Acta Obstet Gynecol Scand 2002: 81: 943–948
Printed in Denmark . All rights reserved

Acta Obstetricia et Gynecologica Scandinavica
ISSN 0001-6349

ORIGINAL ARTICLE

Acupuncture in the management of pain in labor

ELSE SKILNAND[1], DITLEV FOSSEN[1] AND ELI HEIBERG[2]

From the [1]Department of Obstetrics and Gynecology, County Hospital of Oestfold, Fredrikstad, and the [2]Norwegian Institute of Public Health, Oslo, Norway

Acta Obstet Gynecol Scand 2002; 81: 943–948. © Acta Obstet Gynecol Scand 2002

Background. To assess if acupuncture could be a reasonable option for pain relief in labor and to look at possible effects of acupuncture on the progress of labor.
Methods. In a controlled, single blind study, 210 healthy parturients in spontaneous, active labor at term were randomly assigned to receive either real acupuncture or false acupuncture. Visual analog scale assessments were used to evaluate subjective effect on pain. The objective parameter of outcome was the need for analgesic medication in each group.
Results. There were significantly lower mean pain scores and significantly less need for pharmacological analgesia in the study group compared with the control group. The women given real acupuncture spent less time in active labor and needed less augmentation than the control group.
Conclusion. The results indicate that acupuncture reduces the experience of pain in labor. A secondary outcome of acupuncture was a shorter delivery time, which mainly, if not exclusively, can be explained by the reduced need for epidural analgesia. Acupuncture may be useful for parturients who wish a nonpharmacological analgesia without side-effects. For others it could be the analgesic method of choice, with pharmacological analgesics as supplements.

Key words: acupuncture; labor; pain

Submitted 11 March, 2002
Accepted 23 April, 2002

In spite of laboratory evidence documenting a biological basis of acupuncture analgesia and the increasing use of acupuncture for a number of pain conditions, evidence of the effectiveness of acupuncture is still inadequate and partly controversial (1, 2). Acupuncture for labor pain has received little attention in the literature. The majority of the studies consist of case reports and case series. To our knowledge, no randomized, single blind trial of acupuncture during labor has been conducted, despite suggestions that acupuncture might provide good analgesia. WHO, who lists a variety of medical conditions that may benefit from the use of acupuncture, concluded in 1996 that research results were insufficient to provide evidence of efficacy of acupuncture for labor pain (3). Enkin*et al.* came to the same conclusion (4), finding the technique to be complex and time-consuming and that it also immobilizes the woman.

Problems in clinical acupuncture research include the diversity of forms of therapy, individualized treatments, blinding, selecting suitable endpoints and, not least, choosing appropriate controls (1, 5). A commonly used control group is sham acupuncture where the needles are inserted half an inch from the usual location, with the depth of insertion and needle stimulation being the same. However, there is disagreement on correct needle placement. Also, particularly in the studies on pain, sham acupuncture often seems to have either intermediate effects between the placebo and real acupuncture points or effects similar to those

Abbreviations:
VAS: visual analog scale;EDA: epidural analgesia;SD: standard deviation.

of the real acupuncture points (1, 5). Real placebo acupuncture has been defined as a mock acupuncture procedure in which needles are not actually inserted (6). An alternative to sham and real placebo acupuncture is minimal acupuncture which involves needles being inserted away from the usual location, with very shallow needling and very slight stimulation (6). Minimal acupuncture seems to be the nearest that one can possibly come to a reliably inert method of control without renouncing the use of needle insertions. Using a control without needle insertions would exclude the possibility of credible patient blinding. In the present study the method used in the control group, also named false acupuncture group, corresponds to the definition of minimal acupuncture.

The primary aim of this study was to obtain an indication of the efficacy of acupuncture as a treatment for labor pain and, secondarily, to look for possible influences of acupuncture on the progress of labor.

Materials and methods

Our sample for analysis included 210 women enrolled in a randomized, single blind trial of real acupuncture vs. false acupuncture during labor, conducted at the maternity ward of the Hospital Oestfold in Norway for a period of 13 months during 1998/99. The Regional Committee for Ethics in Medical Research and the Ethics Committee of the Norwegian School of Acupuncture/NFKA gave their approval to the study.

