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Women satisfaction on choosing the cervical ripening method: Oral misoprostol versus balloon catheter

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ABSTRACT

Objective: Induction of labor concerns about 29 % of women in Unites States and 33 % in Europe. Among the various methods for cervical ripening, the efficacy and safety profiles of oral misoprostol and balloon catheter are comparable, but data in the literature on maternal satisfaction during induction of labor are few. The objective of this study was to assess the satisfaction of women who chose the method of cervical ripening, i.e. either balloon catheter or oral misoprostol, for induction of labor.

Study design: This retrospective study asked women who had undergone induction of labor between February 1, 2020 and February 28, 2021. After receiving verbal and written information, the choice of method between oral misoprostol and balloon catheter was left to the patient's free appreciation. Satisfaction was assessed by means of a questionnaire distributed to all women during their stay in the maternity unit. The principal assessment criterion was based on women' inclination to choose the same cervical ripening method if induction of labor were to prove necessary in a future pregnancy, and their willingness to recommend this method to a friend. Univariate analyses were conducted using Student's t-test, Chi-2 test or Fisher's exact test.

Results: On 575 women eligible for analysis, 365 (63.5 %) of these women replied to the satisfaction questionnaire. Of this number, 236 (64.7 %) chose cervical ripening by balloon catheter, and 129 (35.3 %) by oral misoprostol. No significant difference was found between the two groups: 68.2 % of women in the balloon catheter group would opt for the same method of cervical ripening if it proved necessary in a future pregnancy and 64.7% would recommend it to a pregnant friend, versus 65.9 % and 63.6 % in the oral misoprostol group, respectively. Women were overall pleased to be able to choose their method of cervical ripening: 90.5 % of patients in the balloon catheter group and 95.3 % in the oral misoprostol group

Conclusions: When women choose the method of cervical ripening, satisfaction is overall good, irrespective of the method, whether by balloon catheter or misoprostol.

Introduction

"Induction of labor" describes the artificial triggering of uterine contractions with the aim of initiating labor and hence delivery in order to reduce maternal or neonatal morbidity and mortality [1]. The average rate of induction in the United States was about 32 % in 2021 [2] and 33 % in Europe [3]. Recent American recommendations are to propose induction at 39 weeks' gestation (WG) in low-risk nulliparous mothers, which suggests that the rate of induction is likely to continue to climb [4,5].

Before induction of labor, prior cervical ripening enables the risk of Cesarean section to be reduced for a Bishop score ≤ 6 [6,7]. Among the various hormonal methods for cervical ripening, oral misoprostol is as effective as vaginal or intracervical prostaglandins in terms of initiating vaginal delivery [8,9], but reduces ceasarean section risk [9] and carries a lower risk of uterine hyperstimulation with anomalies of the fetal heart rhythm compared to vaginal misoprostol [8,9]. Mechanical methods such as the balloon catheter appear to induce fewer contractions but

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with a longer time of labor [10,11]. Nevertheless, both oral misoprostol and balloon catheter produce a comparable rate of vaginal deliveries [10,12], and have a similar rate of maternal or fetal complications [10–12].

Since the efficacy and safety profiles of oral misoprostol and balloon catheter are comparable, the question of maternal satisfaction is of interest. However, data in the literature on women t satisfaction during induction of labor are scanty [13–15]. Few of them compare different methods of cervical ripening, with satisfaction as secondary outcome [16], or by evaluating not only the induction but the whole childbirth [17,18].

The objective of this study was to assess the satisfaction of women who chose the method of cervical ripening, i.e. either balloon catheter or oral misoprostol, for induction of labor.

Material and methods

Study design and recruitment

This prospective study on induction of labor was conducted at the University Hospitals of Strasbourg which consist of a level III maternity unit (Hôpital de Hautepierre) and a level II maternity unit (Centre Médico-Chirurgical and Obstétrical).

We enrolled all women who had undergone induction of labor between February 1, 2020 and February 28, 2021. We did not include women who underwent induction of labor in April and May 2020, which corresponded to the first wave of the Covid-19 epidemic. Not only did women return home early within 12 h of delivery during these two months, the period itself was hardly suitable for assessing women satisfaction regarding a specific therapeutic approach.

