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(Accepted 7 November 2003)

doi 10.1136/bmj.37942.546076.44

Randomised controlled trial of labouring in water compared with standard of augmentation for management of dystocia in first stage of labour

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Abstract

Objectives To evaluate the impact of labouring in water during first stage of labour on rates of epidural analgesia and operative delivery in nulliparous women with dystocia.

Design Randomised controlled trial.

Setting University teaching hospital in southern England.

Participants 99 nulliparous women with dystocia (cervical dilation rate < 1 cm/hour in active labour) at low risk of complications.

Interventions Immersion in water in birth pool or standard augmentation for dystocia (amniotomy and intravenous oxytocin).

Main outcome measures Primary: epidural analgesia and operative delivery rates. Secondary: augmentation rates with amniotomy and oxytocin, length of labour, maternal and neonatal morbidity including infections, maternal pain score, and maternal satisfaction with care.

Results Women randomised to immersion in water had a lower rate of epidural analgesia than women allocated to augmentation (47% v 66%, relative risk 0.71 (95% confidence interval 0.49 to 1.01), number needed to treat for benefit (NNT) 5). They showed no difference in rates of operative delivery (49% v 50%, 0.98 (0.65 to 1.47), NNT 98), but significantly fewer received augmentation (71% v 96%, 0.74 (0.59 to 0.88), NNT 4) or any form of obstetric intervention

(amniotomy, oxytocin, epidural, or operative delivery) (80% v 98%, 0.81 (0.67 to 0.92), NNT 5). More neonates of women in the water group were admitted to the neonatal unit (6 v 0, P = 0.013), but there was no difference in Apgar score, infection rates, or umbilical cord pH.

Conclusions Labouring in water under midwifery care may be an option for slow progress in labour, reducing the need for obstetric intervention and offering an alternative pain management strategy.

Introduction

Management strategies for slower than expected progress in the first stage of labour (dystocia) vary from immediate augmentation¹⁻² to delayed intervention up to four hours after diagnosis.³⁻⁵ Comparison between strategies is difficult as specific features often differ. Our current trial was based on two precepts. Firstly, that incomplete understanding of labour may lead to unnecessarily early intervention. Secondly, that anxiety and pain may trigger a stress response,⁶ leading to reduced uterine activity and dystocia.⁷ Labouring in water may ameliorate this stress response by aiding relaxation and pain relief. A Cochrane review concluded that, for women at low risk of complications,

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BMJ 2004;328:314-8



This is the abridged version of an article that was posted on bmj.com on 26 January 2004: <http://bmj.com/cgi/doi/10.1136/bmj.37963.606412.EE>

Table 1 Epidural analgesia, mode of delivery, and secondary outcomes among nulliparous women with dystocia allocated to labour in a birth pool or standard augmentation (amniotomy and intravenous oxytocin). Values are numbers (percentages) of women unless otherwise indicated

Outcomes	Labour in water (n=49)	Augmentation (n=50)	Relative risk (95% CI)	Number needed to treat to benefit one woman (NNTB) (95% CI)	Pearson χ^2 P value
Epidural analgesia:					
At first stage of labour	21 (43)	30 (60)			
At second stage of labour	2 (4)	3 (6)			
At any stage of labour	23 (47)	33 (66)	0.71 (0.49 to 1.01)	5 (3 to ∞ to NNTH -212)	0.056
Mode of delivery:					
Normal	25 (51)	25 (50)			
Ventouse	12 (25)	10 (20)			
Forceps	4 (8)	4 (8)			
Caesarean section	8 (16)	11 (22)			
Any operative delivery	24 (49)	25 (50)	0.98 (0.65 to 1.47)	98 (3 to ∞ to NNTH -5)	0.919
Method of augmentation:					
Amniotomy	28 (57)	37 (74)			
Amniotomy alone	14 (29)	20 (40)			
Oxytocin	21 (43)	28 (56)			
Oxytocin alone	7 (14)	11 (22)			
Amniotomy and oxytocin	14 (29)	17 (34)			
Amniotomy or oxytocin, or both	35 (71)	48 (96)	0.74 (0.59 to 0.88)	4 (3 to 9)	0.001
Any obstetric intervention*	39 (80)	49 (98)	0.81 (0.67 to 0.92)	5 (3 to 14)	0.004

NNTH=Number needed to treat to harm one woman.

*Amniotomy, oxytocin, epidural analgesia, or operative delivery.

there was no clear evidence of advantage or disadvantage in using a pool in labour but further research was needed.⁸ Two national surveys concluded that labour and birth in water had no effect on perinatal mortality.^{9, 10}

Our current trial compares labour in water with augmentation in nulliparous women with dystocia.