Healthy parturients, with singleton cephalic gestation and anticipated normal delivery, presenting in spontaneous, active labor between 37 and 42 weeks' pregnancy, were eligible for participation in this randomized investigation. Three hundred and twenty women were offered to participate; 110 refused the offer. Each woman signed an informed consent, thereby agreeing to participate in an experimental study, accepting the risk of treatment using needles and accepting not to be told to which group they had been assigned, neither before nor during the study. The women were assured that should the allocated analgesia fail to provide adequate pain relief, switching to pharmacological analgesia would be allowed. Women giving written consent were randomly assigned by drawing lots with numbered, sealed, opaque envelopes. Allocation took place after ensuring normal admission-CTG, regular uterine contractions lasting more than 30 s, contraction intervals of 10 min or less, and cervical effacement and cervical dilatation of at least 3 cm. None of the participants had ever been treated with acupuncture. Some characteristics of the groups are described in Table I.

Of the 11 midwifes participating in the study, six had been taught acupuncture for midwives at the Norwegian School of Acupuncture/NFKA. These six gave both real and false acupuncture, whereas the others, who had been trained in acupuncture by the six, were allowed only to give false acupuncture. A midwife other than the one who gave real or false acupuncture managed approximately 60% of the births in both groups entirely or partly. They helped collect pain score data from the laboring women, but were, as far as possible, kept ignorant of the group to which the laboring woman had been assigned.

Real acupuncture treatment consisted of inserting single use, sterile, thin, solid, stainless, steel needles, using a treatment protocol from the Norwegian School of Acupuncture. The needles were inserted into the acupoints in the muscles until *de chi*, a feeling of numbness, tingling and warmth, was achieved. The depth of the needles depended on the place for the acupoint and the thickness of the subcutaneous fat. Stimulation by rotating the needles depended on the degree of needle sensation. The number of needles used varied from two to 12, with seven as average. To avoid immobilizing the woman, most needles in both groups were taped. Taped needles were left in place until conversion to conventional analgesia or delivery, whereas the others were removed after 20 min. Acupoints utilized are indicated in Fig. 1. The same type and number of needles were used for the control group (false acupuncture group), inserting at points that were not on the classical meridians and mainly in areas used for vaccination and other injections (Fig. 1). The method used was synonymous to the definition of minimal acupuncture (6).

Table I. Characteristics of women in labor, 37–42 weeks' pregnant, randomized to receive real acupuncture or false acupuncture

Characteristics	Study group ($n = 106$)	Control group ($n = 102$)	p-value
Nulliparous	50 (47.2)	51 (50)	
Parous	56 (52.8)	51 (50)	
Age			
Nulliparous (year)	25 ± 3.6	27 ± 5	NS
Parous (year)	30 ± 3.9	29.2 ± 4	NS
Previous			
Cesarean section	3	2	
Ventouse/forceps	3	3	
Cervical dilatation (cm) at start of acupuncture			
Nulliparous	4.2 ± 1.1	4.7 ± 1.6	NS
Parous	4.4 ± 1.0	5.0 ± 1.3	0.02

Data are n (%) or mean ± SD.

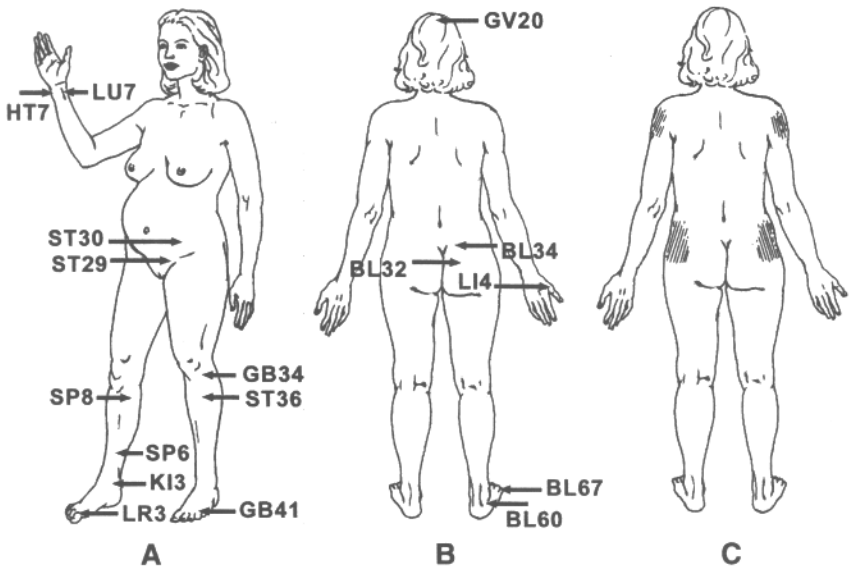

Fig. 1. (A,B) Acupoints used for real acupuncture. The acupoints are numbered according to The Acupuncture Atlas and Reference Book by Low (13). (C) Hatched areas used for false acupuncture.

