



## Perioperative nursing care for hip arthroplasty patients with concomitant hypertension: A minireview

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### Abstract

Hip replacement (HA) is mainly indicated for the elderly, who generally suffer from various underlying diseases such as hypertension. This article provides a review of the key points of perioperative nursing care for patients with hypertension undergoing HA. It analyzes the key points of care during the perioperative period (preoperative, intraoperative, and postoperative) and proposes directions for the development of perioperative nursing care for HA. The prognosis for patients can be improved through the modification of traditional medical approaches and the application of new technologies and concepts.

**Key Words:** Hip arthroplasty; Hypertension; Perioperative nursing care; Intelligent Device; Quality of life; Future research

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**Core Tip:** Patients suffering from femoral neck and intertrochanteric fractures are frequently treated with an orthopedic rehabilitation surgery called hip arthroplasty (HA). Comorbidities challenge perioperative nursing care, specifically in older individuals, who comprise most HA patients. Postoperative rehabilitation may offer an avenue to enhance patients' quality of life with HA. The essential components of perioperative nursing care for patients with HA are covered in this in-depth review.

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## INTRODUCTION

The aging population in China has increased the number of patients with severe hip socket or femoral head injuries leading to hip joint pain, functional impairments, and even hip joint deformities over the years[1]. Hip arthroplasty (HA) involves replacing a damaged hip socket or femoral head with an artificial joint, restoring the structural integrity and function of the patient's hip joint. Recent studies have identified that patients with hip joint dysfunction who require HA are generally over 50 years of age, and many of them have complex medical histories (Figure 1). Moreover, older patients with underlying medical conditions are at great risk of postoperative complications including infection, joint dislocation, deep vein thrombosis (DVT), ectopic ossification, wound complications, fractures, and nerve injuries. In severe cases, mortality is a possible risk. Therefore, Perioperative nursing care is crucial. Research data indicates that perioperative care for patients undergoing HA can promote patient recovery, enhance the functional recovery of the affected limb, reduce the occurrence of joint dislocation, and decrease the incidence of complications and adverse events[2,3]. The study[4] examined 100000 patients who underwent HA and demonstrated significant correlations between patient education level, economic status, and the incidence of postoperative infections. Similarly, in a study of approximately 17000 patients who underwent HA, Stisen *et al*[5] observed that those with higher education levels had significantly higher Harris hip scores, a measure of hip dysfunction, 1 year after a primary or revision HA than those with lower education levels. Patient outcomes are associated with various factors, including perioperative rehabilitation. Therefore, strengthening perioperative rehabilitation and nursing care for patients may significantly impact postoperative recovery, including hip joint function rehabilitation, complication reduction, and quality of life improvement. This research reviewed relevant literature content, using databases such as Web of Science, PubMed, China National Knowledge Infrastructure (CNKI), and Wanfang Medical Database for retrieval. During the search, keywords such as 'hip joint', 'hypertension', 'perioperative care', and 'hip replacement' were set for the search, and approximately 400 pieces of literature were retrieved. When selecting literature, articles from suitable core journals were first screened based on the accuracy and reliability of the information, then reference literature relevant to this review was selected, and the retrospective method was used to broaden the scope of the search and obtain more related information. Finally, after reading the literature, a total of 60 pieces of literature were included. This comprehensive review examines the research progress in perioperative nursing care for patients with concomitant hypertension who underwent HA, including the preoperative, perioperative, and postoperative periods. This study aimed to further improve patients' quality of life following HA.

## PREOPERATIVE NURSING CARE

### *Psychological rehabilitation guidance*

As hip joint-related diseases have a long course, patients often experience anxiety, restlessness, sleep disturbances, and other psychological issues due to daily life inconveniences and chronic pain caused by the joint dysfunction. In severe cases, increased blood pressure may also occur[6]. Several studies have discovered that preoperative anxiety and/or depression assessment and psychological care interventions, including explaining the surgical process and principles to patients, emphasizing the importance and necessity of the surgery to alleviate patients' fear, and addressing their emotional changes and psychological needs, can effectively prevent negative emotions before and after surgery, stabilize blood pressure, and reduce the incidence of postoperative complications[7-9].

