Effectiveness of Foot Reflex Therapy in Post-Operative Pain among Patients Subjected to Major Abdominal Surgery

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ABSTRACT

BACKGROUND

Most patients experience post-operative pain and it is unavoidable. It is the duty of the nurses to ensure that patients' pain is assessed and managed effectively when they are at the hospital. Foot reflex therapy is one effective way nurses can adopt to manage the patient with pain after surgery. We wanted to evaluate the effectiveness of foot reflex therapy on post-operative pain in patients who are subjected to major abdominal surgery.

METHODS

This is a descriptive randomized control study that was conducted at Sri Ramachandra Medical College and Hospital, among 360 patients who underwent major abdominal surgery. They were equally divided into two groups as control and study groups and the results were analyzed statistically.

RESULTS

Majority of the patients in the study group showed a positive effect on pain control during 4th and 5th [(Mean: 1.27 with SD: 1.12) (Mean: 0.03 with SD: 0.32) at $p < 0.001$] post-operative day following foot reflex therapy.

CONCLUSIONS

The existing pain and the post-operative pain can be managed by nurses, patients, their care takers or families together, whenever appropriate, in a multidisciplinary manner. Foot reflex therapy is one such alternative complementary therapy which the nurses can adopt to implement the techniques independently.

KEY WORDS

Foot Reflex Therapy, Foot Reflexology, Alternative Medicine, Complementary Therapy, Post-Operative Day (POD)

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BACKGROUND

Pain is the first and most frequent complication following any surgical procedure.¹ It refers to the subjective physical discomfort experienced due to tissue trauma by the patient after a major abdominal surgery as measured using the Visual Analog Scale (VAS) and reflected by physiological parameters which includes pulse rate, respiratory rate, blood pressure and oxygen saturation.² Pain management in hospitals becomes a major factor to attend especially after major surgeries as it greatly influences the treatment outcome and it affects the patients psychology which cause threat to their comfort.³ Experience of discomfort over a period of time hampers a person's self-care and role obligations that can impair the quality of life.⁴ Pain can cause personal hardships and it is the most common reason for physician consultation all over the world.⁵ It is also a major symptom in various medical and surgical conditions that significantly interferes with a person's quality of life.

The only management of pain which many people cannot cope up is through surgical procedure. Pain when cannot be managed adequately it will cost more for the patient, their families and society.⁶ The common pain in the abdominal surgery is the post-operative pain which is also a symptom of warning.⁷ Analgesics and anaesthetic techniques are available to control the post-operative pain. Still the prevalence rate of pain after surgery is reported high.

Post-operative pain is very common and around 80 % of the patients are reporting pain after surgery. Another study on patients who underwent various surgeries like abdominal, spinal and extremity surgery complained severe pain after the surgical procedure.⁹ It was noted that most of the patients expressed more pain during day 0, A similar study reported that the percentage of postoperative pain experienced by patients after abdominal surgery varied from 22 % to 67 % and was severe to unbearable pain.¹⁰ Preoperative pain and poorly controlled postoperative pain have been in high association with development of chronic postsurgical pain.

One of the effective ways to manage pain is to administer analgesics (NSAIDs or opioid analgesics). While pain relief may sometimes be inadequate with the use of analgesics, development and improvement of alternative interventions became necessary for a more effective pain control strategy.^{11,12} Foot reflex therapy, a modified form of reflexology is an effective, acceptable and complementary intervention.¹³ To find the impact on foot reflex therapy in post-operative surgical pain control, there is very less data available, thus this study focuses on determining the effectiveness of foot reflex therapy on post-operative pain following major abdominal surgeries.

METHODS

This descriptive randomized control study was conducted at the Department of General surgery, Sri Ramachandra Medical College Hospital, Porur, Chennai during the time period Jan 2012 to Sep 2013. The target population of the study included patients who underwent major abdominal surgery between the age group 20 and 60 years. The sample comprised of 360 patients equally distributed among the control and study

groups. The sample size was determined by power analysis and effect size. The patients who underwent abdominal surgery were included in this study. Subjects were included based on their willingness. Patients who had foot wounds, burns infections, deep vein thrombosis, who had history of removal of malignant tumour, who has underwent laparoscopic abdominal surgery were not included in the study. The investigator used Visual Numeric Pain Scale to assess the pain in patients in study and the control groups. Minimum score in Visual Numeric Pain Intensity Scale is 0 and maximum score is 10. The pain intensity was classified for the visual analogue scale is as follows: 0 – no pain, 1 to 3 – mild pain, 4 to 6 – moderate pain and 7 to 10 – severe pain.

The pain scale was administered during the pre-assessment and the post-assessment of foot reflex therapy from 1st to 5th post-operative day. Foot reflex therapy was provided by a foot reflex therapist for 30 minutes per day from the 1st to 5th post-operative day and thereafter the procedures has been carried out by the patient's caregivers for a period of 21 days at their home.

Foot reflex therapy performance was classified into 3 categories. The total score range from 1 to 24. A score of one was given for correct performance and zero for wrong performance. The level of practice was grouped as follows: 71 to 100 % - satisfactory practice, 34 – 70 % - moderate satisfactory practice and < 33 % is poor practice. Data was collected in three phases and analysed statistically using paired 't' test.