Pain was assessed using a linear 10-cm visual analog scale (VAS; 0 = no pain, 10 = worst possible pain). Insertion of needles started at a 'pretreatment pain score' equivalent to 3 or more on the VAS. Subsequently the degree of pain was recorded 30 min, 1 h and 2 h after start of treatment. A final recording for the evaluation of the woman's total experience of labor pain was made 2 h post partum.

The needles were removed and evaluation of pain with VAS was stopped if the woman converted to epidural analgesia (EDA), intramuscular pethidine or nitrous oxide inhalation. This could imply measurement of pain after 30 min only. Comparing the needs for traditional analgesia between the two groups assessed the objective analgesic effect of the acupuncture given. Obstetric data and other additional information were abstracted from maternal and neonatal charts.

Before discharge, the women were asked to fill in a questionnaire of how they had experienced labor. Six to eight weeks after delivery eight women from each group were interviewed concerning their birth experience by a midwife who had not been involved in any way during labor.

Statistical comparisons of VAS scores, cervical dilatation at start of treatment and time spent in labor were made by Student's *t*-test. Chi-square test was employed to compare the use of traditional analgesia and the use of oxytocin. $P < 0.05$ was considered to indicate statistical significance.

Results

Of a total of 210 randomized women, 106 were allocated to receive real acupuncture, whereas 104 were assigned to false acupuncture. Two women from the latter group were excluded from the study because they delivered before treatment could be initiated. Distribution of deliveries, conversions to pharmacological analgesia and continued use of acupuncture, 30, 60 and 120 min after time of initiation of acupuncture, is shown in Fig. 2.

There was no significant difference between the groups in the experience of pain assessed immediately before initiation of acupuncture. Visual analog scale recording after start of acupuncture showed a significantly lower mean pain score in the real acupuncture group than in the false acupuncture group at every time of measurement during labor (Fig. 3). A similar result was found at the final recording 2 h post partum when all participants in the trial were asked to indicate the score for their total experience of pain during labor (Fig. 3).

As shown in Table II, there was significantly less need for both EDA and pethidine in the real acupuncture group compared with the false acupuncture group. The last group received EDA as often as the other parturients in our hospital. Although we did not purposely omit giving epidural analgesia after pethidine, none of the women received both pethidine and EDA. However, some in both

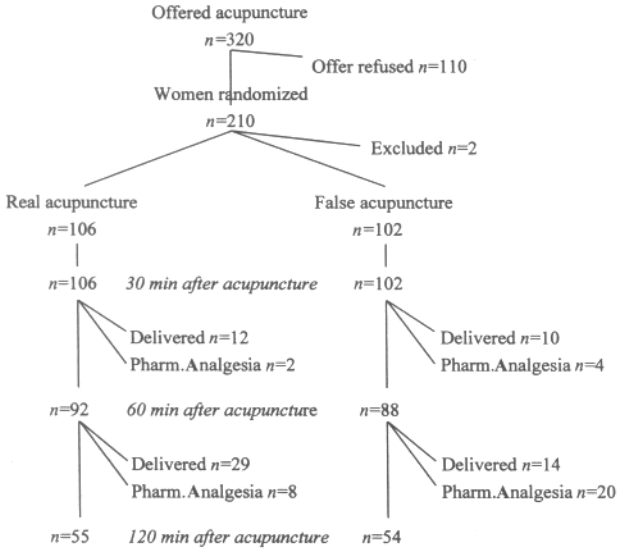

Fig. 2. Women randomized to receive real or false acupuncture. Distribution of deliveries, conversions to pharmacological analgesia and continued use of acupuncture, 30, 60, and 120 min after time of initiation of acupuncture.

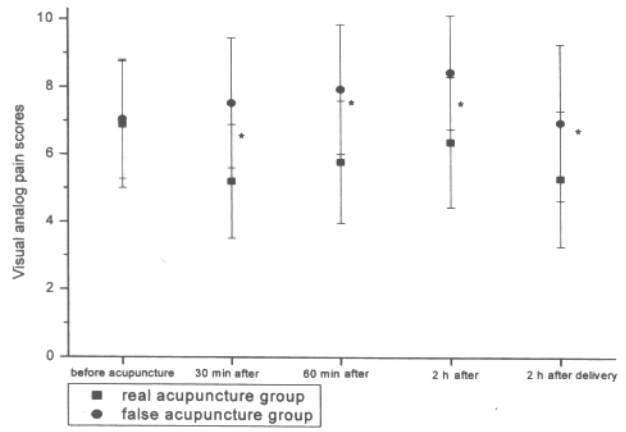

Fig. 3. Visual analog scale pain scores before acupuncture, during labor and 2 h after delivery in women randomized to receive real acupuncture or false acupuncture. Each point represents the mean activity count ±SD. After start of treatment significant differences between the acupuncture group and the control group are indicated as $*p < 0.00$.

categories had nitrous oxide in addition. None had more than one injection of pethidine during labor. Nitrous oxide inhalation was the most frequently used supplement in the study group, in which it was nearly exclusively employed for the last 30 min of the 1st stage of labor. Forty-eight women of the study group did not receive any pharmacological analgesia, compared with 24 in the control group.