Exclusion criteria were the following: absence of prior cervical ripening (Bishop score of greater than or equal to 6 on the day of induction), gestational age of less than 37 weeks' gestation, multiple pregnancy, scarred uterus, non-cephalic presentation, in utero death and severe fetal malformation (requiring neonatal intensive care or likely palliative care), patients who were minor (< 18 years), language difficulties, or who refused to take part in the study. Patients were able to choose their method of maturation. Those for whom the method was selected by their treating physician on medical grounds were excluded from the analysis.

Women care

The main reasons for induction were post-term, rupture of the membranes and women with a history of maternal or fetal disorder (gestational hypertension, delayed intrauterine growth, gestational diabetes, cholestasis of pregnancy, reduced active fetal movements, anomaly of fetal cardiac rhythm). Decisions about the method of induction were taken in a joint discussion between the women and a physician, and subsequently validated by a member of the obstetric staff.

After receiving verbal and written information, the choice of method was left to the women's free appreciation. The two proposed options for cervical ripening were either oral misoprostol or simple balloon catheter. If the balloon catheter failed to work, misoprostol was administered; and vice versa.

Regarding the verbal information, the attending team had received specific verbal and written training in order to deliver information that was identical and as objective as possible concerning the two methods and their advantages and drawbacks.

Regarding the written information, an information sheet was given to the women which explained both cervical ripening induction methods (Supplemental material 1). This information sheet presented: a) methods of cervical ripening following the pre-established protocol:

- The drug-based method with oral misoprostol (Angusta®) consisted of taking a 25 μg tablet every 2 h, to a maximum of 8 tablets (200 μg) over 24 h; the timing of administration and dosage were in line with the summary of product characteristics [19], which had itself been established in two meta-analyses by Z Alfirevic et al. in 2014 [8] and 2016 [12]. Before administering each dose, fetal heart rhythm and uterine activity were recorded; and thereafter every 4 h.
- The mechanical method used a balloon catheter (Dufour or Cook catheter), placed athwart the uterine cervix under visual control using a speculum, after disinfection of the cervix. The balloon was inflated with 60 mL saline at the internal opening of the cervix, and the tip of the catheter attached to the inner surface of the women's thigh without exerting any traction. The catheter was left in situ for a maximum of 24 h, during which fetal heart rhythm and uterine contractile activity were separately monitored over the 24 h.

And b) data on the efficacy, safety and tolerability of each method based on the data in the systematic review by Z Alfirevic et al. [12]:

- Concerning efficacy, both methods are comparable in respect of the rate of vaginal delivery [10,12]. Oral misoprostol enables more rapid delivery than the mechanical method (40 % vaginal deliveries in less than 24 h versus 30 % when using a balloon catheter) [10,11].
- Concerning safety, artificial induction of labor by oral misoprostol probably induces more contractions on cervical ripening than balloon catheter, but does not increase the risk of uterine hyperstimulation [10–12]. Artificial induction of labor by the mechanical action of a catheter or a drug-based method does not increase the risk of neonatal or maternal complications [10–12].
- Concerning women experience, scanty data are currently extant in the literature. Both methods appear comparable in particular with respect to the pain caused by cervical ripening [16,20].
- Finally, misoprostol may cause gastrointestinal upset (nausea, vomiting and diarrhea in 1–10 % of cases) [19], and balloon catheter can provoke little bleeds or pain during insertion.

Data collection

Data was collated regarding the biometric and social characteristics of women, their obstetrical history, course of pregnancy, indication for induction as well as its progress, and the progress of labor and delivery.

Satisfaction was assessed by means of a questionnaire distributed to all women during their stay in the maternity unit (Supplemental material 2) which was completed by the women and retrieved on discharge. Women filled in the questionnaire themselves but were able to ask for help from the medical team if required. The questionnaire consisted of 18 items, of which 12 had been extracted from the EXIT questionnaire [21] (the other 3 items in the latter questionnaire were not suitable for induction by cervical ripening), and 5 items relevant to induction from among the items in the QACE questionnaire [22] (the other items in this questionnaire deal with pain during labor and delivery). Both these questionnaires have been validated for women experience during induction (EXIT) and during delivery (QACE).

