Induction of labour : Foley catheter revisited

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CERVICAL RIPENING IN THE NETHERLANDS: A SURVEY

INDUCTION OF LABOUR IN WOMEN WITH AN UNFAVOURABLE CERVIX

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ABSTRACT

Objective: We aim to investigate methods and use of cervical ripening in women without and with a prior caesarean delivery in the Netherlands.

Methods: In 2010, we conducted a postal survey in all Dutch hospitals with a labour ward. One gynecologist per hospital was addressed and was asked to respond on behalf of the staff. The questionnaire contained 31 questions concerning cervical ripening and induction of labour. We compared this survey to a similar Dutch survey conducted in 2006.

Results: Response rate was 78% (70/92 hospitals). In women *without* a prior caesarean and in need of cervical ripening, all hospitals (100%) applied prostaglandins (either E1 or E2). In women *with* a prior caesarean, 21.4% of the hospitals performed an elective caesarean section if delivery was indicated (26.0% in 2006). In case of cervical ripening, 72.7% used mechanical methods (49.1% in 2006), 20.0% used prostaglandins (40.4% in 2006), 3.6% used a combination of prostaglandins and mechanical methods and 3.6% used membrane-sweeping or oxytocin.

Conclusions: In 2010, in the Netherlands, prostaglandins and Foley catheters were the preferred methods for cervical ripening in women without and with a prior caesarean, respectively. Use of mechanical methods in women with a prior caesarean has increased rapidly between 2006 and 2010, corresponding with decreasing use of prostaglandins and elective repeat caesarean sections.

INTRODUCTION

In 2007, 33% of all deliveries in the Netherlands were induced.[1] It is estimated that more than half of the women in whom labour is induced, have an unfavourable cervix, defined as a Bishop score less than 6.[2] The national guideline of the Dutch Society of Obstetrics and Gynaecology (NVOG) as well as the American College of Obstetricians and Gynecologists (ACOG), the Royal College of Obstetricians and Gynaecologists (RCOG) and the Society of Obstetricians and Gynecologists of Canada (SOGC) advise the use of prostaglandins for cervical ripening in this group of women.[3-6] As an alternative, these guidelines mention that a Foley catheter can be used. However, the RCOG guideline states that mechanical methods should not be used routinely and the SOGC guideline conveys that more data are needed to be able to draw firm conclusions about their effectiveness.[5,6]

20% Of all women with a prior caesarean delivery that attempt a trial of labour in the subsequent pregnancy, are induced.[7] According to the Dutch (NVOG)-guideline on induction of labour, caution is advocated concerning the use of contraction-stimulating drugs in women with a prior caesarean section.[8] Internationally, there seems to be a lack of consensus on the use of prostaglandins in women with a prior caesarean delivery. The 2007 RCOG guideline recommends a limit of 6mg for prostaglandin cervical ripening.[5] The 2006 ACOG Guideline states that appropriate case selection and avoiding sequential prostaglandin and oxytocin use offers the lowest risk of uterine rupture.[9,10] The 2005 SOGC guideline advocates that prostaglandins should only be used in exceptional situations and after appropriate counselling.[6] Mechanical methods for cervical ripening such as the Foley catheter seem to be a good alternative in women with a prior caesarean delivery, carrying a lower risk of uterine rupture compared to prostaglandins.[11-13]

In the Netherlands, both pharmacological and mechanical methods of cervical ripening are applied, both in women with and without a prior caesarean delivery. However, results from a 2006 national survey by Reijers and colleagues showed that mechanical methods were rarely used.[14]

Due to the (re) introduction of the Foley catheter in a randomised controlled trial, the PROBAAT trial, conducted in the Netherlands between February 2009 and May 2010, awareness about and use of the Foley catheter has presumably increased, especially in women with a prior caesarean delivery. The PROBAAT trial comparing Foley catheter and prostaglandins for cervical ripening in women without a prior caesarean delivery showed that both methods are equally effective with less maternal and neonatal side effects when using the Foley catheter.[15]

We conducted a nationwide survey to assess current practice of cervical ripening in women with and without a prior caesarean delivery in 2010. Results of the PROBAAT trial were unknown at time of the survey.

