Guideline for

2006 Update

The Medical Induction of Labour

Following a literature review, this clinical practice guideline (CPG) has been updated with assistance from the Alberta Perinatal Health Program and is consistent with the SOGC recommendations.

GOAL

To initiate effective uterine contractions for the purpose of delivering the infant.

RECOMMENDATIONS

General

- There should be discussion and disclosure of risk factors (including anticipated obstetrical risk, advantages and limitations of local maternity care services, and transport risk) with the pregnant woman and her partner prior to inpatient/outpatient induction, and informed consent should be obtained.

- Alternatives to induction such as fetal surveillance with biophysical profiles between 41 and 42 completed weeks should be discussed.

- Assessment with documentation prior to starting the induction should include:
  - confirmation of parity
  - confirmation of gestational age (early ultrasound for unsure LMP or routine 18 – 20 week ultrasound)
  - presentation
  - pelvic adequacy
  - cervical dilatation, effacement and consistency
  - uterine activity
  - non-stress test including fetal heart rate

- The indication for induction should be documented.

- Assess cervical ripening, if Bishop's score is 6 or less (Table 1), use mechanical or pharmacological cervical ripening agent.

- A qualified registered nurse, familiar with the effects of induction agents and able to detect both maternal and fetal complications, must be available throughout the induction.

Delivery of Care

- When induction of labour is contemplated, it is important that the responsible physician consider where the best conditions can be provided for the patient during labour and delivery and for neonatal care and then refer the patient if advisable. Consideration must be given to the following:

  - availability of an adequately equipped labour and delivery area with appropriate resuscitation equipment for both mothers and newborns.

  - availability of appropriately trained labour and delivery nursing staff to monitor the fetal heart rate and uterine contractions throughout the induction.

  - although there is no evidence to indicate that the ability to perform a cesarean section be a requisite for induction of labour, it is incumbant on rural facilities to determine their local practice and procedures regarding induction of labour and indications for patient transfer.

    - decisions should take into consideration: indication for induction, antenatal risk factors, intrapartum risk factors, method of induction, geographic and climatic conditions.

Practice Point

SOGC[1] states that induction of a nullipara is associated with twice the chance of cesarean delivery compared with spontaneous labour.

The above recommendations are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. They should be used as an adjunct to sound clinical decision making

Recommendations continued

Indications for Labour Induction

- Induction is indicated when the continuance of pregnancy may no longer be advisable in the following clinical circumstances:

  - Gestational hypertension
  - Alloimmune disease at or near term
  - Term, pre-labour rupture of membranes
  - Maternal medical conditions (e.g., diabetes, renal disease, hypertension)
  - Gestation ≥ 41 + 1/7 weeks
  - Evidence of fetal compromise
  - Intrauterine growth restriction
  - Intrauterine fetal death or history of fetal death in prior pregnancy
  - Chorioamnionitis
  - Logistic factors (e.g., history of rapid labour, distance from hospital)

Contraindications for Labour Induction

- Malpresentations (e.g., transverse or oblique lie, footling breech)
- Absolute cephalo-pelvic disproportion
- Placenta previa
- Previous major uterine surgery or classical cesarean section
- Invasive carcinoma of the cervix
- Cord presentation
- Active genital herpes
- Gynecological, obstetrical, or medical conditions that preclude vaginal delivery
- Convenience

Cautions in Labour Induction

- Grand multiparity (greater than four)
- Vertex not fixed in the pelvis
- Unfavourable or unripe cervix
- Brow or face presentation
- Over distension of uterus (polyhydramnios or multiple pregnancy)
- Lower segment uterine scar (extreme caution)
- Pre-existing hypertonus
- Prior history of difficult labour and/or traumatic delivery

Induction of Labour with Prostaglandins

- Prostaglandin analogues of dinoprostone (PGE_2) are available for cervical ripening and the induction of labour. Commercially prepared products are now readily available for endocervical and vaginal application. Refer to product inserts for information specific to each product.

