

Comparison and Efficacy of Auricular Point Acupressure with Auricular Patches on Lactation in Nulliparous Postpartum Cesarean Delivery Parturients at Thammasat University Hospital: A Randomized Controlled Trial

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Objective: To compare the lactation enhancing effect of auricular acupressure with or without a magnetic plate on post-cesarean nulliparous parturients.

Materials and Methods: The present study was a randomized controlled trial conducted in the obstetrics ward of Thammasat University Hospital, Pathum Thani, Thailand between February and July 2022. Participants were term nulliparous pregnant women aged between 20 and 40 years old who underwent cesarean delivery. They were allocated into three groups, namely magnetic (M), non-magnetic (NM), and control groups. The standard care plan for post-cesarean cases was applied to all patients. Participants in both M and NM groups were assigned to receive auricular acupressure using auricular patches with and without magnetic plates, respectively. The ear pinna has five specific auricular points, namely chest (AH10), endocrine (CO18), stomach or Wei (CO4), spleen or Pi (CO13), and sympathetic points (AH6a). The treatment began immediately after counseling and continued for seven days. The onset of the first lactation, lactation visual assessment (LVA) level was collected using the survey form. Exclusive breastfeeding was encouraged at a rate of every three hours to meet newborn demands. The onset of lactation was assessed within three hours after auricular acupressure and every time before breastfeeding.

Results: Seventy-five pregnant women were recruited and allocated with 25 cases per group. Mean maternal age was 30 years. The demographic characteristics of the three groups were comparable. There were more participants in the M group had onset of lactation within 24 hours, than in the control group significantly, at 20 versus 13, respectively ($p=0.039$). Onset of LVA level 1, 2, and 4 in the three groups were comparable. The onset of LVA level 3 in the M group was significantly faster than the control group ($p=0.023$). Satisfactory lactation and auricular acupressure among M and NM groups were comparable.

Conclusion: Auricular acupressure with magnetic plates significantly enhanced lactation onset and lactation visual volume (level 3) in post-cesarean nulliparous parturients. It merits consideration to be included in routine practice.

Keywords: Cesarean delivery; Postpartum lactation; Auricular acupressure

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Nowadays, the cesarean delivery rate increases every year throughout the world. In Thailand, the

cesarean rate was between 30% and 50%⁽¹⁾. This exceeds the World Health Organization's (WHO) recommended rate of 10% to 15%⁽²⁾. Parturients who undergo cesarean delivery can suffer from both surgical and anesthetic adverse effects that result in delayed onset of lactation or even failure to initiate breastfeeding^(3,4). Such challenges should be managed effectively to alleviate difficulties through multidisciplinary methods to ensure successful breastfeeding.

Breast milk is an excellent source of essential nutrients and antibodies for neonates in early life after birth. The consumption of breastmilk by newborns can prevent certain childhood illnesses during early years. Breastfeeding enhances parent and child

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bonding. This is important for the physical and psychological development of the child. The WHO and the United Nations Children's Fund (UNICEF) recommend that every newborn should be exclusively breastfed for the first six months of life. Perceiving delayed onset of milk expression or insufficient milk production could induce maternal stress and anxiety. The aforementioned reason could cause patients to discontinue breastfeeding⁽⁵⁾.

To ensure exclusive breastfeeding for new mothers, using medication, avoiding unnecessary cesarean delivery, or implementing alternative treatments should be considered. In Asian countries, traditional Chinese medicine (TCM) was acknowledged and practiced for thousands of years. Acupuncture and acupressure are methods of TCM that are well-known and accepted in Thailand. However, TCM applications may need to be investigated for appropriate practice in modern medicine⁽⁶⁾.

In TCM, illness occurs due to an imbalance in the flow of Yin-Yang energy (Qi or Chi)⁽⁶⁾. According to TCM, the disproportion of energy and blood flow to the liver was believed to be the cause of insufficient breast milk expression^(6,7). The acupoint stimulation method, either by acupuncture or acupressure, has been used in TCM to treat clinical illness by triggering somatic reflexes and balancing the flow of Chi⁽⁸⁾. Acupuncture and acupressure are currently used as alternative treatments for pain. However, galactorrhea was also reported following acupressure during pain treatment.