For each item, women were asked to note what they felt on a 5-point Likert scale, 1 "strongly disagree", 2 "disagree", 3 "neither agree nor disagree", 4 "agree", 5 "strongly agree", as applied in the EXIT questionnaire. The QACE questionnaire uses a scale from 1 to 4 but we applied a 5-point scale for the sake of consistency.

The questionnaire assessed patient experience during induction, by asking, firstly, about pain levels, time lapses, reassurance, and communication with the obstetrical team and, secondly, about their experience thinking back on the delivery in respect of their understanding of events, their self-image and their choice of cervical ripening method.

All these data were collated prospectively and extracted from the Diamm® electronic medical records (Micro6, Nancy, France).

Outcomes

The principal assessment criterion was based on women's inclination to choose the same cervical ripening method if induction of labor were to prove necessary in a future pregnancy, and their willingness to recommend this method to a friend. Secondary assessment criteria focused on how women experienced induction itself.

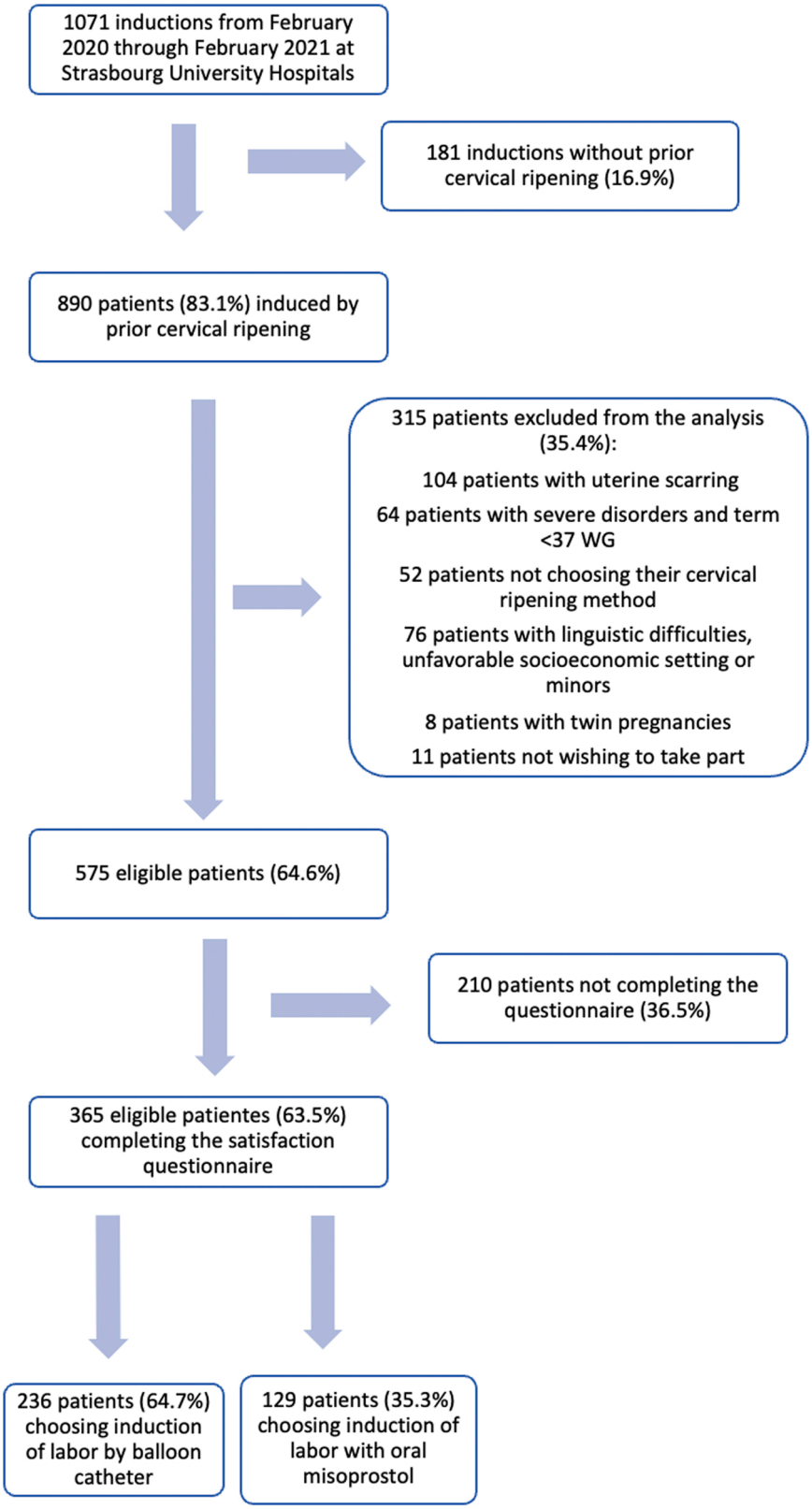

Fig. 1. Diagramme de flux.