RESULTS

The study was conducted among 360 patients who underwent major abdominal surgery under general anaesthesia. They were divided into two groups of 180 each as study group and control group. The major abdominal surgeries that were included in this study are inguinal hernia (37.44 % in study group and 40 % in control group), incisional hernia (30.55 % in study group and 33.33 % in control group), umbilical hernia (16.66 % in study group and 19.46 % in control group), appendicectomy (5.56 % in study group and 1.66 % in control group) and cholecystectomy (9.46 % in study group and 5.55 % in control group) [Figure 1]

Hypertension was the most commonly existing comorbid condition in this study followed by diabetes mellitus. Hypothyroidism and asthma were also observed in a few patients. A majority of the patients in both the groups did not have any existing comorbid conditions. Foot reflex therapy was given to the patients in the study group and their pre and post-test pain scores were assessed. The mean pain scores in the study group and control group during the 1st and 5th post-operative day is 6.23 to 0.03 and 7.01 to 1.31 respectively.

On day 1 majority of the samples, 84 (46.7 %) in the study group and 139 (41.68 %) in the control group had severe pain. 92 (51.1 %) in the study and 40 (56.66 %) in the control group had moderate level of pain. 4 (2.2 %) in the study and 1 (0.66 %) in the control had reported mild pain. All of them reported pain during pre-test. The p value indicated the homogeneity between the group. During post-test majority of the study group samples 135 (75 %) reported moderate pain whereas in the control group 117 (65 %) of them reported severe pain.

	Duration of the Study	Mean	SD	Mean Difference	Paired t Value	(P-Value)
Day 1	Pre-test	6.23	1.36	0.28	5.571	0.000***
	Post-test	4.05	2.30			
Day 2	Pre-test	5.87	1.11	2.51	0.45	0.000***
	Post-test	3.36	1.51			
Day 3	Pre-test	2.88	1.42	1.16	8.88	0.000***
	Post-test	1.72	1.25			
Day 4	Pre-test	3.33	1.53	2.05	8.45	0.000***
	Post-test	1.27	1.12			
Day 5	Pre-test	0.66	0.79	0.62	11.15	0.000***
	Post-test	0.03	0.32			

Table 1. Comparison of Day 1 to 5, Mean Score of Pain among Patients in the Study Group

***p < 0.001, n = 180

	Duration of the Study	Mean	SD	Mean Difference	Paired t Value	(P-Value)
Day 1	Pre-test	7.01	1.04	0.29	3.163	0.000***
	Post-test	6.72	1.42			
Day 2	Pre-test	6.18	0.92	0.61	6.82	0.000***
	Post-test	5.57	1.49			
Day 3	Pre-test	4.41	1.49	0.5	3.936	0.000***
	Post-test	3.92	1.86			
Day 4	Pre-test	3.86	1.59	0.7	5.657	0.000***
	Post-test	3.16	1.74			
Day 5	Pre-test	1.69	1.68	0.38	3.127	0.000***
	Post-test	1.31	1.58			

Table 2. Comparison of Day 1 to 5, Mean Score of Pain among Patients in the Control Group

***P < 0.001, n = 180

Figure 1. The Total Percentage Distribution-Type of Surgery (N = 360)

Figure 2. Level of Pain in the Pre-Assessment Day 1 in the Student of Control Group (N = 360)

Figure 3. Level of Pain in the Post Assessment Day 5 in the Study and Control Groups (N = 360)

The level of severe pain had reduced 28.88 % in the study group whereas in the control group, the level of reduction was only 12.22 %

On day 2, 64 (35.6 %) in the study group, and 70 (38.9 %) in the control group samples reported severe pain during pre-test. Majority of the samples 91 (50.6 %) in the study and 119 (66.1 %) in the control group reported moderate pain during post-test. The level of severity of pain was reduced in 34.5 % in the study group whereas in the control group the level of reduction was only 13.9 %.

On day 3, in pre-test none of them reported severe pain in the study group whereas in the control group, 13 (7.3 %) had severe pain and during post-test in the study group none of them reported severe pain and majority of the samples, 130 (72.2 %) reported mild level of pain whereas in the control group, 12 (6.7 %) of them had severe and 98 (54.7 %) of them had mild pain.

On day 4, majority of the samples 88 (48.9 %) in the study group and 107 (60.1 %) control group reported mild pain whereas in the post-test 116 (64.4 %) in the study group and 74 (41.6 %) in the control group reported mild pain and majority of the samples, 58 (32.2 %) shifted to no pain in the study group whereas in control only 13 (7.3 %) had a change.

On day 5, 92 (51.1 %) of the study group during pre-test, and the control group 59 (33.1 %) were reported no pain and 88 (48.9 %) in the study and 77 (43.1 %) in the control had mild pain. During post-test in study group 146 (81.1 %) had no pain and 30 (16.6 %) were in mild pain whereas in the control group 32 (17.8 %) were with moderate and 65 (36.11 %) reported mild pain.