The women who received real acupuncture spent significantly less time in labor than those in the control group (Table II). When excluding all cases with EDA (all cases of cesarean section included), the difference in delivery time between the groups was no longer significant (Table II). Oxytocin was used less than half as frequently in the study group than in the control group (Table II). Frequency of operative deliveries and infant outcome (Apgar score) are indicated in Table II.

No adverse effects of the needle insertions were recorded during labor or stay in hospital, and none of the participants reported skin infections after arriving home. Before discharge, 91 women from the study group and 93 from the control group responded to a detailed questionnaire about attention and support during labor. With the exception of three from the first group and two from the other group, all women agreed they had been given very good care. None of the 16 women (eight from each group) who were interviewed thoroughly 6–8 weeks postpartum revealed any knowledge of what were real and false acupoints. Women who reported pain relief from the insertion of needles belonged to the real acupuncture group.

Discussion

The assessments with the VAS used in this study showed that women who had real acupuncture experienced significantly less labor pain than women in the control group. Through its analgesic effect, real acupuncture reduced the requirement for EDA and pethidine, both remedies that can be accompanied by adverse side-effects. Although EDA is an effective method of pain relief in labor, it does prolong labor, increase the incidence of fetal malposition and cause an increased requirement for oxytocin augmentation and instrumental delivery. Epidural analgesia also is associated with an increased incidence of maternal fever, the mechanism of which is not clear (7, 8). Pethidine in therapeutic doses is frequently associated with adverse effects such as nausea, sedation, dizziness and disorientation. Like other opioids it has the potential to produce neonatal respiratory depression (8). The shown effect of acupuncture on labor pain is in agreement with findings of a Chinese and a Swedish study (9, 10) which, to our knowledge, are the only controlled studies having reported an effect on labor pain. In the Chinese study 100 women given acupuncture were compared with 100 controls, all selected retrospectively at random from delivery records. An observer assessed the analgesic effect of acupuncture according to a triple-level pain score scale, but neither the subjects nor the methods applied in treatment and evaluation were reported in detail. The other study (10) assessed the effect of acupuncture during childbirth by comparing the need for other pain treatments in 90 women given acupuncture with that in 90

Table II. Pharmacological analgesia, delivery time from initiation of acupuncture, oxytocin augmentation, mode of delivery and infant outcome (Apgar score) in women randomized to receive real acupuncture or false acupuncture

Variable	Real acupuncture ($n=106$)	False acupuncture ($n=102$)	p-value
Epidural analgesia	11 (10)	27 (26.5)	0.01
Pethidine intramuscular	15 (14)	36 (35)	<0.001
Nitrous oxide	41 (39)	35 (34)	NS
Delivery time (min) from initiation of acupuncture	212 ± 155 ($n=106$)	283 ± 225 ($n=102$)	0.01
Delivery time (min) from initiation of acupuncture, EDA cases excluded	181 ± 112 ($n=95$)	201 ± 144 ($n=75$)	NS
Oxytocin augmentation	15 (14)	36 (35)	<0.001
Spontaneous delivery	95 (90)	86 (84)	NS
Cesarean delivery	3 (2.8)	4 (3.9)	NS
Vacuum/forceps delivery	8 (5.7)	12 (12)	NS
Apgar score after 5 min			
9–10	100	99	
<7	0	1	

Data are *n* (%) or mean ± SD.
EDA = epidural analgesia.

women not given acupuncture. The results were obtained, using an open, nonrandomized study design, where the intensity of labor pain was neither assessed before nor after treatment. The conclusion of the study was that acupuncture reduces the need for other methods of analgesia in labor.

Our finding that acupuncture seems to shorten delivery time, counting from initiation of treatment, is in accordance with the Chinese study. The Swedish study, however, found no influence of acupuncture on delivery time.

No adverse effects of acupuncture were recorded in this trial. Although a broad panorama of adverse events of acupuncture have been reported, the occurrence has been documented to be extremely low (1, 11). Immobilization during treatment was not a problem in this study as most of the needles could be taped.

