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Induction of labour (IOL)

**Definition:**

(IOL) is the stimulation of uterine contractions or artificial or planned initiation of labour before its spontaneous onset for the purpose of delivery of the fetoplacental unit. The rate of induction of labour varies by location & institution but appear to be increasing.

**Indications:**

Induction of labour should be considered when it is felt that the benefits of vaginal delivery out weight the potential maternal & fetal risk of induction.

These issues should be discussed with the women prior to initiation of induction.

 The most common indications for induction:

1.Post term or prolonged pregnancy . This is the most common reason for IOL.. women are usually recommended IOL between 41 and 42 weeks gestation

2.Pre-labor rupture of membrane (P.R.O.M.)

3.Potential fetal compromise (significant fetal growth restriction, non-reassuring fetal surveillance).

4.Pre-eclmpsia.

5.Other maternal hypertensive disease.

6.Intra-hepatic cholestasis of pregnancy.

7.Autoimmune disease e.g. (SLE).

8.Maternal medical conditions: (Diabetes mellitus, Renal disease, significant pulmonary disease).

9.Rhesus iso- immunization.

10Twin pregnancy continuing beyond 38 weeks.

11.Recurrent antepartum hemorrhage.

12.Intrauterine fetal demise.

13.Sometime induction done for social or geographic reasons without a medical or obstetrical indication.

 However elective induction should be discouraged with nulliparous women since the rate of caesarean delivery is increasing with elective induction.

**Complications of IOL.**

Potential risks of induction include:

(1).failed induction: is defined as failure to establish labour after one cycle of treatment, if the cervix fail to dilate beyond 3cm after an ARM has been performed and syntocinon has been running for 6-8 hours after maximal infusion rate of syntocinon has been attained..

 If induction fails, the subsequent management options include:

 • a further attempt to induce labour (the timing should depend on the clinical situation and the woman’s wishes)

 • caesarean section.

Delaying delivery further is only acceptable if there is no major threat to fetal or maternal condition.This may be the case with a failed social induction,for example. Failed induction in the setting of preeclampsia or fetal growth restriction will usually necessitate a Caesarean delivery.

(2). Hyper stimulation of the uterus may result in fetal asphyxia &the need for C/S.

(3). IOL in the presence of uterine scare may result in uterine rupture.

(4). Cord prolapsed may result when ARM performed with presenting part still high.

(5). Maternal water intoxication.

(6). IOL is associated with longer duration of labor, greater use of epidural & more assisted vaginal deliveries.

(7). Long labor augmented with syntocinon predisposes to post partum hemorrhage.

(8). Delivery of preterm infant due to incorrect estimated date.

(9).Hyperbilirubinaemia resulting in neonatal jaundice (following the use of oxytocin ,not PG) .

**ContrLaindications (C.I.):**

 It includes C.I. to labour or vaginal delivery.

1. Previous myomectomy entering the uterine cavity.
2. Previous uterine rupture.
3. Fetal transverse lie.
4. Placenta previa.
5. Vasa previa.
6. Invasive cervical cancer.
7. Active genital herpes.
8. Previous classical or inverted T uterine incision.
9. Deteriorating maternal condition with major antepartum haemorrhage, pre-eclampsia or cardiac disease may favour Caesarean delivery.

10.Breech presentation is a relative contraindication to IOL

**Prerequisites:**

Prior to initiation of induction the following should be assessed:

* Indication for induction / any contraindications.
* Gestational age.
* Cervical (cx) favorability (Bishop score assessment).
* Assessment of pelvis & fetal size / presentation.
* Membrane status (intact or ruptured).
* Fetal wellbeing / fetal heart rate monitoring prior to labour induction.

**Bishop scoring**: as the time of spontaneous labor approaches the cervix become shorter, softer, move forward and start to dilate. This reflects the natural preparation for labor.

Bishop produced a scoring system to quantify how far this process had progressed prior to the IOL. Higher score (favorable cervix) associated with easier & shorter induction.

