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Feasibility and Safety of 2-Day Discharge After Fast-Track Total Hip Arthroplasty: A Chinese Experience

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ABSTRACT

Background: A fast-track program (FT) can shorten hospital stay after total hip arthroplasty. The aim of this prospective randomized study was to investigate the feasibility and safety of 2-day discharge after fast-track total hip arthroplasty in a Chinese population.
Methods: A total of 258 selected patients who underwent unilateral primary total hip arthroplasty were enrolled into the final cohort and were randomized into the FT ($n = 126$) and standard program group ($n = 132$). In the FT group, the patients received a multidisciplinary FT, whereas the patients in the standard program group only followed a standard care program. After setting restricted discharge criteria, we undertook follow-up evaluations to investigate the length of hospital stay, clinical performance, 30-day and 90-day complications, and 90-day admissions in both groups. A multivariate regression model was used to assess independent predictors of delayed discharge (>2 days).
Results: The mean length of stay was reduced from 5.8 to 2.1 days after implementation of our FT ($P < .001$). Most patients in the FT group (82.5%) were discharged within 2 days postoperatively. However, the complications and readmissions appeared no difference between the two groups. The multivariate regression analysis identified age ($P = .041$), operative time ($P < .001$), intraoperative blood loss ($P = .026$), and total blood loss ($P < .001$) as the predictive factors for delayed discharge.
Conclusion: A 2-day discharge protocol after fast-track total hip arthroplasty can be safe and feasible in selected patients, without increasing the risk of complications and readmissions. Further efforts are needed to shorten operative time and reduce perioperative blood loss and eventually to shorten hospital stay.

A fast-track surgery program was a comprehensive guide for perioperative management of the patients, aiming to improve clinical outcomes and consequently to reduce length of stay (LOS) in hospital. Although the implementation of this multidisciplinary program requires various surgical skills, special equipment, and trained medical team, recent studies have reported satisfactory results and possible early discharge after fast-track total hip arthroplasty (THA) [1-4]. Nevertheless, there is concern that discharging patients home too soon may incur additional risk of readmissions or other complications. To date, only one prospective study demonstrated that a fast-track clinical pathway could shorten hospital stay in THA, with maintaining a high level of patient safety [5]. However in that study, a randomization scheme was not performed during the patient assignment.

In the recent years, the current debate has been focused on the efficacy of minimum hospital stays after THA. Many medical centers in the United States have attempted to discharge patient home within 24 hours after admission [4]. However, it seemed not applicable in a Chinese population due to political, social, and economic issues. To our knowledge, no previous studies have investigated the prospective results of a fast-track care program in Chinese patients.

Therefore, the primary purpose of this prospective randomized study was to investigate the feasibility and safety of early discharge after fast-track THA in a Chinese population. We hypothesized that the implementation of fast-track program (FT) could allow the selected patient discharge within 2 days postoperatively, without increasing the risk of complications and readmissions. In addition, secondary outcomes focused on all possible variables that could potentially contribute to delayed discharge.

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Patients and Methods

Patient Selection

Between November 2013 and April 2014, a consecutive series of 387 patients with hip fracture or dysfunction who underwent unilateral THA were screened. A total of 326 patients met the inclusion criteria and were eligible to be included in this prospective study. The inclusion criteria are listed in Table 1. The exclusion criteria were (1) revision procedure; (2) simultaneous bilateral THA; (3) concomitant dysfunction on the ipsilateral knee or ankle joint which results in delay of weight bearing; (4) hip flexion contracture more than 30 degrees or leg length discrepancy more than 2 cm which influences early recovery; (5) pathological fracture or primary procedure due to bone tumor. The protocol was in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans and was approved by the institutional review board at the hospital.

Out of 326 patients, 18 patients were excluded due to refusal to participate in the study and 50 patients who met the exclusion criteria were ruled out (Fig. 1). Thus, a total of 258 patients served as the study population. All enrolled patients signed the written informed consents.

The patients were randomized into 2 groups according to computer-generated random numbers: 126 patients who received a FT were classified in the FT group, whereas the remaining 132 patients who followed a standard care protocol were included in the standard program (ST) group. The demographic characteristics of the patients are in Table 2.

