

Outcome Analysis of Outpatient Total Knee and Total Hip Arthroplasty: A Follow up upto three Months

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Abstract— Traditionally total knee and hip arthroplasty surgeries requires long duration of hospital stay. More duration of stay has its own disadvantages. So it was tried to developed an accelerated clinical pathway for patients undergoing total knee arthroplasty (TKA) and total hip arthroplasty (THA) who are considered healthy enough for early discharge. Between March 2013 – April 2014, 89 TKA and 116 THA were performed to different patients at a single institution by a single orthopedic surgeon. 71 (31 TKA, 40 THA) met the inclusion criteria for the study. All patients received 2 grams of tranexamic acid and 750 mg cefuroxime sodium intravenously at 30 minutes prior to surgery. A multi-modal protocol for perioperative pain management was used for all patients. Out of total 71 patients (12 males, 59 females) with a mean age of 59 years (range, 24-79 years). The mean length of hospital stay was 27,3 hours (range, 15-60 hours). The mean duration of surgery was 92 minutes (range, 75-128 minutes) for TKA, 72 minutes (range, 48-81 minutes) for THA. Combined spinal epidural anesthesia was performed in 55 patients (77%) and general anesthesia in 16 patients (23%). Of the total 71 patients, 51 (71,8%) were discharged within 23 hours after surgery. Only 11(15.5%) were re-admitted because of minor complains. These results of this study demonstrated that early discharge does not result in significant complications related to the outpatient procedure in selected patients up to three months postoperatively.

Keywords: Outpatient, Total Hip Arthroplasty, Total Knee Arthroplasty, Anesthesia.

I. INTRODUCTION

Traditionally total knee and hip arthroplasty surgeries have been performed in an in-patient setting. The average length of stay after total knee arthroplasty (TKA) and total hip arthroplasty (THA) has decreased in recent years because of improved postoperative clinical pathways.¹⁻³ These are improvements in postoperative pain management, rehabilitation protocols, less invasive surgical techniques, and early mobilization of the patients. Previous publications have revealed that the average length of stay can be decreased without increasing perioperative complications.⁴⁻⁵ We have developed an accelerated clinical pathway for patients undergoing TKA and THA who are considered healthy enough for early discharge. This pathway combines preoperative patient education, oral pain medications, early mobilization and intensive physical therapy. The purpose of this study is to report our initial experience of attempting outpatient TKA and THA.

II. METHODOLOGY

This descriptive followup study was conducted on 71 cases of either knee or hip joint osteoarthritis (tonnis grade IV) between March 2013-April 2014. During this period, 89 TKA and 116 THA were

performed at a single institution by a single orthopedic surgeon. Out of these, finally 31 for TKA and 40 for THA were included in this study who met inclusion and exclusion criteria of this study.

All the patients were clinically and radiologically indicated for TKA and THA. Patients with a history of diabetes mellitus, myocardial infarct, stroke, congestive heart failure, venous thromboembolism, cardiac arrhythmia, respiratory failure, chronic pain requiring opioid usage, or who did not have support from a carer at home were excluded for both TKA and THA. Only unilateral knee and hip arthroplasties were included in the study. For TKA inclusion criteria were; primer knee joint osteoarthritis (tonnis grade IV) and did not respond to conservative treatment. For THA inclusion criteria were; primer hip joint osteoarthritis (tonnis grade IV) and did not respond to conservative treatment. For TKA from the total 89 patients, 31 met the above-stated criteria for inclusion in the study. For THA from the total 116 patients, 40 met the above-stated criteria for inclusion in the study.

TKA: Patients were admitted to hospital on the day of surgery. All operations were performed by the same orthopedic surgeon though the anteriomedial, parapatellar approach and with the application of an uncemented prosthesis (SIGMA[®] Total Knee System DePuy Synthes, GENESIS II Total Knee System Smith&Nephew) (Image – 1). Anesthesia consisted of either spinal anesthesia or general anesthesia. All patients received 2 grams of tranexamic acid and 750 mg cefuroxime sodium intravenously at 30 minutes prior to surgery. All wounds were closed subcutaneously with Vicryl Rapide - 0 (Ethicon), and an intra-articular hemovac drain was placed in all patients. A multi-modal protocol for perioperative pain management was used for all patients. During the preoperative period, patients were administered 50-100 mcg fentanyl and 2 mg midazolam. After implantation, but before wound closure, a periarticular injection was prepared of 200-400mg 0.5 % bupivacaine, 4-10 mg morphine sulphate, 300 µg epinephrine, 40 mg methylprednisolone acetate, 750mg cefuroxime, and saline to a total volume of 60 ml, and was injected into the anterior and posterior fascia and the joint capsule. Immediately after surgery, the patients were administered 50mg ranitidine, 8mg ondansetron, 500mg paracetamol and either intravenous or epidural patient-controlled analgesia (PCA) depending on the type of anesthesia. A complete blood count was measured at 3 hours postoperatively and patients with symptoms of anemia or hemoglobin level <8 gr/dL were administered 1 unit of erythrocyte suspension. Soon after recovery, the patients were ambulated by a physical therapist for full weight-bearing and the rehabilitation program was initiated.

