

Induction of labour

Roisin Ryan

Fergus McCarthy

Abstract

Induction of labour describes the artificial stimulation of the onset of labour, which is used in up to 20% of pregnancies in the United Kingdom. Both mechanical and pharmacological methods of induction of labour exist. In the vast majority of women, the recommended method of induction of labour is by the use of vaginal prostaglandin E2. Induction of labour is associated with less maternal satisfaction and potentially increased rates of operative delivery compared with spontaneous vaginal delivery. Therefore, the decision for induction of labour should not be undertaken lightly. Appropriate counselling of the mother with documentation of the provision of information regarding the indications, risks, benefits and alternatives to induction of labour is advocated.

Keywords caesarean section; induction of labour; oxytocin; prostaglandin

Introduction

Induction of labour is a method of artificially stimulating the onset of labour prior to the onset of spontaneous labour. The incidence of induction of labour has increased over recent decades, mainly due to an accumulating body of evidence highlighting the risks to the fetus of pregnancy lasting beyond 41 completed weeks of gestation. It has also been suggested that practitioners may have adopted a decreased to recommend intervention of induction of labour for a variety of indications. Without intervention, approximately 5%–10% of pregnancies continue beyond 294 days or 42 completed weeks. These pregnancies are a major contributor to the high incidence of induction of labour. The incidence of induction of labour varies from country to country, ranging from approximately 6% in developing countries such as Nigeria to approximately 20% in the United Kingdom. Induction of labour may be one of the most common interventions in obstetrics, but it is not without risks and should not be undertaken lightly. Recent randomised controlled trials involving induction of labour for conditions such as large for gestational age or pre-eclampsia at 37 weeks' gestation suggest that induction of labour is not associated with increased caesarean section rates. Of all women who are induced, less than two-thirds will give birth without further

intervention; approximately 15% will have an instrumental delivery and over 20% will deliver by emergency caesarean section. It is important to bear in mind however, that the ultimate mode of delivery in these observational studies is influenced not only by the induction process itself, but also by the underlying pathology for which the induction was undertaken. Studies have demonstrated that a vast majority of women (>70%) would prefer not to have induction of labour by any means. It is therefore imperative that women be counselled appropriately antenatally regarding the risks, benefits and alternatives to induction of labour.

Physiology of labour

Labour is a complex physiological process, and there is still a lack of understanding of the factors which trigger labour naturally. There are however two critical components of labour: cervical ripening and myometrial contractions, which result in cervical effacement, dilatation, and ultimately expulsion of the fetus, placenta and membranes.

The normal non-pregnant human cervix measures approximately three and a half centimetres in length and is composed of 80–85% extracellular connective tissue and 10–15% smooth muscle. The predominant molecules of the extracellular matrix are type 1 and type 3 collagen. Intercalated among these collagen molecules are glycosaminoglycans and proteoglycans, hyaluronic acid, dermatan sulphate and heparin sulphate. Fibronectin and elastin also run among the collagen fibres. Release of fibronectin from the interface between the chorion and the decidua is utilised in tests used to predict preterm labour.

It is necessary for the cervix to undergo several changes in order to stimulate the onset of labour and allow dilatation to occur. This process is known as cervical ripening and is the result of a series of complex biochemical reactions resulting in the cervix becoming soft and pliable. Late in pregnancy, hyaluronic acid, cervical collagenase and elastase increase in the cervix. This results in an increase of water molecules which intercalate among the collagen fibres. The amount of dermatan sulphate and chondroitin sulphate decreases, leading to reduced bridging among the collagen fibres. These changes, combined with collagen fibre alignment, decreased collagen fibre strength, and diminished tensile strength of the extracellular cervical matrix, result in the ripening process. Near term, collagen turnover increases and degradation of newly synthesized collagen increases, resulting in overall decreased collagen content in the cervix. The process of cervical ripening is induced by cytokines, nitric oxide synthesis enzymes and prostaglandins and hormones such as progesterone, relaxin and oestrogen.

An increase in the enzyme cyclooxygenase-2 (COX2) leads to increased local production of prostaglandin E2 (PGE2) in the cervix. The increase in PGE2 results in numerous changes to the cervix, including dilatation of small vessels in the cervix, an increase in interleukin (IL) 8 release and an increase in collagen degradation mediated by increased chemotaxis for leukocytes. Cervical ripening also involves prostaglandin F2-alpha which stimulates an increase in glycosaminoglycans. There is also increased activity of matrix metalloproteinases 2 and 9, enzymes that degrade extracellular matrix proteins.

Roisin Ryan MB BCh BAO is a Trainee in Obstetrics and Gynaecology at St Vincent's University Hospital, Dublin, Ireland. Conflicts of interest: none declared.

Fergus McCarthy PhD MSc Dip MRCOG MRCPI is an NIHR Academic Clinical Lecturer and Maternal and Fetal Medicine Subspecialist Trainee in the Division of Women's Health, Women's Health Academic Centre, St Thomas' Hospital and King's College London, UK. Conflicts of interest: none declared.

