Outpatient Total Hip Arthroplasty

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Abstract: Patients younger than 65 years were studied to determine what percentage of patients would enroll in a study of outpatient total hip arthroplasty, its safety, and benefits of the program. Of 192 eligible patients, 69 (36%) enrolled, and 53 (77%) of these went home the same day of surgery. Of 53, 44 maintained a diary for the first 3, weeks and 52 completed a satisfaction questionnaire at 6 weeks. Patients were followed for 6 months for occurrence of complications. There were no medical readmissions. Of 52 patients who completed a 6 week questionnaire, 50 (96%) were satisfied with the decision to have outpatient total hip arthroplasty. There were no objective physical benefits identified. This study reports the distribution of acceptance and completion of same day discharge for patients with total hip arthroplasty in a metropolitan population. It confirms safety in selected patients. **Keywords:** outpatient THA, total hip arthroplasty, rapid recovery THA, THA under 65 year, safety of THA.

There are 4 components to a successful total hip arthroplasty: pain relief, functional recovery, patient satisfaction [1,2], and durable reconstruction. Satisfaction with total hip arthroplasty is a patient achieving his expectations in addition to the expected pain and function outcome [2,3]. Hudak et al [2] have shown that when patients exceed their expectations, their satisfaction is greatest. The desire of surgeons to enable patients to realize their expectations has resulted in changes in surgical and postoperative care. In this decade, there has been the development of smaller incisions [4-7], multimodal pain management [8-11], and rapid recovery [4,6,12,13]. The goal of all 3 of these changes is to provide patients greater relief of their anxiety and earlier control of their independence in activities which will improve their satisfaction [1,4,10,14,15]. One factor in a rapid recovery program is earlier discharge from the hospital [4,14,16,17]. Some patients identified being in the hospital with less control of their body [4]. Prolonged hospitalization increases the risk for medical errors and hospital-based complications [18]. In the younger age group, recovery time and return to work as early as possible are important.

Berger et al [19] have reported the only study in the literature on outpatient total hip arthroplasty and showed safety using the 2 incision operative technique. We perform a single posterior small incision [4] and wondered whether these patients could go home safely and effectively the same day. We began a same day program for patients that wanted to do so. Between 2004 and 2006, 77 patients did go home, and none were readmitted nor had medical complications. There is no literature evidence of the percentage of patients who would select same day discharge, nor of the percentage who can complete the discharge. Therefore, we designed a prospective study to offer all patients younger than 65 years the option of outpatient total hip arthroplasty during a 10-month period. The questions we asked were how many patients would elect to go home the same day; was it safe for them to do so; and was there any benefit for those that went home. The hypothesis of the study was that same day discharge would be safe (no medical complications and no readmissions) and beneficial for those patients who chose it.

Materials and Methods

Patient Selection

One hundred ninety-two patients younger than 65 years, scheduled to undergo primary unilateral total hip arthroplasty between November 2006 and September 2007, were considered as candidates. Institutional review board approval was obtained, and all patients signed their informed consent before participating in the study.

Sixty-nine of 192 patients (36%) enrolled for same day discharge. Of 69 patients, 53 (77%) actually did go home the day of surgery. Demographics of all 69 enrolled same day patients and of the 53 that had outpatient total hip arthroplasty are shown in Table 1.

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Patients were not randomized for this study because one study question was what percentage of patients would enroll and then successfully go home the same day as surgery. We were not attempting to prove that same day discharge was better than a longer hospital stay. We knew that patients could successfully go home the next day (24-hour discharge) [4,6,12,13].

All patients attended a 2-hour preoperative educational class that explained the operation, the preoperative and postoperative care and the postoperative recovery and rehabilitation [20]. The same anesthesia and operating teams were involved in every procedure. Epidural anesthesia was used in 64 patients, spinal anesthesia in 4, and general anesthesia in 1. Patients with epidural and spinal anesthesia were sedated with propofol (Diprivan, AstraZeneca, Wilmington, Del). No parenteral narcotics were used during the operation with any anesthesia regimen. All patients donated 1 U of blood (568 mL) at least 2 weeks before surgery and received the blood during the operation. An epidural catheter was placed during the time of the surgery and removed in the operating room at the completion of the procedure. The patients were awake and able to move their lower limbs in the recovery room.