According to neurophysiological theory, each area on the pinna, as microsystemic representative area, represents a specific organ in the body⁽⁸⁾. By applying pressure to these areas, it is believed that sympathetic impulses are sent to the brain and its corresponding organs through meridians, restoring Yin-Yang harmony and relieving illness^(8,9). There was no report of insufficient breast milk in patients who underwent acupressure for postpartum pain management⁽¹⁰⁾. Insufficiency of breast milk production could be treated by acupressure at specific points⁽¹¹⁾. Positive effects of acupressure on postpartum lactation were reported in studies^(12,13).

The present study aimed to evaluate the effect of auricular acupressure on the onset of lactation using the auricular patch. Primary and secondary outcomes were to investigate the effectiveness and suitability of auricular acupressure for the onset of lactation.

Materials and Methods

This randomized controlled trial was conducted in the obstetrics ward of Thammasat University Hospital, Pathum Thani, Thailand between February and July 2022. Ethical approval was obtained from the Ethics Committee on Clinical Research of the Faculty of Medicine, Thammasat University (MTU-EC-OB-2-280/63). The Thai Clinical Trials registration number was TCTR20220114003.

The inclusion criteria were term nulliparous pregnant women aged between 20 and 40 years who underwent cesarean delivery. Informed consent was obtained from each participant. The subjects with contraindications for breastfeeding, auricular lesions, breast lesions, unstable vital signs, repeated exploratory laparotomy within 24 hours, and the use of lactation enhancing drugs were excluded.

Study design, assessments, and treatment

Near-term pregnant women aged between 20 and 40 years old were recruited during the visit to the antenatal care clinic. Subjects were counseled and thoroughly explained about lactation after giving birth. The idea of auricular acupressure was introduced to each participant. Informed consent was signed upon admission to the labor room. When the attending physician decided to perform cesarean delivery, the allocation was randomly generated, printed, and kept in an opaque envelope. The opening of the envelope was performed by the attending nurse who did not participate in the study and the number was attached to the medical chart.

Randomization was done by running numbers one to three that refer to each specific group as Control, Magnetic (M), Non-magnetic (NM), and concealed in opaque envelopes with the same appearance. The accepted participants were asked to choose the letter and then revealed the number openly. Methods of each group's treatment were then informed in a single-blind technique. No one knew the method in the other groups.

All participants were divided equally into three groups, control, magnetic, and non-magnetic. Neuraxial anesthesia was accomplished by anesthesiologists. The standard care plan for post-cesarean, namely vital sign monitoring, early ambulation, mother-baby bonding, pain management, and surgical wound care, was applied to all patients. The acupressure intervention was initiated within four hours after the operation while the mother was fully conscious. Before applying auricular patches, both pinnae were cleansed using a cotton ball moistened

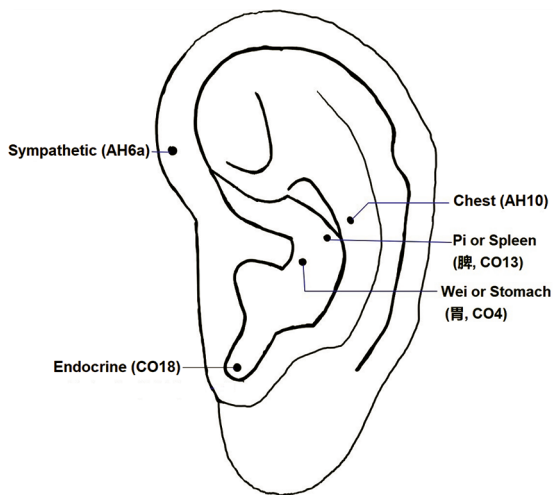


Figure 1. Auricular acupoint for stimulate lactation.

with 75% alcohol. Material components of the auricular patch were fabric material with an adhesive glue size of 5 mm in diameter and a round magnetic plate size of 1 mm (FENG FAN®, Hengshui Fengfan Medical Device Trading Co. Ltd., Hengshui, China).

