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Indications and results of labour induction in nulliparous women: An interview among obstetricians, residents and clinical midwives☆

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ABSTRACT

Objective: To investigate which clinical factors are important in management decisions that clinicians make in the process of labour induction, and which clinical factors they estimate as predictive of labour outcome after induction.

Study design: A written interview was conducted among obstetricians, residents and clinical midwives in five teaching hospitals in the south of the Netherlands. Sixteen fictive vignettes were constructed of pregnant nulliparous women who were candidates for induction of labour. The vignettes differed on eight clinical variables: maternal age, BMI, gestational age, indication for induction (maternal request vs mild pre-eclampsia), dilation, position, consistency and effacement of the cervix. For each case presentation, the inclination to induce labour was calculated for the three groups, and their estimates of the probability of a spontaneous vaginal delivery or a caesarean delivery were analyzed.

Results: Of the 80 questionnaires sent, 60 (75%) were completed. Mild pre-eclampsia and post-term pregnancy were the most important clinical factors for the decision to induce or not in all three groups. Gestational age, effacement and dilation of the cervix were considered as the most important predictors of labour outcome after induction.

Conclusions: In this interview, obstetricians, residents and clinical midwives based their decision-making whether or not to induce labour predominantly on medical indications. Outcome of labour after induction was estimated to depend on gestational age and cervical status at the start of induction.

1. Introduction

Induction of labour is frequently used in day to day obstetric practice based on a variety of indications. For several clinical conditions, for example post-term pregnancies (≥42 weeks), severe pre-eclampsia, or prolonged prelabour rupture of membranes at term, the decision to induce labour is obvious and straightforward [1–5]. However, a large proportion of inductions are performed on maternal request in the absence of a clear medical or obstetric indication.

Induction of labour is associated with an increased risk of caesarean delivery both for medically indicated inductions and for inductions on maternal request, especially in nulliparous women [6–12]. Maternal baseline characteristics like age, height, and body mass index (BMI) seem to be associated with an increased risk of caesarean delivery [13–16]. Cervical dilation has been shown to be a more reliable predictor for successful labour induction than the Bishop score itself or any of its separate components [17].

Little is known about the considerations of the individual obstetrician leading to the decision to induce labour or not. Moreover, many clinicians seem to be unaware of the predictors of successful labour induction [6,13,16,18]. Therefore, we interviewed clinicians on their decision factors to induce labour, and their judgments on the clinical parameters predictive of labour outcome after induction.

2. Materials and methods

Based on a previously published design on clinical decision-making, we constructed 16 fictive vignettes of pregnant nulliparous women who were candidates for induction of labour [19]. The vignettes differed on eight clinical variables: maternal age (23, 31, or 38 years), BMI (28 or 36), gestational age (38, 40, or 42 weeks), indication for induction (maternal request or mild pre-eclampsia), and cervical dilation (0 or 1 cm), position (mid or posterior), consistency (soft or firm) and effacement (0%, 50%, or 100%). Mild pre-eclampsia was defined as developing a blood pressure of 145/95 mmHg (blood pressure in the first trimester of 130/75 mmHg) in combination with proteinuria of 0.5 g/l and complaints of mild

☆ Dutch obstetricians, residents, and clinical midwives in hospitals in the cities of Heerlen, Maastricht, Sittard, Venlo, and Veldhoven were interviewed.

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Table 1
Overview of the 16 constructed vignettes of pregnant women for labour induction. Results from all 60 responding participants. The 10th column shows, per case, the number of all interviewed participants who would perform an induction. The next column shows the percentage. The 12th and 13th columns show, per case, the median 30 probability of a spontaneous vaginal delivery and the chance of caesarean delivery estimated by the 60 participants interviewed. Ranges show the minimum and maximum probability estimates.