Data analysis

Continuous variables are presented as means and standard deviations, categorial variables as numbers and percentages. For each item, the responses "strongly agree" (5/5) and "agree" (4/5) were pooled, as were the responses "strongly disagree" (1/5) and "disagree" (2/5).

Univariate analyses were conducted using Student's t-test, Chi-2 test or Fisher's exact test, depending on the type of variable under comparison and total numbers. The significance level was set at < 0.05. The software package used was SAS version 9.3 (SAS Institute Inc., Cary, NC, USA).

Ethical approval

This study was approved by the ethics committee of the Strasbourg Hospitals (ref.: CE-2021-66). The French National Commission for Information Technology and Civil Liberties was notified in advance of any analysis of patient data.

Results

During the inclusion period, there were 5258 deliveries including a total of 1071 (20.4 %) women who underwent induction, with 890 (83.1 %) requiring prior cervical ripening. After exclusion of 315 (35.4 %) women, 575 (64.6 %) were eligible for analysis: 365 (63.5 %) of these women replied to the satisfaction questionnaire. Of this number, 236 (64.7 %) chose cervical ripening by balloon catheter, and 129 (35.3 %) by oral misoprostol. The flowchart is presented in Fig. 1.

Women were older in balloon catheter group (31,7 versus 30,3 in misoprostol group, p = 0,0127). Other patient characteristics were similar in both groups (Table 1).

Data on induction, delivery and outcome are displayed in Table 2. In the balloon catheter group, 28/236 women (11.9 %) underwent a second cervical ripening method versus 22/129 women (17.1 %) in the oral misoprostol group (p = 0,09).

There was no significant difference regarding the type of delivery between the groups, with 86.9 % of women delivering vaginally in the balloon catheter group versus 87.6 % in the oral misoprostol group (p = 0.9710).

Data on satisfaction are reported in Table 3. Women were overall pleased to be able to choose their method of cervical ripening: 90.5 % of women in the balloon catheter group and 95.3 % in the oral misoprostol group (question 1, p = 0.15).

Concerning the principal assessment criterion, 68.2 % of women in the balloon catheter group would opt for the same method of cervical ripening if it proved necessary in a future pregnancy and 64.7 % would recommend it to a pregnant friend, versus 65.9 % and 63.6 % in the oral misoprostol group, respectively (question 17, p = 0.73 and question 18, p = 0.92).

There was no significant difference between the groups regarding patient satisfaction in respect of the time between the start of induction and birth of the child (question 3, p = 0.25), nor for the pain experience on cervical ripening (question 5, p = 0.41). On the other hand, 63.4 % of women thought that the frequency of uterine contractions was bearable in the balloon catheter group versus 50 % in the oral misoprostol group (question 8, p = 0.018).

Lastly, women were generally satisfied with their delivery: 88.1 % in the balloon catheter group versus 92.2 % in the oral misoprostol group (question 11, p = 0.30).

Table 1
Patient characteristics.

