkling of the skin due to direct contact with aqueous amniotic fluid
- o Growth of hair and nails
- o Wasting of subcutaneous tissue

Diagnosis of Postdated Pregnancy

- o The diagnostic accuracy of post term pregnancy hinges on the reliability of gestational age
- o We can get accurate EDD by:-
 - LMP when ≥ 3 normal regular period before LMP & no OCP, no lactation.
 - EDD calculated by LMP coincide with EDD from USG performed in the 1st trimester.

DETERMINATION OF FETAL MATURITY

The important dates to determine fetal gestational age are:

- Date of LMP
- Early ultrasound dating
- Timing of intercourse

Clinical

- LMP
- Auscultation of FHR (17–20 weeks)
- Fundal height (p. 71, Fig. 7.6)
- Feel of the head
- Amount of liquor
- Cervical condition

Investigations

Noninvasive

Invasive

- Amniocentesis (p. 124, 741)
 - Orange color cells
 - Presence of phosphatidyl glycerol, L/S ratio
 - Lamellar body count ($>30,000/\mu\text{L}$)
See page.111
- Saturated phosphatidyl choline

Sonography

1st trimester

- CR length (variation: ± 5 days)
It is more accurate compared to use of LMP alone

2nd trimester

- BPD
- FL (variation: $\pm 7-10$ days)

3rd trimester

- BPD
- HC
- AC
- FL (variation: $\pm 2-3$ weeks)

Amniotic fluid volume (Diminished amniotic fluid index)

CRL : Crown-rump length
 BPD : Biparietal diameter
 AC : Abdominal circumference
 HC : Head circumference
 FL : Femur length

Management

- o Prior to deciding any line of action it is important to do ***Fetal Surveillance*** by:
 - NST
 - AFI
 - Doppler (if available)

Patient with Prolonged Pregnancy (>40wks) who need to be delivered :

- * Women with medical or obstetrical complications of pregnancy
- * Favorable Cervix Bishop Score ≥ 8
- * Women with oligohydromnios
- * Estimated fetal weight $\geq 4.5\text{kg}$
- * Suspected fetal compromise
- * Fetal congenital anomaly
- * Hyper-mature Placenta

MANAGEMENT

- o **The cases are grouped into:**
- o Uncomplicated Complicated
- o **UNCOMPLICATED**
- o **Selective induction:** In this regime, the pregnancy may be allowed to continue till spontaneous onset of labor. Fetal surveillance is continued with modified biophysical profile twice a week
- o **Routine induction:** The expectant attitude is extended for 7–10 days past the expected date and thereafter labor is induced.

- o **COMPLICATED GROUP:** (Associated with complicating factors)
- o **Elective cesarean section** is advisable when postmaturity is associated with high risk factors like: elderly primigravidae, preeclampsia, Rh-incompatibility, fetal compromise or oligohydramnios.
- o Associated complications that are likely to produce placental insufficiency—Ideally, pregnancy should not be allowed to go past the expected date

o Expectant management of prolonged pregnancy is justified only when:

- GA <41 wks with un-ripe cervix, normal AFI , normal size baby , normal BPP and reactive NST

o There is universal agreement that once pregnancy reaches 42wks delivery mandatory – **Induction/ CS**

-If there is signs of fetal distress ,wt. is ≥ 4.5 kg or obstetrical complicated pregnancy - **CS**

SCHEME FOR THE MANAGEMENT OF POSTMATURITY

Fetal maturity ensured

Fetal surveillance:

- Nonstress test (p. 122)
- Amniotic fluid volume estimation (p. 44)
- Biophysical profile (p. 122)
- Doppler velocimetry study (p. 123)

Uncomplicated

Induction (7-10 days)

Cervix-ripe

Stripping of the membranes

ARM

Cervix-unripe

Vaginal administration of PGE₂ gel (6 hourly)

Cervix ripe

ARM

Liquor-clear

Oxytocin drip

Expected vaginal delivery

Liquor-meconium stained
■ Amnioinfusion (p. 614)
■ Electronic fetal monitoring

Scalp blood pH estimation (abnormal CTG trace) (where facilities available)