MATERIAL AND METHODS

In April 2010, all 92 Dutch hospitals with an obstetric practice received a postal questionnaire concerning methods of cervical ripening in women with an unfavourable cervix. One obstetrician per hospital was addressed and was asked to reply on behalf of the hospitals obstetric staff and based on protocols or policies. The survey consisted of two sections concerning women without (part one) and with (part two) a history of a caesarean delivery. A total of 31 multiple choice questions with the opportunity for additional comments were given. Both sections contained questions concerning preferred method of cervical ripening, frequency and maximum daily dose of medication. Additionally we inquired if a difference in treatment was made between nulli- and multiparous women. Respondents were asked whether a cervical scoring system, such as the Bishop score was used in decisions concerning labour induction and cervical ripening.[2] Methods of maternal and fetal monitoring and subsequent treatment after one and two days of cervical ripening were inquired. In part two, respondents were additionally asked if there were any reasons not to induce labour or apply cervical ripening in women with a prior caesarean delivery.

Non-respondents received a reminder email after six weeks and, if necessary, a phone call two weeks later.

Our results were compared to the 2006 national survey on induction of labour in women with an unfavourable cervix by Reijers et al. for both women without and with a prior caesarean delivery.[14] The questions posed in the 2010 survey were mostly consistent with those in the 2006 survey.

We compared the use of cervical ripening and methods for cervical ripening between 2006 and 2010. For categorical or dichotomous data differences were tested using the chi-square test. All analyses were performed using SPSS version 17.0 (SPSS Inc, Chicago, IL, USA).

RESULTS

Of the 92 surveys sent 70 were returned, giving a response rate of 78%. Respondents according to type of hospital are shown in Table 1.

Part one: women without a prior caesarean delivery

Cervical ripening methods

An overview of the various methods of cervical ripening of the unfavourable cervix in women without a prior caesarean delivery is shown in Table 2. Also, dose and maximum frequency of administration are specified for the preferred method of cervical ripening. Twenty-five hospitals (36%) used more than one method for cervical ripening. If applicable, the second preferred method is also shown. Two hospitals adjusted dose of vaginal prostaglandin E2 gel according to parity.

Table 1. Overview of survey respondents according to type of hospital in the Netherlands in 2010

Type of hospital	Number of returned surveys
University hospital	7/8
Teaching hospital	31/37
District hospital	31/47

Total number of respondents is 70; One survey was returned anonymously

For the assessment of cervical ripeness and the consequent decision of cervical ripening and induction, 48 hospitals (69%) used a cervical scoring system such as the Bishop score. The remaining hospitals assessed cervical ripeness using a vaginal examination, without a specified scoring system. Of the 47 hospitals

Table 2. Methods of cervical ripening in women without a prior caesarean delivery in the Netherlands in 2010

	Intracervical prostaglandin E2 gel (Prepidil ®) 0.5 mg	Intravaginal prostaglandin E2 gel (Prostin ®) 1 mg	Intravaginal prostaglandin E2 gel (Prostin ®) 2 mg	Intravaginal prostaglandin E2 gel (Prostin ®) 1+2 mg	Slow release vaginal insert prostaglandin E2 (Propess ®)	Intravaginal prostaglandin E2 tablet (Prostin ®) 3mg	Intravaginal prostaglandin E1 misoprostol tablet (Cytotec ®)	Oral prostaglandin E1 misoprostol tablet (Cytotec ®)	Foley Catheter	Foley Catheter + prostaglandins (E1 or E2)
Administration frequency*										
once	2	-	2	-	14	-	-	-	-	2
every 2 h	0	-	-	-	-	-	-	1	-	-
every 4 h	2	-	4	7	-	-	9	-	-	-
every 6 h	2	4	5	11	-	2	-	-	-	1
every 12 h	-	-	1	-	-	-	-	-	-	-
Maximum daily doses*										
once	1	-	1	-	14	-	-	-	-	1
twice	4	2	10	12	-	-	-	-	-	-
3 times	-	2	2	5	-	2	8	-	-	2
4 times	1	-	-	1	-	-	1	-	-	-
6 times	-	-	-	-	-	-	-	1	-	-
Total n=70	6	4	13	18	14	2	9	1	-	3
Second choice n=26	1	1	-	-	2	-	2	-	19	1

*Concerns the preferred method of cervical ripening

that used the Bishop score, induction after cervical ripening by amniotomy and oxytocin augmentation was performed at a certain Bishop score (Figure 1). Six of the 22 hospitals (27%) that did not use the Bishop score performed amniotomy at a lower "score" of their own scoring system in multiparous compared to nulliparous women when a 'favourable' cervix was found by vaginal examination.