Cervical maturation method	Balloon catheter (n = 236; 64.7 %)	Oral misoprostol (n = 129; 35.3 %)	p value
Patient age (years)	31.7 (5.4)	30.3 (5.2)	p = 0.0127
Pre-pregnancy BMI (kg/m²)	25.7 (5.5)	26.3 (6)	p = 0.3119
Smoking during pregnancy	11 (4.7 %)	10 (7.8 %)	p = 0.2254
Parity			
0	141 (59.7 %)	66 (51.2 %)	p = 0.1136
≥ 1	95 (40.3 %)	63 (48.8 %)	
Previous induction	29 (12.3 %)	23 (17.8 %)	p = 0.1966
Method of previous induction:			
Vaginal prostaglandins	16 (50 %)	13 (54.1 %)	p = 0.1990
Balloon catheter	10 (31.3 %)	3 (12.5 %)	
Misoprostol	3 (9.4 %)	7 (29.2 %)	
Gestational disorders[a]	92 (39 %)	51 (39.5 %)	p = 0.9178
Gestational age on induction			
Mean age	40.1 (1.4)	39.9 (1.4)	p = 0.0885
37–37 + 6 WG	19 (8 %)	10 (7.8 %)	
38–38 + 6 WG	37 (15.7 %)	25 (19.4 %)	p = 0.3389
39–39 + 6 WG	43 (18.2 %)	31 (24 %)	
≥ 40 WG	137 (58.1 %)	63 (48.8 %)	
Cervical status based on Bishop			
Mean score	2.4 (1.4)	2.1 (1.4)	p = 0.8311
0	21 (8.9 %)	19 (14.7 %)	
1	43 (18.2 %)	25 (19.4 %)	
2	51 (21.6 %)	30 (23.3%)	p = 0.4983
3	67 (28.4 %)	33 (25.6 %)	
4	41 (17.4 %)	17 (13.2 %)	
5	13 (5.5 %)	5 (3.87 %)	
Indications for induction			
Post-term	90 (38.1 %)	36 (27.9 %)	p = 0.0542
Rupture of membranes	47 (19.9 %)	22 (17.2 %)	
Maternal-fetal disorder	91 (38.6 %)	61 (47.3 %)	
Other	8 (3.4 %)	10 (7.6 %)	

[a] Threatened premature delivery; gestational diabetes whether or not insulin-dependent; cholestasis of pregnancy; delayed intrauterine growth; premature rupture of the membranes; amniotic fluid volume anomaly; gestational thrombocytopenia.

Discussion

Our study shows that women were overall satisfied about being able to choose their method of cervical ripening and that their satisfaction regarding the cervical ripening method was overall good, whether achieved by balloon catheter or oral misoprostol.

In a meta-analysis of Kemper et al. [23], balloon catheter was less efficient than oral misoprostol regarding vaginal birth rate, but was also associated with a reduced rate of adverse perinatal outcome. As in the PROBAAT II trial published in 2016 [10] or in the Cochrane meta-analysis of 2023 [11], 85 % of the women who took part in our study delivered vaginally without an observable difference between oral misoprostol and balloon catheter, regarding both maternal and neonatal outcomes.

The recent study of Joensuu et al. [24] reports a negative effect of labor induction in childbirth experience, for all modes of delivery, and being worst during operative delivery.

We didn't perform subgroups analysis on satisfaction according to mode of delivery, as we did not find a significative difference between the two groups for this outcome.

Regarding time of delivery, Dupuis et al. [17] suggested that delivery within 24 h influence positively the maternal satisfaction. It is unclear about which cervical ripening method between balloon catheter or oral misoprostol enables a more rapid delivery, as the different studies seem contradictory [10,11,18,25]. Anyhow, there was no significant difference regarding patient satisfaction for this criterion in our study. Our results are consistent with those of Mieke et al. [20], which find no difference between the two methods of cervical ripening on that outcome, and with those of Place et al. [18], which find that 78,3 % of women were satisfied in balloon catheter group and 77,1 % in oral misoprostol group. Recent study of Anjali et al. [26] suggests that the

Table 2
Characteristics of induction and childbirth, maternal-fetal outcome.