THA: Patients were admitted to hospital on the day of surgery. All operations were performed by the same orthopedic surgeon though the posterolateral approach and applying an uncemented prosthesis (CORAIL[®] Hip System DePuy Synthes, Pinnacle Sector and Smith&Nephew SL-Plus, EP-Fit plus). Anesthesia consisted of either spinal anesthesia or general anesthesia. All patients received 2 grams of tranexamic acid and 750 mg cefuroxime sodium intravenously at 30 minutes prior to surgery. All wounds were closed subcutaneously with Vicryl Rapide - 0 (Ethicon), and an intra-articular hemovac drain was placed in all patients. A multi-modal protocol for perioperative pain management was used for all patients. During the preoperative period, patients were administered 50-100 mcg fentanyl and 2 mg midazolam. After implantation, but before wound closure, a periarticular injection was prepared of 200-400mg 0.5 % bupivacaine, 4-10 mg morphine sulphate, 300 µg epinephrine, 40 mg methylprednisolone acetate, 750mg cefuroxime, and saline to a total volume of 60 ml, and was injected into the anterior and posterior fascia and the joint capsule. Immediately after surgery, the patients were administered 50mg ranitidine, 8mg ondansetron, 500mg paracetamol and either intravenous or epidural

patient controlled analgesia (PCA) depending on the type of anesthesia. A complete blood count was measured at 3 hours postoperatively and patients with symptoms of anemia or hemoglobin level <8 gr/dL were administered 1 unit of erythrocyte suspension. Soon after recovery, the patients were ambulated by a physical therapist for full weight-bearing and the rehabilitation program was initiated.

For both TKA and THA patients; 23 hours after operation, the dressings were changed and the drains were removed. Patients were re-evaluated for discharge from the hospital by a team consisting of an orthopedic surgeon, anesthesiologist, physical therapist and clinic nurse. Patients were accepted as suitable for discharge if they were able to walk 20 meters, climb stairs, get out of bed and to a chair independently, and had a VAS score < 3 . All patients were prescribed with 37.5mg Tramadol/325mg paracetamol (Zaldiar) and 40 mg enoxaparin (Clexane). Patients were scheduled one week later for wound inspection and evaluation and for subsequent follow-up examinations at 15 days, 1 month, 2 months and 3 months.

III. RESULTS

In present study a total of 71 patients (12 males, 59 females) with a mean age of 59 years (range, 24-79 years). The mean length of hospital stay was 27.3 hours (range, 15-60 hours). The mean duration of surgery was 92 minutes (range, 75-128 minutes) for TKA, 72 minutes (range, 48-81 minutes) for THA. Combined spinal epidural anesthesia was performed in 55 patients (77%) and general anesthesia in 16 patients (23%). (Table 1& Figure 1).

Table 1
Distribution of Study Population

S. No.	Variables	Mean	Rang
1	Age (in Years)	59	24-79
2	Length of Hospital Stay (in Hours)	27.3	15-60
3	Duration of Surgery for TKA (in Minutes)	92	75-128
4	Duration of Surgery for THA (in Minutes)	72	48-81

Combined spinal epidural anesthesia was performed in 55 patients (77%) and general anesthesia in 16 patients (23%). (Figure 2)