All hospitals applied fetal monitoring at set times after starting cervical ripening. Two hospitals (3%) applied continuous fetal monitoring with cardiotocography (CTG) during cervical ripening with vaginal prostaglandin E2 gel (1 and 2mg). Induction of labour by amniotomy and subsequent oxytocin augmentation after proven cervical ripeness were performed at any moment of the day in 35 hospitals (50%), the morning after the start of cervical ripening in 29 hospitals (41%) and depended on the indication of induction in 5 hospitals (9%).

The most reported reasons for the preferred method of cervical ripening were 'ease in use' (57%), 'reduced hyperstimulation risk' (24%) and 'increased likelihood of delivery within 24 hours' (19%). The arguments 'ease in use' and 'reduced hyperstimulation risk' were predominantly mentioned by hospitals that used prostaglandin E2 gel or a slow release prostaglandin E2 vaginal insert. The argument 'more deliveries in 24 hours' was given by all three hospitals that use the Foley catheter in combination with prostaglandins. Other important arguments were 'tradition', 'experience' and, among slow release prostaglandin E2 vaginal insert-users, 'the possibility of removing it'.

The policy after insufficient result of cervical ripening after one or two days is shown in Table 3.

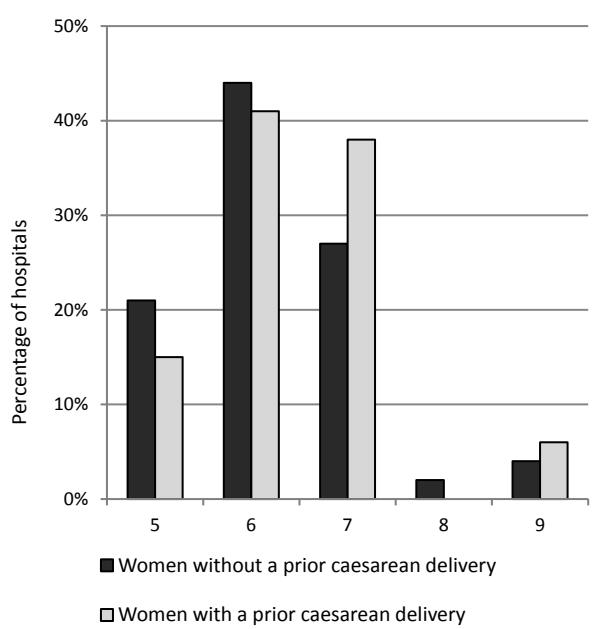

Figure 1. Minimum Bishop score after cervical ripening required for induction of labour by amniotomy and oxytocin augmentation in women without and with a prior caesarean delivery in the Netherlands in 2010

Table 3. Policy after insufficient result of cervical ripening after one and two days in women without a prior caesarean delivery in the Netherlands in 2010

	Continue using same method without day(s) of rest	Day of rest after 1 day, then continue using same method	Day of rest after 2 days, then continue using same method	Day of rest after 2 days, then continue using different method	Foley catheter on day 3	Foley catheter on day 4	Other
Intracervical PG* E2 gel (Prepidil ®) 0.5 mg	3	1	1	1	-	1	-
Intravaginal PG* E2 gel (Prostin ®) 1 mg	1	-	3	-	-	-	-
Intravaginal PG* E2 gel (Prostin ®) 2 mg	2	-	6	5	-	3	-
Intravaginal PG* E2 gel (Prostin ®) 1+2 mg	5	-	13	-	-	-	-
Slow release vaginal insert PG* E2 (Propess ®)	4	2	7	-	2	-	1
Intravaginal PG* E2 tablet (Prostin ®) 3mg	-	-	1	-	-	-	1
Intravaginal PG* E1 misoprostol tablet (Cytotec ®)	4	-	4	1	-	1	-
Oral PG* E1 misoprostol tablet (Cytotec ®)	-	-	-	1	-	-	-
Foley catheter combined with PG* (E1 or E2)	3	-	-	-	-	-	-
TOTAL n=70	22	3	35	8	2	5	2

