Perioperative Nursing Experience of TCM Directional Drug Penetration Therapy Combined with Enhanced Recovery After Surgery Protocol in Hip Arthroplasty Patients

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Abstract

Objective To investigate the nursing experience of Traditional Chinese Medicine directional drug permeation therapy combined with the Enhanced Recovery After Surgery (ERAS) concept in the perioperative period of hip arthroplasty patients. Methods A total of 90 patients who underwent artificial hip arthroplasty in our hospital from October 2022 to October 2023 were selected and randomly divided into an observation group and a control group, with 45 cases in each group. The control group received conventional orthopedic perioperative nursing care, while the observation group received optimized perioperative nursing care for artificial hip arthroplasty under the intervention of Traditional Chinese Medicine directional drug permeation therapy combined with the ERAS concept, based on conventional nursing. Postoperative pain, complications, recovery time, hip function, and satisfaction were compared between the two groups. Results The pain scores of the observation group at 1 day, 3 days, and 7 days postoperatively were lower than those of the control group, the incidence of complications was lower than that of the control group, the time to first ambulation was earlier than that of the control group, the length of hospital stay was shorter than that of the control group, the hip function score at 3 months postoperatively was higher than that of the control group, and patient satisfaction at discharge was higher than that of the control group. All differences were statistically significant ($P<0.05$). Conclusion The application of Traditional Chinese Medicine directional drug permeation therapy combined with the ERAS concept in the perioperative period of artificial hip arthroplasty demonstrates significant nursing efficacy. It can effectively relieve postoperative pain, reduce postoperative complications, shorten recovery time, promote hip function recovery, and improve patient satisfaction, warranting clinical promotion and application.

Full Text

Preamble

Perioperative Nursing Experience of Targeted Traditional Chinese Medicine Drug Permeation Therapy Combined with Enhanced Recovery After Surgery (ERAS) in Patients Undergoing Hip Arthroplasty

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Abstract

Objective: To investigate the perioperative nursing experience of targeted traditional Chinese medicine (TCM) drug permeation therapy combined with the enhanced recovery after surgery (ERAS) concept in patients undergoing hip arthroplasty.

Methods: A total of 90 patients who underwent total hip arthroplasty (THA) in our hospital from October 2022 to October 2023 were randomly divided into an observation group and a control group, with 45 cases in each group. The control group received routine orthopedic perioperative nursing care, while the observation group received optimized perioperative nursing care for THA under the intervention of TCM targeted drug permeation therapy combined with ERAS principles, in addition to conventional care. Postoperative pain, complications, recovery time, hip function, and patient satisfaction were compared between the two groups.

Results: The pain scores in the observation group at postoperative day 1, day 3, and day 7 were lower than those in the control group. The incidence of postoperative complications was lower in the observation group, and the time to first ambulation was earlier. The hospitalization duration was shorter, the hip function score at 3 months postoperatively was higher, and patient satisfaction at discharge was greater in the observation group compared to the control group. All differences were statistically significant ($P<0.05$).

Conclusion: The application of TCM targeted drug permeation therapy combined with ERAS principles in the perioperative period of THA demonstrates significant nursing effects. This approach can effectively alleviate postoperative pain, reduce complications, shorten recovery time, promote hip function recovery, and improve patient satisfaction, making it worthy of clinical promotion and application.

Keywords: targeted drug permeation therapy of traditional Chinese medicine; enhanced recovery after surgery concept; hip arthroplasty; perioperative period; nursing experience

Introduction

Population aging represents a critical social challenge worldwide. According to relevant data, by the end of 2022, China's elderly population had reached 210 million. Research shows that as population aging intensifies, hip diseases such as hip fractures have increased correspondingly among older adults, causing not only pain but also joint deformities, decreased stability, limited mobility, and even disability. For most patients, total hip arthroplasty (THA) can effectively relieve pain, restore hip function, and improve quality of life [1]. However, THA is a traumatic procedure that elicits substantial surgical stress responses. Patients are typically elderly with declining organ function, severe osteoporosis, and prolonged healing times. Additionally, postoperative pain and complications often result in poor compliance, inadequate rehabilitation exercise, and suboptimal hip function recovery, making it difficult to achieve expected outcomes.

