

*Original Article*

## The effect of reflexotherapy on patients' vital signs before coronary artery bypass graft surgery

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**Abstract**

**BACKGROUND:** Medical operation is an anxious factor that causes physiological reactions in body which consequently increases respiratory rate, heart rate and blood pressure. The aim of this study is assessing the effect of reflexotherapy on vital signs of patients before coronary artery bypass surgery in Shahid Chamran hospital of Isfahan.

**METHODS:** Fifty volunteer patients candidated for coronary artery bypass surgery were enrolled in this clinical trial. They were divided in two (control and treatment) groups. Vital signs were measured pre and post 30 minutes reflexotherapy in treatment group. Vital signs were also measured in patients in control group at the same condition of the treatment group, but reflexotherapy was not performed.

**RESULTS:** The mean differences of vital signs was not significant in control and treatment groups at the baseline. But post reflexotherapy intervention, systolic and diastolic blood pressure lowered significantly in the treatment group in comparison with control group ( $p < 0.05$ ). No significant changes were observed for other vital sign.

**CONCLUSIONS:** The findings of the study shows that reflexotherapy is a safe, effective, cheap nursing intervention in reducing systolic and diastolic blood pressure of patients before coronary artery bypass surgery.

**KEY WORDS:** Reflexotherapy, vital sign, coronary artery bypass surgery.

IJNMR 2011; 16(1): 8-12

Surgery is one of the most stressful incidents which may occur in everybody's life. When human life is threatened, whether it is a real or a pseudo threat, stress would occur. This stress is characterized in physical and mental functions of the individual.<sup>1</sup>

Psychological reactions would be manifested in the form of anxiety, besides; physical reactions would be in the form of changes in body's physiological functions.<sup>2</sup>

Heart is one of the organs which easily and naturally reacts to various mental states.<sup>3</sup> Anxiety causes an increase in sympathetic nervous system activity and subsequently left ventricular pressure and heart rate would be increased (diastolic and systolic dysfunction), heart needs more oxygen, the risk of myocardial necrosis

and ischemia process would be increased and cardiovascular symptoms would aggravate before the surgery.<sup>4</sup> Also, in the respiratory system, the respiratory rate may increase which causes respiratory problems.<sup>5</sup>

Therefore, providing health care for the patients undergoing heart surgery seems necessary particularly in those who suffer physical and psychological problems and their situation is getting more dangerous.

Thus, there are many methods available in complementary and alternative medicine (CAM) which nurses can help their patients in order to improve their health.<sup>6</sup>

Reflexotherapy is one of the available interventions in complementary and alternative medicine and treatments<sup>7</sup> which provides an

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This article was derived from MSc thesis in the Isfahan University of Medical Sciences.

opportunity for nurses to care for their patients.<sup>8</sup>

The first scientific aspects of reflexotherapy were discovered in Ankhmahor tomb in Egypt in 2500 B.C. During intervention, the therapist inserted pressure on reflexology areas of plantar surface of the feet or palm of the hands using his fingers (specially the thumbs) which were related to each part of the body. This caused health restore and had made a balance throughout the body.<sup>9,10</sup>

Reflexotherapy, as a comprehensive approach and a nursing intervention (a nursing science which supports traditional cares) can be used in the current medical treatments.<sup>11,12</sup>

So far, many studies have investigated reflexotherapy as a noninvasive nursing intervention in its various aspects such as: the impact of reflexotherapy on hypotension without any known reasons, reducing triglyceride and blood sugar, improving nausea and vomiting in cancer patients undergoing chemotherapy, reducing depression and improving immune system function, improving pain and anxiety of the cancer patients and decrease the fatigue in pregnant women.<sup>11-15</sup> However, in a pilot (small) study conducted on the anxiety of patients before and after the coronary artery bypass graft (CABG) surgery, this method had a significant effect on the physiological parameters of the patients.<sup>4</sup>

Based on recent observations and studies which indicated high level of anxiety in patients before the surgery and its subsequent effects on vital signs of the patients and considering different results of the studies on effectiveness of the reflexotherapy on these signs and also considering that reflexotherapy is a non-invasive and non-pharmacological nursing intervention, the researcher decided to conduct a study in order to investigate and compare the effect of reflexotherapy on vital signs of the patients before CABG surgery.

