



Effectiveness of acupressure on bio-physiological parameters in mediosternotomy patients

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ABSTRACT

Acupressure is one of the emerging alternative therapies for the management of the pain, anxiety and other physiological indexes. The present study was conducted at Sri Sathya Sai Institute of Higher Medical Sciences, Whitefield, Bangalore. A total of twenty male and female patients those who undergo open-heart surgery via median sternotomy were part of the study after obtaining the written informed consent. After recording the demographic data, the participants were randomly grouped into control and intervention groups using random numbers generated by computer with 10 participants in each group. The intervention will be provided at PC6 acupressure point, situated on the inner side of the forearm, three fingers below the wrist joint, three times a day (6 am, 12 noon, 6 pm). There was a significant decrease in the heart rate and blood pressure and a significant increase in the partial pressure of oxygen. Further, there was a decrease in the serum troponin T levels. The study support implementation of the acupressure.



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INTRODUCTION

Management of pain is a very essential part of medical history. Though there are several effective drugs are available, they are associated with significant side effects. Hence, the long term use of these medications is not advisable. Currently, there is an increase in the trend to the alternative therapies which are cost-effective and also not associated

with side effects. Acupressure is one of the emerging alternative therapies for the management of the pain, anxiety and other physiological indexes. As it is cost-effective and non-invasive, the majority of practitioners prefer the application of acupressure in the management of pain (Rizi *et al.*, 2017).

Further, majority of the patients prefer complementary medicine as it has no side effects. Interestingly, acupressure was reported to be effective in the management of the pain effectively in severe conditions like cancer and leukemia patients also (Nia *et al.*, 2017). It was reported that the acupressure not only relieves the pain but also speed up the recovery of the patients after the surgery (Peets and Pomeranz, 1978). Though the acupressure is an effective method in the management of pain, the studies supporting the scientific evidence are sparse. Hence, the present study was undertaken to observe the effect of acupressure on bio-physiological parameters in mediosternotomy patients.

MATERIALS AND METHODS

Study Design

Experimental study with pre and post with control design.

Study Setting

The present study was conducted at Sri Sathya Sai Institute of Higher Medical Sciences, Whitefield, Bangalore.

Study Population

A total of twenty male and female patients those who undergo open-heart surgery via median sternotomy were part of the study after obtaining the written informed consent. After recording the demographic data, the participants were randomly grouped into control and intervention groups using random numbers generated by computer with 10 participants in each group.

Group Control (= 10): No intervention applied

Group Experimental (= 10): Acupressure was applied

The participants were recruited using the following criteria.

Inclusion criteria

1. Male and female participants between the age group of 19 and 60 years.
 2. Patients those who report pain during deep inspiration with an intensity of at least 3 on a 0-10 rating scale under standard analgesia.
- Patients those who are extubated.
 - Patients on the first operative day and conscious.
 - Patients who can communicate through English, Tamil, Hindi and kannada.
 - Patients those who are willing to participate in a study.

Exclusion criteria

- Patients who are having post-operative complications.
- Patients with the emergency operation, chronic pain and hemodynamically unstable.
- Patients who underwent graft donor site from hands for CABG.

Accupressure

The intervention will be provided at PC6 acupressure point, situated on the inner side of the forearm, three fingers below the wrist joint, three times a day.

Assessment of Bio-Physiological parameters

Blood pressure was recorded by using Diamond digital sphygmomanometers (BPDG024) and P02, pulse rate was recorded by using pulse oximeter (EDAN H100B) respiratory rate was measured manually (Sailesh and Mukkadan, 2015; Sailesh *et al.*, 2014).

Ethical consideration

The study was approved by the Institutional Ethics Committee. A written, informed consent was obtained from all the participants. The study was performed in accordance with the "Ethical Guidelines for Biomedical Research on Human Participants, 2006" by the Indian Council of Medical Research and the Declaration of Helsinki, 2008.

Data analysis

Data was analyzed using SPSS 20.0. Data were expressed as frequency and percentage. Pain scores were expressed as mean and SD. A probability value of less than 0.05 was considered significant.

RESULTS AND DISCUSSION

Table 1 presents the comparison of post values of heart rate among control and experimental groups. Table 2 presents the comparison of post values of respiratory rate among control and experimental groups. Table 3 presents the comparison of post values of systolic blood pressure among control and experimental groups. Table 4 presents the comparison of post values of Diastolic blood pressure among control and experimental groups. Table 5 presents the comparison of post values of partial pressure of oxygen (%) among control and experimental groups. Table 6 presents the comparison of post values of Serum Troponin T among control and experimental groups.

