By the end of 2050, the incidences of hip and knee arthroplasties performed in the United States are projected to be more than 1.8 million and 4 million, respectively. In 2014 alone, more than 1 million elective lower extremity arthroplasties were performed, with collective per procedure expenditures ranging from $16,500 to $75,000. This disbursement covered surgery, hospitalization, and rehabilitative services. As the demand for hip and knee arthroplasties continues to escalate, orthopedic surgeons and hospital administrators are striving to provide cost-effective improvements in patient care. Given the large volume of total joint replacements, even modest reductions in costs will translate into substantial savings in health care expenditures.

With the introduction of the Bundled Payments for Care Improvement initiative by the Centers for Medicare & Medicaid Services, providers receive single payments for each procedure covering all costs related to acute hospital stay, the preoperative period, and the period up to 90 days postoperatively. As per this initiative, payments provided to hospitals are based on their previous year’s benchmark. Going forward, hospitals will receive bonuses for reducing average costs by 2% and penalties for failing to meet average costs. Thus, cost reductions are essential in health care organizations.

Major expenses associated with lower extremity total joint arthroplasties are affected by implant costs, in-hospital length of stay, perioperative complications, readmissions, and discharge to rehabilitative services. In an effort to minimize costs and improve efficiency, orthopedic surgeons have focused on reducing length of stay and inpatient rehabilitation services. This has led to the evolution of outpatient surgery. With advancements such as less invasive surgical procedures, strategies to prevent blood loss, improved perioperative pain control, and rapid rehabilitation protocols, outpatient hip and knee arthroplasties have become a reality.

In the past, some authors loosely used the term “outpatient total joint arthroplasty” to encompass discharge within 23 hours of surgery. However, we believe that, when patients stay overnight, this should be called short-stay surgery or expedited recovery and that the term outpatient surgery should be reserved for patients discharged home the same day as surgery. Surgeons have used a variety of approaches—strict patient selection, preoperative counseling, preemptive analgesia with antiemetics, multimodal perioperative analgesic protocols that include adductor canal peripheral nerve blocks, wound infiltration with local anesthetics, less invasive surgical techniques, blood management with tranexamic acid, and completion of surgery by mid-morning or early afternoon—to enhance postoperative recovery, permit adjustment of medications, and allow timely discharge. Despite the appeal of outpatient arthroplasty, outcomes must be analyzed prior to its universal implementation in this era of cost reduction and savings and delivery of quality health care.

**Patient Selection**

Currently, most orthopedic surgeons believe that identifying low-risk populations through strict criteria for eligibility will potentially lead to increased patient satisfaction, increased rates of same-day discharge, and decreased rates of complications. Although there are no universally accepted selection criteria, the following have...
been commonly used: (1) age younger than 65 years; (2) body mass index less than 40 kg/m²; (3) low Charlson score (0 to 2); (4) American Society of Anaesthesiologists score of I or II; (5) preoperative hemoglobin greater than 13 g/dL; and (6) optimal social support at home. Moreover, patients selected for outpatient total joint arthroplasty should not (1) be chronic narcotic users; (2) have a history of cardiopulmonary disease, poorly controlled diabetes, or cirrhosis that would necessitate inpatient monitoring postoperatively; (3) be receiving therapeutic anticoagulation, although patients without cardiac disease receiving oral anticoagulants (eg, for elevated risk of deep venous thrombosis) that can be stopped preoperatively and restarted the first day postoperatively may be potential candidates; (4) have a preoperative ambulatory status requiring the use of walking aids (eg, wheelchair or walker); or (5) have a history of prolonged delirium postoperatively.16-18

However, Berger et al,19 in a study of 111 patients undergoing outpatient total knee arthroplasty (n=86) or unicompartmental knee arthroplasty (n=25) with no special preselection criteria for outpatient surgery, found that 94% of the patients (n=104) were discharged home the same day as surgery. There were no significant differences regarding age (P=.4), weight (P=.4), or body mass index (P=.1) between patients who stayed overnight and those who were discharged the same day as surgery. The authors also reported a 4.5% (n=5) incidence of acute readmissions or emergency department visits within the first week after surgery and 4 additional (3.6%) readmissions and 1 emergency department visit (1%) within 90 days of discharge. However, this was a single-surgeon series in a high-volume tertiary-care referral center. Although other institutions may perform outpatient procedures, these results may be difficult to reproduce. When instituting an outpatient service, it seems prudent to develop stringent criteria for enrollment, as doing so potentially decreases patient frustration and improves overall care.

**Preoperative Counseling and Support Systems**

Management of patient expectations through preoperative counseling and early involvement of patients’ support systems are essential for same-day discharge. In addition, frequent communication with patients and their designated caregivers after discharge is necessary to increase satisfaction and the success of outpatient total joint arthroplasty.20 For patients without social support systems, outpatient surgery may be difficult and may not be cost-effective.15 Such patients may benefit from inpatient total joint arthroplasty. Postoperatively, close coordination with the physician’s office and providers such as physical therapists for assessment of wounds and evaluation of progress toward rehabilitation goals improves patient confidence and reduces emergency department visits and readmissions.

**Preemptive Analgesia and Multimodal Pain Protocols**

The goals of multimodal pain protocols include reducing the consumption of opioids, decreasing the incidence of postoperative delirium, enhancing recovery, and reducing the incidence of nausea and vomiting. Preemptive analgesia regimens with nonsteroidal anti-inflammatory drugs and acetaminophen are gaining popularity for their narcotic-sparing effect. Motor function–sparring peripheral nerve blocks (eg, adductor canal blocks), non-narcotic low-dose spinal anesthesia, intravenous ketorolac, and supplementary wound infiltration with long-acting local anesthetics as intraoperative analgesia are effective for outpatient total joint arthroplasty.19 Institutional protocols and continuous monitoring are necessary to improve outcomes during implementation of outpatient total joint arthroplasty.