All patients had total hip arthroplasties performed with a posterior mini-incision approach previously described [4]. The Navitrack imageless computer hip system (Zimmer, Warsaw, Ind) was used for determination of acetabular component position for all patients. Forty patients had uncemented total hip arthroplasty with porous coated Converge acetabular cup (Zimmer), and 13 had Durom metal-on-metal articulation (Zimmer). Femoral component was proximally porous coated, distally grit blasted anatomic porous replacement (APR, Zimmer) in 47 hips and a tapered grit blasted stem (Alloclassic, Zimmer) in 6 hips.

Table 1. Demographics of Same Day Patients

	Enrolled Same Day Patients (N = 69)	Same Day Patients (n = 53)
Age (y)	54.1 ± 8.4 (23-65)	53.5 ± 8.3 (23-65)
Sex (female:male)	32:37	22:31
Side (R:L)	38:31	33:20
Height (m)	1.7 ± 0.1 (1.5-1.9)	1.7 ± 0.1 (1.5-1.9)
Weight (kg)	85.2 ± 18.2 (50-131.8)	87.2 ± 18.2 (50-131.8)
Body mass index (kg/m^2)	28.3 ± 5.2 (20.8-42.9)	28.8 ± 5.1 (20.8-42.9)
Preoperative limp score	5.0 ± 2.8	4.8 ± 2.8
Diagnosis		
Primary osteoarthritis	53	41
Posttraumatic osteoarthritis	2	1
Rheumatoid osteoarthritis	1	1
Avascular necrosis	3	2
CDH	10	8

R, right; L, left; CDH, congenital disease of the hip.

A standardized multimodal analgesic protocol which avoids parenteral narcotics was used for the management of postoperative pain in each patient as previously described [10]. Avoidance of parenteral narcotics provides a positive emotional state for patients in the hospital and is a major principle of rapid mobilization of the patient because it prevents nausea, vomiting, urinary retention, gastrointestinal ileus, cognitive confusion, and respiratory depression [8,10,15]. Discharge medications for the patients included Celecoxib (Celebrex, Pfizer, New York, NY) 250 mg twice daily for 3 weeks, and whichever oral pain medication the patient used in the hospital: hydrocodone and acetaminophen (Norco, Watson Laboratories Inc, Corona, Calif), Propoxyphene (Darvon, AAIPharma, Wilmington, NC), Tramadol (Ultram, Ortho-McNeil Pharmaceuticals, Raritan, NJ), and/or acetaminophen (Tylenol, McNeil PPC, Inc, Fort Washington, PA).

Prophylaxis of deep vein thrombosis was aspirin 325 mg twice a day for 1 month, with the initial dose being 20 mg given rectally in the recovery room [21]. Intermittent pneumatic compression calf devices (FP 5000, Huntley Health Care, Eaton Town, NJ) were applied bilaterally in the recovery room and used while the patient was in bed during the hours in the hospital. The patient was mobilized within 4 h of the surgery.

Functional rehabilitation with full weight-bearing on the operated limb was begun for all patients on return to their room. The patient was mobilized at least twice by physical therapy before discharge and advanced to a cane if leg strength and balance permitted. After discharge, the patients were instructed to walk every day, gradually increasing their distance with a goal of 1 mile. No other physical therapy after discharge was prescribed. Each patient returned at 5 days postoperative for a wound inspection and a Doppler ultrasound (ACUSON Sequoia 512, Siemens, Malvern, Pa) for testing for deep venous thrombosis. Of 53 studied patients, 49 were local, which means within a 100-mile radius, and went to their home on discharge. Four patients were from out of state and stayed at a hotel for 5 days and, after return for the fifth postoperative day examination, were allowed to fly home.

All data were collected prospectively and analyzed by a research team (DT, JZ, LC) who were not directly involved with patient care.

Intraoperative data included the duration of the surgery, the length of the incision, estimated blood loss, and intraoperative complications. A questionnaire was completed by all patients on the day of surgery which asked when and where they first had memory of recollection after anesthesia; pain score after surgery; appetite; and whether they had difficultly urinating, nausea, or vomiting.

