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ORIGINAL ARTICLE

'To bathe or not to bathe' during the first stage of labor

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Objective. Does a warm tub bath relieve labor pain? How is it experienced by the parturient?
Methods. Design: prospective randomised trial.
Setting: labor ward of a teaching hospital with a uniform active labor management.
Participants: one hundred and ten nulliparous low risk women, at term, in true spontaneous labor. Fifty-four women had a bath, 56 women served as controls.
Mean outcome measures: labor pain (assessed by means of a visual analogue scale) and post partum patients' bathing experience (by means of a self-made questionnaire).
Results. The study group and the control group were comparable with respect to maternal age, weight, length, duration of gestation, cervical status and labor pain sensation before randomisation. Absolute values of labor pain were not statistically different between the two groups, yet this latter progressed differently: in the bathing group the initial pain sensation (V.A.S.) was 6.8, and this remained stable during the first 25 minutes (V.A.S. = 6.7) and then rose to 8.2 after a mean of 53 minutes. In the control group, labor pain rose progressively from 6.3 to 7.3 after 25 min and to 8.7 after a mean of 52 min ($p < 0.01$, Student t-test). There was no difference in the use of epidural analgesia. There were no differences in labor duration nor in the frequencies of either operative deliveries or neonatal complications. Eighty percent of the bathers experienced soothing of the pain and all but one reported body relaxation. Ninety percent wanted to bathe again during a next labor.
Conclusion. Bathing provided no objective pain relief. It had, however, a temporal pain stabilizing effect possibly mediated through the improved ability to relax in between contractions. No side effects were found. It gives great satisfaction to users. Bathing, in conjunction with other forms of analgesia, is recommended.

Key words: bathing in labor; labor management; pain relief

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Bathing in pregnancy and labor is an old practice. In the sixteenth century, Ambroise Paré discouraged bathing during pregnancy for fear that labor might start prematurely (M. Thiery, personal communication).

During the past decade, there has been renewed interest in bathing during pregnancy and labor. In pregnancy, body immersion is used to relief edema and reduce blood pressure, and its effect is well documented (1, 2). On the contrary, there is no scientific evidence that body immersion during labor relieves pain or relaxes the body, nor that it should facilitate labor or correct dystocia (3–6). To the best of our knowledge prospective randomised controlled trials (7) have not been carried out to this day, and this one is the first in its kind.

The study aimed at determining whether a warm tub bath in labor has a pain relieving effect. We also asked the bathing parturients about their experience

Patients and methods

Criteria for enrolment were: true spontaneous labor with a cervical dilatation between three and five centimeters, ruptured membranes with clear liquor and no evidence of dystocia at inclusion. All women were nulliparous, at low risk and at term (≥ 37 weeks), with a singleton fetus in cephalic presentation. One hundred and thirteen women were found eligible for study purposes. At inclusion, the cervical score (8) was determined (Bishop T_1) and the woman requested to rate her actual labor pain by means of a vertical visual analogue scale (9) (V.A.S. T_1).

Zero, at the bottom means: 'No pain at all'. Ten, at the top, means: 'The most severe pain one can imagine'. Then, randomisation took place by means of an opaque sealed envelope containing the method-indicator card. Fifty-seven women were asked to bathe, three refused and were excluded, leaving 54 patients in this group. Fifty-six women served as controls. Together, 110 women formed the final study group.

Pain was evaluated again about 25 min thereafter (V.A.S. T_2) and again 50 to 60 min after randomisation (V.A.S. T_3). The cervical score (Bishop T_3) was determined again at this time. This interval was chosen in the light of previous experience with bathing in labor that had shown the average voluntary stay in the tub to last 52 min.

V.A.S. T_3 and Bishop T_3 could be assessed earlier than after 50 min when the bathing woman decided to leave the tub or when the woman belonging to the control group felt an urge to push.

The study protocol ended with the determination of V.A.S. T_3 and Bishop T_3, our standard labor protocol, based on the National Maternity Labor Protocol of Dublin (10), being then applied further. All patients had a private labor and delivery room and received personalised midwifery care. Telemetric heart beat recording allowed us to monitor the fetus, while the patient was bathing. All patients were delivered by house officers. Demand for study entry, demand for pain evaluation, cervical evaluation and labor management were carried out by the midwives. Labor and delivery were supervised by certified obstetricians. Epidural analgesia was available on demand and was the sole pharmacological method used for pain relief.

The oval shaped bath tub is 160 cm long and 50 cm deep. It is filled with tap water at a temperature at the patient's convenience but not exceeding 37°C. No chemicals are added.

Women who had been bathing were asked to evaluate this by filling in a questionnaire, anonymously, on the first post partum day.

