

The Effect of LI14 Acupressure on Children Undergoing Painful Procedures and Infants' Apgar score: An Overview

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Abstract

Background

Non-pharmacological methods of pain relief are widely used in some societies/places today. They are readily available, inexpensive and uncomplicated methods that have an acceptable efficacy. Acupressure is one of these methods which is a branch of acupuncture. The aim of this study is to assess the effect of LI14 acupressure on children and infants undergoing painful procedures and infants' Apgar score.

Materials and Methods: In this overview, the research was conducted by screening the relevant articles evaluating the effect of LI14 acupressure on children undergoing painful procedures and the application of LI14 acupressure during labor on infants' Apgar score. The electronic databases included Scopus, EMBASE, Cochrane, Web of Science, and Medline with no language or time restrictions (until March 10, 2020).

Results: LI14 acupressure is safe and effective in improving pain in children undergoing tonsillectomy, insertion of cannula, immunization, and IV insertion in pediatric patients with thalassemia. However, LI14 acupressure changed Apgar scores at one and five minutes.

Conclusion

LI14 acupressure is a safe and effective method in improving pain relief in children undergoing painful procedures. According to the results, the use of He Gu point acupressure can be suggested as a non-pharmacological method to relieve pain in children.

Key Words: Acupressure, Apgar score, LI14, Children, Pain.

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1- INTRODUCTION

Suffering from illnesses and hospitalization are among the earliest crises in a child's life (1). These crises expose children to a variety of uncomfortable and unfamiliar feelings, which will result in negative consequences because of the children's limited experience and comprehension ability (1, 2). Due to the significance of pain in children, the International Association for the Study of Pain in the United States has labeled pain the fifth vital sign, and named the period of 2000-2010 as the pain control decade (2).

Non-pharmacological pain relief methods are currently being widely used in some communities and are accessible, affordable, easy, and efficient. One of these methods is acupressure—a branch of acupuncture- which has a long history and is known to be the third most popular method in the world for relieving the pain in infants and mothers as well as the pain induced diseases (painful diseases). Acupressure involves massaging the acupuncture points and is most commonly used for pain relief (3). He Gu is a pressure point related to the large intestine energy channel called the large intestine 4 (LI4) (4). This pressure point is located in the hand's cutaneous membrane between the thumb and the index finger (on the midpoint of the bisector of the angle formed between the first and second metacarpal bones). This area is the most useful analgesic acupuncture point and its stimulation can relieve pain anywhere in the body (5).

Pain is a conscious perception induced by environmental stress. It is a health issue and counts as one of the essential/natural components/experiences of life, especially in children. Adaptation to aggressive medical care is one of the substantial principles in treating children (6). Effective pain control in infants and children is of critical importance since the

sensory area in their brain has the most activity. In infants, the pain transmission pathways are fully developed unlike the pain inhibitory systems (7). There are several non-pharmacological methods, including distraction, mental and physical relaxation, step-by-step imagination, and skin stimulation to relieve the pain and reduce the required analgesics dosage (6). Pharmacological treatments of pain are not recommended for infants due to concerns about their side-effects. Therefore, non-pharmacological pain relief methods can be very useful for this age group and must be considered in treatment (7).

In this regard, studies have emphasized that non-pharmacological pain relief methods (such as acupuncture and acupressure) do not bring about any side effects and pose no risk for infants (8, 9). Acupressure is a 5000-year-old treatment method. Acupressure methods and using/simulating the traditional Chinese medicine meridian points can resolve the imbalance of body's vital energy and, therefore, result in pain relief, reduced muscle contraction, improved blood circulation, vital body activities, and reduced vital symptoms induced by anxiety (10). Evidence indicates that administering acupressure and ice massage on the He Gu point has resulted in pain relief in many cases (9).