*PG: Prostaglandin

Part two: women with a prior caesarean delivery

Reasons for not inducing labour in women with a prior caesarean delivery

None of the hospitals strived for a vaginal birth after caesarean (VBAC) in women with a classical incision at the prior caesarean delivery and 53 hospitals (76%) did not pursue a VBAC in women with more than one prior caesarean delivery. A prior caesarean delivery before a gestational age of 34 weeks and no prior vaginal deliveries were relevant in the decision not to attempt a trial of labour in two hospitals.

When induction of labour was required, VBAC was not pursued in non-vertex position in 51 hospitals (73%), in an unfavourable cervix in 28 hospitals (40%), in a non-engaged head in 25 hospitals (36%) or in a twin pregnancy in 11 hospitals (16%).

In case a prompt delivery was desired, eight hospitals (11%) performed an elective caesarean section. When labour was induced in women with a prior caesarean delivery, 14 hospitals (20%) had a different policy concerning induction of labour in women with and without a prior vaginal delivery.

Cervical ripening methods

Cervical ripening in women with a prior caesarean delivery and an unfavourable cervix was done using various methods. Fifteen hospitals (21.4%) did not use cervical ripening in case of an unfavourable cervix, but planned an elective repeat caesarean section (ERCS). Of the 55 hospitals that applied cervical ripening, 40 hospitals (72.7%) used mechanical methods; 2 hospitals used a hygroscopic cervical dilator (Dilapan-S ®) and 38 hospitals used a Foley catheter, including three hospitals using it in combination with oxytocin. Two of the 55 (3.6%) hospitals used a Foley catheter in combination with prostaglandins (oral E1 tablet 50mcg n=1, cervical prostaglandin E2 gel 0.5mg n=1) and two other hospitals (3.6%) used membrane sweeping or oxytocin only. Eleven hospitals (20%) used prostaglandin analogues. Specifications are shown in Table 4 including the frequency of administration and

Table 4. Methods of cervical ripening in women with a prior caesarean delivery in the Netherlands in 2010

	Intravaginal prostaglandin E2 gel (Prostin ®) 1 mg	Intravaginal prostaglandin E2 gel (Prostin ®) 1+2 mg	Slow release vaginal insert prostaglandin E2 (Propess ®)	Intravaginal prostaglandin E1 misoprostol tablet (Cytotec ®)	Foley Catheter	Foley Catheter + prostaglandines (E1 or E2)	Foley Catheter + oxytocin	Hygroscopic cervical dilator (Dilapan-S ®)	Elective repeat caesarean section	Other: sweep (1) oxytocin (1)
Frequency of administration*										
once	1	-	2	-	35	2	3	1	n/a	n/a
every 4 hours	1	2	-	1	-	-	-	-	n/a	n/a
every 6 hours	3	1	-	-	-	-	-	-	n/a	n/a
every 12 hours	-	-	-	-	-	-	-	1	n/a	n/a
Maximum daily dosis*										
once	1	-	2	-	35	2	3	1	n/a	n/a
twice	2	1	-	-	-	-	-	1	n/a	n/a
three times	2	2	-	1	-	-	-	-	n/a	n/a
TOTAL n =70	5	3	2	1	35	2	3	2	15	2
2nd choice n = 23	3	3	2	-	6	-	-	6	3	-

*Concerns the preferred method of cervical ripening, n/a: not applicable

maximum daily doses, specified for the preferred method of cervical ripening. 17 hospitals (30%) used more than one method of cervical ripening.

In 49% of the hospitals, the method of cervical ripening has changed over the past five years. The reason most frequently mentioned were 'evidence from literature concerning an elevated risk of uterine rupture with the use of prostaglandins' (n=21) and 'the re-introduction of the Foley catheter' (n=5).

