

Clinical Reports

C. PHILIP LARSON, JR., M.D., *Editor*

An Evaluation of Acupuncture Analgesia in Obstetrics

LINDSAY WALLIS, M.B., CH.B.,* SOL M. SHNIDER, M.D.,† RICHARD J. PALAHNIUK, M.D.,‡
HENRY T. SPIVEY, M.D.§

Acupuncture has been practiced in China for more than a thousand years, for both its therapeutic and its analgesic properties.¹ Recent reports have stimulated interest in the value of acupuncture as an alternative to conventional anesthesia.^{2,3} In view of the well-known hazards of anesthesia in the parturient, we evaluated the effectiveness and safety of acupuncture analgesia in obstetrics.

METHOD

The study was designed in two parts. First, we planned to investigate the safety and effectiveness of manual and electrical acupuncture analgesia in volunteer parturients. This was to be followed by a second, controlled study of the efficacy of acupuncture analgesia in treatment and sham-treatment groups. The second study was abandoned when it became apparent that, in our hands, acupuncture failed to provide adequate analgesia.

* Research trainee in Anesthesia.

† Professor of Anesthesia, Obstetrics, and Gynecology.

‡ Assistant Professor of Anesthesia, Obstetrics, and Gynecology, University of Manitoba School of Medicine, Winnipeg, Manitoba, Canada.

§ Research trainee and resident in Anesthesia.

Received from the Departments of Anesthesia, Obstetrics, and Gynecology, University of California, San Francisco, California 94143. Accepted for publication July 1, 1974. Supported in part by USPHS Research Training Grant 5T1 GM00063-04 and USPHS Research Program Project Grant 5P01 GM15571-04. Presented in part at the annual meeting of the American Society of Anesthesiologists, October 9, 1973, San Francisco, California.

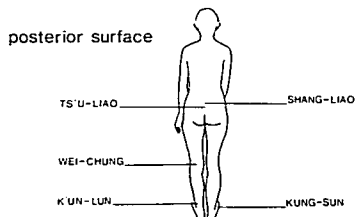
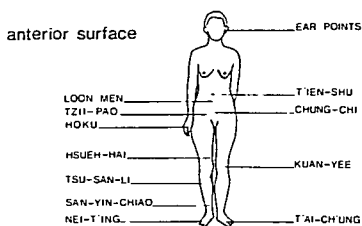


FIG. 1. Sites of acupuncture points chosen by the acupuncturist to provide analgesia during labor. The frequency with which each point was used is shown in table 1.

Acupuncture analgesia was offered to all women attending the antenatal clinic at the University of California Medical Center. The only criteria for selection were that each volunteer be healthy, have an uncomplicated pregnancy, and anticipate normal delivery. Each volunteer gave informed consent after a full explanation of the study protocol. No volunteer was paid. Acupuncture was ad-

TABLE I. Transliterated Names and Approximate Locations of Acupuncture Points Used, and Incidence of Use in Manual and Electro-acupuncture Groups

Acupuncture Point*	Location	Incidence of Use of Each Point	
		Manual Acupuncture (n = 10)	Electro-acupuncture (n = 11)
Ho-ku	Between first and second metacarpals	8	7
Kung-sun	Base of first metatarsal	—	1
San-yin-chiao	4-6 cm above medial malleolus	9	8
Hsueh-hai	Anterior aspect of medial condyle of femur	—	2
T'ien-shu	4 cm lateral to umbilicus	3	—
Tsu-san-li	4-6 cm below and lateral to tibial tuberosity	6	7
Nei-t'ing	Between second and third metatarsals	1	—
Shang-liao	Over first sacral foramen	2	—
Ts'u-liao	Over second sacral foramen	7	4
Wei-chung	Popliteal fossa	1	2
K'un-lun	1 cm posterior to lateral malleolus of fibula	3	3
Chung-chi	1 inch above symphysis pubis	2	—
T'ai-ch'ung	Between first and second metatarsals	1	—
Tzui-pao	2-3 cm medial and inferior to anterior superior iliac spine	5	1
Kuan-ye	Lateral margin of patella	—	3
Loon men	Inferior to umbilicus	—	1
Ear points		—	1

* Each point used bilaterally.

ministered by a Chinese doctor who graduated from the Canton Western Medical School in 1947 and was a professor and supervisor of the Chinese College of Acupuncture, Hong Kong, from 1965 to 1972.