Discussion

The present study was undertaken to observe the effect of acupressure on bio-physiological parameters in mediosternotomy patients. There was a significant decrease in the heart rate, blood pressure and significant improvement in the partial pressure of oxygen followed by the acupressure. The serum troponin T levels also significantly decreased followed by the acupressure. It was reported that the pain levels were reduced significantly followed by the acupressure in conditions like after the child-birth and after the surgery.

Table 1: Comparison of post values of heart rate among control and experimental groups (Data was expressed as mean and SD). (Exp-experimental group, Con- control group)

Day-1			
Experiment group			
Test time	Pre	Post	p-value
5-6:00 am	112.3±14.47	108.8±12.66	0.5719
12-1:00 pm	107.2±13.83	104.2±12.77	0.6204
5-6:00pm	102±12.51	98.4±11.62	0.5133
Control group			
5-6:00 am	109.6±5.64	109.6±5.64	1
12-1:00pm	106.2±4.85	106.4±5.06	0.9291
5-6:00 pm	100.8±4.92	100.8±4.92	1
Day-2			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	95±11.60	92.6±11.51	0.6478
12-1:00pm	91±8.81	88±8.16	0.4398
5-6:00pm	86.80±5.18	84.80±5.18	0.3994
Control group			
5-6:00am	96.4±1.84	96.4±1.84	1
12-1:00pm	93.20±2.70	93.20±2.70	1
5-6:00pm	90.2±1.48	90.20±1.48	1
Day-3			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	86.4±4.70	83.8±5.20	0.2560
12-1:00pm	83±6.13	80.40±5.72	0.3397
5-6:00pm	81.8±5.29	79.8±4.57	0.3772
Control group			
5-6:00am	88.60±1.65	88.60±1.65	1
12-1:00pm	88.60±2.67	88.60±2.67	1
5-6:00pm	86.60±2.50	86.60±2.50	1
Day-4			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	81±5.60	78.8±4.64	0.3512
12-1:00pm	80.8±3.16	78.6±4.01	0.1893
5-6:00pm	78.8±3.01	76.4±3.37	0.1105
Control group			
5-6:00am	84.4±2.46	84.4±2.46	1
12-1:00pm	82.4±2.27	82.4±2.27	1
5-6:00pm	80.60±1.65	80.60±1.65	1

Table 2: Comparison of post values of respiratory rate among control and experimental groups (Data was expressed as mean and SD). (Exp-experimental group, Con- control group)

Day-1			
Experiment group			
Test time	Pre	Post	p-value
5-6:00 am	25.80±1.99	24.20±1.99	0.0888
12-1:00 pm	24.60±2.32	22.60±2.32	0.0697
5-6:00pm	23.60±2.46	21.80±2.39	0.1145
Control group			
5-6:00 am	25.8±0.63	25.8±0.63	1
12-1:00pm	25.20±1.03	25.20±1.03	1
5-6:00 pm	23.60±0.84	23.60±0.84	1
Day-2			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	22.60±1.90	21±1.70	0.0624
12-1:00pm	21.80±1.75	20.20±1.14	0.0261*
5-6:00pm	21.40±0.97	20.60±1.90	0.2502
Day-3			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	21.60±0.84	20±0.94	0.0008***
12-1:00pm	20.60±0.97	19.60±0.84	0.0239*
5-6:00pm	21.40±0.97	19.60±0.84	0.0003***
Control group			
12-1:00pm	21.60±0.84	21.60±0.84	1
Day-4			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	21±1.05	19.6±0.84	0.0042*
12-1:00pm	20±0.94	18.4±1.26	0.0049*
5-6:00pm	20±0.94	18.2±0.63	0.0001***

However, there are other studies reported that there was no reduction in the level of pain followed by the acupressure (Sakurai *et al.*, 2003). Acupressure was also applied successfully for the management of post-surgery nausea and vomiting and recommended implementation of acupressure as a routine treatment along with the medical treatment.

Further, patients who underwent the acupressure were discharged earlier when compared to the control group (Sun and Gan, 2008). The present study results are in accordance with earlier studies as we have assessed the bio-physiological indicators of pain. As it is known that followed by the pain there is an increase in the heart rate and blood pressure. However, after the acupressure, there was a signif-

icant decrease in the heart rate and blood pressure within the normal limits.

