Total hip arthroplasty in an outpatient setting in 27 selected patients

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Background and purpose — As a result of introduction of a fast-track program, length of hospital stay after total hip arthroplasty (THA) decreased in our hospital. We therefore wondered whether THA in an outpatient setting would be feasible. We report our experience with THA in an outpatient setting.

Patients and methods — In this prospective cohort study, we included 27 patients who were selected to receive primary THA in an outpatient setting between April and July 2014. Different patient-reported outcome measures (PROMs) were recorded preoperatively and at 6 weeks and 3 months postoperatively. Furthermore, anchor questions on how patients functioned in daily living were scored at 6 weeks and 3 months postoperatively.

Results — 3 of the 27 patients did not go home on the day of surgery because of nausea and/or dizziness. The remaining 24 patients all went home on the day of surgery. PROMs improved substantially in these patients. Moreover, anchor questions on how patients functioned in their daily living indicated that the patients were satisfied with the postoperative results. 1 re-admission occurred at 11 days after surgery because of seroma formation. There were no other complications or reoperations.

Interpretation — At our hospital, with a fast-track protocol, outpatient THA was found to be feasible in selected patients with satisfying results up to 3 months postoperatively, without any outpatient procedure-specific complications or re-admissions.

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Traditionally, the length of hospital stay (LOS) after primary joint replacement has been more than several weeks (Berger et al. 2009a). In the past few years, fast-track protocols have been introduced worldwide. These protocols are based on principles of optimal clinical care and pain management in combination with a revision of organizational factors. This permits an optimized perioperative period in which patients can safely recover in a shorter period of time (Kehlet and Wilmore 2002, Husted et al. 2012). As a result of these improved factors,

LOS has gradually been reduced (Kehlet and Wilmore 2002, Husted et al. 2012, den Hartog et al. 2013, Khan et al. 2014, Winther et al. 2015).

Reinier de Graaf Hospital (RdGG) is a large teaching hospital in the Netherlands. The introduction of a fast-track protocol for primary total hip arthroplasty (THA) started in 2009 and was completed in 2011. After the implementation of this protocol for unselected patients, mean LOS decreased from 4.6 to 2.9 nights (den Hartog et al. 2013) with a range of 1–7 nights. Since the LOS had been reduced, we wondered whether outpatient THA would be feasible at our hospital.

We therefore studied a selected group of patients who were treated for primary THA in an outpatient setting. We also investigated whether the postoperative results for this group of patients were satisfactory.

Patients and methods

In this prospective cohort study, we included all the patients who were considered for primary THA in an outpatient setting between April and July, 2014. Patients had to have met the following criteria: ASA I or II; wanting to go home on the day of surgery; and sufficient support from a carer at home during the first postoperative day. Exclusion criteria were cardiovascular impairment and insulin-dependent diabetes mellitus.

All operations were performed by the same orthopedic surgeon (SV) through an anterior supine intermuscular approach. All the patients received uncemented prostheses (Taperloc femoral prosthesis and a Universal cup; both Biomet, Warsaw, IN). They were admitted on the day of surgery. The postoperative follow-up period was at least 3 months.

Spinal anesthesia was by a low dose of bupivacaine (6–8 mg), to allow early mobilization directly after surgery. The multimodal protocol for perioperative pain medication was standardized (Table).

The standardized multimodal protocol for perioperative pain medication

2 hours before surgery on the ward:
- paracetamol (acetaminophen), 1,000 mg per os.
- celecoxib (Celebrex) [a], 400 mg per os.
- gabapentin, 600 mg per os.

Just before surgery:
- dexamethasone, 0.15 mg/kg iv. [b]
- esketamine, 15 mg iv.

4 hours after surgery:
- paracetamol (acetaminophen), 1,000 mg per os.

8 hours after surgery:
- paracetamol (acetaminophen), 1,000 mg per os.
- gabapentin, 300 mg per os.

Before the night:
- oxicodone (OxyContin), 10 mg per os.

Day 1:
- paracetamol (acetaminophen), 1,000 mg per os 4 times a day.
- celecoxib (Celebrex) [a], 200 mg per os in the morning.
- gabapentin, 300 mg per os in the morning.

After day 1:
- paracetamol (acetaminophen), 1,000 mg per os 4 times a day (for a maximum of 2 weeks).
- celecoxib (Celebrex) [a], 200 mg per os in the morning (until 2 weeks after surgery).

Rescue medication:
- celecoxib (Celebrex) [a], 200 mg per os extra after the first night.
- piritramide (Dipidolor), 10 mg im, which could be repeated every 4 hours.