Fetal acidosis

Cesarean section

Satisfactory fetal behavior

Expected vaginal delivery

Complicated

Inclination towards CS

Cervix-favorable

ARM (Electronic fetal monitoring)

Liquor-meconium stained

Cervix-unfavorable

Cesarean section

Liquor-clear

Oxytocin drip

Expected vaginal delivery

Complication of Postdated pregnancy

Maternal – Increased morbidity due to increased instrumental & operative delivery

- Fetal**
- Intra-partum fetal distress
 - Meconium aspiration syndrome
 - Fetal trauma due to macrosomia
 - Neonatal complications (hypoglycemia , etc)
 - Increased Perinatal morbidity & mortality

Perinatal Mortality

- after reaching a nadir at 39 - 40 wks, the PNMR increased as pregnancy exceeded 41 weeks.
- Perinatal mortality at ≥ 42 wks of gestation is 2X that at term & 4X at 43 wks and 5-7 fold at 44 weeks
- The major causes include : *prolonged labor with CPD, Asphyxia, meconium aspiration, intrauterine infection , "unexplained anoxia," and malformations*



Postmature infant delivered at 43 wks' gestation. Thick, viscous meconium coated the desquamating skin.



**INDUCTION OF
LABOUR**

- o **Induction** Initiation or stimulation of uterine contractions before the spontaneous onset of labour with or without ruptured membranes
- o **Augmentation** – refers to stimulation of uterine contractions that are already present but found to be inadequate.

Table 35.1: Indications for Induction of Labor (IOL)

- Pre-eclampsia, eclampsia (see p. 266, 275) (hypertensive disorders in pregnancy)
- Maternal medical complications
 - Diabetes mellitus (see p. 325)
 - Chronic renal disease (see p. 278)
 - Cholestasis of pregnancy (p. 336)
- Postmaturity (see p. 371)
- Abruptio placentae (see p. 294)
- Intrauterine Growth Restriction (IUGR) see p. 533
- Rh-isoimmunization (see p. 386)
- Premature rupture of membranes (see p. 370)
- Fetus with a major congenital anomaly
- Intrauterine death of the fetus (see p. 378)
- Oligohydramnios, polyhydramnios (see p. 251)
- Unstable lie-after correction into longitudinal lie (see p. 459)

Table 35.2: Contraindications of Induction of Labor

- Contracted pelvis and cephalopelvic disproportion
- Malpresentation (breech, transverse or oblique lie)
- Previous classical cesarean section or hysterotomy
- Uteroplacental factors: Unexplained vaginal bleeding, vasaprevia, placenta previa
- Active genital herpes infection
- High-risk pregnancy with fetal compromise
- Heart disease
- Pelvic tumor
- Elderly primigravida with obstetric or medical complications
- Umbilical cord prolapse
- Cervical carcinoma

Induction with caution

- o Multiple pregnancy.
 - o polyhydramnios.
 - o Grand parity.
 - o Maternal age of >35years.
 - o Previous cesarean section.
- *Those conditions are at risk for ruptured of uterus.

Prerequisites before Induction

Maternal

- To confirm the indication for IOL
- Exclude the contraindication of IOL
- Assess Bishop score (score > 6, favorable)
- Perform clinical pelvimetry to assess pelvic adequacy
- Adequate counseling about the risks, benefits and alternatives of IOL with the woman and the family members

Fetal

- ◆ To ensure fetal gestational age
- ◆ To estimate fetal weight (clinical and USG p. 84).
- ◆ Ensure fetal lung maturation status (p. 124).
- ◆ Ensure fetal presentation and lie.
- ◆ Confirm fetal well-being (p. 119).

o **Cervical Ripening** is a series of complex biochemical changes in the cervix which is mediated by the hormones. There is alteration of both cervical collagen and ground substance. Ultimately, the cervix becomes soft and pliable

Table 35.4: Methods of Cervical Ripening

Pharmacological Methods

Prostaglandins (PGs)

- Dinoprostone (PGE₂): Gel, tablet, suppository
- Misoprostol (PGE₁): Tablets.