Enhanced Recovery After Surgery (ERAS) is an evidence-based, multidisciplinary approach involving surgery, anesthesia, nursing, and nutrition that optimizes clinical pathways related to perioperative management. By mitigating various perioperative stress responses, ERAS aims to reduce postoperative complications, shorten hospital stays, and promote recovery [2]. Targeted TCM drug permeation therapy is an external TCM treatment method that, guided by a permeation device and utilizing the proximal therapeutic characteristics of acupoints, enables effective transdermal delivery of active herbal ingredients directly to the lesion site to achieve muscle relaxation, pain relief, and swelling reduction [3]. This study reports our nursing experience with the application of TCM targeted drug permeation therapy combined with ERAS principles in the perioperative management of THA patients.

1.1 Study Subjects

Ninety patients who underwent THA in the Orthopedics Department of Cili County Traditional Chinese Medicine Hospital between October 2022 and October 2023 were selected as study subjects. Using a random number table method, patients were assigned to either the observation group or the control group, with 45 cases in each group. In the observation group, there were 20 males and 25 females, aged 60-91 years with a mean age of $74.8\pm6.9 years; 36 cases had femoral neck fractures and 9 had femoral head necrosis. In the control group, there were 86 years with a mean age of 74.6±$6.8 years; 35 cases had femoral neck fractures and 10 had femoral head necrosis. Comparison of general data between the two groups showed no statistically significant differences (P>0.05).

1.2.1 Inclusion Criteria

Patients were included if they had: (1) imaging-confirmed diagnosis of hip diseases such as femoral neck fracture or femoral head necrosis; (2) first-time THA; (3) no obvious abnormalities in muscles around the hip joint; (4) no significant

abnormalities in preoperative examinations such as bilateral lower extremity venous and arterial ultrasound; (5) indications for TCM targeted drug permeation therapy; and (6) signed informed consent.

1.2.2 Exclusion Criteria

Patients were excluded if they had: (1) cognitive dysfunction; (2) preoperative infection; (3) severe systemic organ disease; (4) other orthopedic diseases; (5) contraindications for TCM targeted drug permeation therapy; or (6) inability to tolerate surgery or surgical contraindications.

1.3.1 Control Group

The control group received routine orthopedic perioperative nursing care, which included: (1) **Preoperative care:** assessment of overall condition upon admission; smoking and alcohol cessation; assistance with preoperative examinations; monitoring of vital signs to maintain stable blood pressure and glucose; education to patients and families about disease-related knowledge and the necessity and methods of adequate hydration, effective coughing and sputum expectoration, deep breathing exercises, turning and back percussion, and lower extremity functional exercises; guidance on using the bedpan; detailed introduction to THA treatment protocols; preoperative fasting for 8-12 hours; preoperative indwelling catheter placement; and medication administration as prescribed. (2) **Postoperative care:** monitoring of vital signs, observation of wound dressings and blood circulation at the surgical limb extremity with timely reporting of abnormalities to physicians; fluid intake 6 hours after awakening from anesthesia, gradually transitioning from liquid to regular diet; implementation of drainage tube and catheter care; administration of medications (anticoagulants, antibiotics, etc.) as prescribed with medication education; pain management upon patient complaint; guidance on rehabilitation exercises to prevent complications such as deep vein thrombosis and pressure injuries; removal of drainage tubes on postoperative days 2-3; and guidance on ambulation based on patient recovery. (3) **Discharge guidance:** instructions for follow-up visits at 1, 3, and 6 months, along with education on post-discharge precautions and rehabilitation exercise methods.

1.3.2 Observation Group

Based on the control group care, the observation group received optimized perioperative nursing care integrating ERAS principles combined with postoperative TCM targeted drug permeation therapy. Specific interventions included:

Preoperative care: (1) **Preemptive analgesia:** Pain management was initiated upon admission using the Visual Analogue Scale (VAS) to assess pain intensity, with appropriate interventions based on scores, including oral anti-inflammatory analgesics (etoricoxib, diclofenac), intravenous medications (flurbiprofen axetil, lysine acetylsalicylate, sodium aescinate), and rectal administra-

