

Perioperative Nursing Care of a Patient with Severe Osteoporosis Undergoing Secondary Revision Hip Arthroplasty

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Abstract: To summarize the perioperative nursing experience of a patient with severe osteoporosis undergoing secondary revision hip arthroplasty. Nursing key points: multimodal analgesia management for complex pain; empowering psychological intervention and anxiety management; preventive nursing for high-risk prosthesis dislocation; prophylactic nursing for extremely high-risk thrombosis; multidisciplinary collaborative anti-infection nursing; and continuous rehabilitation nursing. After 3 weeks of systematic nursing, the patient's Numerical Rating Scale (NRS) pain score decreased from 6 at activity to 2, anxiety improved, and no complications such as dislocation, thrombosis, or wound infection occurred. The patient was discharged on schedule. Follow-up at 4 and 12 weeks after discharge showed stable mood and good rehabilitation compliance.

Keywords: Hip revision arthroplasty; Severe osteoporosis; Psychological nursing; Perioperative nursing; Case nursing

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1. Introduction

Secondary revision hip arthroplasty is indicated for patients with prosthesis failure after initial revision^[1,2]. Patients with severe osteoporosis have poor bone quality, and the difficulty of secondary revision surgery and nursing care increases significantly. Current literature mostly focuses on surgical technique modification and complication prevention, with insufficient attention to patients' psychological health and holistic care^[3-5]. Patients with severe osteoporosis undergoing secondary revision hip arthroplasty often experience complex pain resulting from the superposition of chronic bone pain and acute postoperative pain^[6,7]; in addition, multiple surgical experiences can easily lead to severe anxiety, creating dual physical and psychological stress. This case involved a 60-year-old male patient who had previously undergone bilateral total hip arthroplasty and initial revision surgery, and was now scheduled for secondary revision of the right hip. The patient had comorbid severe osteoporosis, rheumatoid arthritis, and gout. Intraoperative exploration revealed multiple fractures of the right femoral shaft. The operation lasted 9 h with 1200 mL blood loss. The

perioperative Caprini thrombosis score was 11 (extremely high risk), and there were also risks of prosthesis dislocation and infection, presenting prominent nursing challenges. In response, the department implemented integrated “body-mind” nursing under multidisciplinary collaboration. This study achieved closed-loop perioperative risk prevention and control through multidisciplinary collaboration, adopted individualized multimodal analgesia to ensure safe early rehabilitation, and combined positive psychology intervention to relieve postoperative anxiety, achieving holistic body-mind nursing. This article summarizes the perioperative nursing experience of this case to provide reference for nursing care of similar complex revision cases.

2. Clinical data

2.1. General data

The patient, male, 60 years old, was admitted due to “pain and limping for more than 2 years after right hip revision arthroplasty”. Past surgical history: bilateral total hip arthroplasty in 2002, initial revision of bilateral hip prostheses in 2013; secondary revision of the left hip in December 2025; this admission was planned for secondary revision of the right hip. Comorbidities included severe osteoporosis, rheumatoid arthritis, and gout. No history of drug allergy.

Admission physical examination: vital signs stable; old surgical scar visible on the right hip, with no local redness, swelling, or sinus tract; positive tenderness in the groin area; active and passive movement of the right hip limited; right lower limb shortened by 3 cm compared with the healthy side; left hip incision healed well; muscle strength and peripheral blood circulation of both lower limbs normal. Numerical Rating Scale (NRS) pain score was 3 at rest and increased to 6 at activity.

2.2. Treatment and outcome

Preoperative auxiliary examinations indicated a hypercoagulable state: fibrinogen 7.15 g/L, D-dimer 1.93 mg/L, with sinus tachycardia, indicating a high risk of postoperative complications. On January 14, 2026, secondary revision of the right hip prosthesis was performed under spinal anesthesia. Intraoperative exploration revealed multiple fractures of the right femoral shaft. The operation lasted 9 h with 1200 ml blood loss, and the patient was transferred to the intensive care unit for 24 h postoperatively.

In the early postoperative period (days 1–2), vital signs were stable, with an indwelling urinary catheter and double incision drainage tubes, and the patient was severely dependent in activities of daily living. On postoperative day 2, pain worsened (NRS score 6) with severe anxiety; the patient was restless and repeatedly asked about the surgical prognosis, fearing prosthesis dislocation. In the intermediate postoperative period (days 3–8), sleep deteriorated. Psychiatric consultation diagnosed postoperative anxiety state, and zaleplon dispersible tablets were given to improve sleep, along with individualized psychological nursing. On postoperative day 8, fever occurred (body temperature 39 °C), which returned to normal after symptomatic treatment.

