Comparison of various methods of induction of cervical ripening and labour, including prostaglandins, oxytocin, oestradiol and mechanical means

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Induction of labour has been practiced for centuries. Cervical ripening is a more recent innovation. Both, however, have the object, to deliver the infant. The recent focus of attention on cervical ripening shows that clinicians have come to recognise the deficiencies in the methods hitherto available for labour induction. To achieve safe delivery it is necessary to make a careful study of each patient and to plan the method of intervention accordingly. If the fetus is already seriously compromised and likely to become even more so during labour, delivery will be best achieved by elective Caesarean section; if not thought must be given to the likely response to different methods of induction of labour, including, if necessary, a procedure for cervical ripening.

Unlike other forms of medical intervention, induction of labour aims to produce an effect which would occur spontaneously in the natural course of events. Human parturition is not the rather sudden phenomenon it may sometimes appear. Rather, it is a gradual evolution of uterine contractility and cervical ripening, occurring in concert over several weeks.

One factor above all others determines the response to induction of labour, namely - How close is the patient to the spontaneous onset of labour? A patient who would be in spontaneous labour tomorrow will respond well to labour induction today, almost regardless of the method employed. Conversely, if spontaneous labour is a distant prospect attempts at induction, especially by inappropriate methods, may fail and expose both mother and fetus to much greater dangers. For the mother these are the risks of prolonged labour, sepsis and damage to the genital tract with the likely need for Caesarean section. For the fetus the risks are infection, hypoxia and trauma including intracranial haemorrhage.

The clinician should therefore tread cautiously and should direct his attention to the cervix. There is no better indicator of the likely response to induction of labour If the cervix is ripe (soft, compliant, effaced and beginning to dilate) and the presenting part well into the pelvis, induction should be trouble free. If the cervix is not ripe induction of labour without first ripening the cervix may lead the patient, fetus and obstetrician into trouble.

The individual techniques of labour induction and cervical ripening will now be considered against this background.

(1) **Mechanical Methods:** In the past, a variety of manipulations and stimuli were applied to the genital tract to interrupt pregnancy. Bizarre foreign materials were introduced into the vagina and cervix and for a time rigid bougies were popular. These are now of historical interest only except intracervical balloons, laminaria, sweeping the membranes and amniotomy. We now know that all these influences release prostaglandins within the uterine compartment.

(2) **Oxytocin:** In the 75 years since this peptide was isolated and made available as a therapeutic agent much experience has accrued about its benefits and dangers. It is the most commonly used agent for induction of labour and is best given by intravenous infusion. Its effectiveness is greatly enhanced by amniotomy which increases the oxytocin sensitivity of the myometrium, probably as the result of an increase in prostaglandin production. It is also much more effective if the cervix is ripe. The primigravida with an unripe cervix will respond poorly to oxytocin infusion. This does not produce effective uterine activity or cervical ripening and if amniotomy is performed with the the cervix still unripe the complication rate is high.

(3) **Prostaglandins:** These so called "local hormones" (especially PGE_2) have largely compensated for the deficiencies of oxytocin. Experience has taught us that they are most effective given locally in the genital tract and that they have a specific effect in ripening the cervix. They also stimulate effective uterine contractions.

If the cervix is unripe PGs should be directed towards the cervix (extra-amniotically, endocervically or vaginally in a gel or pessary) to produce ripening. Amniotomy should be deferred until the cervix is ripe and thereafter myometrial contractions may be enhanced if required with intravenous oxytocin or further prostaglandin therapy. This dramatically reduces the incidence of complications from induction of labour in patients with an unripe cervix.

(4) **Other Hormones:** Oestrogens and relaxin have also been investigated for cervical ripening. Their effect is less dramatic than that of the prostaglandins but they have the potential benefit of causing less myometrial stimulation. This may allow the processes of ripening and induction to be accomplished separately. Experience with these agents is limited, however, and further study and knowledge is required before they can have a clinical impact.