Participants and methods

Design

Our randomised controlled trial compared immersion in water during the first stage of labour after diagnosis of dystocia with augmentation, the standard management for dystocia. We conducted the trial between January 1999 and December 2000 in a university teaching hospital with about 4500 births a year.

Study population

Nulliparous women with a diagnosis of dystocia (cervical dilation of < 1 cm/hour)—who at that time would routinely have been advised to have their labour augmented by amniotomy or oxytocin injection, or both—were eligible for the trial if they were able to give informed consent, had received information about the trial during their pregnancy (a leaflet describing the trial was distributed to all nulliparous women antenatally), were in spontaneous, active labour, and were at low risk of complications (full term, singleton pregnancies, fetus in cephalic presentation, and no medical, obstetric, or psychiatric problems).

Intervention

After participating women were randomised, each management option consisted of a package of care provided by midwives, including one to one care. Labour progress was assessed by vaginal examinations every four hours and documented on a standard partogram. All women could request any form of analgesia available at any time.

Augmentation—This group received the standard management for dystocia. Amniotomy was performed

if the membranes were intact, and a midwife managed the labour for the next two hours unless otherwise clinically indicated. If the membranes were already ruptured or progress was not satisfactory during the two hours after amniotomy, intravenous oxytocin was given until regular contractions occurred. Continuous fetal monitoring was carried out.

Labour in water—This group used a permanent waterbirth pool filled with tap water without additives so that immersion was to above the breasts when sitting. Water temperature was maintained at 36.0–37.0°C. The maximum stay in the pool before reassessment by vaginal examination was four hours. If labour progress was satisfactory (cervical dilation \geq 1 cm/hour), subsequent care could continue in the pool if the woman wished, otherwise augmentation was advised.

Sample size

We based our estimate of the potential effect size on an audit of 50 nulliparous women with dystocia in May–July 1997, who would have met the trial inclusion criteria. We concluded that 220 women would be required to detect an absolute reduction of 25% in the rate of epidural analgesia (from 60% to 35%) and an absolute reduction of 20% in the operative delivery rate (from 40% to 20%) with 90% power in 5% two sided tests. We planned a recruitment period of two years.

After dystocia was diagnosed in an eligible woman, she was randomly allocated to a treatment arm using allocation details concealed in consecutively numbered envelopes.

Outcome measures

Primary outcome measures were epidural analgesia and operative delivery. Secondary measures included augmentation rates and maternal or neonatal morbidity (any infection, admission to the neonatal unit, or condition that required medical care up to the 10th postpartum day). It was not possible to conceal allocation from clinical practitioners. However, as data were

Table 2 Labour length and retrospectively reported pain and satisfaction among nulliparous women with dystocia allocated to labour in a birth pool or standard augmentation (amniotomy and intravenous oxytocin). Values are numbers (percentages) of women unless otherwise indicated

Outcomes	Labour in water (n=49)	Augmentation (n=50)	Mean differences (95% CI)	P value
Mean (SD, range) length of first stage of labour (hours)	10.47 (3.69, 3.75-19.32)	10.26 (3.75, 4.25-21.37)	0.22 (-1.27 to 1.70)	0.677†
Pain score (visual analogue scale)*:				
Mean (SD, range) pain score 30 minutes after start of management (0-100 mm)	49 (22, 8-96)	64 (30, 0-100)	-16 (-27 to -5)	0.003†
Mean (SD, range) change in score after 30 minutes of management (-50 to 50 mm)	-26 (16, -50-28)	12 (32, -50-50)	-38 (-49 to 28)	<0.001†
Maternal satisfaction	(n=47)*	(n=48)*	Relative risk of satisfaction (95% CI)	
With freedom of movement:				
Satisfied	43 (91)	30 (63)		
Satisfied and dissatisfied	4 (9)	15 (31)		
Dissatisfied	0	0	1.46 (1.18 to 1.91)	0.001‡
Not sure	0	3 (6)		
With privacy:				
Satisfied	45 (96)	39 (81)		
Satisfied and dissatisfied	2 (4)	9 (19)		
Dissatisfied	0	0	1.18 (1.02 to 1.42)	0.029‡
Not sure	0	0		
With overall management:				
Satisfied	44 (94)	42 (88)		
Satisfied and dissatisfied	2 (4)	6 (13)		
Dissatisfied	1 (2)	0	1.07 (0.93 to 1.26)	0.486§
Not sure	0	0		

*Postnatal interviews were conducted for 48 women allocated to augmentation and 47 women allocated to labour in water. A further two women in each group declined to answer the pain questions.

†Mann-Whitney test. ‡Pearson χ^2 test. §Exact χ^2 and confidence interval.

objective in nature and recorded contemporaneously, observer bias was minimised.

