Evolution of Outpatient Joint Replacement in the U.S.

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Outpatient Joint Replacement

1) Epidemiology of joint replacement
2) A brief history of joint replacement in the U.S. (where did we come from and where are we going?)
3) Evolution of outpatient joint replacement
4) Future considerations
5) Questions

Epidemiology of Joint Replacement

- Causes of hip pain leading to replacement:
  - OA: wear and tear, pts >50, positive family history
  - RA: most common inflammatory arthritis
  - Post traumatic
  - Osteonecrosis (often secondary to trauma)
  - Congenital (dysplasia, Legg Perthes Dx, etc.)
- Orthoinfo.AAOS.org 2000
Epidemiology of Joint Replacement

- Causes of knee pain leading to replacement
  - 1) O.A.: wear and tear; > 50; associated with obesity in women
  - 2) R.A.: inflammatory arthritis (other types: ankylosing spondylitis, gout and pseudogout, psoriatic arthritis, lupus)
  - 3) Post-traumatic: meniscus tear on the job in a patient with pre-existing but asymptomatic cartilage loss; highly relevant to Work Comp cases
    - “The straw that broke the camel’s back...”
- Orthoinfo.AAOS.org 2020

Prevalence of Joint Replacement in the U.S.

- Agency for Healthcare Research, 2017
- 2017: > 450,000 total hip arthroplasties in the U.S.
  Female/male ratio 1:1
- 2017: > 760,000 total knee arthroplasties in the U.S
  Female/male ratio 2:1

Projected Rates of Joint Replacement in the U.S.

- J of Rheumatology, April 2019: Rates of total joint replacement in the U.S.: Future Projections for 2020 – 2040
- Pandemic disrupted elective surgeries in 2020 and 2021 but has had a positive impact on the development of outpatient “same calendar day discharge” (SCDD) arthroplasty
Total hip arthroplasty projections in the U.S.:
- 2020: 498,000
- 2025: 652,000
- 2030: 850,000
- 2040: 1,429,000

Total knee arthroplasty projections in the U.S.:
- 2020: 1,065,000
- 2025: 1,272,000
- 2030: 1,921,000
- 2040: 3,416,000

A brief history of hip and knee replacement in the U.S.
- Total hip arthroplasty was first performed in the early 1960s.
- Damaged bone and cartilage in the hip is removed and replaced with prosthetic components (metal hemispherical acetabular component and stem that goes in the femoral canal); the bearing surface is a ceramic ball against a polyethylene liner.
- Average length of hospital stay:
  - 5 days in 2000
  - Just under 4 days by 2010
- Orthoinfo.AAOS.org 2020
A brief history of hip and knee replacement in the U.S.

- Total knee arthroplasty was first performed in the U.S. in 1968.
- Damaged bone and cartilage is removed from the end of the femur and the top of the tibia as well as the back of the patella; metallic implants are secured to the end of the femur and tibia with a polyethylene spacer in between and cemented to the back of the patella.
- Average length of hospital stay:
  - 4 days in 2000
  - Just under 3 days in 2010
- Orthinfo.AAOS.org 2020

Evolution of Outpatient Total Joint Replacement (SCDD)

- Blood management
- Teaching in late 1990’s was to maintain postop hemoglobin > 10 and hematocrit > 30 (blood transfusions were common postop)
- Emergence of data suggesting in healthy pts, hemoglobin as low as 7 or hematocrit of 21 was tolerated without additional adverse events
- Growing evidence that tranexamic acid lowers blood loss dramatically and has become the standard of care

Evolution of Outpatient Total Joint Replacement (SCDD)

- Tranexamic acid (and aminocaproic acid) are “antifibrinolics”
- Competitively inhibit plasminogen activation to provide clot stabilization
- Tranexamic acid decreases blood transfusion rates by 69% for primary arthroplasties
- BMJ. 2014 Aug and J Arthroplasty 2018 Oct
Evolution of Outpatient Total Joint Replacement (SCDD)

- Blood management:
  - With the emergence of tranexamic acid and the knowledge that a hemoglobin down to 7 was tolerated, need for postop blood transfusion were largely eliminated
  - Average drop in Hct pre TXA was 10; post TXA about 5
  - No need for hospitals with blood banks
  - No need to check h and h on any TKA patients; one postop measurement on THAs
  - No need for re-transfusion drains

Evolution of Outpatient Total Joint Replacement (SCDD)

- Development of direct anterior approach (DAA) hip arthroplasty, starting 2009
- Surgical plane is both inter-nervous and inter-muscular
- Minimizes post surgical pain and improved function/stability immediately postop; set the groundwork for SCDD
- In a recent AAHKS online survey, 52.6% of 996 respondents currently perform the DAA
- J Arthroplasty. 2019 Sep

Evolution of Outpatient Total Joint Replacement (SCDD)

- The Opioid Epidemic in America
  - In the late 1990s pharmaceutical companies reassured the medical community that pts would not become addicted to opioid pain relievers and healthcare providers prescribed them at an increased rate
  - "Pain scales" and "Pain as another vital sign"
  - In 2017 HHS declared a public health emergency
Evolution of Outpatient Total Joint Replacement (SCDD)

- Opioid Epidemic
  - 2016: opioid overdoses accounted for > 42,000 deaths in the U.S.
  - 2019: > 70,000 U.S. deaths due to drug overdose
  - 1.6 million people with an opioid use disorder in the U.S.
  - >48,000 deaths due to OD on synthetic opioids other than methadone and > 14,000 deaths due to OD on heroin
  - HHS.BOV/OPIOIDS