After discharge, patients kept a daily diary which monitored milestones of recovery for the first 3 weeks.

Table 2. Pain Scores and Medication

Pain Score and Medication	Same Day Patients (n = 44)*
Average pain score in first 4 h after surgery	3.1 ± 2.4
1 wk postoperative	
Average pain score	2.8 ± 1.7
Discontinued pain medication	34% (15/44)
2 wk postoperative	
Average pain score	2.5 ± 1.7
Discontinued pain medication	55% (24/44)
3 wk postoperative	
Average pain score	1.9 ± 1.5
Discontinued pain medication	64% (28/44)

*Forty-four diaries returned from 53 same day patients.

Of 53 patients, 44 returned a completed 3-week diary. In this study, the data are reported by weeks for the first 3 weeks (Tables 2 and 3). A questionnaire of patients' attitude toward same day surgery was completed at the 6 weeks postoperative follow-up by 52 of 53 patients (Table 4). These questions allowed interpretation of the psychological benefit of outpatient total hip arthroplasty for the patient. Harris hip scores and patient self-assessed clinical grade at 6 months are reported.

Table 3. Functional Data

	Same Day Patients (n = 44)*
1 wk postoperative	
Independent for activities of daily living	48% (21/44)
Return to work†	42% (15/36)
Able to drive	39% (17/44)
Walk 1 mile (30 min/d)	75% (33/44)
Average min walked per day	60.2 ± 63.6
Assistive walking device used	
Stopped using assistive device	14% (6/44)
One cane or single crutch	75% (33/44)
Two crutches or walker	9% (4/44)
2 wk postoperative	
Independent for activities of daily living	73% (32/44)
Return to work†	64% (23/36)
Able to drive	73% (32/44)
Walk 1 mile (30 min/day)	93% (41/44)
Average min walked per day	70.0 ± 64.7
Assistive walking device used	
Stopped using assistive device	34% (15/44)
1 Cane or single crutch	64% (28/44)
2 Crutches or walker	2% (1/44)
3 wk postoperative	
Independent for activities of daily living	82% (36/44)
Return to work†	69% (25/36)
Able to drive	84% (37/44)
Walk 1 mile (30 min/d)	98% (43/44)
Average min walked per day	80.5 ± 74.3
Assistive walking device used	
Stopped using assistive device	41% (18/44)
One cane or single crutch	59% (26/44)
Two crutches or walker	0% (0/44)

*Forty-four diaries returned from 53 same day patients.
†Thirty-six of 44 patients worked in the outpatient group.

Table 4. Six-Week Questionnaire*

Question	Yes
Would you have same day surgery again?	96% (50/52)
Was postoperative pain a problem?	19% (10/52)
Do you feel that going home on the same day gave you more confidence in your hip replacement in the first 6 weeks?	87% (45/52)
Do you feel that going home the same day accelerated your recovery?	87% (45/52)
Are you glad you had same day surgery?	96% (50/52)
Would you recommend same day surgery to others?	94% (49/52)

*Of 53 outpatients, 52 completed the questionnaire.

Statistics

The pain score, demographic data, anesthesia time, surgical time, blood loss, incision length, length of hospital stay, and functional data were evaluated as mean ± SD. The analyses were performed with SPSS software (SPSS, Chicago, Ill).

Results

Of 192 patients, 69 (36%) elected to enroll for outpatient total hip arthroplasty. Fifty-three of 69 enrolled patients (77%) achieved their goal of going home the same day as surgery. The mean length of hospital stay for the 53 patients was 11.1 ± 1.1 hours. Of 69 patients, 16 (23.2%) stayed at least 1 night (3 patients remained 2 nights, and 1 patient remained 4 nights). The reasons for not going home were pain in 2 patients, hypotension in 5, dizziness in 4, nausea in 3, infection in 1, and home problems in 1.