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| **Pre-induction cervical scoring(Bishop scoring)** |
| **Points Assigned** |
| **Factor** | **0** | **1** | **2** | **3** |
| Dilatation(cm) | 0 | 1-2 | 3-4 | 5-6 |
| Effacement(length of cervical canal) | >2 cm | 2-1 cm | 1-0.5 cm | < 0.5 cm |
| Station of presenting part | -3 | -2 | -1 or 0 | +1 or +2 |
| Consistency of cervix | Firm | Medium | Soft |  |
| Position of cervix | Posterior | Mid | Anterior |  |

Effacement thinning &shorting of cervix.

Station distance between the lower part of fetal presenting part & ischial spines.

 ( -ve means above it , +ve means below it)

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**Methods of induction ofLabour:**

**(1)Pharmacological-based methods**

**(2)Non-pharmacological methods**

* **Pharmacological-based methods**

**1.Prostaglandins (PGE2)**

**2.Intravenous oxytocin alone**

**3.amniotomy with intravenous oxytocin**

**4.Misoprostol**

**5.Agents currently being researched : (Mifepristone, Hyaluronidase, Corticosteroids , Oestrogens ,Vaginal nitric oxide donors)**

**1.Prostaglandins**

are capable of stimulating uterine contractions resulting in labour. Prostaglandins can be administered by various routes: vaginal, oral, intravenous, extra-amniotic and intracervical.

**Recommendations on vaginal PGE2.**

Local application of prostaglandin E2—dinoprostone—is commonly used for cervical ripening **&**vaginal PGE2 is the preferred method of induction of labour, Prostaglandins are recommended even when the cervix is favourable.unless there are specific clinical reasons for not using it (in particular, the risk of uterine hyperstimulation). It should be administered as a gel, tablet or controlled release pessary. The recommended regimens are:

• one cycle of vaginal PGE2 tablets or gel: one dose, followed by a second dose after 6 hours if labour is not established (up to a maximum of two doses)

• one cycle of vaginal PGE2 controlled release pessary: one dose over 24 hours.

**Recommendation on other routeof PGE2**

Oral PGE2 , Intravenous PGE2 , Extra-amniotic PGE2& Intracervical PGE2 should not be used for induction of labour.

**2.Intravenous oxytocin alone**

Oxytocin has been used alone, in combination with amniotomy, or following cervical ripening with other pharmacological or non-pharmacological methods.

Evidence suggested that, in women with an unfavourable cervix and intact ,or ruptured membranes , intravenous oxytocin alone is less effective than vaginal PGE2 in improving cervical status and in reducing the caesarean birth rate. A common concentration that is used for oxytocin is 10 IU in one liter(1000 ml) of balanced solution (such as normal saline or Ringer’s lactate) .This mixture results in an oxytocin concentration of 10 mU/mL a typical dosage schedule would be 1 mU/min, doubling the rate of infusion every 20–30minuntil adequate uterine contractions are achieved(3–5 contractions are achieved every 10 minutes.) or a rate of 32 mU/min is reached

While this is given, fetal heart rate & uterine activity is monitored.

* If contractions are high (excessive uterine activity) but there is normal fetal heart rate we decrease the dose.
* If excessive activity with abnormal heart rate we stop the induction & do the supportive measures of excessive activity that will be mentioned later.

**3.Recommendation on amniotomy with intravenous oxytocin**

The combination of intravenous oxytocin and amniotomy is commonly used in women with favourable cervices.

**4.Misoprostol** is a synthetic prostaglandin E1 that can be given orally, vaginally or sublingually. It is effective in causing uterine contractions. However, misoprostol is currently not licensed for use in pregnancy in the UK.

Side effects are diarrhoea and shivering, both of which are dose dependent and self-limiting & uterine hyperstimulation. Misoprostol has been widely recommended for the treatment of:

1. Missed miscarriages
2. Incomplete miscarriages
3. Therapeutic termination of prgnancy.
4. Pre-induction cervical ripening
5. Cervical preparation before uterine instrumentation
6. It also has potential in late pregnancy for induction of labour
7. Postpartum haemorrhage prophylaxis and treatment .

