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Influence of Acupuncture on Duration of Labor

Key Words

Duration of labor
Manual acupuncture

Abstract

The aim of this case control study was to evaluate the thus far controversially discussed influence of acupuncture (AP) on the duration of labor. Fifty-seven women with AP treatment (group A) were included in our study after spontaneous vaginal full-term delivery. The control group included 63 women (group B). Median duration of the first stage of labor was 196 min in group A and 321 min in group B (Wilcoxon 2-sample test, $p < 0.0001$). Median duration of the second stage of labor was 57 min in group A and 57 min in group B (Wilcoxon 2-sample test, $p = 0.82$). Thirty women had a premature rupture of the membranes (PROM), in group A 66.7% and in group B 33.3% (χ^2 test, $p = 0.02$). Women without AP (group B) received significantly more often oxytocin during the first stage of labor compared with group A women (85 and 15%, respectively, χ^2 test, $p = 0.01$) as well as during the second stage of labor (72 and 28%, respectively, χ^2 test, $p = 0.03$). Our study suggests that AP treatment is a recommendable form of childbirth preparation due to its positive effect on the duration of labor, namely by shortening the first stage of labor.

Introduction

Acupuncture (AP) is a technique commonly used in obstetrics and gynecology for the treatment of various disorders including female infertility [1] and dysmenorrhea [2]. AP is also used as antiemetic therapy in pregnancy [3] and during chemotherapy of cancer patients [4]. Effective stimulation of clearly defined acupuncture points mediates the sensation De Qi, resulting in activation of nerve receptors [5]. Neural structures are necessary for AP to be effective. Consequently, complete denervation has been shown to totally suppress the effect of AP [6]. Several distinct brain stem nuclei have been identified that may play a role in AP-mediated analgesia [7, 8]. Few studies so far

have evaluated the biochemical response to AP treatment [9–11].

AP has recently enjoyed a rapidly increasing popularity as an attractive complementary treatment in the prenatal preparation. Few data exist concerning the effect of AP on the duration of labor and the available results are discussed controversially. Kubista and Kucera [12] concluded that the median active delivery phase calculated as the time between a cervical dilatation of 3–4 cm and delivery of the infant was significantly shorter in the group of women prepared for delivery by weekly acupuncture compared with a control group. In contrast, Lyrenäs et al. [13] concluded that acupuncture treatment before delivery did not shorten the delivery time. AP treatment

seemed to cause a prolonged labor most obviously indicated in the second stage of labor. Vacuum extractions were performed more commonly in the AP treatment group than in the control group because of the prolonged second stage of labor ($p < 0.05$).

Since the report by Lyrenäs et al. [13] in 1987, no further studies have reported on the effects of AP in prenatal preparation. The aim of the present study was to evaluate the controversially discussed influence of AP on the duration of labor.

Materials and Methods

One hundred and sixteen primiparous women receiving AP treatment during the last 4 weeks before term have been incorporated in this study. An information meeting took place in the 35th week of gestation. Inclusion criteria were nulliparity, an uneventful pregnancy and a spontaneous vaginal delivery. Women with diabetes ($n = 2$), pregnancy-induced hypertension ($n = 2$), or breech presentation ($n = 3$) were excluded. Further exclusion criteria for our study were rhesus incompatibility, multiple pregnancy, fetal growth retardation, malformation, cervical ripening with prostaglandins, and poor obstetric history.

The following parameters were assessed: duration of the first stage of labor, defined as the time interval between 3 cm of cervical dilatation and complete dilatation, duration of the second stage of labor, defined as the time interval between complete cervical dilatation and delivery of the fetus, premature rupture of the membranes (PROM), defined as the rupture of membranes before the onset of labor, time interval between rupture of membranes and delivery, the use of analgesics (pethidin, injected intramuscularly) during labor, frequency of epidural anesthesia, frequencies of episiotomy, perineal tear and laceration of the vagina and finally intravenous application of oxytocin in the first and second stages of labor. The type of analgesia and anesthesia was chosen by obstetrician as the need arose. No restriction was made on the type of analgesia or anesthesia given. The vacuum extraction rate was evaluated for all women ($n = 116$) undergoing AP treatment. The result was compared with the average vacuum extraction rate at our department during the same 6-month period.

