

Clinical Guideline

Induction of labour techniques

Policy developed by: SA Maternal & Neonatal Clinical Network

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Summary Clinical practice guideline on induction of labour techniques

Keywords Sweeping the membranes, ARM, artificial rupture of the membranes, prostaglandins, Cervidil, balloon catheter, cervical ripening, IOL, Bishop score, Prostin, PGE₂, oxytocin, Syntocinon, amniotomy, dinoprostone, clinical guideline

Policy history Is this a new policy? **N**
Does this policy amend or update an existing policy? **Y**
Does this policy replace an existing policy? **Y**
If so, which policies? **Induction of labour techniques**

Applies to All SA Health Portfolio
All Department for Health and Ageing Divisions
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

Staff impact All Staff, Management, Admin, Students, Volunteers
All Clinical, Medical, Nursing, Allied Health, Emergency, Dental, Mental Health, Pathology

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Version control and change history

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South Australian Perinatal Practice Guidelines

induction of labour techniques

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Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with **consumers** in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Introduction

- > **Cervical ripening** refers to softening, effacement (thinning) and dilatation of the cervix¹, which can be assessed with a (modified) Bishop score (< 5 or ≥ 5)
- > **Induction of labour (IOL)** may be defined as 'an intervention designed to initiate uterine contractions artificially leading to progressive effacement and dilatation of the cervix and birth of the baby'²
- > Cervical ripening and/or induction of labour techniques should only follow informed consent by the woman
- > Explain:
 - > Reasons for cervical ripening / induction
 - > Method of cervical ripening / induction of labour
 - > Potential risks
 - > Consequences of accepting or declining an offer of cervical ripening / induction of labour⁴
- > A detailed vaginal examination and pelvic assessment should precede all cervical ripening and induction of labour techniques
- > For fetal demise / genetic termination of pregnancy induction of labour, follow link to [perinatal loss](#)

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Indications

- > Generally whenever continuation of the pregnancy is more hazardous for mother and / or baby than ending pregnancy

Maternal:

- > Hypertensive disorders of pregnancy
- > Diabetes
- > Renal disease
- > Social
- > Other conditions requiring the end of pregnancy

Fetal:

- > Prolonged pregnancy (from 41⁺⁰ weeks of gestation onwards)
- > Intrauterine growth restriction (IUGR)
- > Oligohydramnios
- > Isoimmunisation

Table 1 Cervical Screening

Modified Bishop cervical score system³

Characteristic	0	1	2	3	Score
Dilatation (cm)	< 1	1-2	2-4	> 4	
Length (cm)	> 4	2-4	1-2	< 1	
Consistency	firm	average	soft	-	
Position of cervix	posterior	middle / anterior	-	-	
Station	-3	-2	-1 to 0	+1 to +2	Total

Literature review

- > Women with a cervical score ≥ 5 generally labour more easily than those with a cervical score < 5
- > Women with a low cervical score (nulliparous and parous) experience higher rates of unsuccessful induction and caesarean section⁵
- > Randomised trials comparing induction of labour to waiting have shown that, for a number of indications e.g. maternal diabetes at 38⁺⁰ weeks, term PROM and gestation $> 41^{+0}$ weeks
 - > IOL increases the number of epidural and operative vaginal deliveries
 - > There is no increase in caesarean section rate⁴
- > A policy of labour induction at 41⁺⁰ weeks or later compared to awaiting spontaneous labour either indefinitely or at least one week is associated with fewer perinatal deaths⁶
- > Studies on breast (nipple) stimulation are too small to evaluate the efficacy and safety of this practice. The medical expert consensus is that breast stimulation should not be recommended as a means of stimulating cervical ripening or inducing labour in high risk pregnancies⁷

Methods

- > Currently, medical expert consensus recommends the following techniques for cervical ripening and induction of labour:
 - > Sweeping the fetal membranes
 - > Cervical ripening – balloon catheter
 - > Cervical ripening - prostaglandin E₂ (PGE₂)
 - > Amniotomy
 - > Intravenous oxytocin

Sweeping the membranes

- > A **pre-induction technique**, sweeping the membranes is a method of ripening the cervix with the aim of initiating natural labour and the benefit of avoiding formal induction of labour²
- > Sweeping the membranes refers to the digital separation of the fetal membranes from the lower uterine segment by vaginal examination (this is known to stimulate intrauterine prostaglandin synthesis)⁶
- > Cervical massage has been suggested if the cervix is closed
- > Research has found that sweeping the membranes reduces the duration of pregnancy and the subsequent need for post-term IOL. However, there is a slight increase in the frequency of prelabour rupture of the membranes⁵
- > No large trials have specifically addressed the safety of membrane stripping in known carriers of Group B Streptococcus⁸