## Methods

This study was a clinical trial. The study population included all the male and female candidates for CABG surgery who had the inclusion

criteria for entering the study in Chamran Hospital in Isfahan in 2008. The researcher started collecting the samples and practical work after obtaining the permission from the School of Nursing and Midwifery of Isfahan and informing the Chamran Hospital authorities.

In the present study, the samples were selected using simple random sample method i.e. all the patients undergoing CABG surgery were enrolled in this study and then divided in two groups. Based on the random numbers list, even numbers entered in the intervention group and odd numbers entered the control group. This process continued until a total number of 50 samples were selected (25 in the intervention group and 25 in the control group).

The inclusion criteria of the study were patients over 18 years old, full consciousness, lack of hemorrhage, epilepsy, thrombosis, kidney stone or gallbladder, foot diseases, inflation, lesion or fractures in foot and lack of heart rate reduction and hypotension.

A Japanese analog barometer was used in order to measure the blood pressure. The respiratory rate and pulse were counted and recorded by a nurse. The demographic data were also collected at the beginning of the study in both intervention and control group.

The process of reflexotherapy was explained to the intervention group and an informed consent form was received from them. Before implementing the reflexotherapy, the vital signs of both groups were measured by a nurse who was aware about the nature of the intervention and control group subjects. Reflexotherapy was conducted for each patient in intervention group for 30 minutes. First, for the left foot and then for the right foot (15 minutes each). Conducting reflexotherapy, first of all, the relaxation technique was used from the footstalk toward the sole (plantar surfaces) at the beginning of the session. Then, four major plantar reflexology points (solar plexus, pituitary, heart and liver) were put under pressure using the thumbs. The other reflexology areas of the plantar surface of the foot were also massaged and finally intervention was put to an end with massaging the solar plexus by the researcher.

The vital signs were measured again after finishing the intervention.

The vital signs of the control group were also measured after 30 minutes under similar condition but without conducting the reflexotherapy technique.

Statistical tests such as chi-square, independent t-test and paired t-test via SPSS software were used to analyze the data.  $p < 0.05$  was considered significant.

## Results

After sampling, both groups were studied in terms of demographic characteristics: age, sex, marital status, employment status, education and duration of the cardiac disease. The statistical tests showed that both groups were demographically similar to each other.

The average age of the intervention and control group was 57.68 and 56.8 years, respectively. In the intervention group, 52% of the subjects were female and 48% of them were male. In the control group, 48% of the subjects were female and 52% of them were male. The majority of the subjects in both groups were housewives, and the minority of subjects were employed. A high percentage of the subjects in the intervention group and control group were illi-

terate (48% and 64% respectively). In addition, 92% of patients in the intervention group and 84% in the control group were married.

The average duration of cardiac disease in intervention and control groups was 3.84 and 5.10 years respectively.

The statistical paired t-test showed that there was a significant difference in intervention group between the average systolic blood pressure ( $p = 0.029$ ) and diastolic blood pressure ( $p = 0.013$ ) before and after the intervention.

Although, the results showed that average reduction of respiratory rate was 56% in the intervention group and also the average heart rate reduction was approximately 2 beats per minute after the reflexotherapy, which were statistically not significant (Tables 1 and 2).

The comparison of the vital signs using independent t-test before conducting the intervention showed that two groups did not have any significant statistical difference. But, systolic and diastolic blood pressure in both groups, after conducting the reflexotherapy showed a significant difference ( $p = 0.012$ ), but in average respiratory rate and average heart rate, no significant difference was observed between the two groups.