We conducted a postpartum structured interview in the maternity unit to assess retrospectively the women's experience of pain at 30 minutes after the intervention started and change in pain over the same time period. We did not assess pain concurrently because of the disruption to the women and midwives. We also assessed women's satisfaction overall and in relation to privacy and freedom of movement. We used a structured interview format to reduce potential bias.

Statistical analysis

We compared rates of epidural analgesia and operative delivery between groups. We produced numbers needed to treat to produce benefit in one woman and calculated confidence intervals. We compared length of labour and women's pain and satisfaction scores.

Results

Recruitment

Of 3825 nulliparous women who delivered in the unit during the two years of recruitment, 741 were defined as being at low risk of complications at the time of the diagnosis of dystocia. Consent was sought from 176 eligible women, of whom 99 (56%) agreed to participate, and were randomised. The two groups of women showed no important differences in baseline characteristics. Forty eight of the 49 women allocated to labour in water used the pool, and 48 of the 50 women allocated to standard care received augmentation.

Primary outcomes

Twenty three women (47%) allocated to labour in water received epidural analgesia after randomisation compared with 33 (66%) in the augmentation group (table 1). The numbers of operative deliveries were similar in both arms of the trial.

Secondary outcomes

Twenty five of the 27 women in the water labour arm who had made slow progress at the assessment four hours after recruitment received augmentation. A further three women progressed slowly subsequently and also received augmentation. Seven women who progressed satisfactorily received an amniotomy for other indications. The number of women who received augmentation in the water labour arm was significantly lower than that in the standard care arm (table 1).

The mean duration of the first stage of labour was similar in the two groups, (table 2). Women allocated to labour in water reported significantly lower mean pain scores at 30 minutes after start of the allocated management and a reduction in mean pain compared with an increase for women receiving augmentation. Women allocated to labour in water were more likely to report satisfaction with freedom of movement and with experience of privacy, but there was no difference between groups in overall satisfaction (table 2).

Maternal and neonatal wellbeing

Maternal and neonatal infection rates were similar in the two groups, as was neonatal condition at birth indicated by Apgar score and umbilical cord pH. Six neonates born to women in the water labour group were admitted to the neonatal unit compared with none in the augmentation group ($P=0.013$). The reasons for admission were: cardiac defects (1), hypothermia (2), fever (1), suspected infection on day 2 (1), and poor feeding on day 3 (1). There was a mean delay of 6 hours (range 2-10 hours) between women leaving the pool and birth. Apart from the infant with cardiac defects, the other five neonates who had required an operative delivery were reunited with their mothers within 48 hours and experienced no subsequent problems.

Discussion

This is the first trial to evaluate the impact of labouring in water for nulliparous women with dystocia. Compared with women given standard augmentation, the women labouring in water had no difference in operative delivery rates and tended to receive less epidural analgesia. Almost 30% of women in the water arm did not receive augmentation and 20% received no obstetric intervention, without evidence of longer labour, both of these rates being significantly different from the augmentation arm. In addition, women retrospectively reported less pain and increased satisfaction.

A management approach that reduces rates of augmentation and associated obstetric intervention may contribute positively to maternal physiological and psychological health: oxytocin infusion is known to increase the risk of uterine hyperstimulation and fetal hypoxia, and obstetric interventions are associated with lower maternal satisfaction.¹¹ A reduced need for epidural analgesia and augmentation may enable staff and other resources to be used differently—for example, allowing more women to receive one to one care in labour.

Maternal and neonatal wellbeing

The trial was not large enough to detect differences in maternal and fetal morbidity. However, indicators of wellbeing were similar in the two groups, with the exception of increased admission to the neonatal unit after labour in water. Possible reasons for this include the water immersion itself, the delay in intervention of up to four hours (even though this did not effect overall labour length), extra caution by practitioners when women were known to have laboured in water, or chance factors with no direct relation to the trial. No other studies of labour in water have reported such an association: instead, they either did not provide data on admissions to neonatal units^{12–13} or reported only one admission¹⁴ or similar admission rates in both trial arms.¹⁵ Eckert et al reported an increased incidence of initial resuscitation measures with water immersion,¹⁵ but we found no difference in Apgar scores and blood gas analysis at birth. Indeed, three of the admissions to the neonatal unit were between nine and 48 hours after delivery, while the three admissions immediately after birth were associated with temperature regulation. Comparative studies of labour in water found no increase in admissions to neonatal units or other markers of neonatal distress.^{16–18}

Limitations of study

Only 99 of the intended 220 women were recruited for a variety of reasons. Epidural analgesia was the main reason why nulliparous women were ineligible for our study (28%). In our busy maternity unit recruitment was not a priority, and some eligible women were not invited to participate. The main reason eligible women chose not to enter the trial was a preference for one or other form of care (40%). Consideration is needed on how this may affect the generalisability of our findings and recruitment problems.