Contraindications^{2,8}

- > Gestation < 38 weeks unless medical indication for preterm birth
- > Malpresentation
- > Low lying placenta
- > Planned elective caesarean

Education

- > Membrane sweeping does not increase maternal or neonatal infection
- > The procedure may be uncomfortable
- > There may be a small amount of blood loss after the procedure
- > Despite the discomfort associated with membrane sweeping, most women (88 % in one study) would choose sweeping the membranes again in their next pregnancy²

Procedure^{2,8}

- > Sweeping the membranes is always done in the context of a formal antenatal assessment. This should include:
 - > Questioning the woman about antenatal complications, fetal movements
 - > Performing an abdominal palpation, SFH measurements
 - > BP measurement and other investigations if required
 - > In cases where additional risk factors are identified (e.g. decreased fetal movements, suspected intra uterine growth restriction, placental abruption) then the wellbeing of the fetus should be assessed first (for further information, see [risk factors in antenatal cardiotocography](#))
- > Listen to the fetal heart with a Doppler for approximately 60 seconds before and after sweeping the membranes and consider additional fetal surveillance if indicated

Favourable cervix

- > The cervix is soft and at least admits a finger through the internal os. The presenting part is in the pelvis
- > A vaginal examination is performed. The tip of an examining finger is introduced through the external and internal os onto the membranes. Then, the inferior pole of the membranes is detached from the lower uterine segment by a circular movement of the examining finger
- > Record the vaginal examination findings. If undelivered by the next scheduled visit, there is still benefit in repeating the sweep

Unfavourable cervix

- > The cervix is firm and closed. The presenting part is in the pelvis
- > A vaginal examination is performed. If the membranes cannot be reached, it is reasonable to attempt to digitally stretch the cervix until sweeping is possible. If the cervix is completely closed, perform a cervical massage to stimulate the production of prostaglandins
- > Record the vaginal examination findings. If undelivered by the next scheduled visit, there is still benefit in repeating the sweep

Cervical ripening - balloon catheter

Introduction

- > The use of a transcervical balloon catheter for pre-induction cervical ripening has been shown to be an efficient, safe, cost effective, reversible method with similar caesarean section rates to prostaglandins, and a lower risk of hyperstimulation and infection^{17,18,19}
- > In nulliparous women, transcervical balloon catheters are as effective as prostaglandins in achieving vaginal delivery within 24 hours. However, in multiparous women, prostaglandins are more effective than balloon catheters in achieving vaginal delivery within 24 hours¹⁷
- > One randomised controlled trial found that the use of a single balloon catheter for cervical ripening was associated with significantly less maternal discomfort than either a double balloon catheter or prostaglandins²⁰
- > A recent randomised controlled trial found that ripening an unfavourable cervix in nulliparous women with a Foley catheter with the balloon inflated with 80 mL rather than 30 mL, provided a more effective dilatation, faster labour, and decreased need for oxytocin²¹

Indications

- > To provide a non-pharmacological method of cervical ripening in women around term where delivery is indicated but not urgent, and the Bishop score is less than 7 with an unfavourable cervix²²
- > Transcervical balloon catheter placement may provide an option for cervical ripening when there are contraindications to pharmacological agents

Contraindications

- > Low lying placenta
- > Placenta praevia
- > HIV infection
- > Active herpes lesions
- > Vasa praevia
- > Malpresentation
- > High presenting part (above the pelvic inlet)
- > Polyhydramnios
- > Maternal refusal
- > Ruptured membranes
- > Signs of fetal compromise on cardiotocography
- > Any contraindication to vaginal birth

Best practice notes

- > **NB** Simultaneous use of prostaglandins or oxytocin is not recommended
- > The decision to use a balloon catheter following failed cervical priming with prostaglandins must be made by a senior obstetrician, taking into account timing (at least 6 hours must have elapsed since last dose of prostaglandin) as well as individual risks and benefits
- > In cases where cervical ripening with a balloon catheter fails (Bishops score < 6 or unable to successfully rupture the membranes), the senior obstetrician may consider one of the following, depending on the individual risks and benefits:
 - > Insertion of prostaglandins (see below)
 - > Reinsertion of another balloon catheter (after 24 hours)

Transcervical balloon catheter placement

Equipment

- > Speculum (Cuscoe)
- > Balloon catheter
 - > 16 gauge catheter (30 mL sized balloon) and spigot
- OR
 - > 16 gauge catheter (75 mL sized balloon) and spigot
- OR
 - > 16 gauge catheter with double balloon
- > Sponge forceps
- > Sterile water or 0.9 % sodium chloride
- > Syringe (20 mL)
- > Lubricating gel
- > Tape