**Table 1.** Heart rate and respiratory rate per minute, before and after reflexotherapy

Physiological variables	Heart rate per minute Mean (standard deviation)		Respiratory rate per minute Mean (standard deviation)	
	Intervention Group	Control Group	Intervention Group	Control Group
Before reflexotherapy	70.08 (8.67)	71.32 (7.60)	20.20 (4.37)	20.48 (4.04)
After reflexotherapy	68.12 (8.42)	71.60 (7.86)	19.64 (3.35)	20.52 (3.40)

**Table 2.** Systolic and diastolic blood pressure of the patients before and after reflexotherapy

Physiological variables	Systolic blood pressure Mean (standard deviation)		Diastolic blood pressure Mean (standard deviation)	
	Intervention Group	Control Group	Intervention Group	Control Group
Before reflexotherapy	130.20 (17.64)	130.60 (12.44)	83.00 (10.40)	83.80 (11.01)
After reflexotherapy	122.20 (15.67)	130.80 (10.77)	78.40 (8.74)	84.52 (10.20)

## Discussion

The results of our investigation showed that there was a significant difference between the average systolic and diastolic blood pressure of the two groups. But, this difference in heart rate and respiratory rate was not statistically significant. However, the results showed that in the intervention group, the average heart rate and respiratory rate per minute had slightly decreased after the reflexotherapy. While, in the control group, the average changes in all the physiological parameters have slightly increased. Meanwhile, several studies conducted to confirm the effect of reflexotherapy on some of the vital signs. McVicar et al indicated that reflexotherapy has significantly decreased the systolic blood pressure and heart rate per minute, but diastolic blood pressure showed no significant difference.<sup>16</sup> Also In the study of Park, reflexotherapy has significantly decreased the systolic blood pressure but diastolic blood pressure had no significant difference.<sup>13</sup> However, in another study conducted on the anxiety of the cancer patients and their vital signs, systolic blood pressure, diastolic blood pressure, heart rate and respiratory rate significantly decreased after 30 minutes of reflexotherapy.<sup>12</sup> In the present study also, systolic blood pressure and diastolic blood pressure in the intervention group had significantly decreased. The heart rate and respiratory rate were also decreased, which was not statistically significant. The researcher believes that the cause of the different changes of mentioned vital signs in the above studies were due to slight differences in conducting reflexotherapy technique, which these slight differences had changed slight physiological differences.

Kuhn (1999) believed that reflexotherapy causes relaxation in hyperactive areas of the body and stimulates the passive areas and con-

sequently causes a balance and relaxation of the body.<sup>17</sup>

In addition, Fritz wrote in his book that stimulating foot in reflexotherapy can cause the activity of the parasympathetic nervous system.<sup>18</sup>

In a pilot study that Gunnarsdottir et al had conducted on the patients before and after the CAGB surgery, the vital sign variables had decreased in the intervention group, but in the control group, these changes were not significant<sup>4</sup> which was not in accordance with the present study. Perhaps, one of the reasons that the mentioned study could not reach to positive results was due to small sample size (5 subjects in the intervention group, and 4 subjects in the control group) and environmental and patients' conditions.

Summarizing all these studies which have evaluated the effects of reflexotherapy on the vital signs, it can be concluded that in all the studies, vital signs improved after conducting reflexotherapy, although, in some of the variables, this improvement was not significant. But, the point that none of the variables increased is significant. In cases in which patients had anxiety in association with a phenomenon and subsequently the sympathetic nervous system has been stimulated, particularly in patients with cardiac disease, these parameters can worsen the patients' status before the surgery. Therefore, reflexotherapy, as a complementary method, can cause relaxation and reduces the stress and also can improve the hemodynamic status of the patients.<sup>4</sup>

Since, reflexotherapy can improve the hemodynamic status of the patients and is a safe, noninvasive and cost effective intervention which only needs the nurse's hands, therefore, we can justify using this intervention for the patients in a different condition.

The authors declare no conflict of interest in this study.

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