The mean anesthesia time was 146 ± 36 minutes (range, 105-230 minutes); mean surgical time was 79.9 ± 18.8 minutes (range, 55-133 minutes). The mean incision length was 11.4 ± 2.0 cm (range, 9-20 cm). The mean estimated blood loss recorded by the anesthesiologist was 311.2 ± 102.9 mL (range, 200-800 ml). Each patient was transfused with 1 autologous unit of blood during the operation to increase the volume of circulating red cells.

Forty-four of 53 patients with outpatient surgery completed all 3 weeks of the milestone diaries. Inhospital data showed 31 (70%) of 44 patients had their first recollection of consciousness in the recovery room, and 13 patients (30%) had this in the hospital room. None had any recollection of the operating room. All patients were called by a nurse the day following surgery. The average pain score in the first 4 hours after surgery on an analog scale of 1 to 10 was 3.1 ± 2.4. Of 44 patients, 9 (20%) had nausea, and 1 vomited. Of 44 patients, 4 (9%) had no appetite. All 53 patients urinated before discharge.

There was no wound necrosis or drainage in any of the 53 patients. There were no infections or dislocations, but 1 (1.9%) of 53 patients had a revision of the femoral component for an unrecognized intraoperative fracture. Pain scores are listed in Table 2. At 3 weeks

postoperative, the mean pain score on an analog pain scale of 1 to 10 was 1.9 with 28 (64%) of 44 patients off medications.

Functional improvement was documented by distance and time walked and assistive device used (Table 3). At 3 weeks postoperative, the average time of walking was 80 minutes; 18 (41%) of 44 patients were off all assistive devices, and the remaining 26 patients (59%) were only on a cane. The number who returned to work and who walked 1 mile peaked at 2 weeks; the functions of performing activities of daily living and driving progressed through all 3 weeks (Table 3).

At 6 weeks of follow-up, 50 (96%) of 52 patients were satisfied with the decision to have same day surgery and would choose same day surgery again. One patient who was unsatisfied had the revision operation and the other had persistent pain from poor fixation of a Durom metal-on-metal cup (Zimmer). These 2 patients and a third with a painful Durom cup would not recommend same day surgery to others. Therefore, all 3 patients had component problems and would have had them no matter the length of the hospital stay. Of 52 patients, 45 (87%) believed that same day surgery gave them more confidence and accelerated their recovery, suggesting they gained psychological benefit (Table 4).

All the patients were followed up for 6 months after their operation, and there were no readmissions for medical complications, including deep venous thrombosis. At 6 months, the mean Harris hip score in forty hips with the Converge cup was 95.6 ± 5, with a mean pain score of 42.8 ± 3; 12 hips with a Durom cup had a total score of 80.6 ± 17.6 with a mean pain score of 32.8 ± 12.7. Thirty-five patients self-assessed their clinical outcome as excellent, 14 as good, 1 as fair (Durom cup), and 2 as poor (both Durom cups).

In 16 patients who did not go home the same day, there were no readmissions or medical or orthopedic complications. The mean time of discharge was 35.8 ± 11.6 hours (25-56 hours). Seven of 16 patients with failed same day surgery completed all 3 weeks of the milestone diaries. All 7 patients were on a cane at week 1, and 2 (29%) of 7 patients were off all assistive devices by week 3. Of 7, 4 returned to work at 3 weeks; 6 of 7 were driving.

Discussion

The questions of this study were how many patients would elect to go home the same day; was it safe for them to do so; and was there any benefit for those who went home. Of 192, 69 (36%) elected to go home, and 45 (28%) of 192 actually did go home. Of 69 who wanted to go home, 53 (77%) completed the same day discharge. By the criteria of no medical complications and no medical readmissions this treatment program was safe. The safety of our program confirmed the data of Berger et al [14] who reported 97 patients with no readmissions or complications. We could not identify any objective physical benefit when the 53 patients who went home the same day were compared to the 16 patients who did not. The psychological benefit of outpatient total hip arthroplasty is recognition by the patient of quickly regaining control of their life and independence [22-24]. In our study, at 6 weeks postoperative, 45 (87%) of 52 suggested that going home the same day gave them more confidence in their hip replacement and accelerated their recovery (Table 4).