Before procedure

- > Explain procedure to the woman and gain her consent
- > Complete 20 minutes CTG tracing that fulfils the hospital's accepted criteria
- > Ensure the woman has emptied her bladder
- > Confirm maternal pulse, blood pressure, respiration rate and uterine activity meet accepted criteria
- > Abdominal palpation to confirm cephalic presentation
 - > If presenting part is high and ballotable, discuss suitability for transcervical balloon catheter placement with medical officer
- > Vaginal examination to obtain a modified Bishop score (Table 1)

Insertion of transcervical single balloon catheter

- > The procedure may be done by the primary caregiver or attending medical officer
- > Insert speculum and visualise the cervix
- > Pass the balloon catheter through the internal os of the cervix using sponge forceps to assist
- > Spigot the catheter
- > Inflate the balloon with sterile water 30-50 mL
- > Gently withdraw the catheter until it rests at the level of the internal os
- > Place the balloon on moderate traction by taping it to the inner aspect of the woman's thigh
- > Check fetal heart after completion of procedure

Insertion of transcervical double balloon catheter

- > The procedure may be done by the primary caregiver or attending medical officer
- > Insert speculum and visualise the cervix (the use of a speculum may not be necessary if an introducer is used with the balloon catheter)
- > Pass the cervical ripening balloon catheter through the cervix (using sponge forceps) until both balloons have entered the cervical canal
- > Inflate the uterine balloon with 40 mL of water or 0.9 % sodium chloride. Once the uterine balloon is inflated, pull the catheter back until the balloon abuts the internal cervical os
- > The vaginal balloon is now visible outside the external cervical os and is inflated with 20 mL of water or 0.9 % sodium chloride
- > Once the balloons are situated on either side of the cervix, water or 0.9 % sodium chloride is added up to a maximum of 80 mL per balloon
- > Placement of the balloon should be timed so that it is in place no longer than 12 hours before active labour is induced

Management after insertion of balloon catheter

- > Ongoing care of women with an uncomplicated pregnancy may be conducted on the Antenatal ward
- > Check the balloon catheter every 2 hours (unless asleep)
 - > If single balloon catheter, apply moderate traction and if necessary, readjust the tape on the woman's inner thigh
- > **Perform regular observation** of maternal uterine activity, vaginal loss, pulse, blood pressure, respiration rate and FHR as indicated
- > If the woman has difficulty passing urine after insertion of the balloon catheter
 - > Offer appropriate analgesia and comfort aids
 - > If still unable to void, consider removing 20 mL of fluid from the uterine and vaginal balloons
- > **Remove the catheter after 12 hours**
 - > If the presenting part is high, encourage the woman to ambulate / empty her bladder before attempting to perform an ARM
 - > If the presenting part still remains high, consult with medical officer regarding further management, ensure availability of medical staff / theatre before attempting ARM
- > **Indications for early removal of catheter**
 - > Rupture of the membranes
 - > Uterine hypercontractility with associated fetal compromise
 - > Maternal request
- > **If the catheter falls out perform vaginal examination**
 - > Confirm favourable cervix for ARM and plan ARM at 12 hours or sooner if workload / timing allows
 - > If the cervix is unfavourable, consult medical officer regarding management (e.g.re-insertion of catheter or prostaglandins)
 - > If labour has commenced, transfer to labour and delivery
- > **Return to labour and delivery if**
 - > Labour commences
 - > SROM

Cervical ripening - prostaglandins

Introduction

- > Dinoprostone is prostaglandin E₂ (available as Prostin[®] E₂ vaginal gel 1 mg and 2 mg OR Cervidil[®]; 10 mg vaginal pessary) and is currently used for pre-induction cervical ripening
- > Onset of labour after dinoprostone gel administration is variable (6 – 18 hours)

Indications

- > Dinoprostone gel (Prostin[®]) and pessary (Cervidil[®]) may be used for pre-induction cervical ripening in women around term who have a clinical indication for induction of labour. These agents commonly also cause uterine contractility and, sometimes, labour¹⁴

Contraindications

- > Known hypersensitivity to dinoprostone or the constituents of the preparations used (triacetin, colloidal silica or urethane)
- > History of caesarean section OR uterine perforation with or without surgical repair
- > Dinoprostone gel (Prostin[®]) - grand multiparity (five or more previous births)
- > Dinoprostone pessary (Cervidil[®]) > 3 previous vaginal births
- > Ruptured membranes
- > Signs of fetal compromise on cardiotocography
- > Any contraindication to vaginal birth
- > Dinoprostone pessary (Cervidil[®]) is contraindicated in multiple pregnancy or if the fetus is in a non-vertex presentation

Place of induction

- > Women who are healthy and have had an otherwise uncomplicated pregnancy may have induction of labour with vaginal dinoprostone conducted on the antenatal ward, before the active phase of labour
- > When undertaking induction of labour of women with recognised risk factors (e.g. suspected fetal growth compromise, previous caesarean section, any uterine scar or high parity) the induction process should not occur without close surveillance (usually not available on an antenatal ward)