The study findings conclude that patients who received foot reflex therapy in the post-operative period showed better pain recovery than patients who did not receive the therapy. [(Mean: 1.27 with SD: 1.12) (Mean: 0.03 with SD: 0.32) at p < 0.001].

DISCUSSION

Both by patient and physician, pain is the most undesired symptom in the post-operative period.⁴ Poorly controlled post-operative pain may affect the patient's psychological, social and mental health. It also mainly reduces the quality of life during and after the surgery. This can lead to other physiological disturbances like impaired respiration, sleep disturbances and loss of appetite. The discharge of the patient

is delayed when the pain is not controlled on time after the surgery, which in turn impacts the cost of the healthcare, alleviation of negative pain and loss of productivity of results.

This has become a big challenge for healthcare providers which is one of the important roles in controlling the postoperative pain by managing both pharmacological and non-pharmacological pain-relieving interventions. Uncontrolled pain can lead to other serious health problems like cardiac dysrhythmias, atelectasis, pneumonia and sometimes sensory abnormalities also.¹⁴ This leads to the need for the development of complementary therapy in alleviating post-operative pain.

Several studies on complementary therapies have proven to improve the medical treatment which augment the comfort of the patient. Soothing music, relaxing on own by different methods, touch therapy, reflexology therapies, plant based medications and yoga are other alternative treatment.¹⁵ Foot reflexology was chosen as an alternative nursing intervention in this study. Earlier studies were performed to investigate the effect of reflexes on postoperative pain in cancer patients and none of the studies were on patients undergoing major abdominal surgery for benign conditions / diseases.

The Gate theory, serotonin hypothesis and the restorative-sleep hypothesis¹⁶ are evident of the analgesic effects of reflexology on post-operative pain. Current study also revealed that a high percentage of severe pain was observed during the 3rd and 4th post-operative days. It was also noticed that the level of knowledge on usage of complementary medical practise and alternative treatment among the patients and care givers is low and 67 % of them were unaware about complementary and alternative medicine use to control post-operative pain. The outcome of the present study concluded that postoperative pain is very common in post-surgical condition and available managements are difficult to be continued owing to the drug side effects.

Another study evaluated the benefit of massage therapy in improving peri-operative patient related outcomes, it revealed significant reduction of VAS scores for pain from 5.3 to 2.9 ($n = 79$, $p < 0.0001$) and also an improved well-being from 5.2 to 6.7 ($n = 69$, $p < 0.0001$).¹⁷ One of the study examined the effectiveness of massage of hand in relation to pain, feeling and providing nursing care among 45 post-operative patients at surgical ward. Pain was assessed through visual analogue scale. The nursing support and measurement of physiological conditions was evaluated. The study findings showed a significant pain relief ($t = 4.04$, $p = 0.0001$), improvement in feeling and an increase in skin temperature.¹⁸

The study was conducted to evaluate the neurophysiological effect on different types of body massage in healthy adults in support to functional magnetic resonance imaging methods. The outcome showed that the massage treatment activates the subgenual and posterior cingulate cortices which in turn increases the oxygen level of blood during the cognitive task performances. The results showed light on applying these new interventions might improve to plan new targets for managing pain among healthy individuals.¹⁹ Another study conducted to review the effect of reflexology on pain and outcomes of the labour in 88 primi paras mothers. In the reflexology group, there was a significant difference between the Pain Rating Index (PRI) before and after the 4 stages of intervention ($p < 0.001$). Thus, the study concluded reflexology can decrease the labour pain and also it

is a safe technique and it can be replaced as an alternative for pharmacological methods to control the pain.²⁰ The findings of this current study also lines with the outcomes of those in the previous studies. The patients showed a significant change in the mean pain scores from 4.05 in the 1st post-operative day to 1.27 and 0.03 in the 4th and 5th post-operative days respectively. The pain intensity also reduced significantly in the study group in the 4th and 5th post-operative days to mild or no pain from severe pain in the 1st post-operative day when compared to the control group following the massage. Hence foot reflex therapy can be used as an adjuvant therapy to relieve pain in post-operative patients.

Another study was performed among stomach cancer patients which investigated the foot reflex treatment and management as adjuvant therapy to alleviate pain and reduction of anxiety in patients with cancer and also supported to the management of postoperative pain in cancer patients.²¹ Thus nurses play an important role in improving the patient's health and post-operative recovery as they come in close line of contact with the patients. Foot reflex therapy can be a very good alternative complementary therapy in this accord which the nurses can offer to the patients apart from the administration of regular analgesics and other pain-relieving medications.

CONCLUSIONS

Postoperative pain was reduced in patients who underwent abdominal surgery, upon treatment with foot reflex therapy. Those who received foot reflex therapy for five days post operatively and further continued the therapy being given by patient's care giver at home have produced a more significant positive effect on pain. Foot reflex therapy is an effective therapy to control acute post-operative pain and thereby improves the quality of life of patients. More specific studies should be conducted in the future about the effectiveness of foot reflex therapy in various other parameters and comparative studies can be done among types of surgery and anaesthesia.

Data sharing statement provided by the authors is available with the full text of this article at jemds.com.

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