[a] In combination with celecoxib (Celebrex), all patients receive omeprazole, 20 mg per os once a day as prophylaxis. When the patient is already using a proton pump inhibitor before admission, no omeprazole is administered.
[b] Dexamethasone solution in 50 mL saline is administered slowly to avoid adverse side affects such as severe perianal pain.

Wounds were closed subcutaneously with Monocry 3-0 (Ethicon, Somerville, NJ), after which 2 layers of Dermabond (Ethicon) were applied. The wound was then covered with a transparent dressing (Tegaderm; 3M, St. Paul, MN) to allow visual inspection of the wound. This dressing remained on the wound for 14 days, and allowed patients to take a shower immediately after surgery.

The discharge criteria were functional: the patient had to be able to walk 30 m with crutches, to climb stairs, to dress independently, and to go to the toilet without help. In addition, sufficient pain treatment had to be achieved with oral medication before discharge, with VAS below 3 at rest and below 5 during mobilization. In addition, the wound had to be dry, patients could not be dizzy or nauseous, and hemoglobin levels should be higher than 9.7 g/dL. When a patient met all the discharge criteria, he/she had to make the final decision to go home or to spend a night in hospital.

To score postoperative results, the patient-reported outcome measures (PROMs) EQ-5D (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) (The EuroQol Group 1990, Brooks 1996) and the Numeric Rating Score (NRS) for pain at rest and during activity were recorded preoperatively and at 6 weeks and 3 months postoperatively.

Furthermore, anchor questions on how patients functioned in their daily living were scored at 6 weeks and 3 months postoperatively. The scoring of these questions varied from 1 (deteriorated very much since surgery) to 7 (improved very much since surgery). Anchor-based methods compare changes in scores on the instrument with an anchor, where the patients indicate whether they believe they are better than at baseline (Kim and Park 2013).

Decrease in hemoglobin was defined as the hemoglobin level (g/dL) preoperatively minus the hemoglobin level just after surgery. All complications, re-admissions, and reoperations were registered and analyzed.

Statistics

If data were normally distributed according to the Kolmogorov-Smirnoff test, they were analyzed using an independent Student t-test; otherwise, a Mann-Whitney test with a Bonferroni adjustment was performed. Any p-values less than 0.05 were considered to be significant. Data analysis was done with IBM SPSS Statistics for Mac, version 20.

Results

3 of the 27 patients stayed in hospital because of nausea and/or dizziness. The other 24 patients went home on the day of surgery. In these 24 patients, mean age was 63 (48–71) years, 15 were women, mean BMI was 26 (20–33), and 15 patients were ASA I.

Mean duration of surgery was 66 (47–81) min. Mean blood loss was 308 (0–650) mL and mean decrease in hemoglobin was 1.0 (0.5–2.1) g/dL.

EQ-5D increased from 0.71 (−0.04 to 0.96) preoperatively to 0.93 (0.68 to 1.00) at 6 weeks postoperatively and to 0.92 (0.44 to 1.00) at 3 months postoperatively. NRS for pain at rest decreased from 3.6 (1–8) preoperatively to 0.6 (0–3) at 6 weeks postoperatively and to 1.0 (0–10) at 3 months postoperatively. NRS for pain during activity decreased from 6.6 (3–9) preoperatively to 1.4 (0–3) at 6 weeks postoperatively and to 1.9 (0–9) at 3 months postoperatively. All these changes were statistically significant (p < 0.001).

Mean score for the anchor question on how patients functioned in their daily living was 6.2 at 6 weeks and 6.4 at 3 months (with 6 corresponding to much improvement and 7 corresponding to very much improvement). There was 1 re-admission, 11 days after surgery, because of seroma formation. In addition, no complications or reoperations occurred until 3 months postoperatively.

Discussion

To our knowledge, our hospital is the first in Europe to report on primary THA in an outpatient setting for a selected

cohort of patients. In the USA, THA in an outpatient setting for selected patients has already been described (Berger et al. 2009a, Aynardi et al. 2014). Moreover, US centers have also reported on hemi- and total knee replacement in an outpatient setting (Berger et al. 2009b, Cross and Berger 2014). Although this trend in the USA could well be patient cost-driven, as some patients have to pay extra for each night that they stay in hospital, there does appear to be a general trend towards outpatient joint replacement. These reports show that outpatient joint replacement is feasible in selected patients.

In the present study, 24 of the 27 selected patients who were scheduled to receive THA in an outpatient setting went home on the day of surgery. The PROMs improved significantly for these 24 patients. Moreover, the anchor question on how the patients functioned in their daily living indicated that they were satisfied with the postoperative results. Only 1 re-admission occurred at 11 days after surgery because of wound leakage, which was the result of seroma formation. This complication could occur in other settings for THA, and it is therefore not likely to have been due to the outpatient setting. No surgery was performed in this particular case, and the wound healed otherwise without any further complication.