History of uterine scar

- > There is no reliable way to predict uterine rupture in women who have a uterine scar from a caesarean section, uterine surgery or a previous uterine perforation²³
- > The woman with a uterine scar should be counselled that the use of prostaglandin is associated with increased risks e.g. uterine rupture, severe haemorrhage, bladder laceration, hysterectomy, and may cause significant neonatal neurological morbidity or death
 - > Refer to the SA Coroner's 2014 recommendations²⁴, at URL:
<http://www.courts.sa.gov.au/CoronersFindings/Pages/Findings-for-2014.aspx>

Dosage and administration

- > Intravaginal mode of administration

Dinoprostone (Prostin®) gel dosage

- > The initial dose for dinoprostone gel (Prostin®) is 2 mg per vaginam (PV) in nulliparous women with an unfavourable cervix, 1 mg PV for parous women and 1 mg PV in cases of suspected fetal compromise (intra uterine growth restriction)
- > If the woman is not established in labour, a second dose of 1 or 2 mg of dinoprostone gel (Prostin®) may be administered after 6 hours
- > The maximum dose in a 12 hour period is 4 mg Dinoprostone gel (Prostin®) for nulliparous women with an unfavourable cervix and 3 mg for all other women
- > In situations where the maximum recommended dose has been used and amniotomy is not possible, depending on the indication for induction of labour, a third dose of 1 or 2 mg of Dinoprostone gel (Prostin®) may be considered after discussion with an obstetric consultant

Dinoprostone pessary (Cervidil®) dosage

- > Single dose of 10 mg of dinoprostone pessary (Cervidil®) (releases approximately 0.3 mg dinoprostone per hour over 12 hours)

Before procedure:

- > Complete 20 minutes CTG tracing that fulfils the hospital's accepted criteria
- > Ensure the woman has emptied her bladder
- > Confirm maternal pulse, blood pressure, respiration rate and uterine activity meet accepted criteria
- > Abdominal palpation to confirm cephalic presentation
- > Vaginal examination to obtain a (modified) Bishop score (Table 1)

Dinoprostone gel (Prostin®) administration

- > Insert dinoprostone gel (Prostin®) into the posterior fornix of vagina
- > Advise the woman to remain recumbent in 30° left lateral tilt for at least thirty minutes before sitting up or walking around

Dinoprostone pessary (Cervidil®) administration

- > Remove dinoprostone pessary (Cervidil®) from freezer immediately before insertion
- > Use the retrieval tape to gently pull the product out of the sachet
- > Insert dinoprostone pessary (Cervidil®) high in the vagina, positioning pessary transversely into the posterior fornix of the vagina (use small amount of water soluble lubricant to aid insertion)
- > After insertion, cut the withdrawal tape (allow sufficient tape outside the vagina for removal)
- > Advise the woman to remain recumbent in 30° left lateral tilt for at least thirty minutes (allows prostaglandin absorption) before sitting up or walking around

Dinoprostone pessary (Cervidil®) precautions

- > Remove pessary if:
 - > Uterine hyperstimulation occurs
 - > Labour becomes established
 - > After SROM or before performing ARM
- > Oxytocin augmentation should not be commenced within 30 minutes of removal of Dinoprostone pessary (Cervidil®)

After the procedure

- > Continue CTG monitoring for 20 minutes after insertion of dinoprostone (Prostin[®]) gel or pessary (Cervidil[®]). Discontinue CTG only if accepted criteria are met
- > Perform regular observation of maternal uterine activity, vaginal loss, pulse, blood pressure, respiration rate and FHR as indicated
- > * Refer to midwifery standard for further guidelines

Failure to establish in labour after PGE₂

Dinoprostone gel (Prostin[®]) or pessary (Cervidil[®])

- > After the maximum dose has been administered or if the cervix is favourable, induction can be undertaken immediately with amniotomy
- > Oxytocin augmentation may be commenced 6 hours after the last dose of Dinoprostone gel (Prostin[®]) has elapsed or 30 minutes after removal of Dinoprostone pessary (Cervidil[®])
- > Admission to the labour / delivery suite should occur before amniotomy or oxytocin augmentation is commenced
- > For further information on oxytocin augmentation, see below

Adverse effects

- > Gastrointestinal (e.g. nausea, vomiting), back pain, fever.
- > Increased intraocular pressure in women with a history of glaucoma
- > Uterine hypercontractility (more than five contractions in 10 minutes, or contractions lasting more than 2 minutes)
- > Placental abruption or uterine rupture
- > Burning sensation in the vagina (due to the triacetin vehicle) and, rarely, anaphylactic reaction