According to the hospitals that applied cervical ripening in women with a prior caesarean delivery (n=55), their motivations for the method of choice were 'reduced hyperstimulation risk' (n=12), 'easy in use' (n= 6), 'more deliveries in 24 hours' (n=2) and 'less fetal distress' (n=1). Sixteen hospitals mentioned that their method was preferred 'for different reasons' and 13 gave a combination of reasons, 10 including 'reduced hyperstimulation risk'. Five hospitals gave no motivation for the use of their preferred method.

For the assessment of cervical ripeness and the consequent decision of cervical ripening and induction, 35 of the 55 hospitals (64%) used a cervical scoring system such as the Bishop score. Of the 35 hospitals that used the Bishop score, induction after cervical ripening by amniotomy and oxytocin augmentation was performed at a certain Bishop score (Figure 1). Out of the 20 hospitals that did not use a cervical scoring system, the decision to perform amniotomy was based on the ease in which the membranes could be reached in five hospitals. Six hospitals reported that a minimum of 2cm dilatation was required to perform amniotomy.

Continuous fetal monitoring was applied in 16 hospitals of which 10 used the Foley catheter and four used prostaglandin E2 gel. Amniotomy and subsequent oxytocin augmentation after proven cervical ripeness were performed at any moment of the day in 21 hospitals (38%), the morning after in nine hospitals (16%), and depended on the indication of induction in eight hospitals (15%).

The policy after insufficient result of cervical ripening after one or two days is shown in Table 5.

Comparison: cervical ripening in women with and without a prior caesarean delivery

When comparing cervical ripening in women with and without a prior caesarean delivery, fetal monitoring using CTG was conducted more frequently in women with a prior caesarean delivery. Women with a prior caesarean delivery were monitored continuously in 16 hospitals compared to two hospitals for women without a prior caesarean delivery. The timing of amniotomy and subsequent oxytocin augmentation hardly differed between women without or with a prior caesarean delivery. However, the timing of amniotomy and oxytocin augmentation in women with a prior caesarean delivery seemed less influenced by the indication of induction (15 versus 27%) or the presence of contractions (4 versus 11%). Two hospitals did not perform amniotomy after a specific time (16.00 hrs and 24.00 hrs) if the parturient was not in labour.

The use of a cervical scoring system was nearly equal in women with (69%) and without (64%) a prior caesarean delivery.

Comparison with survey conducted in 2006

Similar to the 2006 survey (response rate 94%, n=77/82), there was a great variety in methods of cervical ripening in 2010. In women without a prior caesarean delivery, all hospitals in 2010 used prostaglandins as preferred method for cervical ripening, as was the case in 2006.

Concerning women with a prior caesarean delivery, 72.7% (40/55) of the hospitals that allowed induction of labour used mechanical methods for cervical ripening in 2010 compared to 49.1% (28/57) in 2006 ($p< 0.05$). The Foley catheter

Table 5. Policy after insufficient success of cervical ripening after one and two days in women with a prior caesarean delivery in the Netherlands in 2010

	Not applicable	Continue using same method without day(s) of rest	Day of rest after 1 day, then continue using same method	Day of rest after 2 days, then continue using same method	Day of rest after 2 days, then continue using different method	Caesarean section on day 2	Caesarean section on day 3	Unclear or unknown	Total
None, elective repeat caesarean section	15	-	-	-	-	-	-	-	15
Intravaginal PG* E2 gel (Prostin ®) 1 mg	-	1	-	2	1	-	1	-	5
Slow release vaginal insert PG* E2 (Propess ®)	-	1	1	-	-	-	-	-	2
Intravaginal PG* E2 gel (Prostin ®) 1+2 mg	-	-	-	2	-	1	-	-	3
Intravaginal PG* E1 misoprostol tablet (Cytotec ®)	-	-	-	1	-	-	-	-	1
Foley catheter	-	8	-	9	1	7	8	2	35
Foley catheter combined with PG*	-	1	-	-	-	-	-	1	2
Foley catheter with oxytocin	-	2	-	-	-	1	-	-	3
Hygroscopic cervical dilator (Dilapan-S ®)	-	-	-	-	-	-	2	-	2
Other (sweeping or oxytocin)	-	1	-	-	-	1	-	-	2
TOTAL	15	14	1	14	2	10	11	3	70

*PG prostaglandin

specifically was used two and a half times more often in 2010 (69.1% vs 25%, $p < 0.01$). The use of prostaglandins in cervical ripening in women with a prior caesarean decreased from 40% in 2006 to 20% in 2010 ($p < 0.05$).