tion (diclofenac sodium suppositories). The approach shifted from on-demand to scheduled administration, with timely adjustment of analgesic protocols based on VAS scores and monitoring for adverse effects. (2) **Standardized health education prescription:** Multi-channel education (verbal, written, video) was provided to patients and families about disease knowledge and treatment measures to ensure cooperation. Personalized functional exercise supervision plans were developed based on admission assessments, including ankle pump exercises, quadriceps contraction exercises, gluteal muscle isometric contractions, lower extremity movements, hip abduction exercises, and deep breathing exercises (practicable using the healthy limb for simulation). Systematic and standardized health education, along with preoperative exercise and intensive limb function training, has demonstrated significant effects in preventing complications (infection, deep vein thrombosis, pressure injuries, hip dislocation) and shortening recovery time [4]. (3) **Selective catheterization:** Indwelling catheters were not placed routinely but decided based on surgical duration. Patients were trained to urinate in bed preoperatively (female patients used female urinals to reduce pain) and emptied their bladder before entering the operating room. For patients requiring catheterization, it was performed after anesthesia to reduce anxiety, fear, and discomfort. (4) **Dietary intervention:** Nutritional status was assessed, and reasonable dietary plans were formulated according to patient preferences to increase nutritional intake. Overnight fasting was not required; instead, patients received oral carbohydrate intake or intravenous supplementation 2 hours before surgery as prescribed. (5) **Psychological care:** Patient psychological status was addressed by understanding concerns and providing timely communication and patient answers. Successful surgical patients were arranged to share experiences in the ward to help build confidence and cooperation.

Intraoperative care: (1) Operating room temperature was maintained around 25°C, with warming blankets, heated irrigation fluids, and warmed infusions used to maintain stable body temperature, along with controlled fluid management to maintain fluid balance [2]. (2) "Joint cocktail" (epinephrine, triamcinolone, ropivacaine, etc.) and tranexamic acid were administered for early postoperative preventive analgesia. (3) Antibiotics were administered 30-60 minutes before incision for infection prevention.

Postoperative care: (1) **Integrated medical-nursing rounds:** Healthcare teams conducted joint rounds and rehabilitation guidance. Dedicated responsible nurses were assigned to each patient to provide personalized care, fostering harmonious nurse-patient relationships, increasing trust, and improving satisfaction. (2) **Gastrointestinal management:** Upon returning to the ward, patients were assessed and encouraged to eat early. General anesthesia patients could drink after awakening, while spinal or epidural anesthesia patients could drink and consume liquid diets immediately upon return. Patients drank water according to individual tolerance, transitioned to liquid diet after 2 hours if no discomfort occurred, then gradually to regular diet, with fluid intake of 2000-3000 ml after eating. Early feeding alleviated gastrointestinal discomfort from

fasting and promoted early gastrointestinal function recovery. Additionally, TCM syndrome-based nursing was implemented; most THA patients experienced constipation, insomnia, and other physical and psychological symptoms postoperatively. Appropriate dietary guidance was provided according to different syndrome types, combined with therapies such as rhubarb umbilical plaster, moxibustion, and auricular point pressing to relieve symptoms. Acupoint application or massage at Taiyang, Hegu, and Neiguan points was used to prevent dizziness, headache, and nausea after anesthesia. (3) **Pain management:** A multimodal analgesia protocol with personalized pain control was implemented. Effective control of postoperative movement pain reduced analgesic-related adverse reactions and facilitated early ambulation. Education on pain-free wards and patient comfort experience was emphasized, encouraging patients to actively report pain. Pain was assessed each shift; VAS scores >3 were reported to physicians, while scores $ $3 were managed with distraction, psychological counseling, position changes, and music therapy. Family members were instructed on proper use of patient-controlled analgesia pumps. Anticoagulants (low molecular weight heparin starting postoperative day 1), analgesics, antibiotics, and other medications were administered as prescribed with explanations of drug effects. (4) **Tube management:** For patients with indwelling catheters, early removal within 24 hours postoperatively was performed, with moxibustion at Zhongji and Shuidao points to promote spontaneous urination and encouragement to drink more water after voiding. Wound drainage tubes were removed promptly on postoperative days 1-2 based on condition. (5) **Position management:** Pillow-free supine position was not advocated; instead, the head of the bed was elevated 15° with pillow use. Neutral abduction position was maintained with a soft pillow between the legs, and patients with severe foot drop or rotation/adduction wore orthopedic shoes for correction. (6) **Postoperative functional exercise:** According to personalized exercise supervision cards, responsible nurses supervised and documented patients' standardized completion of functional exercises daily. Ankle pump exercises were initiated after anesthesia recovery (200-300 times daily). Quadriceps contraction exercises were performed in sets of 12, 3 sets each time, twice daily. Gluteal muscle isometric contractions were performed in sets of 12, 3 sets each time, twice daily. Lower extremity movement training consisted of 10 repetitions per set, 3 sets each time, twice daily. Hip abduction exercises were performed in sets of 10, 2-3 sets each time, 2-3 times daily. Upper extremity strength training, straight leg raises, and bridging exercises (after one week) were also included. On postoperative day 1, patients were guided to sit on the bedside in bed. On postoperative days 1-3, after muscle strength assessment, patients were guided to ambulate with a walker (following the principle of lying-sitting-standing-assisted walking), with gradual activity increase. (7) **TCM targeted drug permeation therapy:** Starting on postoperative day 1, specially trained nurses performed interventions using a TCM targeted drug permeation therapy device (manufacturer: Nanjing Dingshi Medical Equipment Co., Ltd.; model: DS-MF2B). Pads soaked with specialized orthopedic herbal formula were placed on dedicated electrode moisturizing sheets, which were then applied to acupoints including Yanglingquan,

