

## Original Article

# *Effects of Acupressure on Sleep Quality After Coronary Artery Bypass Surgery*

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### ABSTRACT

**Background:** Sleep disturbances are common following coronary artery bypass graft surgery (CABG). Nowadays, nonmedical therapies are considered along with medical therapies for sleep disturbances. The aim of this study was to evaluate the effects of acupressure on sleep quality in patients after CABG.

**Methods:** This randomized controlled trial assigned 60 patients admitted to the intensive care unit after CABG to 2 groups. Each group comprised 30 patients, with the experimental group receiving acupressure on 5 different solar points for 5 to 15 minutes during 2 consecutive postoperative days and the control group receiving only sedative drugs on request. Sleep quality was measured the day before and after CABG using the St Mary's Hospital Sleep Questionnaire (SMHSQ) in both groups. An SMHSQ score 9 is normal and 36 is the worst sleep quality.

**Results:** According to the obtained data, before the intervention, the median (interquartile range) score for sleep quality was 15 (13–17) in the experimental group and 14 (13–14) in the control group; therefore, there was no statistically significant difference between the 2 groups ( $P = 0.689$ ). However, following acupressure, the scores changed significantly: the SMHSQ score rose to 14 (13–14) in the experimental group, while it remained at 23 (23–25) in the control group—suggesting a reasonable difference in sleep quality between the 2 groups after CABG ( $P = 0.001$ ). Also, the average difference in the control group's score (+9 points) before and after the intervention period was more than that of the acupressure group (-1 point).

**Conclusions:** Our findings showed that acupressure improved sleep quality in patients in the intensive care unit after CABG surgery. (*Iranian Heart Journal 2017; 18(3):28-34*)

**Keywords:** Sleep quality, Coronary artery bypass surgery, Complementary therapies, Clinical trial

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Coronary artery disease (CAD) is the leading cause of death in adults worldwide.<sup>1</sup> It is anticipated that CAD will be the first cause of sudden death by 2020.<sup>2</sup> The vast majority of CAD cases do not respond to medical therapies suitably and consequently surgery is still the best way to treat these patients. Pain, stress, anxiety, and sleep disturbances are common complications after coronary artery bypass graft surgery (CABG). All of these factors can affect the treatment and quality of life after surgery.<sup>3</sup> Sleep in patients undergoing CABG is affected by different elements such as suture line pain, chest wall pain, and high levels of anxiety during hospitalization.<sup>4</sup> This situation persists for 2 to 4 days after most noncardiac surgeries and may even last for months after cardiac surgeries, if left untreated.<sup>5</sup> Sleep disturbances can deteriorate normal life and, in addition to mental problems, they can certainly impair the daily activities of a healthy person.<sup>5</sup> Sleep is a regular, reversible, frequent, and physiological event that decreases consciousness and incapacitates skeletal muscles.<sup>6</sup> Sleep disturbances can be treated by different ways such as medical therapies or nonmedical therapies (eg, physical and mental treatments).<sup>7</sup> Currently, common therapies are correlated with drugs and medications, but studies have revealed that there is no substantial difference among patients who use medications in comparison with others who instead choose nonmedical therapies.<sup>3-7</sup> Consequently, because of the complications of medications such as dementia, drug dependency, and drug resistance, it is reasonable to use nonmedical therapies.<sup>4</sup>

One of the new ways to treat sleep disturbances is complementary medicine, including acupressure.<sup>8</sup> Acupuncture and acupressure are procedures that have been accepted by the World Health Organization (WHO) in various types of studies. Acupuncture is one of the main subdivisions

of traditional Chinese medicine.<sup>8</sup> Acupuncture and acupressure have been confirmed by the WHO in a variety of studies. Acupuncture needs experts to perform, and acupressure is almost a safe technique.<sup>10</sup> Acupressure by virtue of releasing neurotransmitters and mediators provides a great bioenergetic balance, leading to improvements in such postoperative discomforts as sleep disturbances.<sup>11</sup> Some researchers have demonstrated enhancement in sleep quality due to acupressure and shown that it is effective in patients suffering from CAD. There have also been reports that acupressure has positive effects on postmenopausal women and confers significant improvement in patients under dialysis. Seeking a way to boost sleep quality in post-CABG patients via a non-pharmacological measure, we conducted the present study to evaluate the effects of acupressure on this group of patients. Accordingly, this study was done to analyze the hypothesis that acupressure improves sleep quality in patients following CABG.