The nitric oxide (NO) system also likely plays an integral role in the cervical ripening process and onset of labour. In the myometrium, nitric oxide synthase (NOS) activity is higher prior to the onset of labour and decreases during labour. In contrast, in the cervix prior to cervical ripening, NOS activity is low and then increases at the time of labour, associated with cervical ripening. In the human cervix, ripening is associated with an increase in induced NOS (iNOS) and brain NOS expression in the cervix.

Cervical ripening is followed by myometrial contractions which result in progressive effacement and dilatation of the cervix. The stimulus which initiates the onset of myometrial contractions is unclear. It is likely that the myometrium, which is relatively quiescent prior to the onset of labour, becomes more sensitive to endogenous signalling molecules, which then trigger myometrial contractions. Coordinated myometrial contractions are achieved by forming gap junctions between myometrial smooth muscle cells, allowing the myometrium to act as a functional syncytium.

Prevention of induction of labour

Accurate dating of pregnancy using early antenatal ultrasound is widely accepted to help prevent high rates of induction of labour, most likely by avoiding misclassification of pregnancies as post-term.

The NICE guidelines on induction of labour recommend that at the 38 week antenatal visit women be informed of the potential for their pregnancy to continue beyond term. Interventions, such as membrane sweeping, may reduce the requirement for post-term induction of labour. This proactive approach allows women to consider the alternatives available and gives them time to discuss the information with her partner before coming to a decision.

To further reduce the incidence of induction of labour, it is recommended that all women are offered a sweep of the membranes after 37 weeks of gestation. Sweeping (or stripping) of the membranes involves inserting the examiner's finger through the internal os of the cervix and rotating it circumferentially. This manipulation is thought to result in the release of PGE₂ from the cervix and also the release of prostaglandin F_{2α} from the decidua and adjacent membranes. Vaginal spotting, mild abdominal cramps and slight maternal discomfort are the commonest side effects of this outpatient procedure. Successive trials have conclusively demonstrated the safety of membrane sweeping. In addition to accelerating the onset of spontaneous onset of labour, sweeping of the membranes may also increase successful vaginal delivery rates. Additional membrane sweeping may be offered if there is no spontaneous onset of labour after 48 hours, however, the extra benefits of this remain unclear. The NICE guidelines recommend that membrane sweeping be offered to nulliparous women from between 40 and 41 weeks' gestation and multiparous women from 41 weeks. However, in practice, the sweeping of membranes is often offered earlier.

Indications for induction of labour

Labour may be induced for maternal or fetal indications. The decision to induce is made after consideration of maternal factors such as wellbeing, cervical assessment, parity, previous mode of

delivery and fetal factors such as gestational age, growth and well being of the fetus. Numerous indications exist for the induction of labour. Commonly accepted indications for induction of labour are presented in [Box 1](#). Specific indications include 'post-dates'-pregnancies, advanced maternal age, maternal conditions such as pre-eclampsia and diabetes, and intrauterine growth restriction.

'Post dates' pregnancies

Traditionally, pregnancy has been allowed to continue up until 42 completed weeks of gestation and beyond. The Royal College of Obstetricians and Gynaecologists now recommend a policy of labour induction at 41 completed weeks of pregnancy rather than awaiting the spontaneous onset of labour. The NICE guidelines recommend that women with uncomplicated pregnancy should be offered induction of labour between 41 + 0 and 42 + 0 weeks' gestation. This appears to result in fewer perinatal deaths and a lower incidence of meconium aspiration syndrome. However, the absolute risk of perinatal mortality remains very small following 41 weeks' gestation. There is insufficient data to recommend routine induction of labour at 40 weeks' gestation as maternal–fetal benefits such as a reduction in the incidence of stillbirth have not been conclusively proven. The potentially increased costs of a policy of routine induction of labour at term, consequent on increases in caesarean sections and neonatal care have also not been properly evaluated.

Indications to offer induction of labour

Maternal indications

- Post-term pregnancy
- Pregnancy induced hypertension or pre-eclampsia greater than 37 weeks' gestation
- Obstetric cholestasis >37 weeks
- Maternal diabetes >40 weeks' gestation
- Advanced maternal age >39 weeks
- Antepartum haemorrhage at term
- Reduced fetal movements (consider number of episodes and gestation)

Fetal indications

- Intrauterine growth restriction (at term if normal Dopplers)
- Intrauterine fetal death
- Fetal macrosomia. Increasingly women are being offered induction of labour for suspected fetal macrosomia. However, there is insufficient evidence that induction of labour improves maternal or fetal outcomes and this is not recommended by the NICE guidelines

Membrane and placental indications

- Prelabour rupture of membranes greater than 37 weeks' gestation with no spontaneous onset of labour occurring within 24–48 hours
- Preterm prelabour rupture of the membranes <37 weeks if any signs or symptoms of chorioamnionitis are present

Box 1

Download English Version:

<https://daneshyari.com/en/article/3966491>

Download Persian Version:

<https://daneshyari.com/article/3966491>

[Daneshyari.com](https://daneshyari.com)