- CAUTION must be taken to administer the appropriate dosage of prostaglandin by the vaginal or intracervical route as dosage is much higher in vaginal preparations.

- Prostaglandins should not be used in the presence of a lower segment cesarean section scar because of the increased incidence of uterine rupture.

- Prior to prostaglandin insertion a non-stress test should be performed. The procedure should only proceed with a reassuring non-stress test.

- There should be fetal heart rate and uterine activity monitoring for a minimum of 30 minutes after insertion.

- There is no evidence that clearly dictates the frequency of maternal vital signs.

- Outpatient cervical ripening with intravaginal controlled release PGE_2 may be a reasonable option for selected low risk women but stress that careful instructions to the women and their partners for follow-up and awareness of signs of hyperstimulation are extremely important.

Practice Point

Anecdotal evidence suggests that Cervidil may be preferred in outpatient cervical ripening as it can be easily removed by the mother

- As a general rule, oxytocin should not be started nor a repeat of prostaglandin administered for at least six hours after the last prostaglandin gel administration or within 30 minutes after removal of Cervidil insert.

Induction of Labour with Oxytocin

- The purpose of oxytocin administration is to effect uterine activity that is sufficient to produce cervical change and fetal descent while avoiding uterine hyperstimulation and fetal compromise.
- It is recommended that oxytocin be ordered and recorded in mU/minute.
- An intravenous infusion of a crystalloid solution, using an adequate sized intracath, is started at a site that allows mobility of the patient's arm.

Practice Point

Prior to any increase in dosage, uterine contractions should be assessed by palpation or intra-uterine pressure monitoring. The lowest possible effective dose of oxytocin should be used to prevent hyperstimulation of the uterus.

- Oxytocin should be delivered by a constant infusion pump through a secondary IV piggy-backed to the main IV line as close to the venipuncture site as possible.
- The infusion is started at 0.5 to 2.0 mU/minute with a recommended incremental increase of 1 to 2 mU/min every 30 to 60 minutes to a maximum of 20 mU/min. This dose should not be exceeded without an evaluation by a physician. Obstetrical consultation should be considered.
- Regular observations of uterine contractions and fetal heart rate should be recorded every 15 to 30 minutes and with each incremental increase of oxytocin.
- Continuous intrapartum electronic fetal monitoring is recommended when oxytocin is being used for induction of labour.[2]
- There are no clear guidelines for the assessment of maternal vital signs during oxytocin induction. The World Health Organization[3] recommends that maternal pulse and blood pressure should be assessed with each incremental increase of oxytocin and at least hourly for the first 4 hours, and then as dictated by individual patient assessment.
- If fetal heart rate abnormalities or tetanic contractions develop, the infusion should be stopped, intrauterine resuscitation measures initiated and the situation re-evaluated before restarting the infusion. If restarting the oxytocin, it may be necessary to lower the dosage and lengthen the interval between subsequent increases.

Induction of Labour Risks

- Uterine hyperstimulation can occur with administration of prostoglandins and/or oxyocin. Signs and symptoms of hyperstimulation could include[1]:
  - Tachysystole - five contractions in 10 minutes or more than 10 contractions in 20 minutes
  - Hypertonus - contraction(s) lasting more than 120 seconds
  - Excessive uterine activity with a nonreassuring fetal heart rate

INTRAUTERINE RESUSCITATION MEASURES

- Stop oxytocin infusion
- Remove Cervidil and as much PGE_2 gel as possible
- Reposition to side
- Give O_2 per mask @ 10 L/min
- Notify responsible physician
- Initiate IV and consider increasing fluids (dependent on maternal condition)
- Administer a tocolytic agent as per hospital protocol/regime
- Prepare for possible cesarean delivery if fetal heart pattern remains non-reassuring

Note: As a tocolytic agent the SOGC, August 2001, suggest: Nitroglycerine 50 to 200 ug subcutaneously or intravenously, or one to two meter dose (400-800ug) of sublingual nitroglycerine spray.