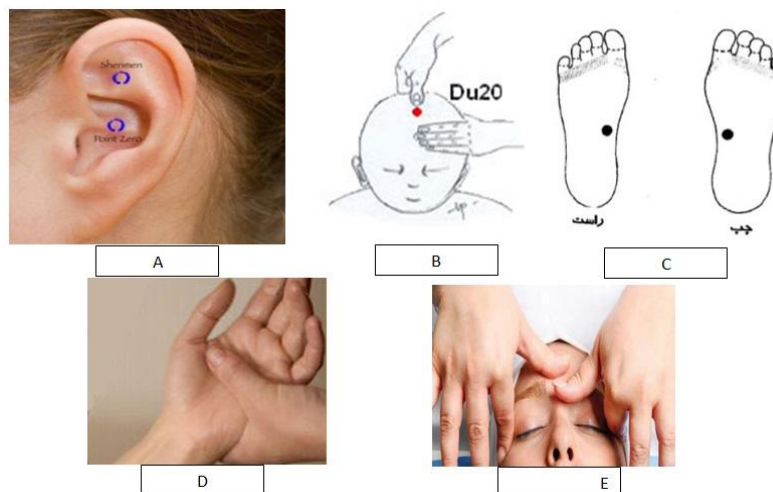
## METHODS

This randomized control trial was conducted from March 2015 to September 2016 in a university hospital. Informed consent was obtained from the participants, who met the inclusion criteria of the present study. Sixty patients were randomly allocated to 2 groups: control and acupressure. The inclusion criteria were comprised of patients' consent, first-time isolated CABG, and any non-emergent cardiac surgery with cardiopulmonary bypass. The exclusion criteria consisted of lack of any abnormalities in the acupressure points, mental abnormalities, sleep disturbances, intra-aortic pump, intubation during the preceding 24 hours, chest tube bleeding more than 200 cc per hour, and refusal to continue the study.

Sleep quality was assessed in the study population using the St Mary's Hospital Sleep Questionnaire (SMHSQ), which contains 11 questions correlating with sleep pattern disturbances. The SMHSQ provides 4 grading scales: not at all (0 point), rare (1 point), few (2 points), and so much (3 points). In addition, the questionnaire contains 3 descriptive questions and 9 graded questions. The lowest point is 9, denoting normal sleep quality, and the maximal point is 36, denoting high-grade sleep disturbances. The points between 9 and 18 suggest mild disturbances, between 19 and 28 moderate disturbances, and between 29 and 36 severe disturbances. The validity and reliability of the test (Persian translation) were assessed by Abolhasani (2003) with a Cronbach's alpha of 0.91 [Abolhasani S. *Effect of sensory stimulation on sleep deprivation symptoms and cardiac index in patients admitted to coronary care unit selected hospitals of Isfahan University of Medical Sciences: MSc Thesis*] Isfahan: Isfahan University of Medical Sciences; 2003.]

The patients in the control group received 1 mg of lorazepam upon request for sleep. The questionnaires were filled in with the aid of our colleagues, who were not aware of the group allocation. Twenty-four hours after surgery, the control group was asked to fill in the questionnaire for the first night and then 2 days later in the morning. On the other hand, 24 hours after surgery, the patients in the acupressure group were asked to answer the questions. After the completion of the questionnaire, acupressure therapy was performed close to the patients' sleeping time (7–8 pm) on 2 consecutive days. This intervention was performed by our experts, certified for massage therapy and traditional medicine. During the intervention, acupressure was implemented on solar points. Finally, on the morning following the 2 nights of intervention, another questionnaire was filled again. The massaging of each spot lasted between 1 and 3 minutes (15 min on average).

The key acupressure points are depicted in Figure 1.



**Figure 1.** Key acupressure points. A: solar network inside ears; B: area of the red dot on the forehead; C: solar network on the sole of feet; D: solar network on the palm of hands; and E: solar network on the scalp

### Statistical Analysis

The collected data were entered into IBM SPSS Statistics for Windows, version 20.0

(IBM Corp, Armonk, NY, USA). The One-Sample Kolmogorov–Smirnov test was used to analyze the normal distribution of the data.

The sleep quality scores were not normally distributed; thus, nonparametric tests were utilized to compare them between the 2 groups. The  $\chi^2$  test was used for the categorical variables, and the Wilcoxon test and the Mann–Whitney  $U$  test were employed for the statistical analysis of the nonparametric data. A  $P$  value equal to or less than 0.05 was considered statistically significant. The continuous data were presented as means  $\pm$  standard deviations (SDs), while the nonparametric data were shown as medians (interquartile ranges). The categorical variables were demonstrated as numbers (%).

## RESULTS

There were no statistical differences regarding the demographic parameters between the control and acupressure groups (Table 1). Nonetheless, there was a difference as regards the patients' occupation between the 2 study groups ( $P = 0.026$ ). History of cigarette

smoking was reported by 33.7% of the control group and 13.3% of the acupressure group ( $P = 0.063$ ) (Table 1).