The first limitation of the study is that the follow-up was only 6 months, which means a dislocation might still occur. However, to-date we have not had a dislocation or deep venous thrombosis in 130 patients with outpatient total hip arthroplasty (77 patients in the preliminary study and 53 in this study). This was a study only of the short term benefits of a patient care program. A second limitation is the lack of a control group, but this study was one of safety and efficacy, not superiority to any other patient care program. A third limitation is that the study was conducted with an experienced total hip recovery team of nurses and therapists. Nursing required 1 nurse for 2 patients going home the same day or a nursing patient ratio of 1 nurse for 3 patients if 1 patient was an outpatient (the routine ratio is 1:5). Therefore, a nurse who is confident in caring for total hip arthroplasty patients is required. Organization with the radiology department was necessary for a regular schedule for ultrasound examination the week following discharge. A fourth limitation is that the 6 week questions (Table 4) are not a validated instrument, but they do provide patient self-assessment of satisfaction, which can only be determined by a questionnaire. There are no validated questionnaires for same day surgery.

Outpatient total hip arthroplasty was considered possible because of published success about patient anterior cruciate ligament reconstruction (ACL) surgery [25-28]. Our operative time is similar to that for ACL operations [26,29]. The ACL reconstruction patients received a similar oral medication schedule and intra-articular injection to our routine [10,27,28,30]. Krywulak et al [31], with a randomized study, studied patient satisfaction of inpatient vs outpatient ACL reconstruction and outpatients were more satisfied with their postoperative care. It would seem that outpatient anterior cruciate ligament reconstruction and outpatient total hip arthroplasty has similar pain levels, safety, and patient satisfaction in spite of the difference in mean age of the 2 groups (28 years for anterior cruciate ligament reconstruction studies vs 54 years in our total hip arthroplasty patients).

The primary concern with an outpatient total hip arthroplasty program is safety of the patients. Phillips et al [32], from Medicare data of 58 521 patients with total hip arthroplasty (1995-1996), reported the incidence of time of occurrence of complications. The median length of stay was 5.0 days, whereas today, most studies report 3 days [4]. Dislocation was 3.9% of patients with 0.55%

during the 5 day hospital stay; pulmonary embolism occurred in 0.9% with 0.23% during the hospital stay; deep infection occurred in 0.2% of patients with none occurring prior to discharge. Today, with a stay of 3 days these complications would be even less likely to occur in the hospital.

Parvizi et al [33] cautioned against "early discharge from the hospital" because they identified that most of their major complications occurred within the time frame of the mean length of stay of 3.9 days (1-36 days). These authors reviewed 1842 patients with 2048 primary unilateral total hip and knee replacements. One-hundred four (5.7%) major systemic complications were those deemed to be life-threatening requiring medical intervention (cardiopulmonary, renal, and stroke). Multiple logistic regression analysis showed these complications were predicted in the elderly, heavy (increased body mass index) and high American Society of Anesthesia score. The orthopedic complications were mostly wound problems of drainage, hematoma, and superficial infection most likely related to their use of Coumadin for deep venous thrombosis prophylaxis [21,34-36]. We do not think the concerns of Parvizi et al [33] about early hospital discharge are relevant to our patient age group, and we did not use Coumadin.

The importance of this study is the definition of acceptance by patients, at least in one metropolitan population, for outpatient total hip arthroplasty. Just more than one-third of patients eligible elected to go home the same day. There was no significant difference in functional recovery for the first 3 weeks between 53 patients with same day surgery and 16 patients staying at least one night in the hospital. Both groups quickly became active and returned to work which is economically advantageous for this age group (Table 3). By 3 weeks postoperative, 25 (69%) of 36 of patients who worked had returned to their job. We do not recommend that outpatient recovery be universally practiced, except by those doctors and programs interested in offering it. It is more labor intensive. It also requires negotiation with insurance companies who must agree to pay the hospital. We did not include patients over the age of 65, although some wanted to go home the same day, because Medicare would not reimburse the hospital. This study does demonstrate it is possible to accomplish outpatient total hip arthroplasty safely and patients who desire it are satisfied they did it. The benefit for patients in this study was entirely psychological, which was an important factor for those who chose to do it.

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