- If intrauterine resuscitation is successful, following physician consultation, oxytocin may be restarted at 1/2 the last dose
- Should uterine hyperstimulation occur without evidence of fetal compromise, then decrease the oxytocin infusion rate and re-evaluate situation.

Caution: Oxytocin infusion should not be started sooner than six hours after the last dose of prostaglandin gel administration or within 30 minutes of Cervidil use.

BACKGROUND

Introduction

Induction of labour is a common procedure in Alberta with an overall rate of 23.1 percent in 2003.[4] Induction of labour involves the initiation of labour prior to spontaneous onset, for the purpose of accomplishing delivery.[5] Ideally all pregnancies should be allowed to go to term, with the onset of labour being the sign of physiologic termination of pregnancy.[5]

Indications for Induction

If induction of labour is warranted, the responsible physician should discuss various options with the woman and her partner and have completed a thorough evaluation of the mother and fetus.[6] This careful risk benefit assessment should precede any decision to induce labour, with induction indicated only when the benefits to either the mother or fetus outweigh those of continued pregnancy. The assessment should include documentation of the indication and method of labour induction. There is not strong evidence in the literature regarding the need for consultation prior to induction, however it is the opinion of this working group that consultation by another practicing physician familiar with obstetric care or an obstetrician should be considered.

Appropriate indications for induction include post-date pregnancy, pre-labour rupture of membranes (PROM), suspected fetal compromise and maternal medical problems.[5-7] Although elective induction of labour (defined as being done solely for convenience) is generally not recommended, logistic factors such as distance from the birth site or a history of rapid labour may be reasonable indications.[8]

Outpatient Cervical Ripening

Randomized controlled trials of outpatient cervical ripening prior to labour induction indicate no significant differences in the outcomes in terms of spontaneous delivery and fetal outcomes. Based on findings, researchers have concluded that outpatient cervical ripening with intravaginal controlled release PGE_2 may be a reasonable option for selected women but stress that careful instructions to the mothers and partners for follow-up and awareness of signs of hyperstimulation are extremely important.[9-13]

Contraindications for Induction

The physician should always rule out such contraindications to cervical ripening and labour induction as placenta or vasa previa, transverse fetal lie and prior uterine incision.[8]

Cervical Ripening

There is no evidence to support cervical ripening independent of labour induction. Therefore, when indicated, cervical ripening should be considered part of the labour induction process. Recent reports have confirmed early studies that emphasized that the state of the cervix was the most important predictor of success, leaving little doubt that ripening of the cervix greatly facilitates labour and increases the likelihood of vaginal delivery.[14-17] A meta-analysis suggests that when labour must be induced with an unripe cervix, prostaglandins can decrease the likelihood of failed induction, decrease the incidence of prolonged labour and increase the chances of a spontaneous vaginal delivery.[18]

Prostaglandins

In the past 20 years, prostaglandins have been used in a variety of formulations both to ripen the cervix and to induce labour. Prostaglandins were first used intravenously in the late 1960-s but this route of administration was associated with significant side effects.[19] A change in route of administration from systemic to local has resulted in fewer side effects and it has also been found that smaller doses have a marked softening effect on the cervix.[20] Intravaginal or intracervical administration of exogenous PGE_2 (dinoprostone) is the most widely used pharmacologic method to promote cervical ripening and labour induction.[8,21]

A meta analysis comparing women who received prostaglandins to placebo or no treatment groups indicated that receiving prostaglandins did more to improve the cervical score and ripen the cervix.[18] Cochrane reviewers[22] studied the use of prostaglandins for cervical ripening on labour induction. Compared with placebo, use of vaginal prostaglandins increased the likelihood that a vaginal delivery would occur within 24 hours. Additionally, the rate of cesarean section was comparable in all studies. Prostaglandins are associated with an increased risk of uterine rupture and should not be used as part of a trial of labour with a previous uterine scar.