The median (interquartile range) of the sleep quality scores before intervention was 14 (13–14) in the control group and 15 (13–17) in the acupressure group, indicating no significant difference ( $P = 0.689$ ). After the intervention, the median of the sleep quality points was 23 (23–25) in the control group and 14 (12–17) in the experimental group, which showed a significant difference between the 2 groups following the intervention. This finding suggested a reasonable difference in sleep quality between the control and acupressure groups after CABG ( $P = 0.001$ ). Also, the average difference in the experimental group (+9 points) before and after acupressure was more significant than that of the control group (-1 point) ( $P = 0.091$ ). The differences in the sleep quality scores before and after the intervention in the acupressure and control groups are illustrated in Table 2.

**Table 1.** Demographic and clinical variables of the study groups

Group	Acupressure Group (n=30)	Control Group (n=30)	$P$
Age(y)*	53.1 $\pm$ 7.5	55.3 $\pm$ 6.9	0.909
Sex			
Male	21(70%)	19(63.3%)	0.580
Female	9(30%)	11(36.7%)	
Cigarette smoking	4 (13.3%)	11(33.7%)	0.063
Opium addiction	2(6.7%)	3 (10%)	0.640
Education level			
illiterate	9(30%)	6(20%)	0.717
elementary	11(36.7%)	19(63.3%)	
high school	10(33.3%)	5(16.7%)	
Daily activity			
low	10(33.3%)	11(36.7%)	0.383
moderate	15(50%)	18(60%)	
high	5(16.7%)	1(3.3%)	
Intubation time (h)	5.9 $\pm$ 3.6	7.1 $\pm$ 3.9	0.221
Occupation			
housewife	9(30%)	11(36.7%)	0.026
government employee	5(16.7%)	0	
self-employed	12(40%)	8(26.8%)	
retired	4(13.3%)	11(36.7%)	
Aortic cross-clamp time (min)	42.6 $\pm$ 6.7	44.1 $\pm$ 6.1	0.368
Cardiopulmonary bypass time (min)	69.4 $\pm$ 10.7	71.3 $\pm$ 11.2	0.504
Operation time (h)	4.2 $\pm$ 0.4	4.4 $\pm$ 0.5	0.093

\*Independent  $t$ -test was used to compare the continuous variables and the  $\chi^2$  test was used to compare the categorical ones.

**Table 2.** Sleep quality scores before and after the intervention in both study groups

	Acupressure Group		Control Group	
	Before	After	Before	After
Sleep quality Score [median (IQR)]	15(13-17)	14(12-17)	14(13-14)	23(23-25)
Score difference before and after the intervention	-1(0-1)		+9 (9-12)	
Test result : (within group before/ after changes)	P=0.091		P<0.001	

## DISCUSSION

The present study was an attempt to demonstrate the beneficial effects of acupressure on sleep quality (low SMHSQ score) in post-CABG patients in the intensive care unit. Our findings showed that sleep quality was better maintained in the acupressure group than in the control group. Our results chime in with those reported by Bagheri Nesami et al <sup>1</sup> (2014), Shafiei et al, <sup>2</sup> and Hossein Abadi et al (2008). A previous study reported the suitable effects of acupressure on sleep quality in the geriatric population. <sup>6</sup> Another study by Ozgoli et al <sup>8</sup> (2012) on the effects of acupressure on sleep quality in postmenopausal women reported results that are concordant with our findings. As a result, sleep quality substantially differs after and before intervention. <sup>8, 13</sup>

Castro-Sanchez et al <sup>14</sup> conducted a semi-experimental investigation on 59 patients suffering from fibromyalgia. In their experimental group, a 90-minute massage therapy was performed each week for 20 weeks. The authors reported significant differences concerning sleep quality between their 2 study groups before and after the intervention, which is consistent with our results.

One of the merits of the study by Castro-Sanchez et al <sup>14</sup> in comparison with the study by Wang et al <sup>15</sup> is that whereas acupuncture effects were assessed in 44 eligible women with insomnia through an invasive procedure in the latter study, a noninvasive therapy was performed in the former study. Additionally, in the study by Wang and colleagues, the patients had to be directly in touch with the

needles during the procedure, which must have caused stress and fear.