Oxytocin

Progesterone receptor antagonists

- Mifepristone (RU 486)

Relaxin: a protein hormone from corpus luteum, dissolves cervical connective tissue

Hyaluronic acid

Estrogen

Nonpharmacological Methods

- Stripping the membranes
- Amniotomy (artificial rupture of the membranes)
- Mechanical dilators, osmotic dilators (laminaria)
- Transcervical balloon catheter
- Extra-amniotic saline infusion

Table 35.5: Bishop's Preinduction Cervical Scoring System (Modified)

Parameters	Score			
	0	1	2	3
Cervix				
■ Dilatation (cm)	Closed	1-2	3-4	5+
■ * Effacement (%)	0-30	40-50	60-70	≥ 80
■ Consistency	Firm	Medium	Soft	-
■ Position	Posterior	Midline	Anterior	-
Head: Station	-3	-2	-1,0	+1,+2
Total score = 13; Favorable score = 6-13; Unfavorable score = 0-5				
* Cervical length (cm)	> 4	2-4	1-2	< 1

* Modification (1991) replaces effacement (%) with cervical length in cm.

- o Total Score – 13
- o Unfavorable Score – 0-5
- o Favorable Score – 6-13
- o Bishop score ≥ 8 is a good index of inducibility

Mechanical methods

1-Hygroscopic dilators

They absorb endocervical and local tissue fluids, causing the device to expand within the endocervix and provide mechanical pressure. These dilators are either natural osmotic dilators (e.g., Laminaria japonicum) or synthetic osmotic dilators (e.g., Lamicel).

Advantages: 1- Outpatient placement
2- No need for fetal monitoring

Risks: fetal and/or maternal infection

2- Transcervical Foley's catheter A fluid filled balloon is inserted inside the cervix inflated with 30-50cc saline. The Balloon provide mechanical pressure directly on the cervix which respond by ripening and dilation. A Foley catheter (26 Fr) or specifically designed balloon devices can be used.

o Preferred in woman where prostaglandins are contraindicated.

o **Cotraindications:** low lying placenta,APH, rupture of membrane, cervicitis.

Surgical Methods

1-Stripping the membranes:

- Stripping the membranes mechanically dilates the cervix which releases prostaglandins. The membranes are stripped by inserting the examining finger through the internal os & moving it in a circular direction to detach the inferior pole of the membranes from the lower uterine segment.
- **Risks** include patient's discomfort, infection, bleeding from undiagnosed placenta previa or low lying placenta, and accidental ROM.
- The Cochrane reviewers concluded that stripping the membranes, when used as an adjunct, decreases the mean dose of oxytocin needed and increases the rate of normal vaginal deliveries. (Ref 7 - Evidence level A)

2-Amniotomy :

o Why?

performed to induce labor, to augment contractions, to shortening the duration of labor, to visualize the color of the liquor, or to attach a fetal scalp electrode for the fetal heart rate.

o When?

ARM done when the cervix is favorable
(high Bishop's score)



Risks of amniotomy:

- 1- Prolapse of the umbilical cord (0.5%)
- 2- Chorioamnionitis: Risk increases with prolonged induction delivery interval
- 3- Postpartum hemorrhage: Risk is doubled compared with women with spontaneous onset of labor
- 4- Rupture of vasa previa
- 5- Neonatal hyperbilirubinemia

Pharmacologic IOL

1-Prostaglandin E2: (dinoprostone): It is inserted vaginally as a gel (Prepidil), as a removable tampon (Cervidil) or as a vaginal pessary. It acts on the cervical connective tissue and relaxes muscle fibres of the cervix. Dinoprostone should only be administered at hospital and the patient is expected to stay recumbent and monitored, at least, for the first 30 minutes after insertion. **Contractions usually start within 60 minutes of commencing induction and peak within 4 hours.** If optimal response is not achieved by 6 hours, another dose can be administered. The maximum allowed dose is 3 doses be administered per 24 hours.

Cervidil contains 10 mg of **dinoprostone** and provides a lower constant release of medication (0.3 mg per hour) than Prepidil does. Cervidil have the advantage of being removed more easily if uterine hyperstimulation occurs. In addition, it does not require refrigeration.