Participants in both M and NM groups had the auricular patches applied with or without magnetic plates on both pinnae at five specific points by a certified doctor of TCM or an OB&GYN resident trained in acupressure, who was a single operator. Each pinna contained five designation points for acupressure, namely chest point (AH10), endocrine point (CO18), stomach or Wei point (CO4), spleen or Pi point (CO13), and sympathetic point (AH6a) (Figure 1). These acupoints were demonstrated in the information sheets as a picture of the ear with specific points for further understanding.

The method of auricular acupressure was instructed and demonstrated in both participants of the study groups. At each point, the pressure was applied using the index finger alone or with the thumb. The pressure on each studied acupoint was applied on both ears simultaneously in a swirling massaging motion at a rate of 60 times per minute until the participant felt slightly heated or irritated on the site (approximately for three minutes). The next point was manipulated in the same manner until the five points on both ears were massaged. This was counted as one cycle. Five cycles of auricular acupressure were needed each day. Additional cycles could be performed if and when the subject wanted to. The treatment began immediately after counseling and continued for seven days.

Clinical information was collected using the

survey form that contained sets of questions about demographic data, fetal weight, time of surgery, time of acupressure, the onset of first lactation, the lactation visual assessment (LVA) level⁽¹⁴⁾, and the LATCH score⁽¹⁵⁾. Satisfaction with milk volume production and accessibility of auricular acupressure were also recorded at 72 hours after delivery.

LVA level was recorded. Level 1 was the condition that the nipple was moistened without a drop of milk seen. Level 2 was classified as the presentation of one or two drops of breast milk. The presence of three or more drops of breast milk without flow after pinching the nipple was classified as level 3. Numerous breast milk ejections and flow were classified as level 4⁽¹⁴⁾.

The onset of lactation was appointed equal to LVA level 1. LATCH scoring system was a standard tool designed to assist healthcare providers for evaluating breastfeeding techniques and problems. Assessment was provided in five aspects, namely latching, audible swallowing, type of nipple, comfort, and holding. Each element had a score ranging from 0 to 2. The maximum LATCH score was 10 points⁽¹⁵⁾.

Exclusive breastfeeding was encouraged to be offered every three hours to meet newborn's demand. The onset of lactation was assessed within three hours after auricular acupressure and every time before breastfeeding. Methods of breast milk extraction and LVA level were given to attending nurses and participants.

The instruction for breast milk extraction was to put the index finger and opposing thumb next to the areolar area, press both fingers against the chest wall, then pinch once. Both breasts were extracted and the one with a higher lactation level was recorded in a survey handed to the participants. The complication of auricular patch usage could be noted in the form.

Phone calls were made to patients after discharge to assist if there were any questions with using the method of auricular pressure. The information about fetal and maternal well-being, LVA level, and method of baby feeding were also obtained and recorded for seven days. The single assessor made all phone calls and recorded phone information in the present study.

Statistical analysis

Anticipated populations were calculated by G*Power, version 3.1.7 (UCLA, LA, USA) using the statistical method of Fixed effects, omnibus, one-way ANOVA. The effect size was set at the level of 0.5 (medium). The margin of error was set at the level of 5%. The number of anticipated participants needed