According to Chung et al. (2003), results indicate that acupressure on the He Gu point can relieve pain immediately, half an hour, and one hour after being administered (11). Despite the evidence on the acupressure's benefits, there is no comprehensive review of the effectiveness of He Gu on infants undergoing painful procedures and Apgar score to familiarize healthcare staff and parents with this pain relief method. Therefore, this study aims to review the effect of acupressure on LI-14 (Bi Nao) on children undergoing painful procedures and infants' Apgar score.

2- MATERIALS AND METHODS

This study aimed to review the effect of LI4 acupressure (Bi Nao) on children undergoing painful procedures and infants' Apgar score. Our research included these keywords: acupressure, LI-4, Bi Nao, infants, pain, children, and Apgar score. Similar keywords were extracted from MeSH and also through manual search by reviewing the titles and abstracts of the articles. After determining the keywords, two researchers searched the electronic databases of Scopus, Web of Science, EMBASE, and Medline via PubMed with no language or time restrictions (until March 10, 2020). To access the rest of the papers, the articles' references were reviewed manually. Additionally, Google and Google Scholar search engines were also checked for confidence. Finally, the articles gathered from each database were imported into EndNote X8.

3- RESULTS

9 studies were selected for reviewing.

3-1. LI4 acupressure for children during painful procedures

In the study by Jayaraman et al., ice was applied on LI4 acupressure point five minutes prior to the immunization for 30 seconds and then repeated twice after the rest of 60 seconds. They showed that acupressure with ice is safe, and effective in improving pain (12). Babu et al., studied the effect of LI4 acupressure 5 minutes prior and during the insertion of cannula level on two groups of children from 1 to 6 years old. Both groups received routine care during IV cannula insertion, and one group received additional acupressure. They found that the intensity of pain was lower in acupressure group than the control group (13).

Pouraboli et al., found that the pain intensity during and after the intervention with LI4 acupressure and ice (group 1),

and massage and ice (group 2) was significantly lower in comparison with the control group ($p=0.0001$) during IV insertion in pediatric patients with thalassemia (14). Yaghoubi et al. assessed the effectiveness of acupressure on physiological indicators of pain in children undergoing tonsillectomy. They found that LI4 (He Gu) acupressure was more effective than the two control and shame groups in improving heart rate ($p = 0.001$), respiratory rate ($p= 0.001$), and arterial oxygen saturation ($p = 0.001$) (15).

3-2. The effect of LI4 acupressure during labor on Apgar score

Ozgoli et al. found no statistically significant difference in Apgar scores at one ($p=0.57$), and five minutes ($p=0.625$) among three groups (LI4 , BL32 and control) (16). In Dabiri et al.'s study, no statistically significant difference was observed in Apgar scores at one and five minutes between three groups (touching, acupressure and control) ($p=0.621$) (17). Mohamed Ali et al. found that the Apgar score >8 in the first and 5th minutes was more frequent in the supportive care and LI4 acupressure groups compared to the control group and the difference was statistically significant ($p<0.001$) (18). In Hamidzadeh et al.'s study, there were no significant differences between LI14 group and control group for neonatal Apgar scores at one and five minutes ($p= 0.2$, and $p= 0.3$, respectively) (19). In Khavandizadeh et al.'s study, no significant difference was found regarding Apgar score in LI14, and control groups in the first and 5th minute ($p>0.05$) (20).

4- DISCUSSION

Considering the importance of LI4 acupressure for children, we reviewed the results of the studies on the impact of LI4 acupressure on children undergoing painful procedures. The reviewed studies suggested that LI4 acupressure is safe and

effective in improving pain in children but it changes the Apgar scores at one and five minutes after birth. Children are the most valuable assets for the future and can be viewed as capital for a society. According to global statistics, over 40% of the global population consists of children, which marks them as the most populated age group. Children younger than 15 make up 28% of the world population (2).

