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Warm bath during labour. Effects on labour duration and maternal and fetal infectious morbidity

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Summary
The purpose of this study was to investigate, in a prospective manner, whether a warm bath during the first stage of labour is associated with an increased risk of maternal and/or neonatal postpartum infectious morbidity and to examine the advantages and disadvantage, of bathing during labour. We undertook a prospective study of 317 patients with an uncomplicated pregnancy, who delivered a single infant between 37 and 42 weeks of gestation and who elected to have a warm bath during labour and compared them with a similar group of 312 patients who had no such desire. The postpartum maternal and neonatal infectious morbidity was compared as well as labour duration and the need of pain relief. This study showed that taking a warm bath during first stage of labour with intact- or ruptured membranes is associated with a significantly higher minor infectious morbidity for the mother while no increased risk was found for the child compared with the non-bathing control group. A significant prolongation of the first stage of labour and an increased need for pain relief was found in the bathing group.

INTRODUCTION

In 1983 Odent claimed that a warm bath during labour reduced labour complications and maternal pain. Since then the practice of bathing during labour has spread rapidly in many Western countries (Waldenström and Nilsson, 1992). It is claimed that the patients experience comfort and relief because maternal weight is supported by the water. Furthermore, the warmth of the bath relaxes her tension and eases her labour pains, and the water gives her the freedom to move into whatever position is the most comfortable (Brown, 1982; Daniels, 1989).

Many papers concerning bathing during labour exist but the obstetric literature is very limited with respect to objective measures of possible harmful side effects.

One major risk of taking a warm bath during labour is the possibility of infection in both mother and infant. Organisms from the patient's vagina, perineal and anal regions, may ascend through the vagina into the uterus and eventually reach the fetus. After rupture of membranes, the protection afforded by the amniotic sac is removed and the risk for infectious morbidity potentially increased. Waldenström and Nilsson in 1992 found in a non-randomized study of 89 bathing patients during labour compared with 89 non bathing controls no statistical difference between the groups with respect to infection. However, a tendency toward more complications was observed in the bathing group. A review of the literature showed that no controlled prospective study seemed to have been performed regarding possible increased postpartum infection in women taken a warm bath during labour, or possible increased perinatal and early neonatal infectious morbidity in infants whose mothers bathed during the first stage of labour.

The purpose of our prospective controlled study was to ascertain whether warm bath during labour was associated with an increased infectious morbidity for the mother and/or child and to estimate this incidence. Furthermore, to estimate eventual advantages or disadvantages of bathing during labour with respect to labour duration, pain relief, incidence of operative deliveries, third degree lacerations, maternal blood loss and hospital stay.

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MATERIALS AND METHODS

A prospective study of healthy pregnant patients delivered at the department of Obstetrics and Gynaecology, Central Hospital, Borås between 1 March and 31 May 1994 was undertaken. In all cases the estimated date of confinement had been established by ultrasound scan at 16 weeks of pregnancy. Criteria for enrolment were: all the patients wanted and had a warm bath during labour, uncomplicated pregnancy and onset of spontaneous labour. All women were at low risk and at term (37–42 weeks), with a singleton fetus in cephalic presentation. No specific cervical dilatation was demanded before bathing. Ruptured membranes, if the liquor was clear, was not considered as a contraindication for bathing. Three hundred and twenty women were found eligible for study purposes.

The bath was filled with warm water at 37°C and no chemicals were added.

Controls were identified among healthy women, who had no desire to bath during labour, giving birth in the same hospital, with an uncomplicated pregnancy and onset of spontaneous labour. Furthermore, they were at low risk and at term ($\geq$ 37–42 weeks), with a singleton fetus in cephalic presentation. Each patient in the bathing group was matched with a control based on age ($\pm$ 2 years), parity (0, 1, 2, 3,4, 5, 6 +) and delivery time (within 1 day).

All infectious morbidity for both mother and child was noted on special proforma and diagnosed as follows. Postpartum endometritis was diagnosed when the body temperature was 38°C or higher on two successive readings at an 8-hour interval, with uterine tenderness and foul-smelling lochia and no other apparent causes for fever. Urinary tract infection was diagnosed if dysuria and positive uterine culture ($> 10^5$ organisms per millilitre) were present with or without fever. Other maternal infectious diseases and infant infectious diseases were diagnosed by means of physical and/or radiographic and/or laboratory examinations. In no cases were prophylactic antibiotics given during the course of labour and antibiotics were given only when definite signs of infections were present after delivery. Microbiological investigations were carried out whenever there were signs of infectious morbidity. The microbiological tests were the same in the bathing and the non-bathing groups for both mother and child.