Table 1. The demographic character of participants

	Control (n=25)	NM (n=25)	M (n=25)	p-value
Age (years); mean±SD	29.0±4.2	30.0±3.4	30.5±4.02	0.405
GA (days); mean±SD	271.5±5.0	269.24±6.5	271.4±6.2	0.310
BMI (kg/m ²); n (%)				0.521
Underweight (<18.5)	2 (8)	2 (8)	4 (16)	
Normal (18.5 to 22.9)	15(60)	11(44)	9 (36)	
Overweight (>23.0)	8 (32)	12 (48)	12 (48)	
Underlying disease; n (%)				0.301
None	20 (80)	23 (92)	18 (72)	
Diabetes mellitus	3 (12)	2 (12)	3 (12)	
Others	2 (8)	0 (0)	4 (16)	
Occupation; n (%)				0.478
Government officer	8 (32)	6 (24)	8 (32)	
Self-employed	7 (28)	7 (28)	11 (44)	
Employee	10 (40)	12 (48)	6 (24)	
Education; n (%)				0.662
Undergraduate or below	7 (28)	10 (41)	9 (36)	
Bachelor or more	18 (72)	15 (60)	16 (64)	

SD=standard deviation; GA=gestational age; BMI=body mass index

Control group: no adhesive tape; Non-magnet group (NM): plain adhesive tape, Magnet group (M): adhesive tape with magnetic plate, Others: HBV infection, thalassemia, allergic rhinitis, hypertension

to meet the statistical significance was 66 cases with 22 cases per group. For data loss compensation, the number of subjects enrolled was 25 cases per group.

The statistical program was a statistical package for the SPSS Statistics for Windows, version 17.0 (SPSS Inc., Chicago, IL, USA). The chi-square test and Fisher's exact test were used to compare the categorized data. ANOVA test or Kruskal-Wallis test was used to compare the means and median of measurement variables, depending on the type of distribution. A p-value of less than 0.05 was set for statistically significant. For two groups analysis, Mann-Whitney U test or t-test was used depending on the distribution of the data. Results were presented in tables and boxplot graphs.

Results

Seventy-five parturients were randomized and divided equally into three groups as shown in Figure 2. The mean maternal and gestational ages of all participants were 30 years and 38.5 weeks, respectively. Approximately 10% (8/75) of the cases had underweight body mass index (BMI). Eighty-three percent (61/75) had no underlying disease. Two-thirds of participants (49/75) had an education level of a bachelor's degree or more. The mean demographic characteristics between groups showed no statistical difference as presented in Table 1.

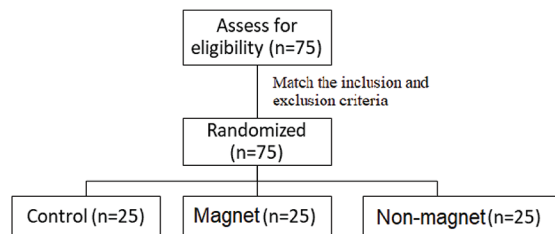


Figure 2. Flow chart of participants in the present study.

Control: no adhesive tape, Magnet: adhesive tape with plastic bead, Non-magnet: plain adhesive tape

Neuraxial spinal block was the choice of anesthesia given to all subjects while experiencing cesarean operation. The three groups had comparable characteristic data of abdominal incisional type, operative time, and estimated blood loss as demonstrated in Table 2. Nearly 80% of participants (59/75) in the present study continued exclusive breastfeeding at least seven days after delivery without statistical significance. The newborn's body weight was measured and recorded after 48 hours, and the three groups were in the physiological range, with no weight loss greater than 7%. The LATCH score (0 to 10) represents the maternal-newborn's breastfeeding ability. A LATCH score of at least 8 was considered to be proper. Less than 10% of parturients (6/75) had LATCH score equal to or less than 7 points

Table 2. Obstetrics history of participants

	Control (n=25)	NM (n=25)	M (n=25)	p-value
Transverse incision; n (%)	16 (64)	11 (44)	18 (72)	0.145
Time (minutes); mean±SD	38.6±10.9	42.4±12.3	37.9±8.04	0.274
EBL (mL); mean±SD	396.2±158.4	414.6±147.6	472.9±186.4	0.637
BW at birth (g); mean±SD	3,244.1±520.0	3,062.2±497.1	2,926.0±939.7	0.262
BW at 48-hour (g); mean±SD	3,055.8±520.0	2,912.7±472.9	2,794.2±900.9	0.378
LATCH at 72-hour (10); n (%)				0.257
8 or lower	5 (20)	2 (8)	1 (4)	
9 or higher	20 (80)	23 (92)	24 (96)	
EBF after 7 days; n (%)	17 (68)	19 (76)	23 (92)	0.108
Onset of lactation; n				
Before 24 hours	13	18	20	0.039* 0.149**