Best practice notes

- > Assess woman and review indication before commencing pre-induction cervical ripening. Document cervical score in case notes
- > If the cervical score is > 7 and the woman is not in labour, negotiate an appropriate time to perform ARM as clinically indicated
- > The second dose of prostaglandins should be withheld if:
 - > An ARM can be performed
 - > The woman is established in labour
 - > 4 or more contractions are present over each ten minute period – review in 2-4 hours to assess whether the woman is in established labour
- > Continue or repeat short CTG if regular uterine activity is present
- > Women who have an established clinical indication for continuous monitoring should be continuously monitored from the very start of having regular uterine activity
- > Inform the woman to notify the midwife should uterine contractions become regular and / or painful, or if the woman has any vaginal loss
- > Ensure there is a documented plan for ongoing management in the woman's case notes
- > If not in labour within 12 hours of the first dose of dinoprostone gel (Prostin[®]) or pessary (Cervidil[®]), review IOL management

Management of uterine hypercontractility (hyperstimulation)

- > A study reporting cases of hyperstimulation associated with dinoprostone pessary (Cervidil[®]) observed reversal of hyperstimulation 2 to 13 minutes after removal of product. Tocolytics were administered in one in five cases
- > Uterine hypercontractility occurs more frequently with dinoprostone gel (Prostin[®]) gel than with intravenous oxytocin⁵
- > The following interventions may be instituted:
 - > If dinoprostone pessary (Cervidil[®]) in situ: remove pessary by pulling the withdrawal tape
 - > If dinoprostone gel (Prostin[®]) is used, consider manually removing the gel
 - > Change maternal position
 - > Continuous CTG monitoring
 - > Prepare and administer emergency tocolysis 250 micrograms intravenous salbutamol as below
 - > Consider fetal scalp blood sampling (where possible and available)
 - > Consider caesarean section if hypercontractility and fetal compromise persist

Emergency tocolysis

- > Consider the use of :
 - > IV Salbutamol OR
 - > IV Terbutaline OR
 - > Sublingual GTN spray
- > For further information follow link to [tocolysis for uterine hypercontractility](#)

Obstetric salbutamol: 5 mL ampoule 5 mg / 5 mL

Dosage and administration

- >Using a 1 mL syringe, draw up 0.25 mL (250 micrograms) of salbutamol
- >Add to a 10 mL syringe and make up to 10 mL with sodium chloride 0.9 % (25 micrograms per mL)
- >Give intravenous salbutamol slowly in 50 microgram boluses up to 250 micrograms in total (often 100 micrograms will be sufficient)
- >**Ensure monitoring of maternal pulse whilst bolus doses are administered**
- >**Stop IV administration if maternal pulse > 140**

Side effects

- >Fetal and maternal tachycardia, maternal hypotension, ventricular ectopics, supra-ventricular tachycardia, ventricular fibrillation, pulmonary oedema, hypoxia – secondary to increased oxygen demands + / - fluid shift in lungs, hyperglycaemia

Terbutaline: 1 mL ampoule 500 micrograms / 1 mL

Dosage and administration

- >May be given subcutaneous or intravenous

Subcutaneous

- >Using a 1 mL syringe, draw up 0.5 mL (250 micrograms) of terbutaline and administer subcutaneously

Intravenous

- > Using a 1 mL syringe, draw up 0.5 mL (250 micrograms) of terbutaline
- > Add to a 10 mL syringe and make up to 10 mL with sodium chloride 0.9 % (25 micrograms per mL)
- > Give intravenous terbutaline slowly in 50 microgram boluses up to 250 micrograms in total (often 100 micrograms will be sufficient)
- > **Ensure monitoring of maternal pulse whilst bolus doses are administered**
- > **Stop IV administration if maternal pulse > 140**

Side effects

- > Tremor, headache, nervousness, cardiovascular effects including arrhythmia, tachycardia, palpitation, muscle cramps, hypokalaemia

Sublingual glyceryl trinitrate spray (Nitrolingual®) 400 micrograms per spray emission

Dosage and administration

- > 1 metered spray (400 micrograms) administered as spray droplets beneath the tongue (do not inhale)
- > Repeat after 5 minutes if hypertonus sustained
- > No more than 2 metered doses should be given

Administration

- > Nitrolingual pump spray should be primed before using it for the first time by pressing the nozzle five times
- > If Nitrolingual pump spray has not been used for seven days a priming of one spray will be necessary
- > If the product has not been used for more than four months it will need to be primed several times (maximum five) until an even spray is obtained
- > The woman should be in a sitting position
- > The bottle should be kept vertical with the nozzle head uppermost
- > Hold the opening in the nozzle head as close to the open mouth as possible and spray under the tongue
- > Close the mouth immediately after each dose