Why would one strive to perform joint replacement in an outpatient setting? An important reason might be hospital-acquired infection and the occurrence of multi-resistant micro-organisms in hospital (Lazarus et al. 2007, Livshiz-Riven et al. 2015). An additional reason would be the lower costs associated with a shorter hospital stay (Aynardi et al. 2014).

There might be concern about early loading of the implant during outpatient THA, especially with uncemented prostheses. However, no adverse effects of early full weight bearing of uncemented THAs have been described (Bodén and Adolphson 2004, Thien et al. 2007, Wolf et al. 2012). Moreover, early loading of the THA is not unique to outpatient THA. It is an important part of fast-track surgery. In the fast-track protocol in our hospital, all patients are mobilized with immediate full weight bearing on the day of surgery.

In the current fast-track setting that we use in our hospital, patients are not selected. All patients are treated with the same protocol. As a part of the introduction protocol for new treatments at our hospital, we performed a prospective risk analysis. Several critical risk factors were identified. Based on these, patient selection criteria for the outpatient setting were established. We did not, however, want to introduce new traditions in orthopedic practice that were not evidence-based (Husted et al. 2014), so we kept these criteria to the absolute minimum, which we felt was necessary for the safe introduction of this protocol. The primary concerns after THA surgery were risk of cardiovascular incidents (Belmont et al. 2014). Historically, this risk has been approximately 0.5% (Mantilla et al. 2002). This percentage has, however, been shown to decrease in a fast-track setting (Khan et al. 2014). Despite this reduced risk, we excluded patients with a history of cardiovascular disease from outpatient THA. In

addition, we excluded patients with insulin-dependent diabetes mellitus.

Only patients with ASA I and II were scheduled for this outpatient setting, because higher ASA score is associated with increased risk of postoperative complications (Tayne et al. 2014). Furthermore, increased ASA score has been described as a predictor of prolonged hospital stay (Husted et al. 2008, Foote et al. 2009, Mears et al. 2009, Abbas et al. 2011), which could be explained by the association of ASA score with comorbidities. In our fast-track setting, however, there was no effect of ASA score on LOS in a multivariate logistic regression model, confirming the results of den Hartog et al. (2015).

The final selection criterion in this study was practical. Patients had to have sufficient support from a carer at home during the first postoperative night. Younger patients are more likely to have sufficient support at home (from cohabitants) than older people. Possibly as a result of this, the mean age of the patients in the present study was 63 years, which is less than the mean age of patients whom many surgeons see. Both younger age and living together with cohabitants have been found to be associated with shortened LOS (den Hartog et al. 2015).

In addition to the selection criteria, as a result of the prospective risk analysis 3 discharge criteria were added to the standard fast-track discharge list. The most important of these was that patients wanted to go home on the day of surgery. After the orthopedic surgeon approved the discharge, the patient made the final decision to leave the hospital. If patients were not feeling comfortable with the idea of going home, they stayed in hospital. This was the case with one patient. She had been dizzy and nauseous during the day, but was fit to go home at the end of the afternoon. She preferred to spend a night in the hospital, however, and left the following morning after an uneventful night.

Dizziness, nausea, and vomiting, which continued during the afternoon of the day of surgery were also introduced as a discharge criterion. 2 patients were not allowed to leave the hospital because of this, one of whom (a patient aged 77) ended up spending 2 nights in hospital. Orthostatic intolerance and nausea and vomiting are likely to be caused by either the pain management or the surgery (Kehlet and Wilmore 2002). The challenge remains to optimize perioperative care even further to prevent the occurrence of these side effects.

Persistent wound leakage was also a reason not to discharge patients. With our wound-care protocol, all the patients had a (nearly) dry wound at discharge and no additional leakage occurred during the first night at home.

Finally, a hemoglobin level of higher than 9.7 g/dL was introduced as a discharge criterion. In patients without a history of cardiovascular disease, this is a relatively high level, which leaves room for a further drop in the days after surgery. The lowest postoperative hemoglobin level measured was 10.5 g/dL.

Since we studied a selected cohort of THA patients, we could not compare the results of our study population to the

results of our total THA patient population. The set-up of a prospective randomized clinical trial would provide more information when comparing postoperative results between outpatient THA and inpatient THA in a fast-track setting.

In conclusion, at our hospital, with a fast-track protocol and using the anterior supine intermuscular approach, outpatient THA is feasible in selected patients and can give satisfactory results up to 3 months postoperatively without outpatient procedure-specific complications or re-admissions.

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