PGE2 can cause uterine hyperstimulation and fetal distress .

- Misoprostol (Cytotec) is a synthetic PGE1 analog that has been found to be a safe and inexpensive agent for cervical ripening.
- Clinical trials indicate that the safe optimal dose and dosing interval is **25 mcg intravaginally** every 4-6 hours. A maximum of 6 doses was suggested. Higher doses or shorter dosing intervals are associated with a higher incidence of side effects, especially hyperstimulation syndrome.
- Misoprostol should not be used in women with previous CS because of increased rates of uterine rupture (Reference 8 - Evidence level B).

Misoprostol :

- Route of administration: Oral, vaginal and sublingual route for induction. Rectal route is used to prevent and treat postpartum hemorrhage.
- Bioavailability: Extensively absorbed from the GIT
- Metabolism: De-esterified to prostaglandin F analogs
- Half life: 20–40 minutes
- Excretion: Mainly renal 80%, remainder is fecal: 15%

-The Cochrane reviewers concluded that use of misoprostol resulted in an overall lower incidence of CS. In addition, there appears to be a higher incidence of vaginal delivery within 24 hours of application and a reduced need for oxytocin augmentation.

(Evidence level A).

3-Mifepristone:

- o Mifepristone (Mifeprex) is an antiprogestosterone agent which counteracts the inhibitory effect of Progesterone on the uterus. Few studies with small number of women enrolled, have shown that women treated with mifepristone in a dose of 600 mg are more likely to have a favorable cervix and deliver within 48 to 96 hrs when compared with placebo and also they these were less likely to undergo C.S.

Synotocin Infusion:

- Oxytocin infusion in an isotonic solution is used to stimulate uterine contractions after rupture of the membranes. The dose and increasing rate depend on each agency protocols.
- Because of short half life (3-4min) used as iv infusion. Plasma levels falls rapidly when iv infusion stopped.
- Oxytocin infusion is commenced at the rate of 1-2miu/min and gradually dose increment at 15-30min

TABLE 20-2. Oxytocin Regimens for Stimulation of Labor

Regimen	Starting Dose (mU/min)	Incremental Increase (mU/min)	Dosage Interval (min)	Maximum Dose (mU/min)
Low-dose	0.5-1	1	30-40	20
	1-2	2	15	40
High-dose	6	6 ^a , 3, 1	15-40	42

^a The incremental increase is reduced to 3 mU/min in presence of recurrent hyperstimulation. Modified from the American College of Obstetricians and Gynecologists (1999a), with permission.

Side effects of oxytocin :

1-Uterine hyperstimulation and subsequent FHR abnormalities.

2-Abruptio placentae and uterine rupture.