Multidisciplinary collaborative intervention was immediately initiated: the pharmacy department adjusted the anti-infection regimen and added meropenem; the rheumatology and immunology department intervened to lower uric acid and prevent gout attacks; the nutrition department formulated a specialized nutritional plan to promote fracture healing. After 3 weeks of systematic nursing, the patient’s pain and anxiety symptoms improved significantly, and the NRS score decreased to 2. Postoperative imaging re-examination showed good prosthesis position and satisfactory fracture alignment. During hospitalization,

no complications such as prosthesis dislocation, deep vein thrombosis, or incision infection occurred. The patient could independently turn to the healthy side and was discharged smoothly. Telephone follow-up at 4 weeks after discharge showed stable mood and good compliance with rehabilitation training.

3. Nursing

3.1. Multimodal analgesia management for complex pain

This patient had comorbid severe osteoporosis with chronic bone pain, superimposed on acute traumatic pain caused by secondary revision surgery. The pain mechanism was complex and difficult to control. We implemented a multimodal analgesia regimen combining pharmacological, physical, and non-pharmacological interventions to achieve dynamic pain management throughout the perioperative period^[8]. Within 72 h after surgery, a patient-controlled analgesia pump was used to control acute pain; on postoperative day 4, oral celecoxib (200 mg, twice daily) combined with sustained-release tramadol tablets (100 mg, twice daily) was administered for baseline analgesia. Meanwhile, targeting the underlying osteoporosis, alendronate sodium (70 mg, once weekly) and Caltrate D (600 mg, once daily) were regularly administered to improve bone quality and relieve intractable chronic pain. From 24 h after surgery, local ice application was performed (15 min per session, 3 times daily) to reduce incision swelling and inflammatory pain. During rehabilitation training, music therapy was used to divert attention and improve exercise tolerance. NRS scores were monitored daily. The patient's pain score steadily decreased from a peak of 6, and at discharge, only occasional mild pain (score 2) occurred after activity, with no adverse drug reactions throughout. For patients with fragile osteoporotic bones, stable pain control not only improves comfort but also serves as an important safeguard against falls and secondary fractures. In this case, multimodal analgesia effectively resolved the challenge of superimposed chronic and acute pain, creating safe conditions for early rehabilitation activities.

3.2. Empowering psychological intervention and anxiety management

The patient had undergone multiple hip surgeries and harbored fear of another revision. On postoperative day 2, when pain intensified, severe anxiety appeared, manifested as restlessness, repeated questioning about surgical prognosis, and fear of prosthesis dislocation. We recognized the shortcoming of missing psychological intervention in traditional orthopedic nursing, and therefore implemented individualized empowering psychological intervention based on the positive psychology PERMA model^[9]. From postoperative day 2, the patient was guided to record “three grateful things” daily to help divert excessive attention from pain; during pain episodes, mindfulness breathing was guided, and by postoperative day 5, the patient could use it independently. Rehabilitation movements were designed as a “check-in challenge” game, and on postoperative day 7, the patient achieved a continuous accomplishment. Audiobooks were used to induce flow experiences, and the patient reported “forgetting the pain while listening to books”. The primary nurse provided consistent explanation and feedback throughout to build a trusting relationship. Family members were instructed to “support without replacing”, encouraging the patient to move independently. On postoperative day 6, the patient successfully turned over independently and received positive family reinforcement. We also guided the patient to visualize rehabilitation goals (e.g., walking in the park, picking up grandchildren), reconstructing the illness narrative from “bad luck” to “persisting despite difficulties”. On postoperative day 8, the patient proactively comforted other patients with his own experience, marking a

transition from “patient” to “helper”. Rehabilitation micro-goals were broken down with specific feedback. On postoperative day 12, the patient actively shared his experience with fellow patients, and self-efficacy was significantly enhanced. On postoperative day 8, sleep declined; psychiatric consultation confirmed “postoperative anxiety state”, and zaleplon dispersible tablets were given to improve sleep, with simultaneous reinforcement of psychological nursing. At discharge, the patient’s anxiety improved and mood was stable. This body-mind psychological intervention effectively improved the specific anxiety of revision patients, corrected negative illness perceptions, and significantly enhanced treatment and rehabilitation initiative.

3.3. Preventive nursing for high-risk prosthesis dislocation

Patients with severe osteoporosis have insufficient bone reserve and poor prosthesis stability, and the risk of dislocation after secondary revision is significantly increased ^[10]. Therefore, we focused on position management and risk prevention. Postoperatively, the affected limb was strictly maintained in an abducted neutral position, with a “T”-shaped shoe and a trapezoid pillow placed between the legs. Double-person log-rolling was strictly performed to ensure hip stability. The head of the bed was elevated $\leq 30^\circ$, and straight leg raising was prohibited within 7 days after surgery. The hip flexion angle was strictly controlled at $< 90^\circ$ throughout. At the same time, health education was strengthened. The “three no’s” principle was explained and strictly implemented for the patient and family members: do not sit on low stools, do not cross the legs, and do not bend sideways, avoiding high-risk dislocation movements. This case was surgically complex, with multiple femoral shaft fractures observed intraoperatively, further increasing the hidden risk of dislocation. However, through standardized position management and continuous education, no prosthesis dislocation occurred during hospitalization, indicating that strict position protection is crucial for high-risk revision patients with extremely poor bone quality.