AP was performed as body acupuncture. The needles were positioned at the points Du 20 (Bai Hui) – corresponding to the posterior fontanelle; He 7 (Shen Men) – distal wrist crease radial of the tendo of the musculus flexor carpi ulnaris; Pe 6 (Nei Guan) – 2 cun proximal from the wrist crease between the tendo of musculus flexor carpi radialis and palmaris longus, which are supposed to be effective in sedating and relaxing [14]. Bilateral application was used. Sterile stainless AP needles were inserted and manually twirled until the ‘De Qi’ effect was obtained. The treatment was given with the women in a resting side position. Each session lasted for 20 min. One session per week was done for 4 consecutive weeks beginning in the 36th week of gestation. A minimum of four sessions was recommended.

Treatment Group

Fifty-seven women with AP treatment (group A) were included in our study after spontaneous vaginal full-term delivery. These women

participated additionally in other forms of antenatal preparation. Twenty-seven women were excluded due to the admission to the delivery unit with more than 3 cm of cervical dilatation. Furthermore, 12 women were excluded because they received less than four AP treatments.

Six women underwent vacuum extraction and in 7 cases cesarean section was performed. Induction of labor by cervical ripening with prostaglandins was performed in 7 cases because of primary inertia uteri. All of these women were not included in our study.

Control Group

This group (group B) was constituted by selection of the nearest primiparous women who delivered before or after the AP-treated women. This procedure was chosen to ensure that the conditions in the delivery ward would be similar to the conditions of the AP-treated group. The control group consisted of 63 women. All women participated in several forms of antenatal courses.

Subgroups

Group C ($n = 48$) included AP-treated women who received no oxytocin during the first and second stages of labor. Women ($n = 41$) without AP treatment and without oxytocin infusion were summarized in group D.

In order to avoid a bias in statistical evaluations caused by the influence of PROM on the first stage of labor, we built two further subgroups. Thirty-seven women received AP treatment and had no PROM (group E). Group F included women without AP treatment and no PROM ($n = 53$).

Statistical Analysis

Statistical analysis was performed by the Wilcoxon 2-sample test for comparison of the medians between groups A and B, C, and D, and E and F. Differences in the frequencies were assessed using the χ^2 test. Statistical significance was determined at the $p < 0.05$ level.

Results

Median duration of the first stage of labor was 196 min in group A (range 40–600) and 321 min in group B (range 60–685) Wilcoxon 2-sample test, $p < 0.0001$). Median duration of the second stage of labor was 57 min in group A (range 7–185) and 57 min in group B (range 12–221) (Wilcoxon 2-sample test, $p = 0.82$). Median duration of the interval between rupture of the membranes and delivery was 376 min in group A (range 10–1,200) and 194 min in group B (range 10–7,800) (Wilcoxon 2-sample test, $p = 0.30$). Thirty women had a premature rupture of the membranes. In group A 66.7% of the women ($n = 20$) had a PROM, and in group B 33.3% ($n = 10$) (χ^2 test, $p = 0.02$).

Women without AP ($n = 11$) received significantly more often oxytocin during the first stage of labor compared with group A women ($n = 2$) (85 and 15%, respectively, χ^2 test, $p = 0.01$). In group A 28% of the women ($n = 7$) received oxytocin during the second stage of labor, and in group B 72% ($n = 11$) (χ^2 test, $p = 0.03$).

In group A only 1 woman received an epidural anesthesia and in group B 2 women (χ^2 test, $p = 0.62$). Analgesia was given in 13 cases (47%) in group A and 54% of the women ($n = 15$) in group B received pethidin (χ^2 test, $p = 0.89$).