SD=standard deviation; EBL=estimate blood loss; BW=newborn birth weight; EBF=exclusive breastfeeding

Control: no adhesive tape, Magnet group (M): adhesive tape with magnet plate, Non-magnet group (NM): plain adhesive tape, Time: operative time, LATCH: breastfeed assessment score, Acceptability: satisfactory score after usage

* M versus control, ** MN versus control

at 72 hours after delivery, which was not statistically significant. Nearly 80% of the participants (59/75) continued exclusive breastfeeding until the day 7 postpartum period. The three groups had no statistically significant percentage of exclusive breastfeeding.

The number of cases presented onset of lactation within 24 hours in the control, M, and NM group were 13, 20, and 18, respectively, with statistical significance as shown in Table 2. Satisfaction of participants in breast milk lactation volume of all three groups were comparable as presented in the box plot (Figure 3). Both magnetic and non-magnetic had high acceptability of auricular acupressure without statistical significance as shown in Figure 3.

The median onset of lactation level at level 1 by LVA score were 18.9, 12.1, and 12.7 hours in control, M, and NM groups, respectively, without statistical significance. The three groups had a comparable time of lactation at level 2 as shown in Figure 4.

At LVA level 3, women in the M group had significantly shorter onset than the control group ($p=0.023$). Three-quarters of the control group had a more prolonged onset than the median time of the M group. The three groups had comparable time onset of level 4 lactation as shown in Figure 4. No adventitious effects such as pain, inflammation, and discomfort, from the use of auricular patches were reported in the current study.

Discussion

The patients participated in the present study

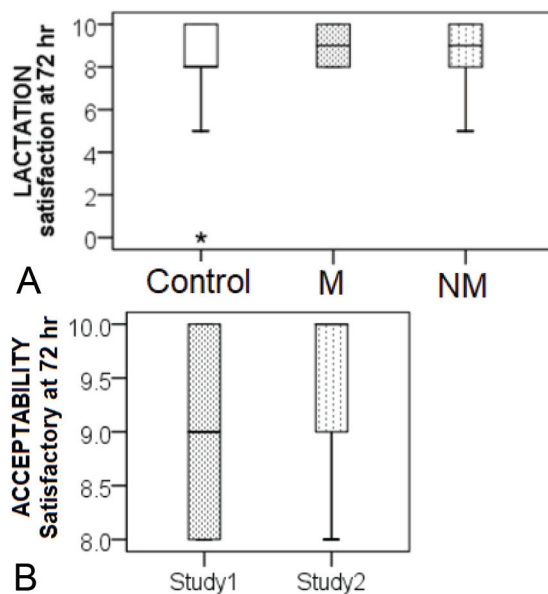


Figure 3. Satisfactory score in lactation (A) and acceptability of auricular pressure (B) by the mean scale of ANOVA test and exact t-test in box plot.

Control: no adhesive tape, Non-magnet group (NM): plain adhesive tape, Magnet group(M): adhesive tape with magnetic plate

were nulliparous pregnant women. This was to minimize the interference of lactation effects from prior pregnancy to the study. Auricular therapy has been reported to improve breastfeeding in literature from China. It helped shorten the lactation onset and increase breast milk volume⁽¹²⁾. Among Thai people's perception, auriculotherapy means painful needles penetrating through the body, as acupuncture. To