The time from the onset of labour and rupture of membranes to delivery for all 640 patients was noted. Criteria for labour were: painful contractions at regular intervals (intensity gradually increasing) and progressive cervix dilatation. The diagnosis of rupture of membranes was made by direct observation of discharged fluid from the vagina, or by careful speculum examination with a positive ferning test. The need for analgesia during labour, including pethidine, paracervical and epidural block was noted for all the patients together with the need of labour augmentation with oxytocin. In our department pain relief is based on modifying the central perception of pain by morphine-like agonists such as pethidine or blocking the pain by infiltration with local anaesthetics at various points on the nerve pathway extending from the subarachnoid space near the spinal cord to the tips of the peripheral nerves. The most commonly used form of local anaesthesia in our department is paracervical block followed by epidural block. The incidence of vacuum extraction, caesarean section rate, number of episiotomies, maternal blood loss and Apgar score at 1, 5 and 10 min were noted for the total patient population.

After discharge from hospital a control visit was made 4 to 8 weeks later. Infectious morbidity during the first 3 weeks was noted for both mother and child together with eventual treatment regimens. Infections in infants occurring after 3 weeks are not usually the result of transmission from the mother during delivery. Therefore, we decided to register only infectious morbidity developing during the first 3 weeks after the delivery for both the mother and child. At the same time every women underwent a gynaecological examination and the result was noted in their chart.

Morbidity rates were compared with the use of chi-squared test, Student's *t*-test and Mann–Whitney *U*-test and differences were considered significant if $P < 0{\cdot}05$.

RESULTS

During the study period 640 pregnant patients entered the study. Three hundred and twenty in the bathing group and 320 in the control group. Eleven patients in the study were excluded because they were lost during the follow-up period. Hence, 629 patients were enrolled in the study. Of these 317 were in the bathing group and 312 in the control group. Out of the 629 women, 327 were nulliparous (52 per cent). For the bathing group the mean time spent in bath was 88 minutes. The two groups were similar with respect to most maternal clinical characteristics during labour except for the incidence of

Table I. Maternal delivery characteristics

	Bathing group (n = 317)	*Control group (n = 312)*	*Significance*
Pethidine	46 (14·5%)	43 (13·8%)	NS
Paracervical block	59 (18·6%)**	28 (9·0%)**	$P<0·01$
Epidural block	11 (3·5%)	9 (2·9%)	NS
Use of oxytocin	107 (33·8%)	92 (29·5%)	NS
Episiotomies	60 (18·9%)	58 (18·6%)	NS
Third degree tears	4 (1·3%)	4 (1·3%)	NS
Vacuum extraction	21 (6·6%)	17 (5·4%)	NS
Caesarean section	7 (2·2%)	6 (1·9%)	NS
Bleeding >600 ml	24 (7·6%)	17 (5·4%)	NS

Table II. Comparison of maternal infectious morbidity between the bathing and the control groups

	Bathing group (n = 317)	*Control group (n = 312)*	*Significance*
Endometritis	10 (3·2%)	4 (1·3%)	
Urinary tract infection	5 (1·6%)	2 (0·6%)	
Overall infectious morbidity	15 (4·7%)	9 (1·9%)	$P<0·05$

paracervical block, where a significant higher incidence was found in the bathing group (Table I).

In the bathing group a significant longer mean duration of labour was found (7·1 hours, s.d. 4·6) compared with the control group (5·1 hours, s.d. 4·1) ($P<0·05$). However, there were no significant differences between length of the second stage of labour, time from rupture of membranes to delivery and mean hospital stay between the two groups.

Fourteen women (2·2 per cent) developed postpartum endometritis and seven (1·1 per cent) developed urinary tract infection. An overall significant difference ($P<0·05$) in maternal infectious morbidity rates was observed in the bathing group compared with the control group (Table II). All maternal infectious morbidity were treated with antibiotics and the course were uneventful in all women after one treatment period.