The importance and value of this age group both for the parents and for the society requires healthcare providers to take effective measures for relieving their pain during painful medical procedures. Applying pressure on LI4 (He Gu) acupressure point is an effective and cost-efficient method to this important end. The LI4 point is located on the back of the hand, at the midpoint of the bisector of the angle formed between the first and second metacarpal bones, i.e., between the thumb and the index finger. Studies have reported the popularity of acupressure in some communities to relieve various types of pain such as pain of vaccination in children and labor in mothers (1, 2, 5).

The results of the study by Ranjkesh et al. (2019) on the impact of SP6, LI4, He-7, and Neima Acupressure revealed that acupressure did not have a significant impact on the average duration of the first and second stages of labor in the intervention group compared with the control group ($p < 0.05$, the labor outcome showed no significant difference between the two groups ($p < 0.05$)) (3). Jayaraman et al. (2018) studied the effect of ice application in reducing pain perception of toddlers during immunization. They found that the application of ice on LI4 acupressure point five minutes prior to the immunization for 30 seconds then repeated twice after a rest of 60 seconds showed that acupressure with ice is safe and effective in improving pain (12). Babu et al. (2016) studied the LI4 acupressure intervention for 5 minutes prior and

throughout the IV insertion of cannula level among children of 1-6 years in addition to the routine care. Pain intensity was lower in the group receiving LI4 acupressure than the control group (13). The results of Pouraboli et al.'s study (2015) showed that pain severity during and after intervention with LI4 acupressure plus ice (group 1) and massage plus ice (group 2) was significantly lower in comparison with the control group ($p = 0.0001$) during IV insertion in pediatric patients with thalassemia (14). Yaghoubi and Pouy (2019) studied the effectiveness of acupressure on physiological indicators of pain in children undergoing tonsillectomy.

LI4 (He Gu) acupressure showed more effectiveness than the two control and shame groups in improving heart rate ($p = 0.001$), respiratory rate ($p = 0.001$), and arterial oxygen saturation ($p = 0.001$) (15). Ozgoli et al. (2016) studied the effect of LI4 and BL32 acupressure on labor pain and delivery outcome in the first stage of labor in primiparous women. No statistically significant difference was observed in Apgar scores at one ($p = 0.57$), and five ($p = 0.625$) minutes among three groups (LI4, BL32, and control) (16).

Dabiri and Shahi (2016) in their study on the effect of LI4 acupressure on labor pain intensity and duration of labor reported no statistically significant difference in Apgar scores at one and five minutes in the three groups (touching, acupressure and control) ($p = 0.621$) (17). The results of Mohamed Ali et al.'s study (2017) showed that the frequency of Apgar score > 8 in the first and 5th minutes was higher in the supportive care and LI4 acupressure groups compared to the control group and the difference was statistically significant ($p < 0.001$) (18). Hamidzadeh et al. (2017) studied the effects of LI4 acupressure on the length of delivery time, mothers' physiologic responses, and newborns' Apgar scores and found no significant difference

between the LI14 and control groups for neonatal Apgar scores at one and five minutes ($p>0.05$) (19). Khavandizadeh et al. (2010) found no significant difference regarding Apgar scores in the LI14 and control groups in the first and 5th minute ($p>0.05$) (20). Applying ice on injured body parts is considered a standard treatment for bleeding, trauma, inflammation, and soft tissue damages. Danny Brown demonstrated that cooling can block nerve conduction in neural pathways, and Marshal discussed the use of ice massage in treating chronic ocular herpes pain. In another study, Malzik found that the sensory impulses induced by massaging the He Gu point with ice alleviated toothache by 50%. Researchers believe that the impact of ice massage is due to the involvement of the gate control of pain system (21).

5- CONCLUSION

LI4 acupressure is a safe and effective method in reducing pain in children undergoing painful procedures. He Gu point acupressure and application of ice on LI4 acupressure point can reduce the intensity of pain in children. The results suggest the usefulness of He Gu point acupressure as an effective non-pharmacological method to relieve pain in children.

6- CONFLICT OF INTEREST: None.

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