Serum Troponin T is a well-known indicator for the myocardial infarction. It is a part of the troponin complex that regulates the muscle contraction both in skeletal and cardiac muscle (Antman, 2002). Increased levels of troponin T indicates severe myocardial injury (Chuang *et al.*, 2015). In the present study, it was observed that there was a significant decrease in the troponin T levels followed by the acupressure. This was in accordance with earlier studies which stated that acupressure may have cardioprotective activity probably acts by reducing the levels of troponin (Kavoussi and Ross, 2007).

Table 3: Comparison of post values of systolic blood pressure among control and experimental groups(Data was expressed as mean and SD). (Exp-experimental group, Con- control group)

Day-1			
Experiment group			
Test time	Pre	Post	p-value
5-6:00 am	139.2±6.94	135.6±6.59	0.2496
12-1:00 pm	135±6.20	132.6±5.97	0.3894
5-6:00pm	131.20±6.75	117.60	0.1908
Control group			
5-6:00 am	139.2±2.15	139.2±2.15	1
12-1:00pm	136.4±2.80	136.40±2.80	1
5-6:00 pm	133.8±2.39	133.8±2.80	1
Day-2			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	127±7.38	123.6±6.79	0.2976
12-1:00pm	125.4±5.74	122.6±5.89	0.2959
5-6:00pm	124.2±7.15	121.8±6.76	0.4505
Control group			
5-6:00am	131.8±2.39	131.8±2.39	1
12-1:00pm	130±1.33	130±1.33	1
5-6:00pm	129.4±1.65	129.4±1.65	1
Day-3			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	123.6±4.79	121±5.68	0.2828
12-1:00pm	121.2±6.94	119.8±7.97	0.6802
5-6:00pm	121.60±6.65	119±6.62	0.3924
Control group			
5-6:00am	127.6±1.26	127.6±1.26	1
12-1:00pm	128.6±2.99	128.6±2.99	1
5-6:00pm	128.8±2.35	128.8±2.35	1
Day-4			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	121±8.01	117.2±8.28	0.3109
12-1:00pm	116.6±6.67	114.4±6.98	0.4804
5-6:00pm	113.8±7.27	112.4±6.92	0.6643
Control group			
5-6:00am	128.8±1.40	129±1.70	0.7771
12-1:00pm	127.6±2.07	127.8±2.20	0.8364
5-6:00pm	128±3.40	127.8±3.58	0.8995

Table 4: Comparison of post values of Diastolic blood pressure among control and experimental groups (Data was expressed as mean and SD). (Exp-experimental group, Con-control group)

Day-1			
Experiment group			
Test time	Pre	Post	p-value
5-6:00 am	90.80±3.79	88.6±3.13	0.1746
12-1:00 pm	88.8±3.55	86.8±3.55	0.2242
5-6:00pm	84.8±2.15	82.8±1.69	0.0327*
Control group			
5-6:00 am	89.2±3.01	89.4±3.13	0.8859
12-1:00pm	87.8±2.39	87.8±2.39	1
5-6:00 pm	87.6±1.58	87.6±1.58	1
Day-2			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	82±1.33	79.8±1.14	0.0009***
12-1:00pm	80.6±1.90	78.8±1.03	0.0168*
5-6:00pm	79.4±1.65	77.4±1.65	0.0142*
Control group			
5-6:00am	85.8±1.99	85.6±2.27	0.8364
12-1:00pm	84.2±2.20	84.20±2.20	1
5-6:00pm	83±1.70	83±1.70	1
Day-3			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	81±1.05	79±1.41	0.0021**
12-1:00pm	78.8±1.40	78±2.98	0.4523
5-6:00pm	78.8±3.16	77±2.87	0.1985
Control group			
5-6:00am	81.4±1.65	81.4±1.65	1
12-1:00pm	80.8±1.40	80.8±1.40	1
5-6:00pm	81.4±2.67	81.4±2.67	1
Day-4			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	80.20±3.19	77.4±3.27	0.0686
12-1:00pm	79.6±1.26	76±1.33	0.0001***
5-6:00pm	79.4±2.99	76.4±2.80	0.0324*
Control group			
5-6:00am	81.60±1.26	81.6±1.26	1
12-1:00pm	80.60±0.97	80.60±0.97	1
5-6:00pm	81±2.36	81±2.36	1

Table 5: Comparison of post values of partial pressure of oxygen (%) among control and experimental groups (Data was expressed as mean and SD). (Exp-experimental group, Con- control group)