- Evolution of Outpatient Total Joint Replacement (SCDD)
  - Opioid epidemic in the U.S. 2016-2021 has led to an interest in minimizing consumed and prescribed opiates postoperatively
  - Multimodal anesthetic techniques have facilitated SCDD TKA surgery in particular
  - Traditional techniques involved general anesthesia and postop IV narcotic via a PCA pump for up to 24 hrs then oral narcotic pain medication

Evolution of Outpatient Total Joint Replacement (SCDD)

- Multimodal analgesia:
  - 1) preop patient education (setting realistic expectations): what to expect from the anesthetic and postop (pain, swelling, lack of mobility); strategies to manage postop pain
  - 2) preop use of acetaminophen, Cox 2 selective nsaids, gabapentin
  - 3) Neuraxial anesthesia: multiple studies show that for joint replacement this type of anesthesia leads to lower rates of superficial infection, transfusion, thromboembolic events, cardiac events, and decreased length of stay
  - JBJS Am 2013 (TKAs) and JBJS Br 2009 (THAs)
Evolution of Outpatient Total Joint Replacement (SCDD)

- Neuraxial anesthesia: “short-acting” spinals to avoid delays in mobilization, urinary retention, and prolonged sensory blockade
- Surgical efficiency needs to be precise and predictable to avoid the spinal wearing off too soon; JAAOS Oct 15, 2020
- Regional anesthesia: preop adductor canal block instead of femoral nerve block; supplement with an IPACK block and a SINHA block (long acting local anesthetic)
- Periarticular injection with ropivicaine also an option (hips and knees); improved postop pain control and opioid consumption
  - J Arthroplasty 2017

Patient Selection

- The single most important factor for successful SCDD joint replacement
- The ideal patient is relatively young and healthy with solid social support
- Outpatient Arthroplasty Risk Assessment (OARA) stratifies pts by 9 separate comorbidity areas to generate a risk category; lower scores correlated with earlier discharge home
  - J Arthroplasty 2017

2018 AAHKS and AAOS position statement on outpatient TJA

- 1) patient selection
- 2) patient education and expectation management
- 3) good social support
- 4) clinical and surgical team expertise and experience
- 5) facility and environment for optimizing surgical outcomes
- 6) evidence-based pathways for pain management, blood conservation, wound management, mobilization, and VTE prophylaxis (Aspirin 81 mg po bid x 14 days)
  - J Arthroplasty 2018
Complication Management and Prevention

1. Postop urinary retention: avoid catheters, limit IVF, avoid intrathecal narcotics
2. Hypotension: avoid deep sedation/narcotics/long-acting spinals; limit blood loss with TKA and aggressive surgical management of bleeding
3. Prevention of PONV: prophylactic anti-emetics and IV corticosteroid
4. Transdermal scopolamine patch reduced PONV by 50%
5. Preop IV decadron 10mg significantly decreased PONV and reduced length of stay

Outcomes of ASC Arthroplasty (SCDD)

1. Two retrospective, matched studies comparing outcomes for THA and TKA done in an ASC or hospital outpatient setting
   a. Darrith et al 243 consecutive ASC THA/TKA vs 243 done in a hospital outpatient setting; 2.1% readmission rate and no difference in complication rates
   b. Sershon et al 965 consecutive pts undergoing THA at ASC or hospital outpatient setting; no difference in 90 day complications, revisions/reoperations/readmissions

Complication Management and Prevention

Scheduled phone calls or electronic communication
Early follow-up visits or early in home PT
Start outpatient PT by 5-7 days postop
Maintain “patient touches” to improve satisfaction, allow early interventions for complications, reduce readmissions and ER visits
Contemporary Outpatient Arthroplasty is Safe Compared with Inpatient Surgery

- JBJS Am 2021; compare matched patient cohorts who underwent outpt vs inpt joint arthroplasty, 30 day adverse events/readmissions
- 575,375 pts identified 2009-2018, 21,506 (3.74%) underwent outpt procedure
- Outpt TKA (3.15 vs 7.45%, p<0.001), outpt THA (4.94 vs 10.05%, p<0.001) and outpt UKA (1.78 vs 3.39%, p<0.001) all with fewer adverse events with no increase in readmission rate

Cost Analysis: Outpt vs Inpatient TJA

- Aynardi et al: Potential economic benefit of outpt arthroplasty; 119 outpt THA vs 78 matched inpt THA: average $7000 savings for outpts
  - HSS J 2014
- Lovald et al: Outpt TKA netted average $8,527 savings vs inpatient TKA
  - J Arthroplasty 2014
- Carey et al: cost for arthroplasty lower in outpt setting: TKA 12.8% less and THA 14.8% less
  - J Arthroplasty 2020

Outpatient Arthroplasty: the BASC Experience

- 2013 started unicompartmental arthroplasty
- 2014 anterior total hip arthroplasty
- 2016 total knee arthroplasty
- By 2019 there were 7 surgeons performing arthroplasty at BASC
- Past 5 years:
  - 2016: 47 cases
  - 2017: 84 cases
  - 2018: 119 cases
  - 2019: 122 cases
  - 2020: 77 cases (on pace for 128 cases in 2021 with 3 surgeons)
Outpatient Arthroplasty: the BASC Experience

- 572 arthroplasties 2013 through 1st quarter 2021
- Concept of “allowable blood loss” for THA
- Relatively strict criteria for surgery including:
  - BMI < 35 (36-40 needs review by anesthesia)
  - ASA 1 or 2
  - Must have PCP clearance
  - Exclusion criteria: significant cardiac dx, pulmonary dx, IDDM, AIC > 7.0, anemia, hypercoagulability, uncontrolled sleep apnea, bilateral or revision

Future Considerations

- Recent removal of THA and TKA from the Medicare Inpatient-Only list and increasing pressures for cost containment and value have led surgeons to offer SCDD arthroplasty to select patients with increasing frequency.
- JAAOS Oct 15, 2020

Questions...