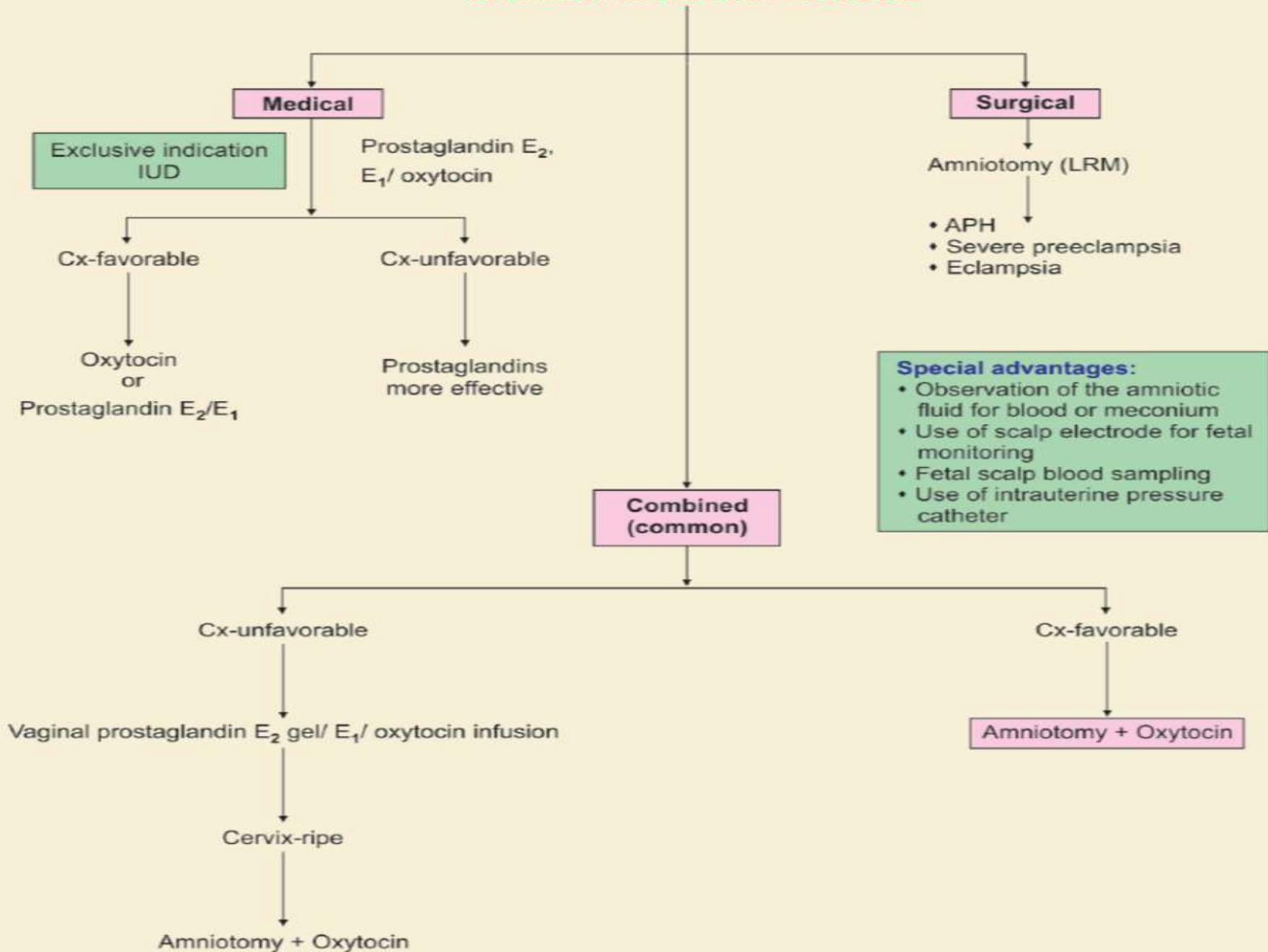
3-Water intoxication may occur with high concentrations of oxytocin infused with large quantities of hypotonic solutions.

Therefore; prolonged administration with doses higher than 40 μ of oxytocin per minute and infusion of fluids in any 10 hours should not exceed 1500 ml. A rapid intravenous injection of oxytocin may cause hypotension.

Other Complications may Occur during Oxytocin Infusion:

- o Ruptured uterus as a result of over-stimulation if any cephalopelvic disproportion present.
- o Amniotic fluid embolism is rare which may be caused by strong, tumultuous contractions. (usually occur in 3rd stage after placenta separation and with tetanic condition of uterus)

SCHEME OF INDUCTION PROTOCOL



Interventions if Uterine Hyperstimulation or Fetal Distress Occur:

Interventions	Rational
1-Turn off immediately oxytocin infusion	1-To prevent fetal anoxia and uterine rupture.
2-Turn woman on her left side.	2-To improve fetal-placental blood flow.

Continue Interventions if Uterine Hyperstimulation or Fetal Distress Occur:

Interventions	Rational
3-Give oxygen 6 to 10 l/min (per protocol) by face mask.	3-To saturate the blood with oxygen as much as possible to prevent fetal anoxia.
4-Notify senior doctor	4-This indicate induction failed. If membrane intact discontinue induction and try again later. If membrane ruptured cesarean birth may be necessary.

Factors that increase success of labour induction

- Favourable cervix
- Multiparity
- Bodymass index < 30
- Birthweight < 3500gm

thank you.

ROYAL