In group A 33% of the women ($n = 19$) underwent an episiotomy and in group B 25% ($n = 16$) (χ^2 test, $p = 0.34$). Perineal tear occurred in 13 cases in group A (23%), and in 18 cases in group B (29%) (χ^2 test, $p = 0.04$). In group A 21% of the women ($n = 12$) and in group B 16% of the women ($n = 10$) had a laceration of the vagina (χ^2 test, $p = 0.46$).

In the AP-treated group vacuum extractions were performed in 6 cases (5.2%). The indications were the lack of delivery progress ($n = 3$) and fetal distress ($n = 3$). We found no difference in the rate of vacuum extractions comparing the AP-treated group and the average vacuum extraction rate at our department (4.6%, 40/1,527) (χ^2 test, $p = \text{n.s.}$).

Median duration of the first stage of labor was 190 min in group C (range 40–460) and 297 min in group D (range 60–685) (Wilcoxon 2-sample test, $p < 0.0001$). Median duration of the second stage of labor was 51 min in group C (range 7–185) and 45 min in group D (range 12–108) (Wilcoxon 2-sample test, $p = 0.11$). Median duration of the interval between rupture of the membranes and delivery was 225 min in group C (range 10–1,530) and 138 min in group D (range 10–7,800) (Wilcoxon 2-sample test, $p = 0.30$).

Median duration of the first stage of labor was 200 min in group E (range 5–420) and 340 min in group F (range 85–685) (Wilcoxon 2-sample test, $p < 0.0001$). Median duration of the second stage of labor was 57 min in group E (range 8–185) and 55 min in group F (range 12–221) (Wilcoxon 2-sample test, $p = 0.72$). Median duration of the interval between rupture of the membranes and delivery was 98 min in group E (range 10–345) and 116 min in group F (range 10–360) (Wilcoxon 2-sample test, $p = 0.78$).

Discussion

In our study we found that AP-treated women had a significantly shortened duration of labor. This difference was limited to the first stage of labor. Our findings suggest that AP treatment has an effect on the cervix, inducing a more rapid maturing of the cervix. This is in contrast to the results of Lyrenäs et al. [13] who found no beneficial effect on the maturation of the cervix. The comparison of

our findings concerning the duration of the first stage of labor with previous reports is difficult because of the lack of an established definition of the first stage of labor [12, 13]. There is no objective method available to ascertain when effective myometrial contractions start. The first stage of labor is said to commence when uterine contractions of sufficient frequency, intensity and duration are attained to bring about readily demonstrable effacement and dilatation of the cervix. In contrast to Lyrenäs, we defined the first stage of labor as the time interval between 3 cm cervical dilatation and complete dilatation.

In our study we found a significantly increased frequency of PROM in the AP-treated group. Our findings of a more rapidly maturing cervix confirm the suggestion of Nelson et al. [15] that PROM may actually accelerate the maturation process. The natural course of PROM is labor. In term deliveries PROM is not associated with an elevated rate of complications for mother and the fetus [16]. After excluding PROM cases from the statistical evaluation, we still found a statistically significant shortened first stage of labor in the AP-treated group confirming the positive effect of AP on the cervical maturation. PROM induced by AP was not considered a negative factor. PROM arises from a multifaceted and multistep process [17–20]. Although our data indicate an influence of AP on PROM, the biochemical basis of the influence of AP treatment on the pathophysiological process remains unclear and needs further investigations.

In our study we found no difference in the duration of the second stage of labor between the AP-treated women and the controls. Furthermore, there was no difference in the vacuum extraction rate at our department. In contrast, Lyrenäs et al. [13] reported that AP treatment seemed to cause a prolonged second stage of labor and that the use of oxytocin tended to be more frequent in the AP-treated group. In our study AP-treated women significantly less often needed oxytocin, both in the first and second stages of labor, compared with the controls.

These different results may be due to the different acupuncture points chosen in both studies. The accurate anatomical knowledge of these points and its correct puncture are indispensable to get satisfactory therapeutically effects and to avoid iatrogenic bias.

In summary, our study suggests that AP treatment significantly shortens the duration of labor and effectively reduced the need for oxytocin. We conclude that AP treatment is a recommendable form of childbirth preparation.

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