Hip Bone point (Hun Gu), Ashi points, Chengshan, and Zusanli on the surgical limb, ensuring tight skin contact. Treatment mode (import massage), prescription selection, intensity (adjusted according to patient tolerance), and duration (30 minutes) were set, with 1-2 sessions daily for 10-12 days. (8) **Discharge health guidance:** At discharge, responsible nurses provided multi-channel education (verbal, health prescription, video) on post-discharge precautions and functional exercises. Telephone, WeChat, or home visits were used for follow-up. Within 1-2 weeks post-discharge, responsible nurses conducted telephone follow-up, with immediate home visits for special cases to provide face-to-face guidance on standardized hip functional exercises. Follow-up visits were scheduled at 1, 3, and 6 months post-discharge.

1.4 Outcome Measures

1.4.1 Postoperative pain: Pain intensity was assessed using the Visual Analogue Scale (VAS) on postoperative days 1, 3, and 7. A 10-point sliding scale was used to score pain in both groups, with scores ranging from 0-10, where higher scores indicated greater pain intensity [5].

1.4.2 Hip function at 3 months postoperatively: Hip function was evaluated using the Harris Hip Score at 3 months postoperatively (including four dimensions: function, pain, range of motion, and limb deformity, with a total score of 100; higher scores indicated better hip function) [6].

1.4.3 Postoperative complications: The incidence of complications including deep vein thrombosis, pulmonary infection, urinary tract infection, pressure injuries, and hip dislocation was recorded.

1.4.4 Recovery time indicators: Time to first postoperative ambulation and length of hospital stay were recorded.

1.4.5 Patient satisfaction: Patients completed our hospital's self-designed orthopedic inpatient satisfaction questionnaire at discharge, covering five major categories (treatment procedures, observation and understanding, daily care, respect and consideration, explanation and guidance) with 27 items, totaling 100 points, where higher scores indicated greater satisfaction.

1.5 Statistical Methods

Study data were analyzed using GraphPad Prism statistical software. Measurement data were expressed as (s x ±) and analyzed using t-tests. Count data were expressed as cases (%) and analyzed using X^2 tests. $P<0.05$ indicated statistically significant differences.

Results

2.1 Comparison of Postoperative Pain and Hip Function Between Groups

Postoperative VAS scores at days 1, 3, and 7 were significantly lower in the observation group compared to the control group (all $P<0.05$). The Harris Hip Score at 3 months postoperatively was significantly higher in the observation group than in the control group ($P<0.05$) .

2.2 Comparison of Postoperative Complications Between Groups

The incidence of postoperative complications in the observation group was significantly lower than in the control group ($X^2=3.27$, $p=0.017<0.05$) .

2.3 Comparison of Postoperative Recovery Time and Satisfaction Between Groups

The time to first postoperative ambulation was significantly earlier in the observation group ($P<0.05$), hospital stay was shorter ($P<0.05$), and patient satisfaction was significantly higher ($P<0.05$) compared to the control group .

Discussion

As population aging intensifies, the incidence of hip diseases (femoral neck fractures, femoral head necrosis, etc.) continues to rise annually. After half a century of development, total hip arthroplasty has played an important role in treating hip diseases, with over one million patients worldwide undergoing THA annually, of which China accounts for more than 20% [7]. However, as a traumatic procedure, THA causes severe postoperative pain that affects patient ambulation and rehabilitation exercise, leading to unsatisfactory hip function recovery. Moreover, patients are typically elderly with poor physical resistance and often comorbid medical conditions, prolonged bed rest, and high postoperative complication rates, all of which impact recovery outcomes. How to optimize perioperative nursing care for THA patients to enable early rehabilitation exercise, early ambulation, complication prevention, hip function recovery, and improved quality of life and patient satisfaction has become a current clinical nursing priority.