Side effects

- > Headache, hypotension, reflex tachycardia or bradycardia
- > Rarely nausea, vomiting, flushing

Amniotomy

- > Amniotomy refers to the surgical artificial rupture of the membranes (ARM) to induce or augment labour

Indications

Cervix is favourable (see [Table 1](#))

Augmentation when labour progress is unsatisfactory due to inadequate contractions

To observe the colour and amount of liquor when clinically indicated

Note

- > Labour should begin within the next 12 hours and birth should occur within 18 hours to minimise the risk of ascending infection

Associated risks

- > Bleeding from placenta praevia, vasa praevia (very rare)
- > Cord prolapse or compression
- > Maternal or neonatal infection
- > Fetal heart rate deceleration
- > To reduce the risk of cord prolapse, the clinician should ensure that the fetal head is positioned in or directly above the pelvis, is well-applied to the cervix and the umbilical cord or other fetal part is not presenting
- > An obstetrician should perform a controlled amniotomy in the following situations:
 - > Unstable lie
 - > Polyhydramnios
 - > High presenting part (Presenting part is not engaged and is poorly applied to the cervix)

Intravenous antibiotics in labour are recommended for:

- > Women with clinically suspected chorioamnionitis
- > Women with maternal Group B Streptococcal vaginal colonisation (according to individual hospital criteria)
- > Rupture of the membranes > 18 to 24 hours
- > ARM is often followed by secondary intervention with intravenous oxytocin after four hours. However, further research is required to establish a recommended time frame between amniotomy and the secondary intervention¹²

Procedure

- > Abdominal examination
- > The clinician identifies the cervix and membranes by digital vaginal examination
- > An appropriate instrument (usually an amnihook or amnicot) is introduced in the vagina and the membranes are pierced
- > The fetal heart rate is recorded immediately following ARM and should continue to be recorded every 15 – 30 minutes until the woman is established in labour
- > Note and document the colour of the amniotic fluid
- > Meconium stained liquor is an indication for continuous electronic monitoring, using a fetal scalp electrode if unable to obtain continuous monitoring (unless contraindicated e.g. Preterm < 34 weeks gestation, malpresentation, Hepatitis B, C or HIV)
- > Once the woman is established in labour, the fetal heart rate should be recorded every 15 minutes⁴
- > Continuous CTG if indicated (follow CTG link for indications)

Intravenous oxytocin

Indications

- > Synthetic oxytocin is the most common induction agent in use
- > It may be used:
 - > Alone
 - > In combination with amniotomy
 - > After cervical ripening with other pharmacological or non-pharmacological methods²⁵
- > Induction of labour using a combination of amniotomy and intravenous oxytocin is the preferred method of induction for women who have a favourable cervix
- > When compared to dinoprostone (PGE₂) gel, induction with oxytocin results in a lower rate of some infective sequelae e.g. chorioamnionitis in women who have ruptured membranes

Administration

- > Oxytocin infusion is run as a separate line piggybacked into the mainline
- > RCOG (2001) recommends the following oxytocin regimen guidelines:
 - > Allow a delay of six hours after administration of intravaginal PGE₂ gel (dinoprostone, Prostin[®]) and 30 minutes after removal of PGE₂ pessary (dinoprostone, Cervidil[®]) before commencing oxytocin
 - > In women with intact membranes, amniotomy should be performed where feasible before starting a oxytocin infusion
 - > Commence oxytocin at 1-2 mU / minute (i.e. 6-12 mL / hour of 10 IU / 1,000 mL solution)
 - > Use the minimum dose possible and aim for a maximum of 3 – 4 contractions in ten minutes
 - > Prescribe and record the dose of oxytocin being delivered (i.e. mU / minute)
 - > Continuous CTG whenever oxytocin is used for induction or augmentation

Maximum oxytocin infusion dosage

The summary of product guidelines recommends a maximum dose of IV oxytocin 20 mU / minute

In cases where labour progress is unresponsive, RCOG recommends higher doses which should not exceed 32 mU / minute

NB: Individual organisations may differ in their management

Uterine hypercontractility without signs of fetal compromise

- > Reduce oxytocin infusion rate and seek review
- > Maternal reposition (left or right lateral position)
- > Increase intravenous fluids

Uterine hypercontractility with signs of fetal compromise

- > Decrease or discontinue oxytocin
- > Position woman on her left side
- > Increase intravenous fluids
- > Review by medical officer
- > Oxygen at 8-10 litres for duration of fetal compromise
- > Palpate the uterus to determine uterine response to management
- > Consider need for uterine tocolytic e.g. salbutamol or terbutaline (link to tocolysis for uterine hypercontractility)