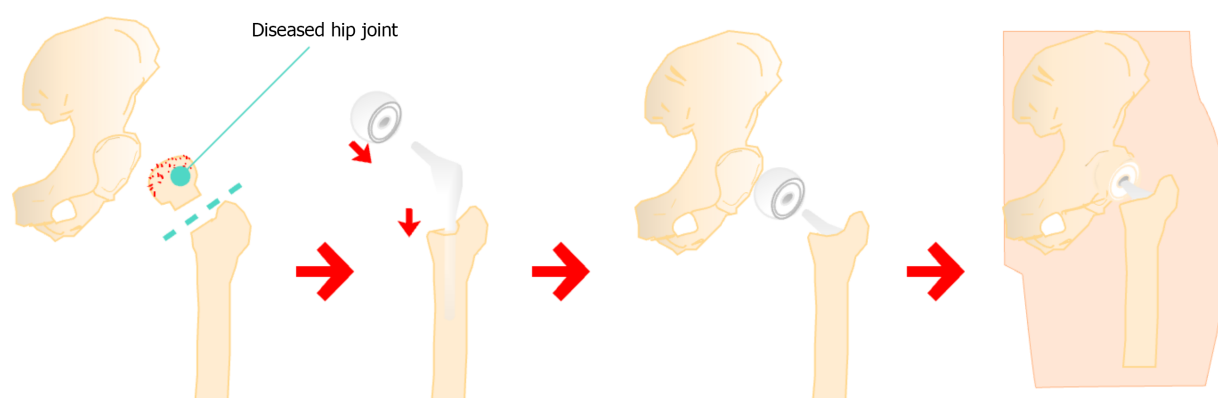
### *Preoperative medication intervention*

Due to the extent of surgical incision in HA, prophylactic antibiotics should be administered preoperatively[10]. Therefore, adverse reactions to antibiotics should be closely monitored as part of the preoperative nursing care. Anti-hypertensive medications may be used preoperatively to maintain blood pressure within the target range and reduce any associated surgical risks[11]. Postoperatively, the body continues to be under stress, which can easily lead to elevated blood pressure and an increased risk of cardiovascular accidents. Therefore, close monitoring of the patient's blood pressure and emotional fluctuations is necessary. Proper documentation and supervision should be implemented to ensure patient compliance with postoperative antihypertensive medications under healthcare professionals' guidance[12].

### *Sleep and dietary interventions*

Studies have demonstrated that sleep disorders increase the risk of elevated blood pressure[12,13]. Therefore, improving the sleep quality of patients undergoing HA, especially those with hypertension, should be a key focus in clinical nursing care. Sleep therapy techniques, such as relaxation, smiling hypnosis, reverse induction sleep, and tension shaking induction, can improve sleep quality, help control blood pressure, and reduce postoperative complications[14-16]. Moreover, guiding patients to adhere to a low-sodium, low-cholesterol, low-sugar, high-protein, and high-calcium diet may be beneficial for controlling blood pressure and improving sleep, as a well-recognized positive correlation exists

Doctors implant artificial joint prostheses into the patient's body through surgery to replace the diseased joint, aiming to relieve pain and restore joint function. However, due to the larger incision, the recovery time is longer



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**Figure 1** Hip arthroplasty.

between sodium intake and blood pressure[17,18].

### **Preoperative rehabilitation training**

Most HA surgeries are elective procedures. Hence, patients generally have sufficient time for preoperative preparation and postoperative rehabilitation. Engaging patients in appropriate upper and lower limb muscle contraction exercises before surgery can improve cardiopulmonary function[19,20]. The two main exercises commonly performed are as follows: (1) Quadriceps femoris muscle contraction exercise: continuous contraction of the quadriceps femoris muscle for approximately 5 s while keeping the limb still, followed by a brief pause and repeat; and (2) Upper limb strength training aims to restore upper limb strength and enable patients to better utilize their walking aids postoperatively. Family members should also be instructed on precautions to enhance the patient's postoperative recovery, such as elevating tables and chairs at home to facilitate the patient's rehabilitation after discharge.

## **INTRAOPERATIVE NURSING**

During HA, intraoperative nursing staff should assist the anesthesiologist in managing the patient throughout surgery. Patients should be positioned comfortably using soft pillows and head support to facilitate anesthesia and ensure smooth surgical progress. Owing to the extensive trauma caused by hip replacement surgery, various factors during the procedure, such as significant bleeding, anesthesia induction, and changes in patient positioning, can impact the patient's hemodynamics. From the nursing perspective, preparing various rescue medications and emergency measures in case of potential hemodynamic changes during surgery is necessary[21].