We studied 21 patients, 24.8 ± 2.8 (SD) years of age. The first ten received acupuncture with manual manipulation of the needles (Group I), while the remaining patients received electrical stimulation with the needles (Group II). Electrical stimulation was provided by a battery-operated "Electrical Pulsating Stimulator" (Model 6.26), manufactured in the Peoples' Republic of China. The stimulator generated a rectangular 0.5-sec pulse. We varied the repetition rate between 0.25 and 0.75 Hz. Each patient was instructed to self-adjust the stimulus intensity until a "warm, tingling, or heavy" sensation, or "Tech' i," was felt at the site of the needle.

Sixteen women volunteered during the third trimester of pregnancy and five volunteered while in early labor. The sixteen in the third trimester visited the Chinese acupuncturist before delivery. These visits acquainted them with the acupuncturist and the experimental protocol. At each visit the

acupuncturist performed a "traditional Chinese diagnosis" by palpation of the patient's radial pulses and inspection of her tongue. This information, according to our acupuncturist, later contributed to the selection of appropriate acupuncture points during labor.

Acupuncture treatment was begun during labor as soon as analgesia was requested by the patient. It was continued either until delivery was imminent or until the patient requested conventional analgesia. Immediately prior to acupuncture treatment, the acupuncturist again performed a Chinese diagnosis and chose acupuncture points to "tonify" or strengthen weak meridians. She also chose points which are used to provide acupuncture anesthesia for gynecologic surgery (table I, fig. 1).

For at least 15 minutes before and then during the entire period of acupuncture therapy, we continuously monitored uterine contractions and fetal heart rate using a pressure transducer and ultrasound, respectively.[‡] Similarly, we recorded maternal blood pressure at two-minute intervals by an

‡ Corometric apparatus.

TABLE 2. The Scoring System*

<i>Patient Assessment (Subjective Score)</i>	
4	Pain completely relieved
3	Pain more than 50 per cent relieved
2	Pain less than 50 per cent relieved
1	Pain unchanged
0	Pain worse than before acupuncture treatment
<i>Observer Assessment (Objective Score)</i>	
4	No demonstrable sign of pain
3	Slight grimace at the height of a contraction
2	Moderate complaint during a contraction
1	Little, if any, sign of analgesia
0	Patient's reaction worse than before acupuncture therapy

* A score of two or less was judged to indicate unsatisfactory analgesia.

ultrasonic technique.** Analgesia was assessed by each patient, using a scoring system which compared the pain of every contraction during acupuncture therapy with that before acupuncture was begun. In addition, an anesthesiologist (one of the investigators) observed the patient during each contraction and scored the analgesia (table 2). For each patient a median score was obtained from all subjective and observer scores of analgesia during acupuncture. As scores did not have a "normal" or Gaussian distribution, we considered the median score more appropriate than the mean in assessing the results. The study was terminated as soon as a patient

** Arteriosonde.

TABLE 3. Summary of Subject Information and Results

	Total Both Groups (n = 21)	Group I Manual Acupuncture (n = 10)	Group II Electro-Acupuncture (n = 11)
Age			
Mean \pm SD	25 \pm 3 years	25 \pm 3 years	25 \pm 3 years
Range	(17-29)	(21-29)	(17-28)
Parity			
Primigravida	13	6	7
Secundigravida	8	4	4
Race			
Oriental	3	2	1
Caucasian	18	8	10
Number of prepartum visits			
Mean	3*	2†	3‡
Range	(1-6)	(1-5)	(1-6)
Number of subjects practicing natural-childbirth methods	12	5	7
Cervical dilation (cm)			
Start of treatment	5 \pm 2 cm	5 \pm 2 cm	6 \pm 3 cm
End of treatment	8 \pm 2 cm§	8 \pm 2 cm	8 \pm 2 cm¶
Frequency of contractions during acupuncture	1:3.4 min \pm 1	1:3.4 min \pm 1	1:3.4 min \pm 1
Duration of acupuncture			
Mean \pm SD	59 \pm 43 min	80 \pm 50 min	39 \pm 23 min
Range	(10-180)	(35-180)	(10-90)
Number of subjects requesting alternative analgesia	16	6	10

* n = 16.

† n = 6.

‡ n = 10.

§ n = 20.

¶ n = 10.

FIG. 2. Histogram representing median analgesia scores during acupuncture treatment for all 21 subjects in the study. Subjective and observer scores are shown for each patient. Scores ≤ 2 were considered to indicate inadequate analgesia.