Best practice notes

- > Discuss oxytocin augmentation with consultant if the woman is > 5 cm dilated
- > If the oxytocin infusion has been ceased for < 30 minutes, recommence at half the previous rate
- > If the oxytocin infusion has been ceased for > 30 minutes, it is likely that oxytocin would have been cleared from maternal circulation, therefore recommence at the initial starting dose / rate (2 mU / minute)²⁵

Oxytocin dosage regimen

- > The following regimen is consistent with RCOG and oxytocin product guidelines. *However, individual organisations may differ in their management*
- > Prepare an infusion of 10 IU oxytocin in either one litre of Hartmann's solution or 0.9 % sodium chloride and infuse using an appropriate volumetric infusion pump
- > For further information, see oxytocin [augmentation and induction of labour infusion regimens](#)

Indications:

Induction or augmentation of labour

Initial rate:

12 mL / hour (2 mU / min)

Increments:

Increase every 30 minutes by 12 mL / hour (2 mU / min)

Maximum:

192 mL / hour (32 mU / min)

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Table 2 oxytocin infusion regimen

10 IU oxytocin in one litre of either Hartmann's or 0.9 % sodium chloride solution		
Initial rate	increments	maximum
12 mL / hour (2 mU / min)	Every 30 minutes	192 mL / hour (32 mU / min)
	Increase with: 12 mL / hour (2 mU / min)	
<p>Prolonged oxytocin infusion</p> <p>If a second litre of oxytocin infusion is required, consider doubling the dose per litre and running the infusion at half the rate to reduce the risk of fluid overload (e.g. increase oxytocin dose to 20 units per litre and infuse dose at half the previous rate)</p>		

References

1. Maul H, Mackay L, Garfield RE. Cervical ripening: Biochemical, molecular, and clinical considerations. *Clin Obstet and Gynecol* 2006; 49: 551-63
2. National Institute for Health and Clinical Excellence (NICE). Induction of labour. National Collaborating Centre for Women's and Children's Health. Commissioned by the National Institute for Health and Clinical Excellence. London: RCOG Press; 2008. Available from URL: <http://guidance.nice.org.uk/CG70/Guidance/pdf/English>
3. Calder AA, Embrey MP, Hillier K. Extra-amniotic prostaglandin E₂ for the induction of labour at term. *J Obstet Gynaecol Br Commonw* 1974;81:39-46.
4. Royal College of Obstetricians and Gynaecologists (RCOG). Induction of labour, Evidence-based Clinical Guideline Number 9. RCOG Clinical Effectiveness Support Unit, London: RCOG Press; 2001.
5. Enkin M, Keirse MJNC, Neilson J, Crowther C, Duley L, Hodnett E, et al. A guide to effective care in pregnancy and childbirth, 3rd ed. Oxford: Oxford University Press; 2000 (Level I).
6. Mandruzzato G, Alfirovic Z, Chervenak F, Gruenebaum A, Heimstad R, Heinonen S, Levene M, Salvesen K, Saugstad O, Skupski D, Thilaganathan B. Guidelines for the management of postterm pregnancy. *J Perinat Med* 2010; 38: 111-9.
7. Kavanagh J, Kelly AJ, Thomas J. Breast stimulation for cervical ripening and induction of labour. *Cochrane Database of Systematic Reviews* 2005, Issue 3. Art. No.: CD003392. DOI: 10.1002/14651858.CD003392.pub2. (Level I). Available from URL: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003392/frame.html>
8. Boulvain M, Stan CM, Irion O. Membrane sweeping for induction of labour. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art. No.: CD000451. DOI: 10.1002/14651858.CD000451.pub2. (Level I) Available from URL: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000451.pub2/pdf/standard>
9. Gülmezoglu AM, Crowther CA, Middleton P. Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database of Systematic Reviews* 2006, Issue 4. Art. No.: CD004945. DOI: 10.1002/14651858.CD004945.pub2. (Level I). Available from URL: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004945/frame.html>
10. Kelly AJ, Kavanagh J, Thomas J. Vaginal prostaglandin (PGE₂ and PGF_{2a}) for induction of labour at term. *Cochrane Database of Systematic Reviews* 2003, Issue 4. Art. No.: CD003101. DOI: 10.1002/14651858.CD003101 (Level I). Available from URL: <http://mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003101/frame.html>
11. Alfirovic Z, Weeks A. Oral misoprostol for induction of labour. *Cochrane Database of Systematic Reviews* 2006, Issue 2. Art. No.: CD001338. DOI: 10.1002/14651858.CD001338.pub2. (Level I). Available from URL: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001338/frame.html>
12. Bricker L, Luckas M. Amniotomy alone for induction of labour. *Cochrane Database of Systematic Reviews* 2000, Issue 4. Art. No.: CD002862. DOI: 10.1002/14651858.CD002862. (Level I). Available from URL:

- <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002862/frame.html>
13. Australian Prescription Products Guide (APP Guide) Online. Product Information – Cervidil®. Thirty-Sixth Edition, 2007.
 14. Hofmeyr GJ, Alfirevic Z, Kelly T, Kavanagh J, Thomas J, Brocklehurst P, Neilson JP. Methods for cervical ripening and labour induction in late pregnancy: generic protocol. (Protocol) *Cochrane Database of Systematic Reviews* 2000, Issue 2. Art. No.: CD002074. DOI: 10.1002/14651858.CD002074. (Level I). Available from URL: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002074/frame.html>
 15. Selo-Ojeme, Pisal P, Barigye O, Yasmin R, Jackson A. Are we complying with NICE guidelines on the use of prostaglandin E2 for induction of labour? A survey of obstetric units in the UK. *J Obstet Gynaecol* 2007; 27: 144-47.
 16. Keirse MJNC. Natural prostaglandins for induction of labor and preinduction cervical ripening. *Clin Obstet Gynecol* 2006; 49: 609-626.
 17. Jozwiak M, Bloemenkamp KWM, Kelly AJ, Mol BWJ, Irion O, Boulvain M. Mechanical methods for induction of labour. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD001233. DOI: 10.1002/14651858.CD001233.pub2. Available at URL: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001233.pub2/pdf/standard>
 18. Gelber S, Sciscione A. Mechanical methods of cervical ripening and labor induction. *Clin Obstet Gynecol* 2006; 49:642.
 19. Kashanian M, Zazemi M, Malakzadegan A. Comparison of 30-mL and 80-mL Foley catheter balloons and oxytocin for preinduction cervical ripening. *International Federation of Gynecology and Obstetrics* 2009; 105:174-5.
 20. Pennell C, Henderson J, O'Neill M, McCleery S, Doherty D, Dickinson J. Induction of labour in nulliparous women with an unfavourable cervix: a randomised controlled trial comparing double and single balloon catheters and PGE2 gel. *BJOG* 2009;116:1443–1452.
 21. Levy R, Kanengiser B, Furman B, Arie AB, Brown D, Hagay ZJ. A randomized trial comparing a 30-mL and an 80-mL Foley catheter balloon for preinduction cervical ripening. *AJOG* 2004; 191: 1632e6.
 22. King Edward Memorial Hospital (KEMH). Transcervical Foley catheter. Section B: Clinical Guidelines 2009. Available from URL: http://www.kemh.health.wa.gov.au/development/manuals/O&G_guidelines/sectionb/5/b5.1.4.pdf
 23. Grobman WA, Lai Y, Landon MB, Spong CY, Leveno KJ, et al. Prediction of uterine rupture with attempted vaginal birth after caesarean delivery. *Am J Obstet Gynecol* 2008; 199:30.e1-5.
 24. Courts Administration Authority South Australia. South Australian findings for 2014. Sleep Aurora Doreen Maureen. Available from URL: <http://www.courts.sa.gov.au/CoronersFindings/Pages/Findings-for-2014.aspx>
 25. Kelly AJ, Tan B. Intravenous oxytocin alone for cervical ripening and induction of labour. *Cochrane Database of Systematic Reviews* 2001, Issue 3. Art. No.: CD003246. DOI: 10.1002/14651858.CD003246. (Level I). Available at: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003246/frame.html>
 26. The American Congress of Obstetricians and Gynecologists (ACOG). Optimizing protocols in obstetrics. Oxytocin for induction; 2011. Available from URL: <http://mail.ny.acog.org/website/OxytocinForInduction.pdf>

Useful websites

RANZCOG College statement:

Use of prostaglandins for cervical ripening prior to the induction of labour. Available at:
<http://www.ranzcog.edu.au/publications/statements/C-obs22.pdf>

Courts Administration Authority South Australia

<http://www.courts.sa.gov.au/CoronersFindings/Pages/Findings-for-2014.aspx>

South Australian Coroner's findings 2014

[SLEEP Aurora Doreen Maureen.pdf](#)

Abbreviations

APP Guide	Australian Products Prescription Guide
ARM	Artificial rupture of the membranes
BP	Blood pressure
CTG	Cardiotocography
cm	Centimetre(s)
FHR	Fetal heart rate
IOL	Induction of labour
IUGR	Intrauterine growth restriction
mg	Milligram(s)
mL	Millilitre(s)
mU	Milliunit(s)
min	Minute(s)
NICE	National Institute for Clinical Excellence
PV	Per vaginam
PROM	Prelabour rupture of the membranes
PGE ₂	Prostaglandin E ₂
RANZCOG	Royal Australian and New Zealand College of Obstetrics and Gynaecology
RCOG	Royal College of Obstetricians and Gynaecologists
SFH	Symphysio fundal height
SROM	Spontaneous rupture of the membranes

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