Figure1

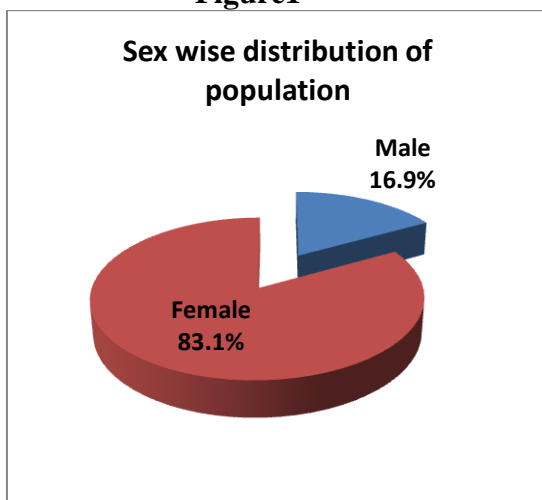
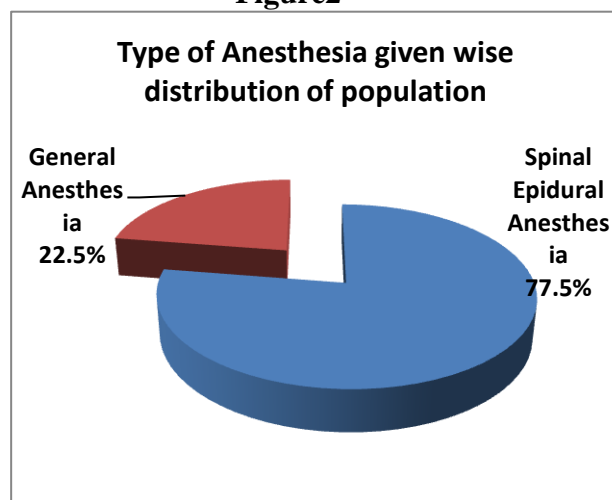


Figure2



Erythrocyte suspension was transfused in 22 (15TKA, 7 THA) patients. Of the total 71 patients, 51 (23 TKA, 28 THA) were discharged within 23 hours after surgery. Others were discharged within 48 hours. But 11 (5TKA, 6 THA) patients got re-admitted again within one week. (Table 2)

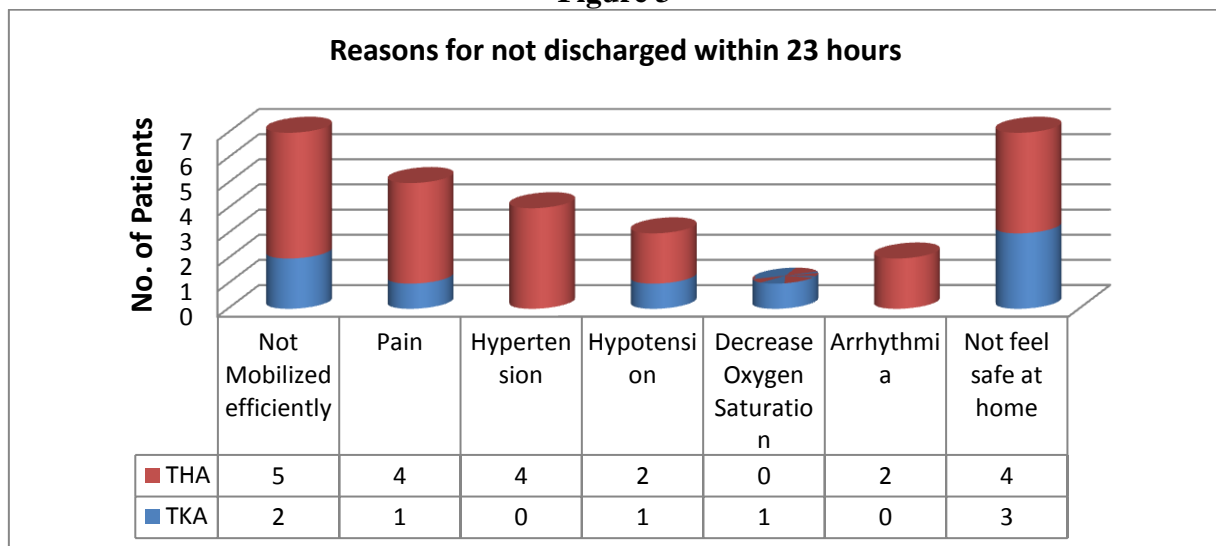
Table 2
Outcome wise Distribution of Study Population

S. No.	Variables	TKA (N=31) N0 (%)	THA (N=40) N0 (%)	Total (N=71) N0 (%)
1	Erythrocyte Suspension Transfused	15 (48.4)	7 (17.5)	22 (31)
2	Discharged within 23 Hours After Surgery	23 (74.2)	28 (70)	51 (71.8)
3	Discharged within 48 Hrs	8 (25.8)	12 (30)	20 (28.2)
4	Re-Admitted within One Week	5 (16.1)	6 (15)	11 (15.5)