Table 3. Comparison of acupressure in parturients

Study	Hai-yan	Cankaya	Esfahani	Mohammadpour	Erfina	Anita	Lu	Present
Years	2009	2018	2015	2018	2019	2019	2019	2022
Country	China	Türkiye	Iran	Iran	Indonesia	Indonesia	China	Thailand
Age (years)	20 to 40	18 to 41	20 to 40					20 to 40
Parity					Nulli	Nulli	Nulli	Nulli
GA (weeks)	Term	≥37	Term	29 to 36	Term	Term	36 to 40	≥37
Delivery		C/S		C/S			C/S	C/S
Cases	118	100	60	50	80	30	80	75
Point	Ear1	Body	Foot	Hand	Foot	Foot	Foot	Ear2
Material	Seed	Hand	Hand	Hand	Hand	Hand	Hand	Magnet
Duration (days)	5	3	12	6	7	3	2	7
Onset (hours)		2.8						33
BMV	Increase		Increase	Increase	Increase		Increase	Increase
PRL						Increase	Increase	

GA=gestation age; BMV=breast milk volume; PRL=prolactin; C/S=cesarean delivery; Nulli=Nulliparous

Material: material for acupuncture; Time: duration of intervention; Onset: onset of the first lactation; Ear1: Auricular point AH10, CO4, CO12, CO3, TF4; Ear2: Auricular point AH6a, AH10, CO04, CO13, CO18

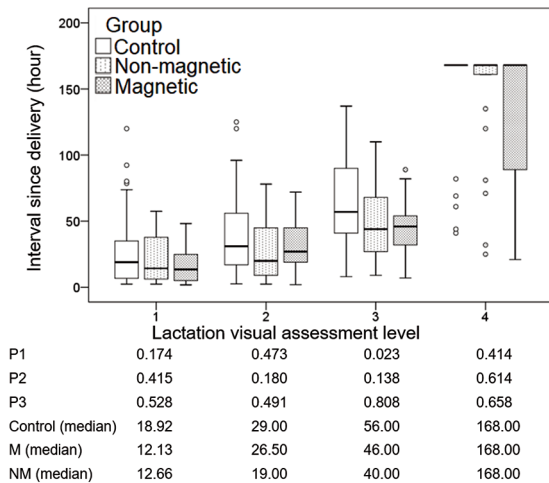


Figure 4. Effect on lactation visual assessment level by a generalized linear model for Kruskal-Wallis test in box plot

Control: no adhesive tape, NM: Non-magnetic group, M: Magnetic group, P1: P-value of the M group compared with the control group, P2: P-value of the NM group compared with the control group, P3: P-value of the M group compared with NM group, * median

minimize the fear of pain from needle acupuncture, auricular acupressure was used in the present study for enhancing lactation⁽¹²⁾. Auricular acupressure is easy to practice, accessible, and appropriate for prolonged application with very minimal side effects.

Since the pinna had no subcutaneous fat deposit, the BMI of the participant was not affected by the result of auricular acupoint⁽¹⁶⁾.

The pinna has multiple acupressure points, which represent body organs according to TCM⁽⁸⁾.

When the specific auricular point was stimulated, it triggered the somatic reflex to balance the Qi or Chi energy, and restored body function. Auricular points AH10, CO18, CO4, CO13, and AH6a were selected to promote lactation in the present study⁽⁸⁾.

The number of participants reported the onset of the first lactation within 24 hours in the M group (20/25) was higher than in the control group (13/25) significantly. The NM group, however, had lower number of participants (18/25) who witnessed the onset of first lactation than the M group and showed no statistical significance when compared to the control and M group. The greater number of participants who had lactation within 24 hours in the M groups could encourage the patients to continue breastfeeding and stimulate their baby. At level 2 of LVA, all groups had a comparable time of onset. At LVA level 3, participants in the M group had a significantly shorter onset than the others. At this level, the amount and quality of breast milk were sufficient for newborns⁽¹⁴⁾. The magnetic plates increased the accuracy of the massages when compared to those without plates. The massage's precision and pressure thus increased and showed better effects when compared to massages without magnetic plates.