3.4. Prophylactic nursing for extremely high-risk thrombosis

The patient had major surgical trauma and a long postoperative bed rest period, with a Caprini thrombosis risk assessment score as high as 11 (extremely high risk). We initiated a thrombosis prevention program early postoperatively: from postoperative day 1, ankle pump exercises in bed were instructed, and the patient was encouraged to drink more water to dilute the blood. Because the patient had multiple surgical incisions, pressure-based antithrombotic devices were avoided, and gentle limb massage from distal to proximal was used to promote blood circulation. At 24 h after surgery, subcutaneous injection of low-molecular-weight heparin 5000 IU was started and continued for 3 weeks, with dynamic monitoring of coagulation function and D-dimer changes. During nursing, we closely observed lower limb circumference, skin color, and temperature, and remained alert to signs of thrombosis. The patient did not develop deep vein thrombosis throughout. For extremely high-risk patients, pharmacological prophylaxis combined with early passive activity is safe and effective, but attention must be paid to bleeding tendency. No bleeding complications occurred in this case, confirming the feasibility of this regimen.

3.5. Multidisciplinary collaborative anti-infection nursing

The patient’s operation lasted as long as 9 h and involved two incisions at the hip and femur, indicating an extremely high risk of infection. On postoperative day 8, the patient developed fever (39°C), with elevated blood routine and inflammatory markers. Multidisciplinary consultation considered infection risk, and the anti-infection regimen was promptly adjusted. Vancomycin was intravenously infused every 12 h strictly

according to medical orders to ensure blood drug concentration; meropenem was added after consultation with the pharmacy department. Incisions were observed daily for redness, swelling, heat, pain, and exudate, and dressings were kept dry. The urinary catheter and drainage tubes were removed on postoperative day 1, and body temperature and blood counts continued to be monitored after removal. Meanwhile, the rheumatology and immunology department assisted in controlling rheumatoid arthritis and gout, and the nutrition department formulated a specialized nutrition package to promote fracture healing. Through closed-loop risk prevention and control under multidisciplinary collaboration, the patient's body temperature gradually returned to normal, the incisions healed well, and no surgical site infection occurred. This case suggests that for complex revision surgery, integrating multidisciplinary resources such as pharmacy, nutrition, and rheumatology and immunology, and dynamically adjusting anti-infection strategies, can effectively address postoperative high fever and high infection risk.

3.6. Continuous rehabilitation nursing

Before discharge, we provided systematic guidance to the patient and family members: avoid lying on the affected side within 3 months after surgery, do not sit on low sofas, and do not bend over to pick up objects; within 6 weeks after surgery, mainly walk with partial weight-bearing, gradually transitioning, with the principle of not causing pain; emphasize the importance of regularly taking anti-osteoporosis drugs, and inform that non-compliance may lead to prosthesis loosening again; clarify the follow-up plan at 6 weeks, 3 months, 6 months, and 1 year after surgery. At the same time, family members were told to pay attention to the patient's emotional changes and seek medical attention promptly if anxiety worsened. Telephone follow-up at 4 weeks after discharge showed stable mood, NRS score 2, and good adherence to rehabilitation training. Continuous nursing maintained the continuity of rehabilitation intervention, effectively avoiding functional decline and emotional fluctuations after discharge, and is an indispensable part of holistic care for complex revision patients.

4. Summary

A 60-year-old male patient was admitted for a second revision of the right hip joint, with comorbid severe osteoporosis, rheumatoid arthritis, and gout. Intraoperatively, multiple femoral shaft fractures were observed, indicating substantial surgical trauma and high nursing complexity. During the perioperative period, we implemented an integrated "physical and psychological co-nursing" model supported by multidisciplinary collaboration. Through multimodal analgesic management for complex pain, empowering psychological intervention and anxiety management, prevention of high-risk prosthesis dislocation, prophylactic nursing for extremely high-risk thrombosis, multidisciplinary collaborative anti-infection nursing, and continuous rehabilitation nursing, multiple challenges including pain, anxiety, and complications were effectively addressed. The patient's postoperative pain and anxiety improved significantly, and no complications such as dislocation, thrombosis, or infection occurred. The patient was discharged smoothly with good rehabilitation adherence during follow-up. This case confirms that an individualized, multidisciplinary holistic nursing strategy is safe and effective for high-risk patients such as those with severe osteoporosis undergoing multiple hip revisions. However, as this is a single case report lacking controlled quantitative analysis, future large-sample prospective studies are still needed to verify its generalizability. This nursing experience may serve as a reference for similar complex orthopedic revision cases.

Disclosure statement

The authors declare no conflict of interest.

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