Of these 8 TKA patients who were not discharged within 23 hours, reasons for that elicited were; 2 could not be efficiently and independently mobilized, 3 had pain, 1 had postoperative hypotension, and 1 patient had decrease in oxygen saturation postoperatively and others stated that they would not feel safe at home. (Figure 3)

THA 12 patients who were not discharged within 23 hours, reasons for that elicited were; 5 could not be efficiently and independently mobilized, 4 stated that they would not feel safe at home and had pain, 2 had postoperative hypertension, and 1 patient had arrhythmia and hypotension during surgery, so was admitted to the intensive care unit postoperatively and referred to the cardiologist. After medical treatment he was transferred to the inpatient clinic for further follow-up. This patient improved after medical treatment and was discharged. All the other patients were discharged within 48 hours. (Figure 3)

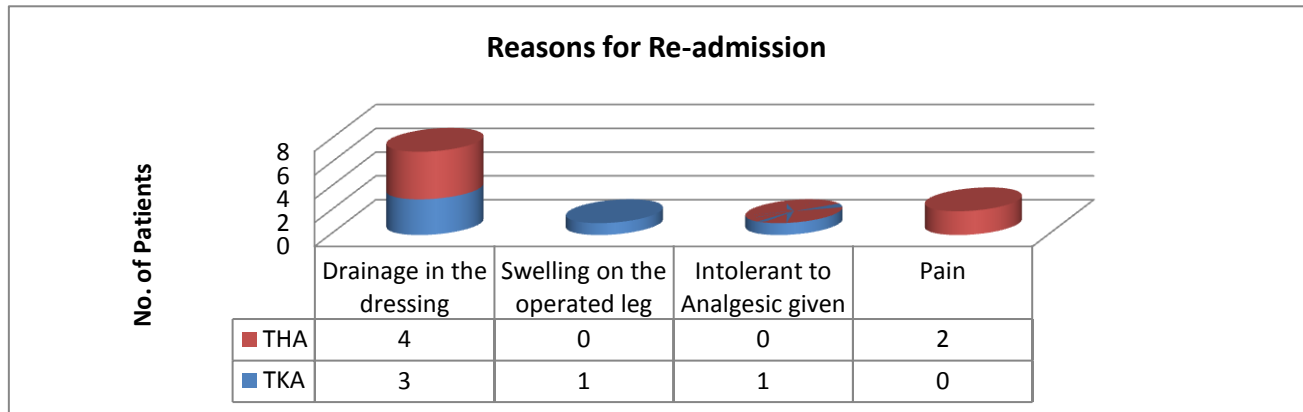
Figure 3



For TKA, 5 patients were re-admitted to hospital within the first week. Of these, 3 had drainage in the dressing, so their dressings were changed, 1 had swelling on the operated leg for which a compressive bandage was applied, and 1 could not tolerate 37.5mg Tramadol/325mg paracetamol (Zaldiar) treatment so the analgesic regimen was changed to Diclofenac Sodium 75 mg and Paracetamol 500 mg. No further problems were encountered during the follow-up of these early-admitted patients.

For THA, 6 patients were re-admitted to hospital within the first week. Of these, 4 had drainage in the dressing, so their dressings were changed, 1 had pain in the operated hip and 1 had contralateral ankle and hip pain on the 4th day postoperatively. The physical rehabilitation program was modified for all these patients and no further problems were encountered during the follow-up of these early-admitted patients.

Figure 3



IV. DISCUSSION

In present study Perioperative and postoperative improvements including less invasive surgery, effective pain control, early mobilization, and rehabilitation protocols have led to earlier hospital discharge after TKA and THA. Various studies have revealed that patients discharged early have similar results to with a longer hospital stay.⁶ Other centers in the USA and Europe have also reported outpatient total hip and knee arthroplasty replacement results.⁷⁻⁸ As this provides a reduction in the healthcare cost, there seems to be a general trend towards outpatient joint replacement.

In this study, 51 of 71 (71.8%) patients fulfilling the discharge criteria went home within 23 hours after surgery. Within 1 week, 11 patients (15.5%) were re-admitted to hospital, 7 because of wound leakage, 2 because of pain, 1 because of swelling and 1 because of drug intolerance. No complications developed in these cases during follow-up. Wound leakage and pain are not specific to outpatients, but could occur in other settings for TKA and THA.