There was a non-significant decrease in the percentage of hospitals that did not apply cervical ripening and thus performed an ERCS in 2010 (21% vs. 26%).

Of the six hospitals that did not apply cervical ripening in 2006 *and* returned both the 2006 and 2010 surveys, four switched to Foley catheter use, one to dilapan and one to prostaglandin E2 gel in 2010. Of the twelve hospitals that did not apply cervical ripening in 2010 *and* returned both the 2006 and 2010 surveys, two hospitals used dilapan, one used intracervical prostaglandin E2 gel and one used the foley catheter for cervical ripening in 2006. Twenty out of 21 hospitals that participated in the PROBAAT study in 2010 returned the survey, revealing that 70%(14/20) used the Foley catheter, 15% (3/20) used prostaglandins and 15% (3/20) did not offer induction of labour in women with a prior caesarean delivery.

Although all respondents in 2006 felt that their method of cervical ripening was easiest in use and led to more deliveries in 24 hours, the respondents in 2010 mostly mentioned 'easy in use' and 'less hyperstimulation' in response to the question why their preferred method of cervical ripening was superior. This survey showed an increase in use of the Bishop score from 39% in 2006 to 69% in 2010 ($p < 0.01$).

DISCUSSION

With a response rate of 78%, this survey gives a representative view of the current methods of cervical ripening in the Netherlands, showing a great variety in methods of cervical ripening.

The use of intracervical prostaglandin gel has declined over the years, whereas the use of vaginal misoprostol has increased. It is striking that the Foley catheter is never used as the preferred method of cervical ripening, neither in 2006 nor in 2010. As the results of the PROBAAT trial [15] were not yet known, it is possible that hospitals were waiting for the results of this trial before changing their preferred method of cervical ripening.

The decrease of ERCS and the increase in use of the Foley catheter in women with a prior caesarean delivery is most likely due to the decreased popularity of prostaglandins and the (re-) introduction of the Foley catheter through recent randomised controlled trials including the PROBAAT trial.[15,16] Furthermore, the results of the studies of Lydon-Rochelle et al. and Kwee et al., in which an increased risk of uterine rupture was found when prostaglandins were used in this group, may have discouraged the use of prostaglandins in these women.[7,9]

The nationwide variety in methods of cervical ripening is not surprising, especially when we bear in mind the lack of evidence and recommendations in the Dutch guideline on induction of labour in which different methods are mentioned to have similar effectiveness and safety profiles.[4] This may also be the basis for the use of more than one method for cervical ripening in 25 hospitals (36%],

probably showing that tradition, culture, experience and personal preference of gynaecologists are of influence on methods used.

It seems that hospitals are increasingly concerned with safety of induction instead of the speed of delivery. However, standardisation of medical procedures and prescriptions reduces medication errors.[17-19] Therefore, a clearly defined, written local protocol on induction of labour including evidence-based methods of induction which are effective and safe would be advisable.

The Dutch guideline on induction recommends the use of the Bishop score for cervical assessment, but also points out that it remains a subjective method.[4] In both surveys there is a great variation in the (Bishop) score at which the cervix is deemed favourable for amniotomy and subsequent oxytocin augmentation.

All hospitals applied fetal monitoring at set times after starting cervical ripening, although length and frequency differed. Again, the lack of evidence and uniformity in literature and in guidelines is reflected in the wide variety of clinical practice. While the guideline does not mention timing or frequency of fetal monitoring, all hospitals seem to have a local protocol to which they adhere.

Although amniotomy and subsequent oxytocin augmentation were performed at any moment of the day in half of the hospitals, a substantial part of hospitals waited until the next day to continue induction. Sometimes, it was also dependent on the indication for induction or the presence of contractions. Whether or not the attention in the media for the publication by de Graaf et al. on increased adverse perinatal outcome of hospital delivery at night influenced this decision, remains unclear.[20] Furthermore, the Dutch guideline advocates an interval of 6 to12 hours after cervical ripening using PGE2 analogues before performing amniotomy because of the risk of potentiation. These phenomena may be the basis for 29 hospitals (41%) to wait until the next day to continue induction and that two clinics discontinued after a certain hour unless strictly necessary.