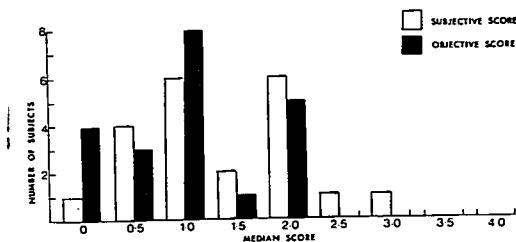
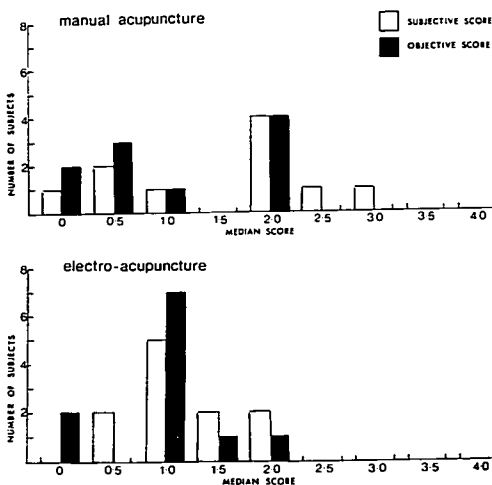


FIG. 3. Histograms representing median analgesia scores during acupuncture treatment for the manual and electro-acupuncture groups. Scores ≤ 2 were considered to indicate inadequate analgesia.



requested additional analgesia and the median analgesia scores were obtained prior to administration of further medication.

The neonate was evaluated by Apgar scores 1 and 5 minutes after delivery and the time to sustained respiration (TSR) was determined. We visited all mothers 24 to 48 hours later to examine for possible complications and to obtain the mothers' retrospective impression of the acupuncture treatment.

RESULTS

There were 13 primigravidas and 8 secundigravidas; 18 patients were Caucasian and

three were Oriental (table 3). The numbers of prepartum visits with the acupuncturist for the 16 patients volunteering in the third trimester ranged from 1 to 6, with a mean of 3. Twelve patients had attended a natural-childbirth training course. The two groups studied were comparable in age, parity, race, number of antepartum visits to the acupuncturist, proportion practicing natural-childbirth techniques, frequency of contractions, and cervical dilation at start and end of acupuncture. However, the mean duration of acupuncture in the manual-stimulation group was 80 minutes, compared with 39 minutes in the electro-acupuncture group ($P < 0.05$).

TABLE 4. Mean Apgar Scores at 1 and 5 Minutes*

	Group I (n = 10)	Group II (n = 11)
One minute	8 (2-10)	8 (6-9)
Five minutes	9 (7-10)	9 (8-10)

* Ranges shown in parentheses.

This difference may be largely explained by the fact that three patients in the electroacupuncture group started acupuncture while in advanced labor and received treatment for 10, 12, and 21 minutes, respectively.

Nineteen of 21 patients had inadequate analgesia, as evidenced by median analgesia scores of less than 2 (fig. 2). Only two patients, both of whom received manual acupuncture, reported median scores greater than 2. Both had practiced a natural-childbirth technique. None of the 21 subjects was judged by the investigators to have adequate analgesia. Alternative methods of analgesia were requested by six patients in the manual and ten patients in the electroacupuncture group. Five patients did not request further analgesia—of these, three practiced natural childbirth methods.

No complication was associated with acupuncture treatment. Acupuncture did not affect maternal blood pressure, uterine contractions, or fetal heart rate. Two neonates were depressed at birth due to obstetric complications (shoulder dystocia in one, precipitous second-stage in the other). All infants had satisfactory Apgar scores at 5 minutes (table 4). Times to sustained respiration were less than a minute in all but the two depressed neonates. No mother experienced any adverse effect such as infection at the needle site, ecchymosis, or residual paresthesias. In retrospect, none of the patients found the acupuncture treatment an unpleasant experience, and none regretted entering the study. In fact, despite negative results, a third of the patients expressed willingness to have acupuncture therapy again for pain during labor in future pregnancies.

DISCUSSION

We have been unable to find reports in the Chinese literature describing acupuncture

analgesia for labor and delivery. In China, acupuncture anesthesia for surgery is reported to be successful in about 70 per cent of patients. However, this success requires careful patient selection, together with indoctrination in political matters and motivation of the patient.³ Patients lacking this cultural background and preanesthetic management have not shown such encouraging results. These requirements suggest that hypnosis may be an important element in successful acupuncture. Furthermore, the successful use of acupuncture to provide anesthesia in China and elsewhere usually is associated with the concomitant use of narcotics, local anesthetics, and sedative drugs.⁴

