

Case Study: Treating Postoperative Pain Case Study

Auricular Acupressure for Managing Postoperative Pain and Knee Motion in Patients with Total Knee Replacement: A Randomized Sham Control Study

Abstract

Background

Postoperative pain management remains a significant challenge for all healthcare providers. A randomized controlled trial was conducted to examine the adjuvant effects of auricular acupressure on relieving postoperative pain and improving the passive range of motion in patients with total knee replacement (TKR).

Method

Sixty-two patients who had undergone a TKR were randomly assigned to the acupressure group and the sham control group. The intervention was delivered three times a day for 3 days. A visual analog scale (VAS) and the Short-Form McGill Pain Questionnaire were used to assess pain intensity. Pain medication consumption was recorded, and the knee

motion was measured using a goniometer.

Results

The patients experienced a moderately severe level of pain postoperatively (VAS 58.66 ± 20.35) while being on the routine PCA ... However, analgesic drug usage in the acupressure group patients was significantly lower than in the sham control group ($P < 0.05$), controlling for BMI, age, and pain score. On the 3rd day after surgery, the passive knee motion in the acupressure group patients was significantly better than in the sham control group patients ($P < 0.05$), controlling for BMI.

Conclusion

The application of auricular acupressure at specific therapeutic points significantly

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reduces the opioid analgesia requirement and improves the knee motion in patients with TKR.

Introduction:

Knee osteoarthritis frequently occurs in elderly people. The overall prevalence of knee osteoarthritis is 23.9%, occurring in 21.0% of men and 27.3% of women [1]. Knee-replacement surgery is frequently performed and is highly successful with respect to pain relief and the improvement in knee function in people with advanced knee osteoarthritis [2]. Postoperatively, patients undergoing total knee replacement would experience significant pain, which can limit their progression in the range of knee motion and ambulatory status.

Despite the development of new pain control methods and medication and the adoption of guidelines for pain care by many hospitals, postoperative pain is still a problem for many patients. A substantial proportion of total knee replacement (TKR) patients experience severe postoperative pain during the

early recovery period [3]. Improper pain control not only increases the burden on many organs but also limits the patient's activity, increases the postoperative morbidity, affects the physical recovery and the emotional state of the patient after surgery, and is more likely to extend the length of the stay and increase the medical costs [4-8]...

Methods:

Sixty-two patients scheduled to undergo an elective total knee replacement were recruited from August 1st, 2010 to March 31, 2011...

All of the patients received an operation under standardized general anesthesia protocols. The patients received routine pain management at the end of the operation: the intravenous PCA was connected to an IV line and set to deliver a bolus of 1 mg morphine with a lockout interval of 5 minutes and a 4-hour maximum morphine dose of 10 mg...Throughout the study period, one acupressure therapist performed the auricular acupressure, and the outcome

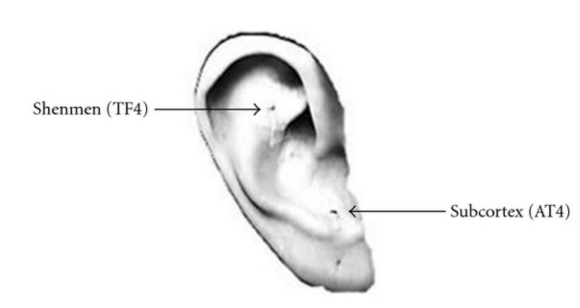
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data were collected by a research assistant who had been trained and was blinded to the patient's group...

The patients were randomly assigned into the auricular acupressure or sham control groups. The auricular acupressure therapy was delivered by the therapist, who was an advanced practice nurse and had been accredited for practicing acupressure. The auricular acupressure involved embedding the magnetic beads within skin-colored adhesive tape that was placed on the auricular acupoints and retained in situ for 3 days (Figure 2). The choice of Shenmen (TF4) and subcortex (AT4) acupoints was based on clinical reports [15–18, 21] and the TCM physician's recommendation. Acupressure then was applied by repeatedly pressing the acupoints with the fingertips for 3 minutes per point, 3 times per day (9 AM, 1 PM, 5 PM). The last treatment was given on the third day after surgery at 5 PM. To validate the auricular acupressure, two Chinese medicine practitioners confirmed the acupoints and the acupressure protocol.

Fig. 2



The patients in the sham control group received regular care and also received the same skin-colored adhesive tape placed on the acupoints but did not receive any massage or acupressure. The sham control patients were given auricular acupressure after the data collection was completed...The pain assessment was conducted using the visual analog scale (VAS) and the Short-Form McGill Pain Questionnaire (SF-MPQ), both of which have good reliability [22]...

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Results:

A total of 62 patients completed the study, 53 women and 9 men, with a mean age of 70.98 (range 46–88) years. The operations included 31 left knees and 31 right knees and were performed by 2 surgeons...None of the patients who received auricular acupressure showed any complications or adverse reactions after the therapy... The analgesic drug usage (38.49 ± 15.53 mg of morphine) in the acupressure group patients was significantly lower than in the sham control group patients (53.07 ± 19.90 mg) ($P < 0.05$)... On the 3rd day after surgery, the passive knee flexion motion in the acupressure group patients ($71.68 \pm 6.90^\circ$) was significantly better than in the sham control group patients ($66.94 \pm 7.15^\circ$) ($P = .01$)...

Discussion:

Our patients reported postoperative pain as moderately severe during the 1st day (baseline) following TKR while the patients were on PCA for pain management. This result corresponded with previously reported results [1] and those of Norkin

et al. [27], who reported that patients are still in pain while being treated with analgesic drugs and techniques, indicating that the management of postoperative pain remains a challenge for medical practitioners. Subsequently, alongside the conventional opioid analgesics, an adjuvant treatment involving a nonpharmacological modality may offer some benefits in the management of postoperative pain in TKR patients.

Similar to acupuncture, we found that 3 days of auricular acupressure can significantly lower the postoperative opioid consumption after a total knee replacement surgery. Our results showed that the morphine consumption in the sham control group patients was 8.38 times higher than that in the acupressure group...

The analgesic effect of acupressure in the reduction of required postoperative morphine can most likely be explained through the stimulation of acupoints, which can adjust organs, correct imbalances of Qi, stabilize the body,

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strengthen the functions, and cure diseases [28]. Acupoints stimulation also increases endorphin secretion and serotonin production, thereby suppressing the transmission of pain messages and its perception [28]

Our present findings illustrate that auricular acupressure applied to the Shenmen (TF4) and Subcortex (AT4) acupoints can also improve the range of motion of the knee after the operation. This effect can be explained primarily because auricular acupressure produced an analgesic effect, allowing patients to have a better compliance with the treatments designed to improve the range motion in the knee...

The acupressure procedure was safe and easy to perform under the perioperative clinical conditions using finger press and massage on the auricular acupoints after the operation. The study protocol was based on the experts' recommendations for the practice of acupuncture...

In conclusion, a program of auricular acupressure applied to therapeutic auricular acupoints significantly reduces the opioid analgesic consumption and improves the passive range motion of the knee postoperatively after total knee replacement...

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