The optimum route (endocervical or vaginal), the initial dose of PGE_2 and the interval and frequency of dosage increase is a source of great debate. A study by Seeras et al,[23] suggests that a 2 mg dose of vaginal PGE_2 given on a 12 hourly basis may be as good or better than on a 6 hourly basis. The authors also suggest that there is little or no benefit in using more than three doses. The American College of Obstetricians and Gynecologists recommend that regardless of route of administration, fetal and maternal well-being should be monitored for 30 to 120 minutes following administration of PGE_2.[8]

Labour Induction

Oxytocin

The appropriate initial dose of oxytocin and the interval and frequency of dosage increase is controversial. Randomized controlled trials have shown a wide range of dosages and frequencies to be successful. Dose increment schedules as short as 15 minutes and 30 minutes have been compared, using a starting dose of 2.5 mU/minute with increases of the same amount, showing no significant difference between the two groups.[24] Successful low dose protocols have begun with an initial dose as low as 0.5 mU/minute and intervals as long as 60 minutes between dose increases.[25,26] Both the 20 and 40 minute dosage intervals have been shown to be safe and efficient when using high dose oxytocin defined as a starting dose of 6 mU/minute with increases of 6 mU/minute.[27] A comparison has been made between gradual dose increments of 1 to 2 mU/minute every 30 minutes with a protocol that doubles the pre-existing rate every 40 minutes, and although the larger dose increments were associated with a shorter time from induction to establishment of labour, no significant difference was seen in the time from onset of induction to time of delivery.[28] Comparison of low-dose to high-dose regimes of oxytocin in a meta-analysis study found that the potential shortening of induction to delivery time with the high-dose protocol occurred at the expense of higher rates of excessive uterine activity, fewer spontaneous vaginal deliveries, a trend towards a higher cesarean section rate and an increased potential for maternal morbidity.[28]

Adverse effects of oxytocin are primarily dose related.[6] The potential adverse risks of oxytocin may consist of uterine hyperstimulation or rupture, fetal compromise, or water intoxication.[14] The most common adverse effect is fetal heart rate deceleration associated with uterine hyperstimulation. Decreasing the dose rather than stopping it may correct the abnormal pattern without slowing the establishment of labour. If it is essential to discontinue the oxytocin, it may be restarted when the fetal heart rate and uterine activity returns to acceptable levels. It may be necessary to lower the dose and lengthen the interval when restarting administration of oxytocin.[7]

Prostaglandins

The successful use of PGE_2 for labour induction in women with favourable cervices has been reported.[7] The SOGC recommends, therefore, that a combination of PGE_2 followed by oxytocin infusion (not less than 6 hours after the last prostaglandin administration), is the most effective method of inducing labour.[16]

Misoprostol

Misoprostol is a synthetic prostaglandin E_1 analogue that has been indicated for peptic ulcer prevention in patients taking NSAIDs. Although it has been investigated for use in pre-induction cervical ripening and labour induction, it has not received FDA approval and therefore should only be used in the context of clinical trials until such time that approval as an induction agent has been granted.[29]

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TOWARD OPTOMIZED PRACTICE (TOP) PROGRAM

The TOP Program promotes appropriate, effective and quality medical care in Alberta by supporting the use of clinical practice guidelines. The program is administered by the Alberta Medical Association under the direction of a multi-stakeholder leadership committee.

TO PROVIDE FEEDBACK

The Working Group for Labour Induction is a multidisciplinary team composed of family physicians, obstetricians, pediatricians, geneticists, midwives, and the TOP Program. The Working Group encourages your feedback. If you need further information or if you have difficulty applying this guideline, please contact:

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Medical Induction of Labour - July 1999
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TABLE 1: BISHOP'S PREINDUCTION CERVICAL SCORE SYSTEM

	Score			
	0	1	2	3
Dilation cervix in cm	0	1-2	3-4	5-6
% Effacement **or** Length of cervix in cm	0 to 30% **or** ≥ 4 cm	40 to 50% **or** 3cm	60 to 70% **or** 2 cm	80%+ **or** ≤ 1 cm
Consistency	Firm	Medium	Soft	
Position	Posterior	Mid Cavity	Anterior	
Station (in cm above or below ischial spines)	-3 cm	-2 cm	-1 cm to 0	+1 to +2