One hundred and ten of 320 women refused the offer to participate in the study. A frequently stated reason was the wish to receive EDA as soon as possible. Some declined because of fear of needle sticks and a few had decided to cope without any analgesia whatsoever. Women biased against acupuncture were presumably not represented in the study, whereas women willing to accept acupuncture might have included a range of individuals who were neutral or who were biased in favor of the method. A double blind study was impossible to accomplish, owing to the nature of acupuncture. Sham acupuncture in the control group would have matched real acupuncture better than the technique used; however, there is substantial controversy over the use of sham acupuncture, and blinding, nevertheless, seemed to be successful. According to the replies of how they had been taken care of during labor, the groups seemed balanced regarding attention and support.

Visual analog scale is a tool commonly used to quantify pain (12). It gives the respondents the greatest freedom to choose the exact intensity of the pain and an opportunity to express a personal response style. It might be claimed that the demonstrated difference in delivery time between the two groups is doubtful in the light of a small preponderance of parous women in the study group (Table I). However, the significantly larger mean cervical dilatation in the parous women of the control group at start of acupuncture (Table I) should have compensated for the lack of complete matching of parity between the groups. The lack of significance in the difference of delivery time between the groups after exclusion of the EDA cases, indicates that the higher frequency of EDA in the control group is the main explanation and may be the only explanation for the longer duration of labor in this group.

It might be argued that acupuncture is a time-consuming method of analgesia, but in the daily work in the labor ward we consider acupuncture to be an appropriate part of the continuous support that all laboring women should receive. It is a cheap and simple method of analgesia, which neither requires extra surveillance of the fetus nor, as opposed to EDA, assistance from anesthesiologists.

Conclusion

The present study is, to our knowledge, the first randomized, single blind study on acupuncture for

pain relief in labor. It indicates that acupuncture reduces the experience of pain in labor. A shown shortening effect of acupuncture on delivery time seems mainly to be a consequence of reduced need for EDA. A trial with a larger sample size is necessary to clarify whether there is a direct influence of acupuncture on labor progress as well. We consider acupuncture to be useful to parturients who wish a nonpharmacological analgesia without adverse effects. For others it could be the analgesic method of choice, with traditional analgesics as supplements.

Acknowledgments

The authors wish to thank Svetlana Skurtveit (National Institute of Public Health, Oslo) for help with statistics and Astrid Mjoerud, Ingrid Skogvoll, Suki Yong, Inga Leyon and Wenche Jeksrud for their participation in the study.

References

1. NIH Consensus Conference. Acupuncture. JAMA 1998; 280: 1518–24.
2. Ezzo J, Berman B, Hadhazy VA, Jadad AR, Lao L, Singh BB. Is acupuncture effective for the treatment of chronic pain? A systematic review. Pain 2000; 86: 217–5.
3. WHO. Care in Normal Birth. A Practical Guide. Geneva: WHO, 1996.
4. Enkin M, Keirse MJN, Neilson J, Crowther LD, Hodnett E, Hofmeyr JA. Guide to Effective Care in Pregnancy and Childbirth, 3rd edn. New York: Oxford University Press Inc., 2000.
5. Thomas M, Lündeberg T. Clinical updates. Does acupuncture work? Pain 1996; 4: 3.
6. Smith CA, Crowther CA. Acupuncture for induction of labour (Cochrane review). The Cochrane Library 2001: 1.
7. Brownridge P. Treatment options for the relief of pain during childbirth. Drugs 1991; 1: 69–80.
8. Howell CJ. Epidural versus non-epidural analgesia for pain relief in labour (Cochrane Review). The Cochrane Library 2001: 1.
9. Pei D, Huang Y. Use of acupuncture analgesia during childbirth. J Tradit Chin Med 1985; 5: 253–5.
10. Kvorning Ternov N, Lofberg NM, Algotsson L, Akeson J. Acupuncture for pain relief during childbirth. Acupunct Electrother Res 1998; 23: 19–26.
11. Norheim AJ, Fonnebo V. Acupuncture adverse effects are more than occasional case reports: results from questionnaires among 1135 randomly selected doctors, and 197 acupuncturists. Complement Ther Med 1996; 4: 8–13.
12. Thomee R, Grimby G, Wright BD, Linacre JM. Rasch analyses of visual analog Scale Measurements before and after treatment of patellofemoral pain syndrome in women. Scand J Rehab Med 1995; 27: 145–51.
13. Low R. The Acupuncture Atlas and Reference Book. New York: Thorsons Publications Inc, 1985.

Address for correspondence:
Ditlev Fossen
Department of Obstetrics and Gynecology
County Hospital of Oestfold (Sykehuset Østfold)
1603 Fredrikstad
Norway
e-mail: di-foss@online.no