Most now agree that prior uterine surgery, including cesarean delivery, precludes the use of misoprostol **(Not recommended for cx- ripening in** **patients who have a uterine scar)**.

**Misoprostol is not licensed for induction of labour in the UK, It should only be offered as a method of induction of labour to women who have intrauterine fetal death or in the context of a clinical trial**.

 **5.Mifepristone**

Mifepristone, also known as RU 486, is an antiprogestin and has been developed to antagonise the action of progesterone. Mifepristone now has an established role in the termination of pregnancy, in combination with prostaglandins, during the first and second trimester.

**Mifepristone should only be offered as a method of induction of labour to women with intrauterine fetal death.**

**Management of excessive uterine activity:**

**Tachysystole** has been defined as more than five contractions in 10 minutes **Hypertonus** is a contraction lasting more than 120 seconds**.**

**Hyperstimulation** is excessive uterine activity with a non-reassuring fetal heart rate tracing.

**Treatment:**

If controlled release PG is in place it should be removed.

If vaginal or cervical PG used, one should attempt to remove any remaining PG.

Stop oxytocin if infusion & do **supportive measurement** such as maternal left lateral position & oxygen by mask, if excessive activity with non-reassuring fetal heart rate persists, a tocolytic (for e.g. terbutaline) can be administered.

* **Non-pharmacological methods of induction & cx.ripening:these include:**
1. **Membrane sweeping**
2. **Herbal supplements**
3. **Acupuncture**
4. **Castor oil, hot baths and enemas**
5. **Sexual intercourse**
6. **Breast stimulation**
7. **Surgical methods**(**Amniotomy**)
8. **Mechanical methods**

**1.Membrane sweeping:** Stripping/sweeping of the membranes was used as a method for inducing labour at least as early as 1810. Increased local production of prostaglandins following vaginal examination. The procedure entails passage of the examining finger through the cervix so that it can be rotated against the wall of the uterus beyond the internal cervical os, thereby stripping the chorion away from the decidua (the decidua is the richest source of PGF2α within the uterus). Risk of this technique includes infection, bleeding, accidental rupture of membranes and patient discomfort.

**2.Herbal supplements:** The use of herbal supplements to promote health has become popular. It is believed by some that drinking herbal beverage teas while pregnant nourishes and tones the uterus, supporting optimal health in pregnancy.

**3.Acupuncture :**Acupuncture involves the insertion of very fine needles into specific points of the body. It has been hypothesized that neuronal stimulation by acupuncture may increase uterine contractility. It is also gaining acceptance as a method to alleviate labour pain and ripen the cervix.

**4.Castor oil, hot baths and enemas :**Castor oil has been widely used as a traditional method of initiating labour in midwifery practice. However, the mechanism is poorly understood. Castor oil is unpleasant to ingest and causes nausea. There is no available evidence relating to hot baths or enemas as induction agents.

**5.Sexual intercourse :** The role of sexual intercourse in stimulating labour is not well understood. It has been suggested that human semen is a biological source of high prostaglandin concentrations and the action of sexual intercourse may stimulate uterine contractions. There may be an endogenous release of oxytocin as a result of orgasm.

**6.Breast stimulation :** It is known that breast stimulation results in the production of endogenous oxytocin in both pregnant and non-pregnant women, causing uterine contractions.

**7.Surgical methods : Amniotomy**

Amniotomy is the deliberate artificial rupture of the membranes, used for induction of labour. The procedure is only possible if the membranes are physically accessible. However, the procedure may be uncomfortable and it gives rise to the possibility of ascending infection. other risk associated with this procedure include umbilical cord prolapsed or compression, bleeding from low-lying placenta & possibly fetal injury.

**8.Mechanical methods**:It include: include various types of balloon catheters or

laminaria tents introduced into the cervical canal or into the extra-amniotic space

a.Foley catheter (with & without cervical extra amniotic saline infusion)

b.Natural dilators (lamineria) and synthetic dilators.

The mechanism of action includes dilation of the cervix through mechanical pressure & increased PG production





**Extra-amniotic catheter with saline infusion**