Our study of manual and electroacupuncture in motivated volunteers indicates that acupuncture does not provide adequate analgesia during labor and delivery. Whether acupuncture might diminish the requirement for conventional obstetric analgesic therapy remains to be determined. It is difficult to develop appropriate controls for acupuncture studies. In a control group the needles might be correctly placed but not stimulated; alternatively, the needles could be placed at inappropriate sites. However, the concept of inappropriate acupuncture may be invalid, as some Chinese and many Western acupuncturists now disregard the meridian theory and consider that acupuncture is effective regardless of needle location. Indeed, many of the new acupuncture points used to provide surgical anesthesia lie off the traditional meridians. Wall has stated that ". . . there is not one scrap of anatomical or physiological evidence for the existence of such a system."⁵

Although there have been reports of side-effects related to acupuncture treatment,⁶ none was noted in our study. However, the costs of the procedure in terms of time, patient education, and personnel involved are considerable.

Any benefits from acupuncture in obstetrics in Western patients are likely, at best, to be modest. It is of interest that obstetric analgesia has been considered by some Chinese sources to be an "abnormal" use of acupuncture⁷ and that natural-childbirth techniques are widely practiced in China, although there have been recent reports of

the successful application of epidural anesthesia of obstetric patients.* Any safe method which reduces requirements for drugs during labor and delivery has merit, and whether acupuncture has this desirable effect has still to be established. Our experience suggests that it will not displace, and is unlikely at present to augment, conventional methods of anesthesia.

In summary, acupuncture analgesia, administered by a trained Chinese acupuncturist, was evaluated during labor and delivery in 21 volunteer parturients. Nineteen of the 21 patients regarded acupuncture treatment as unsuccessful in providing analgesia for labor and delivery; sixteen patients requested alternative methods of analgesia. None of the patients was regarded by the investigators as having adequate analgesia during acupuncture treatment. Acupuncture did not appear to influence the progress of labor or the condition of the fetus or neonate. There was no complication as a result of acupuncture treatment. This study suggests that acu-

puncture analgesia alone will not supplant traditional forms of obstetric analgesia.

The authors thank the acupuncturist, Dr. Shui Wan Wu, for her skillful and competent assistance and for her cooperation throughout the study.

REFERENCES

1. Veith I: Acupuncture in traditional Chinese medicine—an historical review. *Calif Med* 118:70-79, 1973
2. Reston J: *New York Times*, July 26, 1971 and August 22, 1971
3. Dimond EG: Acupuncture anesthesia: Western medicine and Chinese traditional medicine. *JAMA* 218:1558-1563, 1971
4. Jain KK: Glimpses of Chinese medicine, 1971: Changes after the Cultural Revolution. *Can Med Assoc J* 106:46-50, 1972
5. Wall P: An eye on the needle. *New Scientist* 55:129-131, 1972
6. Corbett M, Sinclair M: Acu- and pleuro-puncture. *N Engl J Med* 290:167, 1974
7. Katz R: Proceedings, NIH Acupuncture Research Conference. Edited by HP Jenerick. Bethesda, DHEW Publication No. (NIH) 74-165, 1973, p 88
8. Yui-Fun Lai, Nai-Tung Yang: Lumbar peridural analgesia for labor and delivery. *Chinese Med J, Republic of China* 19:181-188, 1972

Humidification of Anesthetic Gases with an Inexpensive Condenser-Humidifier in the Semiclosed Circle

D. B. WEEKS, M.D.*

Alterations in ciliary cellular morphology¹ and activity² and in pulmonary mechanics³ during endotracheal anesthesia with arid gases have been established. Recent reviews have discussed pulmonary morbidity and presented various humidification systems for supplementing inspired moisture.^{4,5} Most of these systems require electricity or external pressure sources for producing humidity. This paper confirms the suggestion made by Boys and Howells⁴ that condenser-humidifiers, or heat and moisture exchangers (HME), produce sufficient humidity during anesthesia

without the necessity for electricity or external pressure sources.

MATERIALS AND METHODS

The Garthur Vapor Condenser† was selected for this study because it has been demonstrated to be superior to other HME's available.^{6,7} It is readily adaptable to existing anesthesia circuitry, one end accepting 22-mm male fittings and the other, 22-mm female or 15-mm male fittings. For use in this study during general anesthesia with a semiclosed circle, it was placed between the endotracheal tube and Rackow connector (fig. 1).

The HME was evaluated during routine

* Assistant Professor in Anesthesia.

Received from the Department of Anesthesia, Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina 27103. Accepted for publication July 8, 1974.

† Garthur Vapor Condenser (52-00082), Harris-Lake, Inc., 10910 Briggs Road, Cleveland, Ohio.