Surgical Intervention

Two senior surgeons performed cementless THA through a posterolateral approach on the next day after admission, without using a minimally invasive technique. The patients were implanted with Pinnacle acetabular cup system (DePuy, Warsaw, IN) on the acetabular side, and Corail or Summit hip stem system (DePuy) on the femoral side, according to the preference of the surgeons. All technical efforts were made to equalize the leg length and to optimize the implant orientation including preoperative planning, appropriate soft-tissue release, and intraoperative measurements. In patients with flexion contracture, proper soft-tissue balancing was achieved by removing the osteophytes and releasing the ligament, to maintain the optimal tension of the hip joint.

Fast-Track Care Program

In the FT group, a FT was introduced as soon as the patients were grouped, aiming to early recovery after the surgery. This collaborative care program was designed as an evidence-based approach to perioperative care of patients by a multidisciplinary team [6]. The detailed program is listed in Appendix. Once the program was developed, an educational material was distributed to the patients and their family, to deliver the knowledge about surgical and anesthetic procedures, postoperative rehabilitation, potential complications and their managements. On the day of admission, the patients were provided with detailed information about the procedure by a nurse. Discharge planning began at this early stage by reinforcing with the patients and their family an expected discharge on postoperative day (POD) 2. In addition, the education regarding deep vein thrombosis (DVT) prophylaxis, suitable home layout, and competent adult caregiver in the home were involved.

On the day of surgery, preemptive multimodal opioid-sparing analgesia protocol was implemented at the discretion of the attending anesthesiologist. The patients were preferable to receive spinal anesthesia without retention catheterization, otherwise, an indwelling urethral catheter was used in patients under general anesthesia and was removed immediately after the procedure. We standardized anesthesia and postoperative pain management with limited opioid use to reduce the incidence of postoperative delirium. Before the surgery, apart from prophylactic intravenous antibiotics, all patients received dexamethasone 10 mg IV and ondansetron 4 mg IV and, in addition, received a second dose of dexamethasone 10 mg and ondansetron 4 mg IV approximately 24 hours posteoperatively, as described by Backes et al [7]. Before surgical closure of the capsule, we administered topical tranexamic acid 3.2 g intraarticularly without any drainage.

Postoperatively, oral coanalgesics were given routinely at the discretion of the anesthesiologist. Additional opioid injection was also used to relieve moderate to severe pain. Physiotherapy began as soon as the spinal anesthetic had resolved. Physiotherapy sessions were tailored to the characteristics and needs of the individual patients in collaboration with a physical therapist, initially emphasizing bed transfers, movement from sitting to standing, and progressing to ambulation 5-10 m with the assistance of a walking aid. Patients were instructed to use deep breathing, ankle pumping, static quadriceps, and buttock exercises. We used low molecular weight heparin or oral anticoagulants for thromboembolic prophylaxis from POD 0 to 35. Patients were discharged home when they met the following criteria: pain with visual analogue scale less than 2 at rest and 3 during activity and can be managed with oral medication; normal vital signs; intact incision without sign of infection or hematoma; appropriate oral intake without nausea or vomiting; normal bowel movements and micturition; stable hemoglobin great than 100 g/L; independent in dressing, bed mobility, and transfers; ability to sit and rise from chair or toilet; ability to handle personal hygiene, independent in ambulating 20 m with minimal assistance without support or risk of falling; and understands symptoms and signs necessitating return to the hospital. Patients were discharged home and received medical support by the doctors of community hospital. If the patients had medical emergencies requiring inpatient hospital resources, they would be transferred back to the hospital. All patients were contacted by an experienced nurse at the end of first postoperative week to assess their symptoms and recovery.

Table 1
The Inclusion Criteria of the Patients Included in the Study.

Patient Inclusion Criteria
Primary total hip arthroplasty
Age ≤85 y
ASA I~III
No pulmonary or cardiac functional limitation
Previous normal hematocrit
No history of pulmonary embolism or deep vein thrombosis within the last 6 mo
Normal strength of upper limbs
Preoperative normal cognitive function
Adequate home support (responsible adult to assist the patient at home)

ASA, American Society of Anesthesiologists.

Standard Care Program

In the ST group, the patients were managed with a standard care program, which were different from fast-track care program in the following aspects: limited preoperative education, no predetermined LOS plan, minimal discharge planning before admission, no standardized preemptive and postoperative multimodal analgesia, no optimal anesthetic technique, no limited opioid use, no standardized blood management protocol, regular retention