In previous studies, as shown in Table 3, body acupuncture and acupressure had been reported. Seyhan reported from Türkiye in 2018 that body acupressure at specific points (AH10, CO4, CO12, and CO3) could shorten the onset of lactation to 2.8 hours⁽¹⁷⁾. Athena from Iran in 2018 reported that

hand acupressure for six days could increase breast milk volume⁽¹³⁾. Four pieces of literature from Iran, Indonesia, and China reported that foot acupressure for two to twelve days⁽¹⁸⁻²¹⁾ could increase breast milk volume. Increased prolactin level was also reported by foot acupressure in China and Indonesia^(20,21). Hai-Yan's study from China in 2009 reported that auricular acupressure with seeds could enhance breast lactation in the cesarean delivery parturients. The current study using magnetic plates for auricular acupressure also supported Hai-Yan's report. Chen's systemic review reported that auriculotherapy in postpartum women is associated with earlier lactation and reduced risk of low milk production.

Nowadays, Chinese medicine is accepted worldwide as an alternative treatment and supplement therapy. Auricular acupressure was used widely in TCM to treat illnesses. However, the mechanism of the remedy remained unclear. The knowledge of auriculotherapy was studied and adapted to suit modern use and thus, shown to be effective in studies. These five specific auricular points were selected according to the Department of Thai traditional and alternative medicine. The effect on lactation from auricular acupressure was shown as the time onset of lactation was shortened and the milk volume was increased as expected.

The strengths of the present study were randomized control trials, and all participants were in good health and well-educated with a bachelor or higher, and with the ability to communicate in Thai. The acupoint marking, auricular acupressure method, breast pinching, and visual milk evaluation were done under a single investigator to reduce the bias. Auricular acupressure did not interfere with breastfeeding nor disturb the mother's well-being with an invasive method or time-consuming.

The limitation of the present study is that auricular acupressure is not the sole factor that influences lactation. Cesarean delivery is a surgical operation. Parturients have to be observed in the operating department until stable, which delays the time for first breastfeeding, which could be the cause of delayed lactation.

From the present study, the authors concluded that auricular acupressure at points AH10, CO18, CO4, CO13, and AH6a could induce the onset of lactation within the first 24 hours. The use of auricular patches with magnetic plates increases the pressure and accuracy of the acupressure when compared to massaging without a magnetic plate. Auricular patches help locate the specific points for

self-massages. Auricular acupressure is an alternative method that is easy to practice, non-invasive, low cost, and should be promoted in modern practice to help post-cesarean with delayed lactation problems. In the present study, auricular acupressure in the designation points was shown to shorten the time onset of lactation and visually increase the milk-producing volume.

The LVA level showed that auricular acupressure over these points helps post-cesarean mothers. It can be seen that there is a significantly shorter onset of lactation and increased milk volume, therefore, these results can be used to support the application of TCM in the postpartum women.

Conclusion

Auricular acupressure with magnetic plates significantly enhanced lactation onset and lactation visual volume (level 3) in post-cesarean nulliparous parturients.

What is already known on this topic?

Cesarean delivery rates have increased steadily in recent years. Delayed onset of lactation or even failure to initiate breastfeeding are commonly found in patients who underwent cesarean delivery. To ensure exclusive breastfeeding, using medication, avoiding unnecessary cesarean delivery, or implementing alternative treatment should be considered. In TCM, imbalance in the flow of Yin-Yang energy (Qi or Chi) is believed to be the cause of disease or abnormal condition. The acupoint stimulation method is used in TCM to balance the flow of Chi. Insufficiency of breast milk production can be treated by acupressure at specific points. Positive effects on postpartum lactation were reported in studies from specific acupoint stimulation.

What does this study add?

Auricular acupressure at points AH10, CO18, CO4, CO13, and AH6a can reduce the onset of lactation within the first 24 hours and visibly increase volume of lactation. Auricular acupressure with magnetic plates significantly enhanced lactation onset and lactation visual volume (level 3) in post-cesarean nulliparous parturients. Convenience, low risk, non-invasive nature, and very low procedure and material cost of auricular acupressure patch should be noted.

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Conflicts of interest

The authors declare no conflict of interest.

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