The fact that during the acupuncture procedure patients should remove their clothes poses problems in religious and cultural terms. In the current study, we avoided that problem by performing the procedures without necessitating the removal of garments. The WHO has confirmed the use of acupressure and acupuncture in 100 different instances. Nevertheless, because acupuncture requires that patients remove their clothes during the procedure and the intervention is considerably invasive and may, thus, cause HIV and hepatitis transmission, there is a high tendency to use acupressure over acupuncture. <sup>6, 10</sup>

In our study, sleep quality in the control group deteriorated after the intervention by comparison with the baseline. This finding per se indicates that sleep disturbances may increase immediately after CABG. On the other hand, we know that patients who undergo CABG are prone to stress stimulators, which over time influence all the aspects of their lifestyle and lessen their quality of life. This, in turn, can cause irreversible damage to the different systems of the patients' body. It is, therefore, advisable that such damage be prevented through the utilization of complementary medicine in addition to routine medical treatments.

## CONCLUSIONS

Acupressure (a branch of traditional medicine) augmented sleep quality among our post-CABG patients. We found that 15

minutes of acupressure before bedtime substantially promoted sleep quality among our study population. Acupressure is educable and executable for patients and hospital personnel. Furthermore, it is a harmless and inexpensive approach that can not only improve sleep quality among patients but also reduce the adverse effects of palliative and sedative drugs and their side effects. There was no evidence of any complication after acupressure in this study.

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### REFERENCES

1. Bagheri Nesami M, Heydari Gorji MA, Rezaie S, Pouresmail Z, Yazdani Chorati J. The effect of acupressure on the quality of sleep in patients with acute Coronary syndrome in CCU. *Iran J Crit Care Nurse* 2014;7(1):7-14.
2. Shafiei Z , Nourian K, Babae S , Nazari A. Effectiveness of light pressure stroking massage on pain and fatigue of patients after coronary artery bypass graft surgery-A randomized clinical trial. *J ClinNurs Midwifery* 2013; 2 (3): 28-38.
3. Flavia Baggio Nerbass, Maria Ignez Zanetti Feltrim, Silvia Alves de Souza, Daisy Satomi Ykeda, Geraldo Lorenzi-Filho. Effects of massage therapy on sleep quality after coronary artery bypass graft surgery. *CLINICS* 2010;65(11):1105-1110.
4. Mitchisson AR, Kim HM, Rosemberg JM, Geisser M, Kirsh M, Cikrit D, et al. Acute postoperative management using massage as an adjuvant therapy. *Archive Surgery*. 2007;142:1158-67, doi: 10.1001/archsurg.142.12.1158.
5. Rosenberg J. Sleep disturbances after non-cardiac surgery. *Sleep Med Rev*. 2001 Apr;5(2):129-137.
6. Hossein Abadi R, Norosi K, Karimlo B, Madah B. Effect of massage pressure points on sleep quality in the elderly. *Journal of Rehabilitation*. 2008; 9: 8-14.
7. Fakharian E, Masoud S, Tabesh H. An epidemiologic study on spinal injuries in Kashan. *J Guilan University of Medical Sciences*. 2004.
8. Ozgoli G, Armand M , Heshmat R, Alavi majd H. Acupressure effect on sleep quality in menopausal women. *Complementary medicine* 2012;3.
9. Barker R, Kober A, Hoerauf K, Latzke D, Adel S, Kain ZN, et al. Out-of-hospital Auricular Acupressure in Elder Patients with Hip Fracture: A Randomized Double-Blinded Trial. *Academic Emergency Medicine*. 2006;13(1):19-23.
10. Backer M, Michael G. *Acupuncture in the Treatment of Pain. An Integrative Approach*. United Kingdom: Churchill Livingstone; 2010.p. 370- 80.
11. Tsay S-L, Chen M-L. Acupressure and quality of sleep in patients with end-stage renal disease-a randomized controlled trial. *International Journal of Nursing Studies*. 2003;40(1):1-7.
12. Shafiee Z, Babae S, Nazari A, Atashi V. Effects of massage therapy on sleep quality after coronary artery bypass graft surgery. *Cardiovascular Nursing Journal*. 2013.
13. Hakim SH, Samadikhah J, Alizadehasl A, Azarfarin R. Chronobiological rhythms in

onset of massive pulmonary embolism. Middle East Journal of Anesthesiology. 2009 Oct. Vol 20, No. 3: 369-376.

14. Castro-Sánchez AMI, Matarán-Peñarrocha GA, Granero-Molina J, Aguilera-Manrique G, Quesada-Rubio JM, Moreno-Lorenzo C. Benefits of massage-myofascial release therapy on pain, anxiety, quality of sleep, depression, and quality of life in patients with fibromyalgia. Evid Based Complement Alternat Med. 2011; 2011:561753.
15. Wang XY, Yuan SH, Yang HY, Sun YM, Cheng FP, Zhang CL, Huang XC. Abdominal acupuncture for insomnia in women: a randomized controlled clinical trial. Acupunct Electrother Res. 2008; 33(1-2):33-41.