A total of 18 infants (2·9 per cent) developed infectious morbidity. Eight infants (2·5 per cent) in the bathing group and 10 infants (3·2 per cent) in the control group (no significance). Out of the neonatal infectious morbidity 10 infants developed conjunctivitis (six in the bathing group and four in the control group) which was confirmed by positive culture. The following bacteria strains were isolated: alpha haemolytic streptococci ($n=7$), *Staphyloccus aureus* ($n=1$), haemophilus ($n=1$) and coagulase negative *S. aurais* ($n=1$). Two infants in the bathing group developed other infectious diseases (one neonatal infectious morbidity NUD and one with sepsis) compared with six infants in the control group (four neonatal infectious morbidity NUD, one with sepsis and one with suspected neonatal herpes infection).

No difference in Apgar score was noted between the two groups.

In the bathing group when there had been rupture of membranes before or during the bath no increased infectious morbidity was noted

Table III. Comparison of maternal and infant infectious morbidity in the bathing group between patients with rupture of membranes before or during the bath compared with patients with intact membranes during the bath

	Rupture of membranes (n = 119)	*Intact membranes (n = 198)*	*Significance*
Maternal infectious morbidity	4 (3·6%)	11 (5·5%)	NS
Infant infectious morbidity	4 (3·6%)	4 (2·0%)	NS

either for the women or for the child compared with cases with rupture of membranes after the bath (Table III).

DISCUSSION

Few studies concerning maternal and fetal infectious morbidity, following a warm bath during labour, are based on prospective controlled study populations. This study includes all women delivered during a 3 months period at our department, with a singleton fetus, experiencing spontaneous onset of labour between the 37th and 42th weeks of an uncomplicated pregnancy and who wanted warm water therapy during labour. Each patient in the bathing group was matched with a control, who had no desire of a warm bath. Thus both the test group and the control group had their childbirth according to their wishes.

This study showed that taking a warm bath during labour with either ruptured or inact membranes will increase the risk of infectious morbidity to the mother compared with a matched control group. However, the infections were of a minor nature and all were cured with antibiotic treatment without sequelae. No difference was noted in infant infectious morbidity rates between the two groups.

In the present study we found no significant differences between the groups with regard to frequency of operative delivery, argumentation of labour, incidence of episiotomies, duration of the second stage of labour and hospital stay. However, we found a significantly ($P < 0{\cdot}01$) longer mean duration of first stage of labour in the bathing group compared with the control group which is in contrast to the results from other studies where no difference in labour durations was found (Cammu *et al.*, 1994). The present result could, however, be explained by the fact that the non-bathing patients were usually ambulatory. In 1978 Flynn and his co-workers found the duration of labour was shorter in patients who laboured while ambulatory rather than recumbent. Others have observed that relaxation achieved in warm water can causes the contractions to space out (Church, 1989; Jepson, 1989) and as a consequence the first stage of labour will be prolonged.

No significant difference was found in the need for pethidine or epidural block between the two groups. However, a greater need for paracervical block was found in the bathing group compared with the control group. This can be explained by the significantly longer labour duration in the bathing group. Thus, as shown in other papers (Cammu *et al.*, 1994) the present study confirmed that bathing provided no objective pain relief.

The lack of published research on the effects of a warm bath during labour is surprising, considering the rapid spread its use and the enthusiastic support from the staff in the delivery units in different parts of the world. There have been reports concerning maternal body temperature during warm tub bath and weight lost (Mesrogli *et al.*, 1987), operative delivery, vaginal and perineal lacerations (Lenstrup *et al.*, 1987), uterine contractility, fetal heart rate and fetal movements (Vähä-Eskeli and Erkkola, 1990), effects on plasma catecholamine in the infant to bathing mothers (Gradert *et al.*, 1987) and possible maternal and/or fetal increased infectious morbidity (Waldenström and Nilsson, 1992). However, the reports are scanty and the sample sizes often small.

We found only a slight but significant increase in the incidence of maternal infectious morbidity after birth in women who wish to achieve relaxation and comfort in a warm bath during the first stage of labour compared with a matched control group. On the other hand no significant infectious morbidity was noted in the group of infants whose mothers had been bathing during labour compared to infants in the control group. A significantly longer duration of the first stage of labour was noted in the bathing group and a higher need for pain relief. A warm bath can prolong labour duration and increase the need for pain relief together with a slightly increased incidence of minor maternal infectious morbidity. There should be some caution in accepting a policy of warm bathing in labour as the advantages are unproven and there are some disadvantages.

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