Simple questions such as: 'Did bathing soothe the pain?', 'Did bathing relax your body?', 'Would you like to bathe during a next labor?', were answered with 'yes', 'no' or 'I don't know'. We also asked questions about reasons for leaving the tub. An open space was left to clarify answers or to make remarks.

The protocol was approved by the University Medical Ethics Committee.

The comparison of the continuous variables in study and control group was carried out using the Student t-test. Pearson and Mantel-Haenszel chi-square tests were used to evaluate the association between discrete variables. The level of statistical significance was set at $p=0.05$.

Results

Bathing group and control group were comparable with respect to maternal age, weight, length, duration of gestation, cervical status and pain sensation before randomisation (Table I). Absolute values of visual analogue scales, rating labor pain, were not statistically significantly different between the two groups (Table II). However, in the group bathing a slight decrease in pain sensation at T_2 (V.A.S. T_2) was noticed whereas an increase was found in the control group (Table II); this latter difference (V.A.S. T_2–T_1) was highly statistically significant (Student t-test $p<0.001$). A significant difference persisted until the time of final evaluation (V.A.S. T_3–T_1, Table II). Epidural analgesia was provided to seven women in the group bathing, after they had come out the bath, and to eight belonging to the control group (n.s. χ^2).

Labor progress was affected in a similar way as was labor pain: no statistically significant difference was found in absolute values of cervical dilatation and Bishop score at T_1 and T_3 (Table II) between the two groups but the change in Bishop score (T_3–T_1) (Table II) differed significantly. A

Table I. Patients' characteristics

Variable	Bathing group (n=54)	Control group (n=56)
Maternal age (y)*	27.5 (3.1)	27.2 (3.8)
Gestational age (wk)*	39.8 (1.3)	39.6 (1.2)
Birth weight (g)*	3315 (419)	3320 (427)
Cervical dilatation (cm) at T_1*	3.8 (0.9)	4.0 (1.0)
Bishop score at T_1	8.3	8.5
V.A.S. at T_1	6.8 (1.7)	6.3 (1.8)

*Mean (s.d.). T_1=just before randomisation. V.A.S.=visual analogue scale. There is no statistical difference between the bathing group and the control group by Student t-test.

Table II. Labor pain and labor progress

Variable	Bathing group (n=54)	Control group (n=56)	p value Student t-test
V.A.S. at T_1*	6.8 (1.7)	6.3 (1.8)	NS
V.A.S. at T_2*	6.7 (1.7)	7.3 (1.6)	NS
V.A.S. at T_3*	8.2 (1.5)	8.7 (1.3)	NS
V.A.S. T_3–T_1*	1.4 (1.6)	2.4. (1.4)	p=0.001
Cervical dilatation (cm) at T_1*	3.8 (0.9)	4.0 (1.0)	NS
Cervical dilatation (cm) at T_3	6.1 (2.1)	5.7 (2.1)	NS
Cervical dilatation (cm) T_3–T_1*	2.3 (1.7)	1.7 (1.7)	p=0.074
Bishop score T_3–T_1	2.3	1.4	p=0.003

V.A.S.=visual analogue scale. *Mean (sd). NS=not significant. T_1=just before randomisation T_2=on average 25 min after randomisation T_3=at the end of the protocol, i.e., 53.3 (18) min after randomisation in the bathing group and 52.2 (14) minutes in the control group.

trend was found towards a faster cervical dilatation in the bathing group (Table II).

Six women left the tub because they were fully dilated, after an average of 42 min. In the control group, full dilatation was reached before the agreed time interval (T_3) five times, after 41 min on average.

Duration of the first stage was comparable in both groups: 244 min (s.d. 139 min) in bathing patients versus 264 min (s.d. 170 min) in the control group (n.s. t-test). A trend was found towards less labor augmentation in the bathing group, (28% C.I. 16%–42%) than in the control group, (44% C.I. 31%–58%) ($p=0.06$, χ^2). The second stage lasted 33 min (s.d. 20 min) in the group bathing and 34 min (s.d. 22 min) in the control group (n.s. t-test).

Two Cesarean sections were performed, one in each group. Instrumental deliveries were carried out seven times on women having bathed and four times in the control group. Operative delivery (i.e. Cesarean section and instrumental) was performed because of dystocia on five women having bathed and on three belonging to the control group (n.s. χ^2).

Amnionitis was never diagnosed, endometritis occurred once in the control group. Prophylactic antibiotics were given to the two women undergoing a Cesarean section and to one woman with a retained placenta, who belonged to the group having bathed. No neonatal infections were seen.

In the bathing group, two babies had an arterial pH below 7.1 due to progressive bradycardia in the second stage, warranting a vacuum extraction. One of them had a five min Apgar score of six and was kept 24 h in observation in the neonatal unit. In the control group, one baby needed to be intubated because of meconium aspiration.