Day-1			
Experiment group			
Test time	Pre	Post	p-value
5-6:00 am	91.30±5.89	93±5.70	0.5200
12-1:00 pm	94.30±3.80	95.80±3.55	0.3740
5-6:00pm	95.60±2.22	96.90±1.91	0.1777
Control group			
5-6:00 am	94.20±0.63	94.4±0.84	0.5560
12-1:00pm	96±0.00	96.40±0.84	0.1510
5-6:00 pm	95.40±0.52	95.40±0.52	1
Day-2			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	96.1±1.60	97.5±1.35	0.0485*
12-1:00pm	96.9±1.10	97.3±0.82	0.3696
5-6:00pm	97.8±0.79	99±0.47	0.0006***
Control group			
5-6:00am	96.30±0.48	96.30±0.48	1
12-1:00pm	96.9±0.32	96.9±0.32	1
5-6:00pm	97.2±0.42	97.2±0.42	1
Day-3			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	98±0.47	99±0.47	0.0002***
12-1:00pm	98.4±0.70	99.1±0.57	0.0243*
5-6:00pm	98.9±0.32	99.5±0.53	0.0064*
Control group			
5-6:00am	97.2±0.42	97.2±0.42	1
12-1:00pm	97.3±0.48	97.3±0.48	1
Day-4			
Experiment group			
Test time	Pre	Post	p-value
5-6:00am	99.30±0.67	99.9±0.32	0.0203
12-1:00pm	99.7±0.48	100±0.00	0.0652
5-6:00pm	99.9±0.32	100±0.00	0.3306
Control group			
12-1:00pm	98.50±0.53	98.50±0.53	1
5-6:00pm	98.9±0.32	98.9±0.32	1

Table 6: Comparison of post values of Serum Troponin T among control and experimental groups (Data was expressed as mean and SD). (Exp-experimental group, Con- control group)

Group	Serum Troponin T Pre	Serum Troponin T Post	P value
Experimental	497.4±140.58	305.2±146.26	0.0079**
Control	472.60±72.91	273.4±43.34	0.0001***

CONCLUSION

There was a significant decrease in the heart rate and blood pressure and a significant increase in the partial pressure of oxygen. Further, there was a decrease in the serum troponin T levels. The study support implementation of the acupressure

REFERENCES

- Antman, E. M. 2002. Decision Making with Cardiac Troponin Tests. *New England Journal of Medicine*, 346(26):2079–2082.
- Chuang, S. F., Shih, C. C., Yeh, C. C., Lane, H. L., Tsai, C. C., Chen, T. L., Liao, C. C. 2015. Decreased risk of acute myocardial infarction in stroke patients receiving acupuncture treatment: a nationwide matched retrospective cohort study. *BMC Complementary and Alternative Medicine*, 15(1):318.
- Kavoussi, B., Ross, B. E. 2007. The Neuroimmune Basis of Anti-inflammatory Acupuncture. *Integrative Cancer Therapies*, 6(3):251–257.
- Nia, H. S., Sharif, S. P., Yaghoobzadeh, A., Yeoh, K. K., Goudarzian, A. H., Soleimani, M. A., Jamali, S. 2017. Effect of acupressure on pain in Iranian leukaemia patients: A randomized controlled trial study. *International Journal of Nursing Practice*, 23(2):12513.
- Peets, J. M., Pomeranz, B. 1978. CXBK mice deficient in opiate receptors show poor electroacupuncture analgesia. *Nature*, 273(5664):675–676.
- Rizi, M. S., Shamsalinia, A., Ghaffari, F., Keyhanian, S., Nabi, B. N. 2017. The effect of acupressure on pain, anxiety, and the physiological indexes of patients with cancer undergoing bone marrow biopsy. *Complement Ther Clin Pract*, 29:136–141.
- Sailesh, K. S., Archana, R., Mukkadan, J. 2014. Controlled Vestibular Stimulation: A Physiological Method of Stress Relief. *Journal of Clinical and Diagnostic*, 8(12):01–02.
- Sailesh, K. S., Mukkadan, J. K. 2015. Controlled vestibular stimulation, standardization of a physiological method to release stress in college students. *Indian Journal of Physiology and Pharmacology*, 59(4):436–441.
- Sakurai, M., Suleman, M. I., Morioka, N., Akça, O., Sessler, D. I. 2003. Minute Sphere Acupressure Does Not Reduce Postoperative Pain or Morphine Consumption. *Anesthesia & Analgesia*, 96(2):493–497.
- Sun, Y., Gan, T. J. 2008. Acupuncture and related techniques for postoperative pain: a systematic review of randomized controlled trials. *British Journal of Anaesthesia*, 101(2):151–160.