The ERAS concept is a novel nursing model proposed in recent years in the medical and nursing field, with patient-centered care as its core principle. This approach emphasizes reducing physiological responses caused by surgery, anesthesia, and psychological stress to achieve the goals of controlling complication risk and promoting recovery. In recent years, ERAS has been applied in THA with confirmed efficacy [8]. Under ERAS-optimized THA perioperative nursing, preoperative preemptive analgesia, standardized health education prescriptions, dietary intervention, psychological care, and complication prevention can relieve or eliminate postoperative pain, shorten gastrointestinal function recovery

time, reduce postoperative complications, improve patient and family compliance with treatment and nursing, and enhance patient confidence in postoperative recovery. Intraoperative warming measures and controlled fluid management effectively maintain physiological stability, reduce surgical stress response, and ensure smooth surgical procedures. The use of "joint cocktail" and tranexamic acid effectively prevents early postoperative pain and reduces postoperative opioid consumption, facilitating early rehabilitation exercise. Postoperative multimodal analgesia based on pain scores improves patient comfort during rehabilitation exercise, prevents pain-related fear of movement, promotes active participation in early rehabilitation, restores hip function, enables early ambulation, and prevents complications from prolonged bed rest such as infection, deep vein thrombosis, pressure injuries, and hip dislocation, while also promoting gastrointestinal function recovery and metabolism, laying a solid foundation for high-quality rehabilitation, achieving rapid recovery goals, and improving patient satisfaction.

TCM targeted drug permeation therapy is an improved treatment based on traditional TCM theory, integrating transdermal drug delivery, medium-frequency digital bionic massage, and thermal magnetic therapy by combining thermotherapy medicine, pharmacokinetics, and classical Chinese medicine. This approach achieves targeted drug treatment and medium-frequency bionic massage, improving local blood circulation more effectively than single low- or medium-frequency currents, facilitating deep penetration to disease sites. It promotes directional movement of drug ions toward lesions, accelerates local microcirculation, enhances drug efficacy while stimulating acupoints, unblocks meridians, reduces swelling, alleviates pain, and lowers VAS scores. The therapy can inhibit small nerve fibers, cause vasodilation, promote blood circulation, and accelerate removal of local pain substances. In this study, advanced medium-frequency technology and unidirectional pulsed electric fields were used to deliver medicinal effects into and through the patient's body. Through dual thermal and acupoint effects, stimulation of Yanglingquan, Hip Bone point, Ashi points, Chengshan, and Zusanli effectively dilated skin arterioles and venules, reduced muscle tension, relieved local pain, and thereby promoted early active ambulation, reduced postoperative complications, and accelerated hip function recovery [9].

Our study results show that the observation group had lower pain scores at postoperative days 1, 3, and 7, earlier first ambulation, fewer postoperative complications, shorter hospital stays, higher hip function scores at 3 months, and greater satisfaction compared to the control group. These findings indicate that TCM targeted drug permeation therapy combined with ERAS-optimized perioperative nursing can significantly reduce VAS scores, shorten time to first ambulation, decrease postoperative complications, and improve postoperative rehabilitation quality. The reasons may include: dedicated responsible nurses eliminate unfamiliarity, foster harmonious nurse-patient relationships, and improve treatment cooperation; preemptive analgesia, multimodal analgesia, and TCM targeted drug permeation therapy significantly reduce or eliminate postop-

erative pain and effectively control movement pain; standardized health education prescriptions improve the feasibility and compliance of functional exercise, promoting active patient participation in rehabilitation. Additionally, ERAS principles of selective catheterization and early drainage tube removal reduce perioperative stress, eliminate patient constraints, enhance comfort, and facilitate rehabilitation exercise implementation. Furthermore, shortened preoperative and postoperative fasting times reduce hunger, promote early gastrointestinal recovery, enhance nutrient absorption, and accelerate wound healing, achieving rapid recovery goals [10].

In summary, the application of TCM targeted drug permeation therapy combined with ERAS principles in the perioperative period of THA can effectively relieve postoperative pain, reduce complication rates, shorten recovery time, promote hip function recovery, and improve patient satisfaction, making it worthy of clinical promotion and application.

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Note: Figure translations are in progress. See original paper for figures.