**Blood Conservation**

Meticulous hemostasis can help with blood loss and may decrease postoperative hematoma and pain, enhancing recovery. Conserving blood, maintaining normothermia, and employing aggressive fluid hydration during the perioperative period are of utmost importance for outpatient total joint arthroplasty. Preoperative treatment of anemia is also essential. Extensive data support the routine use of tranexamic acid to decrease transfusions in hip and knee arthroplasty.21,22 Despite this, the optimal dosage and route of administration are debatable. Simple techniques such as watertight closure of arthrotomies and tissue glue reduce external drainage when combined with the current generation of dressing materials.23,26

**Rapid Rehabilitation Protocols and Discharge**

Rapid recovery protocols often entail intensive physical therapy in the recovery area within 4 to 5 hours postoperatively. This allows patients to ambulate and climb stairs with the safe use of walking aids, increasing their confidence and motivation for early discharge. Surgeries completed by midday are ideally suited for same-day discharge, allowing nurses, physical therapists, and other ancillary staff ample time to accomplish this. To ascertain patients’ readiness for discharge, specific criteria must be established. Conventionally, these criteria include the return of motor function and normal vital signs without the need for oxygen support or intravenous fluid resuscitation. Patients should not have delirium, nausea, or vomiting and should be ambulating independently with a walker. They should be able to void without difficulty. Visual analog scale scores should typically be less than 5 points with activity and less than 3 points at rest with pain controlled by oral medications. Review of radiographs and nondraining wounds are often essential criteria for discharge.18,19 Additionally, usual physical therapy goals to be met include ambulating to 100 feet, independently transferring from bed to chair, rising from a chair to a standing position and sitting from a standing position, and ascending and descending a flight of stairs. Finally, patient acceptance, social support, and readiness for discharge home should be assessed and evaluated prior to scheduling outpatient surgery. Educational materials outlining expectations, emergency contact numbers, medication details, including deep venous thrombosis prophylaxis, and discharge instructions are essential to minimize complications, reduce frustration, and improve satisfaction.
OUTCOMES

The outcomes of outpatient lower extremity total joint arthroplasty have been reported from only a few high-volume arthroplasty centers in the United States. Aynardi et al\(^2\) compared the outcomes of outpatient (n=119) vs inpatient (n=78) total hip arthroplasties using a direct anterior approach. They showed that outpatient total hip arthroplasties had significant cost reductions (mean, $24,500 vs $31,000) and shorter stays (mean, 24 vs 73 hours). There were no differences in complications or blood loss. However, 4 patients in the outpatient cohort needed to be transferred to an inpatient facility while the remaining patients were discharged home, and 25% of the patients in the inpatient cohort necessitated transfer to a rehabilitation facility. The authors emphasized that, among appropriately selected patients, outpatient total hip arthroplasty may result in substantial cost savings for the health care system.

Dorr et al\(^28\) evaluated the feasibility of outpatient primary total hip arthroplasty for a series of 192 eligible patients younger than 65 years. They found that of 69 patients enrolled in the study, 53 (77%) returned home after discharge with no readmissions or medical complications, thereby confirming the safety of outpatient total hip arthroplasty in selected patient populations.

In a more recent prospective randomized multicenter study of 220 patients, Goyal et al\(^16\) compared outcomes between patients undergoing primary outpatient vs inpatient total hip arthroplasties with direct anterior approaches. They found that, although patients in the outpatient cohort had significantly higher visual analog scale scores on postoperative day 1 at home (mean, 3.7 vs 2.7 points), there were no significant differences regarding reoperations, readmissions, emergency department visits without readmission, or acute office visits. In addition, they found that 24% of the patients scheduled for outpatient total hip arthroplasty were not discharged the same day as surgery and thereby concluded that outpatient total hip arthroplasty can potentially be implemented in a defined population.

Lovdahl et al.\(^29\) in their study of the Medicare 5% sample, evaluated the cost savings and outcomes among patients who underwent outpatient (n=454), short-stay (1 to 2 days; n=7755), standard-stay (n=71,341), and 5+ days’ stay (n=23,134) total knee arthroplasty. At the 2-year follow-up, they reported that costs were $8527 and $1967 lower among the patients in the outpatient and short-stay cohorts, respectively, compared with the patients in the standard-stay cohort. They also showed that the outpatient and short-stay cohorts had less pain and stiffness but higher risks for revision, major complications, readmission, and death. This underscores the importance of establishing careful patient selection criteria and enhanced recovery care pathways before providing outpatient arthroplasty services.

CONCLUSION

Outpatient hip and knee arthroplasties can lead to improved efficiency and increased patient satisfaction at lower costs to health care organizations. Although this is attractive, caution must be exercised during implementation of these services to maintain patient safety. Orthopedic surgeons should gradually shorten the length of stay until 1 night is the norm. Once overnight stays have been safely executed, surgeons can move to same-day discharge. Comprehensive institutional clinical pathways with strict patient selection criteria and pre- and postoperative protocols with monitoring of patients and auditing of practices must exist before implementation to ensure safety and prevent complications, emergency department visits, and readmission. High-volume medical and orthopedic surgical centers with generous resources may find it potentially less challenging to effectively provide outpatient arthroplasty. More robust outcomes data are needed for universal acceptance of outpatient hip and knee arthroplasties in the community and to identify the best candidates for these procedures.

REFERENCES