Telemetric devices did not become waterlogged. Telemetric recording of the FHR was unsuccessful on seven occasions due to frequency interference with car mobile phones.

Eighty percent (43) of the women who had bathed found that bathing had had a soothing effect on the pain and all but one (53) claimed that bathing had relaxed their body, especially in between contractions. The main reason (65%) for leaving the tub was that labor pain became too intense. Forty-eight women wanted to bathe again during a next labor, three women did not, and three didn't know. Reasons for not bathing again were that one woman became unwell and that two were seized with fear because of the warmth and the pain.

Discussion

There are reasons to believe that warm water has beneficial effects during labor. The water will transfer heat to the body, it will decrease the pressure on the abdominal muscles and by eliciting pleasurable sensations it will have a central effect. All these stimuli are able to close the gate for pain at the level of the dorsal horn and therefore dampen the pain (7). Moreover, the emotional stress caused by labor pain may stimulate the release of adrenaline and cortisol, which in turn affect adversely the uterine activity and the progress of labor (11).

At their first contact with the water, parturients feel relieved and cope better with the painful contractions, a stabilizing effect upon labor pain being maintained thereafter for some time. However, bathing women, according to their answers to the questionnaire, experience relaxation predominantly, much more so than pain relief. It is possible that pain stabilization after 25 min is mediated through relaxation.

Be that as it may, little by little, the pain increases and the intensified labor pain is the main reason for leaving the tub, mostly within the hour.

Because of this short lived effect, it is unlikely that, within this given set-up, bathing will significantly reduce the epidural rate.

Bathing women tend to require less oxytocin than controls for a comparable duration of labor, although the difference did not reach statistical significance.

Several observational studies (3, 6, 12–14) stressed both the analgetic and the labor accelerating effect of a warm tub bath, directly by assessment of the pain relief, and that of the duration of labor, or indirectly by the observation of a lesser need for analgesics and oxytocin.

However, the only prospective but non-randomised study (5) failed to confirm the aforementioned

findings. Lenstrup et al. (5) found a significantly faster cervical dilatation in the group bathing (2.5 cm/hour) than in controls (1.26 cm/hour) and a difference just short of significance in oxytocin use (11% versus 25%). However, duration of labor was comparable in both groups. The pain relief they (5) allegedly found in the group bathing could be explained by a non-randomisation bias: women bathing had significantly higher pain scores before the bath than controls.

There is more agreement concerning the influence of bathing on patient satisfaction. All authors (3–6, 12, 13) agree that bathing elicits favorable responses. The vast majority of women said they would like to bathe again during a next labor. A high consumer satisfaction is found in many alternative therapies (7) such as, for instance, transcutaneous electrical nerve stimulation. Unfortunately, satisfaction is not a reliable index of effectiveness.

In women bathing infections did not occur. Infectious morbidity was also very rare in other studies: Odent (3) had no infections, Church (12) found one maternal infection in 483 water births, Lenstrup et al. (5) had two cases of post partum fever in 88 bathers as compared to one in the 72 control subjects. However, Waldenström & Nilsson (14), in a retrospective study, reported significantly lower five min Apgar scores in infants born to women having bathed than in controls, but this applied only to babies born more than 24 h after rupture of the membranes. They therefore cautioned against bathing after rupture of the membranes.

All our bathing patients had ruptured membranes and a scalp electrode, and no increase in morbidity was observed. But our study population was at low risk and the time interval between rupture of the membranes and delivery was less than 24 h in all but two cases. We might say, like others (3, 15), that bathing during labor had no harmful effect on the baby's condition, but our numbers were small.

The evaluation of pain by the patients was done in the presence of a midwife, who also determined the cervical score. Some of the midwives thought much of bathing, while others considered it more as a fancy. Being aware of this examiner's bias, we had (before the study started) strongly emphasized, on the one hand the importance of being open-minded and on the other hand, the need for similar support to bathers and non-bathers. Obviously, it cannot be ascertained that both groups were given strictly comparable care.

To gain information on the bathing experience, we asked some straight forward questions in the post partum period. Clearly, these questions only applied to the study group and for this reason we decided to make no comparison in terms of 'patient satisfaction' between the study- and the control group.

To conclude, bathing provides a temporal pain stabilizing effect but no objective pain relief.

Bathing women tend to dilate faster and to need less labor augmentation. If one wants to implement a trial on the effect of bathing on dystocia or neonatal complications in low risk women at term, large prospective randomised trials are needed. Accordingly, this trial can provide useful pilot data for such larger studies. Laboring women will more frequently be aware that they can bathe during labor, it will therefore be more difficult to carry out such trials in a single center.

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