Although 28 hospitals answered positively to the question whether or not an unfavourable cervix was a reason not to induce labour in women with a prior caesarean delivery, only 15 hospitals declared not to apply cervical ripening in women with a prior caesarean delivery. Possibly the question was not written clearly or misread.

Limitations of this study are that this survey was sent to only one gynaecologist per hospital, which may introduce bias. Results may be affected by the subjective perception and practice of that particular gynaecologist. However, the responding gynaecologist was asked to answer on behalf of the staff and based on protocols or policies.

It remains unclear what the maximum period of induction was for the different hospitals; i.e. which definition of failed induction they used. At the time of the survey, several hospitals (28.5% of the respondents) participated in the PROBAAT-trial, in which failed induction was considered after 4 days. It is likely that the participating hospitals of the PROBAAT-trial used this definition.[15]

The incidence of uterine rupture in 2002 in the Netherlands was 0.8% in women with a prior caesarean delivery undergoing a trial of labour without

contraction-stimulating drugs and 1.47% in all women.[7] Another Dutch study reported an estimated the risk of uterine rupture to be 0.64% in these women undergoing a trial of labour between 2004 and 2006.[21] Although several studies suggest an increased risk of uterine rupture in the use of PGE2 analogues, a review in 2006 did not convey a negative advice due to lack of evidence.[9,22-24] The Dutch guideline does not discourage their use but merely suggests that the elevated risk of uterine rupture when using contraction-stimulating drugs should be weighed and discussed with the women.[8] It is remarkable that in the case of cervical ripening of women with a prior caesarean delivery, policies concerning induction of labour differ so greatly between hospitals.

International comparison of induction of labour in women without or with a prior caesarean delivery

We were unable to identify other surveys of practice concerning methods of cervical ripening in women without a prior caesarean delivery.

Comparison of the results of our study with surveys from the UK, Australia and New Zealand, and Canada shows that the use of prostaglandins for cervical ripening in women with a prior caesarean delivery is by far the lowest in the Netherlands (20%).[25-27] Also, cervical ripening using mechanical methods in this group is much more popular in the Netherlands (73%) compared to England (3%) (Table 6). However, it should be noted that the data span 2003 to 2011, making this comparison difficult since many changes in practice concerning prostaglandin use in women with a prior cesarean delivery have been made over the last decade.

We recommend repeating this survey (inter)nationally to assess whether or not results of the PROBAAT trial have influenced policy concerning cervical ripening.

Table 6. Comparison of international surveys of current practice of induction of labour in women with a prior caesarean birth

	Response Rate	Repeat CS (i.e. no induction of labour)	Use of prosta-glandins	Use of mechanical methods	Use of ARM	Willingness to use oxytocin
England 2011*[25]	67% (322/480)	7% (22/322)	76% (229/300)	3% (9/300)	21% (62/300)	unknown
Australia, NZ 2003**[26]	67% (1091/1641)	32% (349/1091)	33% (360/1091)	unknown	unknown	73% (796/1091)
Canada 2003***[27]	50% (750/1497)	9% (54/601)	25% (150/601)	unknown	unknown	unknown
Netherlands 2010	78% (70/92)	21% (15/70)	20% (11/55)	73% (40/55)	4% (2/55)	unknown

NZ: New Zealand; CS: caesarean section; ARM: artificial rupture of membranes
*among 480 NHS obstetric consultants
**among fellows and members of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists
***among all obstetricians registered with the Canadian Medical Directory

CONCLUSIONS

There is a large diversity in methods of cervical ripening in the Netherlands. In women without a prior caesarean delivery prostaglandins are most frequently used, which is in line with other countries. In women with a prior caesarean delivery, the Foley catheter is most often used, which is in contrast to other high-income countries where prostaglandins are mainly used. Although the Foley catheter has become more popular in cervical ripening in women with a prior caesarean delivery, the overall policy in these women is still diverse and prospective comparisons of different induction methods in these women are lacking. We conclude that a study concerning safety and effectiveness of the Foley catheter for cervical ripening in women with a prior caesarean delivery is recommended.

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