Recruitment became more difficult towards the end of the trial because of the adoption of a more conservative approach to managing dystocia in the unit and the introduction of the modified World Health Organization partogram,³ which incorporates a delay

What is already known

For women in normal labour, immersion in water is associated with less need for analgesia and increased satisfaction

Augmentation of labour, in particular oxytocin administration, is associated with hyperstimulation and decreased maternal satisfaction

What this study adds

For nulliparous women with dystocia (cervical dilation < 1 cm/hour), immersion in water for up to four hours seemed to reduce need for augmentation of labour, reduce pain, and increase satisfaction, without increasing overall length of labour or operative delivery rate

Water immersion may be an alternative option to early augmentation of labour

between the identification of slow progress and augmentation. During this delay midwives could facilitate ongoing conservative management; as a consequence, they were less willing to recruit women to the trial, knowing that half of the women would immediately receive augmentation. The low recruitment rate contributed to the outcomes achieved, such as the lack of statistical significance in relation to the difference in rates of epidural analgesia.

We thank the women who participated in the trial; the midwives and obstetric and support staff of the unit where the trial was conducted; research advisory group members Maggie Elliot and Debbie Gould; and Rona McCandlish for her support in preparing this paper.

Contributors: See bmj.com

Funding: Southampton University Hospitals NHS Trust.

Competing interest: None declared.

Ethical approval: Approval was given by the local research ethics committee.

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(Accepted 18 November 2003)

doi 10.1136/bmj.37963.606412.EE

Effectiveness of opportunistic brief interventions for problem drinking in a general hospital setting: systematic review

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BMJ 2004;328:318-20

Abstract

Objective To determine the effectiveness of opportunistic brief interventions for problem drinking in a general hospital setting.

Design Systematic review.

Data sources Medline, PsychInfo, Cochrane Library, reference lists from identified studies and review articles, and contact with experts.

Main outcome measure Change in alcohol consumption.

Results Eight studies were retrieved. Most had methodological weaknesses. Only one study, with a relatively intensive intervention and a short follow up period, showed a significantly large reduction in alcohol consumption in the intervention group.

Conclusion Evidence for the effectiveness of opportunistic brief interventions in a general hospital setting for problem drinkers is still inconclusive.

Introduction

Evidence of excessive alcohol consumption is common among patients admitted to hospital for reasons other than drinking. Brief psychosocial interventions in general health care, either within or out of hospital, can help patients to reduce problem drinking at an early stage. These interventions are often opportunistic and most comprise assessment, advice, and counselling with educational elements and possibly written information. Professionals other than specialists in substance misuse may deliver the interventions, most of which are aimed at moderate or harm-free drinking as opposed to total abstinence. The interventions may target drinkers who consume hazardous amounts of alcohol or those who exceed the guidelines for safe drinking and are not reached by conventional treatment services.

Various reviews and meta-analyses have shown the effectiveness of brief interventions for problem drinking.¹⁻⁶ The most influential study is the World Health Organization randomised clinical trial of brief interventions in primary health care.⁷ Simple advice and brief counselling reduced hazardous and harmful alcohol consumption by both men and women in various healthcare settings and from different cultures.

In all but one review the results from primary healthcare settings and general hospital settings are pooled.⁵ In most European countries, however, these settings are structurally different and the effectiveness of alcohol intervention can therefore differ. We focused on the general hospital setting.

We identified and summarised the results of all randomised controlled trials and other well controlled trials that evaluated an opportunistic brief intervention for problem drinking in a general hospital setting to determine whether it reduced alcohol consumption.

Methods

We searched Medline and PsychInfo databases for articles published between 1966 and 2001 (see bmj.com for search terms). We also searched the reference lists of relevant reviews, contacted experts by email, and searched the Current Contents database and the Cochrane Library.^{1-4 6 8}

Articles were retrieved if they were individually randomised, cluster randomised, or quasi-randomised trials and non-randomised trials with equivalent groups at baseline; they focused on an opportunistic brief intervention for problem drinking; they had a control group receiving no intervention; they were set in a hospital or specialist outpatient clinic; they had a psychosocial (cognitive or behavioural) intervention; and alcohol consumption was an outcome measure.

Validity assessment and data abstraction

For each trial we assessed randomisation status, the blinding of those assessing outcomes, and the loss to follow up. Corresponding authors were asked to comment on our assessment, and all but one replied.

For each controlled trial, information about the type of intervention and duration, the quality criteria, and the outcome measures was extracted using a



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