1	2	3	4	5	6	7	8	9	10	11	12	13
Case	Age (years)	BMI	Gestational age (weeks)	Indication	Dilation (cm)	Position	Consistency	Effacement (%)	Induction performed (n = 60)	Induction performed (%)	Success rate spontaneous vaginal delivery after induction median 30 (min-max)	Chance of caesarean delivery after induction median 30 (min-max)
1	23	36	42	Mild preeclampsia	1	Midposition	Soft	0	58	97	0.65 (0.20–0.95)	0.25 (0.10–0.75)
2	31	28	42	Maternal request	0	Midposition	Soft	100	56	93	0.75 (0.20–0.95)	0.20 (0.05–0.65)
3	23	28	42	Mild preeclampsia	1	Posterior	Firm	0	54	90	0.65 (0.10–0.90)	0.25 (0.10–0.70)
4	38	36	42	Maternal request	0	Posterior	Firm	50	54	90	0.55 (0.15–0.90)	0.30 (0.10–0.80)
5	23	36	40	Mild preeclampsia	0	Posterior	Soft	100	45	75	0.60 (0.15–0.90)	0.25 (0.05–0.85)
6	23	28	40	Mild preeclampsia	0	Midposition	Soft	50	45	75	0.65 (0.15–0.90)	0.25 (0.10–0.60)
7	38	28	38	Mild preeclampsia	1	Posterior	Soft	100	44	73	0.70 (0.15–0.95)	0.20 (0.05–0.50)
8	31	36	38	Mild preeclampsia	1	Midposition	Firm	50	35	58	0.60 (0.15–0.90)	0.25 (0.10–0.80)
9	38	28	38	Mild preeclampsia	0	Midposition	Firm	0	31	52	0.55 (0.10–0.85)	0.30 (0.10–0.75)
10	31	36	38	Mild preeclampsia	0	Posterior	Soft	0	29	48	0.50 (0.10–0.90)	0.30 (0.10–0.80)
11	38	36	40	Maternal request	1	Midposition	Soft	0	19	32	0.60 (0.10–0.95)	0.25 (0.05–0.65)
12	23	36	38	Maternal request	1	Midposition	Soft	100	17	28	0.65 (0.15–0.90)	0.25 (0.10–0.70)
13	23	28	38	Maternal request	1	Posterior	Soft	50	13	22	0.60 (0.15–0.95)	0.25 (0.05–0.70)
14	31	28	40	Maternal request	1	Posterior	Firm	0	13	22	0.55 (0.10–0.90)	0.25 (0.10–0.80)
15	23	28	38	Maternal request	0	Posterior	Firm	0	5	8	0.50 (0.10–0.85)	0.30 (0.15–0.80)
16	23	36	38	Maternal request	0	Posterior	Soft	0	5	8	0.35 (0.10–0.85)	0.45 (0.15–0.90)

headache. Maternal request was defined as a woman who requests an induction of labour, as she can no longer cope with being pregnant.

Cases were generated from an orthogonal design [20]. Orthogonal designs are sparse fractional factorial designs constructed in such a way that inferences may be made regarding main (first-order) effects. Level combinations necessary for estimating second and higher order effects are excluded to reduce the required total number of measurements. By default, the smallest possible orthogonal plan was generated. In this study we used eight clinical factors. Combining all these factors would have resulted in 864 unique cases, whereas the number of cases necessary for our analysis was limited in our orthogonal design to only 16 cases [20]. Table 1 (columns 1–9) shows the composition of the 16 case vignettes.

We approached all obstetricians (n = 28), all residents (n = 25), and all clinical midwives (n = 27) working in the five teaching hospitals of the Maastricht University teaching cluster in the south of the Netherlands. The Netherlands has eight of these University teaching clusters with a total of 44 teaching hospitals. Participants were asked, for each of the 16 cases, if they would induce labour or not. Secondly, they should estimate the probability of a spontaneous vaginal delivery vs the probability of a caesarean delivery in each case when labour was actually induced. This estimation had to be marked on a scale, ranging from 0% to 100%, divided into steps of 10%. The contribution of each clinical factor to subsequent treatment and the probability estimates was calculated.

The association between each clinical factor and the participants' decision to induce labour was assessed. Because the choice of treatment was categorical (to induce labour or not), odds ratios (OR) and corresponding 95% confidence intervals (CI) were calculated. The ORs were calculated using logistic regression analyses (Forward stepwise; P-level 0.05). In case the OR was above 1, participants were more tended to choose for induction, whereas an OR below 1 indicated that participants were less likely to induce delivery.

The relative contribution (RC) of the eight clinical factors to the probability estimates for labour induction was calculated to assess which of the clinical factors are involved in participants' estimates of the outcome of labour induction (spontaneous vaginal delivery vs caesarean delivery). The RC was estimated with multivariable linear regression analysis (enter method; P-level 0.05). The RC of each factor was calculated as the proportion of the squared partial correlation over the sum of squares of partial correlations of all eight factors. The RC expresses the contribution that each factor had in the estimate of the chance of a vaginal delivery or a caesarean section as made by the participants. The sum of the RCs always adds up to 100%.

3. Results

Out of the 80 questionnaires sent, 60 were completed, resulting in 960 answers (75% response rate (obstetricians (n = 20, response rate 71%), residents (n = 20, response rate 80%), clinical midwives (n = 20, response rate 74%)). In Table 1, the essentials of the 16 written case summaries (columns 1–9) and the number and percentage of responding participants (columns 10–11) that would induce labour, ordered from highest to lowest induction rates, are shown. Per case the median (minimum–maximum) estimated probability of a successful induction resulting in a spontaneous vaginal delivery (column 12), and unsuccessful induction attempt resulting in a caesarean delivery (column 13) are shown. For example, in case 1 (representing a 23-year-old pregnant woman with a BMI of 36, post-term with mild pre-eclampsia, and a non-effaced, soft cervix in midposition and 1 cm dilation), 58 participants (97%) would induce labour. The median estimated