## **POSTOPERATIVE NURSING**

Multiple studies have demonstrated that early rehabilitation training after HA is closely related to successful recovery of hip joint function and improvement of quality of life[22-24]. Due to the significant surgical trauma associated with hip replacement surgery, prolonged and multidimensional nursing and rehabilitation training is required to ensure optimal surgical outcomes.

### **Postoperative medication intervention**

After HA, the patient's body continues to be in a state of stress. This imposes significant pressure on the cardiovascular system[25]. Hence, close postoperative observation of the patient's blood pressure and emotional fluctuations is necessary. Rational use of antihypertensives and analgesics may be required to stabilize the patient's blood pressure within the target range and prevent cardiovascular accidents. In recent years, the development of various pain management techniques, including preemptive analgesia, preventive analgesia, and regional administration, has rendered a relatively pain-free postoperative state possible for patients. During the postoperative analgesic phase, pain assessment techniques such as the visual analog scale can be used to evaluate the patient's pain level, which is beneficial for postoperative rest and functional exercise[26].

### **Prevention of lower limb DVT**

Lower limb DVT after hip replacement surgery is relatively common[27,28]. The affected limb should be immobilized

during the early postoperative period after HA administration to mitigate the chances of DVT. Oral medications, such as aspirin and warfarin, should be administered to prevent thrombotic complications. In contrast, intravenous fluid therapy or venous infusion pumps may be employed to reduce the occurrence of thrombotic complications and prevent all other associated risks[29]. Additionally, during the bed rest period, the patient should be monitored regularly for changes in blood circulation, hip joint edema, and hematoma. Massages of the hip and lower limb muscles after surgery should be performed as part of the nursing process to promote lower limb blood circulation and prevent the formation of thrombosis[30].

### **Guidance for postoperative lower limb functional rehabilitation activity**

Older patients often experience decreased movement coordination of their lower limbs and hip dislocation following HA due to age-related decline in muscle functions[31]. Consequently, maintaining the correct body positioning of the patient during the early postoperative period is essential. During early postoperative transfers, nursing staff should strive to keep the patient's body in a neutral position, with the affected limb not deviating or crossing the body's midline. Furthermore, forward tilting in the sitting position should also be avoided. Care should be taken to prevent falls or injuries during transfer, which could lead to adverse outcomes[32,33].

Functional training should involve foot-specific exercises guided by healthcare professionals, including dorsiflexion and plantar flexion movements, ankle joint flexion and extension exercises, and stretching and contraction exercises of the affected limb muscles. Studies have demonstrated that patients who received early rehabilitation training after HA had significantly improved hip joint and related tissue function. This effectively enhanced the early-stage rehabilitation and patients' quality of work and life[34,35]. In the midterm postoperative period, guidance should be provided for rehabilitation activities, such as position transfers, getting out of bed, and walking exercises for the hip joint[36]. Once the patient can stand and walk, they can be guided to perform further activities, such as straight-leg lifting, sliding board exercises, and sitting position transfers. Healthcare professionals should encourage patients to engage in pain-free rehabilitation exercises for the knee and hip joints, including strengthening exercises for hip flexion and abduction. Achieving a flexion angle of  $\geq 90^\circ$  and an abduction angle of not less than  $40^\circ$  is recommended. Individualized rehabilitation care plans should be developed to enhance the effectiveness of postoperative rehabilitation exercises and promote the recovery of hip joint function[37].

## **DEVELOPMENT DIRECTION OF PERIOPERATIVE NURSING FOR HA**

In recent years, the development of biomechanics, information technology, and intelligent devices has provided new theoretical support and technical means of perioperative nursing in HA[38-41]. As displayed in Table 1, various factors can influence patient prognosis following HA. Moreover, a large body of clinical evidence highlights the importance of perioperative nursing in patient outcomes[42,43]. Coupled with traditional medicine and new treatment concepts, multidimensional nursing, where patient care addresses the patient's physical but also psychosocial, social, and spiritual needs, can improve prognosis and quality of life.