The most important reason for performing joint replacement in an outpatient setting is the prevention of nosocomial infections and the avoidance of multi-resistant microorganisms in hospital.⁹ An additional reason is to lower the costs associated with the length of hospital stay as in some centers, patients are charged per night.

The plan of the outpatient treatment protocol must be explained to the patients. With a clear explanation of postoperative pain management protocols and the overall concept of outpatient surgery, the surgeon can offer reassurance that the primary aim is for the patient to be comfortable and safe. Generally, if patients understand what is planned, they will accept a shorter stay. The major problem in our experience was to convince the patient that they would be safe, comfortable and pain-free at home. Therefore, for the patient to believe in the benefits of an outpatient setting, clear, comprehensible information must be given about every part of the treatment in the preoperative period.

The main goal is to achieve early postoperative mobilization for same day discharge. Therefore, the management of postoperative pain must be provided effectively without analgesic gaps, or periods of inadequate pain control¹⁰. The multimodal analgesic regimen covers the entire operative period. The preoperative period includes patient education, a short fasting period, proper hydration, pre-emptive analgesia (fentanyl) and sedation (midazolam). Periarticular injection constitutes a part of the multimodal regimen. The combination defined by the Ranawat Orthopedic Center was used in this study¹¹. The agents were administered directly into the surgical site by the orthopedic surgeon. The combined duration of the effect extends from the immediate intraoperative period to as long as 48 to 72 hours postoperatively, and therefore represents an attractive means of preventing analgesic gaps¹². Using these medications intraoperatively also reduces the requirement for postoperative opioids in many patients, thereby reducing the risk of opioid-related adverse events.

Outpatient arthroplasty is not appropriate for all patients. Those to be considered for outpatient arthroplasty should not have a history of cardiac, pulmonary, renal, or vascular diseases. It is absolutely vital that there is family or other support of family to provide patient care at home.¹³ The patient should reside in the same city as the surgery center for the surgeon to be able to reach the patient in case of need. Finally, the patient should be completely willing for the operation in an outpatient setting. As previously stated, 89 TKA and 116 THA operations were performed during the period of this study, 31 of which were evaluated in this study of outpatient TKA and 40 of which were evaluated in this study of outpatient THA. One of the most important reasons for the low number in the study population was patient refusal of outpatient arthroplasty surgery, which again highlights the importance of patient education.

This study had some limitations. The study population was small, it was not a randomized, controlled study nor were results compared in respect of complications, clinical outcomes, patient satisfaction, or financial analysis. Although the mean length of hospital stay for traditional TKA and THA patients is 2.4 and 2.6 days in our hospital, almost the same protocol is used for all arthroplasty surgeries for rapid recovery and early mobilization of patients. It is not possible to make a direct comparison of inpatients and outpatients, as the variables of surgical techniques, anesthetic techniques and rehabilitation program influence the recovery and outcomes. The nature of the study did not allow any randomization of the patients. As patients in outpatient settings are younger and do not have any co-morbidity, there is a clear selection bias in the patients chosen for outpatient TKA and THA. Therefore, a randomized study could be designed within the same group to eliminate factors affecting the outcomes.

This study was designed to describe our initial experience regarding outpatient TKA and THA using an accelerated clinical pathway. As the ageing population increases, so the demand for joint arthroplasty will increase. Healthcare systems force the orthopedic surgeons to produce successful outcomes and reduce the cost to the system. Although no financial analysis was made in this study for comparison with the results of traditional TKA and THA patients, the results of this study demonstrated that early discharge does not result in significant complications related to the outpatient procedure in selected patients up to three months postoperatively.

V. CONCLUSION

This study was designed to describe our initial experience regarding outpatient TKA and THA using an accelerated clinical pathway. As the ageing population increases, so the demand for joint arthroplasty

will increase. Healthcare systems force the orthopedic surgeons to produce successful outcomes and reduce the cost to the system. Although no financial analysis was made in this study just outcome analysis of traditional TKA and THA patients, as in this study 71.8% patients were discharged within 24 hours and all patients were discharged within 48 hours. Only 15.5% of these cases were re-admitted because of minor complains. So this study demonstrated that early discharge does not result in significant complications related to the outpatient procedure in selected patients.

CONFLICT

None declared till date.

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