Cervical maturation method	Balloon catheter (n = 236; 64.7 %)	Oral misoprostol (n = 129; 35.3 %)	p value
Utilization of 2nd cervical maturation method	28 (11.9 %)	22 (17.1 %)	p = 0.0935
Epidural anesthesia	222 (94.1 %)	120 (93 %)	p = 0.6523
Utilization of ocytocic drugs	57 (24.2 %)	23 (17.8 %)	p = 0.2064
FCRA* during the active phase of labor	135 (57.2 %)	73 (56.6 %)	p = 0.9098
Uterine hyperkinesia	1 (0.4 %)	2 (1.5 %)	p = 0.5938
Time-lapse between the start of cervical maturation and birth:			
Mean time (hours)	30.38 (0.47)	26.58 (0.62)	p = 0.9351
< 24 h	97 (41.1 %)	51 (39.5 %)	p = 0.9639
> 48 h	29 (12.3 %)	15 (11.6 %)	
Delivery method:			
Spontaneous vaginal	151 (64.0 %)	89 (69.0 %)	p = 0.5866
Instrumental vaginal	54 (22.9 %)	24 (18.6 %)	
Cesarean	31 (13.1 %)	16 (12.4 %)	
Postpartum hemorrhage	24 (10.16 %)	19 (14.7 %)	p = 0.1636
Transfusion	4 (1.7 %)	3 (2.3 %)	p = 0.6745
Fetal Apgar score < 7 at 5 min	9 (3.8 %)	4 (3.1 %)	p = 0.7254
Fetal pH			
< 7.20	42 (17.8 %)	21 (16.3 %)	p = 0.4393
< 7.10	6 (2.5 %)	4 (3.1 %)	p = 0.9999
< 7.00	0	1 (0.8 %)	p = 0.7588
Neonatal resuscitation on birth[2]	5 (2.1 %)	2 (1.6 %)	p = 0.7013
Newborn transferred to:			
Neonatology	4 (1.7 %)	3 (2.3 %)	p = 1
Intensive care	3 (1.3 %)	1 (0.8 %)	

[1] Fetal cardiac rhythm anomal.
[2] Cardiac massage, tracheal intubation.

association of oral misoprostol and balloon catheter would reduce the time of labor, but no satisfaction outcome were evaluated.

Pain relief influences childbirth experience. Mäkelä et al. [27], found that women were less satisfied about pain relief during induced labor compared to spontaneous labor. In our study, we did not find any significant difference between the methods of cervical ripening regarding induction-related pain, whereas women seemed to be less satisfied about the frequency and intensity of uterine contractions in the oral misoprostol group. These results may be explained by the more regular use of oxytocin for cervical ripening with catheter balloon [10,23], and the pain induced by insertion of the catheter, as suggested by Druenne et al. [16]. This study also finds no difference between the two cervical ripening methods concerning overall pain, according to the study of Mieke et al. [20] and our results.

Few authors have dwelt on patient satisfaction regarding the method of cervical ripening. Place et al. [18] assessed the overall childbirth experience of women after cervical ripening with balloon catheter or oral misoprostol by using the Childbirth Experience Questionnaire, which is not specific for artificial induction of labor. They added a part to the Childbirth Experience Questionnaire specially for the induction part of the labor, but it was not validated by a previous study. The lack of a specific questionnaire to assess satisfaction during induction is a problem underlined by many authors, especially Mieke et al. [20] who, as in our study, did not find any difference in satisfaction on delivery induced by oral misoprostol or balloon catheter. This team had utilized the questionnaire by Wijma et al., which measures patient satisfaction over the entire childbirth experience, thus running the risk of not assessing cervical ripening itself.

Strengths of our study include the use of validated questionnaires. We constructed our satisfaction questionnaire by combining the validated EXIT and QACE questionnaires, which were devised and validated for assessing the experience of women during induction (EXIT) and

Table 3
Responses to the satisfaction questionnaire distributed in the maternity unit.