### **Enhancement of patient compliance with intelligent devices**

In the past, due to a lack of standardized guidelines and evidence-based medicine, patient compliance with maintaining correct body positioning and movements after HA was poor, which often led to adverse outcomes, such as hip dislocation[44-46]. In a recent biomechanical study of 30 volunteers, Sah *et al*[47] used validated wearable sensors to measure the relevant angles during typical daily activities. The study identified that the angles while walking and going up and down the stairs were less than  $90^\circ$ . The average transition from sitting to standing was  $103.0^\circ$ , while the average maximum transition when rising from the toilet was  $112.6^\circ$ . Furthermore, the average transition when squatting initially was  $120.0^\circ$ , and the average transition when tying shoelaces was  $126.1^\circ$ . These data can be used to educate patients after HA to improve compliance and prevent hip dislocation.

### **Enhancement of comprehensive treatment effects with traditional medicine**

As previously mentioned, HA is associated with significant surgical trauma and a lengthy recovery period. Two studies have demonstrated that compared to conventional orthopedic care and health education, the implementation of early rehabilitation and traditional Chinese medicine significantly improved hip joint function and self-care ability in patients following HA[48,49]. Wu *et al*[50] also demonstrated a reduced incidence of lower limb venous thrombosis in patients after HA through early rehabilitation guidance and traditional Chinese medicine treatment. Additionally, specific Chinese herbal formulas, such as Shu Jin Huo Xue Tang, combined with ingredients such as Xixin and Dingxiang, can significantly promote blood circulation in the lower limbs, effectively prevent muscle atrophy, and reduce the formation of venous thrombosis in the lower limb[51-53]. The aforementioned results indicate that nursing care that combines traditional medical treatment, such as acupuncture and herbal medicine, and traditional orthopedic care may significantly improve patient outcomes and, thus, should be further researched and promoted.

### **Development of comprehensive nursing programs with new technologies and concepts**

With the development of information technology and digital healthcare, various interactive patient-medical rehabilitation technology platforms are available in China. Patients can consult and communicate with healthcare professionals through video conferences, official WeChat accounts, online consultation platforms, and other media. Healthcare professionals can provide education to patients using these platforms, thereby improving access to care and, thus, improving patient

**Table 1** Factors influencing the prognosis of hip arthroplasty

Influencing factors	Ref.	Conclusion
Economic and educational level	Bhandari <i>et al</i> [4]	Patients with high education levels have low postoperative infection rates and favorable prognoses
Education level	Stisen <i>et al</i> [5]	The Harris hip scores at 1 yr after primary and revision hip arthroplasty were significantly higher in the high-educated group compared to the low-educated group
Whether to adhere to hip dislocation precautions during the first 6 wk after surgery	Theaker <i>et al</i> [35]	Early postoperative rehabilitation training can improve patient outcomes
Early rehabilitation guidance combined with syndrome differentiation	Liu <i>et al</i> [48]	Early rehabilitation guidance combined with syndrome differentiation nursing can improve outcomes in elderly patients
Early rehabilitation guidance combined with traditional Chinese medicine treatment based on syndrome differentiation	Wu <i>et al</i> [50]	Early rehabilitation guidance combined with traditional Chinese medicine treatment based on syndrome differentiation can reduce the incidence of lower limb venous thrombosis after hip arthroplasty

outcomes[54]. Fast-track surgery (FTS) rehabilitation involves preoperative education, intraoperative coordination, and comprehensive postoperative care, allowing personalized nursing plans based on each patient's conditions[55,56]. Research has demonstrated that implementing the FTS concept can significantly reduce hospitalization time, improve patients' postoperative Harris scores, and lead to a favorable prognosis[57].

## CONCLUSION

HA can alleviate the pain caused by hip joint disease, improve the function of the hip joint, and help patients enhance their quality of life and survival in the future. However, postoperative care after HA is also a crucial part of the recovery period, which can promote postoperative recovery and reduce the incidence of complications and adverse events. In addition to following the routine orthopedic nursing and rehabilitation process, the care of patients with hypertension undergoing HA should focus on managing the blood pressure and pain during the perioperative period to prevent cardiovascular accidents and emotional distress, such as anxiety and restlessness. Furthermore, a personalized perioperative rehabilitation program for each patient is desirable and should be developed by incorporating new theories and technologies to improve patient outcomes. Further research to explore innovative approaches and interventions for optimizing patient care and rehabilitation after HA, especially for patients with hypertension, is warranted. Future studies could explore the use of intelligent devices, the benefits of traditional medicine, and the application of new concepts and technologies to enhance comprehensive nursing strategies. By continuously improving and tailoring the care provided to these patients, healthcare professionals can contribute to favorable patient outcomes and an improved quality of life.

## FOOTNOTES

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