Questions	Balloon catheter (n = 236, 64.65 %)	Oral misoprostol (n = 129, 35.34 %)	p value
1) I was satisfied to be able to choose the induction method	4.61 (0.74) 209/231 (90.5 %)	4.66 (0.57) 122/128 (95.3 %)	p = 0.1523
2) I was satisfied with the time lapse between the start of induction and the start of labor	3.72 (1.19) 142/232 (61.2 %)	3.92 (1.07) 88/129 (68.2 %)	p = 0.2250
3) I was satisfied with the time lapse between the start of induction and childbirth	3.58 (1.27) 133/231 (57.6 %)	3.78 (1.19) 83/129 (64.3 %)	p = 0.2525
4) I wasn't happy about the number of vaginal examinations (to check for cervical ripening) during induction	2.23 (1.34) 48/232 (20.7 %)	2.30 (1.380) 28/125 (22.4 %)	p = 0.8095
5) Artificial induction of labor was painful	3.20 (1.40) 111/235 (47.2 %)	3.34 (1.44) 66/126 (52.4 %)	p = 0.4111
6) I had unpleasant side-effects after having been induced	1.90 (1.15) 30/233 (12.9 %)	2.00 (1.26) 18/128 (14.1 %)	p = 0.8762
7) The intensity of my contractions was bearable during induction	3.47 (1.29) 131/232 (56.5 %)	3.12 (1.42) 60/126 (47.6 %)	p = 0.1358
8) The frequency of my contractions was bearable during induction	3.62 (1.19) 149/235 (63.4 %)	3.22 (1.27) 64/128 (50 %)	p = 0.0180
9) I felt that I received support from the obstetric staff who looked after me during induction	4.79 (0.53) 231/235 (98.3 %)	4.71 (0.65) 125/129 (96.9 %)	p = 0.6193
10) I thought that I could express myself and give my opinion about decisions which concerned me	4.61 (0.73) 221/235 (94 %)	4.6 (0.79) 116/128 (90.6 %)	p = 0.3205
11) Overall, I'm satisfied with my delivery	4.39 (0.86) 208/236 (88.1 %)	4.54 (0.78) 118/128 (92.2 %)	p = 0.3041
12) On reflection, I was sufficiently prepared for induction	3.95 (1.10) 164/234 (70.1 %)	3.94 (1.08) 90/126 (71.4 %)	p = 0.8843
13) On reflection, I think that everything that was done during my induction was necessary	4.46 (0.80) 211/235 (89.8 %)	4.43 (0.78) 113/126 (89.7 %)	p = 1
14) I understood everything that happened during my delivery	4.52 (0.83) 217/235 (92.3 %)	4.57 (0.72) 119/127 (93.7 %)	p = 0.7901
15) I'm proud of myself	4.54 (0.71) 215/236 (91.1 %)	4.70 (0.58) 122/128 (95.3 %)	p = 0.2097
16) I feel regret	1.85 (1.14) 27/233 (11.6 %)	1.63 (1.08) 10/127 (7.9 %)	p = 0.3538
17) In view of my experience, I'd choose the same method of cervical ripening if induction of labor is necessary in a future pregnancy	3.91 (1.20) 159/233 (68.2 %)	3.92 (1.22) 83/126 (65.9 %)	p = 0.734
18) I would recommend this method for artificial induction of labor to one of my friends	3.78 (1.23) 152/235 (64.7 %)	3.84 (1.10) 82/129 (63.6 %)	p = 0.922

Results are presented:
– with the mean response to the questions ("strongly agree" = 5, "agree" = 4, "neither agree nor disagree" = 3, "disagree" = 2, "strongly disagree" = 1 (standard deviation in brackets).
– by pooling the responses "strongly agree" et "agree", as well as the responses "strongly disagree" and "disagree".

during delivery (QACE). We selected items related to induction and adapted other items to induction by cervical ripening, thereby devising an analysis of patient satisfaction that specifically dealt with induction by cervical ripening and not the entire childbirth process.

How relevant would it have been to assess a method of maturation which had been randomly selected rather than a personal choice? It is plausible that some women are more likely to be satisfied with one rather than the other method. If that is the case, a randomized study which happened to conclude that women are more satisfied on average with one method of maturation rather than another would hardly warrant imposing this method of maturation on all women. It remains difficult to determine from our study whether the fact of being able to choose the method of maturation influenced patient satisfaction, or whether satisfaction was linked to the type of maturation itself.

Regarding our main outcome, 68,2 % of women in balloon catheter group and 65,9 % of women in oral misoprostol group would use the same cervical ripening method, with no significative difference found between the two groups. These results are different from Mieke et al. study [20] or Druenne et al. study [16]: both found that women who underwent cervical ripening with balloon catheter would use oral misoprostol if necessary for a future pregnancy, contrary to Place et al. [18] study, in which women induced by balloon catheter would use the same method for next pregnancy. Importantly, it has to be noted that in our study, women could choose the ripening method themselves, what could modify satisfaction. No other study questioned women's satisfaction in choosing their method of induction. Women in our two groups were satisfied overall, which suggests giving more autonomy to women in decisions of their concerns.

In conclusion, when women choose the method of cervical ripening, satisfaction is overall good, irrespective of the method, whether by balloon catheter or misoprostol. It is difficult to determine whether satisfaction is bound up with the fact of being able to choose the method of maturation or with the type of method itself.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.eurox.2023.100202.

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